Oracle Financial Services Basel Regulatory Capital Internal Ratings Based Approach

User Guide

Release 8.0.7.0.0

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1 Preface

1.1 Intended Audience

Welcome to Release 8.0.7.0.0 of the Oracle Financial Services Basel Regulatory Capital IRB Approach User Guide.

This guide is intended for:

- Technical Analyst: This user ensures that the data is populated in the relevant tables as per the specifications, executes, schedules and monitors the execution of Runs as batches.
- Business Analyst: This user reviews the functional requirements and information sources, like reports.
- Data Analyst: This user is involved with cleaning, validation and importing of data into the OFSAA Download Specification Format.
- Administrator: The Administrator maintains user accounts and roles, archives data, loads data feeds, and so on. The administrator controls the access rights of users.

1.2 Documentation Accessibility

For information about Oracle's commitment to accessibility, visit the Oracle Accessibility Program website at http://www.oracle.com/pls/topic/lookup?ctx=acc&id=docacc.

1.3 Access to Oracle Support

Oracle customers have access to electronic support through My Oracle Support. For information, visit http://www.oracle.com/pls/topic/lookup?ctx=acc&id=info or visit http://www.oracle.com/pls/topic/lookup?ctx=acc&id=trs if you are hearing impaired.

1.4 Structure

This guide is organized as the following chapters:

1. Preface
2. What's New in this Release
3. Introduction to Basel Regulatory Capital IRB Approach
4. Overview of OFSAA Infrastructure
5. BIS Jurisdiction
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11. Thai (BOT) Jurisdiction

12. Application Processing

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1.5 Related Information Sources

♦ Oracle Financial Services Basel Regulatory Capital Basic Approach Release 8.0.7.0.0, User Guide

♦ Oracle Financial Services Basel Regulatory Capital Admin Guide

♦ Oracle Financial Services Basel Regulatory Capital Analytics User Guide

1. What's New in this Release

In the OFS Basel Regulatory Capital Release 8.0.7.0.0, we are catering to the requirements as per the latest guidelines from Federal Reserve regarding Long Term Debt (LTD) amount and Total Loss-Absorbing Capacity (TLAC) amounts for large U.S. Bank Holding Companies and the U.S operations of large Foreign banking organizations. The application covers the following calculations:

- Eligible Long Term Debt Amounts (internal and external) for Bank holding companies (BHCs) of Global systemically important banks (GSIBs) and Intermediate holding companies (IHCs) of foreign GSIBs.

- Minimum required level of TLAC to be maintained by a holding company.

- Total Eligible Total Loss Absorbing Capital (TLAC) amount.

- Risk-based TLAC ratio and Leverage-based TLAC ratio.

- Total Loss-Absorbing Capacity (TLAC) buffers for the RWAs component as well as the leverage component.

- Total Loss-Absorbing Capacity (TLAC) based payout amount and payout ratio.

The current release covers the Federal Reserve guidelines on Single-Counterparty Credit Limits for Bank Holding Companies and Foreign Banking Organizations. The application covers the following calculation:

- Gross direct credit exposure amounts for different exposure types of the Bank :
  - On balance sheet exposures
  - Off balance sheet exposures
  - Derivatives exposures
  - Securities Financing Transactions (SFTs) and
  - Market risk exposures
- Indirect credit exposure amounts of the Bank
- Additional exposures of the Bank
- Risk shifting and Net credit exposure amount calculation
- Exempted exposure identification and exempted amount calculation
- Total credit exposure amount calculation for a Single counterparty
- Aggregation of related or connected counterparties and calculation of total credit exposure amount for group of connected parties
- Large exposure identification and Regulatory threshold percent assignment for both major and non-major counterparties

- Credit limit threshold amount calculation for both major and non-major counterparties and identification of counterparties breaching the threshold limit.

This release also covers the calculation requirements for the securitization exposures in compliance with the Bank of Thailand (BOT) guideline published for the same. The application covers the following calculations:

- Exposure Amount calculation for the Securitization Exposures

- The Risk Weight assignment to various parties involved in the securitization transaction, depending on the bank's role being:

    o Investor

    o Credit Enhancement Provider

    o Servicer/ Back up Servicer

    o Underwriter

    o Liquidity Facility Provider

- The excess amount calculation which is above the underwriting threshold specified by the regulator.

2 Introduction to Basel Regulatory Capital

2.1 Overview

In 1988, the Bank for International Settlements published the first guidelines on Capital Adequacy called the Basel I accord which primarily focused on credit risk. Assets of banks were classified and grouped into five categories according to credit risk, carrying risk weights. On 4 July 2006, the BIS Committee issued a comprehensive version of the Basel II Framework. This document was the consisted of the June 2004 Basel II Framework, the elements of the 1988 Accord that were not revised during the Basel II process, and the 1996 Amendment to the Capital Accord to incorporate Market Risks. The major outlines of Basel II accord is to comply with the three pillars.

- ♦ The First Pillar: Minimum Requirements for:

    - o Tier 1, Tier 2 and Tier 3 capital

    - o Credit Risk

    - o Market Risk

    - o Operational Risk

- ♦ The Second Pillar: Supervisory Review Process and

- ♦ The Third Pillar: Market Discipline

NOTE: Changes on securitization from Basel 2.5 accord, as incorporated in the previous versions of the OFS Basel Regulatory Capital Release, are prevalent in the current release.

The main highlights of Basel III accord of December 2010 (rev June 2011) were:

- ♦ Stricter Capital: Basel III requires banks to hold 4.5% of common equity (up from 2% in Basel II) and 6% of Tier I capital (up from 4% in Basel II) of risk-weighted assets (RWA).

- ♦ Capital Buffer: Basel III also introduces additional capital buffers, (i) a mandatory capital conservation buffer of 2.5% and (ii) a discretionary countercyclical buffer, which allows national regulators to require up to another 2.5% of capital during periods of high credit growth and (iii) a discretionary G-SIB / D-SIB buffer as applicable.

- ♦ Leverage Ratio: In addition, Basel III introduces a minimum leverage ratio and two required liquidity ratios. The leverage ratio is calculated by dividing Tier 1 capital by the bank's Total Exposure. Banks are expected to maintain the leverage ratio in excess of 3%.

- ♦ CVA Risk: Basel III introduced CVA risk charge in addition to counterparty default risk charge for Over the counter derivative portfolio.

- ♦ Liquidity Coverage and Net Stable Funding Ratio: The Liquidity Coverage Ratio requires a bank to hold sufficient high-quality liquid assets to cover its total net cash outflows over 30 days; the Net Stable Funding Ratio requires the available amount of stable funding to exceed the required amount of stable funding over a one-year period of extended stress.

The Oracle Financial Services Basel Regulatory Capital application consists of Capital Adequacy and Risk Weighted Assets computations as prescribed in Basel I, Basel II, and Basel III Accord. The application is compliant with the regulations in accordance with the Basel accord, and also as published by the regulatory authorities of the Indian, Islamic Banking, Chinese, Brazilian, US and European jurisdictions.

The Oracle Financial Services (OFS) Basel Regulatory Capital application is categorized into two versions:

- ♦ OFS Basel Regulatory Capital Basic: supports the Standardized Approach and its variants for the BIS Jurisdiction, and Standardized Approach for the Indian, Islamic Banking, Brazilian, CBRC, US, and European Jurisdictions.

- ♦ OFS Basel Regulatory Capital Internal Rating Based Approach: is based on the approaches supported by the OFS Basel Regulatory Capital Basic Application and the advanced approaches for BIS, USA, CBRC, Indian, and European Jurisdictions.

For the Islamic Banking jurisdiction, the following approaches for RWA and Capital Adequacy Ratio computation are supported as published in the Capital Adequacy Framework issued in December 2005 and January 2009:

- ♦ Credit Risk

  - o Non Securitization – Standardized Approach

  - o Securitization – Standardized Approach

- ♦ Market Risk

  - o Market Risk – Standardized Approach

- ♦ Operational Risk

  - o Operational Risk – Basic Indicator Approach

- ♦ Capital Structure

  - o Supervisory Discretionary Formula

For more information on the Capital Adequacy and Risk Weighted Assets computation for other jurisdictions, see the respective sections specific to each jurisdiction, in this User Guide.

2.2   Key Features

The important features of the OFS Basel Regulatory Capital application are as follows:

- ♦ One integrated application which allows for multiple jurisdictional computations.

- ♦ Different approaches are configured for various portfolios.

- ♦ Financial institutions can migrate to more advanced approaches as and when required.

- ♦ Comprehensive coverage of Credit Risk Mitigation techniques which ensures optimum allocation of Credit Risk Mitigants to exposures for maximum RWA reduction using the optimizer functionality in the application.

- ♦ Extensive, pre-built instrument coverage, built to meet Basel II and III guidelines, which means banks, can get 'up and running' quickly with minimal pre-processing.

- ♦ It is a fully transparent application where all Rules and Approaches are visible to business users, reviewers, or auditors.

- ♦ Audit Trail is present to maintain accountability of Rules changes, user activity, or system modifications.

2.3 Application's Interface with Other Financial Services Components

2.3.1 Analytical Applications Reconciliation Framework

After data is configured into the relevant tables, you also have an option to perform General Ledger (GL) Reconciliation using our OFS Analytical Applications Reconciliation Framework.

NOTE: The Oracle Financial Services Analytical Applications Reconciliation Framework must be additionally licensed.

OFS Analytical Applications Reconciliation Framework compares the balances from the bank's operational systems, to the balances in the bank's financial systems, which are reflected in the GL. Thus, the OFS Analytical Applications Reconciliation Framework finds out differences, if any, between the two. On the basis of such reconciliations, adjustment entries are passed when required, to ensure that the data from the operational systems tally with the balances in the GL. If you have identified the account or contract that is responsible for the difference, then you can rectify the difference by posting a correction entry on that account. Therefore, OFS Analytical Applications Reconciliation Framework aims to bring the operational system at par with the financial system (GL) by passing adjustment entries, or correction entries, or both.

2.3.2 Operational Risk Economic Capital

Basel regulation defines Operational risk (in Para 644 BCBS 128 - Basel II dated June 2006) as the risk of loss resulting from inadequate or failed internal processes, people and system, or from external events. Oracle Financial Services Operational Risk Economic Capital is responsible for providing a framework for identifying, measuring, monitoring, and managing all risks within the scope of the definition of operational risk. Oracle Financial Services Operational Risk Economic Capital (OREC) application enables you to model the distribution of potential losses due to operational risk. In the application, a loss distribution based approach consistent with Basel - II guidelines are provided, to estimate the Economic Capital for the Operational Risk at the firm level. Oracle Financial Services Operational Risk Economic Capital Application facilitates the calculation of potential losses due to operational risk using the Loss Distribution approach. The application is capable of reporting the losses due to operational risk at reporting group level (internal and standardized) and at firm level.

2.3.3 Loan Loss Forecasting and Provisioning

International Financial Reporting Standards (IFRS) guidelines have set out requirements on classification and measurement of financial assets and liabilities. It specifies two approaches for the measurement of assets namely: Amortized Cost and Fair Value approach. The 3 phases in which IFRS 9 is issued is as follows:

- ♦ Phase I: Classification and Measurement
- ♦ Phase II: Impairment
- ♦ Phase III: Hedge Accounting

Oracle Financial Services Loan Loss Forecasting and Provisioning addresses the requirements of Phase II (Impairment) of IFRS 9. The exposure draft on Phase II requires institutions to adopt an Expected Loss approach for impairment provisions. LLF&P supports two approaches (Incurred Loss and Expected Loss) to impairment provision calculations. LLF&P fills a key gap in the bank's credit risk suite of applications.

2.3.4 Market Risk

Oracle Financial Services Market Risk is concerned with the estimation of market risk for the portfolios held by the bank. These portfolios can belong to the trading book or the banking book. Oracle Financial Services Market Risk enables a bank to estimate the market risk of a portfolio based on its underlying positions, through the estimation of risk measures such as Value-at-Risk, Conditional Value-at-Risk, and so on. It also enables a bank to carry out Stress Testing and Back Testing procedures for validation. Oracle Financial Services Market Risk supports the estimation of market risk of user-defined portfolios covering a wide range of instruments.

2.3.5 Liquidity Risk Management

Liquidity Risk Management (LRM) has emerged as a critical risk management function for banking institutions, as regulators increasingly require banks to have a robust liquidity management framework in place. As per the Basel Committee on Banking Supervision (*BCBS*), "*liquidity is the ability of a bank to fund increases in assets and meet obligations as they come due, without occurring unacceptable losses*". Oracle Financial Services Liquidity Risk Management, Release 2.0, is designed to address liquidity risk of banking institutions across the world. It allows institutions to comply with the Individual Liquidity Adequacy Standards (*ILAS*) or similar standards issued by other regulators. The objective of the LRM Application is to provide a control system to financial institutions to help them identify, measure, monitor, and manage liquidity risk.

Oracle Financial Services Liquidity Risk Management, Release 2.0 supports the following functionality:

- Supports storage and reporting of cash flows (*BAU*, Stress) across natural, local, and reporting currencies.
- Liquidity Gap Calculation
- Liquidity Coverage and Funding Concentration Calculation
- Defining Counterbalancing Strategies

2.3.6 Basel Regulatory Capital Analytics

For more information Basel Regulatory Capital Analytics, see *OFS Regulatory Capital Analytics User Guide.*

2.3.7 Credit Risk Management

Oracle Financial Services (OFS) Credit Risk Management facilitates in obtaining an enterprise-wide comprehensive view of credit risk metrics in a single instance. Financial institutions can obtain a single customer view of credit risk across exposures spreading over multiple product types, lines of business,

geographies, and legal entities. The out of the box capability of the application supports pre-built reports covering credit quality, reserves, delinquency, new business, risk migration, capital requirement, collection, and concentration.

3 Overview of OFSAA Infrastructure

3.1 Components of OFSAA Infrastructure

Oracle Financial Services Analytical Applications Infrastructure (OFSAAI) is a complete end-to- end web-based business intelligence application that provides tools for data integration, mart building, query and analysis, intelligent alerting, and information delivery. OFSAAI enables financial institutions to measure and meet risk-adjusted performance objectives, cultivate a risk management culture through transparency, lower the costs of compliance and regulation, and improve insight into customer behavior. Data in the Basel Regulatory Capital Requirement application is configured and computed using the components of OFSAAI. The main objective of this section is to familiarize you with the important modules of OFSAAI to help understand the functionality of the Basel Regulatory Capital Requirement application.

This module documents the following:

- ♦ Unified Metadata Manager
    - o Data Integrator Framework
    - o Data Entry Forms and Queries
    - o Metadata Browser
    - o Business Metadata Management
- ♦ Rule Framework
- ♦ System Configuration
    - o Segment/Metadata mapping
- ♦ Administration
    - o Save metadata
    - o Utilities
        - ▪ User Group Batch execution Map
- ♦ Data Quality Framework
- ♦ Stress Testing Framework

3.2 Access OFSAA Infrastructure

Infrastructure can be accessed through your web-browser as soon as the System Administrator (SA) installs and configures Oracle Financial Services Analytical Applications Infrastructure. The SA provides you with a link through which you can access Oracle Financial Services Analytical Applications Infrastructure. You can access the Infrastructure application using this link. *For more information on Starting Infrastructure Servers, see OFSAAI 8.0.7 Installation Manual.*

3.2.1 OFSAA Infrastructure Login

When accessing OFSAAI, the Splash *window* is as displayed:

You can select the required language from the **Language** drop-down list. The language options displayed in the drop-down are based on the license. Enter the **User ID** and **Password** provided by the System Administrator and click **Login**. You is prompted to change your password on your first login. Alternatively, you can also choose to change your password any time.

See the following guidelines for Password Creation:

♦ Passwords are displayed as asterisks (stars) while you enter. This is to ensure that the password is not revealed to other users.

♦ Ensure that the entered password is at least six characters long.

♦ The password must be alphanumeric with a combination of numbers and characters.

- ♦ The password should not contain spaces.

- ♦ Passwords are case sensitive and ensure that the Caps Lock is not turned ON.

- ♦ By default, the currently used password is checked for validity if password history is not set.

- ♦ New password should be different from previously used passwords based on the password history, which can be configured.

- ♦ If you encounter any of the following problems, contact the System Administrator:

- ♦ Your user ID and password are not recognized.

- ♦ Your user ID is locked after three consecutive unsuccessful attempts.

- ♦ Your user ID is disabled.

- ♦ Guest user cannot change the password.

OFSAAI Splash Window

On successful login, the Infrastructure splash window is displayed. The splash window is divided into three frames as depicted in the following image:

Top / Header Frame

Right Frame / Work Area

Left Hand Side (LHS) / Function Menu Frame
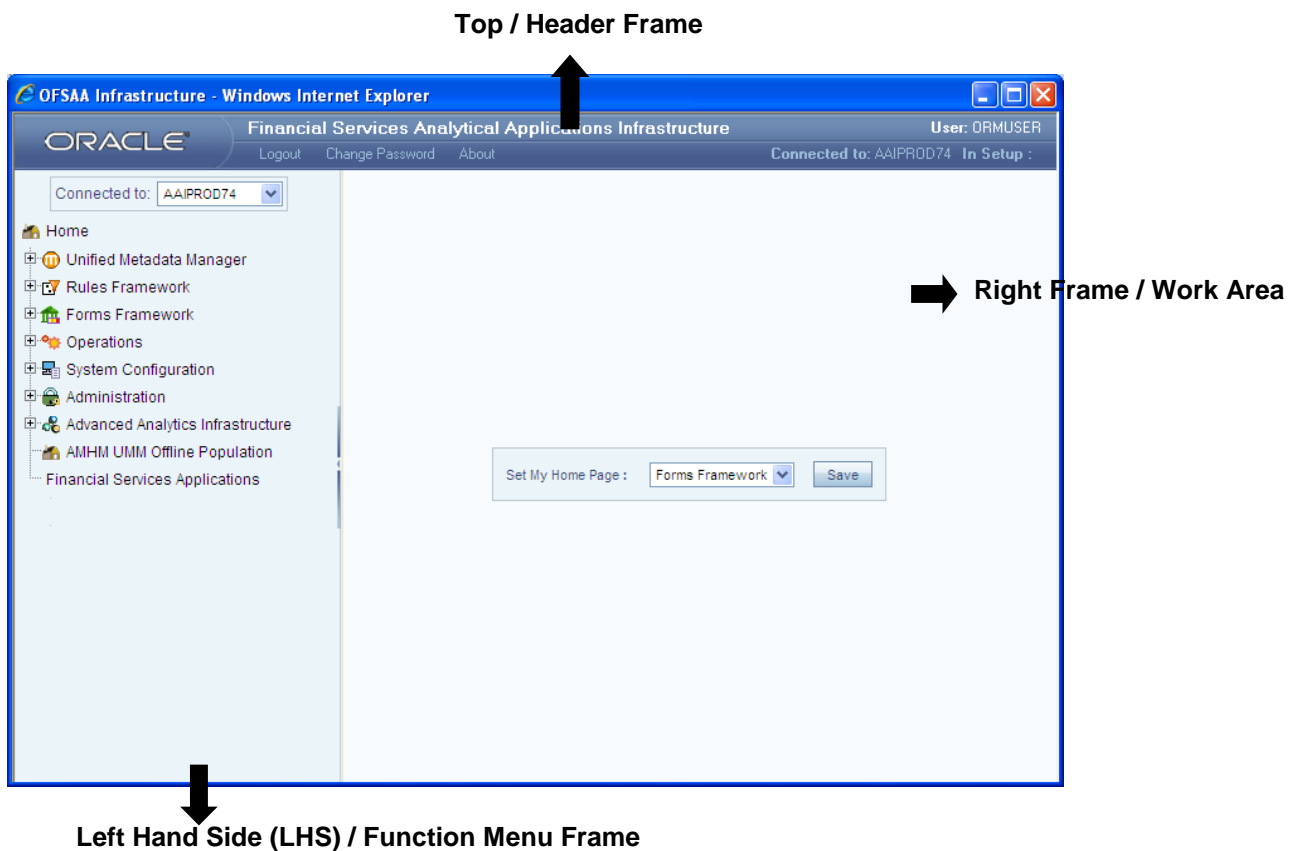
The **Header** frame displays the user details along with the Information Domain selected in the right hand corner in top frame of the window. To exit Oracle Financial Services Analytical Applications Infrastructure, click **Logout**. The built-in security system of the Infrastructure ensures restricted access to the respective windows based on the user's role. This is based on the functions that you as a user are required to perform.

The Function Menu frame displays the Information Domain to which you are connected. The main functions of Oracle Financial Services Analytical Applications Infrastructure, which appear as expandable folders contains submenus with different options. Click "+" to expand the function menu folder. The function menu displays the list of submenus/options. Click the required menu option to open the respective window.

3.3   Unified Metadata Manager

Unified Metadata Manager is intended for the Information and Business Analysts who are instrumental in supporting and affecting analytical decisions. It provides a consistent view of the business dimensions and key measures. OFSAAI's unique Unified Metadata technology allows your enterprise to define a consistent set of business terms and securely deploy them across the entire range of analytic applications. The following sections within the Unified Metadata Manager are relevant for processing of Basel Regulatory Capital:

- Data Integrator Framework
- Data Entry Forms and Queries
- Metadata Browser
- Business Metadata Management

3.3.1 Data Integrator Framework

Data Integrator framework within the infrastructure system is a comprehensive data integration platform that facilitates all the data integration requirements from high-volume and high-performance batch loads to event-driven integration processes and SOA-enabled data services. Data Integrator is a software application based on the ETL (Extract-Transform-Load) structure, which is used for data transformation and merging. In Data Integrator, you can standardize and integrate the data from various source systems into a single standard format for data analysis. To better understand the OFS Basel Regulatory Capital application, the following components of the Data Integrator framework is elaborated in this section:

- Warehouse Designer
- Post Load Transformation

Warehouse Designer

In the Warehouse Designer, you can define Data Source Models, Map Data Source to Applications, and associate Database Extracts to a Table/File for data extraction. The Warehouse Designer consists of the following sections:

- ♦ Data Sources
- ♦ Database Extracts
- ♦ File Extracts

Data Sources Designer

Data Sources Designer within the Data Integrator Framework of the Infrastructure facilitates you to generate data models by defining and mapping the required applications and data sources. You (Business Analysts) need to have ETL Analyst function role mapped to access the Data Integrator framework. The **Source Designer** window displays the list of pre-defined applications, Data Sources, and Mapped Sources in the LHS menu and consists of three sections namely: Define Applications, Define Sources, and Map. In the **Source Designer window** you can:

- ♦ Define Data Source Applications
- ♦ Define Data Sources
- ♦ Map Data Sources to Applications
- ♦ Generate Data Models for each Application
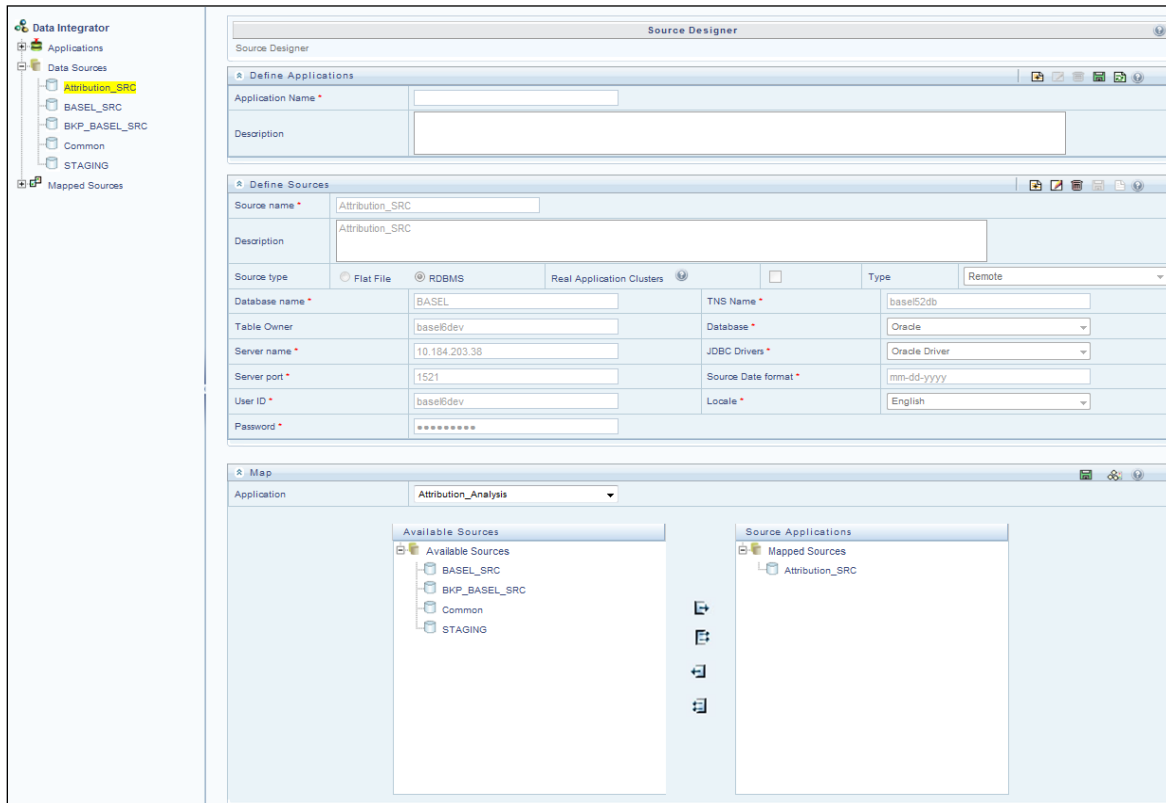
Define Data Source Application

A data source application is a logical group of data sources. You can define data source applications and modify or remove the application details in the *Source Designer* window. To define Data Source applications in the *Define Applications* grid:

1. Enter the **Application Name** by which you can identify the application.

2. Enter a description or related information about the application.

   The application details should contain the name and information pertaining to the source data required. For example: *ABC Corporate* can be the source application, *ABC Corporate sales* can be the description and data can be extracted from Oracle database, which has RDBMS Source Type. Click ⊞ icon in Define Applications tool bar and save the application details.

   You can also click ⊞ icon to define another application or click ⊞ icon to clear the specified details.

To **Edit** the Data Source Applications description, in the *Define Applications* grid:

1. Select the required application from the LHS menu. The application details are displayed in the Define Applications grid.

2. Click ⊞ icon in the Define Applications tool bar.

3. Edit the application description as required.

4. Click ⊞ icon and save the application details.

To **Delete** Data Source applications in the Define Applications grid ensure that there are no data sources mapped. If a model is generated using the application, the data sources cannot be unmapped and hence the application cannot be deleted.

1. Select the required application from the LHS menu. The application details are displayed in the Define Applications grid.

2. Click ⊞ icon in the Define Applications tool bar. Click **OK** in the information dialog to confirm deletion.

Define Data Sources

Data Source refers to the physical structure or location of the source file. Data Source can either be a file or a table with rows and columns and can reside on a remote server or on a local desktop machine. Applications access Data Source using a FTP connection. You can define Data Sources and also modify or remove the Data Source details in the *Source Designer* window. To define Data Source in the Define Sources grid:

1. Enter the **Source Name** of the data source.

2. Enter a description or related information about the application.

3. Select the **Source Type** as either Flat File (default) or RDBMS.

   If **Flat File** Source Type is selected, select the server **Type** as either Local or Remote from the drop down list, and enter the details as tabulated:

NOTE: For source type as Flat File - Remote, the fields, that is, Server Port, FTP Drive, FTP Share, Source Date Format, and Password are mandatory.

Field	Description
Fields marked in red asterisk (*) are mandatory.	
Local	Specify the Source Date Format to be used as default date format for source data extraction and mapping, which is unless modified in the *Define Extracts* window.
Remote	▪ **Server Name**: Enter the Server Name or IP address where the Data Source exists. ▪ **User ID**: Enter the FTP User ID required to connect to the server. ▪ **Server Port**: Enter the active server port number which contains the flat files. ▪ **Password**: Enter the FTP user password required to connect to the server. ▪ **FTP Drive**: enter the FTP server path. For Unix Servers, the home directory path is taken by default. ▪ **Source Data Format**: Enter the Source Date Format which is used as the default date format for source data extraction and mapping, and which is unless modified in the *Define Extracts* window. ▪ **FTP Share**: Enter the ASCII files location for loading if it is located in the staging area other than the default staging area of Infrastructure Database Server.

If **RDBMS** Source Type is selected, specify the source type details as tabulated. The available options are based on the state of **Real Application Clusters** checkbox.

Field	Description
Fields marked in red asterisk (*) are mandatory.	
If Real Application Clusters (RAC) checkbox is selected	▪ **User ID**: Enter the Database User ID, which is also assumed as the Schema name if it is the Oracle database and if the Table Owner field is left blank. ▪ **Source Data Format**: Enter the Source Date Format which is used as the default date format for source data extraction and mapping. ▪ **Password**: Enter the Database user password required to connect to the server. ▪ **Locale**: Select the language using which the Infrastructure Database components are installed. The available options depend on the languages defined in the "configuration" table. ▪ **JDBC URL**: Enter the JDBC (Java Database Connectivity) URL configured by the administrator to connect to the database. ▪ **Table Owner**: Enter the schema name for Oracle database, or Owner of Database Tables for SQL Server and other Databases. ▪ **TNSNAME**: It is the SQL*Net configuration file that defines databases address to

Field	Description
	establish connection. Enter the TNSNAME created for the Information Domain. Also ensure that: It is mandatory to enter the TNS Name if it is the Oracle database. The field is inactive if SQL or DB2 database is selected.
If Real Application Clusters (RAC) checkbox is not selected	▪ **Database Name**: enter the name of the Source Database from which the extraction is required to be done. ▪ **TNSNAME**: It is the SQL*Net configuration file that defines databases address to establish connection. Enter the TNSNAME created for the Information Domain. ▪ **Table Owner**: Enter the schema name for Oracle database, or Owner of Database Tables for SQL Server and other Databases. ▪ **Database**: Select the Database from the drop down list. ▪ **Server Name**: Enter the Server Name or IP address where the Data Source exists. ▪ **JDBC Drivers**: Select the JDBC (Java Database Connectivity) driver from the drop down list. ▪ **Server Port**: Enter the active port number of the server which contains the flat files. ▪ **Source Data Format**: Enter the Source Date Format which is used as the default date format for source data extraction and mapping, unless modified in the *Define Extracts* window. ▪ **User ID**: Enter the FTP User ID required to connect to the server. ▪ **Locale**: Select the language using which the Infrastructure Database components are installed. The available options depend on the languages defined in the "configuration" table. ▪ **Password**: Enter the Database password required to connect to the server.

4. Click 🖼 icon in Define Sources tool bar and save the Data Source details. You can also click 🖼 icon to define another Data Source or click 🖼 icon to clear the specified details.

To **Edit** Data Source in the *Define Sources* grid:

1. Select the required Data Source from the LHS menu. The Data Source details are displayed in the Define Sources grid.

2. Click 🖼 icon in the Define Sources tool bar.

3. Edit the Data Source details as required. You can update all the details except the Source Name, Source Type, and Real Application Cluster option selected.

4. Click 🖼 icon and save the Data Source details.

To **Delete** Data Source in the *Define Sources* grid, ensure that there are no applications mapped. If a model is generated using the Data Sources, the same cannot be unmapped and neither be deleted.

1. Select the required Data Source from the LHS menu. The Data Source details are displayed in the Define Sources grid.

2. Click 🗑 icon in the Define Sources tool bar. Click **OK** in the information dialog to confirm deletion.

Map Data Sources to Applications

You can associate the defined data sources to the required applications using the Map functionality. You can map one or more data sources to serve multiple applications and load separate sources of data into the warehouse. When mapped, the application and all the associated data sources are grouped. You can identify the source data with reference to the source business application. To Map Data Sources to Application in the Map grid, select the required **Application** to map the Data Sources. Do one of the following:

1. Select the Application from the Mapped Sources list in the LHS menu.

2. Select the Application from the Application drop down in the Map grid.

On selection, the mapping details for the selected Application are displayed in the *Available Sources (available)* and *Source Applications (mapped)* list. To map the Data Source to the selected Application, do one of the following:

1. Select the required Data Source, from the Available list and click ⬆ icon. You can press **Ctrl** key for multiple selections.

2. To map all the listed Data Sources to the application, click ⬆ icon.

You can also remove data source mapping by selecting from Source Applications list and clicking ⬇ icon. To remove all selected Data Sources mapping, click ⬇ icon. Click 🖥 icon and save the mapping details.

Generate Source Models

After you have defined and mapped the Data Sources to the required Application, you can generate the Source Models and extract the application data sources to populate data into the warehouse. The source models for each application-source combination are imported into the infrastructure metadata repository. You can generate Source Model only for RDBMS data source using Data Catalogs that are defined in the database. To generate Source Model in the *Source Designer* window:

1. Select the required **Application** which has the RDBMS data sources mapped. Do one of the following:

   a. Select the Application from the **Mapped Sources** list in the LHS menu.

   b. Select the Application from the **Application** drop down in the Map grid.

   On selection, the data source mapping details for the selected Application are displayed in the *Available Sources* and *Source Applications* list.

2. Select the **RDBMS Data Source** from the *Source Applications* list.

3. Click **Generate Source Model** icon from the Map grid tool bar.

In the *Generate Source Model* window, you can generate Source Model using Data Catalogs. You can specify the Filter criteria for selection. Filters are patterns for entity names in the Database and can restrict the source model generation to a specific set of entities. Specify the filter entries by entering details in the "Starts with", "Contains", and "Ends with" fields. The Source Model is generated even if one of the specified filter conditions matches. You can also specify multiple conditions for a single filter type using comma-separated values. For example, tables starting with TB and TM can be specified as "TB, TM".

4. Click **Generate**. The Source Model is generated and the status is displayed in a confirmation dialog. Click **OK**.

NOTE: If the Source Model has already been generated, a confirmation dialog is displayed to replace the existing model. Click **OK** or **Cancel**.

The Source Model is generated in the specified directory which is extracted or transferred to the Business Data Model.

Database Extracts

Data extraction refers to the process of retrieving unstructured data from data sources for further data processing, storage, or migration. You can extract data sources to a Table or a File. You (Business Analysts) need to have ETL Analyst function role mapped to access the Data Integrator framework within the Infrastructure system.
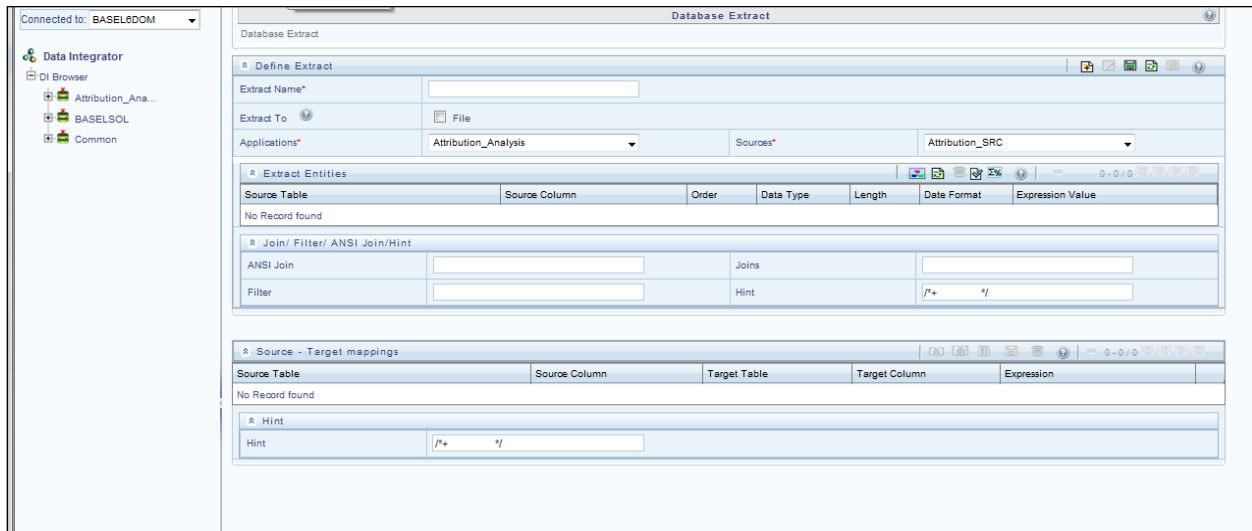
The *Database Extracts* window displays the list of pre-defined Database Extract Mappings in the LHS menu and the options to define and Map the Data Sources to populate the required Table or File. You can also make use of Pagination option to view the list of pre-defined Database Extracts within the system. In the *Database Extracts* window of the Warehouse Designer, you can:

♦ Define extracts, Entities, and related Properties

♦ Map the Source to Target model (table or file)

Database Extraction

The *Database Extracts* window facilitates you to extract data sources to a Table or a File. Extract to Table option is supported only when the source and target tables belong to the same database type. You can **Load** data incrementally from any RDBMS data source to a table based on certain criteria and **Extract** data to a file along with the other sources. The various sections and the available options in the *Database Extracts* window are as tabulated:

- ♦ In the Define Extract grid, you can define the Database Extract details.
- ♦ In the Extract Entities grid, you can define expressions to join tables and specify filter for data extraction.
- ♦ In the Source-Target Mappings grid, you can map the source table of a selected Information Domain to the target model.

Define Database Extracts and Map Table to Table

You can extract data from source table to the required table in the *Database Extracts* window. By default, Extract to Table option is enabled in the *Database Extracts* window. Extraction to Table is supported only when the source and target tables belong to the same database type. Extract to Table does not have any definition (Source) properties. To extract data source to table, do the following:
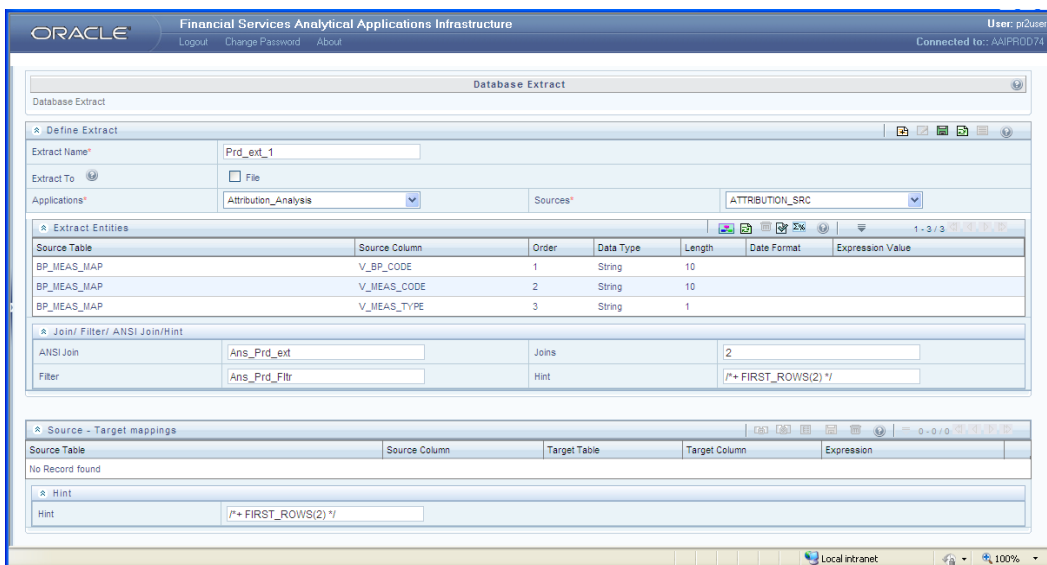
Specify the Database Extract details in the *Define Extract* grid:

1. Enter the **Extract Name**. Ensure that there are no special characters or extra spaces in the name specified. Ensure that **Extract to File** checkbox is not selected.

2. Select the required data source **Application** from the drop down list.

3. Select the mapped **Sources** from the drop down list.

4. Select the required **Entities** in the *Extract Entities* grid:

   a. Click [icon] icon in the Define Entities tool bar.

   In the Choose Entity window, do the following:

    b. Select the entity from the Members list by clicking on the required node, and click ⬚ icon. You can search for a specific entity by entering the keywords and clicking ⬚ icon. You can also deselect an entity by selecting from the Selected Members list and clicking ⬚ icon.

5. Click **OK**. The selected source entities are displayed in the *Define Entities* grid.

Define an expression (optional) in the *Extract Entities* grid. If you have defined more than one Source Table in the *Choose Entity* window, you need to define an expression to join the column data corresponding to each table:

1. Click ⬚ icon in the Extract Entities tool bar.

    In the *Specify Expression* window, do the following:

    a. Enter the **Expression Name**.

    b. Select the **Data Type** from the drop down list. The available options are String, Date Time, Number, Integer, and Timestamp.

2. Define an expression by doing the following:

    a. Select the **Table** in the Entities section.

    b. Select the **Function**. You can select Transformations, Database Functions, or Extraction Functions. Extract functions are populated from the "*DATABASE_ABSTRACT_LAYER*" table which resides in config schema.

    c. Define the **Operators** by selecting Arithmetic, Concatenation, Comparison, Logical or others operators.

    d. Specify the ANSI Join or Join to map the table to columns and enter the filter criteria to include during extraction. For example, "$MISDATE" can be a filter for run-time substitution of the MIS Date.

NOTE: If the defined expression uses function that has a placeholder or calls a stored procedure that has a placeholder for String data type, enclose the placeholder in single quotes. Using double-quotes would generate error during extract definition or batch execution. Also expressions with Date/Timestamp data type placeholders are not supported.

    In the *Expressions* tool bar, you can also:

    a. Click ⬚ icon to view the Expression details.

    b. Click ⬚ icon to view the ANSI Join details.

    c. Click ⬚ icon to view the Joins.

    d. Click ⬚ icon to view the Filters.

3. Click ⬚ icon to clear the details.

4. Select **Show Advanced Options** in the Expression tool bar, and do the following:

   a. Click [icon] icon to and specify hints (Rules), if any. Oracle hints follow (/*+ RULE */) format. For example, /*+ FIRST_ROWS(2) */

   b. Click [icon] icon to validate the query by converting to the selected RDBMS source. If Validation is successful, the Explain Plan for the SQL query is displayed. Else, the *SQL Exception* is displayed.

   c. Click [icon] icon to view SQL, which acts as print command for the complete query.

5. Click **OK**. The defined Expression is displayed in the *Extract Entities* grid as *Derived Column*. The specified ANSI Join or Joins, Filter, and Hints are also displayed and can be edited.

6. Click [icon] icon in the *Define Extract* tool bar and save the details.

Map Source to Target Table in the Source-Target Mappings grid.

1. Click [icon] icon in the *Source-Target Mapping* tool bar. The *DI Mapping* window is displayed.

3. Select the **Target Infodom** from the drop down list. The source details in the selected infodom are displayed in the *Definition* pane of *Target Table Map Panel*.

4. Select the Target Table from Target Entities drop down list. The selected entities are displayed in the *Target Entities* pane of *Target Table Map Panel*. To map Source to Target, do one of the following:

   a. Select a **Definition** and **Target Entity** in each column and click [icon] icon.

   b. Click [icon] icon to Auto-Map the selected definitions and Target Entities.

   c. You can Un-Map a definition from a Target Entity by clicking [icon] icon or Un-Map All definitions by clicking [icon] icon.

   d. Click **Save** and save the mapping details.

Specify the Properties in the *Source-Target Mappings* grid:

2. Click [icon] icon in the Source-Target Mappings tool bar. The *Properties* window is displayed.

3. Specify the properties by entering a value or selecting an option from the drop down list.

   In the *Properties* window, you can specify the **Loading Mode** as *Direct*, *Batch*, or *Bulk*.

   In Bulk Mode of loading, note that:

   1. Loading is possible only when the target database and the data source created for the definition are in the same database.

   2. If the schema used for source and target is different but the database is same, then the target schema should be granted **Select** access for the source table.

   3. You cannot specify the **Batch Size** and commit happens at the end of batch load.

   4. Batch loading is faster for lesser records as compared to larger number of records, which sometimes lead to loss of data while loading.

NOTE: In **Batch** and **Bulk** modes if any of the foreign keys are in **Disabled** state before loading the data using T2T and the property **Disable Primary Key** is set to **Yes**, then all the Primary Keys and corresponding Foreign Keys are disabled before loading and are enabled back after loading. Hence the initial status of foreign and primary keys can be changed from Disabled to Enabled. For **Direct** mode, the Foreign Keys do not return to its initial state.

4. In the *Hint* tool bar, specify Hints (if any), for faster loading. Oracle hints follow (/*+ HINT */) format.

5. Click icon and save the defined Database Extracts mapping details. An information dialog is displayed on completion. Click **OK**.

Define Database Extracts and Map Table to File

You can extract data from source table to the specified file in the *Database Extracts* window. To extract data to a file along with the other sources, you need to define the Database Extracts and specify the Extract Entities. Source-Target mapping is not required since the table structure is completely extracted to the specified file. To extract data source to file, do the following:

Specify the Database Extract details in the *Define Extract* grid:

1. Enter the **Extract Name**. Ensure that there are no special characters or extra spaces in the name specified.

2. Select **Extract to File** checkbox.

3. Select the required data source **Application** from the drop down list.

4. Select the mapped **Sources** from the drop down list.

Specify the Source Properties in the *Define Extract* grid.

5. Click icon in the Define Entities tool bar.

   Specify the properties by entering the required value or selecting an option from the drop down list.

NOTE: Field Delimiter and Data File Locale are mandatory fields. You need to set the *Data File* Locale property to **UTF-8** encoding by specifying the numeric value as **000-000-002**.

6. Select the required Entities in the *Extract Entities* grid.

7. Click icon in the *Define Entities* tool bar.

8. In the *Choose Entity* window, do the following:

   a. Select the entity from the Members list by clicking on the required node, and click icon.

   b. You can search for a specific entity by entering the keywords and clicking icon. You can also deselect an entity by selecting from the Selected Members list and clicking icon.

   c. Click **OK**. The selected source entities are displayed in the Define Entities grid.

Define an expression (optional) in the *Extract Entities* grid. If you have defined more than one Source Table in the *Choose Entity* window, you need to define an expression to join the column data

corresponding to the table.

1. Click ⬛ icon in the Extract Entities tool bar.

2. In the *Specify Expression* window, do the following:

    a. Enter the **Expression Name**.

    b. Select the **Data Type** from the drop down list. The available options are String, Date Time, Number, Integer, and Timestamp.

3. Define an expression by doing the following:

    a. Select the **Table** in the Entities section.

    b. Select the **Function**. You can select Transformations, Database Functions, or Extraction Functions. Extract functions are populated from the "*DATABASE_ABSTRACT_LAYER*" table which resides in config schema.

    c. Define the **Operators** by selecting Arithmetic, Concatenation, Comparison, Logical or others operators.

    d. Specify the ANSI Join or Join to map the table columns and enter the filter criteria to include the same during extraction. For example, "$MISDATE" can be a filter for run-time substitution of the MIS Date.

NOTE: For expression that has a placeholder for String data type, enclose the placeholder in single quotes. Expressions with Date/Timestamp data type placeholders are not supported.

4. In the Expressions tool bar, you can also:

    a. Click ⬛ icon to view the Expression details.

    b. Click ⬛ icon to view the ANSI Join details.

    c. Click ⬛ icon to view the Joins.

    d. Click ⬛ icon to view the Filters.

    e. Click ⬛ icon to clear the details.

5. Select **Show Advanced Options** in the Expression tool bar, and do the following:

    a. Click ⬛ icon to and specify hints (Rules), if any. Oracle hints follow (/*+ RULE */) format. For example, /*+ FIRST_ROWS(2) */

    b. Click ⬛ icon to validate the query by converting to the selected RDBMS source. If Validation is successful, the Explain Plan for the SQL query is displayed. Else, the SQL Exception is displayed.

    c. Click ⬛ icon to view SQL, which acts as print command for the complete query.

6. Click **OK**. The defined Expression is displayed in the Extract Entities grid as Derived Column. The specified ANSI Join or Joins, Filter, and Hints are also displayed and can be edited.

7. Click ▣ icon in the *Define Extract* tool bar and save the details.

NOTE: While saving the Database Extract details, the system alerts you if the mandatory properties are not specified or if the grid data is not validated.

8. An information dialog is displayed on completion. Click **OK**.

Map Source to Target Table in the Source-Target Mappings grid:

1. Click 🔲 icon in the Source-Target Mapping tool bar. The *DI Mapping* window is displayed.

2. Select the **Target Infodom** from the drop down list. The source details in the selected infodom are displayed in the *Definition* pane of *Target Table Map Panel*.

3. Select the Target Table from Target Entities drop down list. The selected entities are displayed in the *Target Entities* pane of *Target Table Map Panel*. To map Source to Target, do one of the following:

    a. Select a Definition and Target Entity in each column and click ▣ icon.

    b. Click ▣ icon to Auto-Map the selected definitions and Target Entities.

    c. You can Un-Map a definition from a Target Entity by clicking ▣ icon or Un-Map All definitions by clicking ▣ icon. You can also search for a specific definition by entering the keywords and clicking ▣ icon.

    d. Click **Save** and save the mapping details.

Specify the Properties in the *Source-Target Mappings* grid.

1. Click ▣ icon in the Source-Target Mappings tool bar. The *Properties* window is displayed.

2. Specify the properties by entering a value or selecting an option from the drop down list.

3. In the *Hint* tool bar, specify Hints (if any), for faster loading. Oracle hints follow (/*+ HINT */) format.

    For example, /*+ PARALLEL */.

4. Click ▣ icon and save the defined Database Extracts mapping details. An information dialog is displayed on completion. Click **OK**.

NOTE: A T2F definition saved with the Source to Target mappings can be used to perform F2T operations.

File Extracts

File Extracts refers to the process of extracting unstructured data from a Flat File for further data processing and storage. File Extracts within the Data Integrator framework of Infrastructure system facilitates you to extract Flat File data to a Database Table. A Flat File is a text and binary file which contains data in a single line, that is, one physical record per line. Flat Files are of two types namely, Delimited File and Fixed Width File.

♦ **Delimited File** refers to a Flat File in which the data is organized in rows and columns and are separated by delimiters (commas). Each row has a set of data, and each column has a type of data. For example, a csv (comma separated values) file.

♦ **Fixed Width** or Fixed Position File refers to a Flat File in which the data is defined by the character position (tab space). The data is formulated in such a way that the data fields are of same size and the file is compact in size. For example, the character spacing of a Birth date data column is known and hence the extra spaces between the Birth date column and other column can be eliminated.
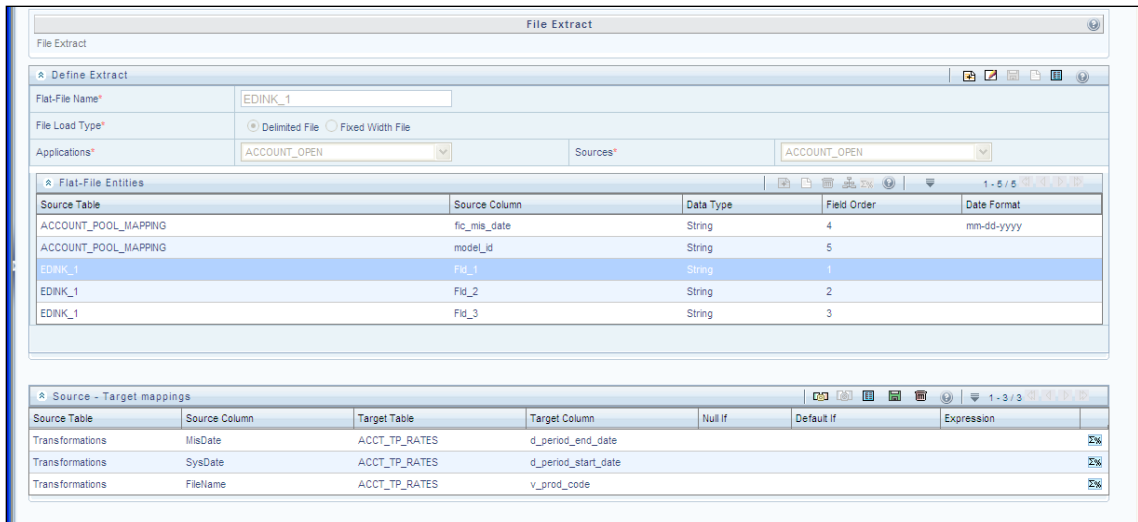
The *File Extracts* window displays the list of pre-defined File Extract Mappings in the LHS menu and the options to define and Map the required Flat File to populate the required Database Table. In the *File Extracts* window of the Warehouse Designer, you can:

♦ Define Flat File definition and Source Properties.

♦ Map the Flat File to Target model (Table) and Specify Target Properties.

File Extraction

In the *File Extracts* window you can **Load** file data incrementally from any RDBMS data source to a table based on certain criteria. Ensure that the ASCII file types are not loaded into the staging area using FTP which can corrupt the file causing load failure. The following steps are involved while defining File Extracts:

1. Create Flat File Definition
2. Define Flat File Properties

     a. Definition (Source) properties: Specified when defining the Flat File Extracts.

     b. Loading (Target) properties: Specified when mapping the Flat File Extracts.

3. Map the Flat File to the Target Model

The various sections and the available options in the *File Extracts* window are as tabulated:

- In the *Define Extract* grid, you can define the File Extract details.
- In the *Flat-File Entities* grid, you can specify the required entities for data extraction.

Define File Extracts and Map File to Table

You can define File Extracts such as Delimited File or Fixed Width File and Map to the required database Table. By default, the Delimited File Extract option is selected. To extract file data to table, do the following:
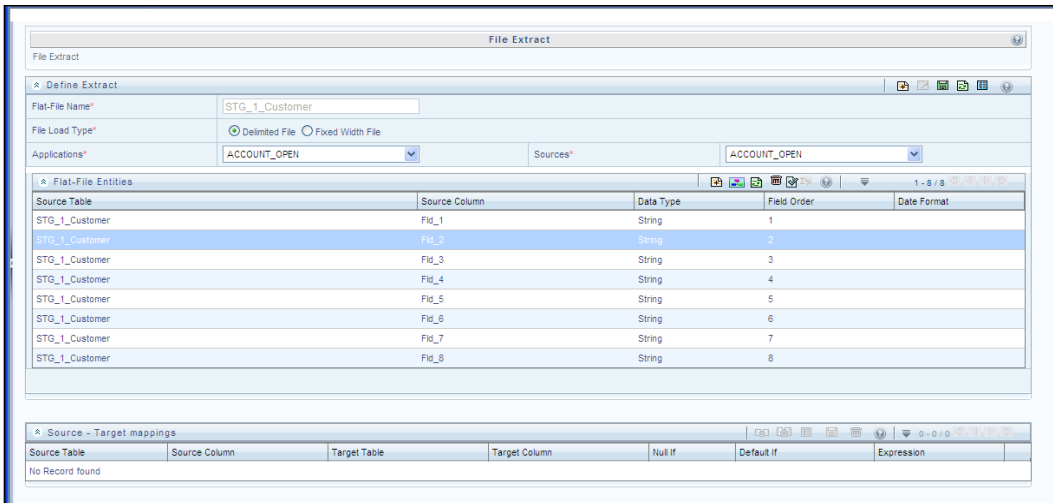
1. Specify the File Extract details in the *Define Extract* grid.

2. Enter the **Flat-File Name**. Ensure that there are no special characters or extra spaces in the name specified.

3. Select the File Load Type as **Delimited File** or **Fixed Width File**.

4. Select the required data source **Application** from the drop down list.

5. Select the mapped **Sources** from the drop down list.

6. Select the required Entities in the *Flat-File Entities* grid. You can define the column data in either of the following ways:

     a. Click ![icon] icon. Select or specify the required number of columns in the drop down list and click ![icon] icon. You can double-click on any row to update the details.

     b. Click ![icon] icon in the Define Entities tool bar. The **Choose Entity** window is displayed.

          i. Select the entity from Members list by clicking on the required node, and click ![icon] icon.

ii. You can search for a specific entity by entering the keywords and clicking ![icon] icon. You can also deselect an entity by selecting from the Selected Members list and clicking ![icon] icon.

iii. Click **OK**. The selected source entities are displayed in the Flat File Entities grid.

The available columns in Delimited File are Source Table, Source Column, Data Type, Order, and Date Format. The available columns in Fixed Width File are Source Table, Source Column, Data Type, Order, Precision, Scale, Source Start Position, Date Format, and Length.

Specify the Source Properties in the *Define Extract* grid.

1. Click ![icon] icon in the Define Extract tool bar. The Properties window is displayed.

   Specify the properties by entering the required value or selecting an option from the drop down list.

NOTE: It is mandatory to set the Data File Locale property for Delimited File and Fixed Width File load types to UTF-8 encoding, by specifying the numeric value as 000-000-0002. Field Delimiter is mandatory for Delimited File load type.

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2. Click ![icon] icon in the Define Extract tool bar and save the details.

Map Source to Target Table in the *Source-Target Mappings* grid.

1. Click ![icon] icon in the Source-Target Mapping tool bar. The *DI Mapping* window is displayed.

2. Select the **Target Infodom** form the drop down list. The source details in the selected Information Domain are displayed in the Definition pane of Target Table Map Panel.

3. Select the **Target Table** from Target Entities drop down list. The selected entities are displayed in the Target Entities pane of Target Table Map Panel. To map Source to Target, do one of the following:

   a. Select a Definition and Target Entity in each column and click ![icon] icon.

   b. Click ![icon] icon to Auto-Map the selected Definitions and Target Entities.

   c. You can Un-Map a Definition from a Target Entity by clicking ![icon] icon or Un-Map All Definitions by clicking ![icon] icon. You can also search for a specific Definition by entering the keywords and clicking Search icon or click Add icon to create an expression to join column data in the *Specify Expression* window.

   d. Click **Save** and save the mapping details.

Specify the Target Properties in the Source-Target Mappings grid:

1. Click ![icon] icon in the Source-Target Mappings tool bar. The *Properties* window is displayed.

2. Specify the properties by entering the required value or selecting an option from the drop down list.

3. Click ![icon] icon and save the details.

Post Load Transformation

Transformation refers to a rule describing the conversion of source data from source to the destination. During the data extraction, a transformation rule facilitates in structuring the required data from sources to the target or an intermediate systems for further processing. Based on the selected mode, transformations can be applied to execute the process successfully. For example, an SQL rule with the "SELECT" statement can retrieve source data from specific table(s). Post Load Transformation within the Data Integrator framework of Infrastructure system facilitates you to define transformations to the source data before extracting/loading it to Target database to populate the data warehouse.
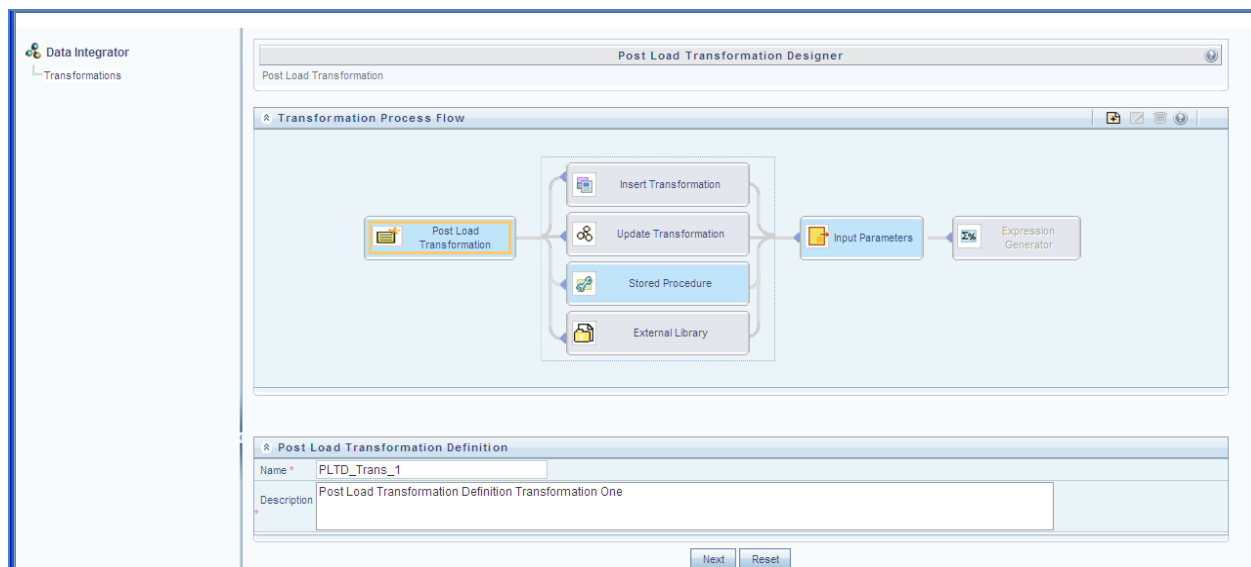
The Post Load Transformation Designer window displays the list of pre-defined Transformations in the LHS menu and the Transformation Process Flow to help you navigate and define Post Load Transformations. The Post Load Transformation Designer window facilitates you to create, update, and delete the following transformations:

♦ Insert/Update Transformation
♦ Stored Procedure Transformation
♦ External Library

Insert/Update Transformation

Insert/Update Transformation facilitates you to define transformation parameters, create expression with source, destination, and join/filter conditions, add transformation logic, and query the SQL Rule generated. To Insert or Update Transformation in the in the *Post Load Transformation Designer* window:

1. Click ![icon] icon in the Transformation Process Flow tool bar.

2. In the *Post Load Transformation Definition* grid.

   a. Enter the **Transformation Name**. Ensure that there are no special characters or extra spaces in the name specified.

   b. Enter a **Description** for the transformation.

      c.   Click **Next** and save the details. You are automatically navigated to the Insert Transformation section. For Update Transformation, click **Update Transformation** in the *Transformation Process Flow* grid.

3. Click icon in the Parameter Definition tool bar. A new row is inserted and allows you to define the run-time parameters to the transformation.

      a.   Double-click on the **Parameter Name** and enter the details.

      b.   Double-click and select the required **Data Type** from the list.

      c.   Double-click on the **Default Value** and enter the details.

      d.   Click **Next** and save the parameter details. You are also navigated to the Expression Generator section.

4. In the Expression Generator grid, specify the Source and Destination Entity by doing the following:

      a.   Click icon. The *Choose Entity* window is displayed.

      b.   Select the entity from Members list by clicking on the required node, and click

      c.   You can search for a specific entity by entering the keywords and clicking the icon. You can also deselect an entity by selecting from the Selected Members list and clicking .

      d.   Click **OK**. The selected source entities are displayed in the Define Entities grid.

5. Specify the Join/Filter Condition. Click Select icon and define the expression in the *Specify Expression* window. Click **OK**. You can also:

      a.   Click icon and include the Transformation parameter conditions in the *Transformation Logic* grid or click icon to define an expression.

      b.   Click icon to generate Logic and view the SQL query in the *Query Generated* grid.

      c.   Click **Check Syntax** to check the syntax of the query generated.

6. Click **Finish** and save the Insert or Update Transformation details.

7. The Transformation details are added to the list in LHS menu and a confirmation dialog is displayed. Click **OK**. You can load the transformation by double-clicking in LHS menu to view or edit.

Stored Procedure Transformation

Stored Procedure Transformation facilitates you to define complex transformations involving multiple tables which are contained in a pre-defined stored procedure. To define a Stored Procedure Transformation in the *Post Load Transformation Designer* window:

1. Click icon in the Transformation Process Flow tool bar. In the *Post Load Transformation Definition* grid.

    a. Enter the **Transformation Name**. Ensure that there are no special characters or extra spaces in the name specified.

    b. Enter a **Description** for the transformation.

    c. Click **Next** and save the details. You are automatically navigated to the *Insert Transformation* section.

2. Click **Stored Procedure** in the Transformation Process Flow grid.

3. Click icon in the Parameter Definition tool bar. A new row is inserted and allows you to define the run-time parameters to the transformation.

    a. Double-click the **Parameter Name** and enter the details.

    b. Double-click and select the required **Data Type** from the list.

    c. Double-click the **Default Value** and enter the details.

4. Click **Browse** in the Stored Procedure Editor tool bar and navigate to the file path containing the stored procedure. You can select either a text file or HTML file. You can click icon in the Stored Procedure Editor tool bar to **Check Syntax** of the stored procedure. You can upload a *Business Process Flow* diagram corresponding to the selected Stored Procedure Transformations in jpg, png, gif, or vsd format.

    a. In the Business Process Flow grid, click **Browse** and locate the file path.

    b. Click icon in the Business Process Flow tool bar and upload the file.

    c. After uploaded, the Upload Status changes to "Yes" and a hyperlinked image icon is displayed to view the Business Process Flow diagram in the *Post Load Transformation Designer* window. You can also view the uploaded Business Process Flow diagram from the *Metadata Browser > Data Transformations* window.

5. Click **Finish** and save the Stored Procedure Transformation details.

The Transformation details are added to the list in LHS menu and a confirmation dialog is displayed. Click **OK**. You can load the transformation by double-clicking in LHS menu to view or edit.

External Library

External Library consists of built-in functions/procedures and facilitates you to define complex SQL Rule Transformations which are compiled and stored as an executable file. You can load the External Library procedures and functions using the transformation wizard. To define External Library Transformation in the *Post Load Transformation Designer* window:

1. Click icon in the Transformation Process Flow tool bar.

2. In the *Post Load Transformation Definition* grid:

    a. Enter the **Transformation Name**. Ensure that there are no special characters or extra spaces in the name specified.

    b. Enter a **Description** for the transformation.

    c. Click **Next** and save the details. You are automatically navigated to the Insert Transformation section.

3. Click **External Library** in the *Transformation Process* Flow grid.

4. Click icon in the Parameter Definition tool bar. A new row is inserted and allows you to define the run-time parameters to the transformation.

    a. Double-click on the **Parameter Name** and enter the details.

    b. Double-click and select the required **Data Type** from the list.

    c. Double-click on the **Default Value** and enter the details.

5. In the External Library Details grid, enter the **Name** of executable library file (**.sh file**) located in default figdb/bin path. You can also specify the path till the file name.

6. Click **Finish** and save the External Library Transformation details.

7. The Transformation details are added to the list in LHS menu and a confirmation dialog is displayed. Click **OK**. You can load the transformation by double-clicking in LHS menu to view or edit.

3.3.2 Data Entry Forms and Queries

Data entry Forms and Queries (DEFQ) within the Infrastructure system facilitates you to design web based user-friendly Data Entry windows with a choice of layouts for easy data view and data manipulation. DEFQ consists of the following sections.

♦ Forms Designer

♦ Forms Authorization

♦ Data Entry

♦ Excel Upload

Forms Designer

Forms Designer within the Data Entry Forms and Queries section facilitates you to design web based user-friendly Forms using the pre-defined layouts. The *DEFQ - Forms Designer* window displays a list of pre-defined options to create, modify, and delete Forms. You can also assign rights and define messages. By default, the option to *Create a New Form* is selected and the left pane indicates the total steps involved in the process. The available options are as indicated below. Click on the links to view the section in detail.

♦ Create a New Form

♦ Alter Existing Forms

♦ Copy Forms

♦ Delete Forms

♦ Assign Rights

♦ Message Type Maintenance

Create a New Form

To design a new form in the *DEFQ - Forms Designer* window:

1. Ensure that **Create a New Form** option is selected and do the following:

    a. Specify the application name by either entering the **New Application Name** or selecting **Available Applications** from the drop down list.

    b. Enter the **New Form Name**.

2. Click **Next**. The DEFQ - Layout Window is displayed with the range of pre-defined layouts for you to choose.
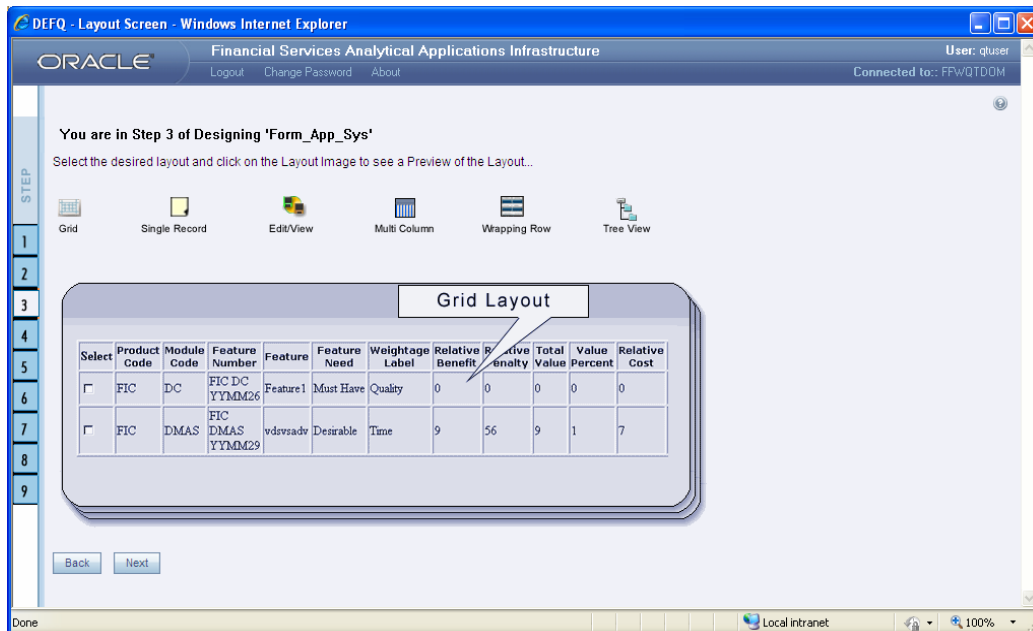
See the following table for information.

Layout	Description
Grid Layout	It is the default layout which displays the records in the Form of a table/grid with multiple rows of data.
Single Record Layout	It displays a single record at a time.
Edit/View Layout	It is a combination of the Single Record and Grid layout. By selecting a record in the grid, the record is displayed in a single record format, which is editable. By default the first record is displayed in the editable grid. **Note**: The column names are editable only during altering the created Form.
Multi Column Layout	It displays a single record with its column in a grid format. You can view a multi column layout Form without having to scroll or with minimum scrolling to view all the columns.
Wrapping Row Layout	It displays rows of a single record in a wrapped manner in a grid format. You can view a wrapping row layout Form easily without having to scroll horizontally to view all the data.
Tree View Layout	It displays the Hierarchical dimensional table with the selected dimension details. You can select the following options: ▪ Dimensional Table Tree ▪ Parent Child Tree **Note**: The process to create a Form using the Tree View Layout differs from the procedure explained below.

3. Select the required layout and click **Next**. The *List of Available Tables* is displayed.

4. Select the required Table from the list on which the Form is to be created. For multiple selections, you can either press **Ctrl** key for nonadjacent selection or **SHIFT** key for adjacent selections. Click **Next**; the *Fields Selection Window* is displayed. If multiple tables are selected, you need to specify Equi-Join Condition(s). Select the *Table* from the drop down list and select the *Available Fields*. Specify the join condition. Click **Next**, the join conditions are validated and *Fields Selection Window* is displayed.

5. Select the fields to be joined from the **Available Fields** list and click ▭. You can press **Ctrl** key for multiple selections and also click ▭ to select all the listed fields. All mandatory fields are auto selected and are indicated on window with an asterisk (*).

NOTE: You can click ^ or v icons to arrange the fields in the required order as intended to display in the Data Entry Form. The fields order need not be similar to the arrangement in the underlying table.

6. Click **Next**. The Sort Fields Selection Window is displayed.

You can sort the fields in required order as intended to display in the Data Entry Form. Also the mandatory fields which needs user inputs are indicated in '*' symbol and are auto selected in the Selected Fields pane.

a. Select the field from the **Available Fields** list click⬛. You can press **Ctrl** key for multiple selections and also click ⬛ to select all the listed fields.

b. (Optional) To arrange multiple fields, select **Sort by Descending** checkbox.

c. (Optional) Select the **Excel Map** checkbox to enable *Bulk Authorization*.

NOTE: If you have selected **Excel Map** checkbox, you need to select "Excel Name" from the **Store Field As** list in the *DEFQ Field Properties* window. Only on selection, the "SelectExcelSheetName" list is displayed for authorizer in the *DEFQ - Data Entry* window.

7. Click **Next**. The DEFQ Field Properties window is displayed with the Form details such as Field Name, Display Name, In View, In Edit/Add, Allow Add, Store Field as, Rules, and Format Type.

Specify the parameters for each field as tabulated.

Field	Description
Display Name	Edit the default Display Name if required.
In View	Select either Display or Do not Display to display the field in the Form. If the field is a foreign key field or if more than one table is selected, then the following options are available in the drop down list; ▪ Same Field ▪ Alternate Display Field ▪ Do not Display options

Field	Description
In Edit/Add	Specify the edit parameters by selecting from the drop down list. The available options depend on the type of field selected. ▪ For normal fields you can select Text Field, Text Area, Select List, Protected Field, Read Only, and Do Not Show. ▪ For foreign key field s you can select Read Only, Select List, and Do Not Show. ▪ For primary key fields you can select Read Only and Do Not Show. ▪ For calendar fields you can select Calendar and Do Not Show. **Note**: If you choose **Select List** option, you need to define the values.
Allow Add	Select the checkbox to permit users to add new record. **Note**: An alert message is displayed if you are trying to save a Form with add option disabled for the mandatory fields.
Store field as	Select the required option from the drop down list. You can select the store format as Normal, Sequence Generator, Maker Date, Checker Date, Created Date, Modified Date Auth Flag, Maker id, Maker Date, Checker id, Checker Date, Checker Remarks, Maker Remarks, and Excel Name (If Excel Map is selected in *Sort Fields Selection* window).
Rules	Click **Rules** and specify Rules and Expressions for the selected field in the *Specifying Rules and Expressions for Data - Validations* window.
Format Type	Select the required Format type from the drop down list depending on the field type selected.
Batch Commit	Select the checkbox to group all the set of table Forms to a batch. All the Form tables are executed along with the batch execution and if a Form in the table fails to execute, the entire set of Forms are returned.
Message Details	Click **Message Details** to define the message type for Creator and Authorizer in the *Messaging Details for a Form* window.
Form Filter	Click **Form Filter** to define an expression for Form-level filter condition in the *Filter for Form* window.
Data Versioning	Click **Data Versioning** to perform data versioning on an authorized Form.

8. Click either **Save** to only save the Form details or click **Save for Authorization** to save the changes with authorization.

NOTE: Sometime, on clicking **Save**, the form does not get saved. This is because the Java heap size setting for OFSAAI service is set too high and web server memory setting is too low. Contact System Administrator to modify it to the appropriate setting by viewing the log file created in the path: $FIC_APP_HOME/common/FICServer/logs/.

While saving, the *User for Mapping - DEFQ* window is displayed which facilitates you to assign user rights to the Form.

Alter Existing Forms

To alter the field details of an existing Form in the *DEFQ - Forms Designer* window:

1. Select **Alter Existing Forms** from the available options and do the following:

   a. Select the **Available Applications** from the drop down list.

   b. Select the **Available Forms** from the drop down list. The listed Forms are dependent on the DSN (Data Source Name) that you have specified.

2. Click **Next**. The *Fields Selection Window* is displayed. **Add** or **remove** the selected fields as required to be displayed in the Form. You can choose a field from the **Available Fields** list and click ▸ to add, or choose the selected field from the **Fields to Display** list and click ◂ to de-select. You can press **Ctrl** key for multiple selections and also click ▸▸ or ◂◂ icons to select/de-select all the listed fields.

3. Click **Next**. The *Sort Fields Selection Window* is displayed.

   a. Sort the fields in required order as intended to display in the Form. You can choose a field from the list and click ▸ or ◂ icons to select/deselect. You can also click ▸▸ or ◂◂ icons to select/de-select all the listed fields.

   b. Select a field and click ∧ or ∨ icons to arrange fields in the required order.

   c. (Optional) To arrange multiple fields, select **Sort by Descending** checkbox.

   d. (Optional) Select the **Excel Map** checkbox to enable *Bulk Authorization*.

NOTE: If you have selected **Excel Map** checkbox, you need to select "Excel Name" from the **Store Field As** list in the *DEFQ Field Properties* window. Only on selection, the "SelectExcelSheetName" list is displayed for authorizer in the *DEFQ - Data Entry* window.

4. Click **Next**. The *DEFQ Field Properties* window is displayed.
5. Modify the parameters for each field as required.
6. Click either **Save** to save the Form details or click **Save for Authorization** to save the changes with authorization. While saving, the *User for Mapping - DEFQ* window is displayed which facilitates you to assign user rights to the Form.

Copy Forms

You can duplicate and recreate a form with the required variants from an existing form. You can also change user rights or display options and other subtle variations for the selected layout. To Copy a Form in the *DEFQ - Forms Designer* window:

1. Select **Copy Forms** from the available options and do the following:

   a. Select the application from the **From Application** drop down list which consist of the required Form which you want to copy.

   b. Select the application from the **To Application** drop down list for which you want to copy the Form.

   c. Select the required Form from the **Save Form** drop down list.

   d. Enter a name for the Form in the **As Form** field.

2. Click **Next**. The specified Form is duplicated as a new Form and a confirmation dialog is displayed with the status.

Delete Forms

You can remove the forms which are not required in the system by deleting from the *DEFQ - Forms Designer* window.

1. Select **Delete Forms** from the available options and do the following:

   a. Select the application from the **Available Application** drop down list which consist of the required Form which you want to delete.

   b. Select the Form from the **Available Forms** drop down list which you want to delete.

2. Click **Next**. An information dialog is displayed for confirmation. Click **OK**.

Assign Rights

You can assign user permissions to view, add, edit, and delete the Form details in the *User for Mapping - DEFQ* window.

1. Select **Assign Rights** from the available options and do the following:

   a. Select the required application from the **Available Application** drop down list.

   b. Select the Form from the **Available Forms** drop down list.

2. Click **Next**. The *User for Mapping - DEFQ* window is displayed.

3. Select the required user from the **Available User** List. You can also click `<` or `>` icons to reload previous/next set of users in the list.

4. Select the checkbox adjacent to the listed user permissions such as View, Add, Edit, Delete, or All Above. You must select view option in order to allow users to Edit or Delete a Form.

5. Select **Authorize** or **Auto-Authorize** checkbox as required. The **Authorize** and **Auto-Authorize** options are applicable for all the forms that are saved with the Authorize option. The **Auto-Authorize** feature for records is applicable in scenarios where the Creator and Authorizer are the same. If a user has **Add** and **Auto-Authorize** grants, the data entered by the user is auto authorized and the data is in **Authorized** status. For normal Authorization, the Record added by the creator is authorized by a different user who has **Authorize** permissions.

NOTE: The **Auto-Authorize** feature in Forms Designer is applicable only for data entered through *Data Entry* window and not through *Excel Upload* window.

You can also select the checkbox to **Show Data Created by Current Users Only**.

6. Click **Save Access Rights**. A confirmation dialog is displayed after saving and the user is added to the **Assigned User List**.

Message Type Maintenance

You can manage the Message Type details which alert the Creator of the Form or to an Authorizer in the *DEFQ Message Type Maintenance Window*. Message Type details can be defined while creating a Form. In the *DEFQ - Forms Designer* window, do the following:

1. Select **Message Type Maintenance** from the available options and click **Next**. The *DEFQ - Message Type Maintenance Window* is displayed.

2. Select the message category from the **Message Type** drop-down list.

3. Edit the message details by doing the following:

   a. The defined **Message Subject** and **Message Content** is auto populated. Edit the details as required.

   b. Add or remove the defined recipients. Double-click on the required member to toggle between **Available** and **Mapped Recipients** list.

NOTE: Selecting Authorizer alerts all the selected authorizers for authorization.

4. Click **Save**. A confirmation is displayed on updating the *Message Type* details.

Forms Authorization

Forms Authorization within the Data Entry Forms and Queries section of the infrastructure system facilitates you to view and authorize / approve any changes that are made to the privileges assigned to a user in a particular form. You need to have **FRMAUTH** function role mapped to access *Forms Authorization* window.

NOTE: You cannot authorize or reject a right request created by you, even if you have **FRMAUTH** function role mapped.

You can access *Forms Authorization* window from the left hand side (LHS) menu of Infrastructure home page. Click "+" and expand the Unified Metadata Manager and select **Data Entry Forms and Queries**.

The *Forms Authorization* window displays the list of privileges assigned to a user in different Forms. These privileges include create, view, modify, delete, authorize, and auto-authorize records.

The *Forms Authorization* window allows you to select a user from the drop down list adjacent to **User ID** field. This field displays the User ID's associated with the selected Information Domain. On selecting a user from the **User ID** field, the columns in *Forms Authorization* window lists the grants requested for that user on different Forms as listed below.

Column Name	Description
Application	Lists the specific application to which the Form is assigned.
Form Name	Displays the Form Name.
Access Rights Before	Displays the available Right Requests for the selected user in the Form. *Note: For new Form, the column remains blank.*
Access Rights After	Displays the Right Requests raised for authorization. **DV** - DEFQ VIEW **DA** - DEFQ ADD **DE** - DEFQ EDIT **DD** - DEFQ DELETE **A** - AUTHORIZE **DU** - AUTO AUTHORIZE **S** - SHOW DATA CREATED BY CURRENT USER ONLY
Operations	Displays the operation carried out in the Form. For example, "**ADD**" indicates a new form is created and specific roles are assigned.
Created By	Displays the USER ID from which the Right Request is created.
Created Date	Displays the Date on which the Right Request is created.
Last Saved By	Displays the USER ID from which the previous Right Request change is saved.
Last Saved Date	Displays the Date on which the previous Right Request change is saved.
Checked By	Displays the USER ID from which the Right Request is authorized.
Checked Date	Displays the Date on which the Right Request is authorized.

To authorize or reject a form in the *Forms Authorization* window:

1. Select the User ID from the drop down box. The Right Requests submitted on various forms are displayed.
2. Select the checkbox(s) adjacent to the requests to authorize / reject. You can also select all the requests at once for a user, by clicking **Select All** checkbox.
3. Click **Authorize / Reject** to authorize or reject the selected Right Requests.

After form action privileges are authorized, those actions can be performed on the form. For an existing Form with certain rights, the rights remain the same until the changes are authorized / rejected by an authorizer.

Data Entry

Data Entry within the Data Entry Forms and Queries section of infrastructure system facilitates you to view, add, edit, copy, and delete data using the various layout formats and Authorize/Re-authorize data records based on the permissions defined during the form creation. You can use the Search option to query the records for specific data and also export the data in Microsoft Excel format for reference. You can launch multiple instances of Data Entry window using the URL to search and update records simultaneously.

You (Business Analysts) need to have DEFQMAN function role mapped to access the DeFQ framework. You can access DEFQ - Data Entry by expanding Data Entry Forms and Queries section of Unified Metadata Manager module within the tree structure of LHS menu.

NOTE: An alert message is displayed if you are not mapped to any Forms in the system.
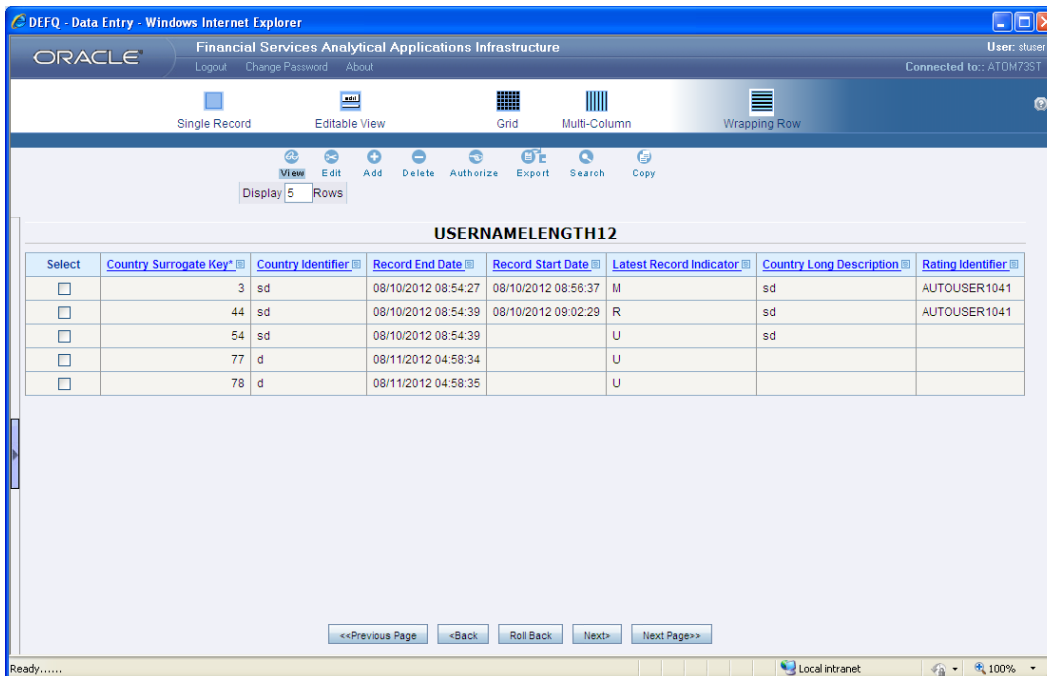
The *DEFQ - Data Entry* window displays the list of Data Entry Forms and Query Forms mapped to the logged-in user in the LHS menu. You can select the required Form to view the details. In the *DEFQ - Data Entry* window, you can do the following:

a. View Form Details

b. Edit Form Details

c. Add Form Data

d. Authorize Records

e. Export Form Data

f. Copy Form Data

g. Delete Form Details

View Form Details

The *DEFQ - Data Entry* window displays the selected Form Data in the View mode by default. The Forms are displayed based on the application names in the LHS menu. There are various layouts available to customize the view and by default, the Form details are displayed in the layout in which it was designed.

In the *DEFQ - Data Entry* window, the following layout types are available. You can click on any of the following layouts to view the Form details. The icons **Previous Page**, **Back**, **Next**, and **Next Page** help you to navigate through the records. However, the customized header sorting does not apply when you have navigate to *Previous* or *Next* pages.

NOTE: The **Roll Back** option can be used only for authorized records. After the records are edited and saved, you can roll back/undo the changes in view mode.

Layout	Description
Single Record	To view a single record details at any given point. You can use the navigation icons to view the next record in the table.
Editable View	To view and edit a single record. A list of five rows/records is displayed by default, and the same can be changed by entering the required number in **Display Rows**. You need to select the required record from the list to view/edit and click **Save** to update the changes.
Grid (Default)	To view all the records in a list. A list of five rows/records is displayed by default, and the same can be changed by entering the required number in **Display Rows**. You can click on the column header to alphabetically sort the list of records in the table.
Multi column	To view all the columns of a selected record. This layout enables you to view a record without having to scroll or with minimum scrolling to view all the columns.
Wrapped rows	To view all the rows of a selected record. This layout enables you to view a wrapping row easily without having to scroll horizontally to view the columns.
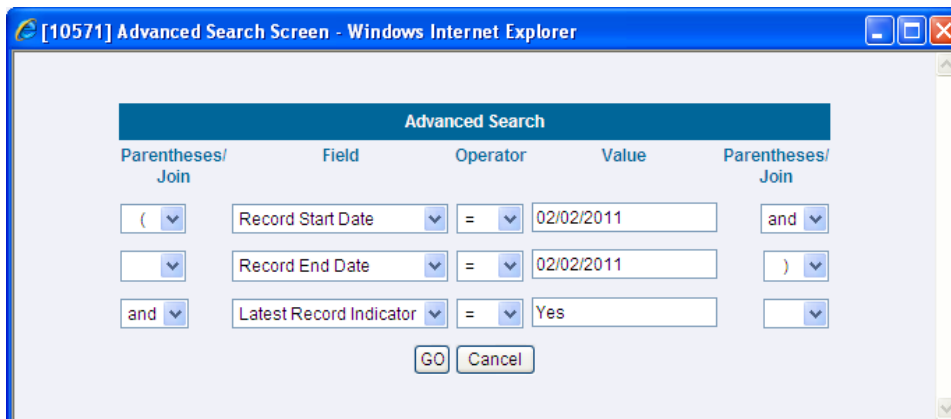
Search Records

In the *DEFQ - Data Entry* window, you can Search for a record in the View, Edit, and Authorize modes. You can perform a quick **Search** to find a specific record or run an **Advanced Search** to further query the record for the required details. To search for a record in the *DEFQ - Data Entry* window:

1. Click . The search fields are displayed.
2. Select **Field Name** from the drop down list.
3. Enter the **value/data** in the Search field.
4. Click **Go**. The search results are displayed in the list.

To perform an A**dvanced Search** in the *DEFQ - Data Entry* window:

1. Click ![search icon] within the Search fields. The *Advanced Search Window* is displayed.

2. Select the required Parentheses/Join, Field, Operator from the drop down list and enter the Value as required to query the Form data.

3. Click **GO**. The results are displayed with the field names containing the searched data.

Edit Form Details

You can edit the permitted Form field values in the *DEFQ - Data Entry* window. However, you cannot modify the primary key fields which are displayed in non editable format. To edit Form Details in the *DEFQ - Data Entry* window:

1. Open the required Form in view mode and click ![Edit icon]. The editable fields are enabled.

2. Enter/update the required details.

3. Click **Save** and update the changes. If required, you can click **Reset** to undo the changes and return to original field values.

If you have edited an Authorized record, the same is again marked for authorization. After the record is updated, a modified status flag is set, and only these record changes can be rolled back. The Roll Back option is supported in view mode only for authorized records, which are updated and saved.

Add Form Data

You can add a row to the required table and enter the field details. To Add Form Data in the *DEFQ - Data Entry* window:

1. Open the required Form in view mode and click ![Add icon]. By default, five rows are displayed. You can modify by specifying the number of required rows in **Display Rows** field and clicking **Reset**.

2. Enter the required numeric data in the new fields. If you want to view the numeric data separated by commas, enter the details accordingly.

3. Click **Save** and update the data to the selected table.

Authorize Record

You need to have DEFQMAN and SYSAUTH function roles mapped to access and authorize Forms in the DeFQ framework. You can Authorize a single record or all the records of a selected Form with the in the *DEFQ - Data Entry* window. You can authorize record in a table which has a primary key field. A primary key field in the record is indicated by "PK". You need to have the authorization rights defined by the user who has created the record. You can also Reject or Hold inappropriate records in the table.
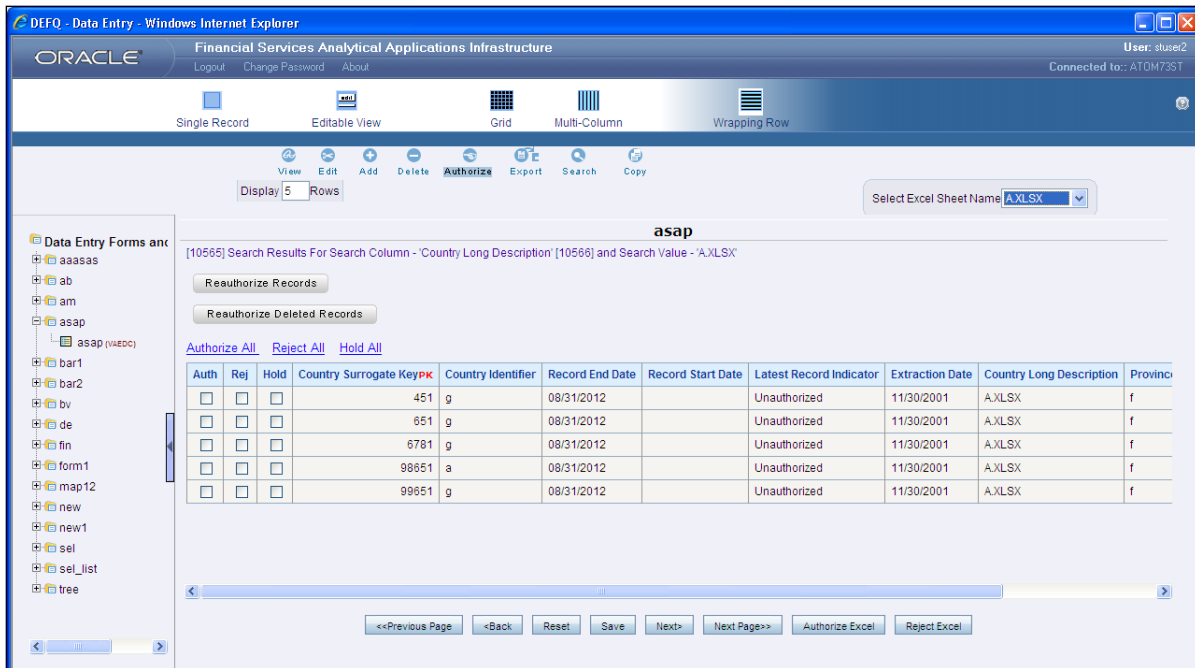
The status of each record in the table is indicated with an "AuthFlag" as indicated below:

- **Unauthorized** records are displayed with the status flag "**U**"
- **Authorized** records are displayed with the status flag "**A**".
- **Rejected** records are displayed with the status flag "**R**".
- **Modified** records are displayed with the status flag "**M**".
- **Deleted** records are displayed with the status flag "**D**".
- If an **Unauthorized** record is on **Hold**, the status flag is displayed as "**H**".
- If a **Modified** record is on **Hold**, the status flag is displayed as "**X**".
- If a **Deleted** record is on **Hold**, the status flag is displayed as "**Z**".

To Authorize Data in the *DEFQ - Data Entry* window:

1. Open the required Form in view mode and click Authorize. The list of available records for Authorization is displayed. If there are "no records" for Authorization in the selected Information Domain, an alert message is displayed.

2. Select the "Auth" checkbox adjacent to the required record with the status flag "**Unauthorized / Put On Hold**" and click **Save**. A confirmation dialog is displayed. Click **OK**. You can also do a **Bulk Authorization** if Excel Map is selected in the *Sort Fields Selection* window. Select the mapped Excel Name from the "Select Excel Sheet Name" drop down list. The *DEFQ - Data Entry* window displays only those records which are uploaded though the selected Excel sheet. Click **Authorize Excel**. A confirmation dialog is displayed. Click **OK**.

You can reject / hold a record by doing the following:

1. To **reject** a record, select the checkbox in the "**Rej**" column adjacent to the required record and click **Save**. A confirmation dialog is displayed. Click **OK**. You can also reject records in Bulk Mode if Excel Map is selected in the *Sort Fields Selection* window. Select the mapped Excel Name from the "Select Excel Sheet Name" drop down list. The *DEFQ - Data Entry* window displays only those records which are uploaded though the selected Excel sheet. Click **Reject Excel**. A confirmation dialog is displayed. Click **OK**.

2. To **Hold** a record and to authorize or reject at a later point, select the checkbox in the "**Hold**" column adjacent to the required record and click **Save**.

In the *DEFQ - Data Entry* window, you can also do the following:

1. Click **Authorize All** and click on **Save** to authorize all the records displayed in current page.

2. Click **Reject All** and click on **Save** to reject all the records displayed in current page.

3. Click **Hold All** and click on **Save** to hold all the records displayed in current page.

If you have enabled the option to send alerts to the Creator of the Form in *Message Type Maintenance* window, a message is sent indicating that the records are authorized/rejected/put-on-hold.

Re-authorize Records

You can re-authorize an authorized record which is updated by other users. When an authorized record is updated, the status flag (AuthFlag) is set to "M" indicating that the record is modified and needs re-authorization.

To re-authorize modified records in the *DEFQ - Data Entry* window:

1. Open the required Form in view mode and click [Authorize]. The list of available records with the Authorization status is displayed. If there are "no records" for Authorization in the selected Information Domain, an alert message is displayed.

2. Click **Reauthorize Records**. The *DEFQ Authorization Window* is displayed.

3. Select **Auth** checkbox adjacent to the required record.

4. Click **Save**. On re-authorization, a confirmation message is displayed. You can also select the checkbox adjacent to "Rej" to reject the record, or "Hold" to re-authorize or reject at a later point. A message is sent to the Form creator indicating that records are authorized/rejected/put-on-hold.

Re-authorize Deleted Records

You can re-authorize the delete action when an authorized record is deleted by other users. When an authorized record is deleted, the status flag (AuthFlag) is set to "D" indicating that the record is deleted and needs re-authorization.

To re-authorize deleted records in the *DEFQ - Data Entry* window:

1. Open the required Form in view mode and click [Authorize]. The list of available records with the Authorization status is displayed. If there are "no records" for Authorization in the selected Information Domain, an alert message is displayed.

2. Click **Reauthorize Deleted Records**. The *DEFQ Authorization Window* is displayed.

3. Select the "Auth" checkbox adjacent to the required record.

4. Click **Save**. On re-authorization, a confirmation message is displayed. You can also select the checkbox adjacent to "Rej" to reject the record, or "Hold" to re-authorize or reject at a later point. A message is sent to the Form creator indicating that records are authorized/rejected/put-on-hold.

Export Form Data

You can export the required record(s) to a selected location in CSV format. To Export Form Data in the *DEFQ - Data Entry* window:

1. In the View mode, select the checkbox adjacent to the record(s) which you want export.

2. Click ⊡ᵗᶜ Export. The *File Download* dialog is displayed.

3. Click **Save**. The *Save As* dialog is displayed.

4. Select the location and click **Save**. The selected record is exported.

Copy Form Data

You can copy the existing fields and create new fields in a record. When you copy a field, the primary key values are incremented from the pre-defined value to the next acceptable value. However, the other fields can be modified as required. To copy fields in the *DEFQ - Data Entry* window:

1. Open the required Form in view mode and click ⊡ Copy. The list of available records is displayed. All the primary field data (indicated by *) is incremented by default.

2. Click **Save**. The field values are added to the record. You can click **Edit** to modify the values or click **Next** to copy the next set of fields.

Delete Form Details

You can remove a Form details which are no longer required by deleting from the *DEFQ - Data Entry* window.

1. In the View mode, select the checkbox adjacent to the record which you want to delete.

2. Click ⊖ Delete. An information dialog is displayed.

3. Click **OK** to confirm and delete the record.

Excel Upload

Excel Upload utility facilitates you to upload excel data sheets to specific destination table and map the table's columns with the columns in MS Excel. In order to view the Excel Upload utility within the Infrastructure system, you need to manually copy the ".ssh" folder from the Application layer to the Web Server area after the OFSAAI installation. Contact System Administrator for more information.

Excel Upload supports excel files created in Microsoft 2007 along with the earlier versions. Also you can map and upload multiple sheets created within a single excel file. The Excel Entity Mappings and Upload utilities have the restricted access depending on the following function roles mapped:

*   Users with XLADMIN and XLUSER function roles can perform mapping and upload operations.

*   Users with XLADMIN function role can only define mapping and authorize, but cannot upload the file.

*   User with "XLUSER" function can only retrieve mapping definition (pre-defined by XLADMIN user) and can upload the file based on retrieved mapping.

You can access DEFQ - Excel upload by expanding Data Entry Forms and Queries section of Unified Metadata Manager module within the tree structure of LHS menu. The *DEFQ - Excel Upload* window displays the Excel-Entity Mappings and Excel Upload options in the LHS menu:

*   Excel-Entity Mappings

*   Excel Upload

Excel-Entity Mappings
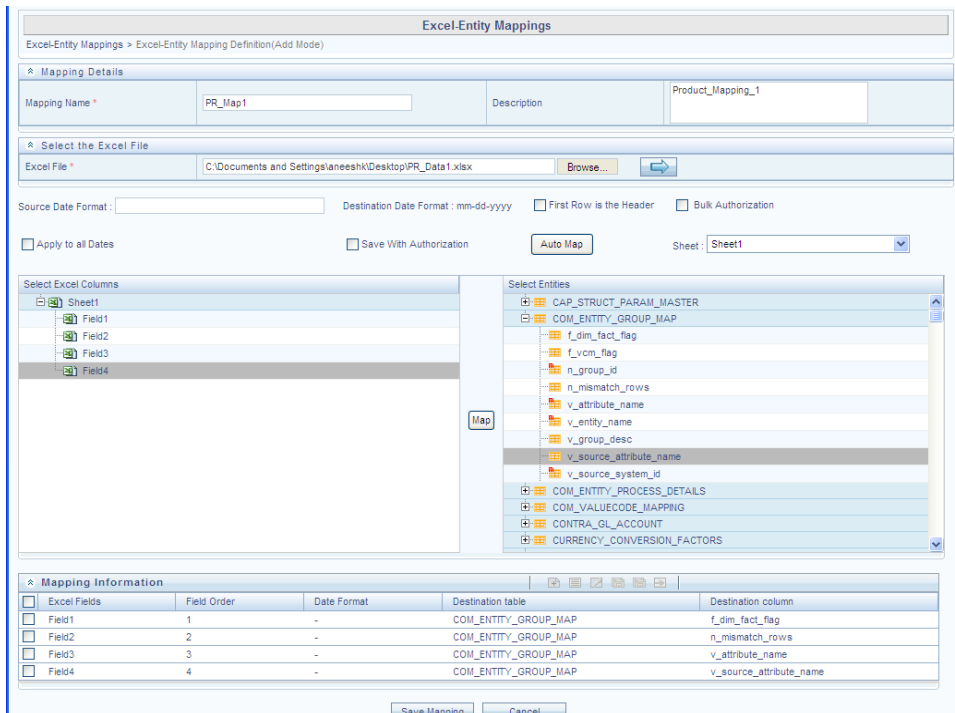
Excel-Entity Mapping helps you to map Excel Data to the destination table in the database. Excel-Entity Mapping supports excel files created in Microsoft 2007 and earlier versions along with the option to map and upload multiple sheets created within a single excel file. You need to have XLADMIN function role mapped in order to define mapping.

Add Excel-Entity Mappings

To define mapping in the *Excel-Entity Mappings* window:

1. Click Add icon in Mappings Summary tool bar. The *ADD Excel-Entity Mappings* window is displayed.

2. Enter the required **Mapping Name** and **Description**.

3. Click **Browse**. The *Choose File to Upload* dialog is displayed. Select the required Excel and click ⬜ icon.

   On upload, the selected Excel columns are listed in *Select Excel Columns* grid and the database tables are listed in *Select Entities* grid.

4. Enter the Source Date in **dd/mm/yy** format. You can select **Apply to all Dates** checkbox if the Excel contains date field.

5. Select **First Row is the Header** checkbox, If the first row in the Excel has headings.

6. Select the mapping database table by clicking on the **+** symbol or table name.

7. Click **Automap**. The respective columns with the similar names in the excel and database is mapped. You need to manually map the other columns. The mapping details are displayed in the *Mapping Information* grid which facilitates you to edit the details as required.

8. Select **Save with Authorization** checkbox to authorize and upload the data. The 3 mandatory fields: Maker_id, System_Date, and Authorization_Status, are displayed in the *Select Excel Columns* grid.

   You can also select **Bulk Authorization** checkbox to assign the "Excel_Name" across the selected column. For example, the selected column "v_fic_description" has the Excel Name assigned.

NOTE: Ensure that the selected "**Varchar2**" column contains the required length to hold the Excel Name. In order to select Bulk Authorization, you need to have **Save with Authorization** checkbox selected.

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9. Select **Save Mapping**. The *Excel-Entity Mapping* window displays the excel-database table mapping details. In the *Excel-Entity Mappings* window, you can also do the following:

   a. Click [image] icon in the Mappings Summary tool bar to **View** the mapping details.

   b. Click [image] icon in the Mappings Summary tool bar to **Edit** the mapping details.

   c. Click [image] icon in the Mappings Summary tool bar to **Delete** the mapping details.

Excel Upload

Excel Upload helps you to upload Excel Data to destination table in the database. You need to have "XLUSER" function role mapped to access *Excel Upload* window and retrieve mapping definition (pre-defined by XLADMIN user) to upload excel data. Excel Upload supports excel files created in Microsoft 2007 and earlier versions along with the option to map and upload multiple sheets created within a single excel file. You need to ensure that the excel data contains the dates in the format as defined in Add Excel-Entity Mapping definition.

To upload excel data in the *Excel Upload* window:

1. Click **Browse** in the *Excel File to Upload* grid. The *Choose File to Upload* dialog is displayed.

2. Select the required Excel and click [image] icon. The columns in excel are populated in the **Sheet** drop down list and the *Preview* grid displays the data of the selected excel file.
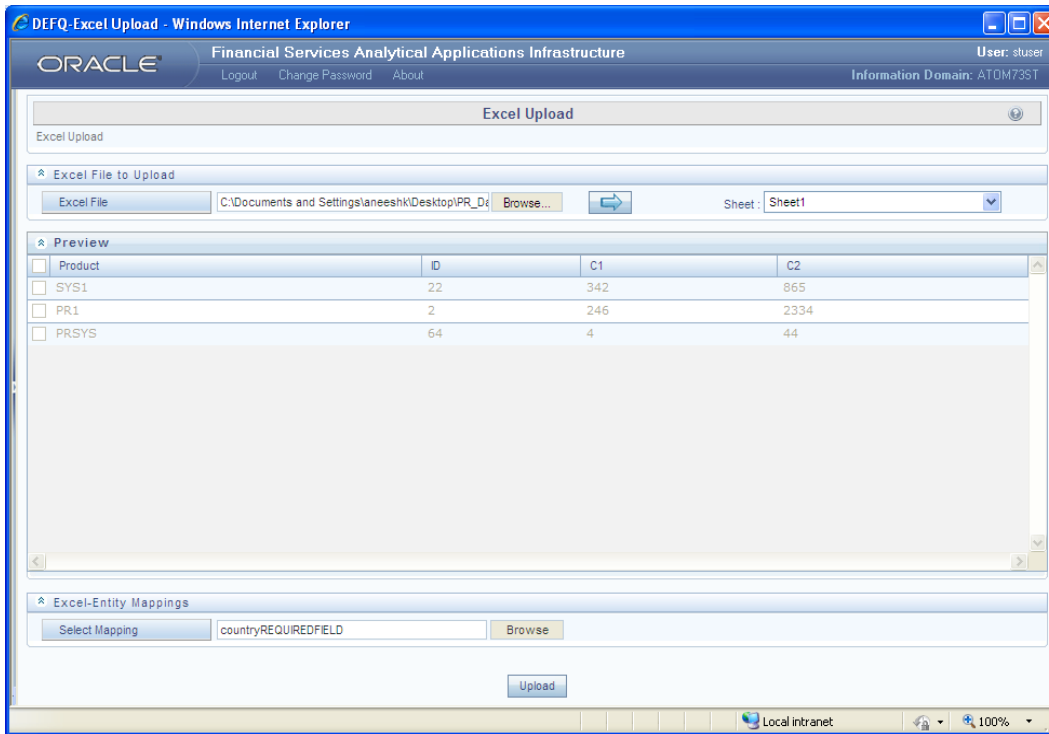
3. Click **Browse** in the *Excel-Entity Mappings* grid. The *Mapping Selector* dialog is displayed with the pre-defined mapping details.

4. Select the checkbox adjacent to the required mapping definition and click **OK**.

5. Click **Upload**. A confirmation dialog is displayed on successful upload and the excel data is uploaded to the database table.

3.3.3 Metadata Browser

Metadata Browser (Object and Application View) provides common repository of metadata objects created in OFSAAI and applications hosted in OFSAAI. Using this view, you can identify the usage of base objects in higher level objects and the mapping of Objects to Application. It enables traceability and impact analysis. It also allows you to view the data flow and the work flow of the application and understand the usage of objects within the application.

The new visualization of Metadata Browser (MDB) supports Application view and Object view. In Application view, you can browse through the metadata created using the applications hosted in OFSAAI. In object view, you can view the metadata created in OFSAAI.

Object View
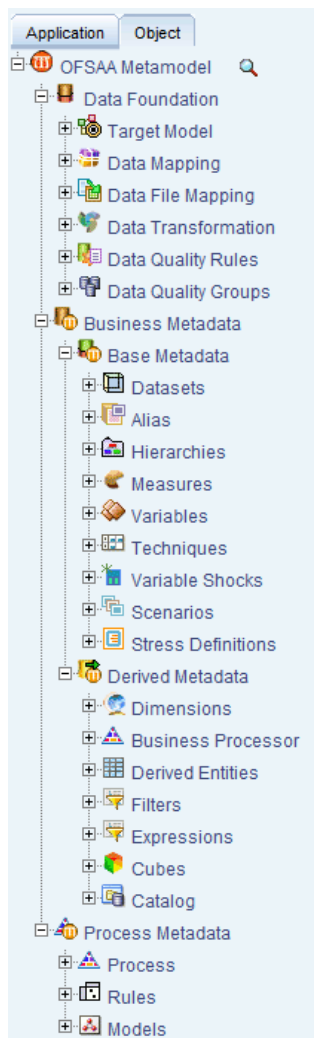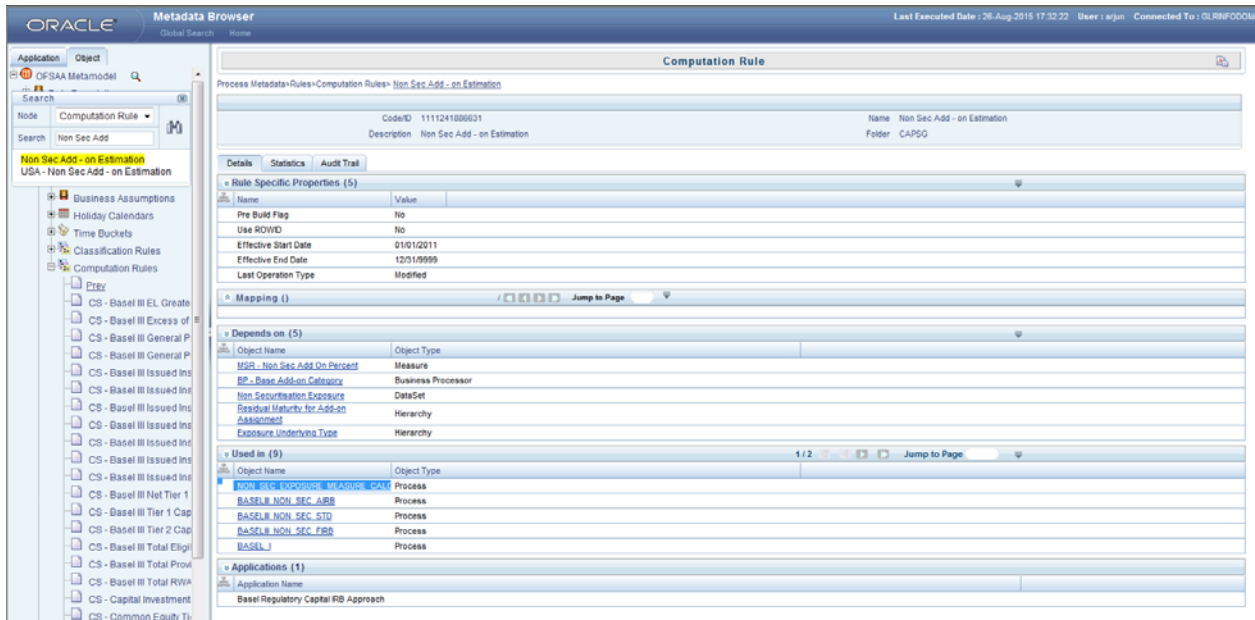
The Object view provides the following details:

- Object basic details

- Object specific details

- Mapping across objects for certain objects like T2T and Rules

- Dependency details of the Child objects

- Usage of the current Object in the higher order objects

- Object usage in the various Applications
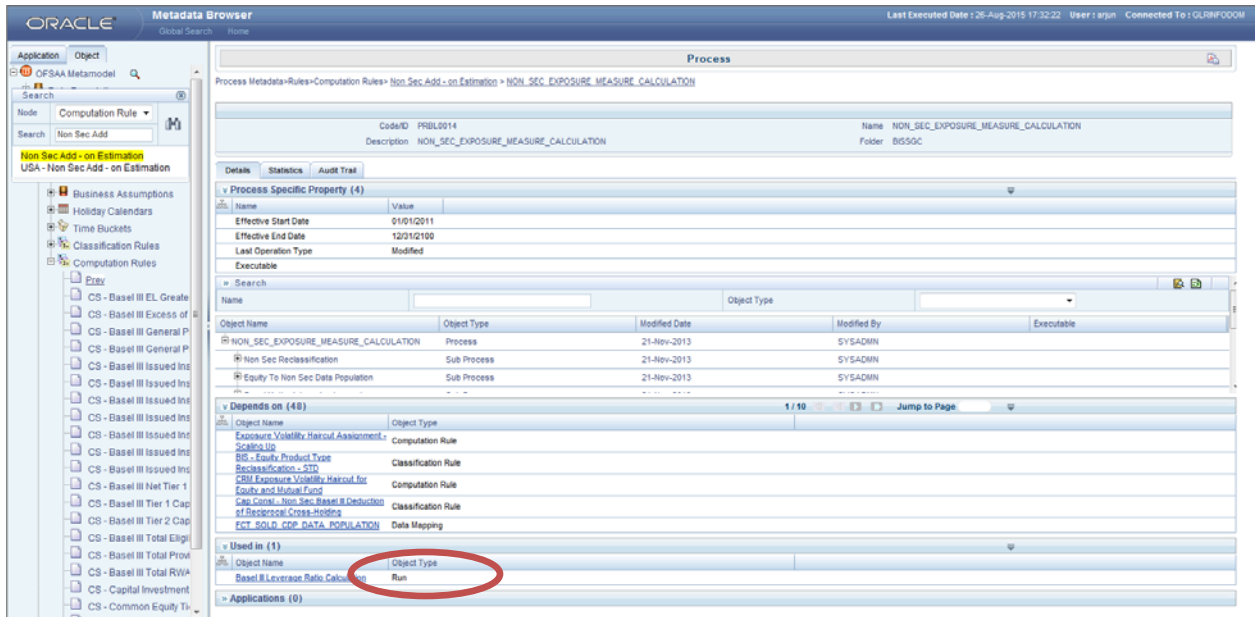
To help you navigate through the Metadata Browser, perform the following steps:

1. Select the Basel Application from the **Select Applications** drop down list in OFSAAI.

2. Click **Metadata Browser** on the LHS pane of OFSAAI. The Metadata Browser screen is displayed.

3. Select either *Application* or *Object* tab to view the underlying metadata.

4. Click ⊞, to view the metadata under each category.

5. Select the dependent metadata and then the underlying dependent run.
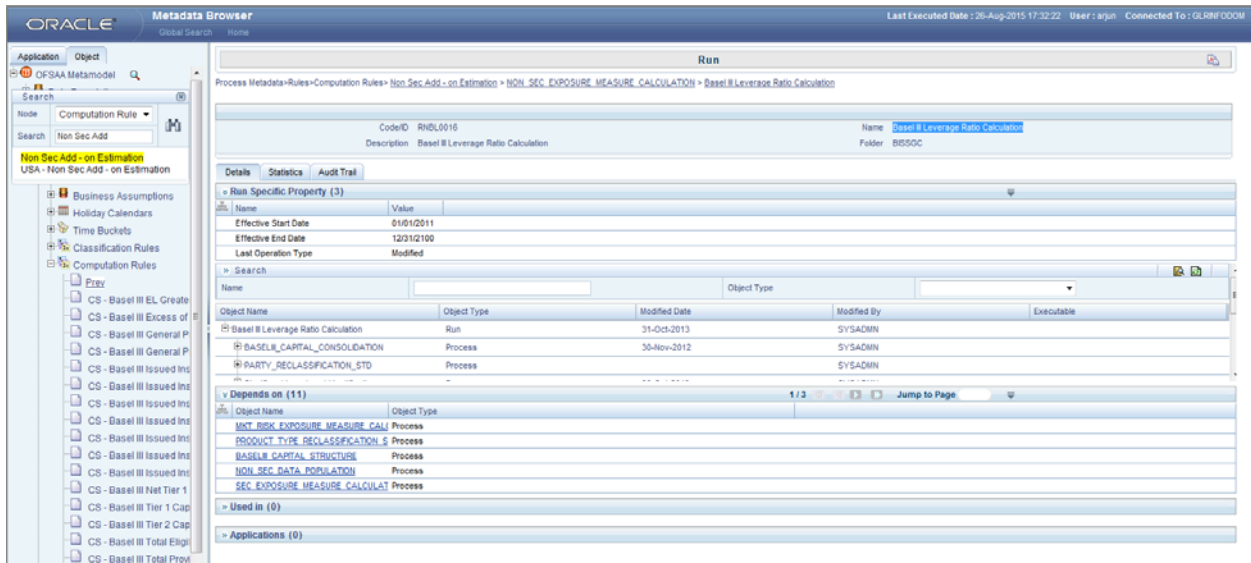
Run

Select a Run to view the details of the Run, shown in the following figure:

A Run is a combination of Processes. For example: For Run **Risk Weighted Asset Calculation-Credit Risk-BIS Standardized Approach**, **CAPITAL_ CONSOLIDATION**, **CREDIT_RATING_PROCESSING,** and **NON SEC STD** are some of the processes mapped to the Run.

Process and Sub Process

A process is a combination of Sub Processes. Select a Process and click [icon] to view the sub process mapped to a Process. The Sub Process mapped to the Process-**CAPITAL_ CONSOLIDATION** is **Capital Consolidation Approach**. For Process-**CREDIT_RATING_PROCESSING** the Sub Process is **Credit Rating Data Population**. Rules, Data Transformations, and T2Ts, are combined to form a Sub Process.

A Rule is a combination of various computational logics that transforms data. Rules are of two types:

- Computational rules (Type 3 Rule): consists of a Data Set, Source Hierarchy and Target Business Processor.
    - Data Set: A **Dataset** is a group of tables whose inter-relationship is defined by specifying a join condition between the various tables.
    - Source Hierarchy: Hierarchy is the organization of data into a logical tree structure. The subset of records on which the computational logic is applied to is stated as the Source Hierarchy.
    - Target Business Processor: Target measure is a metric which computes and stores the computed value in the defined Target Area. The target area where these computed values are populated is defined in the Target Business Processor.
- Assignment Rules (Type 2 Rule): consists of a Data Set, Source Hierarchy and Target Hierarchy.
    - Data Set: A **Data Set** is a group of tables whose inter-relationship is defined by specifying a join condition between the various tables.
    - Source Hierarchy: Hierarchy is the organization of data into a logical tree structure. The subset of records on which the computational logic is applied to is stated as the Source Hierarchy.
    - Target Hierarchy: Hierarchy is the organization of data into a logical tree structure. The target area where the reclassified records are stored is the target hierarchy.
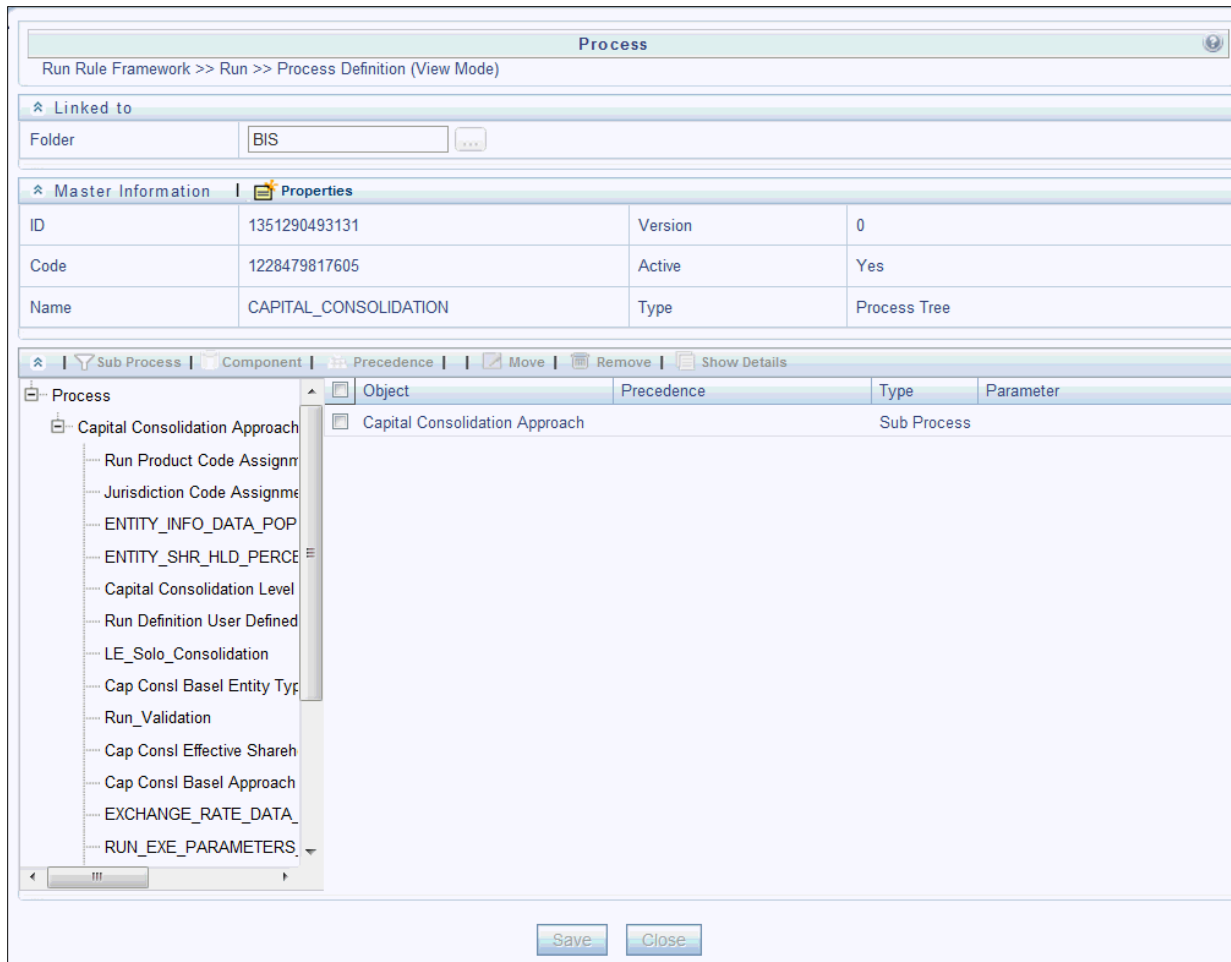
In the preceding figure, Rules, *Data Transformations (DT)* and T2Ts mapped to a Sub Process **Capital Consolidation Approach** are as follows:

- **Rules=**

  Run Product Code Assignment (Type 3 Rule)

  Run Definition Mode Assignment - User Defined (Type 3 Rule)

  Run Definition User Defined Run Param Assignment (Type 3 Rule)

  Capital Consolidation Level Selection (Type 3 Rule)

  Cap Consl Basel Entity Type Reclassification (Type 2 Rule)

  Cap Consl Effective Shareholding Percent of an Entity (Type 3 Rule)

  Cap Consl Basel Approach Type Reclassification for Entity (Type 2 Rule)

  Basel II Credit Rating Reclassification (Type 2 Rule)

- **T2T =**

  ENTITY INFO DATA POP

  ENTITY SHR HLD PERCENT POP

  GL ACCT CAPITAL HEAD POPULATION

RATING_DETAILS_DATA_POPULATION

NON_SEC_EXP_DATA_POPULATION

MITIGANT_DATA_POPULATION

NON_SEC_EXP_DATA_POPULATION

- **DT =**

Run Validation

Run Param Validation

Upd_Rating Details

This document helps you navigate to the smallest element of a Rule. You can similarly navigate to the smallest element of a T2T and Data Transformation.

Rules

Select a Rule (**Cap Consl Effective Shareholding Percent of an Entity**) from the LHS pane, the Rule which appears in the right frame of the window. Select the Rule and click [icon] to view the details of the Rule, as shown in the following figure:
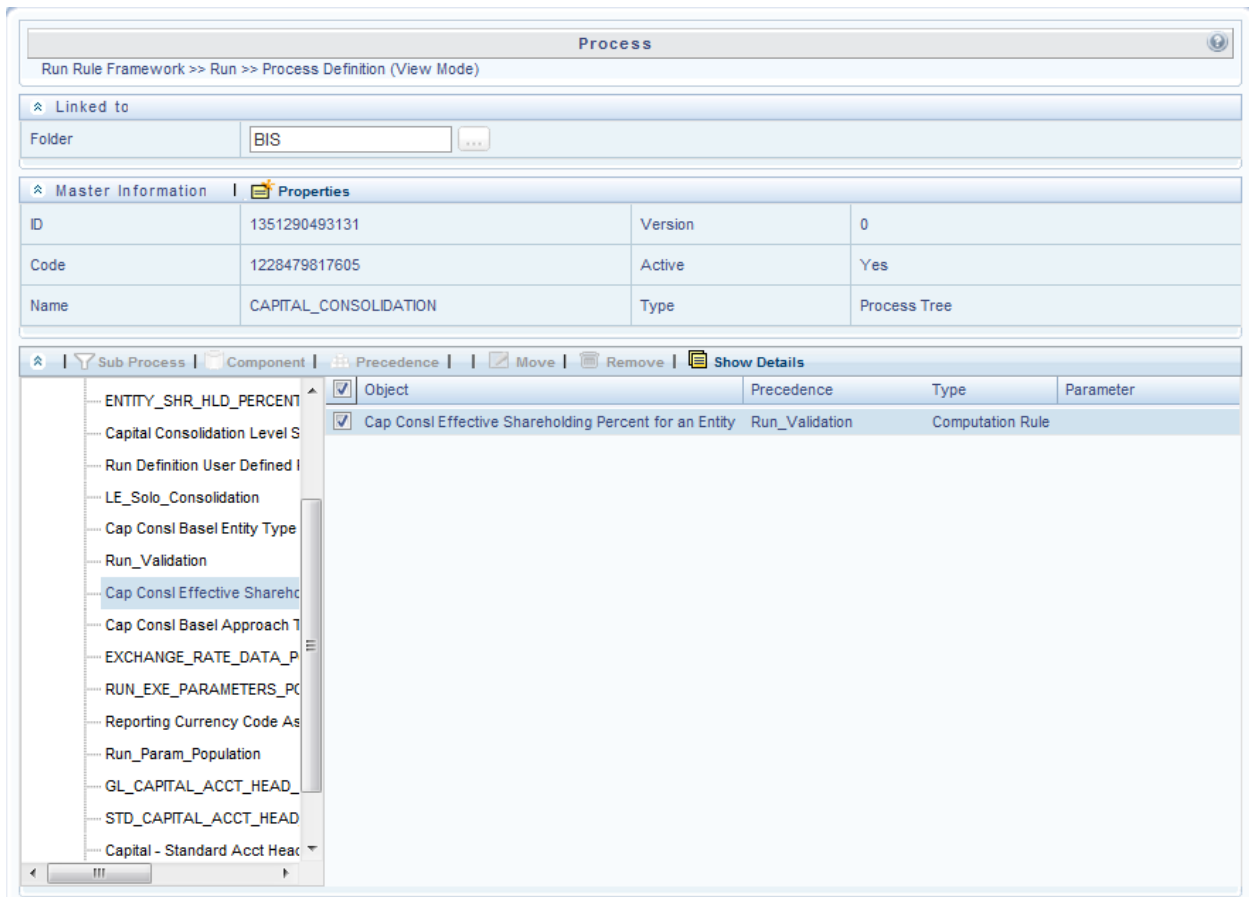
In the following figure, for Rule **Cap Consl Effective Shareholding Percent of an Entity** (a Type 3 rule), mentioned earlier, contains a Data Set, Source Hierarchy, and Target Business Processor. To relate the Rule to a specific section in the Basel accord, see the Comments section in the window.

Click in the **Dataset** (**DS0089) field** to view further details on the Data Set. In the following figure, the **Selected Entities** field displays the tables used by the dataset. Click any table to view the description of the table. The condition or inter-relationships between the tables are detailed in the **Join Condition** and **ANSI Join**.

Trace Cubes Trace Definitions Trace Forms

Details of Dataset Entity Shareholding Percent Dataset

Name	DS0089
Short Description	Entity Shareholding Percent Dataset
Long Description	Entity Shareholding Percent Dataset
Comments	
Created By	SYSADMN
Creation Date	November 25, 2008 4:54:38 PM
Last Modified By	SYSADMN
Modification Date	December 16, 2009 11:35:47 AM
Authorized By	SYSADMN
Authorization Date	December 16, 2009 11:35:48 AM
Selected Entities	Fact Shareholding Percent Fact Entity Information Run Dimension Date Dimension PARENT_ENTITY
Join Condition	COALESCE(PARENT_ENTITY.f_cap_consl_parent_entity_ind,'N') = 'Y' AND COALESCE (PARENT_ENTITY.f_cap_consl_entity_ind,'N') = 'Y'
ANSI Join	FCT_ENTITY_SHR_HLD_PERCENT INNER JOIN FCT_ENTITY_INFO ON FCT_ENTITY_INFO.n_entity_skey = FCT_ENTITY_SHR_HLD_PERCENT.n_investee_entity_skey AND FCT_ENTITY_SHR_HLD_PERCENT.n_run_skey = FCT_ENTITY_INFO.n_run_skey AND FCT_ENTITY_SHR_HLD_PERCENT.n_mis_date_skey = FCT_ENTITY_INFO.n_mis_date_skey INNER JOIN FCT_ENTITY_INFO PARENT_ENTITY ON FCT_ENTITY_SHR_HLD_PERCENT.n_investor_entity_skey = PARENT_ENTITY.n_entity_skey AND FCT_ENTITY_SHR_HLD_PERCENT.n_run_skey = PARENT_ENTITY.n_run_skey AND FCT_ENTITY_SHR_HLD_PERCENT.n_mis_date_skey = PARENT_ENTITY.n_mis_date_skey LEFT OUTER JOIN DIM_RUN ON FCT_ENTITY_SHR_HLD_PERCENT.n_run_skey = DIM_RUN.n_run_skey LEFT OUTER JOIN DIM_DATES ON FCT_ENTITY_SHR_HLD_PERCENT.n_mis_date_skey = DIM_DATES.n_date_skey
Date Filter	DIM_DATES.D_CALENDAR_DATE=$MISDATE AND DIM_RUN.n_run_skey = '$RUNSK'
Order By	

To know more about the Source Hierarchy and Target Measure used in this Type 3 Rule, return to the Rule Window. Select the **Source Hierarchy** (Cap Consl Entity Level Ind) and click icon to view details of the Source Hierarchy.

In the following figure, the Source Entity from which data is computed and populated into the Target Business Processor is displayed in the **Entity** field. Click **Fact Entity Information** to see the description of the table. Click **Capital Consolidation Entity Indicator** to view the description of the Attribute, whereby in this case, the entities appearing in the **Fact Entity Information** are flagged as **Y** if the entity is participating in Capital Consolidation.

To know more about the Target Business Processor used in this Type 3 Rule, return to the Rule Window. Click **Next.** In **Combination Mapper** section click icon and select icon to view details of the Target Business Processor.

A Business Processor (BP) consists of a Data Set, Target Measure, and an Expression.

- Data Set: A Data Set is a group of tables whose inter-relationship is defined by specifying a join condition between the various tables.

- Target Measure: Target measure is a metric which computes and stores the computed value in the defined Target Area.

- Expression: An Expression is a tool that allows for manipulation of data. Expression has three different uses:

  o To specify a calculated column that the OFSAA derives from other columns in the database

  o To calculate assignments in data correction

  o To create calculated conditions in data and relationship filters.

Click **Dataset (DS0089-Entity Shareholding Percent Dataset)** to view details of the Data Set. In the following figure, the **Selected Entities** field displays the tables used by the dataset. Click any table to view the description of the table. The condition or interrelationships between the tables are detailed in the **Join Condition** and **ANSI Join** field.

Details of Dataset Entity Shareholding Percent Dataset

Name	DS0089
Short Description	Entity Shareholding Percent Dataset
Long Description	Entity Shareholding Percent Dataset
Comments	
Created By	SYSADMN
Creation Date	November 25, 2008 4:54:38 PM
Last Modified By	SYSADMN
Modification Date	December 16, 2009 11:35:47 AM
Authorized By	SYSADMN
Authorization Date	December 16, 2009 11:35:48 AM
Selected Entities	Fact Shareholding Percent Fact Entity Information Run Dimension Date Dimension PARENT_ENTITY
Join Condition	COALESCE(PARENT_ENTITY.f_cap_consl_parent_entity_ind,'N') = 'Y' AND COALESCE (PARENT_ENTITY.f_cap_consl_entity_ind,'N') = 'Y'
ANSI Join	FCT_ENTITY_SHR_HLD_PERCENT INNER JOIN FCT_ENTITY_INFO ON FCT_ENTITY_INFO.n_entity_skey = FCT_ENTITY_SHR_HLD_PERCENT.n_investee_entity_skey AND FCT_ENTITY_SHR_HLD_PERCENT.n_run_skey = FCT_ENTITY_INFO.n_run_skey AND FCT_ENTITY_SHR_HLD_PERCENT.n_mis_date_skey = FCT_ENTITY_INFO.n_mis_date_skey INNER JOIN FCT_ENTITY_INFO PARENT_ENTITY ON FCT_ENTITY_SHR_HLD_PERCENT.n_investor_entity_skey = PARENT_ENTITY.n_entity_skey AND FCT_ENTITY_SHR_HLD_PERCENT.n_run_skey = PARENT_ENTITY.n_run_skey AND FCT_ENTITY_SHR_HLD_PERCENT.n_mis_date_skey = PARENT_ENTITY.n_mis_date_skey LEFT OUTER JOIN DIM_RUN ON FCT_ENTITY_SHR_HLD_PERCENT.n_run_skey = DIM_RUN.n_run_skey LEFT OUTER JOIN DIM_DATES ON FCT_ENTITY_SHR_HLD_PERCENT.n_mis_date_skey = DIM_DATES.n_date_skey
Date Filter	DIM_DATES.D_CALENDAR_DATE=$MISDATE AND DIM_RUN.n_run_skey = '$RUNSK'
Order By	

Click **Measure** (M0719-MSR - Cap Consl Entity Shareholding Percent) in the details of Business Processor window, to view further details on the Target Measure. The following figure, displays the target entity where the metric or data is populated. Click **Fact Entity Information** for details of the table. Using the Attribute, that is, **Shareholding Percentage** this measure aims to populate the shareholding percentage in the Fact Entity Table.

Trace Dimensions   Trace Cubes   Trace Definitions   Trace Forms

Details of Measure MSR - Cap Consl Entity Shareholding Percent

Name	M0719
Short Description	MSR - Cap Consl Entity Shareholding Percent
Long Description	Measure for Storing Shareholding Percent of the Entity
Comments	
Created By	SYSADMN
Creation Date	November 25, 2008 12:42:54 PM
Last Modified By	SYSADMN
Modification Date	
Authorized By	SYSADMN
Authorization Date	November 25, 2008 12:42:54 PM
Entity	Fact Entity Information
Attribute	Shareholding Percentage
Aggregation Type	SUM
Measure Type	Base Measure
Summary Condition	1 = 1

Therefore, this Rule aims to populate the shareholding percentage of the entities in the defined target from the master list of entities participating in the Capital Consolidation computation.

Similarly, an Assignment Rule (Type 2 Rule), as shown in the following figure, contains a Data Set, Source Hierarchy from which bank specific data is reclassified and Standardized into Basel Regulatory Capital application specific data and stored in the defined Target Hierarchy.

Rule		
Run Rule Framework >> Run >> Rule Definition (View Mode)		

⌃ Linked to

Folder	BISSEG	...	Dataset	Entity Dataset	...

⌃ Master Information | Properties

ID	1228304537655	Version	0
Code	1228304537655	Active	☑
Name	Cap Consl Basel Entity Type Reclassification	Type	Classification

⌃ List   Add | Move | Show Details

	Location	Code	Name	Type
☐	Source	HBL0028	Counterparty Type	Hierarchy
☐	Target	HBL0045	Standard Counterparty Type	Hierarchy

Next   Preview   Close

Pooling

Sub Processes can also contain Pooling and Optimizer definitions. Pooling identifies and allocates Credit Risk Mitigants to each Exposure into set categories. Pooling consists of the following:

- Data Set: A Data Set is a group of tables whose inter-relationship is defined by specifying a join condition between the various tables.
- Pooling Basis: Pooling Basis identifies the Exposures and Mitigant data from the Fact Sub Exposures Table.
- Output: is the measure which pools the Exposures and Mitigant mapping into set categories and stores in a target area.

Optimizer

Optimizer is a Linear Programming technique that computes the least capital based on the pooling allocation of Mitigants to Exposures. An Optimizer consists of the following Metadata:

- Data Set: A Data Set is a group of tables whose inter-relationship is defined by specifying a join condition between the various tables.
- X Variable
- Objective Function Co efficient
- Constraints
- Bounds
- Output

3.3.4 Business Metadata Management

Business Metadata consists of business names, descriptions for columns, tables and groupings, query and report definition, join-specification tool settings, and security definitions. Business Metadata Management (BMM) within the Infrastructure system facilitates business analysts with the catalog of data present in the data warehouse along with their business definitions. Business Metadata Management consists of the following components which is essential for Basel computation:

- Aliases
- Data Sets
- Business Measures
- Business Hierarchies
- Business Processor
- Derived Entities

Aliases

Alias refers to an assumed name or pseudonym. **Aliases** section within the Infrastructure system facilitates you to define an Alias for a table and specify the join condition between fact and dimension table. Aliases defined to a table help you to query data for varied analytical requirements.
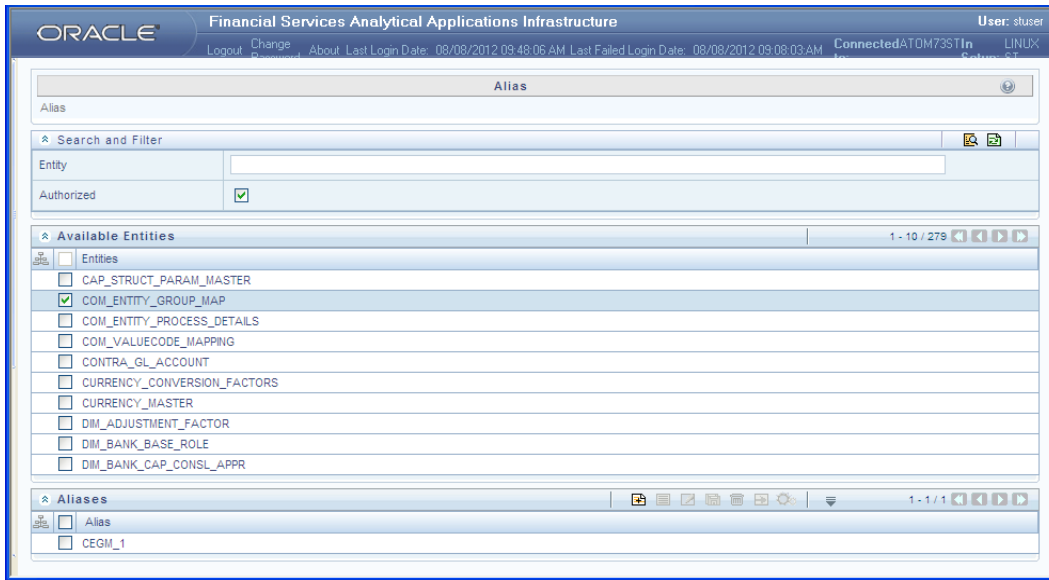
You (Business Analysts) need to have SYSBAU, Oracle Cube Administrator (ORACUB), and View Alias function roles mapped to access Aliases section in the BMM framework. You can access Aliases by expanding BMM section within the tree structure of LHS menu. The *Alias* window displays the options to create, view, edit, copy, and delete Aliases for a selected entity. You can make use of Search and Filter option to search for specific Aliases based on entity name or authorized status.

Add Alias

To create an Alias from the *Alias* window:

1. Select an entity from the *Available Entities* list for which you need to create an Alias. The *Aliases* grid displays the available aliases for the selected entity.

2. Click ⊞ icon in the *Aliases* grid. The *Add Alias* window is displayed.
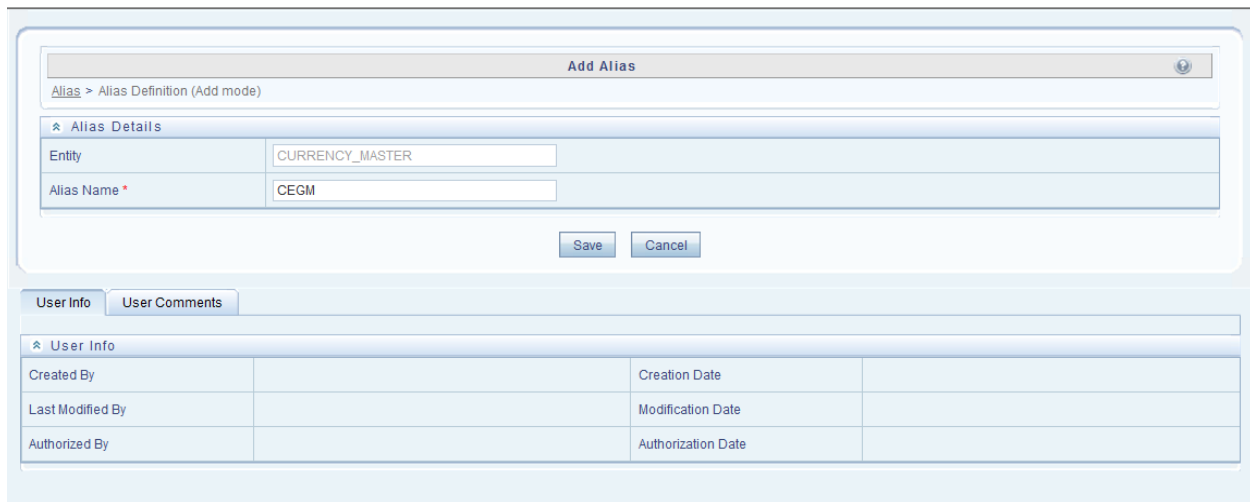
The *Alias Details* grid in the *Add Alias* window displays the entity name you have selected in a non-editable field.

---

3.   Enter the Alias name you wish to provide for the selected entity in the **Alias Name** field.

4.   Click **Save**. The Alias name is listed under the *Aliases* grid for the selected entity.

The *User Info* section at the bottom of *Add Alias* window displays metadata information about the Alias Name created. The *User Comments* section facilitates you to add or update additional information as comments.

You can view individual Alias definition details at any given point. To view the existing Alias definition in the *Alias* window, select the required Alias and click the 🔲 icon. The *View Alias* window displays the details of the selected Alias definition. The *User Info* grid at the bottom of the window displays the metadata information about the Alias definition along with the option to add comments.

You can remove Aliases which are assigned for an entity by clicking 🗑 icon.

Data Sets

Data Set refers to a group of tables whose inter-relationship is defined by specifying a join condition between the various tables. It is a basic building block to create a query and execute on a data warehouse for a large number of functions and to generate reports.

Data Set function within the Infrastructure system facilitates you to create data sets for a cube and specify rules that fine-tune the information for querying, reporting, and analysis. Data Sets enhances query time by pre-defining the names of tables required for an operation (such as aggregation), and also provides the ability to optimize the execution of multiple queries on the same table set. See Scenario to understand the Data Set functionality. You (Business Analysts) need to have DATVIW function role mapped to access Data Set section in the BMM framework. You can access Data Sets by expanding BMM section within the tree structure of LHS menu.
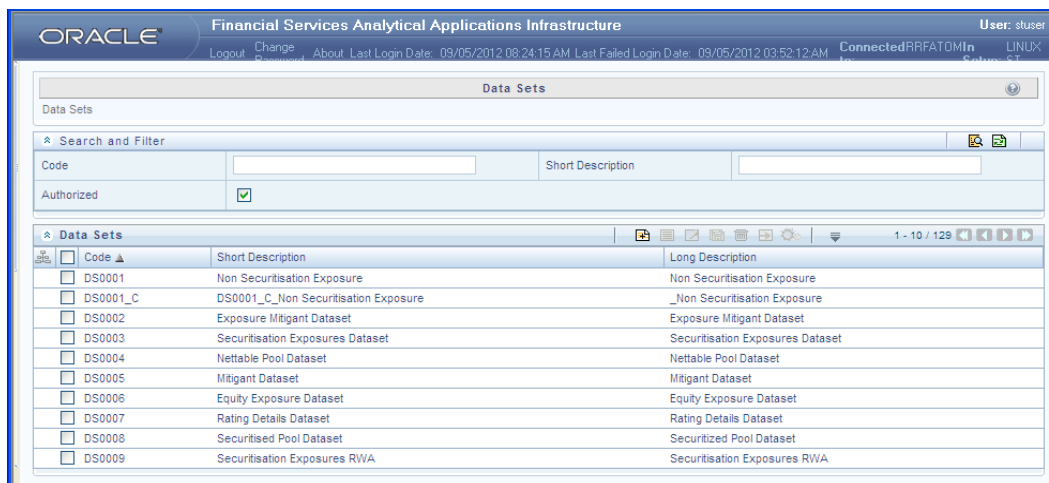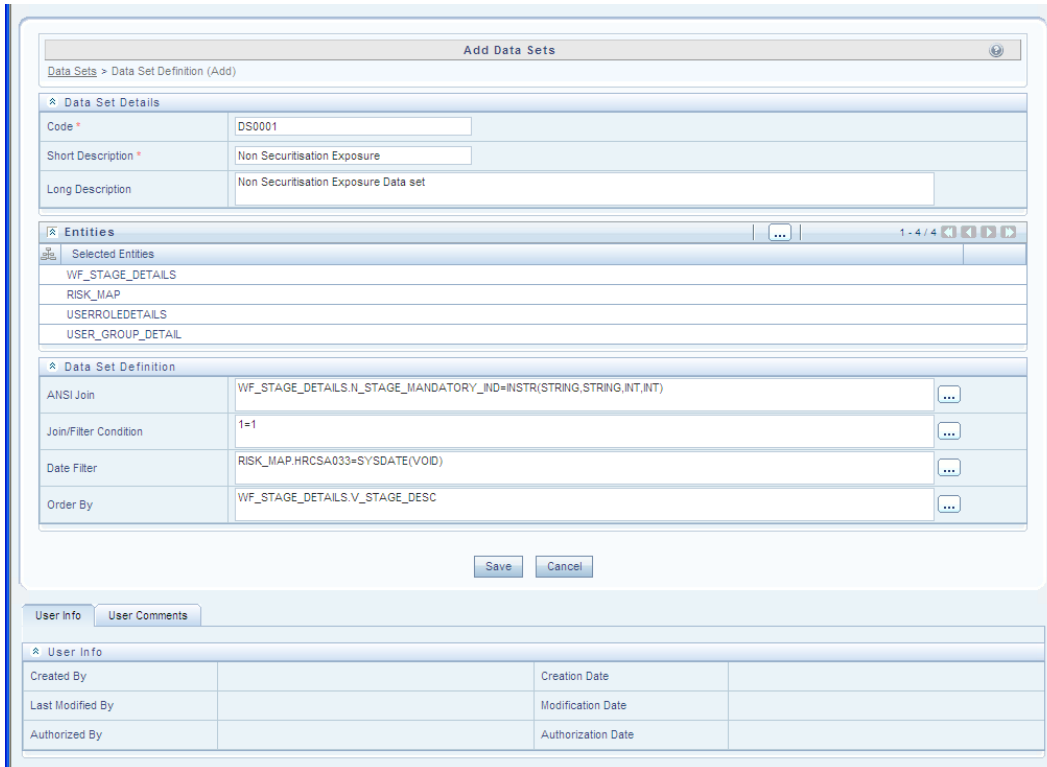
The *Data Sets* window displays the list of pre-defined Data Sets with their code and description. You can add, view, edit, copy, and delete the required Data Set. You can also make use of Search and Pagination options to search for a specific dataset based on the code, description, and Authorization status or view the list of existing datasets within the system.

Create Data Set

You can create Data Set by defining the Data Set Details, Entities, and Data Set Definition. You need to have **DATADD** function role mapped to create Data Sets. To create Data Set in the Data Sets window:

1. Click ⊞ icon from the Data Sets tool bar. The Add icon is disabled if you have selected a Data Set checkbox in the grid. The *Add Data Sets* window is displayed.

2. Enter the details in the *Data Set Details* section as tabulated.

Field	Description
Fields marked in red asterisk (*) are mandatory.	
Code	Enter a distinct code to identify the Data Set. Ensure that the code is alphanumeric with a maximum of 8 characters in length and there are no special characters except underscore "_". **Note the following**: ▪ The code can be indicative of the type of Data Set being created. ▪ A pre-defined Code and Short Description cannot be changed. ▪ Same Code or Short Description cannot be used for Essbase installation: "$$$UNIVERSE$$$", "#MISSING", "#MI", "CALC", "DIM", "ALL", "FIX", "ENDFIX", "HISTORY", "YEAR", "SEASON", "PERIOD", "QUARTER", "MONTH", "WEEK", "DAY". ▪ In Unauthorized state, the users having Authorize Rights can view all the unauthorized Metadata.
Short Description	Enter a Short Description based on the defined code. Ensure that the description is of a maximum of 8 characters in length and does not contain any special characters except underscore "_".
Long Description	Enter the Long Description if you are creating subject-oriented Data Set to help users for whom the Data Set is being created or other details about the type/subject. Ensure that the description is of a maximum of 100 characters in length.

3. Select the Entities by doing the following:

    a. Click Select icon from the Entities tool bar.

       The *Entity and Attribute* window is displayed.

    b. Select the checkbox adjacent to the required fact table(s)/entities from the **Available Entities** list and click 🔁 icon. You can select multiple dimension tables and link each other and with a join condition. You can also Search for the required entity using the Search field. The selected Entities are displayed in the Selected Entities grid. To delete a selected entity, select the Entity checkbox and click 🗑 icon.

    c. Click **Save**. The details are populated in the *Add Data set* window.

4. Specify the required table-join condition in the *Data Set Definition* grid as tabulated.

Field	Description
ANSI Join	The ANSI Join condition defines which set of data is joined along with the type of join condition. It also describes the exact operations to be performed while joining the Data Sets. In ANSI join, the join logic is clearly separated from the filtering criteria.
Join/Filter Condition	The Join/Filter Condition facilitates the objective of creating Data Sets. Data Sets with linked tables using the join conditions help in reducing the query time. There are two ways of defining the join condition: ▪ JOIN condition for SQL Server/SQL OLAP combination should contain only EQUI JOIN condition as required by SQL OLAP. ▪ For SQL Server/Essbase and Oracle/Essbase, data set is defined. Multiple cubes can be built with a single pass and the underlying data set definition should be the same for all the cubes mapped which reduces the aggregation time considerably.
Date Filter	The Date Filter condition enables you to cascade the cubes that are using the data set with the defined Date Filter.
Order By	The Order By condition enables you to sort the dimension data in order. The order of the Dimension nodes is maintained only for Business Intelligence enabled hierarchies. The Order By condition is specific to the Essbase database.

5. Enter the required expression or click [...] icon to define an expression using the *Expression* window.

6. Click **Save** and save the Data Set Definition details.

You can view individual Data Set details at any given point by clicking the 📄 icon. The *View Data Sets* window displays the details of the selected Data Set definition. The *User Info* grid at the bottom of the window displays the metadata information about the Data Set definition created along with the option to add comments.

You can update the existing Data Set definition details except for the Code and Short Description by clicking the ✏ icon. You need to have **DATMOD** function role mapped to modify the Data Sets.

You can copy the existing Data Set details to quickly create a new Data Set by clicking the 💾 icon. You can later modify the Data Set Code or Short Description, add/remove tables, and also define the join conditions. You need to have **DATADD** function role mapped to copy the Data Set definitions.

You can remove the Data Set definition(s) which are created by you and which are no longer required in the system by deleting from the *Data Sets* window by clicking the 🗑 icon. You need to have **DATDEL** function role mapped to delete a Data Set. Delete function permanently removes the Data set details from the database. Ensure that you have verified the details as indicated below:

- A Data Set definition marked for deletion is not accessible for other users.

- Every delete action is **Authorized/Rejected** by the authorizer.

- On Authorization, the Data Set details are removed.

- On Rejection, the Data Set details are reverted back to authorized state.

- You cannot update Data Set details before authorizing/rejecting the deletion.

- An un-authorized Data Set definition can be deleted.

Business Measures

Business Measure refers to a uniquely named data element of relevance which can be used to define views within the data warehouse. It typically implies aggregated information as opposed to information at a detailed granular level that is available before adequate transformations.

Business Measure function within the Infrastructure system facilitates you to create measures based on the area of analysis. While creating a measure, you can choose the aggregation type and apply business exclusion rules based on your query/area of analysis. Business Measures can be stored as Base and Computed measures and can also be reused in defining other multi dimensional stores and query data using the various modules of Oracle Analytical Application Infrastructure. You (Business Analysts) need to have **MSRVIW** mapped to view Business Measure section in the BMM framework and **MSRADD**, **MSRMOD**, and **MSRDEL** to add, update and delete Business Measures.

The *Business Measures* window displays the list of pre-defined Business Measures with their Code, Short Description, Long Description, Aggregation Function, Entity, and Attribute. You can add, view, edit, copy, and delete the required Business Measures. You can also make use of Search and Pagination options to search for a specific Business Measure based on the Code, Short Description, and Authorization status or view the list of existing Business Measures within the system.

Create Business Measure

You can create a Business Measure by specifying the Business Measure Details and defining the Business Measure Definition. To create a measure in the *Business Measures* window:

1. Click ![icon] icon from the Business Measures tool bar. The *Add Business Measures* window is displayed.

2. Enter the details in the Business Measure Details section as tabulated.

Field	Description
Fields marked in red asterisk (*) are mandatory.	
Code	Enter a distinct code to identify the Measure. Ensure that the code is alphanumeric with a maximum of 8 characters in length and there are no special characters except underscore "_". **Note the following**: ▪ The code can be indicative of the type of Measure being created. ▪ A pre-defined Code and Short Description cannot be changed. ▪ Same Code or Short Description cannot be used for Essbase installation: "$$$UNIVERSE$$$", "#MISSING", "#MI", "CALC", "DIM", "ALL", "FIX", "ENDFIX", "HISTORY", "YEAR", "SEASON", "PERIOD", "QUARTER", "MONTH", "WEEK", "DAY". ▪ In Unauthorized state, the users having Authorize Rights can view all the unauthorized Metadata.

Field	Description
Short Description	Enter a Short Description based on the defined code. Ensure that the description is of a maximum of 8 characters in length and does not contain any special characters except underscore "_".
Long Description	Enter the Long Description if you are creating subject-oriented Measure to help users for whom the Measure is being created or other details about the type/subject. Ensure that the description is of a maximum of 100 characters in length.

3. Enter the details in the Business Measure Definition section.

4. Select the required **Aggregation Function** from the drop down list. The list consists of various metrics based on which a Measure can be aggregated. The available aggregation functions are as tabulated.

Aggregator	Description
SUM	Adds the actual value of attribute or data element to get the measure value.
COUNT	Counts the records for the data element to get the measure value or counts the number of occurrences
MAXIMUM	This function acquires the maximum of the data element to get the measure value.
MINIMUM	This function obtains the minimum of the data element to get the measure value.
COUNT DISTINCT	This function is different from a simple count aggregation function. The peculiarity of these measures is that they are linked to the dimensions and they vary across the hierarchies of these dimensions. In a Count Distinct aggregation function a simple roll cannot determine the values at the intermediate nodes in the hierarchies up of their leaf level values.

a. Based on the selected Aggregation Function the **Data Type** is auto populated.

b. Selecting **Roll Up** checkbox calculates the measure values and displays the nodes at the total level. By default, the checkbox is selected if the Aggregation Type is Maximum, Minimum, Count, or Sum. Roll Up option, when selected with Percentage Measures results in wrong values at intermediate/total levels.

5. Select the Entity to load the data for the Measure. Click the [...] icon, The *Entity and Attribute* window is displayed.

a. Select the checkbox adjacent to the required Entities from the **Available Entities** list. The corresponding attributes are displayed in the **Available Attributes** list.

b. Select the checkbox adjacent to the required Attribute.

NOTE: The Entity list is dependent on the imported Data Model.

You can also search for an Entity using the Search option.

c. Click **Save**. The selected Entity and Attributes are displayed in the Entity field of the *Add Business Measures* window.

6. Define the **Business Exclusions** rules for the base Measure. You can enter the expression or click the [...] icon to define using the *Expression* window.

7. Define **Filter Expression** to filter the aggregation process. You can enter the expression or click [...] icon to define using the *Expression* window.

8. Click **Save** and save the Business Measure details.

You can view individual Business Measure at any given point by clicking the [icon] icon. The *View Business Measures* window displays the details of the selected Business Measure definition. The User Info grid at the bottom of the window displays the metadata information about the Business Measure created along with the option to add comments.

You can update the existing Business Measure definition details except for the Code and Short Description by clicking the [icon] icon.

You can copy the existing Business Measure details to quickly create a new Business Measure by clicking the [icon] icon. You can later modify the Code or Short Description, add/remove Entities and Attributes, and also define the join/filter conditions. You need to have Add Business Measure function role mapped to copy the Business Measure definitions.

You can remove the Business Measure definition(s) which are created by you and which are no longer required in the system by deleting from the Business Measures window, by clicking the [icon] icon. You need to have Delete Measures function role mapped to delete a Business Measure. Delete function permanently removes the Business Measure details from the database. Ensure that you have verified the details as follows:

- A Business Measure definition marked for deletion is not accessible for other users.
- Every delete action is **Authorized/Rejected** by the authorizer.
- On Authorization, the Business Measure details are removed.
- On Rejection, the Business Measure details are reverted back to authorized state.
- You cannot update Business Measure details before authorizing/rejecting the deletion.
- An un-authorized Business Measure definition can be deleted.

Business Hierarchy

Business Hierarchy refers to *Organizing Data* into logical tree structure to represent the groups and relations among various levels at which measure can be viewed. A measure can be viewed at different levels depending upon the hierarchy breakdown of the dimension category.

For example, consider the following structure.
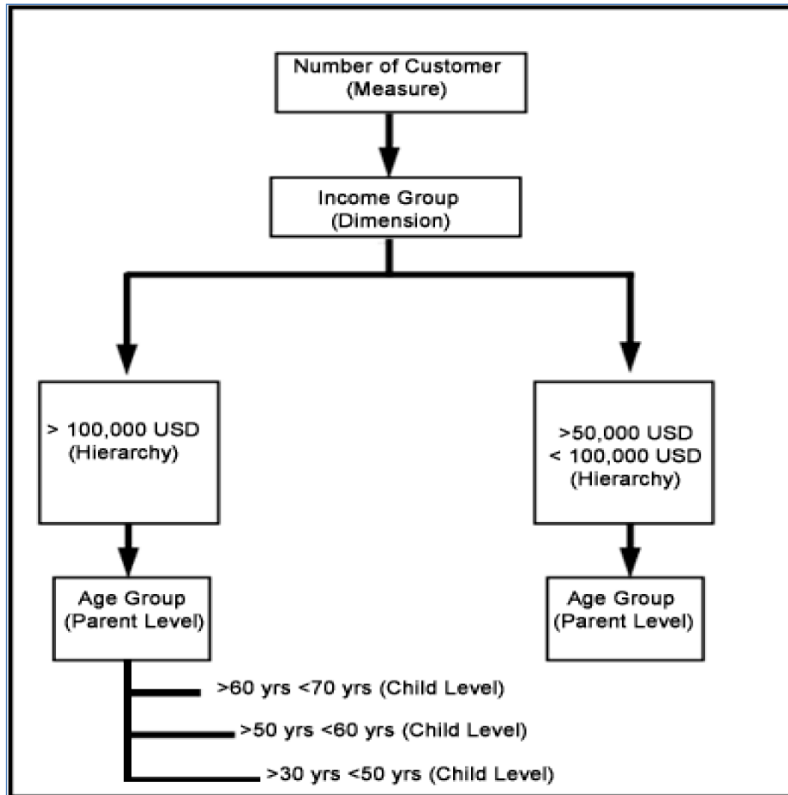
You can view the Number of Customers (Measure) across Income Group (Dimension), which is further broken down by different age groups (Hierarchy). While number of customers is a metric, it is useful when viewed based on some categorization such as customer income profile or customers having an annual income of over USD 100,000 per annum, to provide better quality of information.

You (Business Analysts) need to have SYSBAU, Oracle Cube Administrator (ORACUB), and View Hierarchy function role mapped to access Business Hierarchy section in the BMM framework. You can access Business Hierarchy by expanding BMM section within the tree structure of LHS menu.
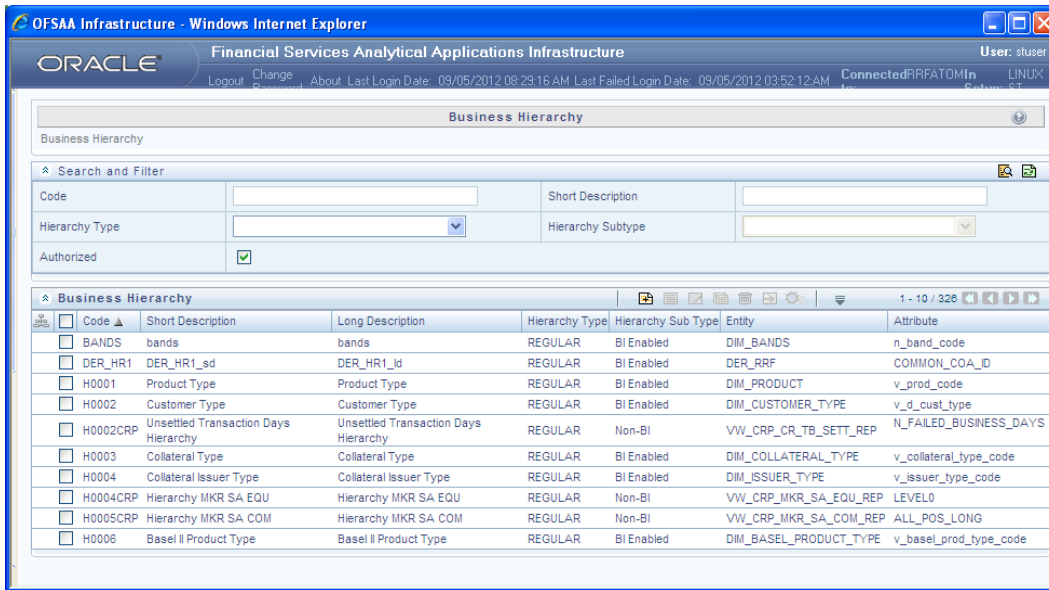
The *Business Hierarchy* window displays the list of pre-defined Business Hierarchies with their Code, Short Description, Long Description, Hierarchy Type, Hierarchy Sub Type, Entity, and Attribute. You can create Business Hierarchies for measure(s), and view, edit, copy, or delete the required Business Hierarchies.

You can also make use of Search and Pagination options to search for a specific Business Hierarchy based on the Code, Short Description, Hierarchy Type, Hierarchy Sub Type, and Authorization status, or view the list of existing Business Hierarchies within the system.

Create Business Hierarchy

You can create a Business Hierarchy by specifying the Hierarchy definition details and defining the required Hierarchies. To create a Business Hierarchy in the *Business Hierarchy* window:

1. Click [icon] icon from the Business Hierarchy toolbar. The *Add Business Hierarchy* window is displayed.

2. Enter the details in Business Hierarchy Details section as tabulated.

Field	Description
Code	Enter a distinct code to identify the Hierarchy. Ensure that the code is alphanumeric with a maximum of 8 characters in length and there are no special characters except underscore "_". **Note the following:** ▪ The code can be indicative of the type of Hierarchy being created. ▪ A pre-defined Code and Short Description cannot be changed. ▪ Same Code or Short Description cannot be used for Essbase installation: "$$$UNIVERSE$$$", "#MISSING", "#MI", "CALC", "DIM", "ALL", "FIX", "ENDFIX", "HISTORY", "YEAR", "SEASON", "PERIOD", "QUARTER", "MONTH", "WEEK", "DAY". ▪ In Unauthorized state, the users having Authorize Rights can view all the unauthorized Metadata.
Short Description	Enter a Short Description based on the defined code. Ensure that the description is of a maximum of 8 characters in length and does not contain any special characters except underscore "_".

Field	Description
Long Description	Enter the Long Description if you are creating subject-oriented Hierarchy to help users for whom the Hierarchy is being created or other details about the type/subject. Ensure that description is of a maximum of 100 characters in length.

In the Business Hierarchy Definition section, select the **Hierarchy Type** from the drop down list.

NOTE: Hierarchy Type is the basic differentiator and based on your selection, the other options to define the Business Hierarchy are available.

You can select the following Hierarchy Type/Sub-Type. Click the links to navigate to the respective sections and define the required Hierarchy.

Hierarchy Type	Description / Hierarchy Sub Type
Regular	In a Regular Hierarchy Type, you can define the following Hierarchy Sub Types: ▪ Non Business Intelligence Enabled In a non Business Intelligence Enabled Hierarchy, you need to manually add the required levels. The levels defined form the Hierarchy. ▪ Business Intelligence Enabled You can Enable Business Intelligence hierarchy when you are not sure of the Hierarchy structure leaf values or the information is volatile and also when the Hierarchy structure can be directly selected from RDBMS columns. The system automatically detects the values based on the actual data. In a BI enabled Hierarchy, you are prompted to specify if a Total node is required (not mandatory) and system auto-detects the values based on actual data. For example, you can define three levels in BI Enabled hierarchies like, Region (1), State (2), and Place (3). The auto generated Hierarchies are: <table><tr><td>**Region (1)**</td><td>**State (2)**</td><td>**Place (3)**</td></tr><tr><td>South</td><td>Tamil Nadu Karnataka Andhra Pradesh</td><td>Madras Bangalore Hyderabad</td></tr><tr><td>North</td><td>Punjab</td><td>Chandigarh</td></tr></table> ▪ Parent Child This option can be selected to define a Parent Child Type hierarchy.
Measure	A Measure Hierarchy consists of the defined measure as nodes and has only the *Non Business Intelligence Enabled* as Hierarchy Sub Type.
Time	A Time Hierarchy consists of the levels/nodes of high time granularity and has only the *Business Intelligence Enabled* as Hierarchy Sub Type.

NOTE: When the defined Hierarchy consists of more than 100 leaf levels, the system treats it as a Large Hierarchy in order to provide efficient and optimized hierarchy handling. For more information on modify the default value, see Large Hierarchy.

Save the details after you have populated the required details in Business Hierarchy Definition and Hierarchy Details sections.

3. Click **Save** in *Add Business Hierarchy* window and save the details.

You can view individual Business Hierarchy at any given point by clicking the ▣ icon. The *View Business Hierarchy* window displays the details of the selected Business Hierarchy definition. The *User Info* grid at the bottom of the window displays metadata information about Business Hierarchy created along with the option to add comments.

You can update the existing Business Hierarchy definition details except for the Code, Short Description, and Hierarchy Type/Sub-Type, by clicking the ▣ icon. You need to have Modify Hierarchy function role mapped to modify the Business Hierarchy definitions.

You can copy the existing Business Hierarchy details to quickly create a new Business Hierarchy, by clicking the ▣ icon. You need to have Add Hierarchy function role mapped to copy the Business Hierarchy definitions.

You can remove the Business Hierarchy definition(s) which are created by you and which are no longer required in the system by deleting from the *Business Hierarchy* window, by clicking the ▣ icon. You need to have Delete Hierarchy function role mapped to delete a Business Hierarchy. Delete function permanently removes the Business Hierarchy details from the database. Ensure that you have verified the details as indicated below:

- A Business Hierarchy definition marked for deletion is not accessible for other users.
- Every delete action is **Authorized/Rejected** by the authorizer.
- On Authorization, the Business Hierarchy details are removed.
- On Rejection, the Business Hierarchy details are reverted back to authorized state.
- You cannot update Business Hierarchy details before authorizing/rejecting the deletion.
- An un-authorized Business Hierarchy definition can be deleted.

Business Processor

Business Processor refers to a uniquely named data element of relevance which can be used to define views within the data warehouse. It typically implies aggregated information as opposed to information at a detailed granular level that is available before adequate transformations.

A Business Processor encapsulates business logic for assigning a value to a measure as a function of observed values for other measures. Business Processors are required Measurements that require complex transformations that entail transforming data based on a function of available base measures. Measurements that require complex transformations that entail transforming data based on a function of available base measures require Business Processors. A supervisory requirement necessitates the definition of such complex transformations with available metadata constructs.

Business Processors are metadata constructs used in the definition of such complex rules. Business Processors are designed to update a measure with another computed value. When a rule that is defined with a Business Processor is processed, the newly computed value is updated on the defined target.

The *Business Processor* window displays the list of pre-defined Business Processors with their Code, Short Description, Long Description, Dataset, and Measure. The *Business Processor* window allows you to generate values that are functions of base measure values. Using the metadata abstraction of a business processor, power users have the ability to design rule-based transformation to the underlying data within the data warehouse / store. You can make use of Search and Filter option to search for specific Business Processors based on Code, Short Description, or Authorized status. The Pagination option helps you to manage the view of existing Business Processors within the system.

Create Business Processor

To create a Business Processor from the *Business Processor* window:

1. Click ![icon] icon. The *Add Business Processor* window is displayed.

2. Enter the details as tabulated:

Field	Description
Code	While creating a new Business Processor, you need to define a distinct identifier/Code. It is recommended that you define a code that is descriptive or indicative of the type of Business Processor being created. This helps in identifying code while creating rules.
	Note the following:
	▪ It is mandatory to enter a Code.
	▪ The Code should be minimum eight characters in length; it can be alphabetical, numerical (only 0-9) or alphanumerical characters.
	▪ The Code should start with an Alphabet.
	▪ The Code cannot contain special characters with the exception of the underscore symbol (_).
	▪ The saved Code or Short Description cannot be changed.

Field	Description
Short Description	Short description is useful in understanding the content of the Business Processor you are creating. It would help to enter a description based on the code. Note the following: ▪ It is mandatory to enter a Short Description. ▪ The Short Description should be of minimum one character and maximum of 80 characters in length. ▪ Only Alphanumeric, non-English, and Special characters such as "<blank space>", ".", "$", "&", "%", "<", ">", ")", "(", "_", and "-" are permitted to be entered in the Short Description field.
Long Description	The long description gives an in-depth understanding of the Business process you are creating. It would help you to enter a Long Description based on the code. The Long Description should be of minimum one character and maximum 100 characters in length.
Data Set	Select the Data Set from the drop-down list. The list of available Data Sets for the selected Information Domain appear in the drop-down. The Short Description of the Data Sets as entered in the *Data Sets* window under **Business Metadata Management** is reflected in the dropdown.
Measure	Select the Measure from the drop-down list. All base measures that are defined on any of the tables present in the selected Data Set appear in the drop-down. If the underlying measure is deleted after the Business Processor definition, then the corresponding **Business Processor** definition is automatically invalidated.
Expression	Click [...] icon. The *Expression* window is displayed. The placeholder option enables the user to provide values for the constants in the expression. The user can specify values to the business processor expression during the run time rather than at definition time through the place holders defined while specifying the expression. The user can specify the expression in the "**Expression**" field. Note the following: ▪ The values for the placeholders can be alphanumeric. ▪ The process of specifying place holders enables the user to execute the same business processor definition with different values during the run time.

Field	Description
Expression has Aggregate Function	The expression can require an aggregation function depending on the business logic. The aggregation functions are entered in the expression field per acceptable syntax. IF an aggregation function is used in the expressions, the checkbox "**Expression has Aggregate Function**" is enabled. Leave the checkbox "**Expression has Aggregate Function**" blank if your expression does not contain an aggregation function.

You can also:

- Click icon in the *Business Processor Definition* grid to refresh the entries.
- Click **Parameters** icon to specify default values for any of the placeholders defined.

The *Business Processor Expression Parameters* dialog is displayed.
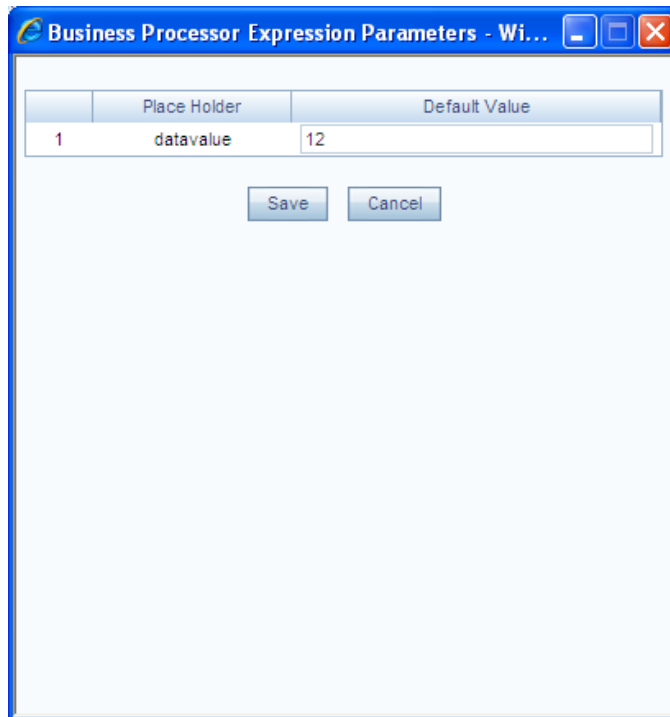
3. Enter a default value for the place holders defined along with the expression in the **Default Value** box.

4. Click **Save** to save the default value for a Place Holder. The *User Info* grid at the bottom of the window displays the metadata information about the Business Processor definition created along with the option to add comments.

5. Click **Save**. The Business Processor is saved and listed in the *Business Processor* window after validating the entries.

You can view individual Business Processor definition details at any given point, by clicking the icon. The *View Business Processor* window displays the details of the selected Business Processor definition. The *User Info* grid at the bottom of the window displays the metadata information about the Business

Processor definition along with the option to add comments.

You can update the existing Business Processor definition details except for the Business Processor Code and Short Description, by clicking the [icon] icon.

You can copy the existing Business Processor to quickly create a new Business Processor definition based on the existing rule details or by updating the required parameters, by clicking the [icon] icon. You can remove Business Processor definition(s) which are no longer required in the system by clicking the [icon] icon.

Derived Entity

Entity refers to a table in which data is stored. Derived Entity within the Infrastructure system facilitates you to define entities which are populated through a series of data transformation processes resulting from an existing Data Set or a Source Application. An Entity can be used to define other Business Metadata such as measures, hierarchies, dimensions, data sets, and cubes.
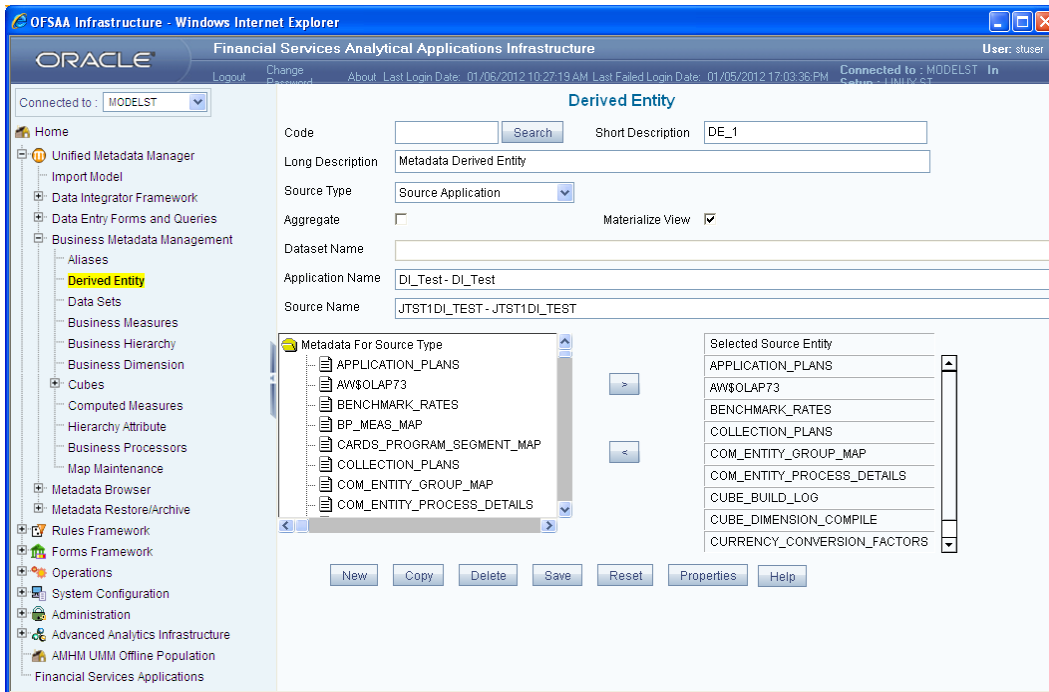
You (Business Analysts) need to have View Derived Entities function role mapped to access Derived Entity section in the BMM framework. You can access Derived Entity by expanding BMM section within the tree structure of LHS menu. The *Derived Entity* window displays the options to define and edit the derived entity definitions for a selected table.

Create Derived Entity

You can define Derived Entity only if you have Add Derived Entity function role mapped in the Infrastructure system. You can create a Derived Entity based on Data Set or Source Application. To define a Derived Entity based on Source Application, you need to have defined permissions for the particular Source Application in the Atomic schema. You can also authorize a Derived Entity created by other users if you have the authorizer rights.
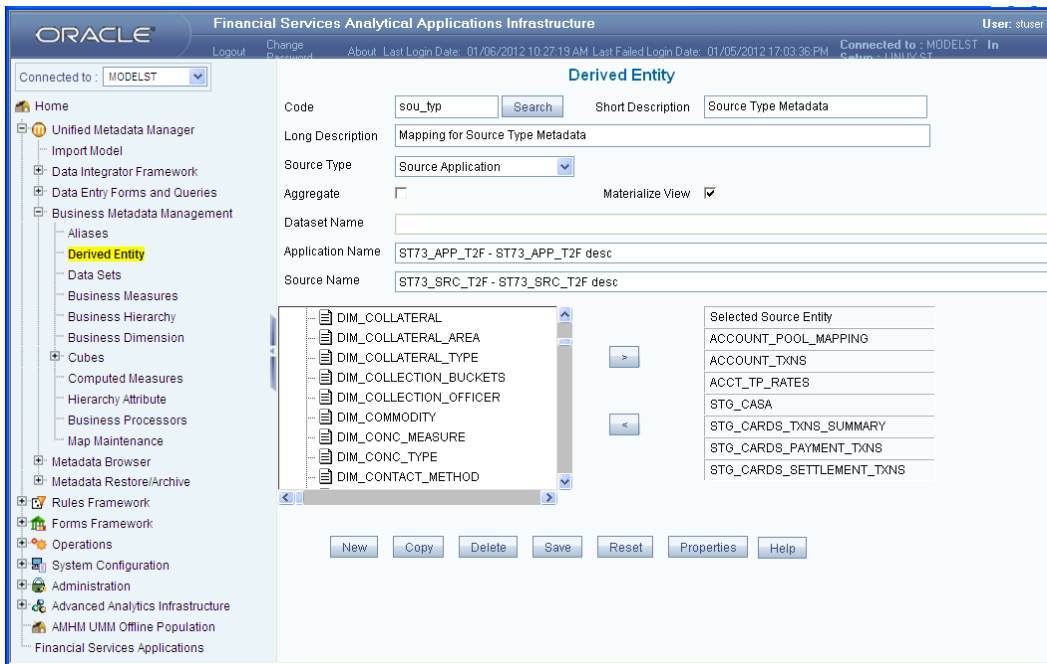
To create a Derived Entity in the *Derived Entity* window:

1. Click **New** if you are defining the derived entity for the first time.

2. Enter the details as tabulated.

Field	Description
Code	Enter a distinct code to identify the Entity. Ensure that the code is alphanumeric with a maximum of 8 characters in length and there are no special characters except underscore "_". **Note the following**: ▪ The code can be indicative of the type of Derived Entity being created. ▪ A pre-defined Code and Short Description cannot be changed. ▪ Same Code or Short Description cannot be used for Essbase installation: "$$$UNIVERSE$$$", "#MISSING", "#MI", "CALC", "DIM", "ALL", "FIX", "ENDFIX", "HISTORY", "YEAR", "SEASON", "PERIOD", "QUARTER", "MONTH", "WEEK", "DAY". ▪ In Unauthorized state, the users having Authorize Rights can view all the unauthorized Metadata.

Field	Description
	You can also search for an existing code or Derived Entity.
	▪ Click **Search**, the *Search* window is displayed.
	▪ Double-click the required code from the list of available Derived Entities or enter the description for the required Derived Entity in **Description Filter** and press **Enter**. The matching Derived Entity code is displayed.
	▪ Select **List Unauthorized** checkbox to view all the unauthorized metadata.
Short Description	Enter a Short Description based on the defined code. Ensure that the description is of a maximum of 80 characters in length and does not contain any special characters except "_, ( ), -, $".
Long Description	Enter the Long Description if you are creating subject-oriented Derived Entity to help users for whom the Derived Entity is being created or other details about the type/subject. Ensure that the description is of a maximum of 100 characters in length.
Source Type	Select either **Data Set** or **Source Application** from the drop down list.
Aggregate	Select **Aggregate** checkbox to collate the information for the Derived Entity.
Materialize View	(Optional) Select the **Materialize View** checkbox if you are using Oracle database to create a Materialized View with the Derived Entity Name and short description. **Note**: You cannot enable the Materialize View option if you are using IBM DB2 database.
Data Set Name	*Option available only if the Source Type is selected as **Data Set**.* Select the **Data Set Name** from the drop-down list. The Short Description for the Data Sets is available in the drop down list to select.
Application Name	*Option available only if the Source Type is selected as **Source Application**.* Select the **Application Name** from the drop down list.
Source Name	*Option available only if the Source Type is selected as **Source Application**.* Based on the Application selected the related Sources are listed. Select the **Source Name** from the drop-down list.

On selecting the Data Set Name or Source Application Name, the respective fields are displayed in the **Metadata for Source Type** list.

3. Double-click **Metadata for Source Type**. The list of Metadata defined on the selected Data Set or Application and Source is displayed.

4. Click to expand the folders. Select the required metadata and click .

5. Click **Save**. A confirmation dialog is displayed. The details are displayed in the *Derived Entity* window with the **Code** and **Short Description** as non-editable fields.

You can copy the pre-defined Derived Entity details to create another entity only if you have View Derived Entity, Add Derived Entity, and Modify Derived Entity function roles mapped.

To copy a Derived Entity in the *Derived Entity* window, enter the description in the **Description Filter** box and press **Enter**. Click **Copy**. On completion, a confirmation dialog is displayed.

You can view the metadata of the selected Derived Entity. In the *Derived Entity* window click **Properties** and open the *Properties* dialog.

The *Properties* tab displays the metadata properties such as Created By, Creation Date, Last Modified By, Modified Date, Authorized By, and Authorized Date.

The *Comments* tab has a text field to enter additional information as comments about the created Derived Entity definition.

6. Click **OK** and save the definition with the comments (if any).

You can search for a Derived Entity and modify the details as required by clicking **Edit**. You need to have Modify Derived Entity function role mapped to edit/modify the Derived Entity definitions. A Derived Entity definition in the un-authorized state (modified by other users) cannot be modified.

When you modify a Derived Entity which is mapped to other metadata definition, the *Affected Metadata* Dialog is displayed with the list of mapped Data Sets, Measures, and Hierarchies which gets auto updated. Click **OK** to confirm, else click **Cancel**.
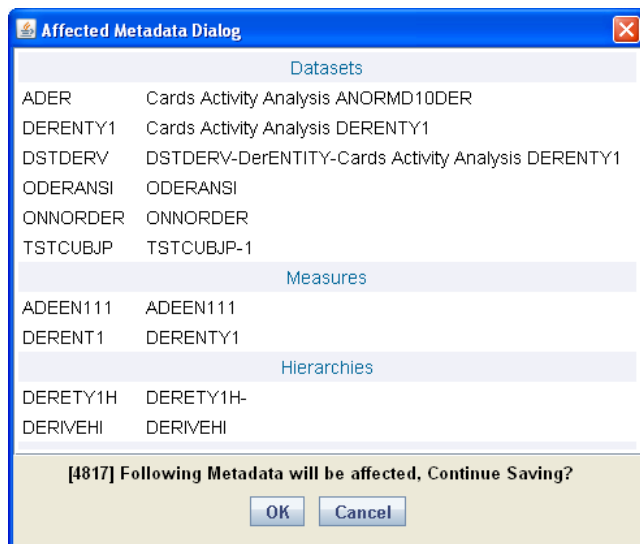
You can delete a Derived Entity that you have created or if you are authorized to do so. A Derived Entity in **Un-Authorized** state (modified by other users) cannot be deleted. You need to have Delete Derived Entity function role mapped to delete a Derived Entity. Delete function permanently removes the Derived Entity from the database. Ensure that you have verified the details as follows:

- A Derived Entity definition marked for deletion is not accessible for other users.
- Every delete action is **Authorized/Rejected** by the authorizer.
- On Authorization, the Derived Entity details are removed.
- On Rejection, the Derived Entity details are reverted back to authorized state.

- You cannot update Derived Entity details before authorizing/rejecting the deletion.
- An un-authorized Derived Entity definition can be deleted.

3.4 Rules Framework

Rules Framework is re-designed to accommodate new RRF (Run Rule Framework) module with enhanced features and functionalities. However, the existing PR2 (Process Run Rule) framework is also accessible through **Rules Framework > Designer** link. Based on the module configured, you can access the respective links to view the section details.

Financial institutions require constant monitoring and measurement of risk in order to conform to prevalent regulatory & supervisory standards. Such measurement often entails significant computations and validations with an organization's data. Data is transformed to support such measurements and calculations. The data transformation is achieved through a set of defined Rules. Rules Framework facilitates you to define a set of rules, reporting objects, and processes that are required to transform data in a warehouse. You can execute Rules and Process and manage to pre-defined rules within the system.

The Rules Framework is used for following three main purposes:

- To design a set of rules, processes and structuring execution flow of processes that are required to transform data in a data warehouse or data store.
- To design reporting objects based on previously transformed data that is stored as aggregated data in multidimensional databases.
- To design reporting objects based on the atomic information stored in the data warehouse or data store.

Before you begin, do the following:

- Select the required **Information Domain**: An Information Domain refers to a logical grouping of specific information and defines the underlying data warehouse or data store in which the physical data model is implemented. When you login to the Infrastructure system, you can access only those Information Domains to which your user ID is mapped. Contact System Administrator for permissions to access a specific Information Domain.
- Select the associated **Segment**: Segments are defined through the Administration module. A Segment facilitates you to classify all the related metadata in the selected Information Domain. You are authorized to access only those metadata objects to which the segment and user roles are mapped.

NOTE:

♦ For Rules framework functionality, the default system roles that are required are Business Analyst, OBIEE Author, and PR2 Administrator.

♦ User mapped to the role PR2ADMIN is able to access metadata objects across all segments within an Information Domain through the Rules, Process, and Run Framework.

♦ The users mapped to the PR2 Administrator role have the rights to Add, View, Edit, and Delete definitions defined in the Rule, Process, and Run windows.

♦ Users mapped to the particular Information Domain and segment can view only the Rules/Process/Run definitions defined in the selected Information Domain and segment.

Rules Framework is available within the LHS menu of the Infrastructure home page.

3.4.1 Rules

Financial institutions require constant monitoring and measurement of risk in order to conform to prevalent regulatory & supervisory standards. Such measurement often entails significant computations and validations with an organization's data. Data is transformed to support such measurements and calculations. The data transformation is achieved through a set of defined Rules.

The Rules option in the Rules Framework provides a framework that facilitates the definition and maintenance of a transformation. The metadata abstraction layer is used in the definition of rules where the user is permitted to re-classify the attributes in the data warehouse model thus transforming the data. The underlying metadata objects such as Hierarchies that are non-large or non-list, Datasets and Business Processors drive the Rule functionality. You need to have PR2ADMIN function role mapped to access the Rule definition. The definition, modification, copy, and deletion of a Rule is approved by an authorizer, for the action to be effective. The *Rule* window displays the rules created in the current Information Domain with the metadata details such as Code, Name, Description, Type, Folder, Dataset, Version, and Active status.

You can archive/restore the existing PR2 definitions using the Metadata Restore/Archive utility and also migrate PR2/RRF definitions through the Command Line Utilities across Information Domains / Setups.

Create Rule

You can create Rule definitions using the existing metadata objects. To create a Rule definition in the *Rule* window:

1. Click ⊞ icon from the List toolbar. The *Rule Definition (New Mode)* window is displayed.

2. Click ⋯ icon in the adjacent to the Folder field in the Linked to grid. The Folder Selector dialog is displayed.
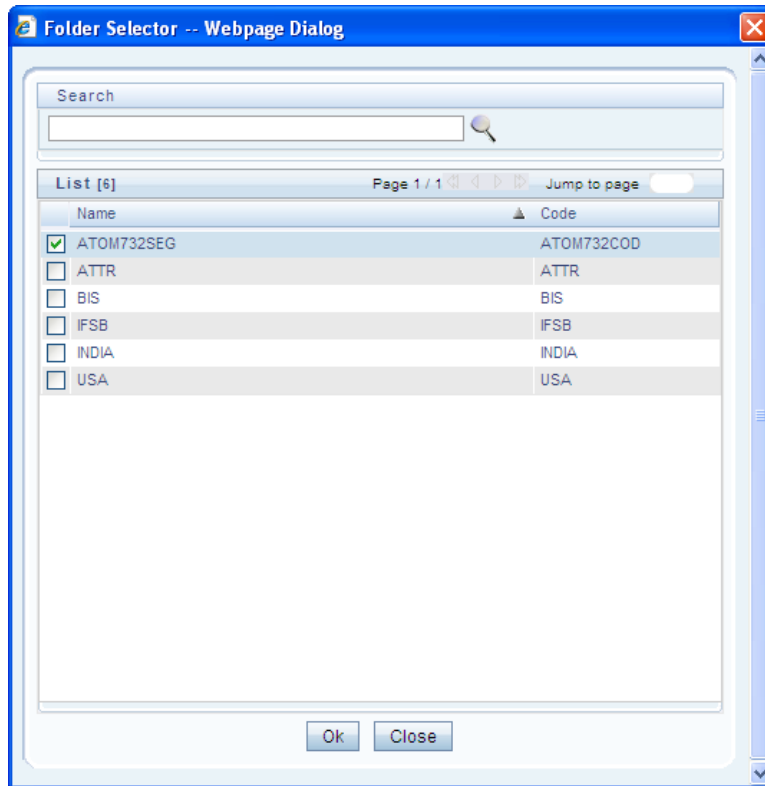
3. Select the checkbox adjacent to the required folder. Click **OK**. You can also enter a keyword and click the icon in the Search field of Folder Selector dialog to locate a particular folder.

4. Click the icon adjacent to the Dataset field in the *Linked to* grid. The *Dataset Selector* dialog is displayed with the list of datasets available under the selected folder.
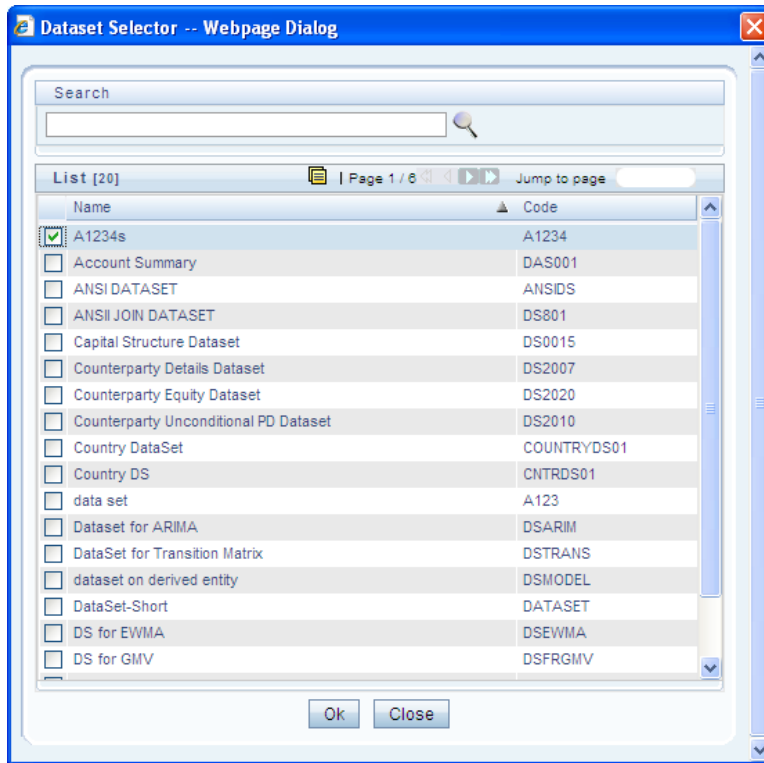
5. Select the checkbox adjacent to the required Dataset name. Click **OK**.

    In the *Dataset Selector* dialog, you can also do the following:

    a. Search for a particular folder by specifying keyword and clicking 🔍 icon.

    b. View properties of the selected Dataset by clicking 📋 icon.

    c. Make use of Pagination option to manage the view of existing Datasets within the system.

6. Enter the details in the Master information grid as tabulated below:

Field Name	Description
ID	Refers to the default ID of a newly created Rule and is **<<New >>**
Code	Enter a valid code for the Rule. Ensure that the code value specified is of maximum 30 characters in length and does not contain any special characters except "_".
Name	Enter a valid name for the Rule.
Version	By default the version field is displayed as **<<NA>>** for the new Rule being created. After the Rule definition is saved, an appropriate version is assigned as either "**-1**" or "**0**" depending on the authorization permissions.

Field Name	Description
Active	By default, the Active field is displayed as **<<NA>>** for the new Rule being created. After the Rule definition is saved, the status is set to "**Yes**" if you are an *Authorizer* creating the Rule or "**No**" if the created Rule must be Authorized by an *Authorizer*.
Type	Select the "Type" based on which you would like to create the rule from the dropdown list. You can select either **Computation** or **Classification**.

7. Click 🗗 icon in the Master info grid. The Properties dialog is displayed.
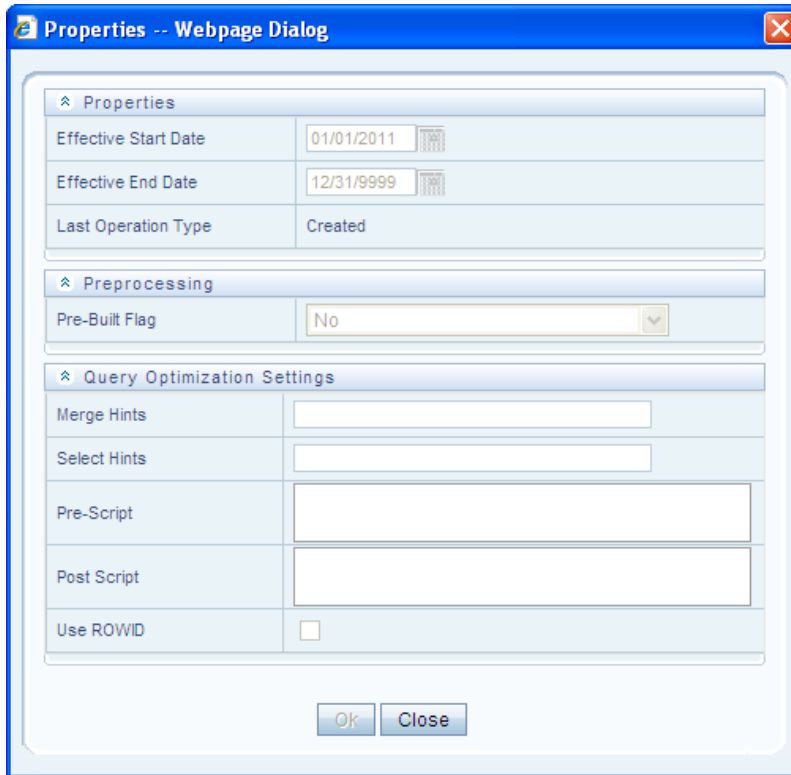
The *Properties* dialog lists the Rule Properties, Preprocessing status, and Query Optimization Settings as tabulated below. The data in *Query Optimization Settings* are derived from the global properties (if defined) in the *Optimization tab* of *System Configuration > Configuration* window. However, some options defined in Global Preferences precede the Rule level properties that you define here.

Field Name	Description
Properties	
Effective Start Date	Select the Effective Start Date by clicking 📅 icon.

Field Name	Description
Effective End Date	Select the Effective End Date by clicking ⬛ icon.
Last operation type	By default, this field displays the last change done to the Rule definition. While creating a Rule, the field displays the operation type as **Created**.
Pre processing	
Pre Built Flag	Pre Built Flag refers to the pre-compiled rules, which are executed with the query stored in database. While defining a Rule, you can make use of Pre Built Flag to fasten the Rule execution process by making use of existing technical metadata details wherein the rule query is not rebuilt again during Rule execution. By default, Pre Built Flag status is set to "**No**". This indicates that the query statement is formed dynamically retrieving the technical metadata details. If the Pre Built Flag status is set to "**Yes**" then the relevant metadata details required to form the rule query is stored in database on "Save" of a Rule definition. Also, the Rule is not dynamically formed based on the current definition of dataset and the BP. When this rule is executed, database is accessed to form the rule query based on stored metadata details, thus ensuring performance enhancement during Rule execution. Select the required option from the drop down list.
Query Optimization Settings	
Merge Hints	Specify the SQL Hint that can be used to optimize Merge Query. For example, "/*+ ALL_ROWS */" In a Rule Execution, Merge Query formed using definition level Merge Hint precede over the Global Merge Hint Parameters defined in the *Optimization* tab of *System Configuration > Configuration* window. If the definition level Merge Hint is empty / null, Global Merge Hint (if defined) is included in the query.
Select Hints	Specify the SQL Hint that can be used to optimize Merge Query by selecting the specified query. For example, "SELECT /*+ IS_PARALLEL */" In a Rule Execution, Merge Query formed using definition level Select Hint precede over the Global Select Hint Parameters defined in the *Optimization* tab of *System Configuration > Configuration* window. If the definition level Select Hint is empty / null, Global Select Hint (if defined) is included in the query.

Field Name	Description
Pre Script	Refers to a set of semicolon (;) separated statements which are to be executed **before** Merge Query on the same connection object. In a Rule Execution, Global Pre Script Parameters (defined in *Configuration* window) are added to a Batch followed by Rule definition level Pre Script statements if the same is provided during rule definition. However, it is not mandatory to have a Pre Script either at Global or definition level.
Post Script	Refers to a set of semicolon (;) separated statements which are to be executed **after** Merge Query on the same connection object. In a Rule Execution, Global Post Script Parameters (defined in *Configuration* window) are added to a Batch followed by Rule definition level Post Script statements if the same is provided during rule definition. However, it is not mandatory to have a Post Script either at Global or definition level.
Use ROWID	You can select the ROWID checkbox to create a Merge Statement based on ROWID instead of Primary Keys. In a Rule Execution, ROWID is considered while creating Merge Statement if **Use ROWID** checkbox is selected in either Global Parameters (*Configuration* window) or Rule definition properties. If **Use ROWID** checkbox is not selected in either Global Parameters (*Configuration* window) or Rule definition properties, then the flag is set to "**N**" and Primary Keys are considered while creating in Merge Statements.

8. Click **OK**. The properties are saved for the current Rule definition.

Add Members to Filter

You can define filters for a Rule definition such as Hierarchy, Filter-Data Element, Filter-Hierarchy, or Filter Group.

NOTE: In order to access *Filter Selector* window and to select the pre-defined filters, you need to have **FILTERRULE** function mapped to your role.

To create a filter for a Rule in the *Rule Definition (New Mode)* window:

1. Click icon from the *List* grid and click the icon. The *Filter Selector* window is displayed.
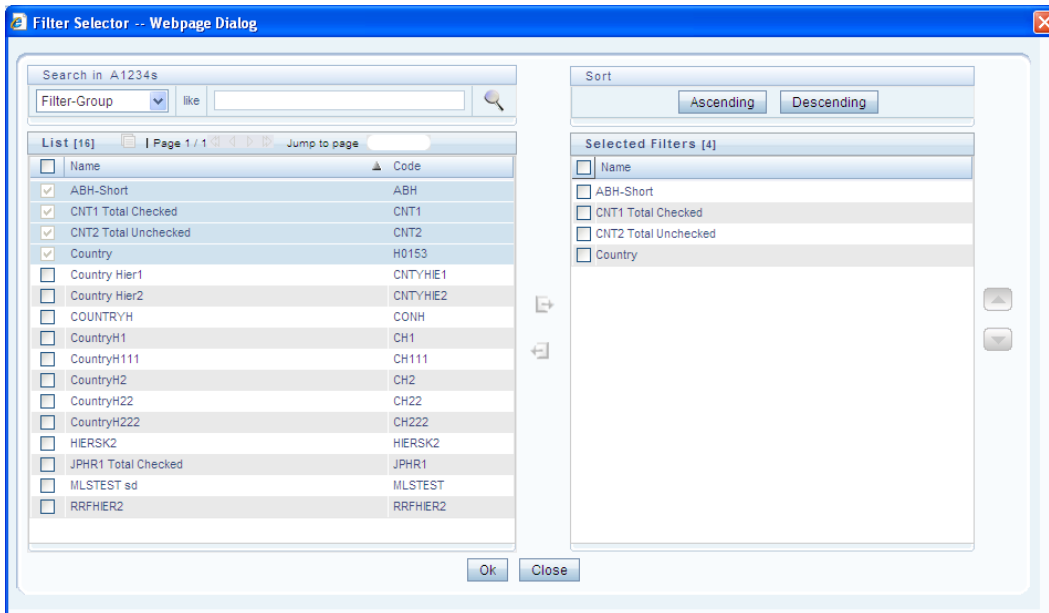
The LHS pane of the *Filter Selector* window displays the available members under the selected Information Domain and Dataset.

2. Select any of the following filters from the List grid drop down list to sort the members:

Member Type	Description
Hierarchy	**Hierarchy** refers to the defined Business Hierarchies and lists all the UMM Hierarchies pertaining to the selected dataset.
Filter-Data Element	**Data Element Filter** is a stored rule that expresses a set of constraints. Only columns that match the data type of your Data Element selection are offered in the Data Element drop down list box.
Filter-Hierarchy	**Hierarchy Filter** allows you to utilize rollup nodes within a Hierarchy to help you exclude (filter out) or include data within an OFSAA rule.
Filter-Group	**Group Filters** can be used to combine multiple Data Element Filters with a logical "AND".

3. Select the checkbox adjacent to the members you want to select.

4. Click ⬆ icon to move the selected members to the Selected Filters pane.

NOTE: You can select maximum of nine Filters for a Rule.

In *Filter Selector* window you can:

a. You can search for a specific member type by selecting from the drop-down list and clicking 🔍 icon. You can also modify your search criteria specifying the nearest keyword in the **like** field.

b. The Pagination option helps you to manage the view of existing Hierarchies within the system.

c. Click ▤ icon to view the details of a selected member.

d. Click **Ascending** or **Descending** icon to sort the selected components in Ascending or Descending order.

e. Click ▲ or ▼ icon to re-arrange the selected list of members.

5. Click ◁ icon to remove selected members from the Selected Filters pane. Click **OK**. The selected filters are listed in the Rule Definition (New Mode) window.

Add Hierarchies to Source

The Source and Target can be selected from the *List* grid. To select the Source for a Rule in the *Rule Definition (New Mode)* window:

1. Click the 🗀 icon from the List grid and select 🗀. The Hierarchy Selector window is displayed.
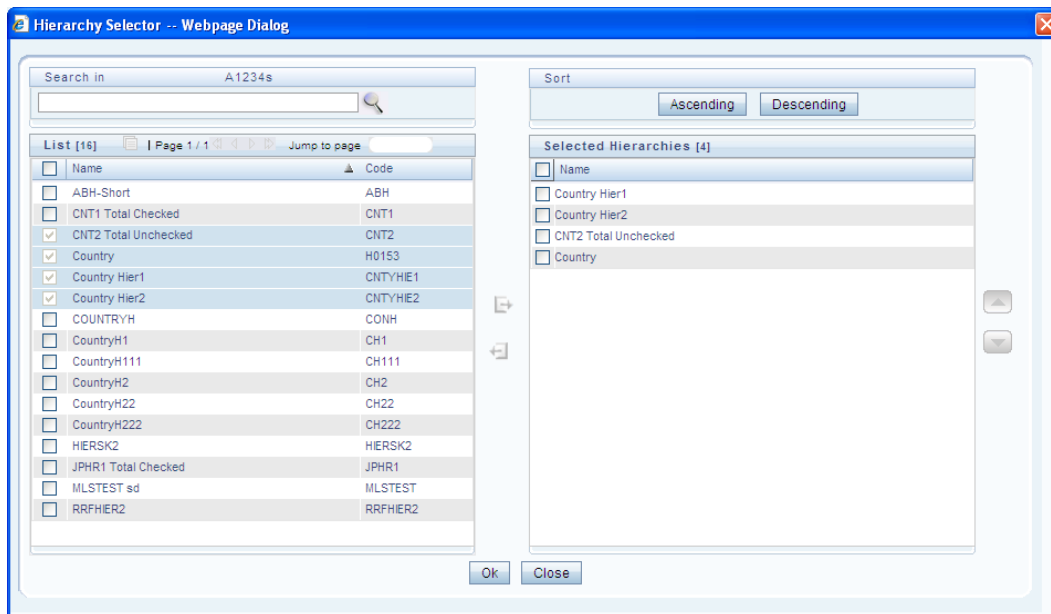
The LHS pane of the *Hierarchy Selector* window displays the available hierarchies under the selected Folder.

2. Select the checkbox adjacent to the Hierarchies you want to select as Source.

3. Click ⤷ icon to move the selected hierarchies to the Selected Hierarchies pane.

    You can select maximum of nine Sources for a Rule. In *Hierarchy Selector* window you can:

    a. Search for a member by specifying the nearest keyword and clicking 🔍 icon.

    b. The Pagination option helps you to manage the view of existing Hierarchies within the system.

c. Click ![icon] icon to view the details of a selected hierarchy.

d. Click **Ascending** or **Descending** icon to sort the selected components in Ascending or Descending order.

e. Click ![up icon] or ![down icon] icon to re-arrange the selected list of hierarchies.

f. Click ![icon] icon to remove selected hierarchies from the Selected Hierarchies pane.

4. Click **OK**. The selected hierarchies are listed in the Rule Definition (New Mode) window.

Add Measures / Hierarchies to Target

To select the Target for a Rule in the *Rule Definition (New Mode)* window:

1. Click the ![icon] icon from the *List* grid and select ![icon] icon. The *Measure Selector* / *Hierarchy Selector* window is displayed. The *Measure Selector* and *Hierarchy Selector* windows are displayed depending on the Type of the Rule you have selected, that is. the Computation Rule and Classification Rule respectively.
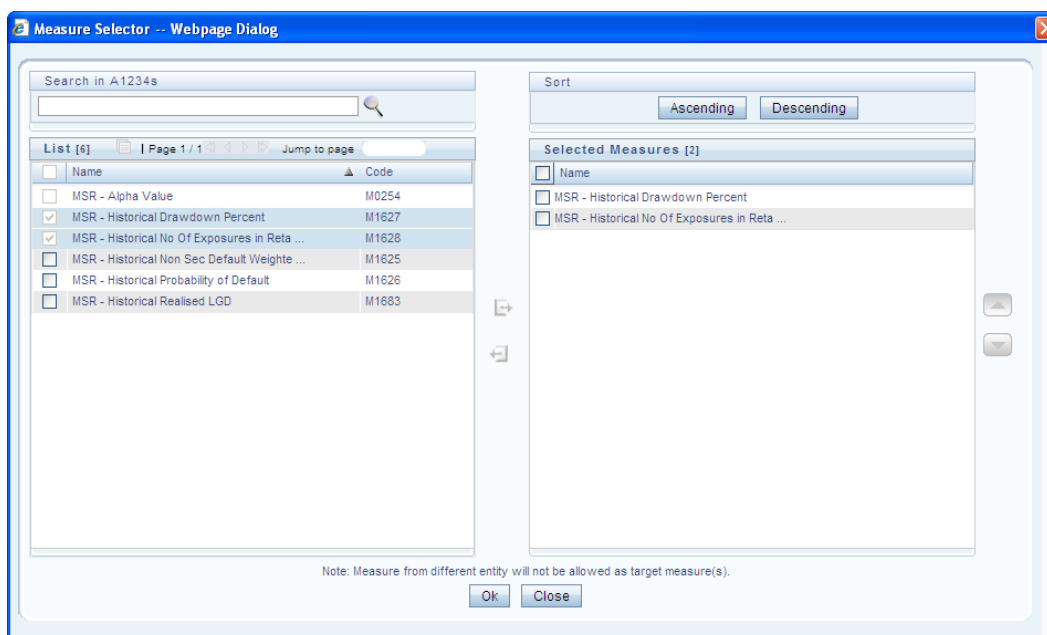
The LHS pane of the *Measure Selector* / *Hierarchy Selector* window displays the available Measures / Hierarchies under the selected Information Domain and Dataset.

2. Select the checkbox(s) adjacent to the members you want to select as Target.

3. Click ![icon] icon to move the selected measures to the Selected Measures / Selected Hierarchies pane:

NOTE: Measures from different entities are not allowed as target measures. You can select maximum of five measures and a single Hierarchy to the target.

In *Measure Selector* / *Hierarchy Selector* window, you can:

a.   Search for a member by specifying the nearest keyword and clicking 🔍 icon.

b.   The Pagination option helps you to manage the view of existing members within the system.

c.   Click 📒 icon to view the details of a selected member.

d.   Click **Ascending** or **Descending** icon to sort the selected components in Ascending or Descending order.

e.   Click ▲ or ▼ icon to re-arrange the selected list of members.

f.   Click ⬅ icon to remove selected measures from the Selected Measures / Selected Hierarchies pane.

4.   Click **OK**. The selected members are listed in the Rule Definition (New Mode) window.

In the *List* grid you can also:

a.   Click 📝 icon to move a selected member between **Filter**, **Source**, or **Target**.

b.   Click 📒 icon to view the selected member details.

5.   After all the necessary information in the first window of the Rule Definition (New Mode) is populated, click **Next** to navigate to the concurrent procedures of defining a Rule.

Hierarchical Member Selection

The second window of *Rule Definition (New Mode)* window displays all the information you have provided in the *Linked to* and *Master info* grids. You can view the filters you have selected in the *Rule Condition* grid. In the Rule Condition grid, you can apply conditions for each of the BMM hierarchy filters.

NOTE: For Data Element, Group, or Hierarchy filters, you can only view the SQL query.

To apply condition for a BMM hierarchy filter and view the SQL query in the *Rule Condition* grid:

1.   Click 🖼 icon adjacent to the filter details. The *Hierarchy Browser* window is displayed.
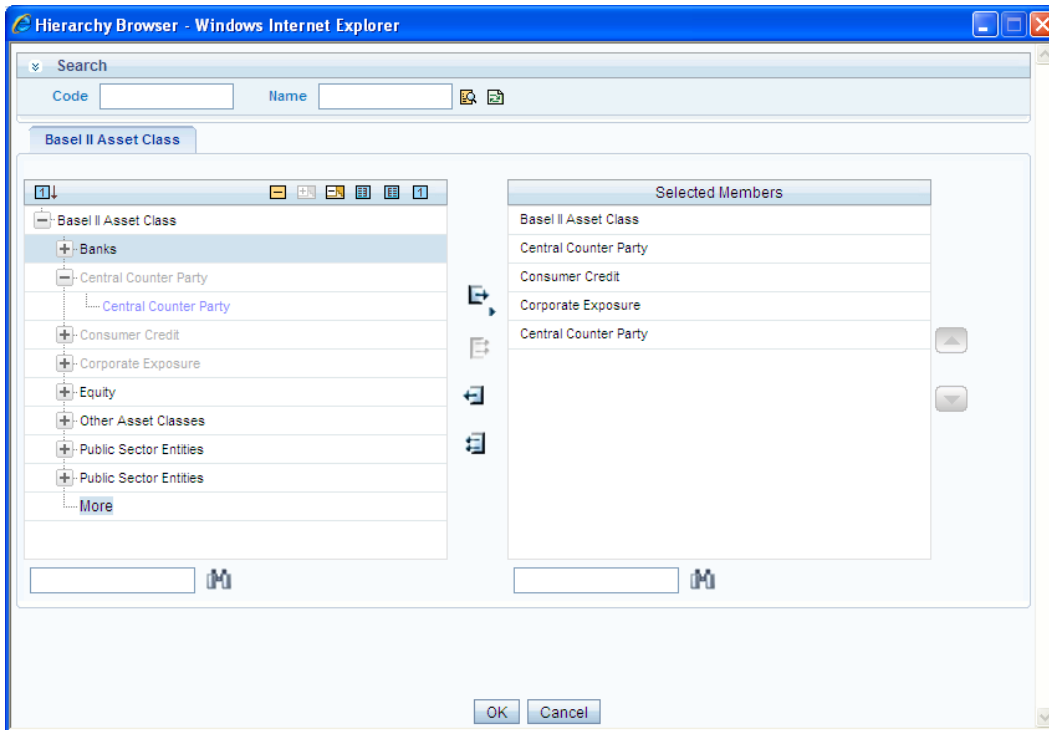
The *Search* grid allows you to search for a particular member by entering Code or any part of the Name and clicking 🔍 icon. You can click 📄 icon to refresh the Code or name fields. You can also find a member in the grid using 📖 icon.

2. Click ➕ and expand the members of the selected hierarchy.

3. Select a member / node and click ↪ to select the same. Click the ▾ to select the member as **Self** or **Parent**. In the *Hierarchy Browser* window you can also:

    a. Click 1↓ or A↓ to sort the members by Code or Name.

    b. Click ➕ or ➖ to expand or collapse the members under a node.

    c. Click ⊞ or ⊟ to expand a branch or collapse a branch.

    d. Click ⊞ or ⊟ to view the code values of members right or left.

    e. Click 1 or A to show code or show name of the members.

4. Click ▲ or ▼ to re-arrange the members in the Selected Members pane. However, the rearranged members are not displayed on the Combination Mapper grid based on the reordering.

5. Click 🔽 icon adjacent to a filter details. The Preview SQL Query window is displayed with the resultant SQL query.

Move Source to Slicer

The selected Source and Target Hierarchies are displayed under *Combination Mapper* grid. You can move the source Hierarchies from *Combination Mapper* grid to Slicer. To move a source Hierarchy from *Combination Mapper* grid to *Slicer* grid:

1. Click the Hierarchy member and drag it to the *Slicer* grid. The member is displayed under *Slicer* grid.

2. Click ![icon] icon to select the members of a Hierarchy. The *Hierarchy Browser* is displayed.

3. Click ![...] icon. The *CombiFilter Node Browser* window is displayed.
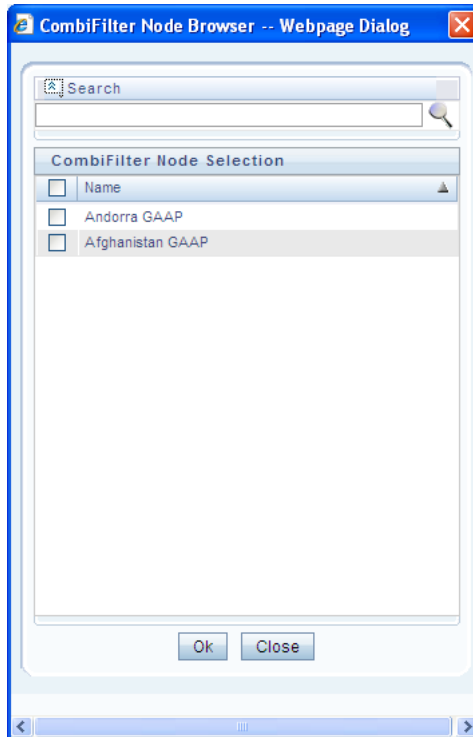
4. Select the checkbox adjacent to the member name and click **OK**.

Select Business Processor as Target

The Measures selected as target are displayed under Target page in the *Combination Mapper* grid. You can select the Business Processors (BP) from these Measures. To select the Business Processors form a Measure:

1. Click ![icon] icon in the Measure displayed under Target page. The *Business Processor Selector* window is displayed.
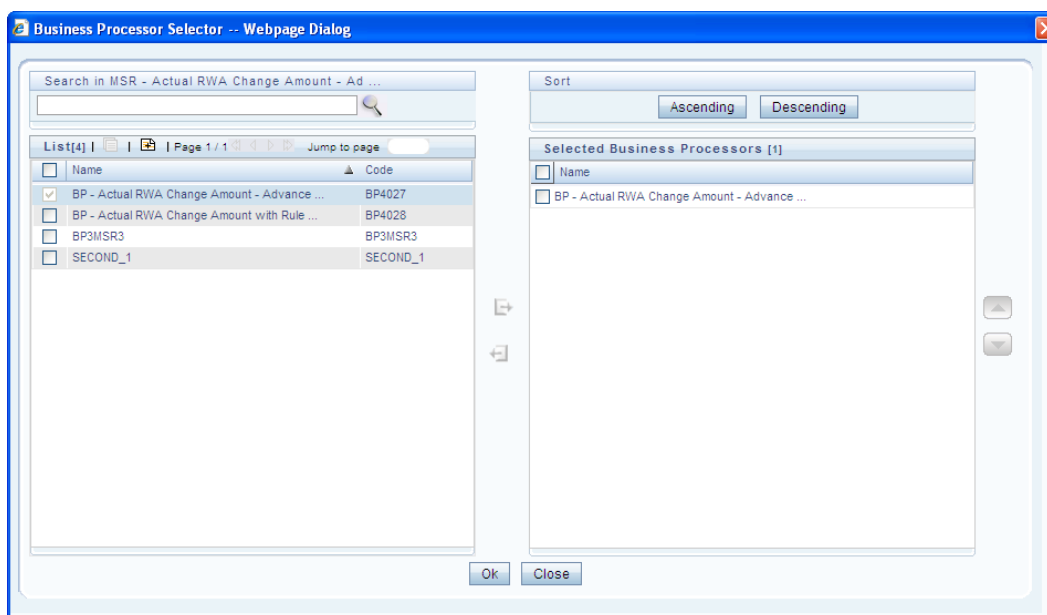
2. Select the checkbox adjacent to the Business Processor name and click .

In *Business Processor Selector* window you can:

    a. Search for a Business Processor by specifying the nearest keyword and clicking icon.

    b. The Pagination option helps you to manage the view of existing Business Processors within the system.

    c. Click icon to view the details of a selected Business Processor.

    d. Click icon to define a new Business Processor.

    e. Click **Ascending** or **Descending** icon to sort the selected components in Ascending or Descending order.

    f. Click or icon to re-arrange the selected list of Business Processors.

    g. Click icon to remove the selected Business Processors from **Selected Business Processors** pane.

3. Click **OK**. The selected Business Processors are listed under the Combination Mapper grid along with the Source and Filer definition details. (Optional) After selecting Business Processor(s) in the Combination Mapper grid, you can set the Default Target member, specify Parameters, and exclude child nodes for the Rule definition.

    a. You can set the selected Target member as default by clicking icon on the header bar of required Business Processor and selecting **Default Member** checkbox. When a Target member is selected as default, all the unmapped Source member combinations for that Target object is logically mapped to the default member and the corresponding target appears disabled. Run time parameters cannot be applied for such defaulted target BP's. However, the logical mappings do not overwrite the physical mapping.

b. You can specify parameters for the selected Business Processor. Select the checkbox(s) adjacent to the required Business Processor and click ▼ icon adjacent to a checkbox selected. The *Parameters* pop-up is displayed.

NOTE: A physical mapping is established when mapping is explicitly done upon a combination of source and target members.

c. For a Classification Rule and Computation Rule with non-parameterized BP, the Parameters pop-up is as displayed. Enter the required note in the text field and click **OK**.
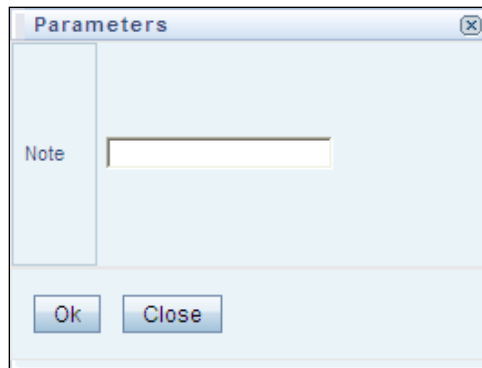
d. For a Computation Rule with parameterized BP, the Parameters pop-up is as displayed. Enter the required note in the text field. The *Parameter Default Value* is fetched from the *Business Processor* definition and the *Assign Value* can be entered manually which is considered during Rule execution at Runtime. You can also clear the *Assign Value* field by clicking the **Clear Values** icon. Click **OK**.
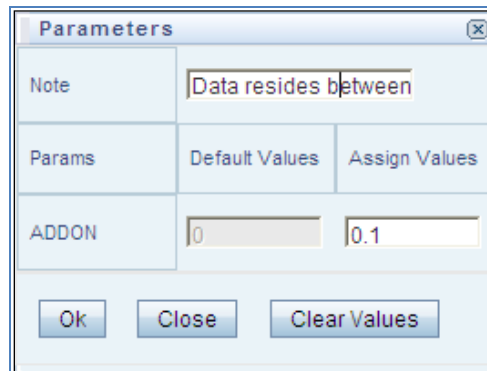
e. You can exclude child node(s) in the *Combination Mapper* grid, if they are not required in the Rule execution. Click ⋯ (Exclude) icon. The *Rule Exclude* window is displayed.

NOTE: The exclude icon is available only for the combinations with physical mappings. When a default member is removed from the target member, all logical mappings would be removed retaining only physical mappings.
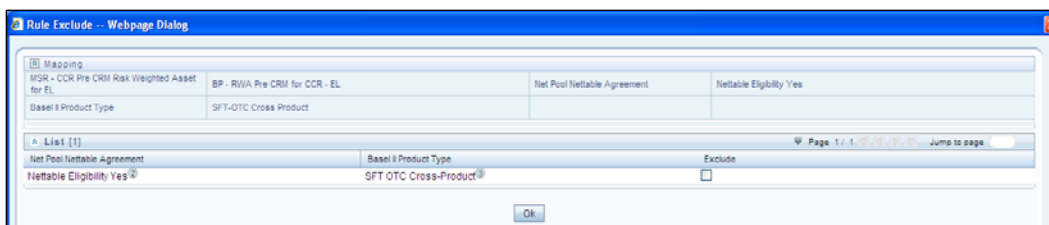
f. The *Rule exclude* window displays only the child nodes associated to a Parent node. Ensure that the selected parent has associated child nodes and is not the default member in the target.

g. Select the checkbox adjacent to Rule code that you want to exclude and click **OK**.

4. After all the necessary details are entered, click **Save**.

The Rule definition is saved with the provided details and is displayed in the Rule window. The default version of a new Rule definition created by an Authorizer is "0" and the one created by non-authorizer is "-1". The Audit Trail section at the bottom of Rule Definition (New Mode) window displays metadata information about the Rule definition created. The User Comments section facilitates you to add or update additional information as comments.

a. You can view individual Rule definition details at any given point. To view the existing Rule definition details in the *Rule* window select the checkbox adjacent to the Rule Code whose details are to be viewed. Click ▦ icon in the List tool bar. The *Rule Definition (View Mode)* window is displayed with all the details of the selected Rule. Click **Next** and **Back** icons to navigate back and forth in the *Rule Definition (View Mode)* window.

b. You can Modify all the details except ID, Code, Version, Active, and Type of a Rule definition. To modify an existing Rule definition in the *Rule* window, select the checkbox adjacent to the Rule Code whose details are to be updated. Click ◪ icon in the *List* tool bar.

Rule Definition Versioning

When a new Rule is being created the default version field is displayed as **<<NA>>.** After the Rule definition is saved, an appropriate version is assigned as either "**-1**" or "**0**" depending on the authorization permissions. The default version of a new Rule definition created by an Authorizer is "0" and the one created by non Authorizer is "-1". When you edit and save a Rule, you are prompted either to overwrite the already existing details and save the same as latest version (version "0") or to create a subsequent version wherein the existing details are retained as of current version +1. Note that a definition with version "-1", when edited by an authorized user changes to "0" and an unauthorized user remains as "-1".

Copy Rule Definition

The Copy Rule Definition facilitates you to quickly create a new Rule Definition based on an existing Rule or by updating the values of the required Rule. To copy an existing Rule Definition in the *Rule* window:

1. Select the checkbox adjacent to the Rule Code whose details are to be duplicated.

2. Click ![icon] icon in the List toolbar to copy a selected Rule definition. The Rule Definition (Copy Mode) window is displayed. Copy icon is disabled if you have selected multiple Rules. In the Rule Definition (Copy Mode) window you can:

   a. Create new Rule definition with existing variables. Specify a new **Rule Code** and **Folder**. Click **Save**.

   b. Create new Rule definition by updating the required variables. Specify new **Rule Code**, **Folder**, and update other required details. Click **Save**.

   The new Rule definition details are displayed in the *Rule* window. By default, version "0" is set if you have authorization rights, else the version is set to "-1".

Authorize Rule Definition

A Rule definition when created/modified should be approved by an authorizer. An authorizer can Approve/Reject a pre-defined Rule definition listed within the *Rule* window. To Approve/Reject Rule(s) in the *Rule* window, you need to have Authorizer function mapped to your role. If you are an authorizer, then all the Rule definitions created/modified by you are auto Approved and the Active status is set to "**Yes**". Else, the Active status is set to "**No**" and can be authorized.

Select the checkbox(s) adjacent to the required Rule Code(s). Do one of the following:

1. To **Approve** the selected Rule definitions, click ![icon] icon.

2. To **Reject** the selected Rule definitions, click ![icon] icon.

A Rule is made available for use only after the approval. For a rejected definition a comment with the rejection details are added.

Export Rule to PDF

You can export single/multiple Rule definition details to a PDF file. To export the Rule definition details in the *Rule* window:

1. Select the checkbox(s) adjacent to the Rule Code(s) you want to export.

2. Click ![icon] icon in the List toolbar.

3. Click the ![icon] icon in the popup. The Export dialog is displayed.
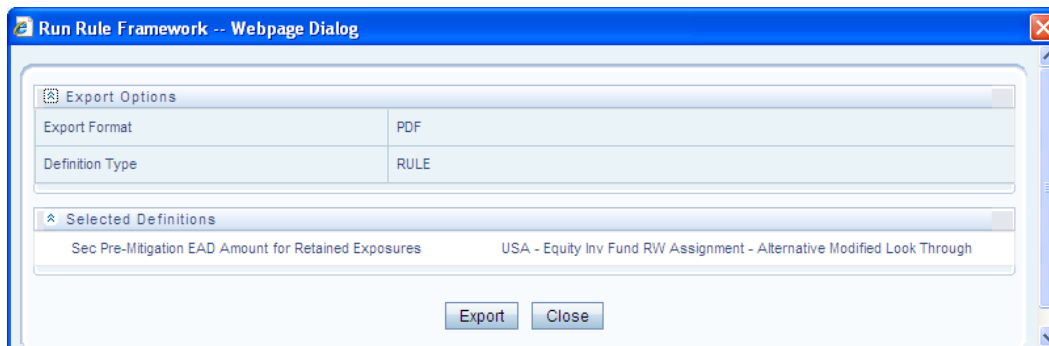
The *Export* dialog displays the Export Format, Definition Type, and the names of the Selected Definitions. Click **Export**. The process is initiated and is displayed in a pop-up specific to the current download.

After the PDF is generated, you can open / save the file from the *File Download* dialog. You can either save the file on the local machine or view the file contents in a PDF viewer. The downloaded PDF displays all the details such as Linked to, Properties, Master info, Audit Trail, List, Mapping Details, and Comments of all the Rule definitions selected.

Trace Rule Definition Details

You can trace the metadata details of individual Rule definitions. To trace the underlying metadata details of a Rule definition in the *Rule* window:

1. Select the checkbox adjacent to the Rule Code whose details are to be traced.
2. Click icon from the List toolbar.

The Trace Definition window is displayed with the details such as Traced Object (Name and definition type) and Processes and Runs in which the selected Rule is used. In the *Trace Definition* window you can also select individual Process or Run and click icon to view the definition details.

Delete Rule Definition

You can remove Rule definition(s) which are no longer required in the system by deleting from *Rule* window.

1. Select the checkbox(s) adjacent to the Rule Code(s) whose details are to be removed.
2. Click icon from the List tool bar.
3. Click **OK** in the information dialog to confirm deletion.

An information dialog is displayed confirming the deletion of the Rule definition(s) and asking the authorization.

3.4.2 Process

A set of rules collectively form a Process. A process definition is represented as a Process Tree. The Process option in the Rules Framework provides a framework that facilitates the definition and maintenance of a process. By defining a Process, you can logically group a collection of rules that pertain to a functional process.

You can define a Process with the existing metadata objects using a hierarchical structure which facilitates the construction of a process tree. Process tree can have many levels and one or many nodes within each level. Sub-processes are defined at level members and process hierarchy members form the leaf members of the tree.

NOTE: Precedence defined to each Process determines the Process Initiation Sequence.

If Precedence is defined, Process Execution (along with the associated Rules) happens based on the precedence defined to each component.

If no precedence is defined, all the processes within the process tree are initiated together in its natural hierarchical sequence.

Consider the following illustration:

If natural Precedence is defined to the sub process **SP1**, Process Execution is triggered in the sequence Rule 1 > SP1a > Rule 2 > SP1.

If no precedence is defined, all the sub processes SP1, SP2, Rule 4, and Rule 5 are executed in parallel.
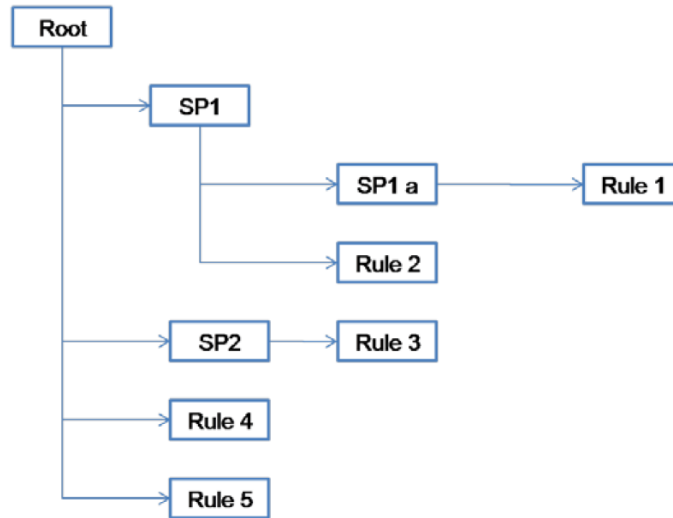
Further, the business can require simulating conditions under different business scenarios and evaluate the resultant calculations with respect to the baseline calculation. Such simulations are done through the construction of Processes and Process trees. Underlying metadata objects such as Rules, T2T Definitions, Processes, and Database Stored Procedures drive the Process functionality.
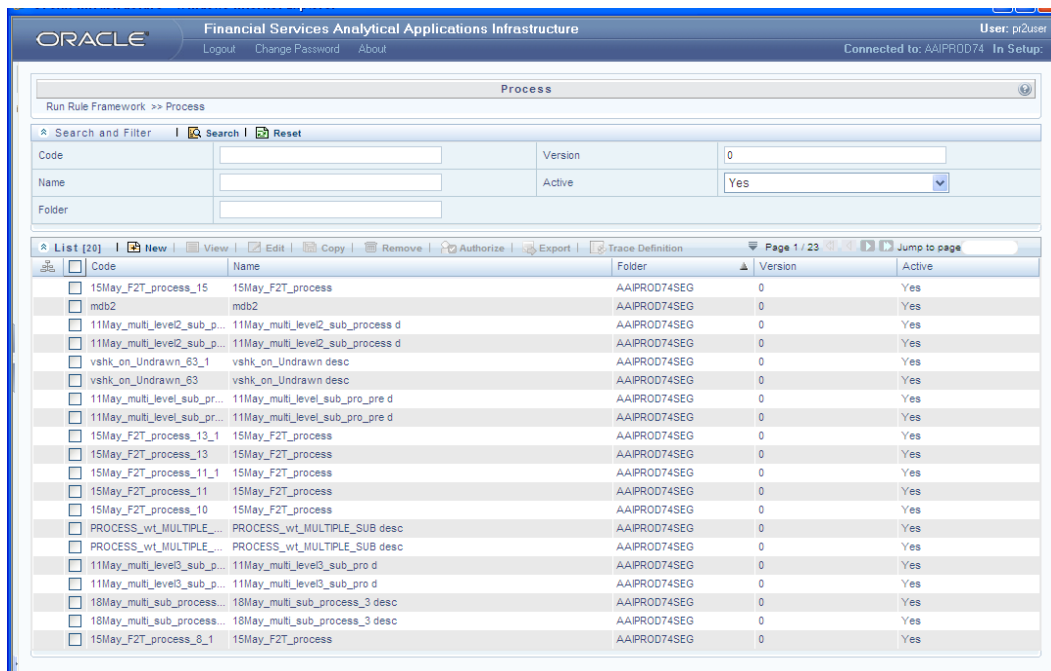
The *Process* window displays the processes created in the current Information Domain with the metadata details such as Code, Name, Folder, Version, and Active. You can archive/restore the existing PR2 definitions using the Metadata Restore/Archive utility and also migrate PR2/RRF definitions through the Command Line Utility across Information Domains / Setups.

Create Process

You can build a Process by adding one or more members called Process Nodes. If there are Predecessor Tasks associated with any member, the tasks defined as predecessors precede the execution of that member. To define a process in the *Process* window:

1. Click ⊞ icon from the List toolbar. The *Process Definition (New Mode)* window is displayed.

2. Click ⋯ icon adjacent to the Folder field in the Linked to grid. The Folder Selector dialog is displayed.

3. Select the checkbox adjacent to the required folder. Click **OK**.

   You can also enter a keyword and click 🔍 icon in the Search field of *Folder Selector* dialog to locate a particular folder. The Pagination option helps you to manage the view of existing Folders within the system.

4. Enter the details of the *Master info* grid as tabulated below:

Field Name	Description
ID	Refers to the default ID of a newly created Process and is **<<New>>**
Code	Enter a valid code for the Process. Ensure that the code value specified is of maximum 30 characters in length and does not contain any special characters except "_".
Name	Enter a valid name for the Process.
Version	By default the version field is displayed as **<<NA>>** for the new Process being created. After the Process definition is saved, an appropriate version is assigned as either "**-1**" or "**0**" depending on the authorization permissions.
Active	By default, the Active field is displayed as **<<NA>>** for the new Process being created. After the Process definition is saved, the status is set to "**Yes**" if you are an Authorizer creating the Rule or "**No**" if the created Rule must be Authorized by an *Authorizer*.

Field Name	Description
Type	Select the "Type" based on which you would like to create the rule from the dropdown list.

5. Click icon in the Master info grid. The Properties dialog is displayed.

6. You can edit the below tabulated details in the *Properties* dialog:

Field Name	Description
Effective Start Date	Select the Effective Start Date by clicking ⬚ (Calendar) icon.
Effective End Date	Select the Effective Start Date by clicking ⬚ (Calendar) icon.
Last operation type	By default, this field displays the last change done to the Process definition. While creating a Process, the field displays the operation type as **Created**.

7. Click **OK**. The properties are saved for the current Process definition.

Define Sub Process to Root

You can define sub processes to the base process being created or for a pre-defined sub process under a base process. To create a sub processor in the *Process Definition (New Mode)* window:

1. Click ▼ (Sub process) icon. The *Sub Process in ROOT* dialog is displayed.
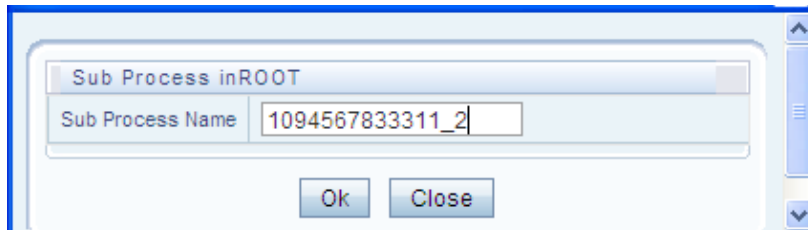
2. Enter the Sub Process Name and click **OK**.

   The sub process is listed under the root process as a branch.

NOTE: You can further create sub processes for the existing processes or for the base process by selecting the process and following the previous procedure.

Add Component to Base Process / Sub Process

You can add process components to the base process and the sub processes. To add the process components from the *Process Definition (New Mode)* window:

1. Select the process on which you want to add the component.

2. Click ⬜ (Component) icon. The Component Selector window is displayed.
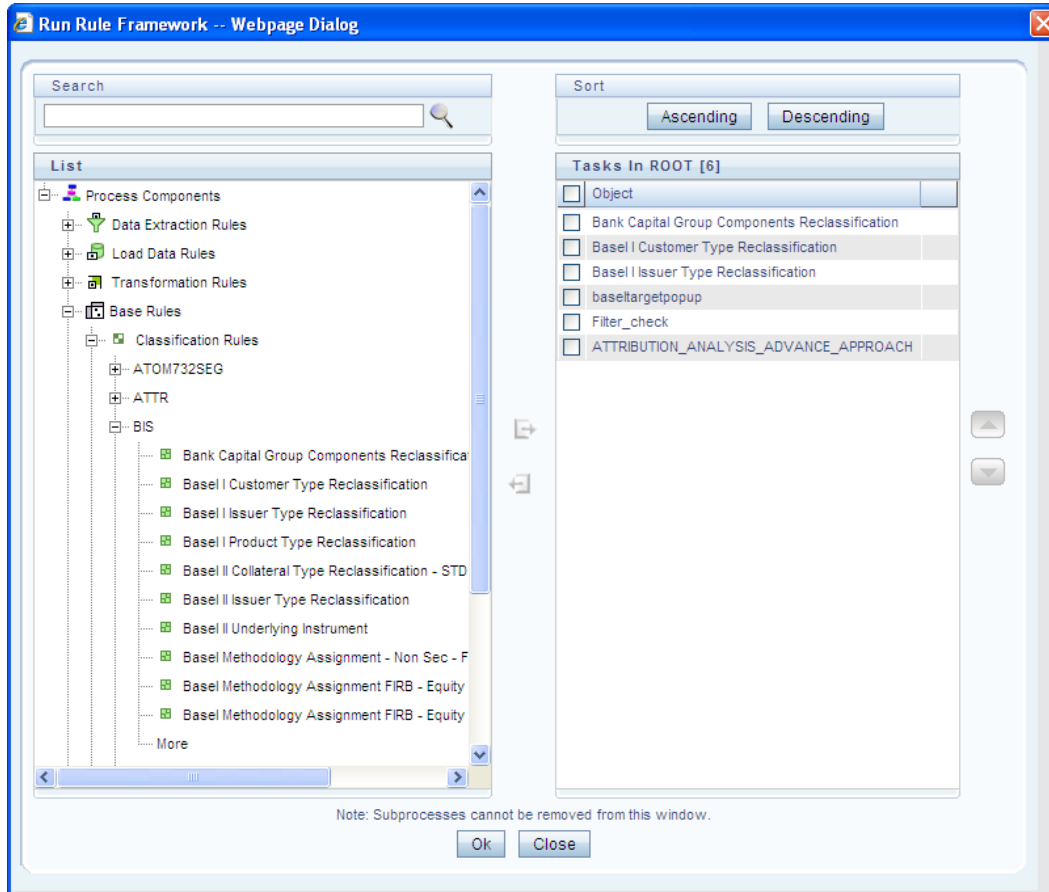
On the List pane of the *Component Selector* window, you can click ➕ icon to expand the members and view the process components.

3. Select a Process Component and click ➡ to move the component to the Tasks In <Process Name> pane. In Component Selector window you can also:

   a. Search for a component by specifying the nearest keyword and clicking 🔍 icon.

   b. Click **Ascending** or **Descending** icon to sort the selected components in Ascending or Descending order.

   c. Click 🔼 or 🔽 icon to move up or move down the selected components.

   d. Click 🔽 icon to add parameters for the selected components.

      The parameter is specified in double quotes and for multiple parameters, specify the values separated by commas. For example: "value 1","value 2".

e. Click ![icon] icon to remove selected components from the *Tasks In <Process Name>* pane.

NOTE: Sub processes listed in *Tasks In <Process Name>* pane cannot be removed.

4. Click **OK**. The components are listed under the selected process.

Add Precedence for the Selected Components

You can add precedence for the selected components in the *Process Definition (New Mode)* window. Precedence can be defined to peer processes in a selected parent process. To add precedence for a selected component:

1. Select the process for whose components you want to select precedence.
2. Click ![icon] (Precedence) icon. The Precedence Selector window is displayed.
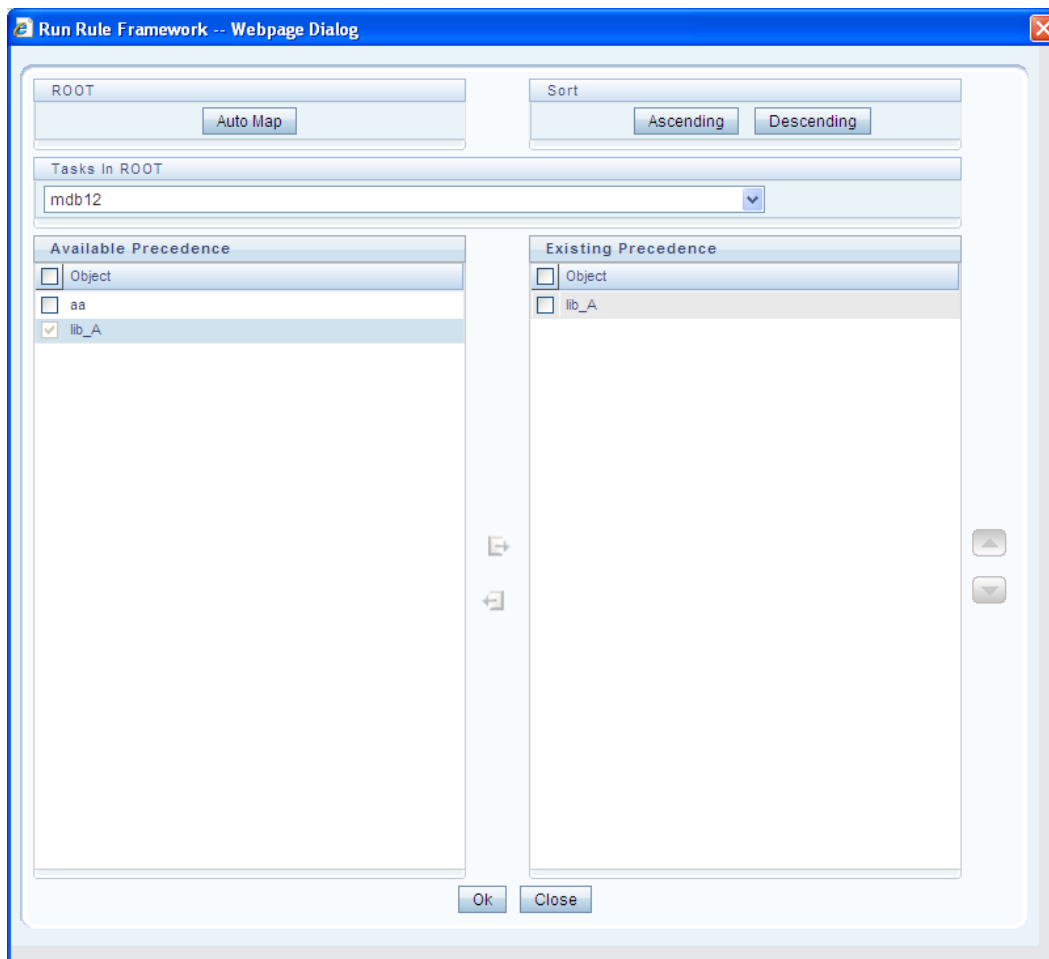
3. Select **Auto Map** to override the predefined precedence and to set predecessor tasks as precedence.

   To manually select predecessor tasks for a task:

   a. Select a task from **Tasks In <Process Name>** dropdown box. The other tasks are listed in the Available Precedence pane.

b. Select the tasks to set as predecessor tasks and click ⬕ icon.

The selected tasks are listed in the **Existing Precedence** pane.

NOTE: You cannot select tasks as predecessor tasks if they have cyclic dependencies with the selected task.

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c. In the *Precedence Selector* window you can also:

i.   Click **Ascending** or **Descending** icon to sort the selected tasks in Ascending or Descending order.

ii. Click ⬆ or ⬇ icon to move up or move down the selected tasks.

iii. Click ⬕ icon to remove selected tasks from the **Existing Precedence** pane.

4. Click **OK**. The precedence is set for the tasks in the selected process.

Move Tasks among Processes

You can move the tasks which has no dependency, among different processes in the *Process Definition (New Mode)* window. To move tasks:

1. Select the checkbox(s) adjacent to the tasks to move to a different process.

2. Click 🖉 icon. The *Move to* dialog is displayed.
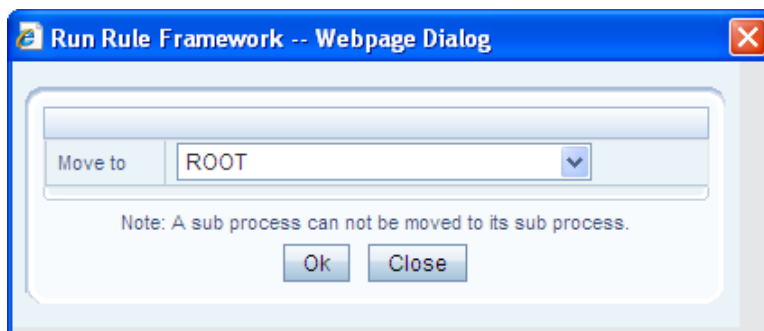
3. Select the process / subprocess to which you want to move the task.

4. Click **OK**. The window is refreshed and the task is displayed under the selected process.

Remove Tasks from a Process

You can remove / delete the tasks which have no dependency, from the *Process Definition (New Mode)* window. To remove tasks:

1. Select the checkbox(s) adjacent to the tasks you want to remove.

2. Click 🗑 icon. The Warning dialog is displayed.

3. Click **OK**. The selected tasks are removed from the process.

In the *Process Definition (New Mode)* window, you can also view the details of a selected task by clicking 🗐 icon.

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4. Click **Save**. The process definition is saved with the provided details and is displayed in the Process window.

The default version of a new Process definition created by an Authorizer is "0" and the one created by non Authorizer is "-1". The *Audit Trail* section at the bottom of *Process Definition (New Mode)* window displays metadata information about the Process definition created. The *User Comments* section facilitates you to add or update additional information as comments.

You can view individual Process definition details at any given point. To view the existing Process definition details in the *Process* window, select the checkbox adjacent to the Process Code whose details are to be viewed. Click ▤ icon in the List tool bar. The *Process Definition (View Mode)* window is displayed with all the details of the selected Process.

You can modify all the details except ID, Code, Version, Active status, and Type of a Process definition. To modify an existing Process definition in the *Process* window, Select the checkbox adjacent to the Process Code whose details are to be updated. Click 🖍 icon in the List tool bar. Edit icon is disabled if you have selected multiple Processes.

Process Definition Versioning

The default version of a new Process definition created by an Authorizer is "0" and the one created by non Authorizer is "-1". When you edit and save a Process, you are prompted either to overwrite the already existing details and save the same as latest version (version "0") or to create a subsequent version wherein the existing details are retained as of current version +1.

Note that a definition with version "-1", when edited by an authorized user changes to "0" and an unauthorized user remains as "-1".

Copy Process Definition

The Copy Process Definition facilitates you to quickly create a new Process Definition based on an existing Process or by updating the values of the required Process. To copy an existing Process Definition in the *Process* window, select the checkbox adjacent to the Process Code whose details are to be duplicated. Click 🖫 icon in the *List* toolbar to copy a selected Process definition. The *Process Definition (Copy Mode)* window is displayed. Copy icon is disabled if you have selected multiple Processes. In the *Process Definition (Copy Mode)* window you can:

- Create new Process definition with existing variables. Specify a new **Process Code** and **Folder**. Click **Save**.

- Create new Process definition by updating the required variables. Specify a new **Process Code**, **Folder**, and update other required details. Click **Save**.

The new Process definition details are displayed in the *Process* window. By default, version "0" is set if you have authorization rights, else the version is set to "-1".

Authorize Process Definition

A Process definition when created/modified should be approved by an authorizer. An authorizer can Approve/Reject a pre-defined Process definition listed within the *Process* window. To Approve/Reject Process(s) in the *Process* window, you need to have Authorizer function mapped to your role. If you are an authorizer, then all the Process definitions created/modified by you are auto Approved and the Active status is set to "**Yes**". Else, the Active status is set to "**No**" and can be authorized. Select the checkbox(s) adjacent to the required Process Code(s). Do one of the following:

1. To **Approve** the selected Process definitions, click ✅ icon.

2. To **Reject** the selected Process definitions, click ❌ icon.

A Process is made available for use only after the approval. For a rejected definition a comment with the rejection details are added.

Export Process to PDF

You can export single/multiple Process definition details to a PDF file. To export the Process definition details in the *Process* window:

1. Select the checkbox(s) adjacent to the required Process Codes.

2. Click 📤 icon in the List toolbar.

3. Click the 📄 icon in the popup. The Export dialog is displayed.
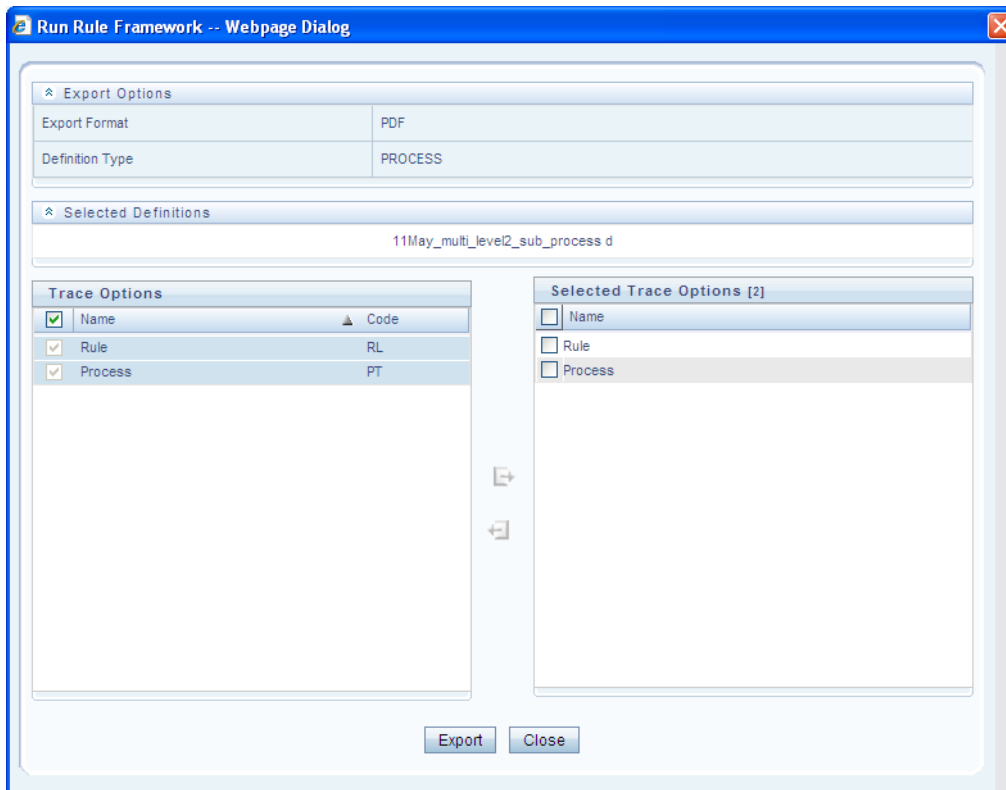
The *Export* dialog displays the Export Format, Definition Type, the names of the Selected Definitions, and the Trace Options. To select the Trace Options in the *Trace Options* grid:

a. Select the checkbox(s) adjacent to the available options.

b. Click ⬆ icon. The selected options are displayed in the **Selected Trace Options** pane. You can also select a trace option and click ⬅ icon to deselect it from the Selected Trace Options pane.

4. Click Export. The process is initiated and is displayed in a pop-up specific to the current download. After the PDF is generated, you can open / save the file from the File Download dialog.

You can either save the file on the local machine or view the file contents in a PDF viewer. The downloaded PDF displays all the details such as Linked to, Properties, Master info, Audit Trail, List, Mapping Details, and Comments of all the Process definitions selected.

Trace Process Definition Details

You can trace the metadata details of individual Process definitions. To trace the underlying metadata details of a Process definition in the *Process* window:

1. Select the checkbox adjacent to the Process Code whose details are to be traced.

2. Click 📖 icon from the List toolbar. The *Process Definition* window is displayed with the details such as Traced Object (Name and Definition Type), other Processes and Runs in which the selected Process is used. In the *Trace Definition* window you can also select individual Process or Run and click 📋 icon to view the definition details.

Delete Process Definition

You can remove Process definition(s) which are no longer required in the system by deleting from *Process* window.

1. Select the checkbox(s) adjacent to the Process Code(s) whose details are to be removed.

2. Click 🗑 icon from the List tool bar.

3. Click **OK** in the information dialog to confirm deletion. An information dialog is displayed confirming the deletion of the Process definition(s) and asking the authorization of the same.

3.4.3 Run

The Run option in the Rules framework helps you to combine various components and/or Processes together and execute them with different underlying approaches. Further, Run Conditions and/or Job Conditions can be specified while defining a Run.

Two types of Runs can be defined namely Base Run and Simulation Run.

- **Base Run** allows you to combine different Rules and Processes together as Jobs and apply Run Conditions and job Conditions.

- **Simulation Run** allows you to replace a Job with another Job (a Job can be a Rule or a Process), in addition to what a Base Run does.
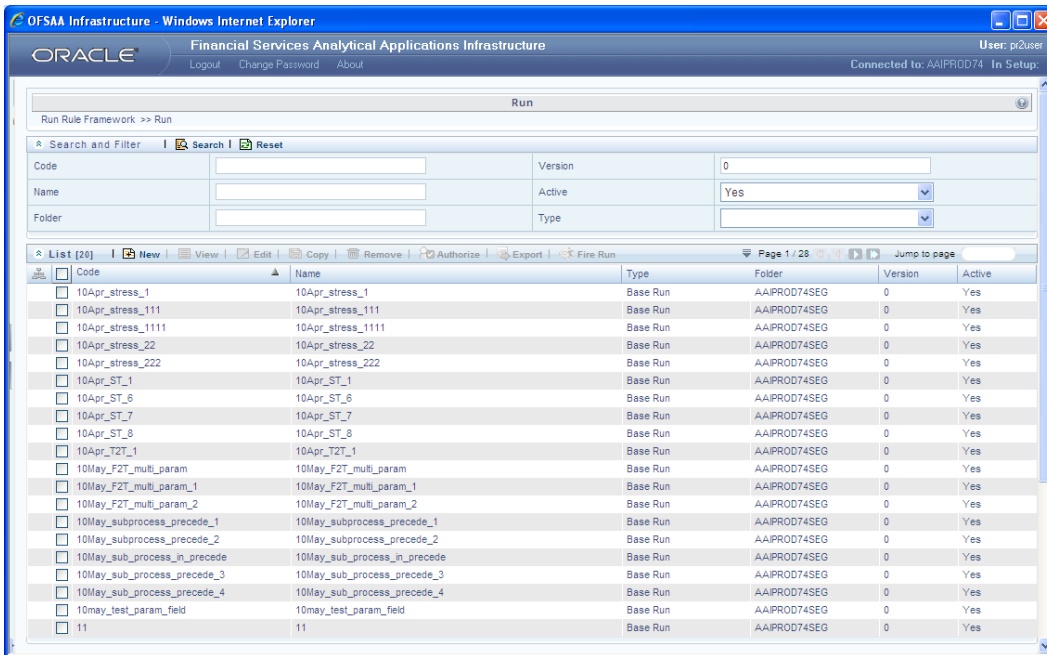
The *Run* window displays the runs created in the current Information Domain with the metadata details such as Code, Name, Type, Folder, Version, and Active status. You can archive/restore the existing PR2 definitions using the Metadata Restore/Archive utility and also migrate PR2/RRF definitions through the Command Line Utility across Information Domains / Setups.

Create Run

You can create Run definitions using the existing metadata objects. The various components that can be used to form Run definitions are mentioned in Process Hierarchy Members. The following filter conditions can also be applied to a Run definition:

Condition Type	Description
Run Condition	When multiple components are selected, there is likelihood that the components can contain Rules / T2Ts whose target entities are across multiple datasets. When the selected components contain Rules, the target entities (hierarchies) which are common across the datasets are made available for defining Run Conditions. When the selected components contain T2Ts, the hierarchies that are based on the underlying destination tables which are common across the datasets are made available for defining the Run Condition. A Run Condition is defined as a filter on the available hierarchies.
Job Condition	A further level of filter can be applied at the component level. This is achieved through a mapping process.

To create a Run definition in the *Run* window:

1. Click ⊞ icon from the List toolbar. The *Run Definition (New Mode)* window is displayed.

2. Click [...] icon adjacent to the Folder field in the Linked to grid. The Folder Selector dialog is displayed.

3. Select the checkbox adjacent to the required folder. Click **OK**.

    You can also enter a keyword and click 🔍 icon in the **Search** field of *Folder Selector* dialog to locate a particular folder. The Pagination option helps you to manage the view of existing Folders within the system.

4. Enter the details of the *Master info* grid as tabulated below:

Field Name	Description
ID	Refers to the default ID of a newly created Run and is **<<New >>**
Code	Enter a valid code for the Run. Ensure that the code value specified is of maximum 30 characters in length and does not contain any special characters except "_".
Name	Enter a valid name for the Run.
Version	By default the version field is displayed as **<<NA>>** for the new Run being created. After the Run definition is saved, an appropriate version is assigned as either "**-1**" or "**0**" depending on the authorization permissions.
Active	By default, the Active field is displayed as **<<NA>>** for the new Run being created. After the Run definition is saved, the status is set to "**Yes**" if you are an *Authorizer* creating the Run or "**No**" if the created Run must be Authorized by an *Authorizer*.
Type	Select the type of the Run from the dropdown box either as Base Run or as Simulation Run.

5. Click 📇 icon in the Master info grid. The Properties dialog is displayed.

6. You can edit the below tabulated details in the Properties dialog:

Field Name	Description
Effective Start Date	Select the Effective Start Date by clicking ⬛ (Calendar) icon.
Effective End Date	Select the Effective Start Date by clicking ⬛ (Calendar) icon.
Last operation Type	By default, this field displays the last change done to the Run definition. While creating a Run, the field displays the operation type as **Created**.

7. Click **OK**. The properties are saved for the current Run definition.

Select Run Condition for Run

You can select conditions to preset the initialization mechanism of a Run. To select a condition for a Run in the *Run Definition (New Mode)* window:

1. Click 🟨 icon from the *List* grid and select Run Condition (🔽). The *Hierarchy Selector* window is displayed.
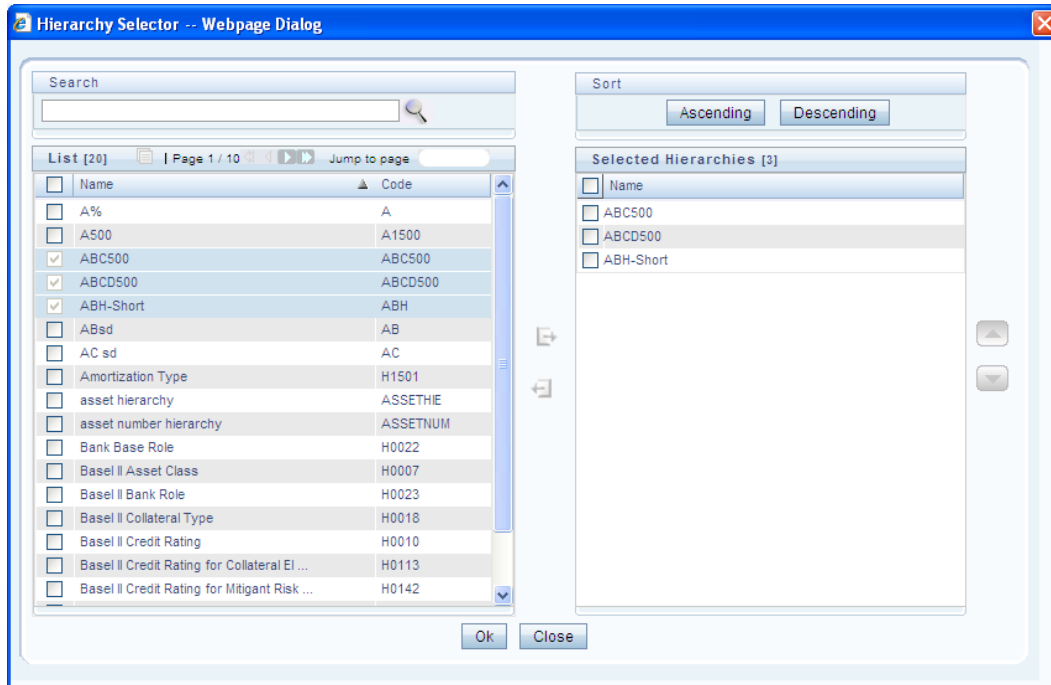
The LHS pane of the *Hierarchy Selector* window displays the available members under the selected Folder.

2. Select the checkbox(s) adjacent to the members you want to select.

3. Click ↪ to move the selected members to the **Selected Hierarchies** pane.

In *Hierarchy Selector* window you can:

a. Search for a member by specifying the nearest keyword and clicking 🔍 icon.

b. The Pagination option helps you to manage the view of existing Hierarchies within the system.

c. Click ▤ icon to view the details of a selected member.

d. Click **Ascending** or **Descending** icon, to re-arrange the selected list of members.

e. Click ▲ or ▼ icon to move up or move down the selected members.

f. Click ⬅ icon to remove selected members from the Selected Hierarchies pane.

4. Click **OK**. The selected Hierarchies are listed in the *Run Definition (New Mode)* window.

Select Jobs for Run

You can select the required Jobs for the Run definition being created. To select Jobs for a Run in the *Run Definition (New Mode)* window:

1. Click 🔲 icon from the *List* grid and select Job (🔲). The *Job Selector* window is displayed.
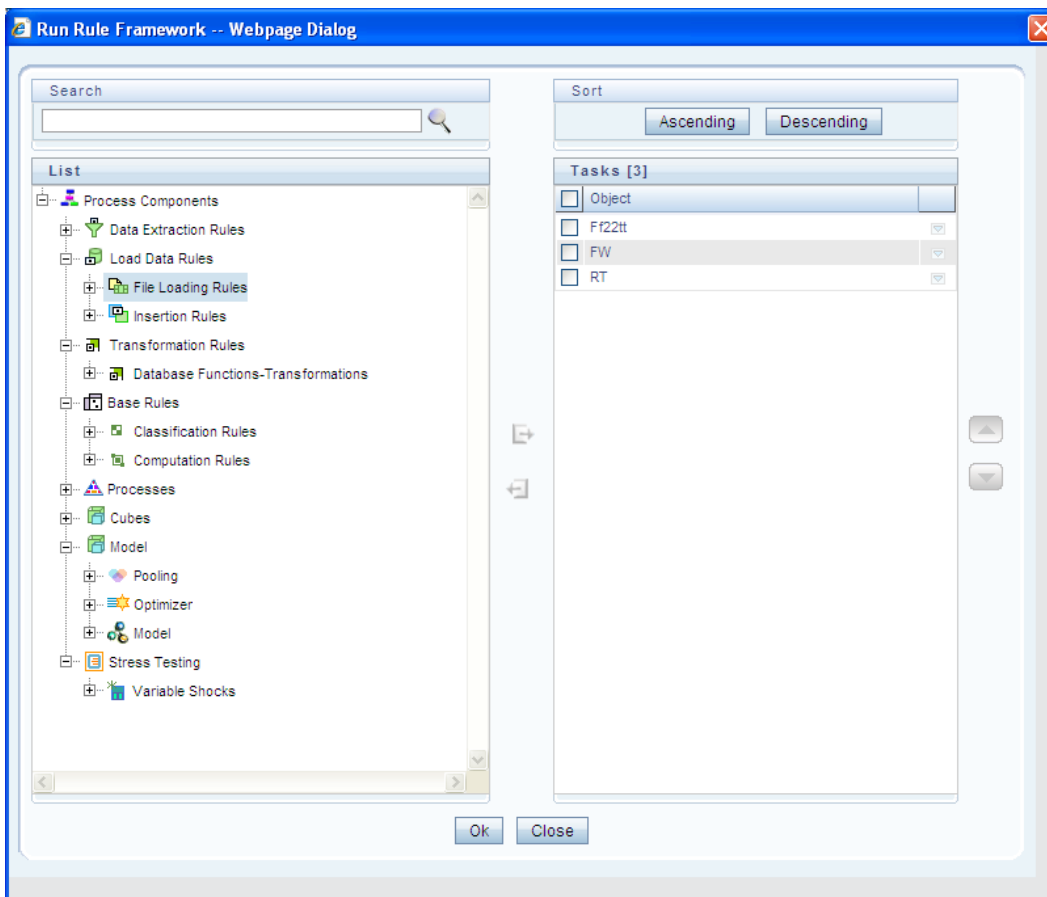
On the **List** pane of the *Job Selector* window, you can click ➕ icon to expand the members and view the job components. Select a Job Component and click ➡ to move the component to the *Tasks* pane.

NOTE: You cannot select same Jobs from Aggregate data and Create Cube components, since those two definitions have the same unique code.

In *Job Selector* window you can also:

a. Search for a component by specifying the nearest keyword and clicking 🔍 icon.

b. Click Ascending or Descending icon to sort the selected components in Ascending or Descending order.

c. Click ⬆ or ⬇ icon to move up or move down the selected components.

d. Click ▽ icon to add parameters for the selected components.

e. Click ⬅ icon to remove selected components from the Tasks pane. Click **OK**. The components are listed under the selected Run.

Select Job Condition for Run

You can select single Job Condition for the execution of pre defined Jobs in a Run. To select the Job Condition for a Run in the *Run Definition (New Mode)* window:

1. Click 📄 icon from the *List* grid and select Job Condition (📋). The *Hierarchy Selector* window is displayed.
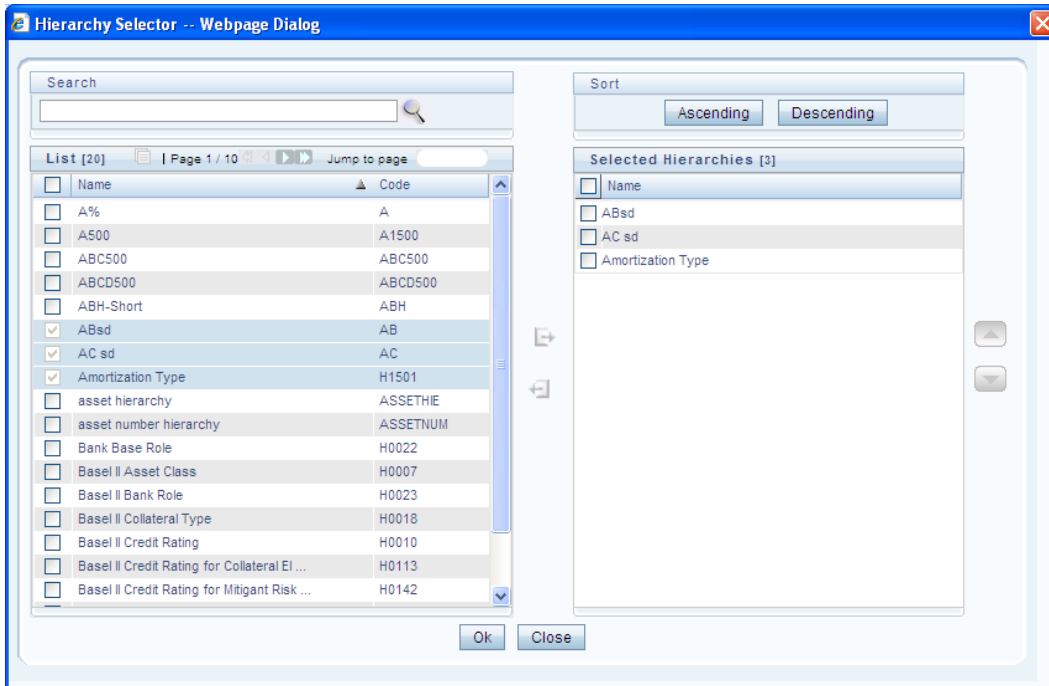
The LHS pane of the *Hierarchy Selector* window displays the available hierarchies under the selected Folder.

2. Select the checkbox(s) adjacent to the Hierarchies that you want to select as Job condition.

3. Click ➡ to move the selected hierarchies to the Selected Hierarchies pane.

In *Hierarchy Selector* window you can also:

a. Search for hierarchies by specifying the nearest keyword and clicking 🔍 icon.

b. The Pagination option helps you to manage the view of existing Hierarchies within the system.

c. Click ▤ icon to view the details of a selected Hierarchy.

d. Click **Ascending** or **Descending** icon to sort the selected Hierarchies in Ascending or Descending order.

e. Click ▲ or ▼ icon to move up or move down the selected Hierarchies.

f. Click ← icon to remove selected Hierarchies from the Selected Hierarchies pane.

NOTE: Ensure that you have selected only one Job Condition and the same hierarchy is not selected as Run and Job conditions.

4. Click **OK**. The selected hierarchies are listed in the *Run Definition (New Mode)* window. In the *List* grid you can also:

a. Click ✎ icon to move a selected member between Run Condition and Job Condition.

b. Click ▤ icon to view the selected member details.

5. After all the necessary information in the first window of the *Run Definition (New Mode)* is populated, click **Next** icon to navigate to the concurrent procedures of defining a Rule.

The second window of *Run Definition (New Mode)* window displays all the information you have provided in the *Linked to* and *Master info* grids. You can view the filters you have selected in the *Run Condition* grid.

Hierarchical Member Selection

In the *Run Condition* grid, you can modify the Run Conditions you have defined in the first window of the Run Definition by including hierarchical members. To modify the condition of a Run Condition in the *Run Condition* grid:

1. Click ⊞ icon adjacent to the Run Condition details. The *Hierarchy Browser* window is displayed.
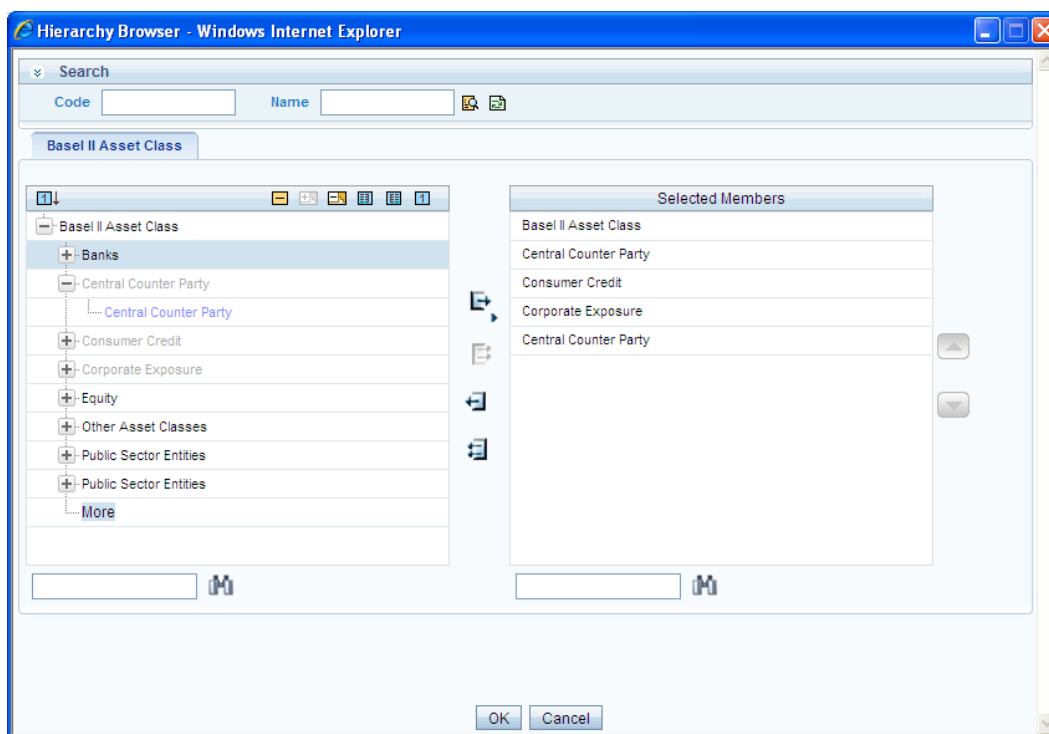
The *Search* grid allows you to search for a particular member by entering Code or any part of the Name and clicking 🔍 icon. You can click 🔃 icon to refresh the Code or name fields. You can also find a member in the grid using 🔍 icon. Click ➕ and expand the members of the selected hierarchy.

2. Select a member / node and click ➡️ to select the same. Click the ▾ to select the member as Self, Self & Descendants, Self & Children, Parent, Siblings, Children, Descendants, or Last Descendants. In the *Hierarchy Browser* window you can also:

   a. Click 1↓ or A↓ to sort the members by Code or Name.

   b. Click ➕ or ➖ to expand or collapse the members under a node.

   c. Click ➕ or ➖ to expand a branch or collapse a branch.

   d. Click ▦ or ▤ to view the code values of members right or left.

   e. Click 1 or A to show code or show name of the members.

   f. Click ▲ or ▼ to move the members up or down in the Selected Members pane.

3. Click 🔽 icon adjacent to a filter details to launch it. The *Preview SQL Query* window is displayed with the resultant SQL equivalent of the launch result.

   The *Detail Information* grid displays the Jobs and Job Condition defined in the primary page of the *Run Definition (New Mode)* window.

   a. Click ⋯ icon adjacent to the Job Names to reorder the selected Jobs.

   b. Select the checkbox in the selected Hierarchy member column to apply the Job condition.

   c. Click a Job to view the details in the *Show Details* window.

You can click **Back** icon to navigate back to the first page of the *Run Definition (New Mode)* window to modify any details.

After all the necessary details are entered, Click **Save**. The Run definition is saved with the provided details and is displayed in the *Run* window. The default version of a new Run definition is "0" and the default version of an unauthorized definition is "-1".

The *Audit Trail* section at the bottom of *Run Definition (New Mode)* window displays metadata information about the Run definition created. The *User Comments* section facilitates you to add or update additional information as comments.

You can view individual Run definition details at any given point. To view the existing Run definition details in the *Run* window, select the checkbox adjacent to the Run Code whose details are to be viewed. Click 📃 icon in the List tool bar. The *Run Definition (View Mode)* window is displayed with all the details of the selected Run. Click **Next** and **Back** icons to navigate back and forth in the *Run Definition (View Mode)* window.

You can modify all the details except ID, Code, Version, Active status, and Type of a Run definition. To modify an existing Run definition in the *Run* window, select the checkbox adjacent to the Run Code whose details are to be updated. Click 📝 icon in the *List* tool bar. Edit icon is disabled if you have selected multiple Runs.

Run Definition Versioning

The default version of a new Run definition created by an Authorizer is "0" and the one created by non Authorizer is "-1". When you edit and save a Run, you are prompted either to overwrite the already existing details or save the same as latest version (version "0") or to create a subsequent version wherein the existing details are retained as of current version +1. A definition with version "-1", when edited by an authorized user changes to "0" and an unauthorized user remains as "-1".

Copy Run Definition

The Copy Run Definition facilitates you to quickly create a new Run Definition based on an existing Run or by updating the values of the required Run. To copy an existing Run Definition in the *Run* window, Select the checkbox adjacent to the Run Code whose details are to be duplicated. Click 🖫 icon in the List toolbar to copy a selected Run definition. The *Run Definition (Copy Mode)* window is displayed. Copy icon is disabled if you have selected multiple Runs. In the *Run Definition (Copy Mode)* window you can:

Create new Run definition with existing variables. Specify a new **Run Code** and **Folder**. Click **Save**.

Create new Run definition by updating the required variables. Specify a new **Run Code**, **Folder**, and update other required details. Click **Save**.

The new Run definition details are displayed in the *Run* window. By default, version "0" is set if you have authorization rights, else the version is set to "-1".

Authorize Run Definition

All the actions in a Run definition should be approved by an authorizer. An authorizer can Approve a pre-defined Run definition for further execution or Reject an inappropriate Run definition listed within the *Run* window.

If you have Authorizer function mapped to your role, the Run definition is auto Approved as you save it and the Active status is set to "**Yes**". Otherwise the Active status is "**No**" and can be authorized.

To Approve/Reject Runs in the *Run* window, select the checkbox(s) adjacent to the required Run Codes. Do one of the following:

1. To **Approve** the selected Run definitions, click ☑ icon.

2. To **Reject** the selected Run definitions, click ⊗ icon.

A Run is made available for use only after the approval. For a rejected definition a comment with the rejection details are added.

Export Run to PDF

You can export multiple Run definition details to a PDF file. To export the Run definition details in the *Run* window:

1. Select the checkbox(s) adjacent to the required Run Codes.

2. Click 📤 icon in the List toolbar.

3. Click the 📄 icon in the popup. The *Export* dialog is displayed.
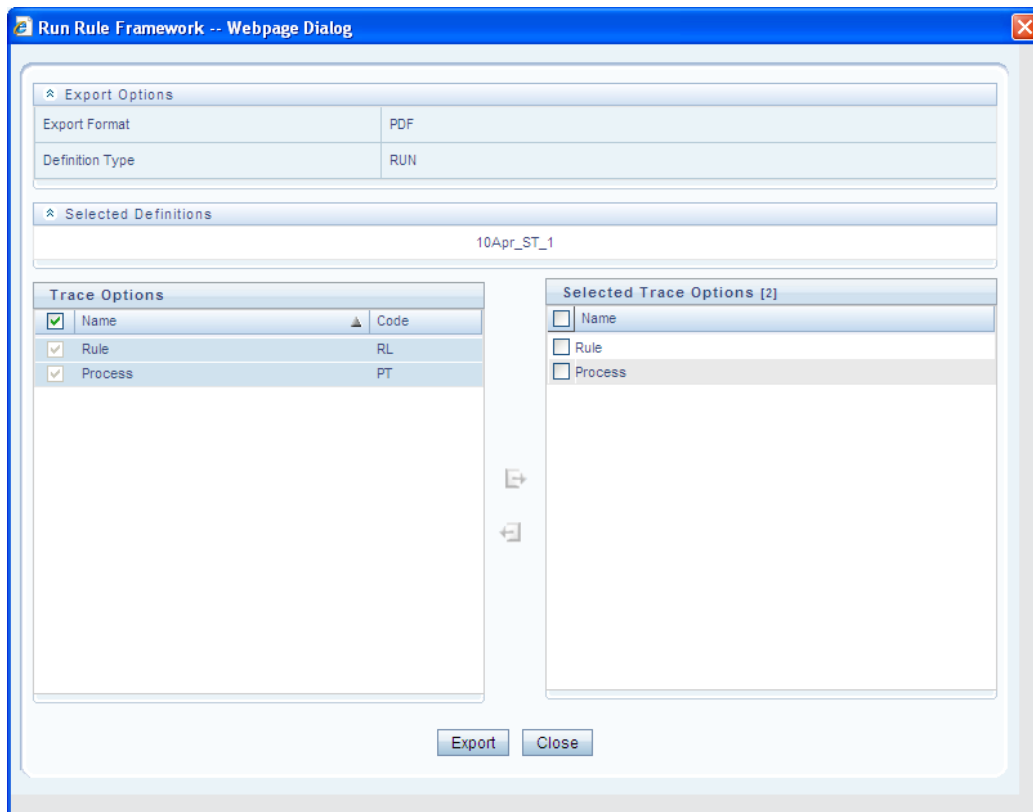
The *Export* dialog displays the Export Format, Definition Type, the names of the Selected Definitions, and the Trace Options. To select the Trace Options in the *Trace Options* grid:

4. Select the checkbox(s) adjacent to the available options.

5. Click ⬀ icon. The selected options are displayed in the Selected Trace Options pane. You can also select a trace option and click ⬁ icon to deselect it from the Selected Trace Options pane.

6. Click **Export**. The process is initiated and is displayed in a pop-up specific to the current download. After the PDF is generated, you can open / save the file from the *File Download* dialog. You can either save the file on the local machine or view the file contents in a PDF viewer. The downloaded PDF displays all the details such as Linked to, Properties, Master info, Audit Trail, List, and Comments of all the Run definitions selected.

Fire Run

The Fire Run feature in the *Run* window facilitates you to execute a previously created Run. To execute a Fire Run:

1. Select the checkbox adjacent to the Run Code which you want to execute.

2. Click 🛠 icon in the List toolbar.

    The *Fire Run* window is displayed.
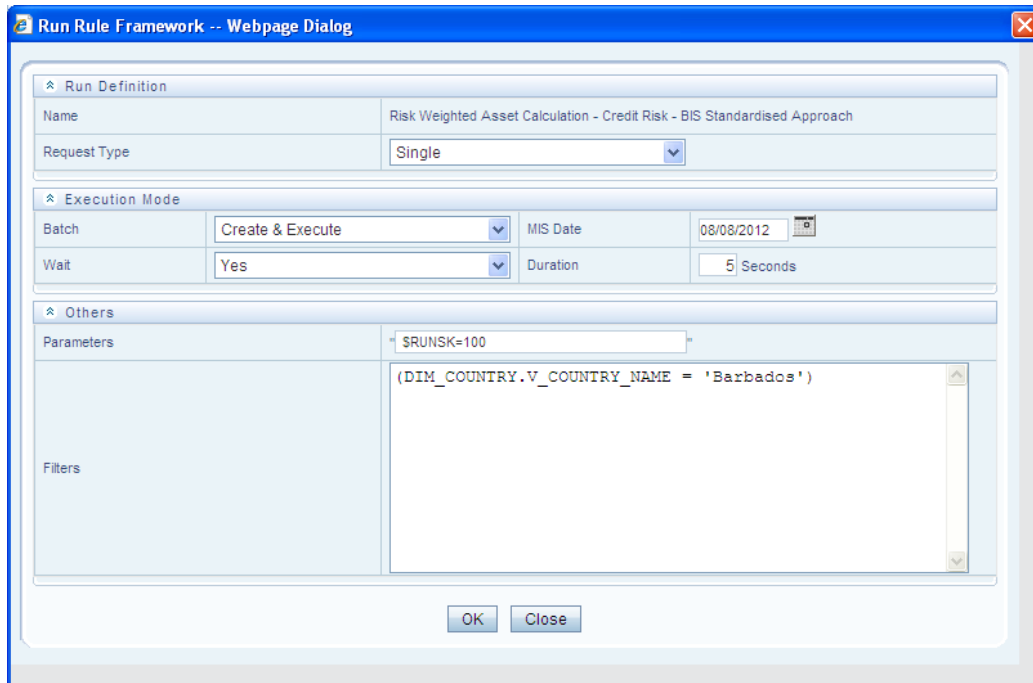
3. In the *Fire Run* window, enter the field details as tabulated below:

Field Name	Description
Name	By default, this field displays the name of the selected Run.
Request Type	Select the request type either as **Single** or as **Multiple** from the drop down box. *Note: A **Single** request creates a Batch where as a **Multiple** request creates Batch group.*

Field Name	Description
Batch	Select the Batch either as Create or as Create & Execute.
MIS Date	Click [icon] icon and the Calendar is displayed. You can select the MIS Date from the calendar. This field is displayed only if you have selected Request Type as **Multiple** with any of the Batch mode or Request Type as **Single** with Batch mode as **Create & Execute**.
Wait	Select the Wait value either as **Yes** or as **No**. ▪ Select **Yes** to provide the Duration in seconds after which the Fire Run status should be displayed. ▪ Select **No** to display the Fire Run status immediately.
Duration	Enter the duration in seconds after which the Fire Run status should be displayed. **Note**: This field is displayed only if you have selected the Wait value as **Yes**.
Parameters	Enter the required parameters in the field provided. The parameter provided in this field is considered for Run execution.
Filters	Enter the filter details in the field provided. The filters provided in this field are considered for Run execution.

4. Click **OK**. The details are saved and the Run is executed as per the Fire Run details.

You can remove Run definition(s) which are no longer required in the system by deleting from *Run* window, selecting the Run Codes whose details are to be removed and clicking the [trash] icon.

3.5   System Configuration

System Administrators define the Servers, Database, and Information Domain along with the other Configuration processes such as segment and metadata mapping, hierarchy security, and designing the Infrastructure Menu functions. System Configuration is mostly a onetime activity which helps System administrator to make the Infrastructure system operational for usage. System Configuration activities should be performed by the infrastructure administrator using the admin credentials. To access System Configuration, you is mapped to SYSADM function role within the Infrastructure system.

3.5.1 Segment/Metadata Mapping

Segment refers to a logically divided part of the whole object based on specific requirement. Segment/Metadata Mapping in the System Configuration section facilitates you to map/unmap the required business metadata definitions such as measures, hierarchies, cubes, and attributes to the selected segment within a specific Information Domain. Based on the mapping, users mapped to the segment are restricted to access only the relevant metadata to view and edit during metadata maintenance and information security.

You (System Administrator) need to have SYSADM function role mapped to your role to access Segment/Metadata Mapping section. You can access *Segment/Metadata Mapping* in LHS menu of System Configuration. By default the *Metadata Segment Mapping* window displays the Information Domain Name to which you are connected along with the metadata details of Measure.

Map Metadata Definitions

You can map/unmap the required business metadata definitions to a segment available within the selected Information Domain. To map the required metadata definitions, do the following:

1. Select the required User Segment from the drop-down list.

2. Select the required metadata definition as Measure, Hierarchy, Cube, or Attribute. The defined metadata are listed in the Available Metadata pane.

3. Map/Unmap the required metadata by doing the following:

a. To map a metadata, select the metadata from the *Available Metadata* list and click icon. The metadata is added to the *Selected Metadata* pane. You can press **Ctrl** key for multiple selections.

b. To map all the listed metadata definitions, click icon.

c. To remove a metadata mapping, select the metadata from the Selected Metadata list and click icon.

d. To remove the entire metadata mapping, click icon.

4. Click **Save** to save the metadata mapping details. The window is refreshed displaying the mapping results.

5. Click **Show Details** to view the results in detail.

You can modify the mapping at any point and the mapping table is updated only on saving the mapping details. When a metadata definition such as measures, hierarchies, cubes, and attributes are removed from the Information Domain, the same is updated in the mappings table.

3.6 Administration

Administration facilitates system administrators to define the security framework with the capacity to restrict access to the data and metadata in the warehouse, based on a flexible, fine-grained access control mechanism. The document deals with Saving Metadata activity of the system administrator. For more information on the Administration related activities, see the OFS Basel Regulatory Admin Guide.

You (System Administrator/System Authorizer) need to have SYSATH, SYSADM, and METAAUTH function roles mapped to access the Administration framework within the Infrastructure system. Administration is available within the tree structure of left hand side (LHS) menu in the Infrastructure home page. Click + to expand and view the Administration sections in detail.

3.6.1 Save Metadata

Save Metadata within the Infrastructure system facilitates you to resave the changes done to an authorized metadata for the selected Information Domain. When you resave metadata, all the existing metadata definitions are updated with the current changes along with the current modified date.

You (System Administrator) need to have SYSADM function role mapped to access the Metadata Authorization within the Administration framework of the Infrastructure system. The Metadata Resave window displays the list of Available Metadata for Hierarchy (default) for the selected Information Domain. To resave metadata in the Metadata Resave window:

1. Filter the metadata type be selecting Hierarchy, Derived Entity, or Map. The list of Available Metadata is populated. Do one of the following:

    a. Select the required metadata from the Available Metadata list and click [image] icon. You can press Ctrl key form multiple selection.

    b. To select all the Available Metadata, click [image] icon.

    c. You can also deselect a metadata by selecting from the Selected Metadata list and clicking [image] icon or deselect all the selected metadata by clicking [image] icon.

2. Click **Save** and update the metadata changes.

    After the details are updated, you can click **Show Details** to view the status. You can also click **Reset** to clear the selection.

3.6.2 Utilities

Utilities refer to a set of additional tools which helps you to fine tune a defined process or maximize and ensure the security of a database based on your need. The Utilities within the Administration framework of Infrastructure system facilitates you to maintain the data in the Oracle database using the various administrative tools. You can define the user access permissions, batch securities, upload attributes, find metadata difference, and migrate source objects to target database.

You (System Administrator) need to have SYSADM function role mapped to access the Utilities section within the Infrastructure system. You can access Utilities section within the Administration framework under the tree structure of LHS menu.

UserGroup - Batch Execution Map

UserGroup-Batch Execution Map facilitates you to map the required UserGroup to the defined Batch(s) before you execute them from Batch Execution or Batch Scheduler window. You can map multiple user groups of an Information Domain to different batches. If a user is mapped to multiple UserGroups, the combined list of batches mapped to these user groups is available in the Batch Execution or Batch Scheduler window for execution.

The default UserGroup of a user who has created the batch has the maximum Precedence Value among the other UserGroups and is automatically mapped for execution. An explicit mapping of this UserGroup to the Batch is not required.

You (System Administrator) need to have SYSADM function role mapped to access the UserGroup-Batch Execution Map within the Utilities section of the Infrastructure system. The UserGroup-Batch Execution Map window displays the list of defined Batches for the selected Information Domain along with the other details such as Batch Name and Batch Description. You can filter the list of defined batches which are created in Batch Maintenance, Advanced Analytics Infrastructure, or in Rules Framework. By default the list displays the batches defined in the Batch Maintenance window. To Map UserGroup to the required Batch in the *UserGroup-Batch Execution Map* window:

1. Select the Information Domain from the drop down list. By default, the window displays the Information Domain to which you are connected.
2. Select the Groups from the drop down list. The list consists of all the User Groups mapped to the selected Information Domain. The window is refreshed and the list of defined batches is populated.
3. You can also search for a specific user group by clicking Search and specifying the User Group Name in the User Maintenance-Search window. Click **OK**.
4. Select the checkbox adjacent to Batch Maintenance (default), Advanced Analytics Infrastructure, or Rules Framework and filter the list of batches. You can also select ALL to list all the defined batches for the selected Information Domain.
5. Map UserGroup to Batch(s) by doing the following:

   a. To map batch(s) to the selected UserGroup, select **Batch Map** checkbox.

   b. To map all the batches to the selected UserGroup, click **Check All**.

   c. You can also click **Uncheck All** to remove all the mapping.

6. Click **Save** to save the UserGroup-Batch mapping details.

3.7 Data Quality Framework

Data quality refers to finding out expected or known anomalies in data provided. This application allows you to define 8 different criteria as per business requirement. Thus, one can define more than one criterion for a column. This helps in performing rigorous quality checks on the data. The application provides the query right at the time of the definition so that you can ensure that the application notifies data elements as per requirement.

You can define the severity of the check which reflects the criticality of check. The options available are 'Error', Warning' or 'Information'. When you define these checks, approval is mandatory before the checks are executed. For more information on Data Quality Checks, see the *OFS Analytical Applications Infrastructure User Guide*.

NOTE: Assignment type has code and leaf members that are created/populated using AMHM screen, which is a part of EPM products.

3.8 Data Quality Checks

In order to maintain the integrity and accuracy of the data populated in to the Basel application, certain data quality checks are pre-configured under the Data Quality Framework link in OFSAAI. For information on out of the box Data Quality checks, see the *Basel Data Quality Checks* spreadsheet in MOS.

3.9 Stress Testing Framework

Stress Testing or risk estimation technique refers to the process of examining the stability of a system or entity in adverse conditions. It involves testing beyond normal operational capacity, often to a breaking point, in order to observe the results. Stress testing is now an integral part of a bank's risk measurement system and plays an important role in estimating the effects of potential financial crises on a bank's operations. Stress Testing also facilitates banks to conduct analysis to estimate the impact of movements in the variables on specific measures such as profitability and capital adequacy.

Stress Testing within the infrastructure system is an integrated framework which supports the stress testing requirements across the entire suite of OFSAAI products. It allows banks to define shocks and assess the impact of such shocks across multiple business areas. For more information on the Stress Testing Framework, see the *OFS Analytical Applications Infrastructure User Guide*.

4. Basel Regulatory Capital Basic Application

4.1 Scope of the Application

The Oracle Financial Services (OFS) Basel Regulatory Capital application is categorized into two versions: OFS Basel Regulatory Capital Basic and OFS Basel Regulatory Capital Internal Rating Based Approach. OFS Basel Regulatory Capital Basic supports the Standardized approach and its variants for the BIS Jurisdiction, Standardized approach for the Indian, Islamic Banking, Brazilian, CBRC, US, Eurpoean, and Thailand Jurisdictions. OFS Basel Regulatory Capital Internal Ratings Based Approach is based on the approaches supported by the OFS Basel Regulatory Capital Basic Application as well as the Advanced approaches for BIS, USA, CBRC, European, and Thailand Jurisdictions.

The guidelines supported by the Oracle Financial Services Basel Regulatory Capital Basic application, are as follows:

♦ **BIS Jurisdiction:** For the BIS jurisdiction, the following approaches for Risk Weighted Assets (RWA) and Capital Adequacy Ratio computations are supported:

Basel I

   o Capital Structure
   o Credit Risk
      ▪ Non Securitization – Standardized Approach

Basel II and Basel III

   o Capital Structure – Capital Ratios and Buffers
   o Credit Risk
      ▪ Non Securitization – Standardized Approach
      ▪ Securitization - Standardized Approach
   o Market Risk
      ▪ Market Risk – Standardized Approach
      ▪ Market Risk – Internal Model Method (IMM) Approach
   o Operational Risk
      ▪ Operational Risk – Basic Indicator Approach
      ▪ Operational Risk – Standardized Approach
      ▪ Operational Risk – Alternate Standardized Approach
   o Leverage Ratio Calculations

♦ **Indian Jurisdiction:** In the Indian jurisdiction, the following approaches for RWA and Capital Adequacy Ratio computation are supported:

Basel II and Basel III

   o Capital Structure – Capital Ratios and Buffers
   o Credit Risk
      ▪ Non Securitization – Standardized Approach

- Securitization - Standardized Approach
    - o Market Risk
        - Market Risk – Standardized Approach
    - o Operational Risk
        - Operational Risk – Basic Indicator approach
    - o Leverage Ratio Calculations
- ♦ **US Jurisdiction:** In the US jurisdiction, the following approaches for RWA and Capital Adequacy Ratio computation are supported:

    Basel II and Basel III
    - o Capital Structure – Capital Ratios and Buffers
    - o Credit Risk
        - Non Securitization – Standardized Approach
        - Securitization – Standardised Approach
    - o Leverage Ratio Calculations
- ♦ **European Union (EU) Jurisdiction:** In the EU jurisdiction, the following approaches for RWA and Capital Adequacy Ratio computation are supported:

    CRR and CRD IV
    - o Capital Structure – Capital Ratios and Buffers
    - o Credit Risk
        - Non-Securitization Exposures – Standardized Approach
        - Counterparty Credit Risk Exposures – Original Exposure Method, Mark to Market Method, and Internal Modeling Method
        - Settlement Risk Exposures – Standardized Approach
        - Securitization Exposures – Standardized Approach
        - Credit Valuation Adjustment – Standardized Approach and Alternative Approach
        - Default Fund Contribution – Qualified Central Counterparty and Non-Qualified Central Counterparty
    - o Operational Risk
        - Operational Risk – Basic Indicator Approach
        - Operational Risk – Standardized Approach
        - Operational Risk – Alternate Standardized Approach
    - o Large Exposure Treatment for Banking Book
    - o Leverage Ratio Calculations
- ♦ **CBRC Jurisdiction:** In the jurisdiction of CBRC the following approaches for RWA and Capital Adequacy Ratio computation are supported:

    Basel II and Basel III
    - o Capital Structure – Capital Ratios and Buffers

- o Credit Risk
    - Non Securitization – Standardized Approach
    - Securitization - Standardized Approach
- o Market Risk
    - Market Risk – Standardized Approach
- o Operational Risk
    - Operational Risk – Standardized Approach
- ♦ **Thailand Jurisdiction:** In the Thailand jurisdiction, the following approaches for RWA and Capital Adequacy Ratio computation are supported:

    Basel III
    - o Capital Structure – Capital Ratios and Buffers
    - o Credit Risk
        - Non Securitization – Standardized Approach
        - Non Securitization – Internal Ratings Based Approach
    - o Operational Risk
        - Operational Risk – Basic Indicator Approach
        - Operational Risk – Standardized Approach
        - Operational Risk – Alternate Standardized Approach

4.2 Attribution Analysis

Attribution Analysis functionality is introduced in the application as a method to analyze the impact of various attribution variables, on the change in Risk Weighted Assets (RWA). It analyzes the capital ratio of the bank across two runs, which are a quarter apart or even a year apart. This functionality enables you to understand the cause of an RWA increase or capital ratio decrease. This become possible by providing them with a causal analysis of various control factors in attribution classes such as Credit Risk, Market Risk, Operational Risk, and Capital Structure categories.

Attribution variables are clubbed together under Attribution categories which are further under the attribution classes. But you can include other categories, depending on the attributes you need to analyze. Thus you can select or deselect the relevant categories for the analysis. In short, Attribution Analysis feature is flexible and enables you to customize the categories and variables to suit your portfolios for analysis.

4.2.1 Attribution Analysis – User Roles and Access not Supported in Out-of-Box product

Workaround:

Attribution analysis supports the role based user access. The roles are not defined in OOB currently. These roles are defined on site. Suggested roles and access are as follows:

- ♦ Credit Risk Analyst - view/add/edit/map attribution variables for Credit Risk Class.

- Market Risk Analyst - view/add/edit/map attribution variables for Market Risk Class.
- Operational Risk Analyst - view/add/edit/map attribution variables for Operational Risk Class.
- Capital Analyst - view/add/edit/map attribution variables for Capital structure.
- Credit Risk Authorizer - view/authorize the control variable definitions and mappings for Credit Risk Class.
- Market Risk Authorizer - view/authorize the control variable definitions and mappings for Market Risk Class.
- Operational Risk Authorizer - view/authorize the control variable definitions and mappings for Operational Risk Class.
- Capital Authorizer - view/authorize the control variable definitions and mappings for Capital structure.
- Enterprise Risk Analysts and Authorizers have access to control variables for all classes.
- Super user has all the above rights and the right to add a new class and map user role to it.

4.2.2 Credit RWA

This functionality is useful for the risk analysts in a scenario, where your RWA has increased and capital ratio has decreased, as compared to the previous quarter when the business growth is static. The Basel application performs necessary analyzations to find the root cause behind the Credit RWA attribution changes, based on various contributing factors.

4.2.2.1 Non Securitized Attribution Categories under Credit RWA

The attribution categories that contribute to the attribution analysis for Non-Securitization are the following:

- Rating Migration: Rating migration (downgrade or upgrade) leads to a direct impact on the risk weights applied to the credit risk exposures.
- Exchange Rate Fluctuations: Change in exchange rate of the reporting currency with respect to the major currencies in the bank's portfolio impacts all the inflows and outflows.
- Effective Maturity: Effective maturity impacts the EAD calculation for advanced approaches. Change in effective maturity leads to a change in RWA for the credit exposures of the advanced approaches.
- Provisioning: Change in the provisioning amount leads to a change in the exposure amount, which is at risk. This further leads to a change in RWA. Any change in loss provisioning amount can also be attributed to the change in corresponding RWA.
- Past Due Analysis: Change in the number of exposures and the amount of past due exposures impacts the risk weights. The handling of the same leads to a change in RWA for Credit Risk. Between the two runs, if the status of the exposures changes from current to past due or vice versa, the RWA's for those exposures and the difference of the two sets of RWAs can be computed.
- Net Business Growth: Change in number and amount of exposures indicate the net business growth of the bank. The change in RWA due to this factor can be attributed to business growth.

The application determines the new exposures and the exposures that is closed by comparing the list of the two runs. The difference in the RWA's provide the impact on RWA's of the Net Business Growth.

♦ Collateral Valuation: Keeping the mark-to-market value of a collateral against an exposure change leads to a change in the post mitigation RWA of that exposure. Thus, this impacts the overall Credit RWA and capital ratio. The application monitors the mark-to-market values of the collaterals that are kept to mitigate the risk arising out of the exposure. The change in such values are used to identify the change in the RWA across two runs and attribute that difference to these amounts.

♦ Probability of Default: Any change in the macroeconomic variables impacts the probability of default percentages of the customers. This in turn leads to the change in RWA. Since directly monitoring the changes in the macroeconomic variables like GDP is not possible, the application monitors the changes in the parameters such as PD that are impacted by them. The change in the PD value of a customer across two runs can contribute to the RWA change for the portfolio.

♦ Loss Given Default: Any change in the macroeconomic variables impacts the LGD percentages of the exposures. This leads to the change in RWA. Since it is difficult to directly monitor the changes in the macroeconomic variables like GDP, the application monitors the changes in the parameters such as LGD that are impacted by them. The change in the LGD value of an exposure across two runs can contribute to the RWA change for the portfolio.

♦ Write-Offs: Number of exposures written off in the latest run as compared with those in the previous run provides an insight into the impact on RWA due to write-offs. This help in attributing the RWA change accordingly.

♦ Exposure Amount: Comparing the exposure amounts of an exposure across the two runs helps in getting an insight into the impact on RWA due to the exposure amount changes.

♦ Others: This captures the changes in RWA across two runs which could not be attributed to any of the preceding reasons. Computation for this depends on the variables selected while defining an attribution analysis.

4.2.2.2 Securitized Attribution Categories under Credit RWA

The attribution categories that contribute to the attribution analysis for Securitization are the following:

♦ Due Diligence Requirement: Any change in the due diligence requirement impacts the exposure amount and the RWA of those credit exposures where Basel methodology opted for the run is gross up approach and hence help us to attribute the RWA changes accordingly.

♦ Rating Migration: Rating migration (downgrade or upgrade) leads to a direct impact on the risk weights applied to the credit risk exposures.

♦ Net Business Growth: Change in the number of exposures and amount indicates the net business growth of the bank. The change in RWA due to this factor can be attributed to business growth.

♦ Exchange Rate Fluctuations: Change in the exchange rate of reporting currency with respect to the major currencies in the bank's portfolio impacts all the inflows and outflows which have the natural currency as the one for which the exchange rate is impacted.

♦ SSFA Parameter Impact: Tracking the changes in the RWA as a result of change in the risk weight across two runs where there is no change in the due diligence requirement and bank opts SSFA methodology.

4.2.3 Capital Structure Attribution Categories

The following are the attribution categories for Capital Structure:

♦ Common Equity Tier 1 Capital: Changes in the CET1 amounts leads to a change in capital ratios. The changes can be monitored from the following attribution variables and the change in capital ratio can be attributed to the same:
  o Paid up equity capital
  o Share premium
  o Undisclosed Reserves
  o Retained Earnings
  o Accumulated Other Comprehensive Income
  o Minority Interest
  o Regulatory Adjustments for CET1

♦ Additional Tier 1 Capital: Changes in the AT1 amounts lead to a change in capital ratios. The changes can be monitored in the following attribution variables and the change in capital ratio can be attributed to the same:
  o Instruments eligible for AT1
  o Share Premium from Instruments Eligible for AT1
  o Minority Interest for AT1
  o Regulatory Adjustments for AT1

♦ Tier 2 Capital: Changes in the Tier 2 amounts lead to a change in capital ratios. The changes can be monitored in the following attribution variables and the change in capital ratio can be attributed to the same:
  o Instruments Eligible for T2
  o Share Premium from Instruments Eligible for T2
  o Minority Interest for T2
  o Loan Provisions
  o Regulatory Adjustments for T2

♦ Transition: Due to the phase-in and phase-out timelines for Basel III implementation, capital compositions and deductions may change. This may lead to a difference in the capital ratios. The application identifies the changes in capital compositions and the deductions introduced due to the transition phases and attributes the capital ratio changes to the same accordingly.

♦ Others: This captures the change in Total Capital Ratio across two runs which could not be attributed to any of the preceding reasons. Computation for this depends on the variables selected while defining an attribution analysis.

4.2.4 Market RWA

Attribution analysis for changes in Market RWA is computed for certain control variables, which are essentially the different approaches used for arriving at the RWA. Computation on each control variable is

further divided based on the risk types. This section explains such various attribution variables and recognizes the changes in RWA corresponding to these variables. This functionality in the application enables you to understand how the RWA does has increased and capital has declined as compared to the previous quarter even when the business growth is static.

The market risk attribution variables are detailed here:

♦ Exchange Rate Fluctuations: Change in exchange rate of the reporting currency with respect to the major currencies in the bank's portfolio impacts all the inflows and outflows.

♦ Net Business Growth: Change in number and amount of exposures indicate the net business growth of the bank. The change in RWA due to this factor can be attributed to business growth. The application determines the new exposures and the exposures that is closed by comparing the list of the two runs. The difference in the RWA's provide the impact on RWA's of the Net Business Growth.

♦ Rating Migration: The migration of ratings impact the market risk exposures as it increases the specific risk capital charge that is applied to interest rate securities. Rating migration impact can be seen on the IR exposures where the specific risk charge is applied based on the counterparty ratings. According to the jurisdictions, whichever exposure category considers ratings, the exposure amount of those exposures impacts market RWA.
Ratings of the various counterparties can be tracked and the change in exposure amounts with the change in ratings are provided as an end result.

♦ Carrying Value: The change in carrying value of the positions (market value) is responsible for the movement in exposure value without any new business growth accounted for. This impacts RWA. The application monitor the market value changes (carrying value) excluding the exposures or positions added in the new run. Thus this change and the corresponding change in RWA becomes an attribute for analysis.

♦ Bond Rates: The change in the interest rates of the bonds are monitored by the application. This is useful in analyzing the impact of an interest rate movement on RWA due to market risk.

♦ Greek Impact: The change in the Gamma and Vega impact for the exposures leads to a change in General Risk Charge, hence change in the RWA computed for market risk.

♦ Others: This captures the change in Total Capital Ratio across two runs which could not be attributed to any of the preceding reasons. Computation for this depends on the variables selected while defining an attribution analysis.

4.2.5 Operational RWA

This section details about various attribution variables and recognizes the changes in RWA corresponding to these variables. It also explains about attributing such changes in RWA and capital ratio to the appropriate Attribution Variable. This functionality of the application enables you to understand why the RWA has increased and capital has decreased as compared to the previous quarter when the business growth was static. This feature identifies the root cause of RWA changes by analyzing various contributing factors.

Attribution analysis for changes in Operational RWA is computed for the following control variables, which are the different approaches used for arriving at the RWA:

♦ Exchange Rate Fluctuations: Change in exchange rate of the reporting currency with respect to the major currencies in the bank's portfolio impacts all the inflows and outflows.

- ♦ Net Business Growth: Change in number and amount of exposures indicate the net business growth of the bank. The change in RWA due to this factor can be attributed to business growth. The application determines the new exposures and the exposures that is closed by comparing the list of the two runs. The difference in the RWA's provide the impact on RWA's of the Net Business Growth.

- ♦ Pre Projection Net Revenue (PPNR): PPNR is computed as following:
    - o Net Interest Income + Non Interest Income - Non Interest Expense
    - o Change in PPNR can be computed across the two runs by comparing the preceding calculation for both the runs and reporting the difference as per the reporting requirements provided.

- ♦ Gross Income: For this Attribution Variable category, the following attribution variables are monitored to attribute the impact of change in gross income due to the listed attribution variables over the Operational RWA:
    - o Net Interest Income
    - o Net Non-Interest Income
    - o Provisioning
    - o Operating Expenses
    - o Gain or Loss from Sale
    - o Gain or Loss Position on Net Interest Income
    - o Irregular gain or loss from Insurance
    - o Income from Insurance

- ♦ Others: This captures the change in Total Capital Ratio across two runs which could not be attributed to any of the preceding reasons. Computation for this depends on the variables selected while defining an attribution analysis.

For more information the Attribution Analysis screen, refer to Attribution Analysis GUI section.

4.3   Key Operational Concepts of the Application

Issue vs Issuer Rating Assignment

Rating assignment for the unrated exposures needs to be based on issue vs. issuer rating assessment and/or multiple rating assessment. This is as per the guidelines and follows the following sequence to arrive at the final rating applicable to the unrated exposure. The issue versus issuer assessment is applicable for corporate, foreign bank asset class. It includes asset classes for which Risk weight is based on rating.

All exposures which are assigned unrated code are sent to the interface logic in the following process:

Sl. No.	Check	Treatment	Remarks
1	Inference from issued debt	All unrated claim goes for rating inference from rated issued debt from the counterparty. Validation is carried out for Seniority, residual maturity and	This step is applicable for issued debt and not for own claim.

		currency. Benefit in terms of lower risk weight is applicable only if unrated claim is ranked pari- passu or senior claim. If any issue of the same counterparty has higher risk weight, higher RW is inferred for unrated issue on the same counterparty. If unrated issue is senior issue than lower risk weight is not inferred. If there are multiple reference issues with multiple risk weight, multiple assessment is applicable.	Multiple assessment is applied post increase in risk weight level. Rating is updated as inferred from rated claim. No equivalent rating is applied based on long term/short term nature of unrated claim.
2	Issuer rating inference	All unrated claim goes for rating inference from issuer. Issuer rating is subjected to multiple assessment if required.	Issuer rating is applied as is. No equivalent rating is applied based on long term/short term nature of unrated claim.
3	Comparison of reference issue rating and issuer rating	The rating and risk weight inferred from step 1 and step 2 above is subjected to multiple assessments to obtain the final rating of the claim.	No equivalent rating is applied based on long term/short term nature of unrated claim.

5. Basel Regulatory Capital Basic Application

5.1 Scope of the Application

The Oracle Financial Services (OFS) Basel Regulatory Capital application is categorized into two versions: OFS Basel Regulatory Capital Basic and OFS Basel Regulatory Capital Internal Rating Based Approach. OFS Basel Regulatory Capital Basic supports the Standardized approach and its variants for the BIS Jurisdiction, Standardized approach for the Indian, Islamic Banking, Brazilian, CBRC, US, Eurpoean, and Thailand Jurisdictions. OFS Basel Regulatory Capital Internal Ratings Based Approach is based on the approaches supported by the OFS Basel Regulatory Capital Basic Application as well as the Advanced approaches for BIS, USA, CBRC, European, and Thailand Jurisdictions.

The guidelines supported by the Oracle Financial Services Basel Regulatory Capital Basic application, are as follows:

- ♦ **BIS Jurisdiction:** For the BIS jurisdiction, the following approaches for Risk Weighted Assets (RWA) and Capital Adequacy Ratio computations are supported:

  Basel I
  - o Capital Structure
  - o Credit Risk
    - ▪ Non Securitization – Standardized Approach

  Basel II and Basel III
  - o Capital Structure – Capital Ratios and Buffers
  - o Credit Risk
    - ▪ Non Securitization – Standardized Approach
    - ▪ Securitization - Standardized Approach
  - o Market Risk
    - ▪ Market Risk – Standardized Approach
    - ▪ Market Risk – Internal Model Method (IMM) Approach
  - o Operational Risk
    - ▪ Operational Risk – Basic Indicator Approach
    - ▪ Operational Risk – Standardized Approach
    - ▪ Operational Risk – Alternate Standardized Approach
  - o Leverage Ratio Calculations
- ♦ **Indian Jurisdiction:** In the Indian jurisdiction, the following approaches for RWA and Capital Adequacy Ratio computation are supported:

  Basel II and Basel III
  - o Capital Structure – Capital Ratios and Buffers
  - o Credit Risk
    - ▪ Non Securitization – Standardized Approach

- Securitization - Standardized Approach
    - o Market Risk
        - Market Risk – Standardized Approach
    - o Operational Risk
        - Operational Risk – Basic Indicator approach
    - o Leverage Ratio Calculations
- **US Jurisdiction:** In the US jurisdiction, the following approaches for RWA and Capital Adequacy Ratio computation are supported:

    Basel II and Basel III
    - o Capital Structure – Capital Ratios and Buffers
    - o Credit Risk
        - Non Securitization – Standardized Approach
        - Securitization – Standardised Approach
    - o Leverage Ratio Calculations
- **European Union (EU) Jurisdiction:** In the EU jurisdiction, the following approaches for RWA and Capital Adequacy Ratio computation are supported:

    CRR and CRD IV
    - o Capital Structure – Capital Ratios and Buffers
    - o Credit Risk
        - Non-Securitization Exposures – Standardized Approach
        - Counterparty Credit Risk Exposures – Original Exposure Method, Mark to Market Method, and Internal Modeling Method
        - Settlement Risk Exposures – Standardized Approach
        - Securitization Exposures – Standardized Approach
        - Credit Valuation Adjustment – Standardized Approach and Alternative Approach
        - Default Fund Contribution – Qualified Central Counterparty and Non-Qualified Central Counterparty
    - o Operational Risk
        - Operational Risk – Basic Indicator Approach
        - Operational Risk – Standardized Approach
        - Operational Risk – Alternate Standardized Approach
    - o Large Exposure Treatment for Banking Book
    - o Leverage Ratio Calculations
- **CBRC Jurisdiction:** In the jurisdiction of CBRC the following approaches for RWA and Capital Adequacy Ratio computation are supported:

    Basel II and Basel III
    - o Capital Structure – Capital Ratios and Buffers

- o Credit Risk
  - ▪ Non Securitization – Standardized Approach
  - ▪ Securitization - Standardized Approach
- o Market Risk
  - ▪ Market Risk – Standardized Approach
- o Operational Risk
  - ▪ Operational Risk – Standardized Approach
- ♦ **Thailand Jurisdiction:** In the Thailand jurisdiction, the following approaches for RWA and Capital Adequacy Ratio computation are supported:
  - ***Basel III***
    - o Capital Structure – Capital Ratios and Buffers
    - o Credit Risk
      - ▪ Non Securitization – Standardized Approach
    - o Operational Risk
      - ▪ Operational Risk – Basic Indicator Approach
      - ▪ Operational Risk – Standardized Approach
      - ▪ Operational Risk – Alternate Standardized Approach

5.2 Attribution Analysis

Attribution Analysis functionality is introduced in the application as a method to analyze the impact of various attribution variables, on the change in Risk Weighted Assets (RWA). It analyzes the capital ratio of the bank across two runs, which are a quarter apart or even a year apart. This functionality enables you to understand the cause of an RWA increase or capital ratio decrease. This become possible by providing them with a causal analysis of various control factors in attribution classes such as Credit Risk, Market Risk, Operational Risk, and Capital Structure categories.

Attribution variables are clubbed together under Attribution categories which are further under the attribution classes. But you can include other categories, depending on the attributes you need to analyze. Thus you can select or deselect the relevant categories for the analysis. In short, Attribution Analysis feature is flexible and enables you to customize the categories and variables to suit your portfolios for analysis.

5.2.1 Attribution Analysis – User Roles and Access not Supported in Out-of-Box product

Workaround:

Attribution analysis supports the role based user access. The roles are not defined in OOB currently. These roles are defined on site. Suggested roles and access are as follows:

- ♦ Credit Risk Analyst - view/add/edit/map attribution variables for Credit Risk Class.
- ♦ Market Risk Analyst - view/add/edit/map attribution variables for Market Risk Class.

- ♦ Operational Risk Analyst - view/add/edit/map attribution variables for Operational Risk Class.
- ♦ Capital Analyst - view/add/edit/map attribution variables for Capital structure.
- ♦ Credit Risk Authorizer - view/authorize the control variable definitions and mappings for Credit Risk Class.
- ♦ Market Risk Authorizer - view/authorize the control variable definitions and mappings for Market Risk Class.
- ♦ Operational Risk Authorizer - view/authorize the control variable definitions and mappings for Operational Risk Class.
- ♦ Capital Authorizer - view/authorize the control variable definitions and mappings for Capital structure.
- ♦ Enterprise Risk Analysts and Authorizers have access to control variables for all classes.
- ♦ Super user has all the above rights and the right to add a new class and map user role to it.

5.2.2   Credit RWA

This functionality is useful for the risk analysts in a scenario, where your RWA has increased and capital ratio has decreased, as compared to the previous quarter when the business growth is static. The Basel application performs necessary analyzations to find the root cause behind the Credit RWA attribution changes, based on various contributing factors.

5.2.2.1 Non Securitized Attribution Categories under Credit RWA

The attribution categories that contribute to the attribution analysis for Non-Securitization are the following:

- ♦ Rating Migration: Rating migration (downgrade or upgrade) leads to a direct impact on the risk weights applied to the credit risk exposures.
- ♦ Exchange Rate Fluctuations: Change in exchange rate of the reporting currency with respect to the major currencies in the bank's portfolio impacts all the inflows and outflows.
- ♦ Effective Maturity: Effective maturity impacts the EAD calculation for advanced approaches. Change in effective maturity leads to a change in RWA for the credit exposures of the advanced approaches.
- ♦ Provisioning: Change in the provisioning amount leads to a change in the exposure amount, which is at risk. This further leads to a change in RWA. Any change in loss provisioning amount can also be attributed to the change in corresponding RWA.
- ♦ Past Due Analysis: Change in the number of exposures and the amount of past due exposures impacts the risk weights. The handling of the same leads to a change in RWA for Credit Risk. Between the two runs, if the status of the exposures changes from current to past due or vice versa, the RWA's for those exposures and the difference of the two sets of RWAs can be computed.
- ♦ Net Business Growth: Change in number and amount of exposures indicate the net business growth of the bank. The change in RWA due to this factor can be attributed to business growth. The application determines the new exposures and the exposures that is closed by comparing

the list of the two runs. The difference in the RWA's provide the impact on RWA's of the Net Business Growth.

♦ Collateral Valuation: Keeping the mark-to-market value of a collateral against an exposure change leads to a change in the post mitigation RWA of that exposure. Thus, this impacts the overall Credit RWA and capital ratio. The application monitors the mark-to-market values of the collaterals that are kept to mitigate the risk arising out of the exposure. The change in such values are used to identify the change in the RWA across two runs and attribute that difference to these amounts.

♦ Probability of Default: Any change in the macroeconomic variables impacts the probability of default percentages of the customers. This in turn leads to the change in RWA. Since directly monitoring the changes in the macroeconomic variables like GDP is not possible, the application monitors the changes in the parameters such as PD that are impacted by them. The change in the PD value of a customer across two runs can contribute to the RWA change for the portfolio.

♦ Loss Given Default: Any change in the macroeconomic variables impacts the LGD percentages of the exposures. This leads to the change in RWA. Since it is difficult to directly monitor the changes in the macroeconomic variables like GDP, the application monitors the changes in the parameters such as LGD that are impacted by them. The change in the LGD value of an exposure across two runs can contribute to the RWA change for the portfolio.

♦ Write-Offs: Number of exposures written off in the latest run as compared with those in the previous run provides an insight into the impact on RWA due to write-offs. This help in attributing the RWA change accordingly.

♦ Exposure Amount: Comparing the exposure amounts of an exposure across the two runs helps in getting an insight into the impact on RWA due to the exposure amount changes.

♦ Others: This captures the changes in RWA across two runs which could not be attributed to any of the preceding reasons. Computation for this depends on the variables selected while defining an attribution analysis.

5.2.2.2 Securitized Attribution Categories under Credit RWA

The attribution categories that contribute to the attribution analysis for Securitization are the following:

♦ Due Diligence Requirement: Any change in the due diligence requirement impacts the exposure amount and the RWA of those credit exposures where Basel methodology opted for the run is gross up approach and hence help us to attribute the RWA changes accordingly.

♦ Rating Migration: Rating migration (downgrade or upgrade) leads to a direct impact on the risk weights applied to the credit risk exposures.

♦ Net Business Growth: Change in the number of exposures and amount indicates the net business growth of the bank. The change in RWA due to this factor can be attributed to business growth.

♦ Exchange Rate Fluctuations: Change in the exchange rate of reporting currency with respect to the major currencies in the bank's portfolio impacts all the inflows and outflows which have the natural currency as the one for which the exchange rate is impacted.

♦ SSFA Parameter Impact: Tracking the changes in the RWA as a result of change in the risk weight across two runs where there is no change in the due diligence requirement and bank opts SSFA methodology.

5.2.3 Capital Structure Attribution Categories

The following are the attribution categories for Capital Structure:

♦ Common Equity Tier 1 Capital: Changes in the CET1 amounts leads to a change in capital ratios. The changes can be monitored from the following attribution variables and the change in capital ratio can be attributed to the same:
  o Paid up equity capital
  o Share premium
  o Undisclosed Reserves
  o Retained Earnings
  o Accumulated Other Comprehensive Income
  o Minority Interest
  o Regulatory Adjustments for CET1

♦ Additional Tier 1 Capital: Changes in the AT1 amounts lead to a change in capital ratios. The changes can be monitored in the following attribution variables and the change in capital ratio can be attributed to the same:
  o Instruments eligible for AT1
  o Share Premium from Instruments Eligible for AT1
  o Minority Interest for AT1
  o Regulatory Adjustments for AT1

♦ Tier 2 Capital: Changes in the Tier 2 amounts lead to a change in capital ratios. The changes can be monitored in the following attribution variables and the change in capital ratio can be attributed to the same:
  o Instruments Eligible for T2
  o Share Premium from Instruments Eligible for T2
  o Minority Interest for T2
  o Loan Provisions
  o Regulatory Adjustments for T2

♦ Transition: Due to the phase-in and phase-out timelines for Basel III implementation, capital compositions and deductions may change. This may lead to a difference in the capital ratios. The application identifies the changes in capital compositions and the deductions introduced due to the transition phases and attributes the capital ratio changes to the same accordingly.

♦ Others: This captures the change in Total Capital Ratio across two runs which could not be attributed to any of the preceding reasons. Computation for this depends on the variables selected while defining an attribution analysis.

5.2.4 Market RWA

Attribution analysis for changes in Market RWA is computed for certain control variables, which are essentially the different approaches used for arriving at the RWA. Computation on each control variable is further divided based on the risk types. This section explains such various attribution variables and recognizes the changes in RWA corresponding to these variables. This functionality in the application enables you to understand how the RWA does has increased and capital has declined as compared to the previous quarter even when the business growth is static.

The market risk attribution variables are detailed here:

- ♦ Exchange Rate Fluctuations: Change in exchange rate of the reporting currency with respect to the major currencies in the bank's portfolio impacts all the inflows and outflows.
- ♦ Net Business Growth: Change in number and amount of exposures indicate the net business growth of the bank. The change in RWA due to this factor can be attributed to business growth. The application determines the new exposures and the exposures that is closed by comparing the list of the two runs. The difference in the RWA's provide the impact on RWA's of the Net Business Growth.
- ♦ Rating Migration: The migration of ratings impact the market risk exposures as it increases the specific risk capital charge that is applied to interest rate securities. Rating migration impact can be seen on the IR exposures where the specific risk charge is applied based on the counterparty ratings. According to the jurisdictions, whichever exposure category considers ratings, the exposure amount of those exposures impacts market RWA.
  Ratings of the various counterparties can be tracked and the change in exposure amounts with the change in ratings are provided as an end result.
- ♦ Carrying Value: The change in carrying value of the positions (market value) is responsible for the movement in exposure value without any new business growth accounted for. This impacts RWA. The application monitor the market value changes (carrying value) excluding the exposures or positions added in the new run. Thus this change and the corresponding change in RWA becomes an attribute for analysis.
- ♦ Bond Rates: The change in the interest rates of the bonds are monitored by the application. This is useful in analyzing the impact of an interest rate movement on RWA due to market risk.
- ♦ Greek Impact: The change in the Gamma and Vega impact for the exposures leads to a change in General Risk Charge, hence change in the RWA computed for market risk.
- ♦ Others: This captures the change in Total Capital Ratio across two runs which could not be attributed to any of the preceding reasons. Computation for this depends on the variables selected while defining an attribution analysis.

5.2.5 Operational RWA

This section details about various attribution variables and recognizes the changes in RWA corresponding to these variables. It also explains about attributing such changes in RWA and capital ratio to the appropriate Attribution Variable. This functionality of the application enables you to understand why the RWA has increased and capital has decreased as compared to the previous quarter when the business growth was static. This feature identifies the root cause of RWA changes by analyzing various contributing factors.

Attribution analysis for changes in Operational RWA is computed for the following control variables, which are the different approaches used for arriving at the RWA:

- ♦ Exchange Rate Fluctuations: Change in exchange rate of the reporting currency with respect to the major currencies in the bank's portfolio impacts all the inflows and outflows.
- ♦ Net Business Growth: Change in number and amount of exposures indicate the net business growth of the bank. The change in RWA due to this factor can be attributed to business growth. The application determines the new exposures and the exposures that is closed by comparing

the list of the two runs. The difference in the RWA's provide the impact on RWA's of the Net Business Growth.

♦ Pre Projection Net Revenue (PPNR): PPNR is computed as following:

- o Net Interest Income + Non Interest Income - Non Interest Expense
- o Change in PPNR can be computed across the two runs by comparing the preceding calculation for both the runs and reporting the difference as per the reporting requirements provided.

♦ Gross Income: For this Attribution Variable category, the following attribution variables are monitored to attribute the impact of change in gross income due to the listed attribution variables over the Operational RWA:

- o Net Interest Income
- o Net Non-Interest Income
- o Provisioning
- o Operating Expenses
- o Gain or Loss from Sale
- o Gain or Loss Position on Net Interest Income
- o Irregular gain or loss from Insurance
- o Income from Insurance

♦ Others: This captures the change in Total Capital Ratio across two runs which could not be attributed to any of the preceding reasons. Computation for this depends on the variables selected while defining an attribution analysis.

For more information the Attribution Analysis screen, refer to [Attribution Analysis GUI](#) section.

5.3   Key Operational Concepts of the Application

Issue vs Issuer Rating Assignment

Rating assignment for the unrated exposures needs to be based on issue vs. issuer rating assessment and/or multiple rating assessment. This is as per the guidelines and follows the following sequence to arrive at the final rating applicable to the unrated exposure. The issue versus issuer assessment is applicable for corporate, foreign bank asset class. It includes asset classes for which Risk weight is based on rating.

All exposures which are assigned unrated code are sent to the interface logic in the following process:

SI. No.	Check	Treatment	Remarks
1	Inference from issued debt	All unrated claim goes for rating inference from rated issued debt from the counterparty. Validation is carried out for Seniority, residual maturity and currency. Benefit in terms of lower risk weight is applicable only if unrated claim is ranked pari- passu or senior claim.	This step is applicable for issued debt and not for own claim. Multiple assessment is applied post increase in risk weight level.

		If any issue of the same counterparty has higher risk weight, higher RW is inferred for unrated issue on the same counterparty. If unrated issue is senior issue than lower risk weight is not inferred. If there are multiple reference issues with multiple risk weight, multiple assessment is applicable.	Rating is updated as inferred from rated claim. No equivalent rating is applied based on long term/short term nature of unrated claim.
2	Issuer rating inference	All unrated claim goes for rating inference from issuer. Issuer rating is subjected to multiple assessment if required.	Issuer rating is applied as is. No equivalent rating is applied based on long term/short term nature of unrated claim.
3	Comparison of reference issue rating and issuer rating	The rating and risk weight inferred from step 1 and step 2 above is subjected to multiple assessments to obtain the final rating of the claim.	No equivalent rating is applied based on long term/short term nature of unrated claim.

4 BIS Jurisdiction

Capital Adequacy guidelines as issued in the following regulations are incorporated in OFS Financial Services Basel Regulatory Capital:

BIS Jurisdiction: International Convergence of Capital Measurement and Capital Standards, June 2006.

Basel III: A global regulatory framework for more resilient banks and banking systems, Dec 2010 (rev June 2011).

For the BIS jurisdiction, the following approaches for Risk Weighted Assets (RWA) and Capital Adequacy Ratio computations are supported:

- **Basel I**
    - o Credit Risk
        - Non Securitization – Standardized Approach
    - o Capital Structure
- **Basel II and Basel III**
    - o [Credit Risk](#)
        - Non Securitization – Standardized Approach
        - Non Securitization – Foundation Internal Rating-Based (IRB) Approach
        - Non Securitization – Advanced IRB Approach
        - Securitization – Standardized Approach
        - Securitization – IRB Approach
    - o [Market Risk](#)
        - Market Risk – Standardized Approach
        - Market Risk – Internal Model Method (IMM) Approach
    - o [Operational Risk](#)
        - Operational Risk – Basic Indicator Approach
        - Operational Risk – Standardized Approach
        - Operational Risk – Alternate Standardized Approach
    - o [Capital Structure](#)

4.1 Basel II

4.1.1 Basel II – Standardized Approach

4.1.1.1 BIS II - High Level Process Flow for Standardized Approach

The Basel defined Capital Adequacy ratio is delivered out-of-box in OFSAAI as a building block approach. The application includes capital computations for Credit Risk (Standardized Approach), Market Risk, and Operational Risk along with Capital Structure and Capital Consolidation process.

For more information on the pre-defined Runs available with the application, see *OFS Basel Regulatory Capital Run Charts.*

4.1.1.1.1 Process Flow for Capital Adequacy Ratio Calculation
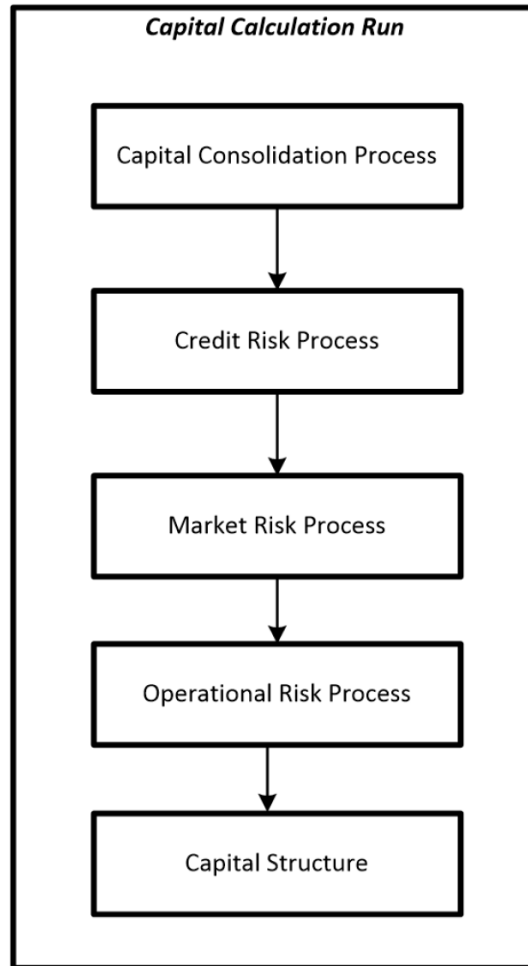
The Capital Calculation Run depicted in the preceding process flow is a single run which is a joined together by multiple processes. Each process is a block, compiled together to form an entire Capital Adequacy run. The individual blocks like the Credit Risk process, Market Risk process, and so on, also exist as individual runs which is described in the following sections.

4.1.1.1.2 Capital Consolidation Process

Capital Consolidation is a process common to each of the individual block when they are triggered separately as an individual run. For example: the standard out-of-box Market Risk run has Capital Consolidation and Market Risk process bundled together as a single Market Risk run. This is applicable for a Credit Risk run and Operational Risk run as well. Capital Consolidation is explained in the following section and is not repeated under the Non Securitization process, Securitization process, Market Risk process, or Operational Risk section of this document.

In Capital Consolidation, the application processes the following:

Capital Consolidation Level Selection

The reporting bank can be a part of a financial group that has multiple legal entities like parent or child entities (subsidiaries) under its name. The entity on which you are required to process should be selected by you. Subsequently, level at which a Run is to be executed (solo or consolidated) should also be selected. You can select these options in the [Run Management](#) UI. However, if the Run is executed in the Run Rule Framework (RRF), then these options have to be set using the Rule '**Capital Consolidation Level Selection**' in the process '**CAPITAL_CONSOLIDATION**'.

CAPITAL_CONSOLIDATION is the first process to be added in all the Runs defined in the RRF except for the Staging Data Population Run. The Run Management UI selects this process by default.

Run Parameters Assignment

The Basel accord states different approaches for calculating RWA. The Run Management UI in the application allows the reporting bank to define and execute a Run by selecting a combination of different Basel II approaches for RWA computation.

Run Parameter Assignment is also part of **Capital Consolidation** process. The Rule '**Run Definition User Defined Run Param Assignment**' is used to assign the Run parameters if a Run is executed in the RRF. If the Run is executed from the Run Management UI, then the parameters are populated based on the Run defined in the [Run Definition](#) window.

Currency Conversion

The Rules pre-defined in the application performs currency conversion of all General Ledger amount attributes to be used for Capital Consolidation from the Natural currency to the Reporting currency, based on the exchange rate provided.

Shareholding Percent Multiplication

For all entities in the Capital Consolidation process, the application updates the shareholding percentage against each entity data in the fact capital accounting head from the fact entity shareholding percent table. The parent data in the processing table of fact capital accounting head is updated with the value 1 and for each child entity the data is based on parent's holding percentage specified for each child in fact entity share holding percent table.

4.1.1.1.3 Process Flow for Credit RWA

Common Process between Non Securitization and Securitization

- Credit Rating Processing
- Party Reclassification
- Mitigant data Population

Non Securitization Process

- Non Sec Data Population
- Reclassification
- EAD Calculation
- RW Assignment
- Pre Mitigation RWA
- CRM eligibility
- CRM Haircuts
- Post Mitigation RWA

Securitization Process

- Securitization Data Population
- Reclassification
- EAD Calculation
- RW Assignment
- Pre Mitigation RWA
- CRM Eligibility
- CRM Haircuts
- Post Mitigation RWA

A Credit RWA Run is a combination of the Non Securitization RWA process and Securitization RWA process. A few processes like Credit Rating, Party Type Reclassification, and Mitigant Data Population are common between Non Securitization and Securitization process. Though these sub processes are explained separately under Non Securitization and Securitization section of this document, it is executed only once under the Credit RWA run

Certain sub processes under Non Securitization process like Reclassification, RW assignment, and so on are common across all types of exposures for example: banking book, over the counter derivative transactions, and securities financing transactions, and are executed only once in the Run. The details of these sub processes are explained under Reclassification and Risk Weight Assignment sub process of the Basel II Non Securitization exposures section of this document. Likewise, details of Credit Risk Mitigation for Non Securitization process is detailed under the Basel II Non Securitization section of this document and details of Credit Risk Mitigation for Securitization process is detailed under the Basel II Securitization section of this document.

For more information on the sub processes as detailed in the preceding process flow for the Non Securitization process and Securitization process, see Credit RWA.

For example: Non Sec Data Population is detailed under data population and currency conversion of Credit RWA (Non Securitization - Standardized approach) section of this document.

4.1.1.1.4 Process Flow for Market RWA

Market RWA Run is made up of multiple sub processes specific to Market Risk. However, when Market Risk is bundled under a Consolidated Run and triggered, Capital Consolidation and Rating process is executed only once for Credit Risk and Market Risk. The details of each of the sub process mentioned in the preceding flow chart are present under Market Risk section of this document.

For more information on Market RWA computation, see Market RWA.

For example: 'Capital Charge for Interest Rate Instruments' sub process is detailed elaborately under 'Capital Charge for Interest Rate Instruments' section of Market Risk. Likewise 'Capital Charge for Equities', 'Capital Charge for Foreign Exchange Transaction' 'Capital Charge for Commodity transaction', and 'Options risk charge calculation' has a detailed explanation present under 'Capital Charge for Equities', 'Capital Charge for Foreign Exchange Transactions' 'Capital Charge for Commodity Transactions', and 'Capital Charge for Options' sub process of the Market Risk section of this document, respectively.

4.1.1.1.5 Process Flow for Operational RWA
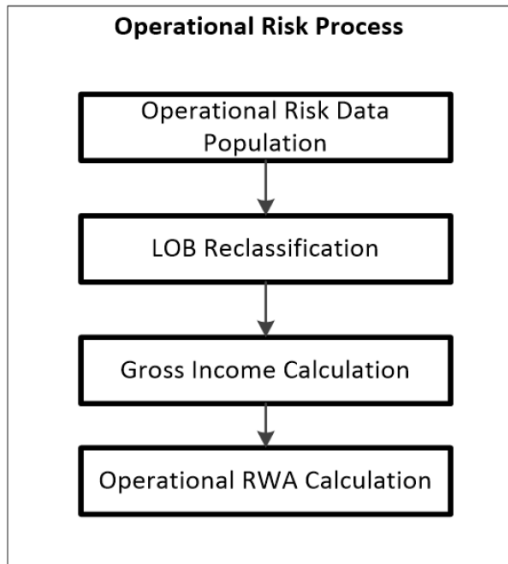
Operational RWA run is executed with the Capital Consolidation process. For more information on the Operational RWA computation, see Operational RWA.

For example: LOB Reclassification and Gross Income Calculation sub process are detailed as separate processes under the Operational RWA section of this document.

4.1.1.1.6 Process Flow for Capital Structure
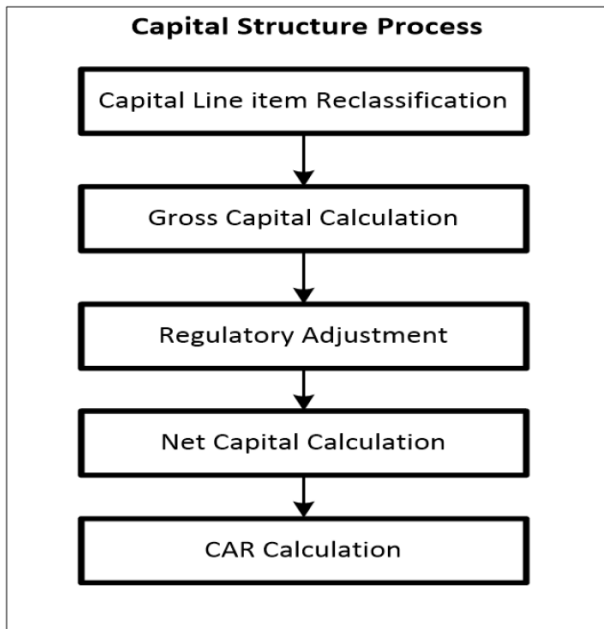
Capital Structure is executed with Capital Consolidation, Credit Risk, Market Risk, and Operational Risk RWA processes.

For more information on the sub processes of Capital Structure, see <u>Capital Structure</u>.

For example: 'Gross Capital Calculation' mentioned in the preceding flow chart is explained in detail under 'Gross Capital Calculation for T1, T2 and T3' sub process section of the Basel II Capital Structure in this document. Likewise 'Regulatory Adjustment' and 'Net Capital Calculation' is detailed under 'Regulatory Adjustment to Tier 1 and Tier 2' and 'Calculation of Net Capital' sub process section of the Basel II Capital Structure in this document.

4.1.1.2 Credit RWA

The application supports the computation of Credit RWA, as per the guidelines laid out in the Basel Accord. Credit RWA computation is divided into Credit Risk for Non Securitized exposures process and Credit Risk for Securitized exposures process.

For Credit Risk of Non Securitized and Securitized exposures, the Standardized Approach is as follows.

4.1.1.2.1 Non Securitization – Standardized Approach

Standardized Approach consists of the processing of the following broad functional areas:

- Banking Book Products
- Securities Financing Transactions
- Over the Counter Derivative Products
- Credit Risk Mitigation

Banking Book Products

All the credit risk exposures are identified by the application, through their product type, counterparty type, and the corresponding derived asset classes. A sample list of products types, party types, mitigant types, and credit ratings are pre-defined in the application. However, this list and naming convention differs from one bank to another. Hence, the application re-classifies the bank's information on product type, party type, credit ratings and so on, into standard data as per the accord. The application reclassifies the bank's product types and party types to Basel standard product and party types. Based on standard Basel product and party types, it forms an asset class for each exposure. For equity exposures, the asset class is formed on the basis of equity type and Basel product type.

Some exposures can be hedged against credit risk through various mitigants like guarantors, collaterals, credit derivatives, and so on. These provide mitigation to credit risk and should be considered while computing Credit RWA, as per the Basel Accord. Hence, the application calculates pre-mitigation exposure amount and post-mitigation exposure amount.

Based on the asset class, the application calculates the Pre-Credit Risk Mitigation (CRM) Exposure at Default (EAD) for each exposure. This value signifies the maximum loss that the bank can suffer, in case of default on this exposure, prior to considering any mitigation effects. Through the CRM process, the bank takes into account the effect of the mitigation and calculates the post mitigation exposure at default amount. This signifies the maximum loss that the bank can suffer in case of default on this exposure, after considering the effects of the mitigation.

The application also computes pre-mitigation risk weighted assets (Pre CRM RWA) and post mitigation risk weighted assets (Post CRM RWA) by multiplying the respective EAD by risk weight. The risk weight is arrived at, by considering the credit rating of the exposures and mitigants as per the Basel guidelines. Some credit risk exposures that belong to the category of internal transactions, like holding owned subsidiaries shares or investment in its capital, reciprocal cross holding, and so on, are treated separately under capital structure.

Process Flow for Banking Book Products

A comprehensive explanation of the process flow is as follows:

Rating Information Processing

Pre Processing Steps

Data on ratings is captured in the following rating specific tables:

Accounts Rating Table (STG_ACCOUNT_RATING_DETAILS)

Ratings of all Credit Risk Non Securitized Exposures, Securitized Exposures and Securitized Positions are captured in this table.

Instrument Rating Table (STG_INSTRUMENT_RATING_DETAILS)

Ratings for all market risk exposures, investment exposures subject to credit risk (one that are in **STG_INVESTMENTS**), and mitigants, are captured in this table.

Party Rating Table (STG_PARTY_RATING_DETAILS)

Credit Rating for all customers and issuers are captured in this table.

Sovereign Rating Table (STG_SOVEREIGN_RATING_DETAILS)

Credit Rating for all countries is captured in this table.

Processing Steps

Banks obtain credit ratings from different sources and these are provided as an input in the application through the four rating tables mentioned in the preceding list. The application re-classifies the rating information to Basel standard ratings.

The rating reclassification lookup table (**FSI_RATING_CLASSIFICATION**) is used to lookup reclassified Basel ratings, so that the reclassification rule is not repeated for each of the rating processing tables. Ratings are populated from the stage tables (**STG_PARTY_RATINGS_DETAILS**) to FSI tables (**FSI_PARTY_RATING_DETAILS**) using the lookup table (**FSI_RATING_RECLSSIFICATION**) to obtain reclassified rating.

Note: In the **STG_PARTY_RATINGS_DETAILS** table ensure that the following columns are mandatorily populated with data:

○ Rating source code (**V_RATING_SRC_CODE**)

○ Party Code (**V_PARTY_CD**)

○ Purpose (**V_PURPOSE**): In this field whether the rating is a domestic rating or foreign rating should be indicated. If any other rating is provided, then the exposure is considered as unrated.

○ Rating Code (**V_RATING_CODE**)

After ratings reclassification, the risk weight is updated in risk weight to rating mapping table (**FSI_RW_MAP_MASTER**). The multiple assessments data transformation logic, updates the rating and the risk weights to the exposures. For each exposure, the application checks the risk weight generated by each of its ratings. It then assigns the higher of the two lowest risk weight and the rating corresponding to this risk weight, to the exposure.

For unrated Non Securitized exposures, the application performs an issue-issuer assessment to infer a rating of the unrated exposures, based on the rating of a similar instrument (referred as reference issue hereafter) issued by the same issuer. The reference issue is used only when it is of the same currency as the exposure and the exposure is senior or equivalent to the same.

Data Population

Pre Processing Steps

Credit Risk exposures are updated in the application for all the product types through their respective input tables known as Product Processors. Main categories of Credit Risk Non Securitization exposures, along with their respective table names that are used as an input, are as follows:

Product	Source Product Processor
Bills	STG_BILLS_CONTRACTS

Credit Cards	STG_CARDS
Swaps	STG_SWAPS_CONTRACTS
Futures	STG_FUTURES
Guarantees	STG_GUARANTEES
Investments	STG_INVESTMENTS
Lease Contracts	STG_LEASE_CONTRACTS
Letters of Credit	STG_LC_CONTRACTS
Line of Credit	STG_CREDIT_LINE_DETAILS
Commitment Contracts	STG_COMMITMENT_CONTRACTS
Loans	STG_LOAN_CONTRACTS
Money market instruments	STG_MM_CONTRACTS
Overdraft	STG_OD_ACCOUNTS
Options	STG_OPTION_CONTRACTS
Re purchase contracts	STG_REPO_CONTRACTS
Equity Exposures	STG_INVESTMENTS
Underlying Exposures for Derivatives and Securitization	STG_UNDERLYING_EXPOSURES
Underlying Exposures for Repo contracts	STG_PLACED_COLLATERAL / STG_MITIGANTS
Credit Derivatives	STG_CREDIT_DERIVATIVES
Fixed Assets	STG_FIXED_ASSETS_DETAILS

Processing Steps

Stage data from the Product Processors or other stage tables is populated in the respective processing tables. Information from all Product Processors data is populated in a common Fact table for all non sec exposures (**FCT_NON_SEC_EXPOSURES**), except equity data which is first populated in the respective equity table (**FCT_EQUITY_EXPOSURES**) and is then (after risk weighing) populated in the common Fact table for all Non Securitized exposures. For more information on the list of columns to be populated within each table, see the *Download Specifications* document.

Shareholding Percent Multiplication

The exposure amount which is a part of the input data (Product Processors) is the exposure amount for a solo entity. However, for a consolidated Run, the parent exposure is considered only by the shareholding percentage, based on the following calculation:

Exposure Amount   X   Share Holding Percent = Updated Exposure Amount
Where:

Share holding percent is allotted a value by the Rule **Cap Consl Effective Shareholding Percent for an Entity** in the process - **Capital Consolidation**.

This assignment uses the Rule **<Attribute > Shareholding Percent Multiplication** which relates to paragraph 28 of the Basel II Accord. Shareholding percent multiplication is computed for the following attributes:

- o Outstanding Principal
- o Current Exposure Amount
- o Undrawn Amount
- o Exposure Market Value
- o Exposure Accrued Interest
- o Provision Amount
- o Write Off Amount
- o Notional Principal, and Contract Amount for OTC products

Currency Conversion

The application converts the amount attributes, which are in natural currency, to reporting currency which is used for further calculations. The column names suffixed with '_ncy' are in the natural currency and are multiplied by currency conversion factor to populate values in the reporting currency. The Rule **Reporting Currency Code Assignment** assigns the reporting currency. For more information on Currency Conversion, see Exhibit 4 in *Annexure A: Key Concepts.*

NOTE: The data populated in the Product Processor is expected in natural currency of the exposure.

Reclassification

The application reclassifies the bank's product types and party types to Basel standard product and party types. Based on standard Basel product and party type, it forms an asset class for each exposure. Equity is reclassified by the application in a separate Rule. Similarly, the application does reclassification for mitigant on the basis of its mitigant types and reclassifies it to standard mitigant types.

Product Type Reclassification

Product types used by the reporting bank as input data are reclassified to standard product types as recommended in the Basel Accord. The product types after reclassification are stored as Basel product types. For example: Housing Loan is reclassified as Residential Mortgage Exposure as per the Basel II guidelines.

Party Type Reclassification

Similar to the product type, the customer type and issuer type (which are stored as counterparty type) are also reclassified as standard counterparty type. The Basel application is designed to include customer type, issuer type, and legal entity type in a single table (**STG_PARTY_MASTER**). This is applicable for staging and the dimension model. These are reclassified together as well. Party type reclassification Rules handle reclassification for customer types, issuer, and entity types. For Example: Individual is reclassified as Retail.

Asset Class Reclassification

On the basis of Basel product type and standard counterparty type, an asset class is formed by the application. This asset class is used for data processing.

For example:

When standard counterparty is a large corporate, the asset class is large corporate, except when exposure has product types like cash and real estate.

For Basel product type gold, the asset class is gold, however when standard counterparty type is Central Counter Party, the asset class is Central Counter Party.

For standard counterparty type Corporate Non SME and Basel product type as Loan, the asset class is Corporate Non SME.

Asset class for all equity products is reclassified on the basis of equity type and Basel product type.

In addition to the previous asset class reclassification process for exposures, to ensure it follows the regulatory retail portfolio definition as specified in the Basel Accord the following process is followed:

MAP_RET_EXP works based on fct_non_sec_exposures table; particularly on columns like Basel Asset Class, Customer/Issuer, Standard Counterparty type, Basel Product Type, and so on.

This DT checks the Qualifying Criteria requirement of Para 70 of Basel Capital Requirement in terms of Orientation Criterion, Low value of individual exposures and Granularity Criterion. Product Criterion and customer as Individual is addressed through reclassification.

It checks whether the aggregated exposure to one counterparty exceeds threshold limit based on customer type it updates asset class to Corporate, Regulatory Retail or others. Granularity check is performed at the end to check whether total exposure to one counterparty is greater than Granularity threshold (0.2%) of total Regulatory Retail Portfolio. In that case, based on customer type it updates asset class to Corporate, Regulatory Retail or others. It excludes NPAs from the overall regulatory retail portfolio.

Mitigant Reclassification

For mitigants the application reclassifies the mitigant type to the standard mitigant type like the debt securities, credit derivative, cash, and so on. It also reclassifies the mitigant issuer type to the standard mitigant issuer type like Banks, Corporate, and so on. The reclassification tasks are present in the **Mitigant Reclassification** sub process.

Pre-CRM EAD computation

Credit Conversion Factor

This is applied to all off-balance sheet exposures. Off-balance sheet exposures can be identified at the first level in the Basel Product Types Dimension (**DIM_BASEL_PRODUCT_TYPE**) table. The CCF values applied are 0.2, 0.5, and 1. The factors on the basis of which the CCF is applied are standard product type (as per Basel Accord) type of facility (whether it is cancellable or not), and the maturity of the exposure.

Pre CRM Exposure at Default (EAD)

Exposure at Default (EAD) is calculated for all asset classes based on the Current Exposure Amount, Accrued Interest, Off-Balance Sheet Drawn CCF Percent, Drawn CCF Percent, and Undrawn Amount. Using the same inputs, drawn EAD amount and undrawn EAD amount is calculated.

In a standardized approach, the EAD value of an exposure is calculated as follows:

> (**Current Exposure Amount - Non Sec Investment amount which is above Materiality Level for Commercial Entity) * Off-Balance Sheet Drawn CCF Percent + Undrawn Amount * CCF Percent + Net accrued but unpaid interest and fees**

Risk Weight Assignment

Non Sec Exposures Risk Weight

Risk Weight is assigned on basis of asset class and the credit rating as per Basel guidelines. The risk weight rules operate on the risk weight table (**FSI_RW_MAP_MASTER**). Highly rated exposures are allocated low risk weight and poorly rated exposures are allocated high risk weights. If an exposure has more than one rating (rated by more than one agency), then the final rating is assigned on the basis of multiple assessments. The application updates the risk weights against the exposures directly, when ratings are not considered. Options for risk weighting are selected during Run definition if the Run Management UI is used. If the Run Rule Framework (RRF) of OFSAAI is used, a setup code from **USR_DEFINED_RUN_PARAMETERS** is set in the Rule **Run Definition User Defined Run Param Assignment**. The multiple assessments of ratings are performed in the Data Transformation "Mult_Assessment_SCP" for the sold credit protection exposures, since their risk weight is based on the securitization framework. The details of the Data Transformation are as follows:

Data Transformation Name	Objective	Processing Logic
Mult_Assessment_SCP	The objective of this Data Transformation is to perform multiple assessment of the ratings and assign a normalized rating and risk weight to the sold credit protection exposures.	For each exposure, the various standard ratings associated with that exposure and the respective risk weights are identified. If the number of ratings are 1, then the same rating gets assigned as the standard rating for the exposure and the risk weight associated with that standard rating gets assigned as the Pre-mitigation risk weight. If the number of

Data Transformation Name	Objective	Processing Logic
		ratings are greater than or equal to 2, then the exposure is assigned a risk weight which is the worst of the best two risk weight. And the corresponding rating is assigned to the exposure.

For more information on setting up this Rule, see *Run Parameters Setup for Run Creation*.

Pre-CRM RWA Computation

Pre-CRM RWA is calculated for all asset classes by multiplying the Pre-CRM EAD with the risk weight. RWA for Unexpected Loss is calculated as follows:

Non Sec Pre-Mitigation Pre-Volatility Haircut Exposure at Default * Non Sec Risk Weight for UL before Mitigation

The reporting bank can be a part of a financial group that has multiple legal entities like parent or child entities (subsidiaries) under its name. The entity on which you are required to process should be selected by you. Subsequently, level at which a Run is to be executed (solo or consolidated) should also be selected.

You can select these options in the Run Management UI. However, if the Run is executed in the Run Rule Framework (RRF), then these options have to be set using the Rule '**Capital Consolidation Level Selection**' in the process '**CAPITAL_CONSOLIDATION**'

CAPITAL_CONSOLIDATION is the first process to be added in all the Runs defined in the RRF except for the Staging Data Population Run. The Run Management UI selects this process by default.

If reporting bank has an exposure to one of its own subsidiaries, then that exposure is classified as an internal exposure. A subsidiary is identified by the values present in V_PARENT_CODE in the DIM_ORG_STRUCTURE table.

Each of the internal transaction, that is, transaction between parent and its subsidiary is marked as a deduction line item. The deduction is processed as part of Basel II capital structure in the capital structure processing and all the internal transactions are eliminated from any RWA calculation.

Run Parameters Assignment

The Basel accord mentions different approaches for calculating RWA. The Run Management UI in the application allows the reporting bank to define and execute a Run by selecting a combination of different Basel II approaches for RWA computation.

Run Parameter Assignment is also part of **Capital Consolidation** process. The Rule '**Run Definition User Defined Run Param Assignment**' is used to assign the Run parameters if a Run is executed in the RRF. If the Run is executed from the Run Management UI, then the parameters are populated based on the Run defined in the Run Definition window.

Counterparty Credit Risk (CCR) - Over the Counter Derivative Products

The Basel committee has introduced Counterparty Credit Risk (CCR), wherein the counterparty can default before the final settlement of a transaction. Unlike the firm's exposure to credit risk arising from a loan, CCR creates a bilateral risk of loss. Market value of the transaction can be positive or negative for either parties in the transaction at different points in time, till the maturity or closure of the transaction. This market value is dependent on the movement of the underlying risk factor. The Basel committee has proposed Rules to calculate the EAD or exposure amount for the instrument with CCR.

NOTE: All OTC Derivatives and Repo products are part of the CCR computation. Also, all the trades with Central Counterparty (CCP) are assigned a zero risk weight.

The application's treatment for the instrument with CCR is divided into three categories:

1. Exposure at Default (EAD)
2. Risk Weighted Asset (RWA)
3. Credit Risk Mitigation (CRM)

Process Flow for Over the Counter Derivatives – EAD Approach

A comprehensive explanation of the process flow is as follows:
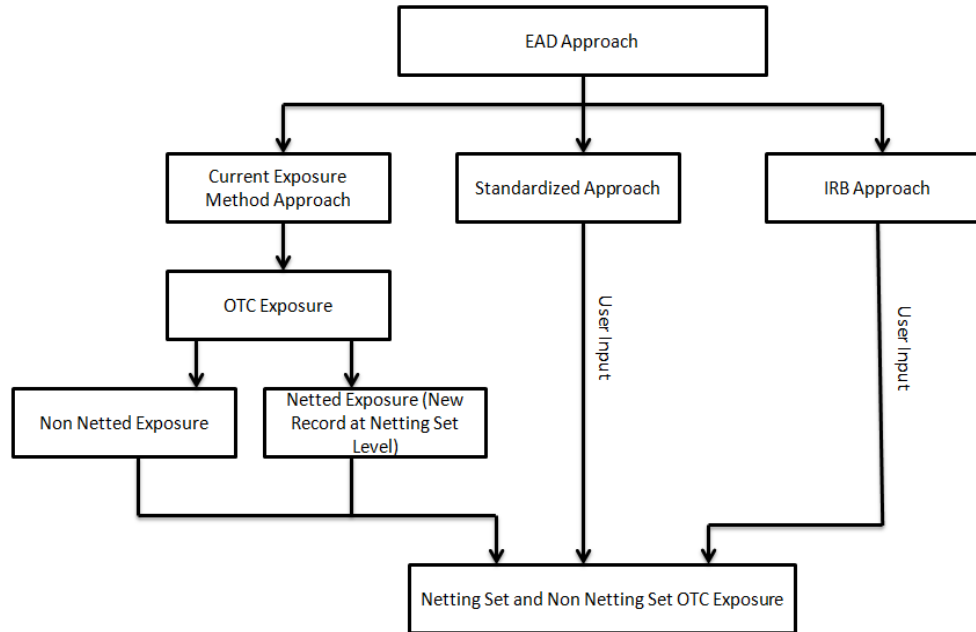
The exposure amount which is subject to CCR is estimated by three different approaches as described in the Basel Accord. The application calculates EAD with Current Exposure Method as laid out in Basel Accord. For the other approaches, standardized approach and Internal Rating Based (IRB) approach, the application expects the exposure amount of the transaction as direct user input for further processing.

Current Exposure Method

The application calculates the EAD for two different sets of the records with a different methodology - Netting agreement Records and Non Netting agreement Records.

OTC Exposure

For the calculation of EAD, the exposure amounts from the exposure table are moved to a different table for OTC and REPO transactions. The application also creates a new record for each netting agreements in the data.

Non Netted Exposure

To compute EAD for non netting records the application reads the following inputs:

- Total replacement cost which is greater than Mark to Market value or zero for all the contracts.

- An amount for potential future credit exposure is calculated based on the notional amount and multiplied by the add-on factor based on the underlying type in the contracts. The assignment of Add-on for different products is represented in the following table:

	Interest Rates	FX and Gold	Equities	Precious Metals Except Gold	Other Commodities
One year or less	0.00%	1.00%	6.00%	7.00%	10.00%
Over one year to five years	0.50%	5.00%	8.00%	7.00%	12.00%
Over five years	1.50%	7.50%	10.00%	8.00%	15.00%

The Rule: **Non Sec Add-on Estimation** assigns the add-on percent in the processing Non Securitization table. Data is populated to Nettable Pool (**FCT_NETTABLE_POOL)** table by T2T: **NETTABLE_POOL_OTC_POPULATION_OTHERS**

Netted Exposure

To compute EAD for netting agreement records, the application reads the following inputs:

- Total replacement cost which is greater than Mark to Market value for all the contracts.

- An amount for potential future credit exposure is calculated based on the notional and multiplied by the add-on factor based on the following formula:

$$A_{net} = 0.4 * A_{Gross} + 0.6 * NGR * A_{Gross}$$

The application creates new records for netting agreement and then populates into the OTC Exposure table. It selects all the records with the following attributes which are similar to computing the netting agreement exposure:

- Trades with Entity
- Customer
- Product Level – All OTC trades
- Netting Agreement
- Book Code: Trading or Banking
- Long Settlement transaction Flag
- GAAP Code

The following T2Ts are used to create and populate the OTC exposure table:

- NETTABLE_POOL_OTC_POPULATION
- NET_POOL_EXPOSURE_CREATION

The add-on percent netting agreement is achieved by using the following calculations:

- Gross Current Exposure Calculation for OTC Derivatives
- Gross Potential Exposure Calculation for OTC Derivatives
- Net Current Exposure Calculation for OTC Derivatives
- Net Gross Ratio Calculation for OTC Derivatives

♦ Net Potential Exposure Calculation for OTC Derivatives

Exposure at default for all instruments with CCR risk is calculated using the following calculations:

♦ Exposure Calculation for OTC Derivatives

Risk Weighted Asset (RWA) Approach

RWA calculation for the instruments which are subject to CCR risk is similar to RWA calculation for other instruments.

Credit Risk Mitigation (CRM) Approach

CRM calculation for the instruments which are subject to CCR risk is similar to CRM calculation for other instruments. See Credit Risk Mitigation for more details.

Key Data Elements

Key data elements to be noted are listed in this section. To view the complete list of tables, see to *Download Specification* document.

- For instruments participating in netting agreement, the nettability flag should be set as 'Y'.
- Instruments with the same agreement code are netted in the same netting agreement. The application handles cross product and product netting for netting agreements.

Credit Risk Securities Financing Transactions (SFT)

Securities Financing Transactions (SFT) includes Repo Style transactions, Margin Lending, Security Financing Borrowing, and so on. The SFT portfolio of a bank is included for capital charge calculations as per standardized, foundation IRB, and advanced IRB approach. The SFT EAD calculation follows two methodologies:

- Collateral Haircut Approach
- Simple VaR Approach

Currently, the Basel Regulatory Capital application supports Collateral Haircut approach only.

For all SFT contracts which have a mitigant mapped to it, the application computes CRM based on the RWA approach undertaken by the bank. For standardized approach, a risk weight is applied for all eligible mitigants based on mitigant value post haircut adjustment. For foundation IRB or advanced IRB approach, mitigation is based on the IRB Capital calculation on Credit Risk.

Process Flow for Credit Risk Securities Financing Transactions

SFT EAD is computed in the sub process **SFT Exposures RWA - Comprehensive Approach**.

```
┌─────────────────────────────────────────────────┐
│         SFT Underlying Data Population           │
└─────────────────────────────────────────────────┘
                        │
                        ▼
┌─────────────────────────────────────────────────┐
│    Volatility Haircut Assignment for SFT Underlying │
└─────────────────────────────────────────────────┘
                        │
                        ▼
┌─────────────────────────────────────────────────┐
│   Pre-Mitigation  Post Volatility Haircut EAD Amount │
│            Calculation for Exposures             │
└─────────────────────────────────────────────────┘
                        │
                        ▼
┌─────────────────────────────────────────────────┐
│          Nettable Pool Data Population           │
└─────────────────────────────────────────────────┘
                        │
                        ▼
┌─────────────────────────────────────────────────┐
│  Pre-Mitigation  Risk Weighted Assets Unexpected Loss │
│            Calculation for the Pool              │
└─────────────────────────────────────────────────┘
```

A comprehensive explanation of the process flow is as follows:

SFT Underlying Data Population

The two data elements present in the SFT transactions are captured as follows:

Firstly, the parent transaction is captured in the Repo contracts table (**STG_REPO_CONTRACTS**) and secondly the underlying information, on which the parent transaction is built, is captured separately in the mitigant table **(STG_MITIGANTS)** or Placed collateral staging table **(STG_PLACED_COLLATERAL)**, depending on the product type**.**

The underlying data is identified by using the Exposure Mitigant Mapping Staging table **(STG_EXP_MITIGANT_MAPPING)**, wherein this is linked to the data in the repo contracts staging table, for any collateral which is provided to the repo contracts.

And the underlying data for any collateral placed with the counterparty, is identified by using the Account placed collateral Mapping Staging table **(STG_ACCT_PLACED_COLL_MAP)**, wherein this is linked to the data in the repo contracts staging table.

Volatility Haircut Assignment for SFT Underlying

This is computed by the following Rules:

- Exposure Volatility Haircut Assignment for Supervisory Haircut
- CRM Exposure Volatility Haircut for Equity and Mutual Fund
- Exposure Volatility Haircut Assignment - Scaling Up for "Capital Market Driven" or "Repo Style" transaction types
- Exposure Volatility Haircut Assignment - Own Estimate
- FOREX Haircut

Pre-Mitigation Post Volatility Haircut EAD Amount Calculation for Exposures

For SFT transaction, the application calculates EAD for the parent exposure, based on the underlying information. The underlying exposures are moved to **FCT_SFT_UNDERLYING** table from **FCT_NON_SEC_EXPOSURES**. Each underlying exposure is assigned a volatility haircut, if the underlying exposures are financial instruments. FOREX haircut is applied if the underlying and the parent contract are in different currency. Each SFT underlying exposure adjusted for haircut (EAD + haircut value) is added as EAD to the parent contract.

Nettable Pool Data Population

The application nets SFT contracts based on the same customer, common netting agreement identifier, transaction of Repo, Re-Repo or Margin Lending, Trading or Banking book, and so on. Margin lending transaction being SFT also follows the same EAD calculation methodology; however Repo or Reverse Repo and margin lending are not netted together.

Pre-Mitigation Risk Weighted Assets Unexpected Loss Calculation for the Pool

Pre-Mitigation Risk Weighted Assets Unexpected Loss is calculated for the pool as EAD multiplied by the risk weight or capital * 12.5.

Credit Risk Mitigation

The application handles multiple mitigants for credit risk mitigation like financial collateral, on-balance sheet netting, guarantees, credit derivatives, and so on. CRM reclassification is computed by reclassifying collateral and issuer to standard collateral and issuer type. The mitigant is identified as eligible or not based on the eligibility rule for CRM.

Process Flow for Credit Risk Mitigation
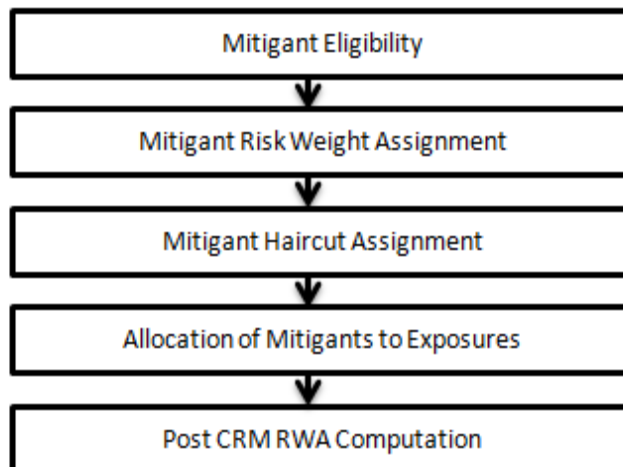
Mitigant Eligibility

The mitigant is identified as eligible or not based on the eligibility rules for CRM as mentioned in Basel II accord. Credit rating of the collateral is considered for all mitigant types issued by all party types, while deciding whether a mitigant is eligible for a particular exposure or not. Separate eligibility Rules exist for mitigants types like equity, mutual funds, or debt security, to perform these checks. For the remaining, a mitigant is marked as eligible only if its credit rating is better than the exposure to which it is providing protection and also if it is classified as senior in position. This is handled in the sub process - **Mitigant Collateral Eligibility - Comprehensive Approach.**

Mitigant eligibility is also checked based on the original and residual maturity of the collateral. Collateral is classified as eligible only if its original maturity is more than a year and residual maturity is more than 3 months.

Mitigant Risk Weight

Similar to Non Securitization exposures, collaterals and mitigants are also assigned a risk weight based on their issuer type, credit rating, and original maturity of the mitigant. For financial collateral, under the BIS Standardized Approach, the RWA used is 0. For mitigants issued by bank, the application offers two choices for calculating RWA on the basis of credit rating:

- Option I

- Option II

Mitigant Haircut Assignment

The application assigns three kinds of mitigant haircut, which are volatility haircut, FOREX haircut, and maturity mismatch haircut. Volatility haircuts are assigned to the collateral to account for any future fluctuations in the market value of the financial collateral. Separate Rules exist in the application for various types of financial collaterals like debt securities, equity, mutual funds, and so on. When the exposure and collateral are in different currencies, the application makes an adjustment by applying FOREX haircut. If the residual maturity of CRM is less than the underlying credit exposure, then a maturity mismatch is applied. If there is a maturity mismatch and CRM has an original maturity of more than a year, the maturity mismatch haircut is applied to adjust the value. The application assigns a volatility haircut using Supervisory Haircut method.

In case of Supervisory Haircut method, the application assigns volatility haircut based on issues, issuer's ratings, mitigant's residual maturity, and type of mitigant as per Basel II accord. The FOREX haircut is also assigned based on these transaction types as per the Basel II accord. Only eligible mitigants are considered for haircut assignment. The eligible mitigants data flows from Mitigants (**FCT_MITIGANTS)** table to Sub Exposures (**FCT_SUB_EXPOSURES)** table.

Allocation of Mitigants to Exposures

The application has a pre-built optimizer for optimum allocation of mitigants to the exposures for CRM purposes. One-to-One, Many-to-One, and Many-to-Many mapping of mitigants are handled in an efficient manner. This involves storage of intermediate computations for traceability.

All mitigants which are eligible and mapped to an exposure are then populated to a new table where each exposure is broken down to the mitigant types. An additional row is included which treats the exposure as having covered and uncovered portion. The covered factor and uncovered factor is also populated in this table.

The application uses the linear programming method to allocate the mitigants to the exposures. Pooling identifies the exposure and mitigant data from sub exposures (**FCT_SUB_EXPOSURES**) table. Exposure identifier and mitigant identifier are the attributes on which Pooling is performed. It assigns the pool ID for each exposure-mitigant combination. Based on these pool ids, the optimizer allocates a covered factor to the exposures. Optimizer allocates mitigants to exposures to attain the most favorable EAD output. For more information on pooling and optimizer, see Exhibit 2 and Exhibit 3 in *Annexure A: Key Concepts*.

NOTE: A tag <ALTER_STATEMENTS> is present in Optimizer_Config.xml. This statement is used to enable the parallel Data Manipulation Language (DML) for the optimizer. This is disabled by default, due to which the following warning appears which is printed in the Optimizer log:

"Error: **Could not find node ALTER_STATEMENTS in the xml**"

The administrator can uncomment this tag to enable parallel DML for the optimizer.

Post CRM RWA Computation

Pre mitigation EAD is divided into Post Mitigation EAD for the covered portion and Post Mitigation EAD for uncovered portion. Covered portion is the portion of the exposure covered by the mitigant and uncovered portion is portion of the exposure not covered by the mitigant. For multiple mitigants covering one exposure, there is more than one record for the covered portion of that exposure. Post mitigation RWA UL (Post CRM RWA UL) is calculated by multiplying post mitigation EAD and its Capital Required UL with 12.5. Post mitigation RWA Expected Loss is calculated by multiplying the PD, LGD, and post mitigation EAD amount with 12.5.

4.1.1.2.2 Securitization – Standardized Approach

The Basel accord differentiates the Credit Risk computation of the Securitized exposures from Non Securitized exposures. As securitized exposures are part of off-balance sheet transactions, it follows a waterfall cash flow mechanism unlike the other exposures. Hence these exposures are treated differently. Due to the economic crisis of 2008, the Basel Rule has categorized securitized exposures into securitized and re-securitized exposures.

Securitized exposures are exposures which are issued out of a pool of underlying exposures for the transfer of risk. Re-securitized exposures are the exposures which are issued out of a pool of underlying exposures which constitutes non-securitized exposures and some portion of securitized exposures. The application is capable of handling both securitized exposures and re-securitized exposures. It also handles the calculation for the originator and the investor bank roles. At a broad level, there are two categories of Investors:

- An Investing Bank who has invested heavily in securitization.
- An Investing Bank who has invested minimal in securitization.

For both the investors, the data is expected in the Stage Underlying Exposures (**STG_UNDERLYING_EXPOSURES**) for the underlying of the pool, Total Pool Level attributes in the Stage Pool table (**STG_SECURITIZATION_POOL**), Tranche Level attributes in the Stage Tranche table (**STG_SECURITIZATION_TRANCHE**), and the Exposure Level Attributes in the respective product processor (PP) tables.

For an originator, the data is expected in the same manner as the Investor, except for the Underlying Exposures. The underlying exposures of the pool are expected in the respective PP tables, depending on the product type of the underlying exposures.

If the exposure is a credit protection in the form of guarantee, it is expected in the Stage Guarantees table (**STG_GUARANTEES**), and if it is a credit derivative, it is expected in the Stage Credit Derivatives table (**STG_CREDIT_DERIVATIVES**). If it is a regular investment in the Tranches by an investing bank, or it is part of the mandate for retention in the pool or tranche for an originating bank, the data is expected in the Stage Investments table (**STG_INVESTMENTS**).

For exposures being a facility like liquidity facility, or servicer cash advance, the exposures are expected in the Stage Commitment Contracts table (**STG_COMMITMENT_CONTRACTS**).

The Basel Accord specifies Standardized Approach for the calculation of the capital charge for the Securitization exposures:

- Standardized Approach

The standardized approach is handled by the application. For a few procedures, the calculations pertaining to the underlying exposures of the Securitization transaction are required before processing the Securitization exposures. This is computed before processing the Securitization exposures. This is applicable for Basel II standardized approach.

Process Flow for Securitization – Standardized Approach

The process flow for standardized approach of Securitization exposures are as follows:

```
┌─────────────────────────────────┐
│     Credit Rating Processing    │
└─────────────────────────────────┘
                 ↓
┌─────────────────────────────────┐
│         Data Population          │
└─────────────────────────────────┘
                 ↓
┌─────────────────────────────────┐
│     Mitigant Data Population     │
└─────────────────────────────────┘
                 ↓
┌─────────────────────────────────┐
│         Mitigant Mapping         │
└─────────────────────────────────┘
                 ↓
┌─────────────────────────────────┐
│        Sec Reclassification      │
└─────────────────────────────────┘
                 ↓
┌─────────────────────────────────┐
│     Mitigant Reclassification    │
└─────────────────────────────────┘
                 ↓
┌─────────────────────────────────┐
│       Sec Pre-CRM Computations   │
└─────────────────────────────────┘
                 ↓
┌─────────────────────────────────┐
│          Sec Deductions          │
└─────────────────────────────────┘
                 ↓
┌─────────────────────────────────┐
│          Sec CRM Process         │
└─────────────────────────────────┘
                 ↓
┌─────────────────────────────────┐
│    Sec Post CRM RWA Computation  │
└─────────────────────────────────┘
```

Credit Rating Processing

All the rating information of the exposures and the mitigants are populated from the staging tables to the processing tables. The exposure and the tranche rating information are captured in the account rating tables and the mitigants rating information are captured in the instrument rating details. This is handled in the **CREDIT_RATING_PROCESSING** process.

Sec Data Population, Mitigant Data Population, and Mitigant Mapping

The data pertaining to pool, tranche, and exposures are populated from the staging tables to the processing tables. The underlying exposures data are captured in the respective Product Processor tables (and for these, the process pertaining to the non-securitization exposures is followed). The mitigants data are populated from the staging table to the processing table. The exposures which are mapped to the mitigants are captured and populated from the staging table to the processing table. Securitization data population is handled in the process **SEC_DATA_POPULATION**. Mitigant data population is handled in the process **MITIGANT_DATA_POPULATION** and Exposure Mitigant Mapping Population is handled in the process **SEC_EXP_MITIGANT_MAPPING_ POP**.

Sec Reclassification and Mitigant Reclassification

The application uses the standardized data for all kinds of calculations (product type like eligible liquidity facility, bank role like originator, pool type like mortgage backed securities). Before any computations, the application reclassifies the bank specific data to standard data as stated in the Basel accord. It reclassifies the bank role to the standard bank role of an originator or investor. Any other bank roles like sponsor, credit protection provider, and so on, are reclassified into originator, investor, and so on, respectively. The application also reclassifies the pool type to the standard pool type like credit cards receivable pool, auto loans, and so on. It also reclassifies the product type to the standard product type like mortgage backed securities, eligible liquidity facility, and so on.

For mitigants the application reclassifies the mitigant types to the standard mitigant types like the debt securities, credit derivative, cash, and so on. It also reclassifies the mitigant issuer type to the standard mitigant issuer type like Banks, Corporate, and so on. The reclassification tasks are present in the **Sec Reclassification** and **Mitigant Reclassification** sub process. The application assigns the Sec - Standardized Approach in the **Sec Reclassification** Sub Process for approach selection.

Sec Pre-CRM Computations

The application calculates the pre-CRM RWA for the exposures by multiplying the pre-CRM EAD with the risk weight of the exposures. This is handled in the **Sec STD Pre CRM Computations** sub process.

Risk Weight Assignment

The application assigns the risk weight to the exposures based on the external rating assigned to the exposures. If the exposures have internal ratings assigned, then the application treats the exposures as unrated. Initially, the application assigns the risk weight to each of the exposure's ratings. Then, the application using multiple assessment logic as specified by the regulators, assigns the final rating to the exposures. For each exposure, this final rating is the worst of the best two ratings assigned to the exposure.

Further, the application updates the rating after multiple assessments and updates the corresponding risk weight to the exposures. For Securitization and Re-securitization exposures, the risk weights assignment are different from the Non Securitization exposures. The application assigns the risk weights based on the following conditions:

- Bank role
- The exposure is an exposure issued out of a Securitization or Re-securitization pool
- The external ratings assigned to the exposures

For unrated exposures, the application applies the Look through Approach and assigns the weighted average risk weight of the underlying exposures.

The application also handles other securitization exposures like the eligible liquidity facility, exposures in a second loss position and issued to ABCP Program, and so on. If the data to assign a risk weight is not available, then the application marks these exposures for deduction. Risk weights corresponding to the external ratings are assigned to the entity Securitization Risk Weight Map Master (**FSI_SEC_RW_MAP_MASTER**) and the final applicable risk weight is updated in Securitization Exposures table after multiple assessments of the ratings.

Pre-CRM EAD Computation

The application assigns the Credit Conversion Factor (CCF) to the off-balance sheet items as specified in the Basel Accord. The CCF percentages are assigned based on the bank role (this is applicable only for the originator bank role), the product type (like the eligible liquidity facility) and the applicable ratings. The CCF percentages are also assigned to the exposures based the availability of early amortization provision, applicable to the transaction. In such cases, the CCF assignment is based on the early amortization type (controlled or uncontrolled), the pool type, and the ratio of three month average excess spread to the trapping point. Further, the application computes the pre-mitigation EAD. This is computed based on the bank role and the product type. The application calculates the EAD for the investors and the originators separately based on the calculations given in the Basel II Accord.

Sec Deductions Process

The exposures which are lower than the investment grade and the unrated exposures are deducted from the capital. This is handled in the **Sec Deduction** sub process.

Sec CRM Process

Mitigant Eligibility, Mitigant Risk Weight, Haircut Assignment, and Allocation of Mitigants to Exposures are handled in Sec CRM sub-process.

Mitigant Eligibility

The application identifies the eligible mitigants based on the criteria as mentioned by the Basel Accord. It identifies the following mitigants in the case of securitized exposures – Collateral, Guarantees, and Credit Derivatives. The application is capable of using the simple approach and the comprehensive approach for the mitigants which are part of the collateral. This is similar to the mitigant eligibility of the Non Securitization process.

The application processes the multiple assessments of ratings for the mitigants also. This is required since some of the mitigant eligibility criteria are based on the ratings and risk weight of the mitigants. The application identifies the eligibility of the financial collateral separately for the simple approach and the comprehensive approach. The eligibility of the collateral mitigants are based on the party type of the mitigant, mitigant types, the credit rating assigned to the mitigant or the party (as applicable) and whether the collateral is classified as a senior or not. For equity, the eligibility is based on the main index equity and the equity trading status. For mutual funds, the eligibility is based on the eligible mutual fund indicator.

The application identifies the eligibility of the guarantees and credit derivatives based on the party type of the mitigant and the credit rating assigned to the issuer of the mitigant. For Nth to default credit derivatives, the application further identifies the eligible credit derivative, based on the number of defaults in the exposures and the defaulted position covered by the mitigant. The application identifies the number of defaults in the tranches based on the attachment point of the tranche to which the exposure belongs, the initial pool exposure amount, and the cumulative default amount. Further, it computes the number of tranches in default and compares it with the defaulted position covered by the mitigant.

Based on the criteria of eligibility mentioned in the Basel accord, the application identifies whether the mitigant is eligible or not. If eligible, the application considers the least risk weighted exposure as the eligible mapping for the least eligible nth to default mitigant for the exposure.

This identification of the eligible nth to default credit derivative and the eligible exposure-mitigant mapping is performed with the help of the Data Transformation "CD_Sec_Mitigant_Elig_STD". The details of the Data Transformation are as follows:

Data Transformation Name	Objective	Processing Logic
CD_Sec_Mitigant_Elig_STD	The objective of this Data Transformation is to identify an eligible sec exposure mitigant mapping wherein the mitigant is an Nth to default credit derivative, in the case of IRB Approach.	The eligible nth to default credit derivative mitigant is identified and processed based on the exposures mapped to the same pool id. All the exposures mapped to the same pool ID are identified and the corresponding mitigants mapped to them are also identified. In the sec pool id, the cumulative pool default amount is compared with the tranche attachment point as a number (obtained by multiplying the tranche attachment percentage by the initial pool exposure amount). The number of tranches for which the tranche attachment point is less than the cumulative pool default amount is calculated. This number is compared with the minimum defaulted position of the credit derivative mitigant. For a basket of exposures covered by multiple credit derivatives, eligible mitigant is minimum defaulted position in the basket minus 1. Also other credit derivative in the basket of exposures which are having the defaulted position consecutively iscome eligible. For each eligible mitigant, the exposure mitigant mapping wherein the exposure has the least risk weight or capital charge iscome eligible. All other exposure mitigant mapping for that mitigant is marked ineligible.

The application also identifies the eligibility of the mitigants based on the comparison of the risk weight of the exposures and the mitigants. If the mitigants risk weight is lesser than that of the exposures, then the mitigants become eligible or else the application makes them ineligible.

Mitigant Risk Weight

The application calculates the mitigant risk weight similar to the exposure risk weight of non securitized exposures. This is based on the issuer type and the credit rating which includes the unrated issuers as well. The application performs multiple assessments for the mitigants, similar to the Non Securitization exposures process and arrives at a single rating for the mitigant. Further, the application assigns the final risk weight to the mitigant. In case of financial collateral mitigants like cash, and gold zero risk weight is assigned.

Haircut Assignment

The application assigns the various haircuts, as applicable to the Mitigants. For collateral following simple approach, there are no haircuts assigned to the mitigant. For collateral following comprehensive approach, the application has the flexibility to use the supervisory haircut and scale up, if required, based on the minimum holding period. Alternatively, it can also use the bank's own estimate of haircuts. The application applies the volatility haircut, FOREX haircut, and the maturity mismatch haircut to the mitigants as appropriate. This is as per the Basel Accord regulations. Only eligible mitigants are considered for haircut assignment. The eligible mitigants data flows from the mitigants (**FCT_MITIGANTS**) table to sub exposures (**FCT_SUB_EXPOSURES**) table.

Allocation of Mitigants to Exposures

The application computes the mitigant value post all haircuts. Further, it uses the pooling and optimizer logic to allocate the exposures to the mitigants. This allocation is a bit different from the optimizer logic of Non Securitization exposures as the Securitized exposures have priority in the cash flow and gets the maximum protection by the mitigants. The senior most exposure (or tranche) is denoted with seniority 1 and the second senior exposure is denoted with seniority 2 and so on. For securitization exposures, the mitigants are given preference to the senior most exposure and later to the other exposures based on the seniority. The other parameters which are considered in the allocation logic are the risk weight and the mitigant value post haircut.

The application uses the linear programming logic to allocate the mitigants to the exposures. The optimizer logic for Securitization exposures is a bit different from Non Securitization exposures, which is explained as follows:

Based on the seniority of the exposures, risk weight of the exposures, and the mitigant and the mitigant value, the rank order in which the mitigants are allocated to the exposures is arrived at. The order of allocation can be modified by updating the operation type and the optimizer constraints of the objective function. You can select the allocation rank measure in the **Optimizer Definition** window, while defining the optimizer logic. For more information on defining the optimizer, see Exhibit 2 and Exhibit 3 in *Annexure A: Key Concepts.*

Single Mitigant Mapped to Single or Multiple Exposures

If there is one or more than one exposure mapped to a single mitigant, the mitigant is allocated to the exposure with the highest seniority. If there is more than one exposure with the same highest seniority, then the mitigant is allocated to the exposure which yields the highest mitigant value post haircut.

Single Exposure Mapped to Single or Multiple Mitigants

If there is one or more than one mitigants mapped to a single exposure, the least risk weighted mitigant is allocated to the exposure. If there is more than one mitigant with the same least risk weight, then the mitigant which has the highest mitigant value post haircut is allocated to the exposure.

Multiple Exposures Mapped to Multiple Mitigants

The treatment for this case is similar to the treatment of single mitigant mapped to single or multiple exposures, for the identification of the mitigant which is assigned to the exposures. The treatment pertaining to single exposure mapped to multiple mitigants is followed to yield the credit risk weighted exposure amount.

Using this logic, the application calculates the factor of exposure covered by the mitigant and the factor of the exposure uncovered (without any protection).

Sec Post CRM RWA Computation

The application computes the covered amount and the uncovered amount for the exposures. The covered amount is computed by multiplying the covered factor with the exposure amount, and to this covered amount, the application assigns the mitigant risk weight. The product of the covered amount and the mitigant risk weight is the covered RWA. The uncovered amount is computed by multiplying the uncovered factor (which is 1 – sum of all covered factors for that exposure) with the exposure amount. This uncovered amount is multiplied by the exposure risk weight to get the uncovered RWA.

The sum of the covered RWA and the uncovered RWA is the Post CRM RWA of the Exposure.

> **Post-CRM RWA = Covered Amount * Risk Weight of the Mitigant**
>
> **+ Uncovered Amount * Risk Weight of the Exposure**

This logic is handled in **Sec Post-CRM RWA computation** sub process.

Key Data Elements

Key data elements for Securitization computation is as follows. For a complete list of tables and columns, see the *Download Specifications* document.

Securitization Exposures (Standardized Approach)

The Key attributes required in the case of an investor or a third party that does not provide the complete pool and tranche details are as follows:

- Credit Enhancement Level
- Pool Exposure Amount
- Sec Second Loss Position of the Tranche
- Seniority of the Tranche
- Sec Trading Book Approach

For an investing bank, the data is expected in the Stage Underlying Exposures (**STG_UNDERLYING_EXPOSURES**) for the underlying of the pool, Total Pool Level attributes in the Stage Pool table (**STG_SECURITIZATION_POOL**), Tranche Level attributes in the Stage Tranche table (**STG_SECURITIZATION_TRANCHE**), and the Exposure Level Attributes in the respective PP tables.

For an originator, the data is expected in the same manner as the Investor, except for the Underlying Exposures. The underlying exposures of the pool are expected in the respective PP tables, depending on the product type of the underlying exposures.

For a credit protection exposure in the form of guarantee, it is expected in the Stage Guarantees table (**STG_GUARANTEES**); and if it is a credit derivative, it is expected in the Stage Credit Derivatives table (**STG_CREDIT_DERIVATIVES**). If it is a regular investment in the Tranches by an investing bank, or it is part of the mandate for retention in the pool or tranche for an originating bank, the data is expected in the Stage Investments table (**STG_INVESTMENTS**).

For a liquidity facility exposure, or servicer cash advance, the exposures are expected in the Stage Commitment Contracts table (**STG_COMMITMENT_CONTRACTS**).

Mitigant Eligibility (Standardized Approach)

The Mitigant eligibility can be Eligible Mutual Fund Indicator, Main Index Equity Indicator, and Equity Traded Indicator.

Miscellaneous

All tranche information, regardless of the bank having exposure or not, is required for inferring the ratings, credit enhancement level computation, and eligibility of nth to default credit derivative mitigant.

Mitigant value is to be assigned at an exposure level (not to the tranche).

Mitigant pool ID in the exposure mitigant mapping table for nth to default mitigants is required for eligibility of nth to default credit derivative mitigant.

Attachment point of tranches based on original balances is required for eligibility of nth to default credit derivative mitigant.

4.1.1.3 Market RWA

The Basel Committee has introduced Market Risk Capital Charge calculation in 1996 as an amendment to the earlier Basel accord by considering the risk borne by a financial institution having exposures in the trading book. BIS defines Market Risk as "the risk of losses in the on and off-balance-sheet positions arising from movements in market prices". It is the risk that arises out of the adverse movements of the market factors. Market risk consists of the risk borne by the bank due to the positions in its trading book.

Basel outlays two basic approaches for calculating the capital charge for Market Risk:

- Standardized Approach
- Internal Model Method Approach

4.1.1.3.1 Standardized Approach

In standardized approach (STD Approach), the Market Risk Capital Charge is calculated for the following instrument types:

- Interest Rate related Instruments (IR Instruments)
- Equity Position Risk
- Foreign Exchange Risk
- Commodities
- Options

Prerequisite for Market Risk Processing

Execution of the Run, **Staging Data Population - Market Risk - BIS Standardized Approach** is usually a onetime activity. This should be executed once before actual Market Risk Run is executed. This Run is expected to execute in following circumstances. The following tasks are performed when the Run is executed.

- Interest Rate Curve (IRC) Data
- Market prices of the instruments
- Bank positions

This Run populates the instrument level data that is required by the actual Run for further processing. The instrument level data such as number of units of the instruments on that particular MIS date is downloaded in bank instrument position (**STG_BANK_POSITIONS)** table.

This data flows into the fact table for further processing. The OTC instrument price is expected as a download. For non-OTC instruments the data for instruments' price is captured in Market Instrument Contract (**STG_MKT_INSTRUMENT_CONTRACT**) table. This data further flows into the fact table.

For IR instruments, the interest rate required is captured in IRC Rate History (**STG_IRC_RATE_HIST**) table. This data further flows into the fact table. This data is required for term structure that is used in Modified Duration and Greeks Parameter calculation for options.

Process Flow for Market Risk- Standardized Approach

The following pre-defined Run can be executed to compute Market RWA using the Standardized Approach.

Run: Risk Weighted Asset Calculation - Market Risk - BIS Standardized Approach

Capital Consolidation

For a reporting bank, the level at which the consolidation is done is identified by the application. You can select Solo or Consolidation level for each entity in the rule present in the Capital Consolidation process. This particular process handles entity level details. The entity data is captured in Legal Entity Details (**STG_LEGAL_ENTITY_DETAILS**) table. All the child entities underlying a parent are considered for RWA consolidation. When consolidation is the level selected for a reporting bank, each child entity data is consolidated with the parent entity post Entity shareholding percent multiplication.

The process and sub process details are as follows:

Process: CAPITAL_CONSOLIDATION

Sub-process: Capital Consolidation Approach

Approaches Followed in Capital Consolidation

The three approaches followed by the Capital Consolidation are as follows.

Consolidation Approach (CONSL)

Under this approach, all the entities of the bank's organizational structure are considered. This includes all the entities/subsidiaries that belong to the same jurisdiction. All the exposures of the entities in the organizational structure are considered for computing risk weighted exposures, except the intra-group exposures.

Aggregation Approach (AGG)

This approach is similar to the Consolidation approach but is used in the cases, where some of the entities that are part of bank's organizational structure belong to a different jurisdiction. The capital requirement of the affiliate is computed as per the jurisdiction that it is subject to and is then aggregated with the rest of the group's capital requirement. Intra-group exposures are not excluded in this approach.

Deduction Approach (DED)

This approach is used in the case where some of the subsidiaries/entities that are part of bank's organizational structure are excluded from consolidation. In such a scenario, the regulatory investment in the excluded subsidiary attributable to the rest of the group are deducted from the consolidated capital requirements.

Rating Process

Rating data is expected for all instruments which bear an interest rate risk. The rating data is reclassified into Basel equivalent standard rating and the standard rating is considered for assigning specific risk charge for interest rate instruments, wherever applicable. If there are multiple ratings for the same issue, then the application does a multiple assessment check as per the multiple assessment logic detailed in the Basel II guidelines. This process assigns a Basel equivalent rating for an instrument, counterparty and/or issuer based on the rating details available for the same after applying multiple assessment logic.

The process and sub process details are as follows::

Process: CREDIT_RATING_PROCESSING

Sub-process: Credit Rating Data Population

Position Conversion

Position conversion is processed before Capital Charge calculation under Market Risk. In Position Conversion, different instruments are broken into long and short positions and carried forward for specific and general risk charge calculation. All derivative instruments undergo position conversion so that the instrument is broken down into simplified positions for further processing. For derivative positions in equities, commodities, gold, currencies, and so on, only one leg is exposed to interest rate and other leg is exposed to the respective asset (equity, FOREX) as the case may be. The following information is required for position conversion: Long or Short position, Value of Notional Position, Coupon Rate, and Maturity.

Methodology for Position Conversion

While calculating interest rate risk, each instrument is converted into multiple positions. The notional value of each position is derived based on the following methodology:

♦ Notional positions in actual debt securities are valued as the nominal amount underlying the contract at the current market price of the debt security.

♦ Positions in zero-specific-risk securities is valued using one of the following two methods:

   o The present value approach, under which the zero specific-risk security is assigned a value equal to the present value of all the future cash flows that it represents or

   o The alternative approach, under which the zero specific-risk security is assigned a value equal to the market value of the underlying notional equity position in the case of an equity derivative; the notional principal amount in the case of an interest rate or foreign currency swap; or the notional amount in the case of any other financial instrument

♦ For options, the delta weighted values go into the general risk charge calculation. Delta is computed by the application based on the instrument type, coupon, residual maturity, strike price, spread, option premium value, and so on.

♦ For an Interest Rate (IR) Swap, the parent instrument is identified as a Receiver or Payer swap based on whether the bank is receiving fixed or paying fixed, respectively. After Position Conversion, the parent swap is converted to two child positions which is in zero specific risk securities. The exposure amount for each of these positions is computed based on the coupon rate of receiving leg for the long child position and the coupon rate of the paying leg for short child position. Currently the notional amount for both the child positions is being computed using the current market price column of the parent.

Instrument Coverage

♦ Interest Rate Derivatives

   o Bond Forward

   o Forward Rate Agreement

   o Bond Future

   o Future on a Basket/Index of bonds

   o Interest Rate Futures

   o Receiver Swap (without deferred start)

   o Payer Swap (without deferred start)

   o Basis Swap (without deferred start)

   o Forward Basis Swap

   o Forward Receiver Swap

   o Forward Payer Swap

- o Dual Currency Bond
- ♦ Equity Derivatives
    - o Equity Forward
    - o Equity Future
    - o Equity Swap
- ♦ Currency Derivatives
    - o Currency Forward
    - o Currency Future
    - o Currency Swap
- ♦ Commodity Derivatives
    - o Commodity Forward
    - o Commodity Future
    - o Commodity Swap
    - o Gold Forward
    - ♦ Credit Derivatives
    - o Credit Default Swap
    - o Total Rate of Return Swap
    - o Cash Funded Credit Linked Notes
    - o First and Second-to-Default Basket Credit Derivatives
- ♦ Options / Structured Products
    - o Option on Equity
    - o Option on Currency
    - o Option on Commodity
    - o Option on Currency Future
    - o Option on Currency Forward
    - o Currency Swaption
    - o Option on a bond
    - o Option on a bond future
    - o Option on a Forward Rate Agreement

- o Option on an Interest Rate Future

- o Caps

- o Floors

- o Collars

- o Swaptions

- o Bonds with Embedded Swaptions

- o Callable Bonds

- o Putable Bonds

- o Floating Rate Notes with Caps

- o Floating Rate Notes with Floors

- o Reverse Floaters

- o Leveraged Floaters

Position Conversion - Process Flow

The process flow of Market Risk Position Conversion is as follows:

```
┌─────────────────────────────────────────────┐
│         Market Risk Position Conversion       │
└─────────────────────────────────────────────┘
                      ↓
┌─────────────────────────────────────────────┐
│       Position Conversion Data Population      │
└─────────────────────────────────────────────┘
                      ↓
┌─────────────────────────────────────────────┐
│              Currency Conversion              │
└─────────────────────────────────────────────┘
                      ↓
┌─────────────────────────────────────────────┐
│      Shareholding Percent Multiplication       │
└─────────────────────────────────────────────┘
                      ↓
┌─────────────────────────────────────────────┐
│    Position Conversion of Derivatives into     │
│               simple positions                 │
└─────────────────────────────────────────────┘
                      ↓
┌─────────────────────────────────────────────┐
│     Position Conversion Parameter Assignment   │
└─────────────────────────────────────────────┘
                      ↓
┌─────────────────────────────────────────────┐
│           Notional Value Calculation           │
└─────────────────────────────────────────────┘
                      ↓
┌─────────────────────────────────────────────┐
│          Specific Risk Weight Assignment       │
└─────────────────────────────────────────────┘
```

Position Conversion Data Population

The application populates Market Risk Exposures (**FCT_MARKET_RISK_EXPOSURES) table** with the details provided by the bank in Stage Bank Positions (**STG_BANK_POSITIONS**) table and Stage Instrument Contract Master (**STG_INSTRUMENT_CONTRACT_MASTER**) table. FOREX exposures of the bank are populated into Market Risk FOREX (**FCT_MARKET_RISK_FOREX**). This exercise is done for all the trading book exposures.

For more information on processes and sub processes that compute this:

Process: MKT_RISK_POSITION_CONVERSION

Sub-process: Market Risk Data Population

Currency Conversion

All the positions in other currencies are converted into the reporting currency of the bank, based on the currency conversion rate between the exposure currency and reporting currency.

For more information on processes and sub processes that compute this, see the following:

Process: MKT_RISK_POSITION_CONVERSION

Sub-process: Currency Conversion

Shareholding Percent Multiplication

For consolidated runs, exposures of the child entities are multiplied by the entity shareholding percentage to arrive at the consolidated exposure at the parent level.

For more information on processes and sub processes that compute this, see the following:

Process: MKT_RISK_POSITION_CONVERSION

Sub-process: Shareholding Percent Multiplication

Position Conversion of Derivatives into Simple Positions

The application takes the contract details from instrument table and breaks each contract into multiple positions into market risk exposures (**FCT_MARKET_RISK_EXPOSURES**) table. The application splits instruments, which are derivatives in nature, into multiple positions based on the instrument position mapping available in the mapping table. For example: A bank having a plain long position in a derivative instrument is split into one long and one short position. Hence for each position and nature of contract type, the application creates the required number of positions in the processing table. The download information used for position conversion is contract details, instrument type, contract position, position mapping, and so on.

Certain exotic instruments are split into more than two positions. For example: A long position in a reverse floater is converted into the following positions.

- ♦ A long position in two straight bonds (double the notional amount and half the fixed interest rate);
- ♦ A short position in a floating rate bond (a position in floating rate bond with notional amount and floating reference rate);
- ♦ A long position in a cap (which is further broken down into its underlying positions).

The application reclassifies all bank instruments into standard instrument types based on contract type, contract position, market risk position, and so on. A fixed bond forward with a long position in the contract is reclassified into fixed rate bond for the long leg and zero risk security for the short leg created by position conversion. The reclassifications are then used for notional value calculation.

For more information on processes and sub processes that compute this, see the following:

Process: MKT_RISK_POSITION_CONVERSION

Sub-process:

> Position Conversion Exotic Options
>
> Position Conversion Options
>
> Position Conversion Basket Futures - Interest Rate
>
> Position Conversion Swaps
>
> Position Conversion Forwards and Futures
>
> Position Conversion Credit Derivatives

Position Conversion Parameter Assignment

After position conversion, that is, breaking each derivative instrument into long and short leg, the application assigns instrument parameters for each position leg created under position conversion logic. For each leg, relevant information like: coupon rate, coupon frequency, maturity, strike price for options, option premium value, and so on are updated from parent information. This information is used in identifying instruments to be grouped under maturity ladder based on coupon rate (less than or greater than equal to 3%), duration calculation for duration ladder approach, calculation of Greeks for option charge, and so on.

For more information on processes and sub processes that compute this, see the following:

Process: MKT_RISK_POSITION_CONVERSION

Sub-process:

> Position Conversion Exotic Options
>
> Position Conversion Options
>
> Position Conversion Basket Futures - Interest Rate
>
> Position Conversion Swaps
>
> Position Conversion Forwards and Futures
>
> Position Conversion Credit Derivatives

Notional Value Calculation

Notional value of each leg created by position conversion for each instrument is calculated based on the contract characteristics (market price, number of units). For options it is the delta weighted position which is carried forward for market risk charge calculation.

For more information on processes and sub processes that compute this, see the following:

Process: MKT_RISK_POSITION_CONVERSION

Sub-process:

> Position Conversion Exotic Options
>
> Position Conversion Options
>
> Position Conversion Basket Futures - Interest Rate
>
> Position Conversion Swaps
>
> Position Conversion Forwards and Futures
>
> Position Conversion Credit Derivatives

Specific Risk Weight Assignment

After Notional Value calculation, the application assigns risk weights to the position converted IR-instruments. The risk weights are stored in Specific Risk Mapping table. These risk weights are stored against time band, Basel rating and category surrogate keys. The categories are Qualifying and sovereign and the ratings are picked from standard Basel Rating table.

For more information on processes and sub processes that compute this, see the following:

Process: MKT_RISK_POSITION_CONVERSION

Sub-process:

> Market Risk Specific Risk IR Assignment
>
> Market Risk CD Underlying Specific Risk

There is some dependency on different instrument types, like exotic options which can further result into a vanilla option after position conversion. Therefore, position conversion of instrument types should be processing in the following order:

- ♦ Exotic Options
- ♦ Options.
- ♦ Basket Futures
- ♦ Swaps
- ♦ Forwards Futures
- ♦ Credit Derivatives

After position conversion of Basket Futures instrument types, position offsetting is performed on different positions of same kind of instrument types and the post offset exposure amount is arrived at.

Example of a Forward Rate Agreement (FRA) Position Conversion:

A purchased FRA can be depicted through two notional zero-coupon positions: one short position (liability) up to the maturity of the underlying credit transaction and one long position (claim) up to the settlement of the FRA. Suppose a firm purchases 3 x 6 month FRA, principal: 1000; interest rate 6%. The previous position is broken down into two opposite zero coupon bond positions as follows:

♦ **First Position:**

Position	: Long
Value of Notional Position	: PV {1000/ ((1+5%) ^0.25) = 987.87}
Maturity	: 3 months
Coupon	: Zero (Coupon of less than 3%)

♦ **Second Position:**

Position	: Short
Value of Notional Position	: PV {1000/ ((1+5%) ^0.5) = 975.90}
Maturity	: 6 months
Coupon	: Zero (Coupon of less than 3%)

A sold FRA has positions exactly opposite to the one given in the preceding example, that is, the long position iscome short and short position iscome long, with the value, maturity, and coupon remaining the same.

Taking the preceding example into consideration, it must be noted that the actual discount rates for discounting the notional values of the two legs, is the interest rates pertaining to the respective maturities, that is, 3 months (long leg) and 6 months (short leg). For simplification purposes, an assumed rate of 5% is considered in the preceding example. Taking the preceding example into consideration, the steps processed in the application are as follows:

1. The FRA as a contract is captured in the contract record details table with the banks position in the contract in the position table. The application also captures the position mapping table for the instrument type which is used for position conversion under data population as detailed in the high level Market Risk process flow. For the previous FRA example, two positions are created, one long position with a maturity of 3 months and a short position for the life of the contract that is, with a maturity of 6 months.

2. Both the position legs are reclassified into zero specific risk security.

3. The various contract parameters are assigned by the application to both the legs. Example: Coupon Rate, Maturity.

4. The notional value of both the legs is calculated as per the logic stated in the example.

Capital Charge for Interest Rate Instruments

The total risk charge for Interest Rate (IR) instruments consists of specific risk charge (specific to the issuer and instrument) and general risk charge (market related risk vested in the instrument).

The process flow for Interest Rate Risk is as follows:

Specific Risk Charge Calculation

Specific risk charge is calculated based on the categories and investment grade. The application first identifies the categories based on the conditions laid by the accord. After the category is identified the specific charge weight is assigned based on category, Basel equivalent rating, and residual maturity.

The specific risk weight is assigned under the Market Risk position conversion process. These specific risk weights are then multiplied by the exposure amount arrived at after position offset to eventually compute specific risk charge for Interest Rate instruments.

For more information on processes and sub processes that compute this, see the following:

Process: MKT_RISK_STD_APPROACH

Sub-process: Market Risk Specific Risk Charge Calculation - IR and Equity

General Risk Charge Calculation

General Risk charge is calculated for each interest rate risk exposure for a reporting bank. General Risk charge is calculated based on two methods:

- Maturity Ladder Approach
- Duration Ladder Approach

Under both the methods, the application creates time bands and based on Residual Maturity or Modified Duration, places each instrument in the respective time bands for offsetting. The matched and unmatched position across time bands and across three zones attracts general risk charge as per the definition stated in Basel II guidelines for market risk.

Residual Maturity Ladder

Under the Maturity Ladder approach, the general risk charge is calculated for each currency. For multiple currencies, the horizontal and vertical disallowance is calculated by creating separate residual maturity ladder for each currency unless the interest rate risk exposures are insignificant for the reporting bank. In the case of insignificant exposures in multiple currencies, exposures are grouped into a single residual maturity ladder for general risk charge calculation.

Under Residual Maturity Method, the application initially creates around 15 residual maturity time bands. The time band definitions, provided in the Basel II guidelines, are based on the coupon being less than 3% or equal to and greater than 3%. All the 15 time bands are grouped to 3 zones for horizontal disallowance as per the zone definition given in Basel II Market Risk guidelines. This is computed under the process '**MR Time Band Reclassification – Maturity Approach**'. Based on the time bands, positions are assigned general risk weights. The delta-weighted positions of IR options are considered for the slotting into time bands and zones.

The entire end to end processing of general risk charge is calculated in a separate table (**FCT_MARKET_RISK_CAPITAL**) meant specifically for it and can be selected and analyzed in the form of reports. All the processing steps and related data are stored in the table starting from weighted long and short positions, matched and unmatched positions following horizontal and vertical disallowance, and net open position by each currency.

For more information on processes and sub processes that compute this, see the following:

Process: MKT_RISK_STD_APPROACH

Sub-process: Time Band Reclassification - Maturity Approach

Duration Ladder

Under the Duration Ladder approach, the application creates Duration Ladder based on the modified duration calculated for each instrument. Similar to Maturity Ladder, the general risk charge under Duration Ladder is also calculated for each currency and insignificant positions across multiple currencies are put into a single modified duration ladder for horizontal and vertical disallowance calculation.

The duration ladder time band created in the application is based on the definition provided in the Basel II guidelines on Market Risk. Like Residual Maturity, for Duration Based Ladder approach the application creates three time zones for each modified duration time band. This is computed in the process '**MR Time Band Reclassification - Duration Approach**'. Based on the time bands, positions are assigned an 'assumed rate'. The delta-weighted positions of IR options are considered for the slotting into time bands and zones.

All the processing attributes used under the Duration Ladder Approach are stored in a separate table (**FCT_MARKET_RISK_CAPITAL**) starting from weighted long and short positions, matched and unmatched positions following horizontal and vertical disallowance, and net open position by each currency.

For more information on processes and sub processes that compute this, see the following:

Process: MKT_RISK_STD_APPROACH

Sub-process: Time Band Reclassification - Duration Approach

Horizontal/Vertical Disallowance

In the application, vertical and horizontal disallowance for IR instruments under Maturity and Duration Approach is computed by using a Data Transformation function '**Mkt_Risk_GenRsk_IR**' under '**Market Risk General Risk Charge Calculation – IR and Equity**'. This computes the matching of the positions within time bands, zones, across adjacent zones, and across non-adjacent zones to finally arrive at the general risk charge for interest rate instruments.

The capital charge is applied at each state for the matched and unmatched position as per the capital charge stated in Basel II guidelines for Market Risk. The procedure followed by the application which handles the horizontal and vertical disallowance is provided in the following section. This process remains same across the Maturity Ladder and Duration Ladder Approaches.

1. The application initially populates weighted long and weighted short position amounts for each time band.

2. The application offsets the matched positions and populates them as 'offset matched position within the time band'. The unmatched positions are populated as 'offset unmatched position within the time band'.

Offset unmatched positions arrived at from the previous step are then considered for offsetting within a time zone. All the 'offset unmatched positions within time band' falling under the same zone are offset with each other and 'offset match same zone' and 'offset unmatched same zone are computed'.

Offset unmatched positions within same zone are then carried forward for calculating 'offset matched between zone' and 'offset unmatched between zones'. This is first processed for zones 1 and 2, further for zones 2 and 3, and lastly for zones 1 and 3.

All the unmatched positions (within time band, same zone, between zones and net unmatched position) are multiplied by the factors listed in the Basel accord for Maturity and Duration approach as applicable.

For more information on processes and sub processes that compute this, see the following:

Process: MKT_RISK_STD_APPROACH

Sub-process: Market Risk Generic Risk Charge Calculation - IR and Equity

Procedure: Mkt_Risk_GenRsk_IR

Summary Output

For reporting purposes, the application moves data from market risk capital (**FCT_MARKET_RISK_CAPITAL**) table to market risk reporting (**FCT_MARKET_RISK_REPORTING**) table.

Finally, RWA is calculated in Market Risk Summary (**FCT_MARKET_RISK_SUMMARY**) table by multiplying capital charge with 12.5.The interest risk charge gets reported out of market risk summary (**FCT_MARKET_RISK_SUMMARY)** table under Interest Risk charge reporting line. Specific and general risk charge for interest rate is also reported separately from the summary table.

For more information on processes and sub processes that compute this, see the following:

Process: MKT_RISK_STD_APPROACH

Sub-process:

Market Risk Capital Risk Charge Calculation

Market Risk IR Reporting Data Population

Market RWA Calculation

Capital Charge for Equities

The application calculates equity capital charge as the sum of specific risk charge and general risk charge. The process flow for calculation of equity risk charge is as follows:

Deliberate Arbitrage Strategy Computations

The application identifies the deliberate and future arbitrage strategies for equity positions, in this process. Components, as per the Basel guidelines, for 10 percent slippage, exposure amount calculation under arbitrage, exclusions under deliberate arbitrage and so on, are computed under this process.

For more information on processes and sub processes that compute this, see the following:

Process: MKT_RISK_STD_APPROACH

Sub-process: Market Risk Arbitrage Strategy

Position Offset

Long and short position in the same equity instrument are offset for the matched position and the net open position is carried forward as net long or net short position for specific and general risk charge calculation.

For more information on processes and sub processes that compute this, see the following:

Process: MKT_RISK_STD_APPROACH

Sub-process: Market Risk Equity Offsetting

Specific Risk Charge

The application assigns specific risk charge as 8% on gross equity positions. For an index equity which is well diversified, a 4% specific risk charge is applied. In the case of equity derivative, the application takes into account either any future related arbitrage or deliberate arbitrage strategy created on equity. If equity arbitrage is created out of futures, then the application considers the arbitrage information as a mapping in the equity arbitrage mapping (**EQ_ARBITRAGE_STRGY_MAPPING**) table where any opposite future derivative created as hedge for the underlying equity exposures is expected. The application applies a 2% specific charge on lower of opposite index position created or equity underlying.

For more information on processes and sub processes that compute this, see the following:

Process: MKT_RISK_STD_APPROACH

Sub-process:

> Market Risk Specific Risk Equity
>
> Market Risk Specific Risk Charge Calculation - IR and Equity

General Risk Charge

The application assigns 8% general risk charge for equity instrument type and then multiplies it with post offset exposure amount to arrive at the general risk charge. Delta-weighted positions of equity options are considered for general risk computations.

For more information on processes and sub processes that compute this, see the following:

Process: MKT_RISK_STD_APPROACH

Sub-process:

> Mkt Risk General Risk Weight Assignment - FOREX and Equity
>
> Market Risk Generic Risk Charge Calculation - IR and Equity

Summary Output

The equity risk charge is reported from the market risk summary (**FCT_MARKET_RISK_SUMMARY**) table under the equity reporting line. Specific and general risk for equity is also reported separately from the summary table.

For more information on processes and sub processes that compute this, see the following:

Process: MKT_RISK_STD_APPROACH

Sub-process:

> Market Risk Capital Risk Charge Calculation
>
> Market RWA Calculation

Capital Charge for Foreign Exchange Transactions

The process flow for FOREX capital charge is as follows:
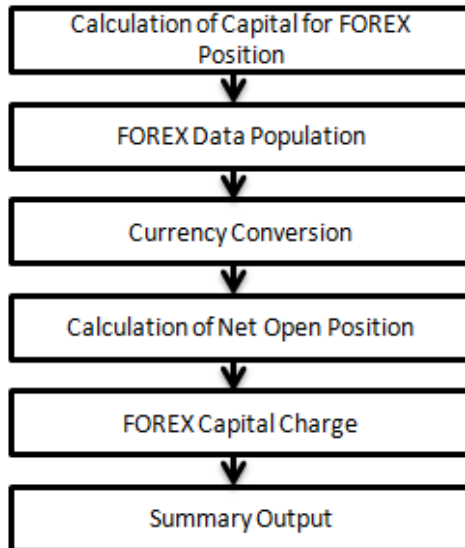
FOREX Data Population

All foreign exchange exposure data is expected at a net level by each currency in a separate table meant only for FOREX exposures data (**STG_FOREX_EXPOSURES**). Forward currency position, asset, liability, accrued interest, profit and loss, structural position, and so on, in different currencies, are captured separately in the FOREX exposure table. This data is then populated to **FCT_MARKET_RISK_FOREX** which is a table used to specifically compute FOREX capital charge.

For more information on processes and sub processes that compute this, see the following:

Process: MKT_RISK_POSITION_CONVERSION

Sub-process: Market Risk Data Population

Currency Conversion

The following rules processes currency conversion of FOREX positions to reporting currency:

- ♦ FOREX Position Profit and Loss Attribute Natural CCY Conversion to Reporting CCY
- ♦ FOREX Position Attribute Natural CCY Conversion to Reporting CCY
- ♦ FOREX Position Other Attribute Natural CCY Conversion to Reporting CCY

This conversion is based on the exchange rate between the natural currency of the exposure and the reporting currency.

For more information on processes and sub processes that compute this, see the following:

Process: MKT_RISK_STD_APPROACH

Sub-process: Market Risk Options - Capital Charge Calculation - Delta Plus Approach

Calculation of Net Open Position

The net open position is the maximum value of the net long and net short position across all currency exposures plus the value of gold. This is computed under the process '**Market Risk FOREX Risk Position Calculation**' in the application.

For more information on processes and sub processes that compute this, see the following:

Process: MKT_RISK_STD_APPROACH

Sub-process: Market Risk FOREX Risk Position Calculation

FOREX Capital Charge

The application applies the short hand method for FOREX risk charge calculation by treating all the currencies to be same and applying 8% risk charge on net open position. This is processed by the rule 'Market RW Assignment - General Risk - FOREX and Equity' and the Data Transformation 'Mkt_Risk_Cap_Chrge_FOREX'.

For more information on processes and sub processes that compute this, see the following:

Process: MKT_RISK_STD_APPROACH

Sub-process: Market Risk Capital Risk Charge Calculation

Summary Output

The FOREX risk charge gets reported out of market risk summary table under FOREX charge reporting line.

For more information on processes and sub processes that compute this, see the following:

Process: MKT_RISK_STD_APPROACH

Sub-process: Market RWA Calculation

Capital Charge for Commodity Transactions

The process flow for Commodity Transactions is as follows:
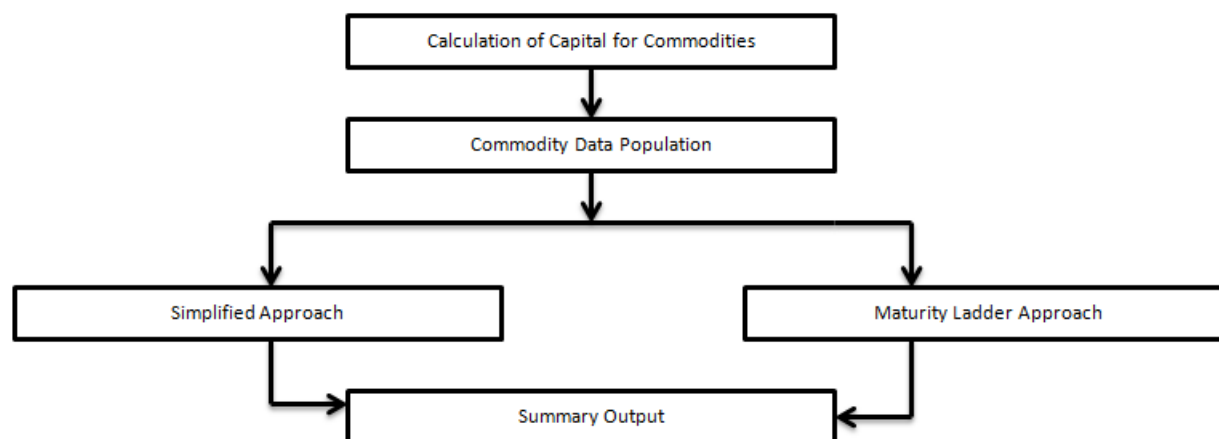
Commodity Data Population

Commodity data is captured at an exposure level with commodity identifier as information. Commodity identifier is referred from the list of commodities available in the dimension table meant only for commodities.

For more information on processes and sub processes that compute this, see the following:

Process: MKT_RISK_POSITION_CONVERSION
Sub-process: Market Risk Data Population

Simplified Approach

In the Simplified Approach, the application moves data from the market risk exposure (**FCT_MARKET_RISK_EXPOSURES**) table to market risk commodity capital (**FCT_MARKET_RISK_COM_CAPITAL**) table. In the Simplified Approach, the application calculates 15% capital charge on the net open long or open short position including an additional 3% capital charge on gross position (long plus short) for each commodity group.

This computation is processed in the table load '**MKT_RISK_SIM_APP_COMDTY**'

For more information on processes and sub processes that compute this, see the following:

Process: MKT_RISK_STD_APPROACH

Sub-process: Market Risk Capital Charge Calculation - Simple Approach

Maturity Ladder Approach

In the Maturity Ladder Approach, the application creates 7 maturity ladders as per the definition provided in the Basel II guidelines for Market Risk. The offsetting is processed within each time band and for the matched position 1.5% capital charge is applied. The net open position of each time band is carried forward and a capital charge of .06% is applied to all the carried forward amounts. For the final net open position, for the post offset amount across the time bands, a capital charge of 15% is applied.

The task 'Time Band Reclassification – Commodities – Maturity Approach' assigns time bands while the Data Transformation 'Mkt_Risk_GenRsk_Comdty' computes the capital charge for commodities using maturity approach as per the Basel guidelines.

For more information on processes and sub processes that compute this, see the following:

Process: MKT_RISK_STD_APPROACH
Sub-process:

> Time Band Reclassification - Commodities - Maturity Approach

> Market Risk Generic Risk Charge Calculation - Commodities - Maturity Approach

Summary Output

The commodity risk charge gets reported out of market risk summary (**FCT_MARKET_RISK_SUMMARY**) table under commodity charge reporting line.

For more information on processes and sub processes that compute this, see the following:

Process: MKT_RISK_STD_APPROACH

Sub-process:

> Market Risk Capital Charge Calculation
>
> Market Risk Commodities Reporting Data Population - Maturity Approach
>
> Market RWA Calculation
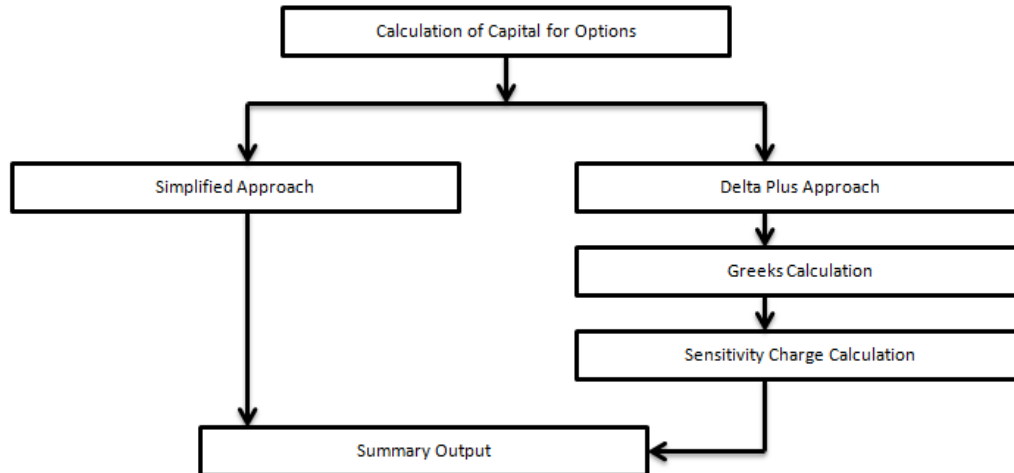
Capital Charge for Options

Simplified Approach

In the Simplified Approach, for option type being long cash and long put or short cash and long call, the application calculates the 'in the money' values for the option. In the case of in the money option the value is calculated as the number of units multiplied by the difference of the underlying forward price and strike price, if the residual maturity of the option is greater than 6 months. In the case of the Residual Maturity Approach of the option contract being less than or equal to 6 months, the 'in the money' value is calculated as number of units multiplied by the difference of underlying current market price and strike price.

The capital charge is arrived at as the difference between sum of general risk and specific risk on the underlying value and in the money value of the option. For long put or long call, the application applies the capital charge as the least of the sum of general risk and specific risk on the underlying and option premium value.

This computation is processed in the task 'Market Risk Options – Capital Charge Calculation – Simple Approach'

For more information on processes and sub processes that compute this, see the following:

Process: MKT_RISK_STD_APPROACH

Sub-process: Market Risk Options - Capital Charge Calculation - Simple Approach

Delta Plus Approach

In the Delta Plus Approach, the option taken on any underlying contract is processed for position conversion. The purpose of position conversion is to create multiple positions with delta weighted amounts and send each position for respective capital charge calculation.

Greeks Calculation

The application calculates Greeks for options based on the option contract information. The Greek calculation involves calculating implied volatility, delta, gamma, and vega. The information required for calculating Greek is explained under **Position Conversion Parameter Assignment.** Each of the Greeks calculated then participates in sensitivity charge calculation.

For more information on processes and sub processes that compute this, see the following:

Process: MKT_RISK_STD_APPROACH
Sub-process: Market Risk Options - Delta and Gamma Calculations - Delta Plus Approach

Sensitivity Charge Calculation

For options, total charge includes underlying capital charge which includes sensitivity risk charge. Sensitivity risk charge includes delta risk, gamma risk, and vega risk charge. The formula used against each of the sensitivity charge is as per Basel II guidelines on Market risk.

The computation of Delta weighted positions and Gamma impact for options is processed under the process 'Market Risk Options – Delta and Gamma calculations – Delta Plus Approach'. The delta weighted positions of options participate in the specific and general risk charge computations applicable for the respective underlying.

For more information on processes and sub processes that compute this, see the following:

Process: MKT_RISK_STD_APPROACH
Sub-process: Market Risk Options - Capital Charge Calculation - Delta Plus Approach

Summary Output

The capital charge for option is reported from the summary table where reporting line is options where as the underlying risk charge is reported under the respective reporting line.

For more information on processes and sub processes that compute this, see the following:

Process: MKT_RISK_STD_APPROACH
Sub-process: Market Risk Generic Risk Charge Calculation - IR and Equity

---

NOTE: Treatment of Securitized Exposures in the Trading Book

Securitized exposures under trading book are treated based on the Basel guidelines and is dependent on the approach taken for the Securitization process. The specific risk charge assignment to such exposures is processed in the task 'Market Risk Sec Specific Risk Charge Calculation' which assigns the specific risk charge to Securitized exposures based on their ratings and the approach followed (Standardized, RBA, SFA or IRB). The deductions for securitized exposures are computed and treated under the process 'Market Risk Sec Deductions'.

For more information on processes and sub processes that compute this, see the following:
Process: MKT_RISK_STD_APPROACH
Sub-process: Market Risk Sec Specific Risk Charge Calculation Market Risk Sec Deductions

---

Key Data Elements

Key data elements are listed in this section. For a complete list of tables and columns to be populated, see the *Download Specification* document.

♦ Interest Rate Historical Data: Interest Rate information for IR instrument is stored here.

♦ Bank Positions: Position in the instrument (Long/Short), Price of Instrument and No of Units for OTC instruments are stored here.

♦ Market Instrument Contract: Price of Non-OTC instruments is stored here.

♦ Instrument contract: Instrument Type, Counter party type, currency code, coupon rate, effective date, maturity date, strike price, coupon rate, coupon frequency are stored here.

♦ FOREX Exposures: Exposure amount, asset amount, asset accrued interest, asset accrued profit are stored here.

4.1.1.3.2 Internal Models Method Approach

As per the Internal Models Approach for Value at Risk (VaR) calculation, the bank has to provide the capital requirement which is higher than:

♦ Previous Day VaR

♦ Average of previous 60 days VaR multiplied by a factor

The bank also needs to calculate stress VaR modeling movement of risk factor due to extreme scenarios. Total Capital requirement is a summation of normal VaR plus stress VaR.

Process Flow for Market Risk – Internal Model Method
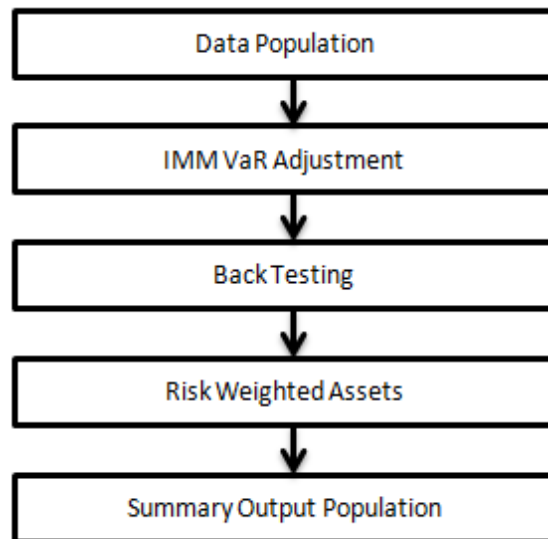
Data Population

The application populates VaR data from stage market risk VaR data (**STG_MR_VAR_DATA**) to fact market risk VaR data (**FCT_MR_VAR_DATA**). The application expects VaR, stress VaR, hypothetical, and actual profit, and loss data as input from bank at a portfolio level.

For more information on processes and sub processes that compute this, see the following:

Process: MKT_RISK_IMM_VAR

Sub-process: Market Risk IMM VaR Data Population

IMM VaR Adjustment

The application takes the maximum of previous day VaR and 60 day average VaR which is provided as an input. A factor of 3 is applied to arrive at a final VaR number. A similar approach is followed for stress VaR and then normal VaR and stress VaR are added up for final capital requirement under market risk IMA.

For more information on processes and sub processes that compute this, see the following:

Process: MKT_RISK_IMM_VAR

Sub-process:

> Market Risk IMM Basel Value Calculation
>
> Market Risk IMM VaR Summary Population
>
> Market Risk IMM SRC Calculation
>
> Market Risk Var IRC CRM Avg Calculation
>
> Market Risk IMM Capital Charge Calculation

Back Testing

The application does a back testing of VaR number by comparing the total VaR with hypothetical an actual profit and loss. If the VaR breaches the hypothetical, then the actual profit and loss application updates each breach as an exception.

For more information on processes and sub processes that compute this, see the following:

Process: MKT_RISK_IMM_VAR

Sub-process: Market Risk IMM Back Testing

Risk Weighted Assets

VaR number is changed to RWA by multiplying by 12.5.

For more information on processes and sub processes that compute this, see the following:

Process: MKT_RISK_IMM_VAR

Sub-process: Market RWA Calculation

Summary Output Population

The reporting of VaR numbers is processed in the fact market risk summary (**FCT_MARKET_RISK_SUMMARY**) under the respective reporting line item.

For more information on processes and sub processes that compute this, see the following:

Process: MKT_RISK_IMM_VAR

Sub-process: Market Risk VaR Capital Charge Population

4.1.1.4 Operational RWA

As per the Basel accord, "Operational Risk is the risk of loss resulting from inadequate or failed internal processes, people and systems, or from external events". External losses can occur due to theft of information or hacking of systems. The Basel accord has prescribed three methods for calculating Operational Risk capital charges and banks can use any of these methods to calculate capital charge:

- Basic Indicator Approach
- Standardized Approach
- Alternative Standardized Approach

NOTE: When executing Solo Run for computing Operational Risk, the parent entity data is processed. However, for a Consolidated Run the parent entity and the subsidiary data are processed.

4.1.1.4.1 Basic Indicator Approach

To calculate the capital charge under the basic indicator approach, the annual gross income for each of the past three years for a standard line of business is multiplied by a fixed percentage of 15%. The average is considered to calculate the capital charge. If the annual gross income is negative or zero in any of the past three years, then the value from the numerator is excluded thereby reducing the base denominator by the same count.

The capital charge formula is as follows:

$$K_{BIA} = \left[\sum (GI_{1..n} \times \alpha) \right] / n$$

Where:

K_{BIA} = the capital charge under the Basic Indicator Approach

GI = annual gross income, where positive, over the previous three years

n = number of the previous three years for which gross income is positive

α = 15 per cent, which is set by the BCBS, relating the industry wide level of required capital to the industry wide level of the indicator.

4.1.1.4.2 Standardized Approach

In this approach, banking activities are divided into eight lines of business. The gross income for each line of business is multiplied by the beta factor which is pre-defined in the Basel accord. Every year the gross income of the standard line of business is multiplied by respective beta factor. The total capital charge is calculated as the three-year average of the sum of the regulatory capital charges across each lines of business every year. The total capital charge is calculated as follows:

$$K_{TSA} = \left\{ \sum_{years\ 1-3} \max\left[\sum (GI_{1-8} \times \beta_{1-8}), 0 \right] \right\} / 3$$

Where:

K_{TSA} = the capital Charge under the Standardized Approach.

GI_{1-8} = annual gross income in a given year (as defined in the Basic Indicator Approach) for each of the eight lines of business.

β_{1-8}= a fixed percentage, set by the committee, relating the level of required capital to the level of the gross income for each of the eight lines of business.

4.1.1.4.3 Alternative Standardized Approach

This approach is an extension of the standardized approach. In this approach for two lines of business: Retail Banking and Commercial Banking, the loan and advance amount is used (rather than annual gross income) which is multiplied by the fixed factor "m" and the beta factor. The beta factor as in the standardized approach remains the same for retail and commercial banking. The constant factor "m" is equal to 0.035. The capital charge for retail and commercial banking uses the loan and advance amount and for the remaining, the calculation of capital charge is the same as in the standardized approach. The total capital charge is calculated as the three-year average of the sum of the regulatory capital charges across each lines of business every year.

Process Flow for Operational Risk

Prerequisite

Before calculating the capital charge for Operational Risk, the following should be computed as a prerequisite.

In the processes **OPS_RISK_STD_APPROACH**, **OPS_RISK_BASIC_IND_APPROACH**, and **OPS_RISK_ALTERNATE_STD_APPROACH** the task defined as **OR_Capital_Std_App**, **Opr_Risk_Capital_Charge**, and **OR_Capital_Std_App** respectively, should mention the number of years (in the past) as a parameter for capital calculation.

For example: if the previous 3 years are considered, then assign 3 as a parameter against the task **OR_Capital_Std_App**. Therefore, in the future, if the previous 4 years have to be considered then change that particular parameter only.

After defining the parameter, the procedure to compute Operational Risk is as follows:

Operational Risk Data Population

The input data for each of the financial years mapped along with the internal lines of business are populated in the processing table.

Internal LOB to Standard LOB Reclassification

The internal lines of business are reclassified into Basel standard lines of business.

Annual Gross Income Calculation

For each of the standard lines of business and for each financial year, the annual gross income is calculated.

Capital Charge Calculation

Capital charge is calculated by multiplying the alpha value or the beta value (for basic indicator approach or standardized approach) with the annual income of each year across each standard line of business. The average of 3 years is considered, if the values of all the 3 years are positive. If the values of all the 3 years are not positive, then zero or the negative value from numerator and denominator is excluded.

Risk-Weight Asset Calculation

The capital charge value obtained is converted to the equivalent RWA value by multiplying with the factor 12.5.

Operational Risk Summary Data Population

The RWA amount is populated into the OR summary (**FCT_OPS_RISK_SUMMARY**) table along with the entity for which the OR RWA is calculated. The application converts all the elements in the annual gross income and loan and advance amount reported in their respective national currency to the reporting currency. While calculating annual gross income or loan and advance amount for the subsidiary that are part of regulatory consolidation, the amount is limited to the share-holding percentage.

Hence, a subsidiary which is part of regulatory consolidation and if the parent holding in the subsidiary is considered as 45%, then the amount limited to 45% is considered for gross calculation. Similarly, if the holding is more than 50%, the entire amount is considered for gross calculation.

4.1.1.4.4 Key Data Elements

Key data elements that are noted while calculating the capital charge for OR for the consolidated entity. To view the complete list of tables used for CCR computation, see the *Download Specification* document.

- Entity details which are part of regulatory consolidation and parent entity share holding percent is required. These details are captured in the Stage Entity Shareholding Details (**STG_ENTITY_SHR_HLD_PERCENT**) table.

- Net Interest Income, Net Provision Amount, Net Non Interest Income, Operating Expenses, Security Sale Gain or Loss from HTM, Insurance Irregular Loss, Security Sale Gain or Loss from AFS, and Insurance Irregular Gain for each line of business and for each financial year is required.

4.1.1.5 Capital Structure

Basel II Capital structure calculates the total capital of the bank holding company. The total capital consists of the following components:

- Tier 1 (T1) capital
- Tier 2 (T2) capital
- Tier 3 (T3) capital

Tier 1 capital consists of core equity capital, retained earnings, and disclosed reserves. Tier 2 capital consists of undisclosed reserves, revaluation reserves (discounted by 55%), general provisions, hybrid debt capital, and subordinate term debt. Tier 3 capital consists of short term subordinate debt covering market risk instrument.

The total capital amount arrived at for each tier of capital is followed by deduction of goodwill, investment in the subsidiary engaged in BFSI, reciprocal cross holding, and expected loss greater than total provision amount. These line items are deducted at 50% from Tier 1 capital and 50% from Tier 2 capital. Securitization transaction and DTA are deducted from Tier 1 capital.

Tier 2 capital is limited to 100% of Tier1 capital whereas Tier 3 capital is limited to 250% of the bank's Tier1 capital. The total capital ratio must not be lower than 8%.

NOTE: While executing Solo Run the parent entity data is processed. Investment into the subsidiary data undergoes RWA calculation as per the Credit Risk and Market Risk rule. Capital line item pertaining to parent entity is only processed. For consolidation approach, the parent entity and the subsidiary data is considered. All the GL line items are expected at solo level for each entity. The consolidated data is discarded.

4.1.1.5.1 Assumption

The GL codes are expected to be unique across entities in **STG_GL_DATA** and **DIM_CAPITAL_ACCT_HEAD**.

4.1.1.5.2 Process Flow for Capital Structure

Level Selection and Approach Selection Calculation

To process the capital for a bank, a solo or consolidated entity selection should be made, based on which the capital is calculated at organization level. If solo is selected, then only for that particular selected banking organization the capital is calculated. If consolidation is selected, then all the entities that fall under the umbrella of the selected organization are part of capital calculation.

This is done in the task – '**Capital Consolidation Level Selection**' in process '**CAPITAL_CONSOLIDATION**'

Based on the share-holding percentage of the parent bank in the subsidiary and the consolidation approach to be followed (consolidation approach and deduction approach) for each of the entity, the Basel approach is selected.

For example: if the share-holding for an entity is 35% and is part of the consolidation process, then the approach selected for this entity is pro-rata consolidation. The reclassification is performed in task – '**Cap Consl Basel Approach Type Reclassification for an Entity**' in the process '**CAPITAL_CONSOLIDATION'**

Gross Capital Calculation for T1, T2, and T3

The total gross capital for each tier of capital, that is, T1, T2, and T3 are calculated as per the definition of T1, T2, and T3, by adding the relevant financial instrument in each tier of capital. The calculation is done in the sub process – '**Capital Components Calculations**' in the process '**CAP_STRUCT**'.

Internal Transaction and Reciprocal Cross Holding Transaction

All inter-group and reciprocal-cross holding capital investments are marked as internal customer transactions and reciprocal cross holdings, respectively. The marking is done by populating appropriate standard account head surrogate keys for the exposures which qualifies as internal transactions or reciprocal cross holding.

Expected Loss Vs Total Provision Calculation

If the total provision amount is greater than the expected loss, then the difference is added into Tier 2 capital up to a maximum of 0.6% of CR RWA under the IRB approach. The processing is done in Rule – **CS Total Provision for IRB** in sub process – **Capital Components Calculations** under the process '**CAP_STRUCT**'. If expected loss is greater than the total provision amount, the difference is deducted, where 50% is deducted from Tier 1 capital and remaining 50% is deducted from Tier 2 capital. The processing is done in the Rules – '**CS General Provisions for IRB**' and '**CS Total Provision for IRB**' in the sub process – '**Capital Components Calculations**' under the process '**CAP_STRUCT**'.

Regulatory Adjustment from Tier 1 and Tier 2

All the regulatory adjustment line items are identified and 50% of the total amount is deducted from Tier 1 capital and 50% from Tier 2 capital. In order to handle this 50-50 deduction, all the regulatory adjustment line items are moved to table **FCT_CALC_ACCT_HEAD** where each of the regulatory adjustment line items are equally split into 2 records. The capital component group of one record is marked as 'T1-50' and the other record is marked as 'T2-50'. The processing is computed in the sub processes – **Calc Acct Head Population** and **Std Acct Head Population** in the process **CAP_STRUCT**.

Calculation of Net Capital

Net Tier 1 capital is calculated by deducting the Securitization transaction, DTA, and 50% of regulatory adjustment line item. Similarly, net Tier 2 capital is calculated by deducting 50% of regulatory adjustment line item. If net tier 2 is greater than net tier 1 capital, then the net tier 2 capital is limited to net tier 1 capital.

Total Capital Calculation

The total Net Tier 1 capital, Net Tier 2 capital, and Net Tier 3capital is summed up to obtain the Total Eligible capital.

Risk Weighted Asset (RWA) Amount – Credit Risk, Market Risk, and Operational Risk

The RWA amount for Non Securitization, Securitization, Market Risk, and Operational Risk are calculated by summing up the RWA amount and is reported under different headings such as 'Risk Weighted Asset amount for Standardized Portfolios/IRB portfolio' for Non Securitization, "Sec Std RWA" for Securitization portfolio, "Market RWA" for Market Risk and "Operational RWA" for Operational Risk.

Capital Ratio Calculation

Tier 1 capital ratio and capital adequacy ratio are calculated using the total RWA amount, net Tier 1 capital, and Total capital amount. The processing is done in sub process – **Capital Components Calculations** in the process **CAP_STRUCT**.

4.1.1.5.3 Key Data Elements

Key data elements to process the capital structure for the consolidated entity are as follows. For a complete list of tables and columns to be updated, see the *Download Specifications* document:

♦ Entity details which are part of regulatory consolidation and parent entity share holding percent is required. This data is captured in Stage Entity Shareholding Details (**STG_ENTITY_SHR_HLD_PERCENT**) table.

♦ The capital structure component for each tier of capital for all entities involved in regulatory consolidation is required.

♦ The General Ledger line items are captured as download in Stage General Ledger Data (**STG_GL_DATA**).

♦ If a capital line item like 'MR RWA' or 'OR RWA' is available as download, then these non GL line items are expected as download in Stage Standard Accounting Head (**STG_STANDARD_ACCT_HEAD**).

♦ The standard account head ID of line items like 'Net Tier 1 capital', 'Capital Ratio', and so on, which are computed by application, are expected to be mapped to capital Account Identifier – 'OTHERS', as the application populates these line items into Fact Standard Accounting Head (**FCT_STANDARD_ACCT_HEAD**) table with initial value as 0. Later, this value is over written by the application.

♦ Information stored in Capital Standard Mapping (**FSI_CAPITAL_STANDARD_MAPPING)** table is a mapping of GL capital line items with seeded data in DIM_STD_ACCT_HEAD. For all jurisdictions this mapping should be present. For more information on the mapping of all jurisdictions in **FSI_CAPITAL_STANDARD_MAPPING** table, see Exhibit 5 in *Annexure A: Key Concepts.*

4.1.2   Basel II – Internal Ratings Based Approach

4.1.2.1 BIS II – High Level Process Flow for Internal Ratings Based Approach

The Basel defined Capital Adequacy ratio is delivered out of box in OFSAAI as a building block approach. The application includes capital computations for Credit Risk (Internal Ratings Based Approach), Market Risk, and Operational Risk along with Capital Structure and Capital Consolidation processes.

For more information on the pre-defined Runs available with the application, see *OFS Basel Regulatory Capital Run Charts*.

4.1.2.1.1 Process Flow for Capital Adequacy Ratio Calculation
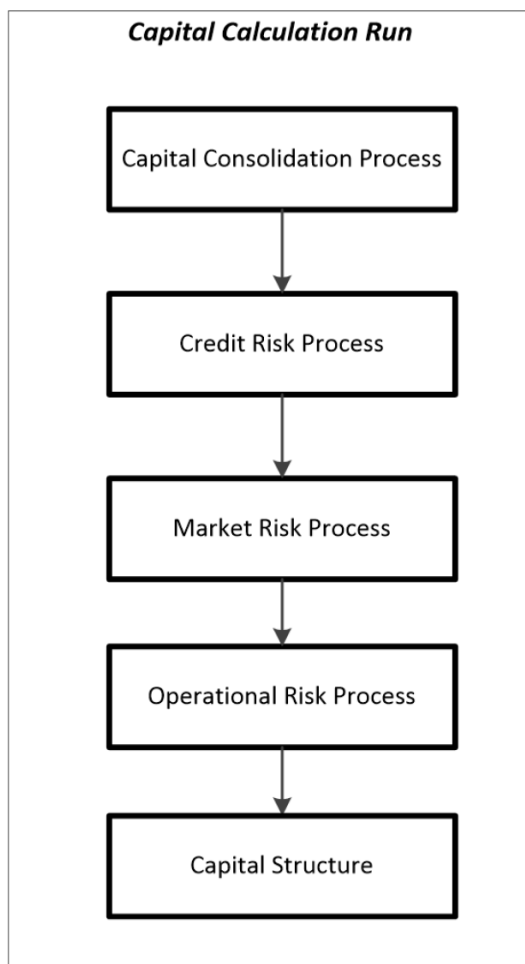
The Capital Calculation Run, depicted in the preceding process flow, is a single Run joined together with multiple processes. Each process considered as blocks, consists of tasks defined in a sequence to complete the processing of the entire Capital Adequacy Run. The individual blocks like Credit Risk process, Market Risk process, and so on exists as individual runs as well. Capital Consolidation is a process common across each of the individual blocks when executed separately as individual risk runs.

4.1.2.1.2 Capital Consolidation Process

The Capital Consolidation is explained in the following section and is not repeated under the Non Securitization process, Securitization process, Market Risk process, or Operational Risk section of this document.

For example: the standard out of box Market Risk Run has Capital Consolidation and the Market Risk process bundled together as a Single Market Risk Run. This applies for Credit Risk and Operational Risk Runs.

The processing of Capital Consolidation is as follows.

Capital Consolidation Level Selection

The reporting bank can be a part of a financial group that has multiple legal entities like parent or child entities (subsidiaries) under its name. The entity on which you are required to process should be selected by you. Subsequently, level at which a Run is to be executed (solo or consolidated) should also be selected. You can select these options in the Run Management UI. However, if the Run is executed in the Run Rule Framework (RRF), then these options have to be set using the Rule '**Capital Consolidation Level Selection**' in the process '**CAPITAL_CONSOLIDATION**'.

CAPITAL_CONSOLIDATION is the first process to be added in all the Runs defined in the RRF except for the Staging Data Population Run. The Run Management UI selects this process by default.

Run Parameters Assignment

The Basel accord states different approaches for calculating RWA. The Run Management UI in the application allows the reporting bank to define and execute a Run by selecting a combination of different Basel II approaches for RWA computation.

Run Parameter Assignment is also part of **Capital Consolidation** process. The Rule '**Run Definition User Defined Run Param Assignment**' is used to assign the Run parameters if a Run is executed in the RRF. If the Run is executed from the Run Management UI, then the parameters are populated based on the Run defined in the Run Definition window.

Currency Conversion

The Rules pre-defined in the application performs currency conversion of all General Ledger amount attributes to be used for Capital Consolidation from the Natural currency to the Reporting currency, based on the exchange rate provided.

Shareholding Percent Multiplication

For all entities in the Capital Consolidation process, the application updates the shareholding percentage against each entity data in the fact capital accounting head from the fact entity shareholding percent table. The parent data in the processing table of Fact Capital Accounting Head is updated with the value 1 and for each child entity the data is based on the parent's holding percentage specified for each child in fact entity share holding percent table.

4.1.2.1.3 Process Flow for Credit RWA

A Credit RWA Run is a combination of the Non Securitization RWA process and Securitization RWA process. A few processes like Credit Rating, Party Type Reclassification, and Mitigant Data Population are common between Non Securitization and Securitization process. Though these sub processes are explained separately under Non Securitization and Securitization section of this document, it is executed only once under the Credit RWA run.

Certain sub processes under Non Securitization process like Reclassification and so on are common across all types of exposures for example: banking book, over the counter derivative transactions, and securities financing transactions, and are executed only once in the Run. The details of this sub processes are explained under Reclassification sub process of the Basel II Non Securitization exposures section of this document. Likewise, details of Credit Risk Mitigation for Non Securitization process is detailed under the Basel II Non Securitization section of this document and details of Credit Risk Mitigation for Securitization process is detailed under the Basel II Securitization section of this document.

For more information on the sub processes as detailed in the preceding process flow for the Non Securitization process and Securitization process, see Credit RWA.

For example: Non Sec Data Population is detailed under data population and currency conversion of Credit RWA (Non Securitization - Standardized approach) section of this document.

4.1.2.1.4 Process Flow for Market RWA

Market RWA Run is made up of multiple sub processes specific to Market Risk. However, when Market Risk is bundled under a Consolidated Run and triggered, Capital Consolidation and Rating process is executed only once for Credit Risk and Market Risk. The details of each of the sub process mentioned in the preceding flow chart are present under Market Risk section of this document.

For more information on Market RWA computation, see Market RWA.

For example: 'Capital Charge for Interest Rate Instruments' sub process is detailed elaborately under 'Capital Charge for Interest Rate Instruments' section of Market Risk. Likewise 'Capital Charge for Equities', 'Capital Charge for Foreign Exchange Transaction' 'Capital Charge for Commodity transaction', and 'Options risk charge calculation' has a detailed explanation present under 'Capital Charge for Equities', 'Capital Charge for Foreign Exchange Transactions' 'Capital Charge for Commodity Transactions', and 'Capital Charge for Options' sub process of the Market Risk section of this document, respectively.

4.1.2.1.5 Process Flow for Operational RWA
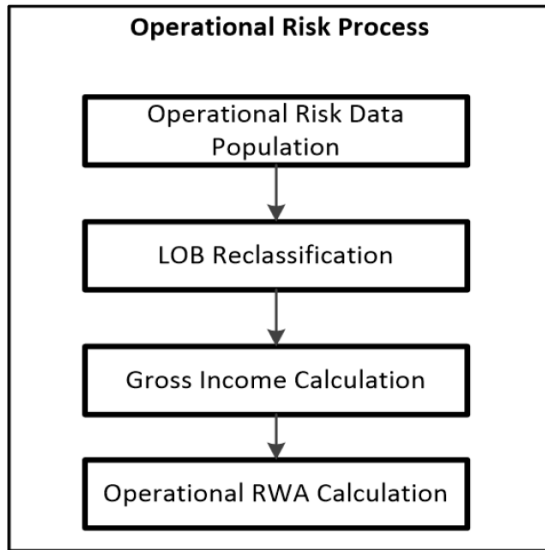
Operational RWA run is executed with the Capital Consolidation process. For more information on the Operational RWA computation, see Operational RWA.

For example: LOB Reclassification and Gross Income Calculation sub process are detailed as separate processes under the Operational RWA section of this document.

4.1.2.1.6 Process Flow for Capital Structure
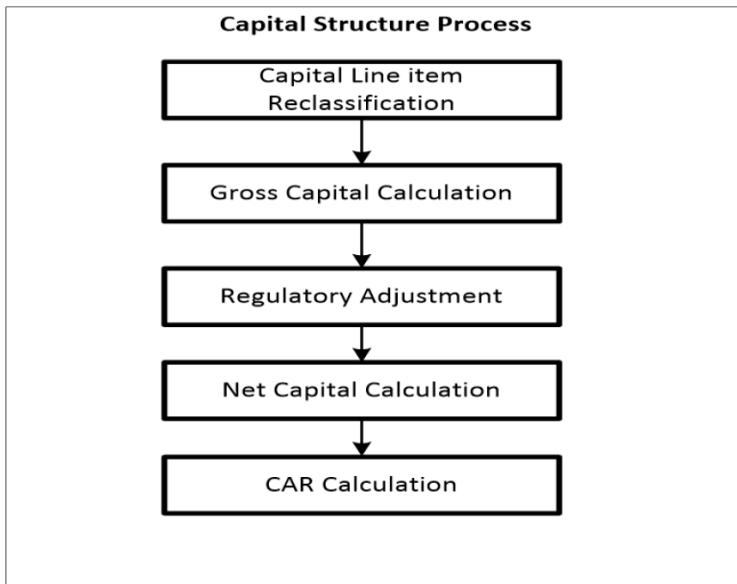
Capital Structure is executed with Capital Consolidation, Credit Risk, Market Risk, and Operational Risk RWA processes.

For more information on the sub processes of Capital Structure, see Capital Structure.

For example: 'Gross Capital Calculation' mentioned in the preceding flow chart is explained in detail under 'Gross Capital Calculation for T1, T2 and T3' sub process section of the Basel II Capital Structure in this document. Likewise 'Regulatory Adjustment' and 'Net Capital Calculation' is detailed under 'Regulatory Adjustment to Tier 1 and Tier 2' and 'Calculation of Net Capital' sub process section of the Basel II Capital Structure in this document.

4.1.2.2 Credit RWA

The application supports the computation of Credit RWA, as per the guidelines laid out in the Basel Accord. Credit RWA computation is divided into Credit Risk for Non Securitized exposures process and Credit Risk for Securitized exposures process.

For Credit Risk of Non Securitized and Securitized exposures, the Foundation IRB Approach (FIRB) and Advanced IRB Approach (AIRB) is as follows.

4.1.2.2.1 Non Securitization – Foundation IRB / Advanced IRB Approach

Foundation IRB/Advanced IRB Approach consists of the following:

- Banking Book Products

- Over the Counter Derivative Products: See Over the Counter Derivatives in Standardized Approach section.

- Securities Financing Transactions: See Securities Financing Transactions in Standardized Approach section.

- Credit Risk Mitigation

Banking Book Products

Rating reclassification is the initial step in the process. All exposures are rated by different agencies. However, naming convention of these ratings might not be the same as mentioned in the Basel Accord. Hence, the application re-classifies the rating information shared in the bank's data to standard rating as recommended in the Basel Accord.

The exposure amount and other amount attributes that are provided as input (in the stage tables) should be in the natural currency (currency of the exposure) and this is usually different for exposures across different countries. The application converts them to reporting currency, so that processing occurs in a single currency.

The Credit Risk exposures are identified by their product types, counterparty types, and their corresponding asset classes by the application. A sample list of products types, party types, mitigant types, and credit ratings are pre-defined in the application. However, this list and naming convention differs from one bank to another. The application reclassifies the bank's product types and party types to Basel standard product and party types. Based on standard Basel product and standard party type, it forms an asset class for each exposure. For equity exposures, the asset class is formed on the basis of equity type and Basel product type. Some exposures can be hedged against Credit Risk through various mitigants like guarantors, collaterals, credit derivatives, and so on.

These provide mitigation to credit risk and are considered while computing Credit RWA as per the Basel Accord. Hence, the application calculates pre-mitigation RWA amount and post-mitigation RWA amount.

The application calculates the correlation factor using the formula specified for each asset class. Using this Correlation Factor, Probability of Default (PD), and Loss Given Default (LGD), the application calculates the pre-mitigation capital charge for each exposure. This value signifies the capital charge that the bank needs to maintain for each exposure, before considering any mitigation effects.

The application calculates pre-mitigation EAD amount and RWA for each exposure and then computes pre-mitigation risk weighted assets (Pre-CRM RWA) by multiplying the EAD by the risk weight. The risk weight is arrived at by multiplying pre-mitigation capital charge with 12.5.

With the Credit Risk Mitigation (CRM) process, the bank considers the mitigation effect. The application checks on the eligibility of the mitigants, based on Basel specifications. It assigns a haircut to each mitigant based on their currency, residual maturity, and expected volatility in their market value. FOREX and maturity haircuts consider any currency and maturity mismatches that the mitigants have with the exposures it covers. Volatility haircut considers the change in the mitigation effect that arises due to future fluctuations in the value of the mitigant. The application allocates mitigants to exposures based on optimizer function and subsequently the capital charge is calculated for each mitigant.

The application then calculates the post mitigation RWA Unexpected Loss (Post CRM RWA UL) and post mitigation RWA Expected Loss (Post CRM RWA EL). Some credit risk exposures that fall under the category of internal transactions like holding own subsidiaries shares or investment in its capital, are treated separately under Capital Structure.

Process Flow for Banking Book Products

Rating Information Processing

Pre Processing Steps

Data on ratings are captured in the following rating specific tables:

Accounts Rating Table (STG_ACCOUNT_RATING_DETAILS)

Ratings of all Credit Risk Non Securitized Exposures, Securitized Exposures, and Securitized Positions are captured in this table.

Instrument Rating Table (STG_INSTRUMENT_RATING_DETAILS)

Ratings for all market risk exposures, investment exposures subject to credit risk (one that are in **STG_INVESTMENTS**), and mitigants are captured in this table.

Party Rating Table (STG_PARTY_RATING_DETAILS)

Credit rating for all customers and issuers are captured in this table.

Sovereign Rating Table (STG_SOVEREIGN_RATING_DETAILS)

Credit rating for all countries is captured in this table.

Processing Steps

Banks obtain credit ratings from different sources and these are provided as an input in the four rating tables mentioned in the preceding list. The application reclassifies the rating information to Basel standard ratings.

The rating reclassification lookup table (**FSI_RATING_CLASSIFICATION**) is used to lookup reclassified Basel ratings. Ratings are populated from the stage tables (**STG_PARTY_RATINGS_DETAILS**) to FSI (**FSI_PARTY_RATING_DETAILS**) tables using the lookup table (**FSI_RATING_RECLSSIFICATION**) to obtain the reclassified rating.

Note: In the **STG_PARTY_RATINGS_DETAILS** table ensure that the following columns are mandatorily populated with data:

○ Rating source code (**V_RATING_SRC_CODE**)

○ Party Code (**V_PARTY_CD**)

○ Purpose (**V_PURPOSE**): In this field whether the rating is a domestic rating or foreign rating should be indicated. If any other rating is provided, then the exposure is considered as unrated.

○ Rating Code (**V_RATING_CODE**)

Out of the multiple Basel ratings assigned to an exposure, the worst rating is picked up and assigned against the exposures. Basel rating for all asset classes and sovereign rating is computed separately.

Data Population

Pre Processing Steps

Credit Risk exposure data should be uploaded in the application for all the product types through their respective input tables known as Product Processors. The important categories of Credit Risk Non Securitization exposures, along with their respective table names that are used as an input are as follows:

Product	Source Product Processor
Bills	STG_BILLS_CONTRACTS
Credit Cards	STG_CARDS
Swaps	STG_SWAPS_CONTRACTS
Futures	STG_FUTURES
Guarantees	STG_GUARANTEES
Investments	STG_INVESTMENTS
Lease Contracts	STG_LEASE_CONTRACTS
Letters of Credit	STG_LC_CONTRACTS
Line of Credit	STG_CREDIT_LINE_DETAILS

Commitment Contracts	STG_COMMITMENT_CONTRACTS
Loans	STG_LOAN_CONTRACTS
Money market instruments	STG_MM_CONTRACTS
Overdraft	STG_OD_ACCOUNTS
Options	STG_OPTION_CONTRACTS
Re purchase contracts	STG_REPO_CONTRACTS
Equity Exposures	STG_INVESTMENTS
Underlying Exposures for Derivatives and Securitization	STG_UNDERLYING_EXPOSURES
Underlying Exposures for Repo contracts	STG_PLACED_COLLATERAL / STG_MITIGANTS
Credit Derivatives	STG_CREDIT_DERIVATIVES
Fixed Assets	STG_FIXED_ASSETS_DETAILS

Processing Steps

Staging data from the Product Processors or other stage tables is populated in the required processing tables. The entire data in the Product Processor is populated in a common fact table for all Non Securitized exposures (**FCT_NON_SEC_EXPOSURES**), except equity data, which is first populated in the respective equity table (**FCT_EQUITY_EXPOSURES**) and is then populated in the common fact table for all Non Securitized exposures. For more information on the list of columns to be populated within each table, see the *Download Specifications* document.

Shareholding Percent Multiplication

The exposure amount that is a part of the input data (Product Processors) is the exposure amount for a solo entity. However, for a consolidated Run, the parent exposure is considered only on the shareholding percentage, based on the below calculation:

Exposure Amount   X   Share Holding Percent = Updated Exposure Amount

Where:

Share holding percent is allotted a value by the Rule **Cap Consl Effective Shareholding Percent for an Entity** in the process- **Capital Consolidation**.

This assignment which uses the Rule **<Attribute > Shareholding Percent Multiplication** relates to paragraph 28 of the Basel II Accord. The following attributes undergo shareholding percent multiplication:

- Outstanding Principal
- Current Exposure Amount
- Undrawn Amount
- Exposure Market Value

- Exposure Accrued Interest

- Provision Amount

- Write Off Amount

- Notional Principal and Contract Amount for OTC products

Currency Conversion

The application converts the amount attributes, which are in natural currency, to reporting currency which is used for further calculations. The column names suffixed with '_ncy' are in the natural currency and are multiplied by currency conversion factor to populate values in the reporting currency. The Rule **Reporting Currency Code Assignment** assigns the reporting currency. For more information on Currency Conversion, see Exhibit 4 in *Annexure A: Key Concepts.*

NOTE: The data populated in the Product Processor is expected in natural currency of the exposure.

Reclassification

The application reclassifies the bank's product types and party types to the Basel standard product and party types. Based on the standard Basel product and party type, it forms an asset class for each exposure. A separate Rule in the application reclassifies equity. Similarly, mitigant is reclassified on the basis of its mitigant types and is reclassified to standard mitigant types.

Product Type Reclassification

Product types used by reporting bank as input data are reclassified to standard product types as recommended in the Basel accord. The product types after reclassification are stored as Basel product types.

For Example: Unsecured bonds are reclassified as debt securities.

A separate Rule in the application reclassifies lease residual and equity products.

Party Type Reclassification

Similar to the product type, the customer type and issuer type (which are stored as counterparty type) are also reclassified to standard counterparty type. The application is designed to include customer type, issuer type, and mitigant types in a single table (**STG_PARTY_MASTER**) and these are also reclassified together. Party type reclassification Rules handle reclassification for customer types and issuer types.

For Example: Individual is reclassified as Retail.

A separate Rule in the application reclassifies for issuer of equity. This Rule is defined in the lookup table so that the same reclassification can be used across exposures, equity, and the mitigant tables.

Asset Class Reclassification

On the basis of Basel product type and standard counterparty type, an asset class is formed by the application. This asset class is used for data processing.

For example: Standard counterparty is large corporate, the asset class is large corporate, except for exposures that have product types like cash and real estate. For Basel product type gold, the asset class is Gold, except for standard counterparty type which is Central Counter Party; the asset class is Central Counter Party. For standard counterparty type Insurance Entity and Basel product type as Line of Credit, the asset class is Corporate Non SME Non SL.

Asset class of all equity products are is done on the basis of equity type and Basel product type. Asset class for all mitigants is reclassified based on their standard mitigant types and standard issuer type.

Mitigant Reclassification

For mitigants the application reclassifies the mitigant type to the standard mitigant type like the debt securities, credit derivative, cash, and so on. It also reclassifies the mitigant issuer type to the standard mitigant issuer type like Banks, Corporate, and so on. The reclassification tasks are present in the **Mitigant Reclassification** sub process.

Risk Parameters Assignment

The application assigns risk weight parameters of PD, LGD, and maturity to all exposures. For Foundation Internal Rating Based (FIRB) approach, the application assigns the PD and LGD on its own. In Advanced Internal Ratings Based (AIRB) approach, these values are directly taken as downloaded values from the reporting bank.

For senior claim exposures, LGD assigned is 0.45 and for non senior claim exposures LGD assigned is 0.75. For exposures belonging to retail asset class, irrespective of the seniority of the exposure, the LGD has a floor value of 0.1. FIRB approach assigns pre -mitigation LGD to all purchase receivables through a separate rule. PD has a floor value of 0.0003 for all asset classes, except for defaulted exposures, where the value is 1.

Pre-mitigation Capital Charge Calculation

Pre-mitigation capital is calculated for all asset classes using the Correlation factor, PD, and LGD where correlation factor is calculated for each asset class on the basis of PD. Capital for defaulted exposures and failed trades is calculated through separate Rules. For exposures that have defaulted, the application uses two inputs - LGD and Best Estimated Expected Loss of a Bank. For failed trade transactions, the capital requirement is assigned by the application on the basis of the number of failed business days.

In the case of sold credit protection exposures, the exposures are assigned the risk weight pertaining to the securitization exposures. For assigning these risk weights, the application applies multiple assessments. These multiple assessment of ratings is performed in the Data Transformation "Mult_Assessment_SCP". The details of the Data Transformation are as follows:

Data Transformation Name	Objective	Processing Logic
Mult_Assessment_SCP	The objective of this Data Transformation is to perform multiple assessment of the ratings and assign a normalized rating and risk weight to the sold credit protection exposures.	For each exposure, the various standard ratings associated with that exposure and the respective risk weights are identified. If the number of ratings are 1, then the same rating gets assigned as the standard rating for the exposure and the risk weight associated with that standard rating gets assigned as the Pre-mitigation risk weight. If the number of ratings are greater than or equal to 2, then the exposure is assigned a risk weight which is the worst of the best two risk weight. And the corresponding rating is assigned to the exposure.

For more information on setting up this Rule, see *Run Parameters Setup for Run Creation.*

Credit Conversion Factor (CCF)

This is applied to all the off-balance sheet exposures. The CCF applied values are 0.2, 0.5, and 1. The various factors on the basis of which CCF is applied are product type, type of facility (whether it is cancellable or not), and the maturity of exposure.

Pre CRM Exposure at Default (EAD)

Exposure at default is calculated for all asset classes based on:

- Current Exposure Amount

- Off-Balance Sheet Drawn CCF Percent

- Provision Amount

- Undrawn Amount

- CCF Percent

- Exposure Accrued Interest

- Write Off Amount

CCF percent for FIRB approach is assigned by the application and is taken as a value provided by the client for AIRB Approach.

If the reporting bank has exposure to one of its own subsidiaries, then that exposure is classified as internal exposure. Each of the internal transaction, that is, transaction between parent and its subsidiary is marked as deduction line item. The deduction is processed as part of the Basel II capital structure in the capital structure processing and all the internal transactions are eliminated from any RWA calculation.

Of the total exposure amount, the exposures can have drawn amount and undrawn amount. Drawn amount is the direct credit exposure and undrawn amount can become a potential exposure when that amount is drawn. Therefore, EAD related to undrawn amount is calculated by multiplying the CCF percent with undrawn amount. The application calculates the EAD related to drawn amount using the following attributes:

- Exposure Accrued Interest

- Off-Balance Sheet Drawn CCF Percent

- Write Off Amount

- Provision Amount

- Current Exposure Amount

Equity Exposures – SRWA/ PD LGD Approach Non Investment Fund Treatment

Equity Exposures are treated in the Equity Exposures (**FCT_EQUITY_EXPOSURES**) table where EAD is calculated using the post off-set amount. This is further reduced by the exposure excess investment amount. The excess investment amount is to be provided as an input. For more information, see the *Download Specifications* document.

Equity Exposure can be treated using the Simple Risk Weight Assignment (SRWA) method, PD/LGD approach or Internal Model Method. You can define the approach to be used to calculate the RWA for equity approach. If PD/LGD approach is selected Correlation, Capital charge and RWA is calculated. If SRWA is the selected RW is calculated based on equity being Public Traded or Private traded. If IMM is selected, then the Capital Charge Derived from VaR Model is taken as input and RW is assigned.

Equity Exposures RWA

Equity Exposure RWA is calculated by multiplying the risk weight with the Equity EAD. Equity data is processed in Equity Exposures (**FCT_EQUITY_EXPOSURES**) table. From Equity Exposures (**FCT_EQUITY_EXPOSURES**), data is populated to Fact Non Sec Exposures (**FCT_NON_SEC_EXPOSURES)** table.

Pre-CRM RWA Computation

Pre-CRM RWA is calculated for all asset classes by multiplying the Pre-CRM EAD with the risk weight.

Counterparty Credit Risk (CCR)

The Counterparty Credit Risk is calculated as in the Standardized Approach except for the CRM as follows.

Credit Risk Mitigation

The application handles multiple mitigants for credit risk mitigants like financial collateral, on-balance sheet netting, guarantees, credit derivatives, and so on. In CRM reclassification, collateral and issuer is reclassified to standard collateral and issuer type. The mitigant is identified as eligible or not based on the eligibility rules for CRM.

Process Flow for Credit Risk Mitigation

Mitigant Eligibility

In the Comprehensive approach, credit rating of the mitigant of the collateral is considered for all mitigant types issued by all party types, while deciding whether the mitigant is eligible for a particular exposure or not. The application has pre-defined Rules that perform these eligibility checks. Separate eligibility Rules for mitigants types that are equity, mutual funds, or debt security exist in the application. For the remaining mitigant types, a mitigant is marked as eligible if it satisfies the following conditions:

- The credit rating is better than the exposure to which it is providing protection
- The exposure is classified as senior in position.

Mitigant eligibility is also checked based on the original and residual maturity of the collateral. Collateral is classified as eligible only if its original maturity is more than a year and residual maturity is more than 3 months.

PD/LGD for CRM

The application assigns the PD and LGD to the mitigants as follows:

In the FIRB approach for financial collateral, PD used is that of the exposure that the collateral is covering and the LGD used is 0. For other mitigants like guarantees or credit derivative, the PD used is that of the mitigant (expected to be an input from the bank) and LGD used is that of the exposure that the mitigant is covering.

For LGD assignment, the application considers the minimum collateralization effect as stated in the Basel II guidelines. Additionally, if there is any over collateralization amount, the application does the mitigant value adjustment based on the over collateralization percentages as stated in Basel II guidelines.

For AIRB Approach, the institutions must provide the PD or LGD data at a mitigant level. However, if the reporting bank is able to model the PD or LGD of the exposure considering the mitigation effects, then the application offers the flexibility to the reporting bank to include the mitigation effects at exposure level. In such cases, the reporting bank need not provide mitigant data separately, as they have already factored in its effects at the exposure level PD and LGD.

Mitigant Haircut Assignment

The application does computations for three kinds of mitigant haircut as follows:

- Volatility haircut
- FOREX haircut
- Maturity mismatch haircut

Volatility haircuts are calculated and amount of the exposure to the counterparty and the value of collateral or mitigant is adjusted to account for any future fluctuations in the market value. After this adjustment, the application updates the volatility adjusted amounts for the exposure (higher than original exposure amount) and the collateral (lower than original amount).

When the exposure and collateral are in different currencies, the application performs adjustments by applying the FOREX haircut. If the residual maturity of the CRM is less than that of the underlying credit exposure, then a maturity mismatch is applied. If there is a maturity mismatch and the CRM has an original maturity of more than one year, maturity mismatch haircut is applied to adjust the value.

There are two methods for assigning volatility haircut:

- Supervisory Haircut
- Own Estimate

For supervisory haircut method, the application assigns volatility haircut based on issuers, issuer's ratings, mitigants residual maturity, and type of mitigant, as recommended by the Basel accord. For Own Estimate method, the application considers the Basel transaction type of the exposure. Basel transaction types are stored in the Basel transaction type dimension (**DIM_BASEL_TRANSACTION_TYPE**) table. The various transaction types available are capital market driven, repo style, and secured lending. The volatility haircut is assigned as per the Basel accord. The FOREX haircut is also assigned based on these transaction types as per Basel accord.

Only eligible mitigants are considered for haircut assignment. The eligible mitigants are moved from the mitigants (**FCT_MITIGANTS**) table to sub exposures (**FCT_SUB_EXPOSURES**) table. Haircuts mentioned in the Basel Accord assume a holding period for 10 days. However, if the holding period for mitigants is more than 10 days, then the application scales up the haircut value to reflect the correct value as per the holding period.

CRM Capital Charge Calculation

Mitigant Correlation Factor

Similar to Non Securitization exposures, correlation factor for collaterals or mitigants are also calculated for mitigants belonging to all asset classes. This is based on their PD as mentioned in the Basel accord.

Capital Charge Calculation

Capital charge is calculated for all mitigants using their effective maturity, correlation factor, probability of default, loss given default, and maturity adjustment value.

Allocation of Mitigants to Exposures

This process loads the mitigant mapping data from stage table to the corresponding processing table. Mitigants are allocated to the respective exposures it covers and the application defines the amount of the bank's exposure the mitigant is covering. Shareholding percent is also applied to the mitigant amounts. The application has a pre-built optimizer for optimum allocation of mitigants to the exposures for CRM purposes. One-to-One, Many-to-One, and Many-to-Many mapping of mitigants are handled in an efficient manner involving storage of intermediate computations for traceability.

All mitigants which are eligible and mapped to an exposure are then populated to a new table where each exposure is broken down into mitigant types. It includes an additional row which treats the exposure as having covered and uncovered portion. The covered factor and uncovered factor is also populated in this table.

The application uses the linear programming logic to allocate the mitigants to the exposures. Pooling identifies the exposure and mitigant data from sub exposures (**FCT_SUB_EXPOSURES)** table. Exposure identifier and mitigant identifier are the attributes on which pooling is performed. It assigns a pool ID for each exposure to mitigant combination. Based on these pool Ids, the optimizer allocates a covered factor to exposures. Optimizer allocates mitigants to exposures to attain the most favorable EAD output

For more information on pooling and optimizer, see Exhibit 1 and Exhibit 3 in *Annexure A: Key Concepts*.

NOTE: A tag <ALTER_STATEMENTS> is present in Optimizer_Config.xml. This statement is used to enable the parallel Data Manipulation Language (DML) for optimizer. This is disabled by default due to which a warning appears as follows, which is printed in the optimizer log:

"Error: **Could not find node ALTER_STATEMENTS in the xml**"

The administrator can uncomment this tag to enable parallel DML for the optimizer.

Post-CRM RWA Computation

Pre mitigation EAD is divided into Post Mitigation EAD for the covered portion and Post Mitigation EAD for uncovered portion. Covered portion is the portion of the exposure covered by the mitigant and uncovered portion is portion of the exposure not covered by the mitigant. For multiple mitigants covering one exposure, there is more than one record for the covered portion of that exposure. Post mitigation RWA UL (Post CRM RWA UL) is calculated by multiplying post mitigation EAD and its Capital Required UL with 12.5. Post mitigation RWA Expected Loss is calculated by multiplying the PD, LGD, and post mitigation EAD amount with 12.5.

4.1.2.2.2 Securitization – Internal Ratings Based Approach

The Basel accord differentiates the Credit Risk computation of the Securitized exposures from Non Securitized exposures. As securitized exposures are part of off-balance sheet transactions, it follows a waterfall cash flow mechanism unlike the other exposures. Hence these exposures are treated differently. Due to the economic crisis of 2008, the Basel Rule has categorized securitized exposures into securitized and re-securitized exposures.

Securitized exposures are exposures which are issued out of a pool of underlying exposures for the transfer of risk. Re-securitized exposures are the exposures which are issued out of a pool of underlying exposures which constitutes non-securitized exposures and some portion of securitized exposures. The application is capable of handling both securitized exposures and re-securitized exposures. It also handles the calculation for the originator and the investor bank roles. At a broad level, there are two categories of Investors:

♦   An Investing Bank who has invested heavily in securitization.

♦   An Investing Bank who has invested minimal in securitization.

For both the investors, the data is expected in the Stage Underlying Exposures (**STG_UNDERLYING_EXPOSURES**) for the underlying of the pool, Total Pool Level attributes in the Stage Pool table (**STG_SECURITIZATION_POOL**), Tranche Level attributes in the Stage Tranche table (**STG_SECURITIZATION_TRANCHE**), and the Exposure Level Attributes in the respective product processor (PP) tables.

For an originator, the data is expected in the same manner as the Investor, except for the Underlying Exposures. The underlying exposures of the pool are expected in the respective PP tables, depending on the product type of the underlying exposures.

If the exposure is a credit protection in the form of guarantee, it is expected in the Stage Guarantees table (**STG_GUARANTEES**), and if it is a credit derivative, it is expected in the Stage Credit Derivatives table (**STG_CREDIT_DERIVATIVES**). If it is a regular investment in the Tranches by an investing bank, or it is part of the mandate for retention in the pool or tranche for an originating bank, the data is expected in the Stage Investments table (**STG_INVESTMENTS**).

For exposures being a facility like liquidity facility, or servicer cash advance, the exposures are expected in the Stage Commitment Contracts table (**STG_COMMITMENT_CONTRACTS**).

The Basel Accord specifies IRB Approach for the calculation of the capital charge for the Securitization exposures:

- IRB Approach
    - Ratings Based Approach
    - Internal Assessment Approach
    - Supervisory Formula Approach

The IRB approach is handled by the application. For a few procedures, the calculations pertaining to the underlying exposures of the Securitization transaction are required before processing the Securitization exposures. This is computed before processing the Securitization exposures. This is applicable for Basel II FIRB approach and Basel II IRB approach.

Process Flow for Securitization - IRB Approach

The application handles the IRB Approach of the Securitization Exposures as follows:

Credit Rating Processing

All the rating information of the exposures and the mitigants are populated from the staging tables to the processing tables. The exposure and the tranche rating information are captured in the account rating (**STG_ACCOUNT_RATING_DETAILS**) tables and the mitigants rating information are captured in the instrument rating details (**STG_INSTRUMENT_RATING_DETAILS**).

This is handled in the **CREDIT_RATING_PROCESSING** process.

Sec Data Population, Mitigant Data Population, and Mitigant Mapping

The data pertaining to the pool, tranche, and exposures are populated from the staging tables to the processing tables. The underlying exposures data is captured in the respective Product Processor tables (for which the process pertaining to the Non Securitization exposures are followed). The mitigants data are populated from the staging table to the processing table. The exposures which are mapped to the mitigants are captured and populated from the staging table to the processing table.

Sec Reclassification

The application uses the standardized data for all kinds of calculations (product type like eligible liquidity facility, bank role like originator, pool type like mortgage backed securities). Before any computation, the application reclassifies the bank specific data to standard data, similar to the Basel accord terms. The application reclassifies the Bank role to the standard Bank Role of an Originator or Investor. Any other bank roles like Sponsor, Credit Protection Provider and so on are reclassified into Originator, Investor respectively.

The application also reclassifies the pool type to the standard pool type like Credit Cards Receivable Pool, Auto Loans, and so on. It also reclassifies the product type to the standard product type like Mortgage Backed Securities, Eligible Liquidity Facility, and so on. For mitigants, the application reclassifies the mitigant types to the standard mitigant types like the Debt Securities, Credit Derivative, Cash, and so on. It also reclassifies the mitigant issuer type to the standard mitigant issuer type like banks, corporate, and so on.

The reclassification tasks are present in Sec reclassification and Mitigant reclassification sub process.

Sec Approach Selection

The application assigns the appropriate approach to the exposures, based on the criteria specified in the Basel Accord. The application assigns any of the three approaches under IRB process:

- Sec-internal assessment approach
- Sec-ratings based approach
- Sec-Supervisory Formula Approach (SFA)

If the exposure is qualified for the SFA approach (SFA Qualified flag is 'Y') and there is one or no external ratings assigned for that exposure, then the application assigns the SFA to the originator exposures. It assigns the sec-ratings based approach, if there is at least one rating assigned to the exposures. If exposures are qualified for SFA approach (SFA Qualified flag is 'Y') and has more than one rating, the application assigns the sec-ratings based approach to that exposure. In the case of Asset Backed Commercial Paper (ABCP) exposures which have internal ratings, the application assigns the sec-internal assessment approach. In the case of exposures not qualifying for any of these approaches, the application assigns the sec-internal ratings based approach.

This approach selection is handled in the Sec Approach selection sub-process.

Pre-CRM RWA Computation

The application calculates the Pre-CRM RWA for the exposures by multiplying the pre-CRM EAD with the risk weight of the exposures. This is handled in the Pre-CRM Computations sub-process.

<u>**Pre-CRM EAD Computation**</u>

The application assigns the Credit Conversion Factor (CCF) to the off-balance sheet items as specified by the Basel accord. The CCF percentages are assigned based on the bank role (this is applicable only for the originator bank role), the product type (like the Eligible Liquidity Facility), and the applicable ratings. The CCF percentages are also assigned to the exposures based on the early amortization provision applicable to the transaction. In such cases, the CCF assignment is based on the early amortization type (controlled or uncontrolled), the pool type, and the ratio of three month average excess spread to the trapping point. Further, the application computes the pre-mitigation EAD based on the bank role and the product type. It calculates the EAD for the investors and the originators separately based on the calculations given in the Basel II Accord. This is handled in the **Pre-CRM Computations** sub-process.

<u>**Risk Weight Assignment**</u>

<u>*Ratings Based Approach*</u>

For exposures that follow the ratings based approach, the risk weight assignment is similar to the standardized approach, except for the difference on the criteria used for risk weighting. The application uses the granularity of the pool, seniority position of the exposure, and the credit rating of the exposure for the risk weighting the exposures which follow the ratings based approach.

In the case of exposures which are unrated, the application checks the criteria required for inferring the rating. This is based on the presence of the subordinate tranche information (based on seniority) for the same pool, regardless of whether the bank has an exposure in that tranche or not, residual maturity of the subordinate tranche being more than the unrated tranche's residual maturity, the credit enhancement level of the unrated tranche being equal to or more than the subordinate tranche's credit enhancement level. The ratings of the tranches also undergo multiple assessments and the application assigns a single rating for all the rated tranches. This multiple assessment of ratings occur in the Data Transformation "Mult_Assessment_Tranche". The details of the Data Transformation are as follows:

Data Transformation Name	Objective	Processing Logic
Mult_Assessment_Tranche	The objective of this Data Transformation is to perform multiple assessments of the ratings and assign a normalized rating and risk weight to the securitization tranche. This is required for processing the inferred ratings treatment.	For each securitization tranche the various standard ratings associated with that exposure and the respective risk weights are identified. If the number of ratings are 1, then the same rating gets assigned as the standard rating for the tranche. If the number of ratings are greater than or equal to 2, then the tranche is assigned a standard rating which corresponds to the worst of the best two risk weights associated with the various tranche ratings.

Based on all this criteria, the rating for the unrated exposure is considered to be equal to the identified subordinate tranche. Due to the seniority of the exposure in the cash flow and in the securitization structure, a subordinate tranche does not have ratings more than that of the immediate senior tranche. Hence, if more than one subordinate exposure exists, then the application assigns the rating of the immediate subordinate tranche.

This is handled in the **Pre-CRM Computations** sub-process.

Internal Assessment Approach

For exposures that follow the internal assessment approach, the risk weight assignment is similar to the standardized approach, except for the difference on the criteria used for risk weighting. The application uses the granularity of the pool, seniority position of the exposure, and the credit rating of the exposure for the risk weighting the exposures that follow the internal assessment approach. The internal rating of the exposures is reclassified by the application into standard ratings, for applying the internal assessment approach consistent with the Basel Accord.

This is handled in the **Pre-CRM Computations** sub-process.
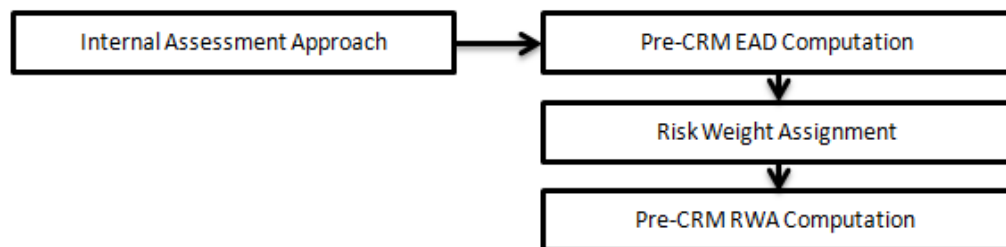
Supervisory Formula Approach

For exposures which follow the supervisory formula approach, the application calculates the underlying capital of the securitization pool (K_{IRB}), using the Non Securitization process. Further, the application calculates the SFA parameters based on the pool and tranche details. The application calculates these, using the calculation logic specified by the Basel accord. It also checks the exposure to identify whether the exposure should be straddled or not. This check is based on the credit enhancement level of the tranche to which the exposure belongs to, the thickness of the tranche to which the exposure belongs to, and the underlying capital of the securitization pool.

The exposures for which the sum of the credit enhancement level and the tranche thickness are less than that of the K_{IRB}, the exposures are deducted from the capital. The exposures for which the credit enhancement level is more than that of the K_{IRB}, the exposures have the SFA Parameters computed. The exposures for which the credit enhancement level is less than that of the K_{IRB} but the sum of the credit enhancement level and the tranche thickness are more than the K_{IRB}, the exposures are straddled, that is, the tranche to which the exposure belongs is split into a position below K_{IRB} and a position above K_{IRB}. All the exposures mapped to the straddled tranche are also split by the application in the same proportion as the split tranche.

The application populates straddled tranche information into Securitization Straddled Tranche (**FSI_SEC_STRADDLED_TRANCHE)** table. The application splits each of the exposures of the identified straddled tranche, into two. The account skey of the parent exposure, which is undergoing the split, is added as the parent account skey for the new exposures formed. The straddled tranche deduction amount (the K_{IRB} amount less the tranche amount) is calculated and populated from the **FSI_SEC_STRADDLED_TRANCHE** in a pro-rated manner to all the exposures of the straddled tranche which are identified for deductions. The remaining amount (which is the tranche amount above the K_{IRB}) is the exposure amount of the senior exposure belonging to the category of split exposures. After the original exposures are split into two and their amounts are populated, the original exposure is deleted from the Exposure table. The splitting of the identified straddled exposures are done with the help of the Data Transformation "Sec_Straddling_Sfa" for securitized exposures and with the help of the Data Transformation "Resec_Straddling_Sfa" for resecuritized exposures. The Details of the Data Transformation are as follows:

Data Transformation Name	Objective	Processing Logic
Sec_Straddling_Sfa	The objective of this Data Transformation is to split the sec position (excluding resec position) belonging to straddling qualifying tranche into two positions (senior and junior) and treat them as per regulator guidelines.	Cases where L < KIRB < (L+T), the position is split into two position, where junior position is calculated as pool capital in amount terms minus the sum of amount of all tranches junior to the one to which bank has exposure to. The remaining amount is assigned to senior position, which gets assigned risk weight calculated as per Supervisory Formula. The junior position is assigned 1250% risk weight.
Resec_Straddling_Sfa	The objective of this Data Transformation is to split the re-sec position belonging to straddling qualifying tranche into two positions (senior and junior) and treat them as per regulator guidelines.	Cases where L < KIRB < (L+T), the position is split into two position, where junior position is calculated as pool capital in amount terms minus the sum of amount of all tranches junior to the one to which bank has exposure to. The remaining amount is assigned to senior position, which gets assigned risk weight calculated as per Supervisory Formula. The junior position is assigned 1250% risk weight. The Data Transformation inserts record corresponding to the straddled tranche into DIM_EXPOSURE and FCT_SEC_EXPOSURES. The Data Transformation

Data Transformation Name	Objective	Processing Logic
		updates N_SEC_EXP_RW_UL & N_PRE_CRM_SEC_EXP_CAPITAL_UL. of FCT_SEC_EXPOSURES.

After all the SFA Parameters are computed, the capital charge is calculated using the SFA Parameters. This capital charge is subsequently converted into the risk weight.

This is handled in the **Pre-CRM Computations** sub-process.
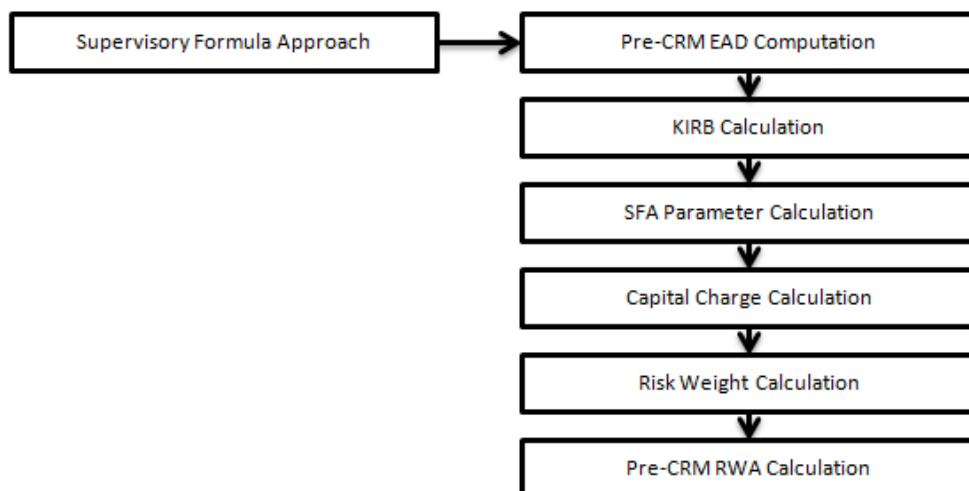
Sec Deductions Process

The exposures which are unrated and do not qualify for any of the approaches, are deducted from the capital. Also, the exposures under RBA and IAA which are below investment grade are also deducted from capital. The exposures which follow the SFA Approach and which are lower than the KIRB, also gets deducted from the capital.

Sec CRM Process

Mitigant Eligibility, Mitigant Risk Weight, Haircut Assignment, and Allocation of Mitigants to Exposures are handled in Sec CRM sub-process.

Mitigant Eligibility

The application identifies the eligible mitigants based on the criteria as mentioned in the Basel Accord. The application identifies the following mitigants in the case of Securitized exposures – collateral, guarantees, and credit derivatives. The application is capable of using comprehensive approach for mitigants which are part of the collateral. This is similar to the mitigant eligibility of the Non Securitization process. The application processes multiple assessments of ratings for mitigants and some of the mitigant eligibility criteria are based on the ratings and risk weight of the mitigants.

The eligibility of the collateral mitigants are based on the party type of the mitigant, mitigant types, the credit rating assigned to the mitigant or the party (as applicable), and the classification of collateral being senior or not. For equity, the eligibility is based on the main index equity and the equity trading status. For mutual funds, the eligibility is based on the eligible mutual fund indicator. The application identifies the eligibility of the guarantees and credit derivatives based on the party type of the mitigant and the credit rating assigned to the issuer of the mitigant. In the case of Nth to default credit derivatives, the application further identifies the eligible credit derivative, based on the number of defaults in the exposures and the defaulted position covered by the mitigant. The application identifies the number of defaults in the tranches based on the attachment point of the tranche to which the exposure belongs to, the initial pool exposure amount, and the cumulative default amount. Further, the application computes the number of tranches in default and compares it with the defaulted position covered by the mitigant. Based on the criteria of eligibility mentioned in the Basel accord, the application identifies whether the mitigant is eligible or not, and if eligible, the application also makes the least risk weighted exposure as the eligible mapping, for the least eligible nth to default mitigant for the exposure.

This identification of the eligible nth to default credit derivative and the eligible exposure-mitigant mapping is performed with the help of the Data Transformation "CD_Sec_Mitigant_Elig_IRB". The details of the Data Transformation are as follows:

Data Transformation Name	Objective	Processing Logic
CD_Sec_Mitigant_Elig_IRB	The objective of this Data Transformation is to identify an eligible sec exposure mitigant mapping wherein the mitigant is an Nth to default credit derivative, in the case of Securitization IRB Approach.	The eligible nth to default credit derivative mitigant is identified and processed based on the exposures mapped to the same pool id. All the exposures mapped to the same pool ID are identified and the corresponding mitigants mapped to them are also identified. In the sec pool ID, the cumulative pool default amount is compared with the tranche attachment point as a number (obtained by multiplying the tranche attachment percentage by the initial pool exposure amount). The number of tranches for which the tranche attachment point is less than the cumulative pool default amount is calculated. This number is compared with the minimum defaulted position of the credit derivative mitigant. For a basket of exposures covered by multiple credit derivatives, eligible mitigant is minimum defaulted position in the basket minus 1. Also other credit derivative in the basket of exposures which are having the defaulted position consecutively iscome eligible. For each eligible mitigant, the exposure mitigant mapping wherein the exposure has the least risk weight or capital charge iscome eligible. All other exposure mitigant mapping for that mitigant is marked ineligible.

The application also identifies the eligibility of the mitigants based on the comparison of the risk weight of the exposures and the mitigants.

The application also identifies the eligibility of the mitigants based on the comparison of the risk weight of the exposures and the mitigants. If the mitigants risk weight is lesser than the risk weight of the exposures, then the mitigants become eligible or else the application makes them ineligible.

Mitigant Risk Weight

The application calculates the mitigant risk weight similar to the exposure risk weight of Non Securitized exposures. This is based on the issuer type and the credit rating, which includes the unrated issuers as well. The application performs multiple assessments for the mitigants, similar to the Non Securitization process, and arrives at a single rating for the mitigant. Further, the application assigns the final risk weight to the mitigant. In the case of financial collateral mitigants like cash and gold, zero risk weight is assigned.

Haircut Assignment

Haircut assignment to the mitigants is processed in the **FCT_SUB_EXPOSURES** table. The application assigns the various haircuts, as applicable to the mitigants. In the case of collateral following simple approach for recognition, there are no haircuts assigned to the mitigant. In the case of collateral following comprehensive approach, the application has the flexibility to use the supervisory haircuts and scale up if required, based on the minimum holding period. Alternatively, it also uses the bank's own estimate of haircuts. The application applies the volatility haircut, FOREX haircut, and the maturity mismatch haircut appropriately to the mitigants, as per the Basel accord. Only eligible mitigants are considered for haircut assignment. The eligible mitigants data flows from mitigants (**FCT_MITIGANTS**) table to sub exposures (**FCT_SUB_EXPOSURES**) table.

The application populates an uncovered mitigant for each exposure in the **FCT_SEC_EXPOSURES** table. This uncovered mitigant has same features as that of the exposure and are created in the **FCT_MITIGANTS** table.

Allocation of Mitigants to Exposures

The application computes the mitigant value after all haircuts. The application uses the pooling and optimizer logic to allocate the exposures to the mitigants. This is a bit different from the optimizer logic of Non Securitization exposures as the Securitized exposures have priority in the cash flow and gets the maximum protection by the mitigants. The senior most exposure (or tranche) is denoted with seniority 1 and the second senior exposure is denoted with seniority 2 and so on.

In the case of securitization exposures, the mitigants are always given preference over the senior most exposure and subsequently to the other exposures based on the seniority.

The other parameters which are considered in the allocation logic are the risk weight and the mitigant value post haircut. The application uses the linear programming logic to allocate the mitigants to the exposures. The optimizer logic for the Securitization process is a bit different from the Non Securitization process which is as follows:

Based on the seniority of the exposures, risk weight of the exposures, the mitigant, and the mitigant value, the ordering of ranking in which the mitigants is allocated to the exposures, is arrived at.

The order of allocation can be modified by updating the operation type and the optimizer constraints of the objective function. You have to select the allocation rank measure in the **Optimizer Definition** window, while defining the optimizer logic. For more information on Currency Conversion, see Exhibit 4 *Annexure A: Key Concepts*.

Single Mitigant Mapped to Single or Multiple Exposures

If there is one or more than one exposure mapped to a single mitigant, then the mitigant is allocated to the exposure with the highest seniority. If there is more than one exposure with the same highest seniority, then the mitigant is allocated to the exposure which yields the highest mitigant value post haircut.

Single Exposure Mapped to Single or Multiple Mitigants

If there is one or more than one mitigant mapped to a single exposure, then the least risk weighted mitigant is allocated to the exposure. If there is more than one mitigant with the same least risk weight, then the mitigant which has the highest mitigant value post haircut is allocated to the exposure.

Multiple Exposures Mapped to Multiple Mitigants

The treatment in this case is similar to a single mitigant mapped to single or multiple exposures, for the identification of the mitigant which is assigned to the exposures. Later, the treatment pertaining to single exposure mapped to multiple mitigants is followed to yield the credit Risk weighted exposure amount.

Using the logic mentioned in the preceding list, the application calculates the factor of exposure covered by the mitigant and the factor of the exposure uncovered (without any protection).

Sec Post CRM RWA Computation

The application computes the covered amount and the uncovered amount for the exposures. The covered amount is computed by multiplying the covered factor with the exposure amount. To this covered amount, the application assigns the mitigant risk weight.

The product of the covered amount and the mitigant risk weight is the covered RWA. The uncovered amount is computed by multiplying the uncovered factor (which is 1 – sum of all covered factors for that exposure) with the exposure amount. This uncovered amount is multiplied by the exposure risk weight to get the uncovered RWA. The sum of the covered RWA and the uncovered RWA is the Post CRM RWA of the Exposure.

> **Post-CRM RWA = Covered Amount * Risk Weight of the Mitigant**
>
> **+ Uncovered Amount * Risk Weight of the Exposure**

This logic is handled in **Sec Post CRM RWA computation** sub process.

The following sub processes and tasks are computed in the **SEC_IRB** Process:

- Sec Reclassification
- Sec Approach Selection
- Mitigant Reclassification
- Sec Pre-CRM EAD Computation
- Risk Weight Assignment
- Pre-CRM RWA Computation
- Mitigant Eligibility
- Mitigant Risk Weight
- Haircut Assignment
- Allocation of Mitigants to Exposures
- Post CRM RWA Computation

Key Data Elements

Key data elements for Securitization computation is as follows. For a complete list of tables and columns, see the *Download Specifications* document.

Securitization Exposures (IRB Approach)

The key attributes required in the case of an investor or third Party that does not provide complete pool and tranche details are as follows:

- Credit Enhancement Level
- Pool Exposure Amount
- Sec Second Loss Position of the Tranche
- Granularity of the Pool
- Largest Exposure of the Pool
- Seniority of the Tranche
- Sec Trading Book Approach

Mitigant Eligibility (IRB Approach)

Eligible Mutual Fund Indicator, Main Index Equity Indicator, and Equity Traded Indicator.

4.1.2.3 Market RWA

The Market Risk of Non Securitized and Securitized exposures in the Foundation IRB Approach (FIRB) and Advanced IRB Approach (AIRB) is calculated under the Internal Model Method Approach. See the IMM Approach in the Standardized Approach section.

4.1.2.4 Operational RWA

The Basel accord has prescribed three methods for calculating Operational Risk capital charges in the Foundation IRB Approach (FIRB) and Advanced IRB Approach (AIRB). Banks can use any of these methods to calculate capital charge same as in the Standardized Approach.

- Basic Indicator Approach
- Standardized Approach
- Alternative Standardized Approach

See Operational RWA in the Standardized Approach section.

4.1.2.5 Capital Structure

Basel II Capital Structure is calculated for the Foundation IRB Approach (FIRB) and Advanced IRB Approach (AIRB) similar to the Standardized Approach.

See Capital Structure in the Standardized Approach section.

4.2   Basel III

4.2.1   Basel III – Standardized Approach

4.2.1.1 BIS III – High Level Process Flow for Standardized Approach

The Capital Consolidation approach in the previous releases of the application was compliant with Basel II guidelines. With this release, this is modified to be compliant with Basel III guidelines issued by the Basel Committee. You also have the option of selecting any one of the Basel II or Basel III processes.

The Basel defined Capital Adequacy ratio is delivered out-of-box in OFSAAI as a building block approach. The application includes capital computations for Credit Risk (standardized approach), Market Risk, and Operational Risk along with Capital Structure and Capital Consolidation process.

For more information on the pre-defined Runs available with the application, see *OFS Basel Regulatory Capital Run Charts*.

4.2.1.1.1 Process Flow for Capital Adequacy Ratio Calculation
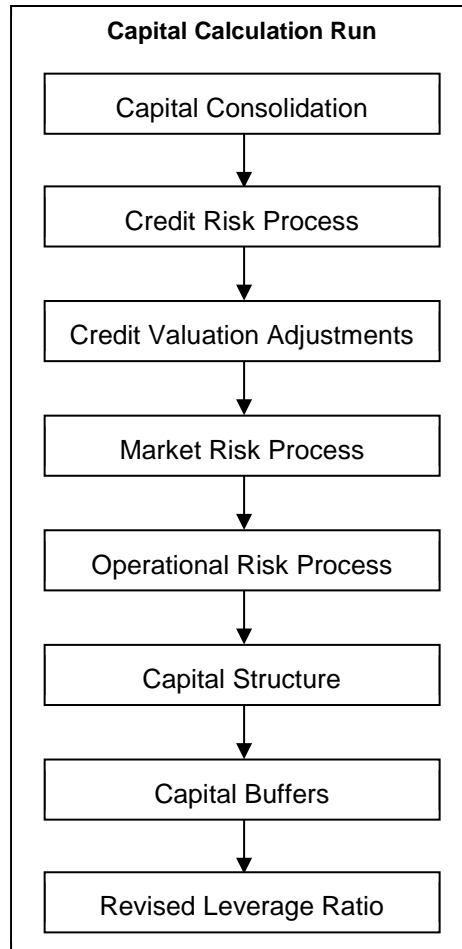
```
┌─────────────────────────────────────────┐
│          Capital Calculation Run          │
│   ┌───────────────────────────────────┐   │
│   │       Capital Consolidation       │   │
│   └───────────────────────────────────┘   │
│                     │                       │
│                     ▼                       │
│   ┌───────────────────────────────────┐   │
│   │        Credit Risk Process        │   │
│   └───────────────────────────────────┘   │
│                     │                       │
│                     ▼                       │
│   ┌───────────────────────────────────┐   │
│   │    Credit Valuation Adjustments    │   │
│   └───────────────────────────────────┘   │
│                     │                       │
│                     ▼                       │
│   ┌───────────────────────────────────┐   │
│   │        Market Risk Process        │   │
│   └───────────────────────────────────┘   │
│                     │                       │
│                     ▼                       │
│   ┌───────────────────────────────────┐   │
│   │      Operational Risk Process      │   │
│   └───────────────────────────────────┘   │
│                     │                       │
│                     ▼                       │
│   ┌───────────────────────────────────┐   │
│   │         Capital Structure         │   │
│   └───────────────────────────────────┘   │
│                     │                       │
│                     ▼                       │
│   ┌───────────────────────────────────┐   │
│   │          Capital Buffers          │   │
│   └───────────────────────────────────┘   │
│                     │                       │
│                     ▼                       │
│   ┌───────────────────────────────────┐   │
│   │      Revised Leverage Ratio       │   │
│   └───────────────────────────────────┘   │
└─────────────────────────────────────────┘
```

The Capital Calculation Run depicted in the preceding process flow is a single run which is a joined together by multiple processes. Each process is a block, compiled together to form an entire Capital Adequacy run. The individual blocks like the Credit Risk process, Market Risk process, and so on, also exist as individual runs which is described in the following sections.

4.2.1.1.2 Capital Consolidation Process

Capital Consolidation is a process common to each of the individual block when they are triggered separately as an individual run. For example: the standard out-of-box Market Risk run has Capital Consolidation and Market Risk process bundled together as a single Market Risk run. This is applicable for a Credit Risk run and Operational Risk run as well. The Capital Consolidation is explained in the following section and is not repeated under the Non Securitization process, Securitization process, Market Risk process, or Operational Risk section of this document.

In Capital Consolidation, the application processes the following.

Capital Consolidation Level Selection

The reporting bank can be a part of a financial group that has multiple legal entities like parent or child entities (subsidiaries) under its name. The entity on which you are required to process should be selected by you. Subsequently, level at which a Run is to be executed (solo or consolidated) should also be selected. You can select these options in the [Run Management](#) UI. However, if the Run is executed in the Run Rule Framework (RRF), then these options have to be set using the Rule '**Capital Consolidation Level Selection**' in the process '**CAPITAL_CONSOLIDATION**'.

CAPITAL_CONSOLIDATION is the first process to be added in all the Runs defined in the RRF except for the Staging Data Population Run. The Run Management UI selects this process by default.

Run Parameters Assignment

The Basel accord states different approaches for calculating RWA. The Run Management UI in the application allows the reporting bank to define and execute a Run by selecting a combination of different Basel II approaches for RWA computation.

Run Parameter Assignment is also part of **Capital Consolidation** process. The Rule '**Run Definition User Defined Run Param Assignment**' is used to assign the Run parameters if a Run is executed in the RRF. If the Run is executed from the Run Management UI, then the parameters are populated based on the Run defined in the [Run Definition](#) window.

Currency Conversion

The Rules pre-defined in the application performs currency conversion of all General Ledger amount attributes to be used for Capital Consolidation from the Natural currency to the Reporting currency, based on the exchange rate provided.

Shareholding Percent Multiplication

For all entities in the Capital Consolidation process, the application updates the shareholding percentage against each entity data in the fact capital accounting head from the fact entity shareholding percent table. The parent data in the processing table of fact capital accounting head is updated with the value 1 and for each child entity the data is based on the parent's holding percentage specified for each child in fact entity share holding percent table.

4.2.1.1.3 Process Flow for Credit RWA

A Credit RWA Run is a combination of the Non Securitization RWA process and Securitization RWA process. A few processes like Credit Rating, Party Type Reclassification, and Mitigant Data Population are common between Non Securitization and Securitization process. Though these sub processes are explained separately under Non Securitization and Securitization section of this document, it is executed only once under the Credit RWA run.

Certain sub processes under Non Securitization process like Reclassification, RW assignment, and so on are common across all types of exposures for example: banking book, over the counter derivative transactions, and securities financing transactions, and are executed only once in the Run. The details of these sub processes are explained under Reclassification and Risk Weight Assignment sub process of the Basel II Non Securitization exposures section of this document. Likewise, details of Credit Risk Mitigation for Non Securitization process is detailed under the Basel III Non Securitization section of this document and details of Credit Risk Mitigation for Securitization process is detailed under the Basel III Securitization section of this document.

Credit Valuation Adjustment processing is a separate process and detailed under the Credit RWA section of this document, as a separate section.

For more information on the sub processes as detailed in the preceding process flow for the Non Securitization process and Securitization process, see Credit RWA.

For example: Non Sec Data Population is detailed under data population and currency conversion of Credit RWA (Non Securitization - Standardized approach) section of this document.

The party rating considered for RW assignment should be current and not original. Therefore, if a rating must be considered as eligible rating for RW assignment as on MIS date, then the F_ORIGINAL_CREDIT_RATING_IND in party rating detail should be 'N'.

4.2.1.1.4 Process Flow for Credit Valuation Adjustments

```
            ┌─────────────────────┐
            │     CVA Process     │
            └─────────────────────┘
              │                 │
              ▼                 ▼
  ┌──────────────────────┐  ┌──────────────────────┐
  │ Simple CVA Approach  │  │ Advanced CVA Approach│
  └──────────────────────┘  └──────────────────────┘
```

Basel committee has introduced a new Credit Valuation Adjustment (CVA) capital charge, which is added to default risk capital charge to arrive at the new Counterparty Credit Risk (CCR) capital charge. The mark to market counterparty credit losses or the spread migration risk is captured with CVA, which were not directly capitalized before. CVA is the difference between the risk-free portfolio value and the true portfolio value that takes into account the possibility of the counterparty's default. In other words, CVA is the market value of counterparty credit risk.

This process flow is divided into two sections: Simple Approach and Advanced Approach.

For more information on the sub processes as detailed in the process flow, see Credit Valuation Adjustments.

4.2.1.1.5 Process Flow for Market RWA

Market RWA Run is made up of multiple sub processes specific to Market Risk. However, when Market Risk is bundled under a Consolidated Run and triggered, Capital Consolidation and Rating process is executed only once for Credit Risk and Market Risk. The details of each of the sub process mentioned in the preceding flow chart are present under Market Risk section of this document.

For more information on Market RWA computation, see Market RWA.

For example: 'Capital Charge for Interest Rate Instruments' sub process is detailed elaborately under 'Capital Charge for Interest Rate Instruments' section of Market Risk. Likewise 'Capital Charge for Equities', 'Capital Charge for Foreign Exchange Transaction' 'Capital Charge for Commodity transaction', and 'Options risk charge calculation' has a detailed explanation present under 'Capital Charge for Equities', 'Capital Charge for Foreign Exchange Transactions' 'Capital Charge for Commodity Transactions', and 'Capital Charge for Options' sub process of the Market Risk section of this document, respectively.

4.2.1.1.6 Process Flow for Operational RWA

Operational RWA run is executed with the Capital Consolidation process. For more information on the Operational RWA computation, see Fundamental Review of Trading Books (FRTB) – Standardized Approach

In January 2016, the Basel Committee for Banking Supervision replaced the existing minimum capital requirements with revised standards for market risk. These revised standards include amendments that were made to the Basel III: International Convergence of Capital Measurement and Capital Standards - Comprehensive Version that was published in June 2006. These guidelines are referred to as the Fundamental Review of Trading Books (FRTB). In the Standardised Approach (SA), the Market Risk Capital is calculated as a sum of the following three instrument types:

- Sensitivities Based Method

  In the Sensitivities Based Method, the market risk capital charge is calculated from sum of the Delta, Vega, and Curvature risk measures of the seven risk classes.

  Depending on the characteristics of a bank portfolio's instrument, one or more these risk classes might be applicable. Under the Sensitivities Based Method, the risk charge for each of the risk classes is calculated by aggregating the following risk measures:

  - Delta

  - Vega

  - Curvature

- Default Risk Charge

  The Default Risk Charge is a risk measure that captures the Jump-to-Default (JTD) risk of an instrument, which is the loss suffered by a holder if the issuer of a bond or equity defaults. This Default Risk Charge is computed separately for each instrument. Changes in market value due to

credit quality are captured by the Sensitivities Based Method's Delta charge for Credit Spread Risk factors. In the Standardized Approach, the Default Risk Charge is independent of capital charges for CSR non-securitizations and securitizations.

The Default Risk Charge is classified into three types of risk classes based on; securitization, non-securitization, and the positions that qualify and do not qualify for Correlation Trading Portfolio (CTP).

- Residual Risk Add-on

The Residual Risk Add-On was introduced as not all market risks can be captured by the standardized approach. The Residual Risk Add-On is calculated for all instruments in addition to risk charges that arise from the Sensitivities Based Method and the Default Risk Charge. Instruments that are subjected to the Residual Risk Add-on do not have an impact in increasing or decreasing the scope of risk factors with respect to the Delta, Vega, Curvature, and Default Risk Charge.

NOTE: The regulatory capital requirements for market risk under the standardized approach on FRTB must be computed separately for each of the trading desks of the banks on a daily basis and reported to their supervisors on monthly basis or/and at the demand of their supervisors.

4.2.1.1.7   Sensitivities Based Method

4.2.1.1.7.1 Risk Measures

Process Flow for the Delta Risk Measure

The Delta sensitivities are calculated by using the baseline Present Values (PV) and stressed PVs. The fetched sensitivities are based on risk factors of the respective risk class. Based on the position of the exposure, for non-swap instruments or swap instrument, whether a leg is pay or receive, the exposures are netted. The risk weights, as prescribed by the regulator, are pre-defined in the solution and can be changed if desired. The calculation of the WSK is done on the basis of the risk-weighted sensitivities. Correlation values are computed for both Intra and Inter-bucket correlation. The computation of different prescribed correlation scenarios such as High, Medium, and Low are executed simultaneously by the application. The scenario that yields the highest delta risk weight is used for aggregating the total risk charge for the trading desk.

Process Flow for the Vega Risk Measure

The calculation for the Vega sensitivity is based on Vega inputs and values. The Vega sensitivity is only calculated for an instrument's optionality. The Vega sensitivities are mapped to the relevant risk factors of the respective risk class post interpolation. Based on the position of the exposure, in the case of non-swap or swap instruments i.e. long or short, or whether a leg is pay or receive, the exposures are netted. The risk weights as prescribed by the regulator are pre-defined in the solution and can be modified. The calculation of the WSK is done on the basis of the risk-weighted sensitivities. Correlation values are then computed on the fly for both Intra and inter bucket correlation. The computation of different prescribed correlation scenarios such as High, Medium, and Low are executed simultaneously by the application. The scenario that yields the highest Vega risk is used for the aggregation of total risk charge for the trading desk.

Process Flow for the Curvature Risk Measure

A risk measure that accounts for the incremental risk of the price changes in the value of an option not captured by a delta risk measure. The calculation for this measure is based on two stress scenarios; the upward and downward stress shock of a risk factor. The Vega and Curvature risk measures only apply to instruments that contain optionality.

4.2.1.1.7.2 Risk Classes

GIRR – The General Interest Rate Risk is the risk due to the absolute value of the interest rate or the relationship between interest rates changing that in turn changes the value of the investment. The risk factors in FRTB for the General Interest Rate Risk are identified as the yield curve in the denominated currency, the term structure as time vertices, and the flat curve of inflation in the denominated currency. Cross currency basis with term structure not recognized.

> **Delta** – The delta sensitivity is computed for two risk factors; a risk-free yield curve for interest rate sensitive instruments for each currency and the maturity for the vertices: 0.25 years, 0.5 years, 1 year, 2 years, 3 years, 5 years, 10 years, 15 years, 20 years, and 30 years. The GIRR delta risk factor also includes a cross currency basis risk-factor and a flat curve of market-implied inflation rates for each currency.

> **Vega-** The implied volatilities of options that reference GIRR-sensitive underlyings in two dimensions; the maturity of the option and the residual maturity of the underlying of the option for the vertices: 0.5 years, 1 year, 3 years, 5 years, and 10 years. Vega sensitivities are assigned to their respective buckets by bilinear interpolation.

> **Curvature-** The Curvature sensitivity is computed for only one risk factor; the risk-free yield curve for interest rate sensitive instruments for each currency. Similar to the Delta risk measure for GIRR, all the vertices are shifted in parallel. The Curvature sensitivity does not include the risk

factors of cross currency basis risk and inflation. There will be no intra-bucket correlation as the bucket and CVRk granularity are the same in GIRR. There will be only one CVRk per bucket.

Equity – Equity risk is due to the volatility in the price of the equity, where the risk is incurred due to holding equity exposures and equity instruments. The equity risk factors in FRTB are all the equity spot prices and the equity repurchase agreement rates.

> **Delta** – The delta sensitivity is computed for two risk factors; the equity's spot price and the equity's repurchase agreement (repo) rate.

> **Vega-** The implied volatility of options that reference the equity spot price as underlying and the maturity for the vertices; 0.5 years, 1 year, 3 years, 5 years, and 10 years.

> **Curvature-** The Curvature sensitivity is computed for one risk factor; all the equity's spot prices. Equity repo rates do not contain a curvature risk charge.

Foreign Exchange - Foreign Exchange Risk or Forex risk is due to the value change of an exposure due to changes in the currency exchange rates. The risk factor in FRTB for Forex risk is identified as the exchange rates between the currency in which the instrument is denominated and the reporting currency.

> **Delta** – The delta sensitivity is computed for risk factor that is the exchange rate between the denominated currency and the reporting currency of the instrument.

> **Vega-** The optionality's volatility for exchange rates and the maturity for the vertices; 0.5 years, 1 year, 3 years, 5 years, and 10 years.

> **Curvature-** The Curvature sensitivity is computed for only one risk factor; the exchange rate between the denominated currency and the reporting currency of the instrument.

Credit Spread Risk - Non Securitization – A credit spread is the difference in yield between a risk-free interest curve, e.g. a Government Bond, and the yield of a marketable security e.g. a Corporate Bond, with the same maturity but of lesser quality. Based on the credit rating of instrument, credit spreads vary from one security to another. Credit Spread Risk buckets are based on a combination of party types and industries to arrive at the 'Sector' for the bucketing. The credit quality is divided into two parts; 'Investment Grade' and 'High Yield & Non – Rated' are based on the credit rating of the security. Securities that do not in which the application is unable to assign any security to any of the bucket will be assigned to "Others" bucket.

> **Delta** – The delta sensitivity is computed for two risk factors; the issuer's credit spread curve, bonds and Credit Default Swap (CDS), and the maturity for the vertices; 0.5 years, 1 year, 3 years, 5 years, and 10 years. The calculation of the 'Others' bucket is done after the risk charge calculation.

> **Vega-** The implied volatilities of options that reference the credit issuers name as underlying for bonds for one dimension; CDs and the maturity for the vertices; 0.5 years, 1 year, 3 years, 5 years, and 10 years. The calculation of the 'Others' bucket is done after the risk charge calculation.

> **Curvature-** The Curvature sensitivity is computed for one risk factor; the risk-free yield curve per currency of the issuer. All the vertices are shifted in parallel. The CVRk is calculated at the Issuer granularity level; hence one bucket contains multiple correlations.

Credit Spread Risk - Securitization (CTP) – The Credit Spread Risk - Securitization (CTP) criteria and calculations are similar to the ones in Credit Spread Risk - Non Securitization.

Delta – The delta sensitivity is computed for two risk factors; the issuer's credit spread curve, bonds and CDS and the maturity for the vertices; 0.5 years, 1 year, 3 years, 5 years, and 10 years. The calculation of the 'Others' bucket is done after the risk charge calculation.

Vega- The implied volatility of the options that reference the credit spread curve as underlying, for bonds and CDs, for one dimension; the maturity for the vertices; 0.5 years, 1 year, 3 years, 5 years, and 10 years. The calculation of the 'Others' bucket is done after the risk charge calculation.

Curvature- The Curvature sensitivity is computed for one risk factor; the underlying credit spread curve for bonds and CDS.

Credit Spread Risk - Securitization (Non CTP)- The risk for holding securitized instrument, when the credit spreads change gets captured by this risk class. Defined buckets are reclassified in to standard pool types to arrive at the sectors. Credit quality selection depends upon the seniority of the tranche and the credit rating of the instrument.

Delta – The Delta sensitivity are defined on two dimensions; tranche, credit spread curves and the following vertices: 0.5 years, 1 year, 3 years, 5 years, 10 years to which delta risk factors are assigned.

Vega- The Vega sensitivity is allocated for the maturity of the option represented on the standard vertices; 0.5 years, 1 year, 3 years, 5 years, 10 years, through linear interpolation.

Curvature- The CSR securitization curvature risk factors are defined on one dimension: the relevant tranche credit spread curves (bond and CDS). The CVrK is calculated along tranche granularity and contains multiple CVrKs per bucket.

Commodity - The commodity price risk is the volatility in market price due to the price fluctuation of a commodity. A commodity's price is affected by politics, seasonal changes, technology, and current market conditions. Based on the underlying commodity, the exposures are allocated to buckets.

Delta – The delta sensitivity is computed for the following risk factors; the commodity's spot prices, which depends on the contract grade, the city of the commodities legal terms and the maturity of the vertices from 0 to 30 years.

Vega- The implied volatility of the option for a commodity's spot price as underlying for one dimension; the maturity for the vertices; 0.5 years, 1 year, 3 years, 5 years, and 10 years.

Curvature- The Curvature sensitivity is computed for one dimension; the constructed curve of the commodity's' spot price.

4.2.1.1.8   Default Risk Charge

The Default Risk Charge (DRC) is used to capture the Jump-to-Default (JTD) risk of an instrument i.e. the loss that would be suffered by the holder if the issuer of the bond or equity were to default. It is computed for each instrument separately and is a function of the face amount or notional, market value of the instrument, and the Loss Given Default (LGD). The change in market value due to credit quality is captured by the Sensitivities Delta charge for Credit Spread Risk factors.

The Default Risk Charge is distinct from a counterparty to a trade defaulting in which it is capitalized under the Credit Risk and not Market Risk.

Default Risk Charge is broadly classified into three types of risk classes based on non-securitisation and securitisation positions and as the positions that qualify and do not qualify to the Correlation Trading Portfolio (CTP).

- Default Risk Charge Non – Securitization.

- Default Risk Charge Securitization Non – CTP

- Default Risk Charge Securitization CTP.

Process Flow for the Default Risk Charge

The Default Risk Charge for Non – Securitised instrument is only applicable for equity and credit instruments. With an instrument type filter, all the applicable exposures are populated in the landing table. The Credit Direction allocation is based on the position of the exposure and the option type for option instruments. The P&L Calculation depends on the instrument type, position, and the option type of the exposure. Based on the claim seniority the exposure are netted. DRC of each bucket is calculated which later gets aggregated to arrive at final risk charge.

4.2.1.1.9   Residual Risk Add-on

The Residual Risk Add-On captures any market risk that has not been captured by the Sensitivities Based Method and Default Risk Charge of the standardized approach. The Residual Risk Add-on is applicable in addition to any other risk charge i.e. a Residual Risk Add-on does not increase or decrease the scope of any other risk charges and is separately calculated and added to the risk charge from the Sensitivities Based Method and Default Risk Charge. A set of conditions, but not limited to, are prescribed by BIS that decides if a certain exposure will carry a Residual Risk Add- on or not are described below:

- All instruments with an exotic underlying.

- Asian options.

- Callable bonds issued by a retail issuer.

- Instruments that fall under the definiton of the Correlation Trading Portfolio (CTP), except those that are recognised in the market risk framework as eligible hedges of risks within the CTP.

- Options without an option maturity and that have been assigned to the largest maturity vertex for Vega computation.

The following scenarios are excluded from the Residual Risk Add-On instrument type:

- Instruments that have been used in a back-to-back transaction.

- Instrument that are listed and/or eligible for central clearing.

4.2.1.1.10 Market Risk Measurement and Management (MRMM) Integration for FRTB Standardized Approach

The integration of the MRMM services of the Stress Framework and Instrument Valuation for the Sensitivities Based Approach (SBM) of FRTB Standardised Approach allows you to have seamless valuation and market risk charge calculation.

You can use MRMM's stress framework and valuation services, supported by Numerix, or any third-party valuation services. An integration between OFSAA applications allows you to avoid reduant data and provides you with single point valuation and risk charge computation. You can expect the following possibilites with this integration:

1. The Basel FRTB solution uses the services of MRMM's stress framework to shock the market data and the valuation services to obtain the Present Values (PVs), Vega, and Implied Volatility. These are then used to compute the risk charges under the Sensitivities Based Method of the FRTB standardised approach. To do this, the application seeds the required standard scenarios for different calculations to stress the market data on the MRMM Stress Framework.

2. For the Delta risk charge calculations, the Delta sensitivities are calculated by using the PV values at a baseline level i.e. PV values witout any shock to the market data, and the stressed PV values i.e. PV values with shocked market data with shocks as prescribed by BIS.

3. For the Vega risk charge calculations, the Vega sensitivity is calculated by multiplying the Vega of the exposure with the implied volatility of the exposure. The Vega and the implied volatility are provided by MRMM for all the required exposures.

4. For the Curvature risk charge calculations, the PV with upward shock to the market data, the baseline PV i.e. the PV without any shock to the market data, and the PV with downward shock to the market data are provided by MRMM. This is achieved by making use of the stress framework and using multiple scenarios to stress the market data in the required manner.

5. Only the Sensitivities Based Method (SBM) approach uses MRMM services. The Default Risk Charge and Residual Risk Add-on are independent of MRMM.

6. If you do not use the services of MRMM, then you need to manually add the required valuation inputs in the Delta, Vega and Curvature input tables along with the scenario definition table in the required format..

4.2.1.1.10.1 *Process Flow*

In an integrated scenario the user is provided with the needed set of scenarios predefined and packaged with the product. These scenarios will be used by the application to not just stress the market data but the unique identifier of the scenarios i.e. N_SCENARIO_ID is also used to identify various other parameters of the exposure.

The solution detailing below details the requirements for both cases; an integrated situation with MRMM services being used and a situation with no integration i.e. only Basel FRTB std. approach being used without any of the MRMM services being used.

As stated previously, the MRMM services of valuation and stress testing are only required for the Sensitivities Based Method of the FRTB standardised approach. The Delta, Vega, and Curvature risk measures are handled in the following ways with the MRMM integration:

I.   Delta

     i.   The Delta calculations requires two types of PVs; the PV of the exposure without shocking the market data and the PV of the exposure with the prescribed shocks.

     ii.   The pre-configured scenarios for MRMM stress framework are available. In an execution, all the scenarios are executed through the market data, and then based on the market data, the scenario is applied per exposure.

     iii.   The different scenarios are then used to apply shocks to different market data. Depending on the market data followed by an instrument, the shock value stresses the market data

     iv.   The scenario ID of an is also used to identify the risk class, risk measure, time vertex, shock value, credit spread curve type, and the shock direction needed for the calculations associated with that scenario. This assigns an exposure to the correct calculation template and in order to proceed with the calculations.

     v.   If an exposure is associated with a swap instrument type or not is based on the instrument type of the exposure.

II.   Vega

     i.   For the Vega sensitivity, the Vega value and the implied volatility per exposure are multiplied.

     ii.   There is no stressing of marked data for calculating the Vega sensitivity.

     iii.   The credit spread curve type indicator for an exposure, whether an exposure follows a bond curve or the CDS curve, cannot be identified from the scenario IDs. To fetch the Vega values and the implied volatilities, the baseline scenario is used, where the baseline scenario must not be associated with a certain credit spread curve. Each exposure that carries the Credit Spread Risk (CSR) is associated with a credit spread curve, where Vega is a subset of Delta. After identifying the credit

spread curve type for an exposure, the Vega and implied volatility is fetched from the baseline scenario of the exposure, and then the credit spread indicator is fetched from the upward shock scenario used by the exposure.

III. Curvature

i.   For curvature calculations, the baseline PV, the PV without any shock applied to the market data, the upward shocked PV, and downward shocked PVs are used with the sum of the delta sensitivities for the exposure and the shock value to arrive at the CVRk value.

ii.   The market is shocked upward and downward as prescribed by FRTB for all exposures.

iii.   Multiple scenarios are used to shock the market data. The upward shock and the downward shock are provided in different scenarios on the market data type for a risk class where the upward shock is provided as a positive shock value and the downward shock is provided as a negative shock value.

iv.   Similar to Delta calculations, the scenarios IDs are used to fetch information on the shock direction, shock value, and risk class as well as obtaining PVs. The curvature calculation is not associated time vertices.

v.   For the Equity risk class, the curvature stress scenarios are based on the bucket that an exposure falls into.

vi.   The Delta, Vega, and curvature risk measures are handled in the following ways with the MRMM integration:

vii.   The Delta, Vega, and curvature risk measures are handled in the following ways with the MRMM integration:

In the case where the MRMM integration is not used, the Delta, Vega, and Curvature risk measures are handled in the following ways:

I. Delta

i.   You are required to manually provide all the required values for calculation such as the shocked and baseline PVs, the shock direction indicator, tenor, shock values, the risk measures, and risk classs.

ii.   You must follow the following criteria when adding data to the Delta input table:

a. For GIRR, CSR, and Commodity risk classes, the PV values are to be provided at the standard vertices as prescribed by BIS:

i. **GIRR:** Depending on the residual maturity of the exposure, 0.25 years, 0.5 years, 1 year, 2 years, 3 years, 5 years, 10 years, 15 years, 20 years, and 30 years. Cross currency and inflation curves do not contain any vertices. In the Delta input and the scenario definition tables, you must provide the cross currency scenario with a time vertex value of -8888, and then you must provide the inflation scenario with a time vertex value of -9999.

ii. **CSR non-sec, sec (CTP) and sec (non-CTP):** The vertices are; 0.5 years, 1 year, 3 year, 5 year, 10 year

iii. **Commodities:** Depending on the residual maturity of the exposure, the commodities spot are associated with the 0 year vertex, the commodity forwards are associated with 0.25 years, 0.5 years, 1 year, 2 years, 3 years, 5 years, 10 years, 15 years, 20 years, and 30 years.

iv. The **Equity** and **Commodity** risk classes are not associated with any vertices for the delta risk charge calculations. You must provide a value of -1 in the Delta input table and scenario definition table for the vertices against these scenarios. Similarly, you must provide a value of -1 in the baseline scenario table.

v. The time vertex value must always be expressed in years.

b. For each exposure, a baseline scenario PV; a PV without shock or 0 shock to the market data, and PV with an upward shock to the market data must be provided.

   Note: In the Delta Input and Scenario Definition Tables, the shock values are always expected to be provided in Basis Points (BPS) only. This restricts the Shock Type to only 'BPS'.

c. You must create separate scenarios to stress the market data associated with bond and CDS curves. 5 scenarios, 1 each for each of the time vertices to stress the CDS market data types, and another 5 scenarios, 1 each for each of the time vertices to stress the bond, market data types are to be created.

d. Based on the instrument type of the exposure, you must indicate per exposure if an exposure belongs to a swap instrument type or not.

e. You must provide details on the risk class to which the required entry in the Delta input table is made.

f. All the inputs provided in the Delta Input table must be converted in the reporting currency of the bank. For currency conversion, you must use the same exchange rates as used by the application for DRC and RRAO as well as any other areas where the currency conversion is being done. From the next release onwards this will not be the case and you will be able to provide the inputs in any desired currency and the currency conversion for the input table will be taken care of.

Vega

i. You must provide the Vega number and the implied volatility for all of the exposures of the option instrument types, including instrument types with built in optionality like callable bonds and cap floors in the Vega input table.

ii. You must use the standard prescribed vertices as well the residual maturity of the option. The underlying from the maturity of the option are interpolated to arrive at the standard vertices.

iii. You must provide details on the risk class and the credit spread curve with the associated entry in the Vega input table.

iv. All the inputs provided in the Delta Input table must be converted in the reporting currency of the bank. For currency conversion, you must use the same exchange rates as used by the application for DRC and RRAO as well as any other areas where the currency conversion is being done. From the next release onwards this will not be the case and you will be able to provide the inputs in any desired currency and the currency conversion for the input table will be taken care of.

Curvatue

i. You must provide the required inputs for curvature calculation in the curvature input table and the required inputs in the scenario definition table.

ii. The exposures eligible for curvature, exposures in option instrument types, must be involved with 3 scenarios; a baseline scenario, a scenario to provide upward shock, and a scenario to provide downward shock. You must provide all 3 scenarios for a curvature eligible exposure. The scenarios depend on what risk class a certain exposure falls into.

iii. You must provide the parameters for the shock direction, shock value from the required scenario in a record, and the risk class the record corresponds to.

Note: The credit spread curve indicator in the curvature input table is not relevant.

iv. For exposures carrying an equity curvature charge, the scenarios are configured per bucket and you must provide the shock values and the shocked PV values,both upward and downward, on the basis of which bucket the exposure falls into.

v. The baseline scenario is exposure specific.

vi. All the inputs provided in the Delta Input table must be converted in the reporting currency of the bank. For currency conversion, you must use the same exchange rates as used by the application for DRC and RRAO as well as any other areas where the currency conversion is being done. From the next release onwards this will not be the case and you will be able to provide the inputs in any desired currency and the currency conversion for the input table will be taken care of.

NOTE:

i. MRMM provides the output in the reporting currency of the bank. For a selected portfolio, you must execute the MRMM services and the Basel FRTB standardised approach by use of the same reporting currency.

4.2.1.1.11 Assumptions

Our interpretations of a few sections:

- The Vega sensitivities are obtained by multiplying the Vega number of the exposure with the implied volatility.

- The Baseline scenario is needed for all the participating exposures in all the cases.

- The list of supported instrument types and the applicable risks for each of the instrument types are seeded out of box in the FSI_INSTR_TYPE_RISK_CLASS_MAP table. For the purpose of this table, the RRAO is also treated as a risk measure.

- Inter bucket correlation for CSR and Commodity risk classes are considered as 100%.

4.2.1.1.11.1 *Data Expectations*

The following are some key data expectations:

- We expect one instrument or exposure to be mapped to only one Credit Spread Curve.

- In the FSI_BASEL_MR_SCENARIO_DEFN table, you must provide N_SHOCK_VAL column values in Basis Points, and then the V_SHOCK_TYPE value should be 'BPS'. This also applies to the Delta and Curvature INPUT tables. You are also expected to provide the shock values in Basis points.

- In an integrated scenario, you must run the MRMM valuation, stress testing services, and the Basel FRTB Standardized approach by using the same reporting currency.

- If user is using a third party or in-house valuation engine instead of MRMM, you must populate the FSI_BASEL_MR_SCENARIO_DEFN table and adhere to the conditions of scenario creation as required by the application. The following are the detailed set of conditions and expectations in a non- MRMM case

- User must follow the standard vertices in providing the input data in for the GIRR, CSR, and Commodity risk classes as there is no interpolation of data for Delta.

- While seeding the scenarios for cross currency and inflation scenarios in the FSI_BASEL_MR_SCENARIO_DEFN table, you must use the N_TIME_VERTEX values -8888 and -9999 for cross currency and inflation scenarios respectively.

4.2.1.1.11.2 *Limitations*

- Index instruments and Multi-underlying instruments are not supported.

- Exotic Instruments are not supported.

- Covered Bond is not supported.

- DRC Sec (CTP) is not supported.

- Replication of Securitization exposures cannot be done.

- Multiple strikes and barrier instruments are not supported.

Operational RWA.

For example: LOB Reclassification and Gross Income Calculation sub process are detailed as separate processes under the Operational RWA section of this document.

4.2.1.1.12 Process Flow for Capital Structure

Capital Structure is executed with Capital Consolidation, Credit Risk, Market Risk, and Operational Risk RWA processes.

For more information on the sub processes of Capital Structure, see Capital Structure.

For example: 'Gross Capital Calculation' mentioned in the preceding process flow, is explained in detail under 'Gross Capital Calculation for CET1, AT1, and T2' sub process section of the Capital Structure section in this document. Likewise, 'Regulatory Adjustment' and 'Net Capital Calculation' is detailed under 'Regulatory Adjustment to Common Equity Tier 1, Additional Tier 1, and Tier 2' section along with 'Treatment of Insignificant and Significant Investment Data Treatment' and 'Calculation of Net Capital' sub process section of Capital Structure in this document.

4.2.1.1.13 Process Flow for Capital Buffers
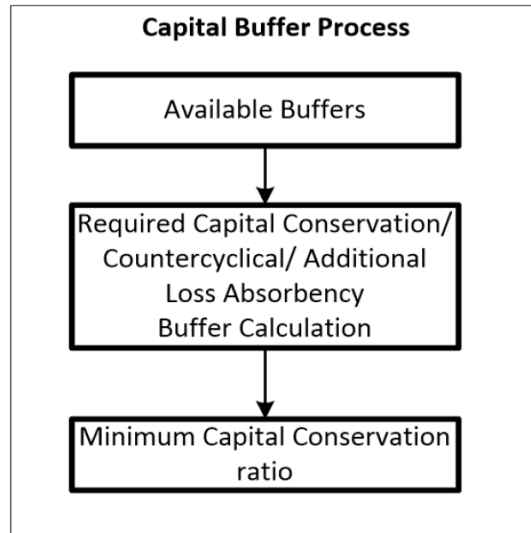
Capital Buffer is calculated after the calculation of Capital Ratios, as they go as an input to Buffer calculation. Each sub-process is explained in detail under Capital Buffer section of the user guide.

For more information on Capital Buffers, see Capital Buffers.

For example, Required Capital Conservation Buffer and Required Countercyclical Buffer calculation are detailed in the 'Required Total Buffer' sub-section of the Capital Buffer section in this document. Similarly, Minimum Capital Conservation ratio is detailed in the 'Capital Conservation Ratio' sub section of Capital Buffer section in this document.

4.2.1.1.14   Process Flow for Revised Leverage Ratio
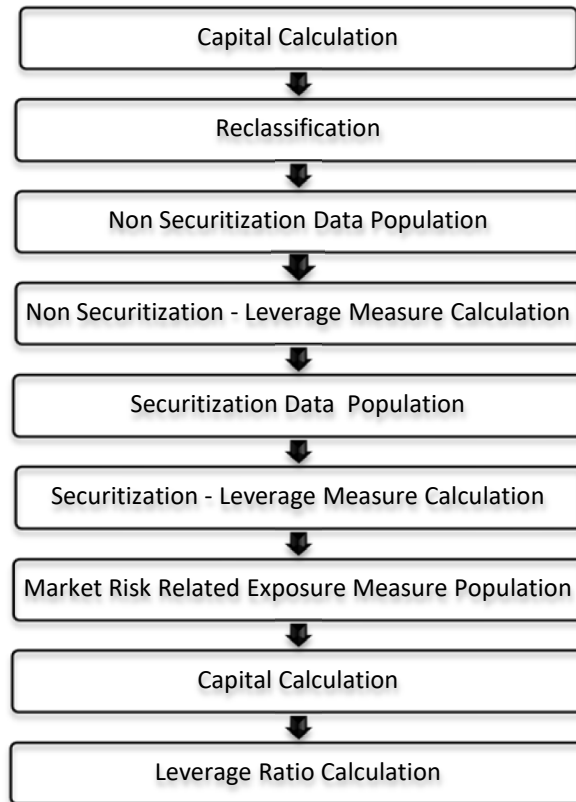
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┌─────────────────────────────────────────────┐
│            Capital Calculation              │
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┌─────────────────────────────────────────────┐
│              Reclassification               │
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│      Non Securitization Data Population      │
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│  Non Securitization - Leverage Measure Calculation  │
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│        Securitization Data  Population       │
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┌─────────────────────────────────────────────┐
│   Securitization - Leverage Measure Calculation   │
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│  Market Risk Related Exposure Measure Population  │
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┌─────────────────────────────────────────────┐
│            Capital Calculation              │
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┌─────────────────────────────────────────────┐
│          Leverage Ratio Calculation          │
└─────────────────────────────────────────────┘
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The leverage ratio calculations are a separate run, and not part of the regular capital calculation run. This is because of the changes in the Credit conversion factor assigned to the exposures, and also exemption of few exposures from the calculation which are part of the capital charge calculations. Also, the mitigation is not required for these exposures, and the exposure measure calculations are different from the regular EAD calculations.

For more information on Capital Buffers, see Revised Leverage Ratio.

4.2.1.2 Credit RWA

The application supports the computation of Credit RWA as per the guidelines laid out in the Basel accord. Credit RWA computation is broken down into Credit Risk for Non Securitized Exposures and Credit Risk for Securitized Exposures. For Credit Risk for Non Securitized Exposures, the application follows the Standardized Approach, Foundation IRB Approach, and Advanced IRB Approach. Credit RWA computation also consists of computation of Credit Valuation Adjustments which is explained in the later section.

4.2.1.2.1 Non Securitization – Standardized Approach

All the credit risk exposures are identified by their product types, counterparty types, and their corresponding asset classes by the application. A sample list of products types, party types, mitigant types, and credit ratings are pre-defined in the Basel application. However, this list and naming convention differs from one bank to another. Hence, the application reclassifies the bank's data into standard data as per the Basel accord. The application reclassifies the bank's product types and party types to Basel standard product and party types.

Based on these standard Basel product and party types, an asset class for each exposure is formed. It also checks for conditions regarding regulatory retail portfolio asset class. For details, see Asset Class Reclassification section under Credit RWA.

For equity exposures, the asset class is formed on the basis of equity type and Basel product type. The application does further data processing based on these standard reclassifications. In the current release, some new product types are added in the list and the application is updated to reclassify them to new Basel standard product types.

Some exposures can be hedged against Credit Risk through various mitigants like guarantors, collaterals, credit derivatives, and so on. These provide mitigation to credit risk and should be considered while computing Credit RWA as per Basel norms. Hence, the application calculates pre-mitigation exposure amount and post-mitigation exposure amount.
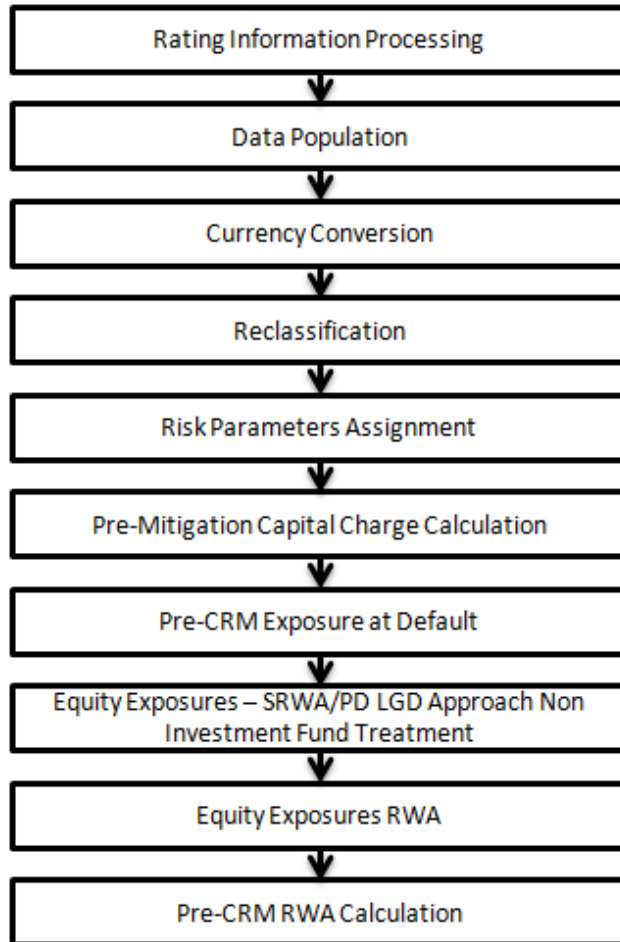
The Basel committee has revised Credit Risk Mitigation (CRM) guidelines to a large extent and the same is incorporated in the application. The changes at a macro level relate to the recognition of the eligible mitigants, applicable for the Securitized and the Non-Securitized exposures. BCBS has also revised the haircuts to be applied for the debt securities issued by a securitization transaction which act as collateral. The remaining processing for CRM remains the same as per the previous releases of the Basel application. Based on the asset class, the application calculates the pre-CRM EAD for each exposure. This value signifies the maximum loss that the bank can suffer in case of default on this exposure, prior to considering any mitigation effects. Through the CRM process, the bank takes into account the mitigation effect and calculates the post mitigation exposure at default amount. This signifies the maximum loss that the bank can suffer in case of default on this exposure, after considering all the mitigation effects.

The application also computes pre-mitigation risk weighted assets (Pre-CRM RWA) and post mitigation risk weighted assets (Post CRM RWA) by multiplying the respective EAD by risk weight. The risk weight in this case is arrived at by analyzing the credit rating of the exposures or mitigants as per the Basel guidelines. Some Credit Risk exposures that fall under the category of internal transactions like holding own subsidiaries shares or investment in its capital, reciprocal cross holding, and so on, are treated separately under Capital Structure.

Process Flow for Non Securitization – Standardized Approach

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│      Rating Information Processing    │
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┌──────────────────────────────────────┐
│           Data Population             │
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│         Currency Conversion           │
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│           Reclassification            │
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┌──────────────────────────────────────┐
│        Pre CRM EAD Computation        │
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│         Risk Weight Assignment        │
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│        Pre CRM RWA Computation        │
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│          Mitigant Eligibility         │
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│          Mitigant Risk Weight         │
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┌──────────────────────────────────────┐
│       Mitigant Hair cut Assignment    │
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│     Allocation of Mitigants to Exposures │
└──────────────────────────────────────┘
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┌──────────────────────────────────────┐
│        Post CRM RWA Computation       │
└──────────────────────────────────────┘
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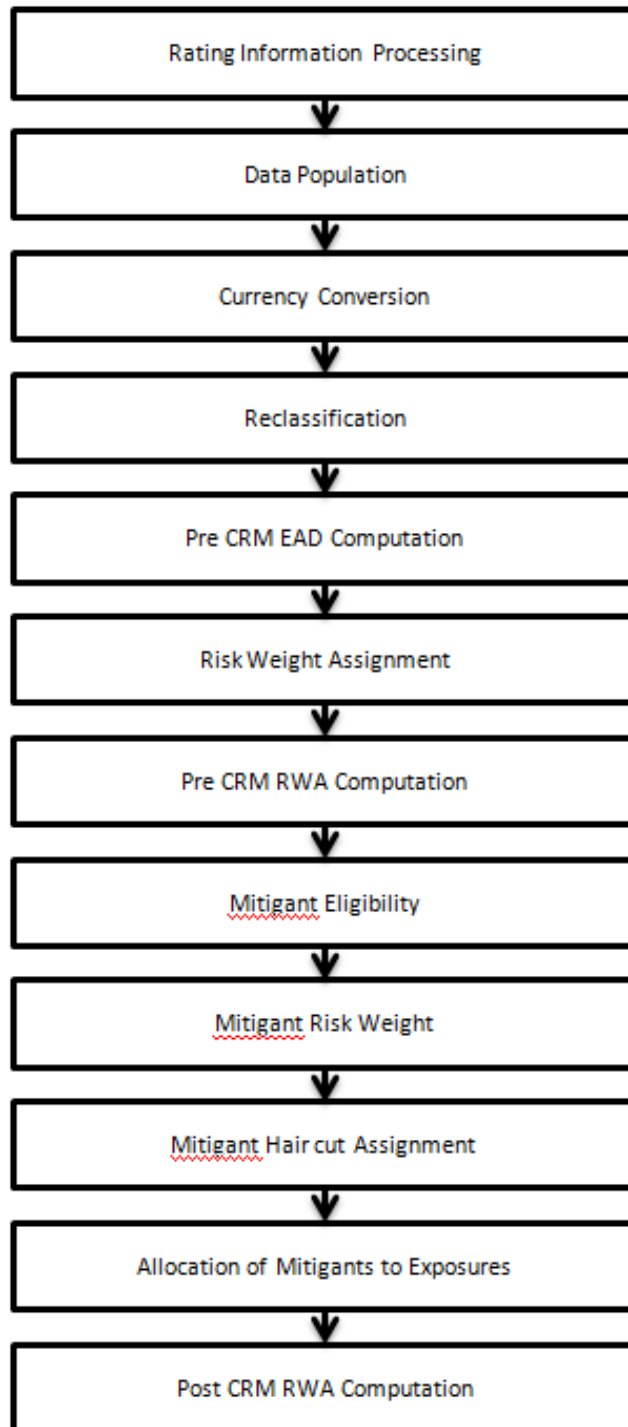
The processing of only mitigants eligibility and mitigant haircut assignment is different in the processing of the Basel III section of the release, which explained in detail in the following section. For processing of all the other line items for banking book products, securities financial transactions, and over the counter products, see Non Securitization – Standardized Approach.

Mitigant Eligibility and Haircut Assignment

As per the Basel III guidelines, BCBS recognizes the must change certain criteria in the eligibility of mitigants due to the economic crisis of 2008. It has revised the criteria for recognition of the eligible mitigants, applicable for the Securitized and the Non-Securitized exposures. BCBS has also revised the haircuts to be applied for the debt securities issued by a securitization transaction which act as collateral. These changes are an outcome of the financial crisis of 2008, as these transactions are sensitive to fluctuations in the price. This is applicable for Standardized Approach and IRB Approach.

The process flow for CRM is the same as in the existing Basel II computation except for a few differences. The differences are in the Mitigant Eligibility and the Mitigant Haircut Assignment procedures. The Mitigant Eligibility depends on the original ratings in the case of Securitized exposures. Hence, this has an effect on the credit rating processing.

All the rating information of the mitigants are populated from the staging tables to the processing tables. The mitigants rating information are captured in the instrument rating details. The flag Y in the **F_ORIG_CREDIT_RATING_IND** indicates that the rating is the original rating or the rating of the instrument at the time the protection was given and N indicates that the rating is the current rating.

This is handled in the **CREDIT_RATING_PROCESSING** process.

Also, multiple assessment is performed for the mitigants current rating and the original rating. This is handled along with the multiple assessment of the exposures.

The Mitigant Eligibility, Mitigant Risk Weight, Haircut Assignment, and Allocation of Mitigants to Exposures are handled in CRM sub process.

Mitigant Eligibility

The application identifies the eligible mitigants based on the criteria as mentioned by the Basel Accord. The application identifies the following mitigants– collateral, guarantees, and credit derivatives. The application is capable of using the Simple Approach and the Comprehensive Approach for the mitigants which are part of the collateral. The application identifies the eligibility of the financial collateral separately for the simple approach and the comprehensive approach. The eligibility of the collateral mitigants are based on the party type of the mitigant, mitigant types, the credit rating assigned to the mitigant or the party (as applicable), and the classification of collateral as senior or not. For equity, the eligibility is based on the main index equity and the equity trading status. For mutual funds, the eligibility is based on the eligible mutual fund indicator.

The application also identifies whether the mitigant is a Re-securitized exposure and if yes, makes it ineligible. The application identifies the eligibility of the guarantees and credit derivatives based on the party type of the mitigant and the credit rating assigned to the issuer of the mitigant. This is based on the satisfaction of the criteria as specified in the Basel accord. All the guarantees and credit derivative issued by issuers who are reclassified as Other Entities are treated as eligible for Non Securitization exposures if they have any rating assigned to them. All the guarantees and credit derivative issued by issuers that are reclassified as Other Entities are treated as eligible for Securitization exposures if they satisfy the current rating and the original rating criteria specified by the Basel accord. For processing the original rating of these issuers, the solution performs the multiple assessments of the initial ratings.

This is performed by the Data Transformation "Mult_Asses_Initial". The details of the Data Transformation are as follows:

Data Transformation Name	Objective	Processing Logic
Mult_Asses_Initial	The objective of this Data Transformation is to perform multiple assessments of the initial ratings and assign a normalized rating and risk weight to the mitigants. This is specific to the Basel III Securitization CRM framework.	For each mitigant, the various standard ratings associated with that mitigant as of the time it was initially issued and the respective risk weights are identified. If the number of ratings are 1, then the same rating gets assigned as the standard initial rating for the mitigant. If the number of ratings are greater than or equal to 2, then the mitigant is assigned a standard initial rating which corresponds to the worst of the best two risk weights associated with the initial ratings assigned.

Haircut Assignment

The application assigns the various haircuts, as applicable to the Mitigants. For collateral following Simple Approach for recognition, no haircuts are assigned to the mitigant. For collateral following Comprehensive Approach, the application is flexible to use the supervisory haircuts and scale up, if required, based on the minimum holding period. The application can also use the bank's own estimate of haircuts. The application applies the volatility haircut, FOREX haircut, and the maturity mismatch haircut to the mitigants as appropriate. This is as per the Basel Accord regulations. The volatility haircuts for debt securities which are mitigants are modified to include the Securitized exposures.

Only eligible mitigants are considered for haircut assignment. The eligible mitigants are moved from mitigants table to sub exposures table.

The CRM change is applied in the following processes:

- BASELIII_NON_SEC_STD
- BASELIII_NON_SEC_FIRB
- BASELIII_NON_SEC_AIRB
- BASELIII_SEC_STD
- BASELIII_SEC_IRB
- BASELIII_SEC_RBA
- BASELIII_SEC_SFA

This is applicable for Basel III Standardized Approach, Basel III FIRB and Basel III IRB Approach. This change has an impact for the Securitized Exposures and the Non-Securitized exposures.

Key Data Elements

Key data elements are listed in this section. For a complete list of tables and columns to be updated, see the Download Specifications document.

For Mitigants

- Re-securitized exposures Mitigant – The mitigants belonging to re-securitized exposures have "Y" value in this field. The application marks them as ineligible mitigants.

- Securitized exposures Mitigant – The mitigants belonging to securitized exposures have "Y" value in this field. The application assigns different volatility haircuts for these, depending on the current ratings and the residual maturity.

For Ratings

Current Rating for the Guarantees and Credit derivatives issued to Non-Securitized Exposures.

Current Rating and Original Rating for the guarantees and credit derivatives issued to Securitized Exposures.

Counterparty Credit Risk – Standardized Approach

The Standardized Approach for Counterparty Credit Risk (SA-CCR) is an alternative for Standardized Method (SM) and Current Exposure Method (CEM) for Counterparty Credit Risk (CCR) in Credit Risk. Banks can use SA-CCR approach while they follow Standardized or IRB approaches for credit risk. The SA-CCR approach is applicable for Over the Counter (OTC) Derivatives, Exchange Traded Derivatives, and Long Settlement Transactions.

Important: The changes detailed in this section is applicable only from 1 Jan 2017. Therefore, only those Runs with the FIC_MIS_DATE greater than or equal to 1 January 2017, is executed.

According to the guidelines, the banks that do not have approval to apply the IMM approach for the relevant OTC transactions, must use SA-CCR.

Ensure that you have modified the data type length of V_PARENT_EXPOSURE_ID column in STG_UNDERLYING_EXPOSURES table to VARCHAR2(50).

NOTE: This approach does not impact the IMM approach for CCR and any processes for IRB (AIRB or FIRB) runs.

Process Flow

The following flowchart depicts the process flow of SA-CCR.

```
              ┌──────────────────────┐
              │    SA-CCR Process    │
              └──────────┬───────────┘
                         │
              ┌──────────┴───────────┐
              │║  Replacement         ║│
              │║  Cost Process        ║│
              └──────────┬───────────┘
                         │
        ╱─────────────────────────────────╲
       ╱ Inputs – Netting Set details,       ╲
      ╱ Recd & placed collaterals, IM,         ╲
     ╱  VM, MTA & Threshold                     ╲
      ╲ STG_PLACED_COLLATERAL,                  ╱
       ╲ STG_NETTING_SET_DETAILS              ╱
        ╲─────────────────┬─────────────────╱
                          │
               ┌──────────┴───────────┐
               │  Apply haircuts on   │
               │     collaterals      │
               └──────────┬───────────┘
                          │
┌─────────────┐      ◇─────┴─────◇      ┌─────────────────┐
│ RC = MAX {V-C;│──No──│ Margined Txn? │──Yes──│ RC = MAX {V-C;  │
│      0}      │      ◇───────────◇      │ TH+MTA-NICA; 0} │
└──────┬──────┘                         └────────┬────────┘
       │            ┌──────────────┐             │
       └───────────▶│ Replacement Cost │◀────────┘
                    └──────┬───────┘
                           │
                ┌──────────┴───────────┐
                │║  PFE Process         ║│
                │║  (Add-on &           ║│
                │║  Multiplier)         ║│
                └──────────┬───────────┘
   (IR)                    │              (FX)
   (EQ)  ⬡ Assign Risk Category & Compute respective Add-ons ⬡  (CM)
   (CD)                    │
                ┌──────────┴───────────┐
                │  Aggregate Add-On    │
                │    for Netting Set   │
                └──────────┬───────────┘
                           │
                ┌──────────┴───────────┐
                │  Multiplier          │
                │  Calculation for     │
                │  Netting Set         │
                └──────────┬───────────┘
                           │
                ┌──────────┴───────────┐
                │  PFE = Multiplier *  │
                │  Aggregate Add-On    │
                └──────────┬───────────┘
                           │
                ┌──────────┴───────────┐
                │ EAD = Alpha *( RC+PFE);│
                │      Alpha = 1.4     │
                └──────────────────────┘
```

Replacement Cost

The Replacement Cost (RC) is computed differently for margined and unmargined netting agreements. The Exposure at Default (EAD) for margined netting agreement is capped at the EAD of the same netting agreement calculated on unmargined basis.

NOTE: The RC is capped to zero to ensure that the replacement cost does not become negative value when the bank maintains NICA in excess of TH+MTA.

For unmargined transactions, the RC intends to capture the loss that occurs when a counterparty defaults and closes out its transactions immediately. For margined transactions, the RC intends to capture the loss that occurs if a counterparty defaults at present or on the future, assuming that the closeout and replacement of transactions occur instantaneously. However, there can be a period (the margin period of risk) between the last exchange of collateral before default and replacement of the trades in the market.

The RC can be calculated as follows:

For unmargined transactions:

> **RC= MAX {V-C; 0}**
>
> Where:
>
> V = Value of the derivative contract in netting agreement
>
> C = Haircut value of net collateral held.

For unmargined transactions:

> **RC = MAX {V-C; TH+MTA-NICA; 0}**
>
> Where:
>
> V = Value of the derivative contract in netting agreement
>
> C = Haircut value of net collateral held
>
> TH = Positive threshold before counterparty sends collateral to bank
>
> MTA = Minimum transfer amount applicable to counterparty
>
> NICA = Net Independent Collateral Amount

The formulation for RC for SA-CCR approach depends on the transaction types (margined or unmargined). You must distinguish between the transactions that require only Initial Margin (IM) and no variation margin (VM) as unmargined transactions and the transactions that require IM and VM as margined transactions.

The following tables are referred to as derivative tables in the application. Note that the data for counterparty credit risk related transactions that is for derivatives, are expected in these tables:

- STG_FORWARDS
- STG_FUTURES
- STG_OPTION_CONTRACTS
- STG_SWAPS_CONTRACTS
- STG_CREDIT_DERIVATIVES

The N_MARKET_VALUE column in all the preceding derivative tables is used to store the market value of the derivative contract.

NOTE:	Due to uncertainty in the guidelines regarding the treatment of cross-product netting agreements (the nettings agreements that include OTC and SFT), the application calculates the netting agreement level amounts applicable for OTC derivatives by finding out the proportion of OTC in the netting agreement and then allocating the contract amounts accordingly to the same under SA-CCR approach.

IM and VM are expected at netting agreement level. Banks must provide the same either by dividing the IM/VM at counterparty level into netting agreements or by aggregating the IM/VM at transaction level to the netting agreement level. Minimum Transfer Amount and threshold amount should also be provided at netting agreement level in STG_NET_EXPOSURES table.

Banks are also required to identify the transactions as margined or unmargined and provide the values appropriately in the F_MARGINED_TXN_IND column of the STG_FORWARDS, STG_FUTURES, STG_OPTION_CONTRACTS, STG_SWAPS_CONTRACTS, and STG_CREDIT_DERIVATIVES tables. Bilateral transactions, where there is a one-way margining agreement exists in favor of the counterparty (where bank posts but does not receive collaterals) must have the value of the column F_MARGINED_TXN_IND as Y.

Potential Future Exposure (PFE)

The PFE, Add-ons, and Multiplier are detailed in this section.

The PFE add-ons consists of an aggregate add-on component, which consists of add-ons calculated for each risk category and a multiplier that allows for the recognition of excess collateral or negative mark-to-market value for the transactions.

Add-on Aggregate is the aggregate of add-on components. The multiplier is defined as a function of the following three inputs:

- Value of the derivative contract in netting agreement (V)
- Haircut value of net collateral held (C)
- Add-on Aggregate

If the banks hold collateral which is present in excess than the market value of derivative contracts to reduce the counterparty credit risk, it is called, over-collateralization. If the value of the collateral is lesser than the market value of the derivatives, the contract is called, under-collateralized. To provide the benefit of over-collateralization to banks, BIS has introduced a multiplier on the PFE Add-ons. This decreases as the collateral value increases and is at five percentage of the PFE Add-on.

Therefore, when collateral value is higher than the derivative value, RC becomes zero and the PFE Add-on is multiplied by a multiplier to factor in the effect of over-collateralization. If the contract is under-collateralized, that is if the collateral value is less than the derivative value, the replacement cost remains the same as explained in the Replacement Cost section (for margined and unmargined). In addition, the multiplier becomes equal to, one so that, under collateralization neither benefits nor detriments the bank.

Add-on Aggregate is the sum of the Add-ons for each risk category in a netting agreement. Note that it is an absolute sum and not a netting effect.

The process for Add-on calculation includes the following steps.

Risk Category

For each exposure, the banks must identify the primary risk driver of the risk factors such as interest rate, foreign exchange, credit, equity, or commodity. This is crucial because the Add-on formula for each risk category is different and it depends on the nature of the risk factors. For Add-on calculation it is assumed that all the exposures possess zero current msark-to-market value. That is, all the contracts are at-the-money. The risk categories can be identified by defining the primary risk factors of underlying exposures in the derivative contracts.

Adjustments

There are multiple factors which are a part of the Add-on estimation formulae for each risk category, based on which the transactions are adjusted. These factors are:

- Adjusted Notional Amount: An adjusted notional amount based on actual notional or price is calculated at the trade level. For interest rate and credit derivatives, this adjusted notional amount also incorporates a supervisory measure of duration.

- Delta Adjustment: Supervisory delta adjustment is made to the notional amount depending on the position of the trade (long/short) and the type of trade (option, CDO tranche, or neither).

- Volatility Adjustment: Supervisory adjustment is applied to notional amount to capture volatility.

- Hedging Sets: The trades within each risk category are separated into hedging sets and an aggregation method is applied to aggregate all the trade-level inputs at the hedging set level and finally at the risk-category level. For credit, equity, and commodity derivatives, this involves the application of a supervisory correlation parameter to capture important basis risks and diversification.

- Maturity Adjustment: A maturity factor depending on type of transactions (MF margined, MF Unmargined) is defined based on the time horizon at trade level. This maturity adjustment factor is applied to the adjusted notional amount. Maturity adjustment for unmargined transactions is the lesser of one year and residual maturity of the contract, floored by 10 business days. For margin transactions, maturity adjustment is calculated after minimum period of risk (MPOR) which depends on cleared transaction indicator.

Flooring of Margin period of risk for illiquid collaterals and OTC traded exposures is not supported in out-of-box product.

Workaround:

As per the BIS guidelines, margin period of risk (MPOR) must be defined for the derivatives cleared by central counterparty based on the collateral or derivatives being illiquid. Since the margin dispute days column is required at the netting agreement level for the joins in OOB product, the issue requires a data model change. Without the DM change, the following can be done for workaround:

- F_ILLIQUID_COLLATERAL and F_ILLIQUID_DERIVATIVES should be populated in fct_non_sec_exposures, these are inputs from the user. T2Ts to be modified: FUT_EXPOSURE_DATA_CREATION, SWAPS_EXPOSURE_DATA_CREATION, OPT_EXPOSURE_DATA_CREATION and CREDIT_DERIVATIVES_DATA_POPULATION.

- Introduce a flag for F_ILLIQUID_TRADE, F_ILLIQUID_COLLATERAL and F_OTC_IND in fsi_netting_agreement_details. If any one of the transactions in a netting agreement in fct_non_sec_exposures has F_ILLIQUID_COLLATERAL as Y, then populate F_ILLIQUID_COLLATERAL as Y else N in fsi_netting_agreement_details. If any one of the transactions in a netting agreement in fct_non_sec_exposures has F_ILLIQUID_DERIVATIVES as Y, then populate F_ILLIQUID_TRADE as Y else N in fsi_netting_agreement_details. If any one of the transactions in a netting agreement in fct_non_sec_exposures has F_OTC_IND = Y, then populate F_OTC_IND as Y else N in fsi_netting_agreement_details. This should be done via multiple BP's, namely: BP – Illiquid Trade for Netting agreement; BP – Illiquid collateral for Netting agreement and BP – OTC Indicator for Netting agreement in the new rule 'Illiquid Trade, Illiquid Collateral and OTC Indicator for netting agreement'. This rule should be placed as the first rule in sub-process 'Pre Potential Future Exposure Calculation'.

- Introduce a column N_NO_MARGIN_DISPUTE in fsi_netting_agreement_details. Modify the T2T 'NETTING_SET_DETAILS_DATA_POPULATION' to populate this column from stg_net_exposures to fsi_netting_agreement_details for each netting agreement code.

- Introduce a column F_CLEARED_TRANSACTION_FLAG in fsi_netting_agreement_details. If F_CLEARED_TRANSACTION_FLAG in fct_non_sec_exposures is Y for any one of the transactions under a netting agreement, then populate F_CLEARED_TRANSACTION_FLAG in fsi_netting_agreement_details as Y else N. This can be done via a new rule 'Cleared Transaction Update for Netting Agreement' which is placed after 'Illiquid Trade, Illiquid Collateral and OTC Indicator for netting agreement' rule.

- In fsi_netting_agreement_details, assign the following to column N_MARGIN_PERIOD_OF_RISK:

F_ILLIQUID_ COLLATERAL	F_ILLIQUID_ DERIVATIVES	F_OTC_IND	N_NO_MARGIN_ DISPUTE	F_CLEARED_ TRANSACTION_ FLAG	N_MARGIN_ PERIOD_OF_ RISK
N	Y/N	Y/N	0	Y	20
Y/N	N	Y/N	0	Y	20
Y/N	Y/N	Y	0	Y	10
Y/N	Y/N	Y	>0	Y/N	20
N	Y/N	Y/N	>0	Y	40
Y/N	N	Y/N	>0	Y	40

This should be done via a new rule 'Margin Period of Risk for Illiquid Collaterals and OTC'. This rule should be placed after rule 'Non Sec Exposures Margin Period of Risk - Others - SA – CCR' in sub-process: 'Pre Potential Future Exposure Calculation'.

Period or Date Parameters

Four date parameters are used in SA-CCR approach. These are:

- **M**: This is the latest date on which the contract is active. In such cases where the derivative contract has another underlying contract (for example, Swaption) and where the exercise of one contract can result into the position in the underlying contract, M is the final settlement date of the underlying contract. This input is used in MF adjustment for unmargined transactions.

- **S**: This is the start date for the interest rate derivatives and credit derivatives. If the derivatives refer to another underlying interest rate or credit instrument, then the start date is calculated based on the underlying contract. This value should not be less than 10 days. If the contract has already started, it should be equal to zero.

  For example, for Bond futures, S is the start date of the bonds. These inputs are used for the duration adjustment of notional amount for IR and Credit derivatives.

- **E**: This is the contract end date for the interest rate derivatives and credit derivatives. If the derivatives refer to another underlying interest rate or credit instrument, then this end date is calculated based on the underlying contract. This value should not be less than 10 days.

  For example, for Bond futures, it is the end date of the bonds. This input is used for the duration adjustment for notional amount of IR and Credit derivatives. Also, this date determines the maturity bucket category for the IR and Credit Risk Categories.

- **T**: This is the latest contractual exercise date for options in all the Risk Categories. This is used in the computation of Delta adjustment factor for options.

Add-ons

Add-on for IR Derivatives

Following flowchart depicts the IR derivatives:

For interest rate derivatives, each currency forms a different hedging set. In each hedging set, the trades are divided into maturity buckets (Less than 1 year, 1 to 5 years, and more than 5 years). Positions are allowed to be completely offset within a time bucket. Add-on for IR derivatives is the sum of add-ons for each hedging set.

Add-on for FOREX Derivatives

Following flowchart depicts the FOREX derivatives:

```
                    ╭──────╮
                    │  FX  │
                    ╰──────╯

            ┌──────────────────┐
            │ Adjusted notional│
            │   = Exposure     │
            │ amount converted │
            │  to reporting    │
            │    currency      │
            └──────────────────┘
                     │
                     ▼
            ┌──────────────────┐
            │ Add-on at hedging│
            │   set level as   │
            │   product of     │
            │ Effective notional *│
            │ supervisory factor│
            └──────────────────┘
                     │
                     ▼
            ┌──────────────────┐
            │  Cumulative Add- │
            │  on for FX Risk  │
            │    Category      │
            └──────────────────┘
```

Add-on for a hedging set for forex derivatives is calculated as per the guidelines.

Add-on for Credit Derivatives

Following flowchart depicts the add-on calculation for credit derivatives:

$$AddOn^{(Credit)} = \left[\left(\sum_k \rho_k^{(Credit)} * AddOn(Entity_k) \right)^2 + \sum_k \left(1 - \left(\rho_k^{(Credit)} \right)^2 \right) * \left(AddOn(Entity_k) \right)^2 \right]^{\frac{1}{2}}$$

where $\rho_k^{(Credit)}$ is the appropriate correlation factor corresponding to the Entity k.

All credit derivatives that reference the same entity (either a single entity or an index) are allowed to offset each other completely to form an entity-level effective notional amount.

For single name entities, SF is determined by the credit rating of the reference name. For index entities, SF is calculated by determining if the index is investment grade or speculative grade. All entity level add-ons are grouped in a single hedging set, except for basis and volatility transactions for which full offsetting is not allowed.

For credit derivatives, add-ons are divided into systematic and idiosyncratic components. Entity Level Add-ons are allowed to be completely offset in systematic component whereas in the idiosyncratic component, there is no offsetting benefit.

Add-on for Equity Derivatives

Following flowchart depicts the add-on calculation for Equity derivatives.

EQ

Adjusted notional
= No. of units *
Price

Compute Effective Notional for each reference entity by full offsetting if same reference entity is present for 2 trades

Compute Add-on for each reference entity by multiplying Effective notional by Supervisory Factor. Supervisory factor depends on whether the entity is single named or index

Compute Aggregate Add-on for Equity risk category by using below formula:

$$AddOn^{(Equity)} = \left[\left(\sum_k \rho_k^{(Equity)} * AddOn(Entity_k) \right)^2 + \sum_k \left(1 - (\rho_k^{(Equity)})^2 \right) * (AddOn(Entity_k))^2 \right]^{\frac{1}{2}}$$

Equity derivative add-ons are based on a similar concept of systematic and idiosyncratic components. Derivatives referencing equity indices are measured as if those are referencing single equities but with a higher correlation factor.

Banks are not permitted to make any modeling assumptions regarding the Add-ons including estimating individual volatilities or taking publicly available estimates of beta. This is to ensure the consistency during implementation across multiple jurisdictions.

Add-on for Commodity Derivatives

Following flowchart depicts the add-on calculation for Commodity derivatives.

CM

Adjusted notional
= No. of units *
Price

Compute Effective Notional for each reference entity by full
offsetting if same commodity type is present for 2 trades

Compute Add-on for each commodity type by multiplying
Effective notional by Supervisory Factor. Supervisory factor
depends on type of commodity

Compute Aggregate Add-on for Commodity risk
category by using below formula:

$$AddOn_{HS_j}^{(Com)} = \left[\left(\rho_j^{(Com)} * \sum_k AddOn\left(Type_k^j\right)\right)^2 + \left(1 - \left(\rho_j^{(Com)}\right)^2\right) * \sum_k \left(AddOn\left(Type_k^j\right)\right)^2 \right]^{\frac{1}{2}}$$

Add-on for commodity derivatives are also divided into systematic and idiosyncratic components. Full offsetting is allowed between derivatives referencing same type of commodity. Partial offsetting is allowed within each hedging set between same types of commodities. No offsetting is permitted across hedging sets.

For a basis transaction hedging set, supervisory factor applicable to the relevant asset class is multiplied by 0.5. For a volatility transaction hedging set, supervisory factor applicable to the relevant asset class is multiplied by 5.

Treatment of Multiple Margin Agreements and Multiple Netting Agreements

For RC and PFE, if one of the netting agreement has multiple margin agreements, then this netting agreement should be divided into sub-netting agreements to align with the margin agreements.

If a single margin agreement applies to multiple netting agreements, RC is calculated by taking the maximum of the mark-to-market value of the derivative contract in the netting agreement, then subtracting the value of the collaterals against the margin agreement, and finally flooring this value to 0.

For the calculation of PFE, it is required to adopt the unmargined methodology. This is because, one margin agreement applies to multiple netting agreements and collaterals are based on the netted mark-to-market values of the derivative contracts.

NOTE:	CDO Tranches are not included in out-of-the-box product, as the guidelines do not clarify whether CDO's should be treated under SA-CCR or Securitization. The existing treatment of CDO tranches under securitization remains unchanged.

Commodity

Similar to credit derivatives and equity, offsetting for commodity derivatives are also permitted for the trades in the same commodity. The commodity is identified by the V_UNDERLYING_DATA_IDENTIFIER column values in the respective derivative tables. The effective notional amount for a commodity type and the Add-on for commodity type are computed as per the guidelines. The individual commodity types column expects the values from DIM_EXPOSURE_UNDERLYING_TYPE table.

For Long Settlement Transactions, the methodology described previously is replicated. The only difference is that for the complete process, the transactions with long settlement transaction flag (F_LONG_SETTLEMENT_TXN_FLAG) = Y is considered.

Data for Staging Tables

Data for the staging tables (STG_FORWARDS, STG_FUTURES, STG_SWAPS_CONTRACTS, STG_OPTION_CONTRACTS, and STG_CREDIT_DERIVATIVES) are provided with the appropriate underlying types. This ensures that the correct asset class and sub-class are assigned. For Commodity derivatives, data is provided for commodity code. Otherwise, the banks cannot avail the offsetting benefit for the offsetting of notional amount, as permitted by BIS.

Underlying type values in each of the derivative tables are listed in the previous paragraph are expected from the following codes:

- INTRAT
- EXRATE
- CREDIT
- IGRO
- NIGRO
- EQTY
- EQIDX
- OILGAS
- ELEPOW
- MET
- AGRI

- OTHCOM

The following are ensured:

- The correct hedging sets are formed and processed accordingly for margin agreement codes and netting agreement codes. Incorrect data in these columns can lead to inaccurate capital computation.

- For derivatives that have 2 legs in the books, same Deal ID should be provided with appropriate position indicators. This is to ensure that the correct treatment is applied to such positions and offsetting benefit is given to the bank wherever permitted.

- Netting agreement codes should be provided uniformly across the relevant transactions. This is to ensure that the correct calculation of PFE and also to help identify netting agreements in which trades exceed 5000.

Run Management

You can choose between SA-CCR and IMM approach for CCR charge.

BIS has provided an option to choose if the banks want to recognize offset across maturity buckets or not. To enable the offsetting option across maturity buckets for SA CCR approach for IR asset class, a new column namely V_CCR_IR_BUCKET_OFFSET is introduced. If this column is provided with the value Y, then the solution uses the formula according to the guidelines for Offsetting. Otherwise, the formula for effective notional calculation for IR asset class from the guidelines is considered.

As the partial offset within a netting is not detailed in the accord, the same is not included in the scope of the application.

Contracts with one-way margining agreements are not being treated as unmargined transactions in out-of-box product

Workaround:

Currently, we are capturing one way margining indicator in stg_placed_collateral table and no join condition is there between fct_non_sec_exposures and stg_placed_collateral table. One way margin is captured at netting agreement level and since it is applicable for bilateral transactions, we should capture it at transaction granularity.

Introduce new column F_ONE_WAY_MARGIN_AGREEMENT in stg_futures, stg_credit_derivatives, stg_swap_contracts and stg_option_contracts. If this flag is populated as 'Y' for any transaction, then that transaction should be treated as unmargined transaction and the rules applicable under SA-CCR for computation of replacement cost for unmargined transactions should be replicated here.

Modify the T2T's populating from the PP tables into fct_non_sec_exposures to populate this column in fct_non_sec_exposures. T2T's to be modified are: FUT_EXPOSURE_DATA_CREATION, SWAPS_EXPOSURE_DATA_CREATION, OPT_EXPOSURE_DATA_CREATION and CREDIT_DERIVATIVES_DATA_POPULATION.

For the exposures where F_ONE_WAY_MARGIN_AGREEMENT = 'Y', populate fct_non_sec_exposures. F_MARGINED_TXN_IND = N. This is done by a rule 'One way margined transaction reclassification to unmargined transaction'.

The source hierarchy is a new hierarchy formed on fct_non_sec_exposures. F_ONE_WAY_MARGIN_AGREEMENT ('One way margined transaction') and target is fct_non_sec_exposures. F_MARGINED_TXN_IND. For the Y node of hierarchy 'One way margined transaction', set fct_non_sec_exposures. F_MARGINED_TXN_IND = 'N'.

This ensures that one-way margined transactions are treated like unmargined transactions throughout the solution. The rule should be placed under sub-process "Pre Replacement Cost Calculation" as the first task.

Capital Charge for Qualified CCP's is not being Capped with Capital Charge for Non-Qualified CCP's Currently

Workaround:

Capping is happening for default fund contributions. In Basel, the capital computation is done at aggregate level and not at exposure level. For capping of capital of cleared transactions with QCCP, we can first cap the RWA calculation as the capital is flat 8% in case of cleared transactions.

Create a new rule named as 'Post Mitigation RWA for CCP Exposures'. The source hierarchy is HBL0098 (Qualifying CCP Indicator – Exposure). The measure should be N_RWA_UL_AMT for both nodes of the hierarchy. For QCCP, that is, for Y node of this hierarchy, the target is n_std_acct_head_amount in fct_standard_acct_head corresponding to the new CAP ID. The CAP ID description is 'Total RWA for Qualified Central Counterparty'. For non-QCCP, that is, for N or blank node of this hierarchy, the target is n_std_acct_head_amount in fct_standard_acct_head corresponding to the new CAP ID. The CAP ID description is 'Total RWA for Non-Qualified Central Counterparty'.

The new CAP ID's ('Total RWA for Qualified Central Counterparty' and 'Total RWA for Non-Qualified Central Counterparty') is summed up to populate another CAP ID in fct_standard_acct_head having description as 'RWA for Central Counterparties'. This rule is called 'RWA for Central Counterparties'. Both the rules detailed previously is placed in process 'BASELIII_NON_SEC_STD', under sub-process 'Non Sec Post-CRM Process' at the end of this sub-process in the same order.

In the rule that computes the total credit RWA (CS - Basel III Credit RWA), modify the existing BP to sum RWA for exposures that are not cleared transactions. Introduce hierarchy HBL0095 (Cleared Transaction Indicator – Exposure) and map existing BP to N or blank node of this hierarchy. Populate target as a new CAP ID with description 'Credit RWA for non central counterparties' in fct_standard_acct_head. Rename the existing rule as "BIS-CS-Basel III Credit RWA for non-CCP". Create new rule as "BIS - CS - Basel III Credit RWA". This rule is the sum of new CAP ID for CCP ('RWA for Central Counterparties') and CAP ID for non-CCP ('Credit RWA for non central counterparties') and populate to CAP169 (Credit RWA).

4.2.1.2.2 Securitization – Standardized Approach

The Basel accord differentiates the Credit Risk computation of the Securitized exposures from Non Securitized exposures. As securitized exposures are part of off-balance sheet transactions, it follows a waterfall cash flow mechanism unlike the other exposures. Hence these exposures are treated differently. Due to the economic crisis of 2008, the Basel Rule has categorized securitized exposures into securitized and re-securitized exposures.

Securitized exposures are exposures which are issued out of a pool of underlying exposures for the transfer of risk. Re-securitized exposures are the exposures which are issued out of a pool of underlying exposures which constitutes non-securitized exposures and some portion of securitized exposures. The application is capable of handling both securitized exposures and re-securitized exposures. It also handles the calculation for the originator and the investor bank roles. At a broad level, there are two categories of Investors:

- An Investing Bank who has invested heavily in securitization.
- An Investing Bank who has invested minimal in securitization.

For both the investors, the data is expected in the Stage Underlying Exposures (**STG_UNDERLYING_EXPOSURES**) for the underlying of the pool, Total Pool Level attributes in the Stage Pool table (**STG_SECURITIZATION_POOL**), Tranche Level attributes in the Stage Tranche table (**STG_SECURITIZATION_TRANCHE**), and the Exposure Level Attributes in the respective product processor (PP) tables.

For an originator, the data is expected in the same manner as the Investor, except for the Underlying Exposures. The underlying exposures of the pool are expected in the respective PP tables, depending on the product type of the underlying exposures.

If the exposure is a credit protection in the form of guarantee, it is expected in the Stage Guarantees table (**STG_GUARANTEES**), and if it is a credit derivative, it is expected in the Stage Credit Derivatives table (**STG_CREDIT_DERIVATIVES**). If it is a regular investment in the Tranches by an investing bank, or it is part of the mandate for retention in the pool or tranche for an originating bank, the data is expected in the Stage Investments table (**STG_INVESTMENTS**).

For exposures being a facility like liquidity facility, or servicer cash advance, the exposures are expected in the Stage Commitment Contracts table (**STG_COMMITMENT_CONTRACTS**).

The Basel Accord specifies Standardized Approach for the calculation of the capital charge for the Securitization exposures:

- Standardized Approach

The standardized approach is handled by the application. In some computations, the calculations pertaining to the underlying exposures of the securitization transaction are required. This is computed before processing the Securitization exposures.

Process Flow for Securitization – Standardized Approach

The process flow for Standardized Approach of Securitization exposures are as follows:

The only change in the computation of the Securitization - Standardized Approach process, in the Basel III processing of the current release of the application is in the Sec Pre-CRM Computation Process. Under this process, for Sec Deduction Process, the exposures which are lower than the investment grade and the unrated exposures are risk weighted at 1250%.

For more information on the processing of the remaining line items Securitization – Standardized Approach process flow, see Securitization.

4.2.1.3 Credit Valuation Adjustments

Basel committee has introduced a new Credit Valuation Adjustment (CVA) capital charge, which is added to default risk capital charge to arrive at the new Counterparty Credit Risk (CCR) capital charge. The mark to market counterparty credit losses or the spread migration risk is captured with CVA, which were not directly capitalized before. CVA is the difference between the risk-free portfolio value and the true portfolio value that takes into account the possibility of the counterparty's default. In other words, CVA is the market value of counterparty credit risk.

The application calculates CVA Charge for OTC portfolio of a bank. When using the standardized approach, it is calculated at portfolio level and for advanced approach it is calculated at counterparty level. CVA Charge is not applicable for the trades with central counterparty and structured financial transactions.

Structured financial transactions are applicable only if the supervisor specifically mentions the same. You can include or exclude structured financial transactions in CVA calculation from the Run Management window. Portfolio level considers all the trades in different OTC products with all counterparties. The charge is calculated for the entire exposure of OTC products.

Counterparty level calculations consider all trades in different OTC products with counterparty for calculation of CVA Charge. Charge is calculated for all counterparties with which banks have OTC exposures. The CVA charge for all the counterparties is summed up to ascertain the Portfolio Level Charge. The manner of consolidation is dependent on the IMM approval status and Specific Interest Rate (SIR) Value at Risk (VaR) model approval status of the bank. The following section describes two ways of consolidating default risk charge and CVA capital charge:

If the bank does not have IMM approval and Specified Interest Rate Risk as a part of approved VaR model for bonds,

> **CCR Capital Charge = Default Risk Capital Charge (Current Exposure Method or Standardized Method based, whichever the bank is using for CCR) + Standardized CVA Capital Charge**

If the bank has IMM approval Specified Interest Rate Risk as a part of approved VaR model for bonds,

> **CCR Capital Charge = Default Risk Capital Charge + Advanced CVA Capital Charge**

NOTE: All the OTC Derivatives products are part of CVA calculations. SFTs are included if you select the option from Run Management Window. Also, trades with Central Counterparty (CCP) are excluded from CVA Charge calculations.

4.2.1.3.1 Assumptions

CVA hedge should be identified by the clients separately. Only single name CDS and Index Hedge are eligible for CVA. The Basel III Accord does not clearly mention whether index hedge position should be marked to the counterparty or not. The Basel Regulatory Capital application handles the index position in the following manner:

1. Both index position marked to the level of counterparty or not marked to the level of counterparty is handled by the application.
2. Effective index hedge amount is considered in the CVA charge calculation at portfolio level without considering whether it is marked to the counterparty or not.
3. If the index position is marked to the counterparty, then index hedge amount is considered while allocating total CVA charge to the counterparty CVA Charge, while using Standardized Approach.

4.2.1.3.2 Process Flow for Credit Valuation Adjustments

This process flow is divided into two sections, for Simple Approach and Advanced Approach.

Simple Approach

The application calculates CVA capital charge at portfolio level using the following formulae as specified by Basel guidelines:

$$K = 2.33 \cdot \sqrt{h} \cdot \sqrt{\left(\sum_i 0.5 \cdot w_i \cdot \left(M_i \cdot EAD_i^{total} - M_i^{hedge} B_i \right) - \sum_{ind} w_{ind} \cdot M_{ind} \cdot B_{ind} \right)^2 + \sum_i 0.75 \cdot w_i^2 \cdot \left(M_i \cdot EAD_i^{total} - M_i^{hedge} B_i \right)^2}$$
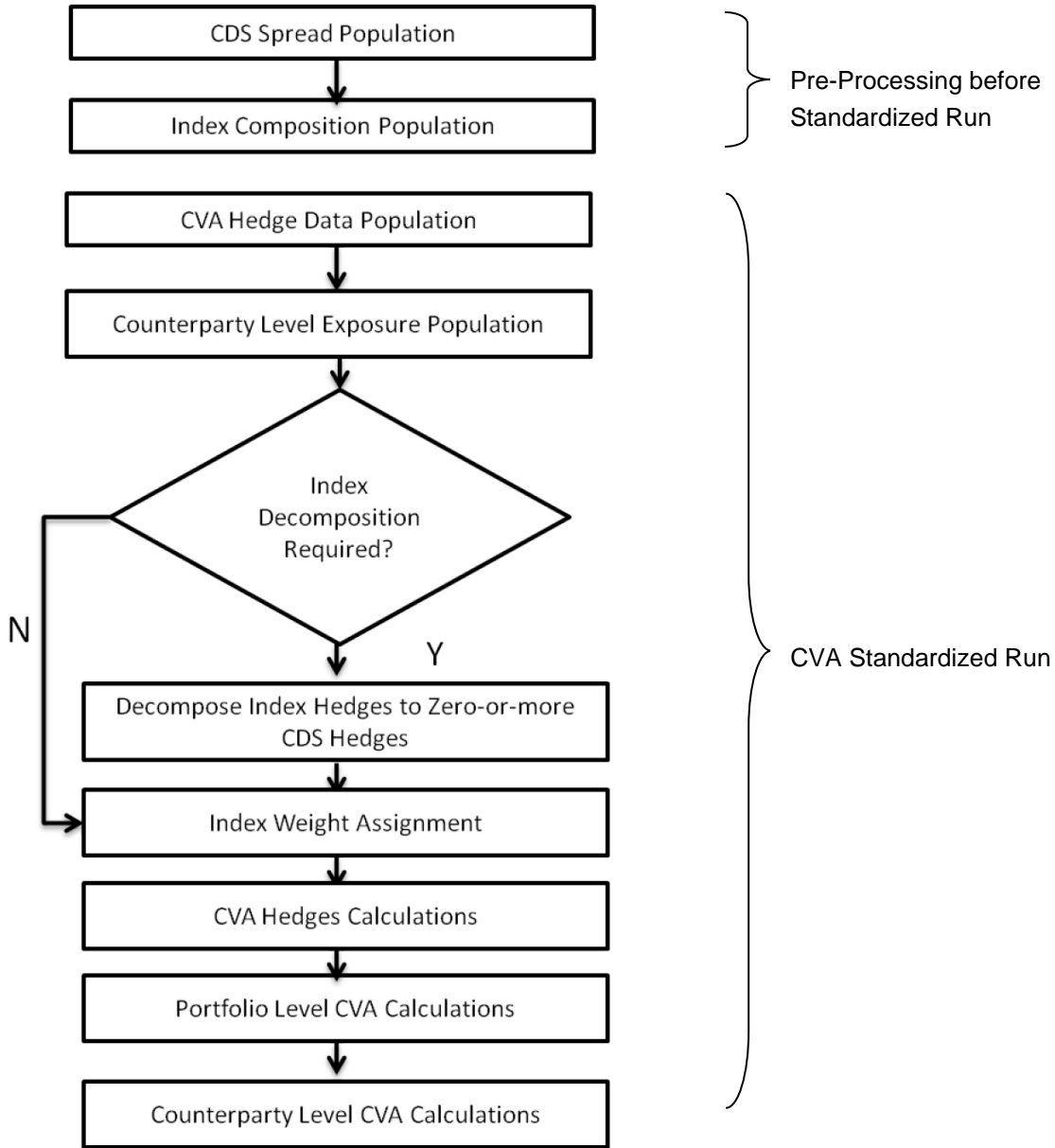
```
        ┌──────────────────────────────────┐
        │      CDS Spread Population        │
        └──────────────────────────────────┘          ┐
                        │                               ├  Pre-Processing before
                        ▼                               │  Standardized Run
        ┌──────────────────────────────────┐          ┘
        │   Index Composition Population    │
        └──────────────────────────────────┘

        ┌──────────────────────────────────┐
        │     CVA Hedge Data Population     │
        └──────────────────────────────────┘
                        │
                        ▼
        ┌──────────────────────────────────┐
        │ Counterparty Level Exposure       │
        │          Population               │
        └──────────────────────────────────┘
                        │
                        ▼
                 ◇ Index
                   Decomposition          ──── CVA Standardized Run
                   Required? ◇
         N ←──┘              Y
                        ▼
        ┌──────────────────────────────────┐
        │ Decompose Index Hedges to Zero-   │
        │    or-more CDS Hedges             │
        └──────────────────────────────────┘
                        │
                        ▼
        ┌──────────────────────────────────┐
        │     Index Weight Assignment       │
        └──────────────────────────────────┘
                        │
                        ▼
        ┌──────────────────────────────────┐
        │     CVA Hedges Calculations       │
        └──────────────────────────────────┘
                        │
                        ▼
        ┌──────────────────────────────────┐
        │  Portfolio Level CVA Calculations │
        └──────────────────────────────────┘
                        │
                        ▼
        ┌──────────────────────────────────┐
        │ Counterparty Level CVA Calculations│
        └──────────────────────────────────┘
```

CDS Spread Population and Index Composition Population

Pre-processed data for CVA is required to be populated only once for a particular execution date. The process **CVA_DATA_POPULATION** in the Run **Staging Data Population - BIS Credit Value Adjustment** is responsible for populating pre-processed data for CVA.

CVA Hedge Data Population

Mitigants data marked as CVA Hedge is populated as a part of the CVA Hedge Data Population. The application loads all the single name CDS hedge and index hedge data. The hedge data marked as CVA does not flow in the application during the CCR process. New tables are not added for hedge records; however a few columns are added to the existing table to capture CVA specific data. CVA specific data is present in the following tables:

- **F_CVA_HEDGE**: Identifier for CVA Hedge records by which the application identifies it as CVA Hedge.

- **N_CDS_INDEX_AVG_SPREAD**: Average traded CDS Index Spread which is required for assignment of weight to the index.

- **V_REF_ENTITY_**PARTY_**ID**: This field captures the counterparty of the hedge transaction.

Counterparty Level Exposure Population

The application expects the uncovered EAD at netting agreement level or at trade level. This is available as an output of Current Exposure Method (CEM). If more than one netting agreement is available, then the exposures are summed at counterparty level. These aggregated data is stored in **FCT_REG_COUNTERPARTY_CVA** table using **COUNTERPARTY_EXPOSURE_POPULATIO** T2T.

Maturity adjustment discount factor is computed at netting agreement level or for each netting agreement using the formula **1- exp(-0.05*M_i)/ (0.05*M_i).**

Maturity is the notional weighted maturity at netting agreement level. The application sums the data for exposure at counterparty level. If more than one netting agreement is available, the exposures are discounted and then summed at counterparty level. Weight assignment is done based on the counterparty rating as specified in the following table. Data is aggregated at counterparty level and stored in separate counterparty table.

Rating	Weight
AAA	0.7%
AA	0.7%
A	0.8%
BBB	1.0%
BB	2.0%
B	3.0%
Lower Than B	10.0%
Unrated	1.0%

Index Decomposition Required

You can select index decomposition which is executed in the **Run Management** window. Index decomposition option, creates single name CDS hedge positions for the counterparties which are part of the CDS Index and also have exposures. Index hedge amount is adjusted by the same amount for which single name CDS hedge is created, so as to get maximum benefit from hedging. Maturity of the single name CDS hedge is considered same as the maturity of index.

Index Weight Assignment

The application derives the weight for each index by assigning rating. Rating is assigned by comparing the historical average spread of index with spread corresponding to the tenor, which is equal to the maturity of index. After acquiring the rating, assign the weights to the index as per the reference table (weights table). Average index spread and credit spread data for different ratings are the inputs. Index spread is populated as a part of mitigants data. Credit spread data for respective ratings and tenors are required as inputs.

CVA Hedge Calculations

After population of hedge data and creation of single name CDS hedge from the index, the application sums the notional to counterparty level and populates in CVA Specific table. Maturity Adjustment discount factor is computed using the formula (1-exp (-0.05* Mihedge))/ (0.05* Mihedge). If more than one CDS Contract is available for the counterparty, the amount is summed at counterparty level. The Index Hedge amount is calculated separately. Maturity Adjustment discount factor for index position is computed using the formula (1-exp (-0.05* Mind)) / (0.05* Mind). If more than one index hedge is available then index hedge amount is summed. All the data required for CVA calculation is populated from Mitigants data to CVA specific table. The data is summed for every counterparty and stored.

Portfolio Level CVA Calculation

Portfolio Level CVA Charge is calculated as per the following formula:

$$K = 2.33 \cdot \sqrt{h} \cdot \sqrt{\left(\sum_i 0.5 \cdot w_i \cdot \left(M_i \cdot EAD_i^{total} - M_i^{hedge} B_i \right) - \sum_{ind} w_{ind} \cdot M_{ind} \cdot B_{ind} \right)^2 + \sum_i 0.75 \cdot w_i^2 \cdot \left(M_i \cdot EAD_i^{total} - M_i^{hedge} B_i \right)^2}$$

The CVA charge calculated at portfolio level is populated in the **FCT_REG_CVA_SUMMARY** table. Single Name CDS Hedge component for CVA at portfolio level is calculated and the summary table is populated using **CVA_SUMMARY_POPULATION** T2T.

Counterparty Level CVA Calculation

CVA Capital Charge at counterparty level is allocated using the following formula:

CVA at Counterparty = Total CVA at Portfolio *W_{CVAi}

W_{CVAi} = Absolute[0.5*W_i *(M_i * EAD_{itotal} - M_i^{hedge} * Bi) - $\sum_{indi}(W_{ind} * M_{ind} * B_{ind})$]/

$\sum_i^n$Absolute[0.5*W_i * (M_i * EAD_{itotal} - M_i^{hedge} * Bi) - $\sum_{indi}(W_{ind} * M_{ind} * B_{ind})$]

Advanced Approach

Expected Exposure Data Population

The data requirement which is required as input for calculation of CVA Charge using Advance Approach is as follows:

$$CVA = \left(LGD_{MKT}\right) \cdot \sum_{i-1}^{T} Max\left[0; exp\left(-\frac{s_{i-1} \cdot t_{i-1}}{LGD_{MKT}}\right) - exp\left(-\frac{s_i \cdot t_i}{LGD_{MKT}}\right)\right] \cdot \left(\frac{EE_{i-1} \cdot D_{i-1} + EE_i \cdot D_i}{2}\right)$$

LGDMKT: This is the LGD of the counterparty based on the spread of a market instrument of the counterparty. It should be based on market assessment and not an internal estimate. LGD Market should be an input for every counterparty.

Si: This is the credit spread of the counterparty at each tenor Ti, which is used to calculate CVA of the counterparty. Spread data is an input for each counterparty and tenor level.

Ti: This is the tenor at which the Expected Exposure (EE) and spread are provided. Tenor is an input for each EE and spread.

EEi: This is the expected exposure (EE) of the counterparty at revaluation time ti where exposures of different netting agreements of counterparties is added. Expected exposure is an input at each counterparty and tenor level.

Di: This is the default risk free discount factor for each revaluation time bucket. Default risk free rate is an input for each counterparty and tenor ti.

Counterparty Level CVA Calculation

CVA RWA calculation at counterparty level is computed by the following formula:

CVARWA = 12.5*K

Where K= CVA capital charge calculated as per formula specified in Standardized or Advanced method for each counterparty.

The application calculates the CVA Charge at counterparty level using the below formula for two different scenarios:

- Expected Exposure calculated with Current Market Data.
- Expected Exposure calculated with Stressed Market Data.

K = 3* (CVAUnstressed VAR + CVAStressed VAR)

The application calculates the CVA Charge at counterparty level using this formula, for every counterparty, and sums the CVA charge for all counterparties to compute portfolio level capital charge.

The CVA charge calculated at portfolio level is populated in the **FCT_REG_CVA_SUMMARY** table.

These aggregated data is stored in **FCT_REG_COUNTERPARTY_CVA** table using **COUNTERPARTY_EXPOSURE_POPULATIO** T2T.

Portfolio Level CVA Calculation

CVA RWA calculation at portfolio level is computed using the following formula:

> **CVA$_{RWA}$ = 12.5*K**
>
> Where K= CVA capital charge calculated as per formula specified in standardized or advanced method at portfolio level.

NOTE: CVA RWA is added to Credit RWA and is not multiplied by the factor 1.06.

4.2.1.3.3 Key Data Elements

Key data elements are provided in this section for computation for Credit Valuation Adjustment. For a complete list of tables and columns to be updated, see the Download Specifications document.

- CDS Index Composition data requirement.
- CDS Spread data for Rating and Tenor.
- Average Index Spread for all the Index Hedge Position.

4.2.1.3.4 Out of Scope

The following is not covered by the application in the computation of Credit Valuation Adjustment:

- Treatment of specific wrong way risk.
- Treatment of incurred CVA loss

4.2.1.4 Market RWA

The Basel Committee has introduced Market Risk Capital Charge calculation in 1996 as an amendment to the earlier Basel accord by considering the risk borne by a financial institution having exposures in the trading book. BIS defines Market Risk as "the risk of losses in the on and off-balance-sheet positions arising from movements in market prices". It is the risk that arises out of the adverse movements of the market factors. Market risk consists of the risk borne by the bank due to the positions in its trading book.

Basel outlays two basic approaches for calculating the capital charge for Market Risk:

- Standardized Approach
- Internal Model Method Approach

4.2.1.4.1 Standardized Approach

In standardized approach (STD Approach), the Market Risk Capital Charge is calculated for the following instrument types:

- Interest Rate related Instruments (IR Instruments)
- Equity Position Risk
- Foreign Exchange Risk
- Commodities
- Options

Prerequisite for MR Processing

Execution of the Run, **Staging Data Population - Market Risk - BIS Standardized Approach** is usually a onetime activity. This should be executed once before actual Market Risk Run is executed. This Run is expected to execute in following circumstances. The following tasks are performed when the Run is executed.

- Interest Rate Curve Data
- Market prices of the instruments
- Bank positions

This Run populates the instrument level data that is required by the actual Run for further processing. The instrument level data such as number of units of the instruments on that particular MIS date is downloaded in bank instrument position (**STG_BANK_POSITIONS)** table. This data flows into the fact table for further processing. The OTC instrument price is expected as a download. For non-OTC instruments the data for instruments' price is captured in Market Instrument Contract (**STG_MKT_INSTRUMENT_CONTRACT**) table. This data further flows into the fact table.

For IR instruments, the interest rate required is captured in IRC Rate History (**STG_IRC_RATE_HIST**) table. This data further flows into the fact table. This data is required for term structure that is used in Modified Duration and Greeks Parameter calculation for options.

Process Flow for Market Risk - Standardized Approach

The following pre-defined Run can be executed to compute Market RWA using the Standardized Approach.

Run: Risk Weighted Asset Calculation - Market Risk - BIS Standardized Approach

For more information on the computation of Market Risk using the Standardized and IMM approaches, see Market RWA.

4.2.1.5 Fundamental Review of Trading Books (FRTB) – Standardized Approach

In January 2016, the Basel Committee for Banking Supervision replaced the existing minimum capital requirements with revised standards for market risk. These revised standards include amendments that were made to the Basel III: International Convergence of Capital Measurement and Capital Standards - Comprehensive Version that was published in June 2006. These guidelines are referred to as the Fundamental Review of Trading Books (FRTB). In the Standardised Approach (SA), the Market Risk Capital is calculated as a sum of the following three instrument types:

- Sensitivities Based Method

    In the Sensitivities Based Method, the market risk capital charge is calculated from sum of the Delta, Vega, and Curvature risk measures of the seven risk classes.

    Depending on the characteristics of a bank portfolio's instrument, one or more these risk classes might be applicable. Under the Sensitivities Based Method, the risk charge for each of the risk classes is calculated by aggregating the following risk measures:

- Delta

- Vega

- Curvature

- Default Risk Charge

  The Default Risk Charge is a risk measure that captures the Jump-to-Default (JTD) risk of an instrument, which is the loss suffered by a holder if the issuer of a bond or equity defaults. This Default Risk Charge is computed separately for each instrument. Changes in market value due to credit quality are captured by the Sensitivities Based Method's Delta charge for Credit Spread Risk factors. In the Standardized Approach, the Default Risk Charge is independent of capital charges for CSR non-securitizations and securitizations.

  The Default Risk Charge is classified into three types of risk classes based on; securitization, non-securitization, and the positions that qualify and do not qualify for Correlation Trading Portfolio (CTP).

- Residual Risk Add-on

  The Residual Risk Add-On was introduced as not all market risks can be captured by the standardized approach. The Residual Risk Add-On is calculated for all instruments in addition to risk charges that arise from the Sensitivities Based Method and the Default Risk Charge. Instruments that are subjected to the Residual Risk Add-on do not have an impact in increasing or decreasing the scope of risk factors with respect to the Delta, Vega, Curvature, and Default Risk Charge.

NOTE: The regulatory capital requirements for market risk under the standardized approach on FRTB must be computed separately for each of the trading desks of the banks on a daily basis and reported to their supervisors on monthly basis or/and at the demand of their supervisors.

```
                          ┌─────────────────────────┐
                          │  Standardized Approach   │
                          └─────────────────────────┘
         ┌────────────────────────┼────────────────────────┐
┌──────────────────────┐  ┌──────────────────────┐  ┌──────────────────────┐
│ Sensitivities Based  │  │  Default Risk Charge │  │ Residual Risk Add-on │
│       Method         │  │        (DRC)         │  │                      │
└──────────────────────┘  └──────────────────────┘  └──────────────────────┘
```

Standardized Approach

Sensitivities Based Method

- **General Interest Rate Risk (GIRR)**
- **Credit Spread Risk Non-Securitization**
- **Credit Spread Risk Securitization Non-Corelation Trading Portfolio (CTP)**
- **Credit Spread Risk Securitization CTP**
- **Equity Risk**
- **Commodity Risk**
- **Foreign Exchange Risk**

Default Risk Charge (DRC)

- **DRCNon-Securitization**
- **DRC Securitization (Non-CTP)**
- **DRC Securitization (CTP)**

Residual Risk Add-on

4.2.1.5.1 Sensitivities Based Method

4.2.1.5.1.1 Risk Measures

Process Flow for the Delta Risk Measure

```
┌─────────────────────────┐
│  Netting of Long and Short │
│       Instruments         │
└─────────────────────────┘
            │
            ▼
┌─────────────────────────┐
│   Risk Weight Assignment  │
└─────────────────────────┘
            │
            ▼
┌─────────────────────────┐
│      WSₖ Calculation      │
└─────────────────────────┘
            │
            ▼
┌─────────────────────────┐
│  Intra- bucket Correlation for all │
│        Scenarios          │
└─────────────────────────┘
            │
            ▼
┌─────────────────────────┐
│     Calculation of Kᵦ     │
└─────────────────────────┘
            │
            ▼
┌─────────────────────────┐
│  Inter- bucket Correlation for all │
│        Scenarios          │
└─────────────────────────┘
            │
            ▼
┌─────────────────────────┐
│  Delta Risk Charge Calculation │
└─────────────────────────┘
```

The Delta sensitivities are calculated by using the baseline Present Values (PV) and stressed PVs. The fetched sensitivities are based on risk factors of the respective risk class. Based on the position of the exposure, for non-swap instruments or swap instrument, whether a leg is pay or receive, the exposures are netted. The risk weights, as prescribed by the regulator, are pre-defined in the solution and can be changed if desired. The calculation of the WS_K is done on the basis of the risk-weighted sensitivities. Correlation values are computed for both Intra and Inter-bucket correlation. The computation of different prescribed correlation scenarios such as High, Medium, and Low are executed simultaneously by the application. The scenario that yields the highest delta risk weight is used for aggregating the total risk charge for the trading desk.

Process Flow for the Vega Risk Measure

```
┌─────────────────────────────┐
│   Netting of Long and Short │
│         Instruments         │
└─────────────────────────────┘
              │
              ▼
┌─────────────────────────────┐
│    Risk Weight Assignment   │
└─────────────────────────────┘
              │
              ▼
┌─────────────────────────────┐
│        WSk Calculation      │
└─────────────────────────────┘
              │
              ▼
┌─────────────────────────────┐
│   Intra- bucket Correlation │
│        for all Scenarios    │
└─────────────────────────────┘
              │
              ▼
┌─────────────────────────────┐
│       Calculation of Kb     │
└─────────────────────────────┘
              │
              ▼
┌─────────────────────────────┐
│   Inter- bucket Correlation │
│        for all Scenarios    │
└─────────────────────────────┘
              │
              ▼
┌─────────────────────────────┐
│  Vega Risk Charge Calculation│
└─────────────────────────────┘
```

The calculation for the Vega sensitivity is based on Vega inputs and values. The Vega sensitivity is only calculated for an instrument's optionality. The Vega sensitivities are mapped to the relevant risk factors of the respective risk class post interpolation. Based on the position of the exposure, in the case of non-swap or swap instruments i.e. long or short, or whether a leg is pay or receive, the exposures are netted. The risk weights as prescribed by the regulator are pre-defined in the solution and can be modified. The calculation of the WS_K is done on the basis of the risk-weighted sensitivities. Correlation values are then computed on the fly for both Intra and inter bucket correlation. The computation of different prescribed correlation scenarios such as High, Medium, and Low are executed simultaneously by the application. The scenario that yields the highest Vega risk is used for the aggregation of total risk charge for the trading desk.

Process Flow for the Curvature Risk Measure

```
┌─────────────────────────────┐
│  Calculate the CVR_K Value for │
│         each Bucket          │
└─────────────────────────────┘
               │
               ▼
┌─────────────────────────────┐
│  Intra- bucket Correlation for all │
│          Scenarios           │
└─────────────────────────────┘
               │
               ▼
┌─────────────────────────────┐
│     Calculation of K_b       │
└─────────────────────────────┘
               │
               ▼
┌─────────────────────────────┐
│  Inter- bucket Correlation for all │
│          Scenarios           │
└─────────────────────────────┘
               │
               ▼
┌─────────────────────────────┐
│    Curvature Risk Charge     │
│        Calculation           │
└─────────────────────────────┘
```

A risk measure that accounts for the incremental risk of the price changes in the value of an option not captured by a delta risk measure. The calculation for this measure is based on two stress scenarios; the upward and downward stress shock of a risk factor. The Vega and Curvature risk measures only apply to instruments that contain optionality.

4.2.1.5.1.2 Risk Classes

GIRR – The General Interest Rate Risk is the risk due to the absolute value of the interest rate or the relationship between interest rates changing that in turn changes the value of the investment. The risk factors in FRTB for the General Interest Rate Risk are identified as the yield curve in the denominated currency, the term structure as time vertices, and the flat curve of inflation in the denominated currency. Cross currency basis with term structure not recognized.

> **Delta** – The delta sensitivity is computed for two risk factors; a risk-free yield curve for interest rate sensitive instruments for each currency and the maturity for the vertices: 0.25 years, 0.5 years, 1 year, 2 years, 3 years, 5 years, 10 years, 15 years, 20 years, and 30 years. The GIRR delta risk factor also includes a cross currency basis risk-factor and a flat curve of market-implied inflation rates for each currency.

> **Vega**- The implied volatilities of options that reference GIRR-sensitive underlyings in two dimensions; the maturity of the option and the residual maturity of the underlying of the option for the vertices: 0.5 years, 1 year, 3 years, 5 years, and 10 years. Vega sensitivities are assigned to their respective buckets by bilinear interpolation.

> **Curvature**- The Curvature sensitivity is computed for only one risk factor; the risk-free yield curve for interest rate sensitive instruments for each currency. Similar to the Delta risk measure for GIRR, all the vertices are shifted in parallel. The Curvature sensitivity does not include the risk

factors of cross currency basis risk and inflation. There will be no intra-bucket correlation as the bucket and CVR_k granularity are the same in GIRR. There will be only one CVR_k per bucket.

Equity – Equity risk is due to the volatility in the price of the equity, where the risk is incurred due to holding equity exposures and equity instruments. The equity risk factors in FRTB are all the equity spot prices and the equity repurchase agreement rates.

> **Delta** – The delta sensitivity is computed for two risk factors; the equity's spot price and the equity's repurchase agreement (repo) rate.

> **Vega**- The implied volatility of options that reference the equity spot price as underlying and the maturity for the vertices; 0.5 years, 1 year, 3 years, 5 years, and 10 years.

> **Curvature-** The Curvature sensitivity is computed for one risk factor; all the equity's spot prices. Equity repo rates do not contain a curvature risk charge.

Foreign Exchange - Foreign Exchange Risk or Forex risk is due to the value change of an exposure due to changes in the currency exchange rates. The risk factor in FRTB for Forex risk is identified as the exchange rates between the currency in which the instrument is denominated and the reporting currency.

> **Delta** – The delta sensitivity is computed for risk factor that is the exchange rate between the denominated currency and the reporting currency of the instrument.

> **Vega**- The optionality's volatility for exchange rates and the maturity for the vertices; 0.5 years, 1 year, 3 years, 5 years, and 10 years.

> **Curvature-** The Curvature sensitivity is computed for only one risk factor; the exchange rate between the denominated currency and the reporting currency of the instrument.

Credit Spread Risk - Non Securitization – A credit spread is the difference in yield between a risk-free interest curve, e.g. a Government Bond, and the yield of a marketable security e.g. a Corporate Bond, with the same maturity but of lesser quality. Based on the credit rating of instrument, credit spreads vary from one security to another. Credit Spread Risk buckets are based on a combination of party types and industries to arrive at the 'Sector' for the bucketing. The credit quality is divided into two parts; 'Investment Grade' and 'High Yield & Non – Rated' are based on the credit rating of the security. Securities that do not in which the application is unable to assign any security to any of the bucket will be assigned to "Others" bucket.

> **Delta** – The delta sensitivity is computed for two risk factors; the issuer's credit spread curve, bonds and Credit Default Swap (CDS), and the maturity for the vertices; 0.5 years, 1 year, 3 years, 5 years, and 10 years. The calculation of the 'Others' bucket is done after the risk charge calculation.

> **Vega**- The implied volatilities of options that reference the credit issuers name as underlying for bonds for one dimension; CDs and the maturity for the vertices; 0.5 years, 1 year, 3 years, 5 years, and 10 years. The calculation of the 'Others' bucket is done after the risk charge calculation.

> **Curvature-** The Curvature sensitivity is computed for one risk factor; the risk-free yield curve per currency of the issuer. All the vertices are shifted in parallel. The CVR_k is calculated at the Issuer granularity level; hence one bucket contains multiple correlations.

Credit Spread Risk - Securitization (CTP) – The Credit Spread Risk - Securitization (CTP) criteria and calculations are similar to the ones in Credit Spread Risk - Non Securitization.

Delta – The delta sensitivity is computed for two risk factors; the issuer's credit spread curve, bonds and CDS and the maturity for the vertices; 0.5 years, 1 year, 3 years, 5 years, and 10 years. The calculation of the 'Others' bucket is done after the risk charge calculation.

Vega- The implied volatility of the options that reference the credit spread curve as underlying, for bonds and CDs, for one dimension; the maturity for the vertices; 0.5 years, 1 year, 3 years, 5 years, and 10 years. The calculation of the 'Others' bucket is done after the risk charge calculation.

Curvature- The Curvature sensitivity is computed for one risk factor; the underlying credit spread curve for bonds and CDS.

Credit Spread Risk - Securitization (Non CTP)- The risk for holding securitized instrument, when the credit spreads change gets captured by this risk class. Defined buckets are reclassified in to standard pool types to arrive at the sectors. Credit quality selection depends upon the seniority of the tranche and the credit rating of the instrument.

Delta – The Delta sensitivity are defined on two dimensions; tranche, credit spread curves and the following vertices: 0.5 years, 1 year, 3 years, 5 years, 10 years to which delta risk factors are assigned.

Vega- The Vega sensitivity is allocated for the maturity of the option represented on the standard vertices; 0.5 years, 1 year, 3 years, 5 years, 10 years, through linear interpolation.

Curvature- The CSR securitization curvature risk factors are defined on one dimension: the relevant tranche credit spread curves (bond and CDS). The CV_rK is calculated along tranche granularity and contains multiple CV_rKs per bucket.

Commodity - The commodity price risk is the volatility in market price due to the price fluctuation of a commodity. A commodity's price is affected by politics, seasonal changes, technology, and current market conditions. Based on the underlying commodity, the exposures are allocated to buckets.

Delta – The delta sensitivity is computed for the following risk factors; the commodity's spot prices, which depends on the contract grade, the city of the commodities legal terms and the maturity of the vertices from 0 to 30 years.

Vega- The implied volatility of the option for a commodity's spot price as underlying for one dimension; the maturity for the vertices; 0.5 years, 1 year, 3 years, 5 years, and 10 years.

Curvature- The Curvature sensitivity is computed for one dimension; the constructed curve of the commodity's' spot price.

4.2.1.5.2   Default Risk Charge

The Default Risk Charge (DRC) is used to capture the Jump-to-Default (JTD) risk of an instrument i.e. the loss that would be suffered by the holder if the issuer of the bond or equity were to default. It is computed for each instrument separately and is a function of the face amount or notional, market value of the instrument, and the Loss Given Default (LGD). The change in market value due to credit quality is captured by the Sensitivities Delta charge for Credit Spread Risk factors.

The Default Risk Charge is distinct from a counterparty to a trade defaulting in which it is capitalized under the Credit Risk and not Market Risk.

Default Risk Charge is broadly classified into three types of risk classes based on non-securitisation and securitisation positions and as the positions that qualify and do not qualify to the Correlation Trading Portfolio (CTP).

- Default Risk Charge Non – Securitization.

- Default Risk Charge Securitization Non – CTP

- Default Risk Charge Securitization CTP.

Process Flow for the Default Risk Charge

```
┌─────────────────────────────┐
│     Bucket Allocation        │
└─────────────────────────────┘
              ↓
┌─────────────────────────────┐
│  Credit Direction Allocation │
└─────────────────────────────┘
              ↓
┌─────────────────────────────┐
│   P&L Calculation for every  │
│         Exposure             │
└─────────────────────────────┘
              ↓
┌─────────────────────────────┐
│   JTD Calculation for every  │
│         Exposure             │
└─────────────────────────────┘
              ↓
┌─────────────────────────────┐
│  Netting based on Senority and │
│      Credit Direction        │
└─────────────────────────────┘
              ↓
┌─────────────────────────────┐
│  Risk Weight Assignment based │
│         on Rating            │
└─────────────────────────────┘
              ↓
┌─────────────────────────────┐
│ Hedge Benefit Ration Calculation │
└─────────────────────────────┘
              ↓
┌─────────────────────────────┐
│ Default Risk Charge Calculation │
└─────────────────────────────┘
```

The Default Risk Charge for Non – Securitised instrument is only applicable for equity and credit instruments. With an instrument type filter, all the applicable exposures are populated in the landing table. The Credit Direction allocation is based on the position of the exposure and the option type for option instruments. The P&L Calculation depends on the instrument type, position, and the option type of the exposure. Based on the claim seniority the exposure are netted. DRC of each bucket is calculated which later gets aggregated to arrive at final risk charge.

4.2.1.5.3   Residual Risk Add-on

The Residual Risk Add-On captures any market risk that has not been captured by the Sensitivities Based Method and Default Risk Charge of the standardized approach. The Residual Risk Add-on is applicable in addition to any other risk charge i.e. a Residual Risk Add-on does not increase or decrease the scope of any other risk charges and is separately calculated and added to the risk charge from the Sensitivities Based Method and Default Risk Charge. A set of conditions, but not limited to, are prescribed by BIS that decides if a certain exposure will carry a Residual Risk Add- on or not are described below:

- All instruments with an exotic underlying.

- Asian options.

- Callable bonds issued by a retail issuer.

- Instruments that fall under the definiton of the Correlation Trading Portfolio (CTP), except those that are recognised in the market risk framework as eligible hedges of risks within the CTP.

- Options without an option maturity and that have been assigned to the largest maturity vertex for Vega computation.

The following scenarios are excluded from the Residual Risk Add-On instrument type:

- Instruments that have been used in a back-to-back transaction.

- Instrument that are listed and/or eligible for central clearing.

4.2.1.5.4 Market Risk Measurement and Management (MRMM) Integration for FRTB Standardized Approach

The integration of the MRMM services of the Stress Framework and Instrument Valuation for the Sensitivities Based Approach (SBM) of FRTB Standardised Approach allows you to have seamless valuation and market risk charge calculation.

You can use MRMM's stress framework and valuation services, supported by Numerix, or any third-party valuation services. An integration between OFSAA applications allows you to avoid reduant data and provides you with single point valuation and risk charge computation. You can expect the following possibilites with this integration:

7. The Basel FRTB solution uses the services of MRMM's stress framework to shock the market data and the valuation services to obtain the Present Values (PVs), Vega, and Implied Volatility. These are then used to compute the risk charges under the Sensitivities Based Method of the FRTB standardised approach. To do this, the application seeds the required standard scenarios for different calculations to stress the market data on the MRMM Stress Framework.

8. For the Delta risk charge calculations, the Delta sensitivities are calculated by using the PV values at a baseline level i.e. PV values witout any shock to the market data, and the stressed PV values i.e. PV values with shocked market data with shocks as prescribed by BIS.

9. For the Vega risk charge calculations, the Vega sensitivity is calculated by multiplying the Vega of the exposure with the implied volatility of the exposure. The Vega and the implied volatility are provided by MRMM for all the required exposures.

10. For the Curvature risk charge calculations, the PV with upward shock to the market data, the baseline PV i.e. the PV without any shock to the market data, and the PV with downward shock to the market data are provided by MRMM. This is achieved by making use of the stress framework and using multiple scenarios to stress the market data in the required manner.

11. Only the Sensitivities Based Method (SBM) approach uses MRMM services. The Default Risk Charge and Residual Risk Add-on are independent of MRMM.

12. If you do not use the services of MRMM, then you need to manually add the required valuation inputs in the Delta, Vega and Curvature input tables along with the scenario definition table in the required format..

4.2.1.5.4.1Process Flow

In an integrated scenario the user is provided with the needed set of scenarios predefined and packaged with the product. These scenarios will be used by the application to not just stress the market data but the unique identifier of the scenarios i.e. N_SCENARIO_ID is also used to identify various other parameters of the exposure.

The solution detailing below details the requirements for both cases; an integrated situation with MRMM services being used and a situation with no integration i.e. only Basel FRTB std. approach being used without any of the MRMM services being used.

As stated previously, the MRMM services of valuation and stress testing are only required for the Sensitivities Based Method of the FRTB standardised approach. The Delta, Vega, and Curvature risk measures are handled in the following ways with the MRMM integration:

IV.   Delta

    vi.   The Delta calculations requires two types of PVs; the PV of the exposure without shocking the market data and the PV of the exposure with the prescribed shocks.

    vii.   The pre-configured scenarios for MRMM stress framework are available. In an execution, all the scenarios are executed through the market data, and then based on the market data, the scenario is applied per exposure.

    viii.   The different scenarios are then used to apply shocks to different market data. Depending on the market data followed by an instrument, the shock value stresses the market data

    ix.   The scenario ID of an is also used to identify the risk class, risk measure, time vertex, shock value, credit spread curve type, and the shock direction needed for the calculations associated with that scenario. This assigns an exposure to the correct calculation template and in order to proceed with the calculations.

    x.   If an exposure is associated with a swap instrument type or not is based on the instrument type of the exposure.

V.   Vega

    iv.   For the Vega sensitivity, the Vega value and the implied volatility per exposure are multiplied.

    v.   There is no stressing of marked data for calculating the Vega sensitivity.

    vi.   The credit spread curve type indicator for an exposure, whether an exposure follows a bond curve or the CDS curve, cannot be identified from the scenario IDs. To fetch the Vega values and the implied volatilities, the baseline scenario is used, where the baseline scenario must not be associated with a certain credit spread curve. Each exposure that carries the Credit Spread Risk (CSR) is associated with a credit spread curve, where Vega is a subset of Delta. After identifying the credit

spread curve type for an exposure, the Vega and implied volatility is fetched from the baseline scenario of the exposure, and then the credit spread indicator is fetched from the upward shock scenario used by the exposure.

VI.   Curvature

viii.   For curvature calculations, the baseline PV, the PV without any shock applied to the market data, the upward shocked PV, and downward shocked PVs are used with the sum of the delta sensitivities for the exposure and the shock value to arrive at the CVR_k value.

ix.   The market is shocked upward and downward as prescribed by FRTB for all exposures.

x.   Multiple scenarios are used to shock the market data. The upward shock and the downward shock are provided in different scenarios on the market data type for a risk class where the upward shock is provided as a positive shock value and the downward shock is provided as a negative shock value.

xi.   Similar to Delta calculations, the scenarios IDs are used to fetch information on the shock direction, shock value, and risk class as well as obtaining PVs. The curvature calculation is not associated time vertices.

xii.   For the Equity risk class, the curvature stress scenarios are based on the bucket that an exposure falls into.

xiii.   The Delta, Vega, and curvature risk measures are handled in the following ways with the MRMM integration:

xiv.   The Delta, Vega, and curvature risk measures are handled in the following ways with the MRMM integration:

In the case where the MRMM integration is not used, the Delta, Vega, and Curvature risk measures are handled in the following ways:

II.   Delta

iii.   You are required to manually provide all the required values for calculation such as the shocked and baseline PVs, the shock direction indicator, tenor, shock values, the risk measures, and risk classs.

iv.   You must follow the following criteria when adding data to the Delta input table:

a. For GIRR, CSR, and Commodity risk classes, the PV values are to be provided at the standard vertices as prescribed by BIS:

i. **GIRR:** Depending on the residual maturity of the exposure, 0.25 years, 0.5 years, 1 year, 2 years, 3 years, 5 years, 10 years, 15 years, 20 years, and 30 years. Cross currency and inflation curves do not contain any vertices. In the Delta input and the scenario definition tables, you must provide the cross currency scenario with a time vertex value of -8888, and then you must provide the inflation scenario with a time vertex value of -9999.

ii. **CSR non-sec, sec (CTP) and sec (non-CTP):** The vertices are; 0.5 years, 1 year, 3 year, 5 year, 10 year

iii. **Commodities:** Depending on the residual maturity of the exposure, the commodities spot are associated with the 0 year vertex, the commodity forwards are associated with 0.25 years, 0.5 years, 1 year, 2 years, 3 years, 5 years, 10 years, 15 years, 20 years, and 30 years.

iv. The **Equity** and **Commodity** risk classes are not associated with any vertices for the delta risk charge calculations. You must provide a value of -1 in the Delta input table and scenario definition table for the vertices against these scenarios. Similarly, you must provide a value of -1 in the baseline scenario table.

v. The time vertex value must always be expressed in years.

b. For each exposure, a baseline scenario PV; a PV without shock or 0 shock to the market data, and PV with an upward shock to the market data must be provided.

   Note: In the Delta Input and Scenario Definition Tables, the shock values are always expected to be provided in Basis Points (BPS) only. This restricts the Shock Type to only 'BPS'.

c. You must create separate scenarios to stress the market data associated with bond and CDS curves. 5 scenarios, 1 each for each of the time vertices to stress the CDS market data types, and another 5 scenarios, 1 each for each of the time vertices to stress the bond, market data types are to be created.

d. Based on the instrument type of the exposure, you must indicate per exposure if an exposure belongs to a swap instrument type or not.

e. You must provide details on the risk class to which the required entry in the Delta input table is made.

f. All the inputs provided in the Delta Input table must be converted in the reporting currency of the bank. For currency conversion, you must use the same exchange rates as used by the application for DRC and RRAO as well as any other areas where the currency conversion is being done. From the next release onwards this will not be the case and you will be able to provide the inputs in any desired currency and the currency conversion for the input table will be taken care of.

Vega

v. You must provide the Vega number and the implied volatility for all of the exposures of the option instrument types, including instrument types with built in optionality like callable bonds and cap floors in the Vega input table.

vi. You must use the standard prescribed vertices as well the residual maturity of the option. The underlying from the maturity of the option are interpolated to arrive at the standard vertices.

vii.   You must provide details on the risk class and the credit spread curve with the associated entry in the Vega input table.

viii. All the inputs provided in the Delta Input table must be converted in the reporting currency of the bank. For currency conversion, you must use the same exchange rates as used by the application for DRC and RRAO as well as any other areas where the currency conversion is being done. From the next release onwards this will not be the case and you will be able to provide the inputs in any desired currency and the currency conversion for the input table will be taken care of.

Curvatue

vii.   You must provide the required inputs for curvature calculation in the curvature input table and the required inputs in the scenario definition table.

viii. The exposures eligible for curvature, exposures in option instrument types, must be involved with 3 scenarios; a baseline scenario, a scenario to provide upward shock, and a scenario to provide downward shock. You must provide all 3 scenarios for a curvature eligible exposure. The scenarios depend on what risk class a certain exposure falls into.

ix.   You must provide the parameters for the shock direction, shock value from the required scenario in a record, and the risk class the record corresponds to.

Note: The credit spread curve indicator in the curvature input table is not relevant.

x.   For exposures carrying an equity curvature charge, the scenarios are configured per bucket and you must provide the shock values and the shocked PV values,both upward and downward, on the basis of which bucket the exposure falls into.

xi.   The baseline scenario is exposure specific.

xii.   All the inputs provided in the Delta Input table must be converted in the reporting currency of the bank. For currency conversion, you must use the same exchange rates as used by the application for DRC and RRAO as well as any other areas where the currency conversion is being done. From the next release onwards this will not be the case and you will be able to provide the inputs in any desired currency and the currency conversion for the input table will be taken care of.

NOTE:

ii.   MRMM provides the output in the reporting currency of the bank. For a selected portfolio, you must execute the MRMM services and the Basel FRTB standardised approach by use of the same reporting currency.

4.2.1.5.5   Assumptions

Our interpretations of a few sections:

- The Vega sensitivities are obtained by multiplying the Vega number of the exposure with the implied volatility.

- The Baseline scenario is needed for all the participating exposures in all the cases.

- The list of supported instrument types and the applicable risks for each of the instrument types are seeded out of box in the FSI_INSTR_TYPE_RISK_CLASS_MAP table. For the purpose of this table, the RRAO is also treated as a risk measure.

- Inter bucket correlation for CSR and Commodity risk classes are considered as 100%.

4.2.1.5.5.1 _Data Expectations_

The following are some key data expectations:

- We expect one instrument or exposure to be mapped to only one Credit Spread Curve.

- In the FSI_BASEL_MR_SCENARIO_DEFN table, you must provide N_SHOCK_VAL column values in Basis Points, and then the V_SHOCK_TYPE value should be 'BPS'. This also applies to the Delta and Curvature INPUT tables. You are also expected to provide the shock values in Basis points.

- In an integrated scenario, you must run the MRMM valuation, stress testing services, and the Basel FRTB Standardized approach by using the same reporting currency.

- If user is using a third party or in-house valuation engine instead of MRMM, you must populate the FSI_BASEL_MR_SCENARIO_DEFN table and adhere to the conditions of scenario creation as required by the application. The following are the detailed set of conditions and expectations in a non- MRMM case

- User must follow the standard vertices in providing the input data in for the GIRR, CSR, and Commodity risk classes as there is no interpolation of data for Delta.

- While seeding the scenarios for cross currency and inflation scenarios in the FSI_BASEL_MR_SCENARIO_DEFN table, you must use the N_TIME_VERTEX values -8888 and -9999 for cross currency and inflation scenarios respectively.

4.2.1.5.5.2 _Limitations_

- Index instruments and Multi-underlying instruments are not supported.

- Exotic Instruments are not supported.

- Covered Bond is not supported.

- DRC Sec (CTP) is not supported.

- Replication of Securitization exposures cannot be done.

- Multiple strikes and barrier instruments are not supported.

4.2.1.6 Operational RWA

As per the Basel accord, "Operational Risk is the risk of loss resulting from inadequate or failed internal processes, people and systems, or from external events". External losses can occur due to theft of information or hacking of systems. The Basel accord has prescribed three methods for calculating Operational Risk capital charges and banks can use any of these methods to calculate capital charge:

- Basic Indicator Approach

- Standardized Approach

- Alternative Standardized Approach

NOTE: When executing Solo Run for computing Operational Risk, the parent entity data is processed. However, for a Consolidated Run the parent entity and the subsidiary data are processed.

4.2.1.6.1 Basic Indicator Approach

To calculate the capital charge under the basic indicator approach, the annual gross income for each of the past three years for a standard line of business is multiplied by a fixed percentage of 15%. The average is considered to calculate the capital charge. If the annual gross income is negative or zero in any of the past three years, then the value from the numerator is excluded thereby reducing the base denominator by the same count.

The capital charge formula is as follows:

$$K_{BIA} = \left[\sum \left(GI_{1..n} \times \alpha \right) \right] / n$$

Where:

K_{BIA} = the capital charge under the Basic Indicator Approach

GI = annual gross income, where positive, over the previous three years

n = number of the previous three years for which gross income is positive

α = 15 per cent, which is set by the BCBS, relating the industry wide level of required capital to the industry wide level of the indicator.

4.2.1.6.2 Standardized Approach

In this approach, banking activities are divided into eight lines of business. The gross income for each line of business is multiplied by the beta factor which is pre-defined in the Basel accord. Every year the gross income of the standard line of business is multiplied by respective beta factor. The total capital charge is calculated as the three-year average of the sum of the regulatory capital charges across each lines of business every year. The total capital charge is calculated as follows:

$$K_{TSA} = \left\{ \sum_{years\ 1\text{-}3} \max \left[\sum \left(GI_{1\text{-}8} \times \beta_{1\text{-}8} \right), 0 \right] \right\} / 3$$

Where:

K_{TSA} = the Capital Charge under the Standardized Approach

GI$_{1-8}$ = annual gross income in a given year (as defined in the Basic Indicator Approach) for each of the eight lines of business.

β$_{1-8}$ = a fixed percentage, set by the committee, relating the level of required capital to the level of the gross income for each of the eight lines of business.

4.2.1.6.3 Alternative Standardized Approach

This approach is an extension of the standardized approach. In this approach for two lines of business: Retail Banking and Commercial Banking, the loan and advance amount is used (rather than annual gross income) which is multiplied by the fixed factor "m" and the beta factor. The beta factor as in the standardized approach remains the same for retail and commercial banking. The constant factor "m" is equal to 0.035. The capital charge for retail and commercial banking uses the loan and advance amount and for the remaining, the calculation of capital charge is the same as in the standardized approach.

The total capital charge is calculated as the three-year average of the sum of the regulatory capital charges across each lines of business every year.

For more information on computation of Operational RWA, see Operational RWA.

4.2.1.7 Capital Structure

During the economic crisis, the global banking system had an insufficient level of high level quality capital. During the crisis, it was identified that there was inconsistency in the definition of capital across jurisdictions and lack of disclosure. To address this issue of inconsistency, the Basel committee has prescribed a new definition of capital to strengthen the global capital framework under Basel III.

As per the new definition in the Basel III accord, total capital consists of sum of the following elements:

- Tier1 Capital
  - o Common Equity Tier 1
  - o Additional Tier 1
- Tier 2 Capital

Each component of capital is subject to restrictions where CET1 must be at least 4.5% of total risk-weighted asset. Tier 1 capital must be at least 6.0% of total risk-weighted asset. Total capital must be 8.0% of total risk-weighted asset. Each component of capital undergoes minority interest and regulatory adjustments. The minority interest is applicable for a bank only. Most of the regulatory adjustment line items are to be deducted from CET1.

For a bank, the accounting entity that are not part of regulatory consolidation, the investment amount is partly deducted from its respective component of capital and is partly risk weighted as per banking or trading book rules.

Significant entity investment amount (which are common shares) along with Mortgage Servicing Rights and DTA (due to temporary differences) are processed for threshold deduction where each line item is subject to 10% and 15% CET1 capital. Each line item which are above 10% and 15% limit are deducted from the CET1 Capital. Any amount below 15% is risk-weighted at 250%. If the deduction line item is following phase-in arrangement, then the amount not deducted should be risk-

weighted at 250%.

Securitization transaction, equity exposure under PG/LGD approach, and non-DvP and non-PvP transaction items, which were formerly as per Basel II, deducted 50% from Tier 1 and 50% from Tier 2 are instead risk weighted at 1250%. All the regulatory adjustment line items follow a phase-in arrangement from the beginning of 2014 till 2017.

In particular, the regulatory adjustments begins at 20% of the required adjustments to Common Equity Tier 1 on 1 January 2014, 40% on 1 January 2015, 60% on 1 January 2016, 80% on 1 January 2017, and reaches 100% on 1 January 2018.The same transition approach applies for all deductions from additional Tier 1 and Tier 2 capital.

Capital Structure process takes inputs from Fact Non Sec Exposures (**FCT_NON_SEC_EXPOSURES**) and Market Risk Exposures (**FCT_MARKET_RISK_EXPOSURES**). Capital Structure process is positioned between Market Risk data processing (**BASELIII_MKT_RISK_DATA_PROCESSING**) and Market Risk position conversion (**BASELIII_MKT_RISK_POSITION_CONVERSION**) due to the following reasons:

- The significant and insignificant investment deductions involve splitting of certain exposures into multiple exposures (2 new exposures and deletion of the parent exposure). These split exposures should be position converted and RWA is calculated on these position converted exposures.

- After processing of Market Risk, the calculated RWA is populated to Market Risk Summary (**FCT_MARKET_RISK_SUMMARY**) which contains the aggregated record for each instrument type. If Market Risk is processed before Capital Structure processing, then the RWA is adjusted for the split exposures for the Market Risk record and this task is repeated for each record.

- If the RWA for the split exposures is adjusted, then it is approximate in case the RWA is pro-rated between instrument types. The same tasks are repeated (falling into cycles) if RWA is computed in this table again.

> **NOTE:** All the GL line items are expected at Solo level for each entity. The consolidated data is discarded.
>
> While executing Solo Run the parent entity data is processed. Investment into the subsidiary data is processed as per Credit Risk and Market Risk rule. Capital line item pertaining to parent entity is only processed.
>
> While executing Consolidation Run, the parent entity and the subsidiary data is considered. Regulatory Investment data to financial institutions which are part of regulatory consolidation is treated as an internal transaction. Those subsidiaries which are outside the scope of consolidation are treated as per insignificant and significant rule.

The sub processes and rules within Market Risk Data Processing process **BASELIII_MKT_RISK_DATA_PROCESSING** perform the following tasks**:**

The Rules within the sub process **Market Risk Currency Conversion** converts the amount attributes, which are in natural currency to reporting currency, which is used for further processing. Attributes like the exposure amount, margin amount, MR notional amount, and so on are processing for currency conversion from natural currency to reporting currency.

The Rule **Mkt Risk Instrument type to Capital Comp Group Reclassification** in the sub process **Market Risk Reclassification** within **BASELIII_MKT_RISK_DATA_PROCESSING** re-classifies Market Risk instrument data into the various Capital Component Groups such as CET1, AT1.

The re-classified instruments are further processed for identification of Regulatory Entity Internal Transaction, Reciprocal Cross-Holding, Own Shares - Treasury Stock, and Significant Investment in Non Reg Consl Entity transaction. The following Rules in the **Market Risk Capital Consolidation Calculations** sub process identify these transactions:

- Cap Consl - MR Deduction of Regulatory Entity Internal Transaction
- Cap Consl - MR Basel III Deduction of Reciprocal Cross-Holding
- Cap Consl - MR Deduction of Own Shares - Treasury Stock
- Cap Consl - Mkt Risk Deduction of Significant Investment in Non Reg Consl Entity

4.2.1.7.1 Assumption

The regulatory adjustment that follows a phase-in arrangement and not deducted from CET1, needs to follow national treatment as per Basel III accord. Hence, the assumption is that the regulatory adjustment line item follows Basel II accord. Items which were formerly deducted from 50%-50% from Tier 1-Tier 2 capital are deducted from AT1 and capital investment instrument not deducted from CET1 is risk-weighted at 100%.

Since investments in accounting entities (which are outside the scope of regulatory consolidation) by parent bank are long-term investments and mostly equity related instruments, these investments are not processed for Credit Risk Mitigation.

The GL codes are expected to be unique across entities in Stage General Ledger Data (**STG_GL_DATA**) and Capital Accounting Head Dimension (**DIM_CAPITAL_ACCT_HEAD**).

4.2.1.7.2 Process Flow for Capital Structure

```
┌─────────────────────────────────────────────────────────┐
│                  Capital Consolidation                   │
└─────────────────────────────────────────────────────────┘
                            │
                            ▼
┌─────────────────────────────────────────────────────────┐
│  Calculate the Minority Interest in CET1, AT, and T2,    │
│  belonging to third party and Internal transaction in    │
│                    CET1, AT, and T2                       │
└─────────────────────────────────────────────────────────┘
                            │
                            ▼
┌─────────────────────────────────────────────────────────┐
│         Gross Capital Calculation for CET1, AT1, and T2  │
└─────────────────────────────────────────────────────────┘
                            │
                            ▼
┌─────────────────────────────────────────────────────────┐
│                  Regulatory Adjustment                   │
└─────────────────────────────────────────────────────────┘
                            │
                            ▼
┌─────────────────────────────────────────────────────────┐
│         Phase-in treatment for Regulatory Adjustment     │
└─────────────────────────────────────────────────────────┘
                            │
                            ▼
┌─────────────────────────────────────────────────────────┐
│  Insignificant Investment treatment for accounting entity│
│  where Parent Bank Holding is not more than 10% of issued│
│  common shares.                                          │
└─────────────────────────────────────────────────────────┘
                            │
                            ▼
┌─────────────────────────────────────────────────────────┐
│  Significant Investment Treatment for accounting entity  │
│  where Parent Bank holding is more than 10% if issues    │
│  common shares                                           │
└─────────────────────────────────────────────────────────┘
                            │
                            ▼
┌─────────────────────────────────────────────────────────┐
│                   Threshold Deduction                    │
└─────────────────────────────────────────────────────────┘
                            │
                            ▼
┌─────────────────────────────────────────────────────────┐
│  Post Phase-in Treatment Regulatory Adjustment and       │
│                  Threshold Deduction                     │
└─────────────────────────────────────────────────────────┘
                            │
                            ▼
┌─────────────────────────────────────────────────────────┐
│  Bifurcation of Insignificant and Significant Investment │
│                        amount                            │
└─────────────────────────────────────────────────────────┘
                            │
                            ▼
┌─────────────────────────────────────────────────────────┐
│                  Net Capital Calculation                 │
└─────────────────────────────────────────────────────────┘
                            │
                            ▼
┌─────────────────────────────────────────────────────────┐
│  RWA Calculation for CR, MR, OR and Phase –in arrangement│
└─────────────────────────────────────────────────────────┘
                            │
                            ▼
┌─────────────────────────────────────────────────────────┐
│                 Capital Ratio Calculation                │
└─────────────────────────────────────────────────────────┘
```

Capital Consolidation

See Capital Consolidation Level Selection in the Capital Adequacy Ratio Calculation.

Surplus of Minority Interest

Minority Interest as per the Basel III guidelines are calculated and the surplus amount in each tier of capital, which is attributed to third parties, are deducted from the gross capital of each tier of capital.

- Minority interest is calculated as the third party's interest (share holding percent) in the surplus capital (available capital – minimum required capital)

- All the values required for processing are populated into Minority Interest Capital (**FSI_MINORITY_INTEREST**) table which is the processing table for minority interest calculations

- The sub process – **Minority Interest Calculations** in **BASELIII_CAPITAL_STRUCTURE** process covers this processing.

The deduction also includes internal transactions in each tier of capital among the various entities which are part of the regulatory consolidation. Hence, minority interest attributed to third party and the internal transactions in each tier of capital is deducted from the gross capital of each tier of capital.

Gross Capital Calculation for CET1, AT1, and T2

For Gross Capital calculation all the components are classified into their respective tiers (CET1, AT1, and T2) based on their purpose. The total gross capital for each tier of capital (CET1, AT1, and T2) is calculated as per the definition of CET1, AT1, and T2 by adding the relevant financial instrument in each tier of capital. The sub process – **Provisions and Gross Capital Calculations** in **BASELIII_CAPITAL_STRUCTURE** process covers this processing.

Regulatory Adjustment

The unrealized gain on AFS Equity securities are added to the CET1, as per the transition, by splitting this capital line item into two.

Goodwill and other intangibles, DTAs, cash flow hedge reserve, gain on sale of securitization transaction, cumulative gain and losses due to change in own credit risk, defined pension fund asset are direct downloads (in **STG_GL_DATA** table). The General Provision is obtained as a download in the **Stage General Ledger Data** (**STG_GL_DATA)** table. All the DTLs related to phase line items are expected as download in the STG_GL_DATA table. The application calculates the values net of DTL and then processes it for the Regulatory Adjustments. This amount is prorated between the standardized approach and the IRB approach. This is processed using the **Provisions and Gross Capital Calculations** sub process.

Treasury Stock and Reciprocal Cross Holding is calculated as the sum of pre-mitigation EAD - **N_EAD_PRE_MITIGATION** in Fact Non Sec Exposures (**FCT_NON_SEC_EXPOSURES**) and **N_POST_OFFSET_AMOUNT** in Market Risk Exposures (**FCT_MARKET_RISK_EXPOSURES**) where the **F_TREASURY_STOCK_INDICATOR** is '**Y**' and **F_RECIPROCAL_CROSS_HLDG_IND** is 'Y' respectively.

All the regulatory adjustment line items are deducted from its respective tier of capital post minority and internal transaction deduction.

Insignificant Investment Treatment for Accounting Entity where Parent Bank Holding is not more than 10% of Issued Common Shares

The total investment amount of all the insignificant entity is checked against the set limit of 10% of CET1 amount of the parent bank amount post regulatory adjustments. The amount above 10% limit is processed for deduction. The total deduction amount is pro-rated among each tier of capital based on the percentage of investment in each tier of capital. The amount arrived is deducted from each tier of capital.

The investment amount below the 10% limit is treated as per the trading book and banking book rule for the instrument belonging to trading book and banking book respectively.

The application computes as follows:

- Entities are marked as insignificant investment entities by updating the flag: **F_SIGNIFICANT_INVESTMENT_IND** in Fact Entity Information (**FCT_ENTITY_INFO)** with value N.

- The exposure amount of banking book and trading book exposures to these entities are summed by grouping their component of capital and compared against 10% of parent bank's CET1 capital. The portion of amount which exceeds the 10% limit is deducted.

- This is done by calculating tier wise deduction percentage and multiplying this percentage with the exposure amount to arrive at the amount to be deducted from each tier of capital.

- The total investment values are populated into **FSI_NON_REG_CONSL_ENTITY_INVST** which is the processing table for insignificant and significant investment deductions.

- The sub process – **Insignificant Investment in entities outside Regulatory Consolidation Processing** in **BASELIII_CAPITAL_STRUCTURE** process covers this processing.

Significant Investment Treatment for Accounting Entity where Parent Bank Holding is more than 10% of Issued Common Shares

The total investment amount of all significant investment entity is checked against the set limit of 10% of CET1 amount of parent bank post insignificant investment amount adjustment. The CET1 amount greater than 10% is deleted from the CET1 post insignificant investment amount deduction. The CET1 amount lower than 10% follows threshold deduction. The investment amount in AT1 and T2 is fully deducted from its respective AT1 and T2 tier of capital. The application computes as follows:

Entities are marked as significant investment entities by updating the flag – '**F_SIGNIFICANT_INVESTMENT_IND**' in Fact Entity Information (**FCT_ENTITY_INFO)** with value 'Y'.

The exposure amount of banking book and trading book exposures to these entities are summed up by grouping their component of capital and compared against 10% of parent bank's CET1 capital. The portion of amount which exceeds the 10% limit is deducted from CET1. The exposures of AT1 and T2 are fully deducted from respective tier of capital. The deduction percentage for CET1 is calculated and this percentage is multiplied with the CET1 exposure's exposure amount to arrive at the amount to be deducted from CET1 capital.

The sub process – '**Significant Investment in Entities outside Regulatory Consolidation Processing**' in **BASELIII_CAPITAL_STRUCTURE** process covers this processing.

Threshold Deduction

The three line items' significant investment in the common shares of BFSI where the bank owns more than 10%, Mortgage Servicing Rights (MSR), and DTAs that arises from temporary differences is processed for threshold deduction are populated in the **Capital Threshold Treatment (FSI_THRESHOLD_TREATMENT)** table and the threshold calculations are processed in this table.. These three line items are individually compared with the 10% of CET1 calculated Post Regulatory Adjustments, Insignificant Investments, and Significant Investment. The amounts which are above 10% CET1 limit are deducted from CET1 following the phase-in arrangements. During the transition period, any amount of these three line items, which is not deducted as per the 10% mentioned earlier, is summed up for the aggregate 15% limit check. During the transition period, the check of 15% is against the CET1 post all regulatory adjustments and adjustments to insignificant investments and significant investments and the individual threshold deduction. In the post transition period, instead of 15%, the aggregate check is 17.65% of CET1, post all regulatory adjustments and adjustments to insignificant investments, less 100% of the sum of the line items which goes for threshold deduction.

The amount which is not deducted due to this 10% and 15% check is risk weighted 250% during the transition period and is risk weighted 250% post the transition period.. The entire processing is done in the sub process – '**Threshold Treatment Calculations**' in the process – **BASELIII_CAPITAL_STRUCTURE**.

Phase-in Arrangement

The regulatory adjustment line items that include goodwill, DTA, cash flow hedge reserves, gain on sale related to sec transaction, defined pension fund, cumulative gain and losses due to changes in own credit risk, treasury stock, and reciprocal cross-holdings, follows phase-in arrangement as per the timelines defined in the Basel III accord. Similarly, insignificant investment, significant investment, and threshold deduction amount line items also follow phase-in arrangement, after insignificant, significant, and threshold treatment calculation. The phase-in deduction percent for each year is available in a setup table - **FSI_SETUP_CAPITAL_HEAD**.

V_STD_ACCT_HEAD_DESC	N_CAPITAL_COMPONENT_VALUE	D_START_DATE	D_END_DATE	V_CAPITAL_ADEQUACY_REGULATOR
Phase-in Regulatory Deduction	0.20	1/1/2014	12/31/2014	BIS

The entire processing is done in sub processes – **Provisions and Gross Capital Calculations** and **Post Phase In Treatment calculations** in process – **BASELIII_CAPITAL_STRUCTURE**

Bifurcation of Insignificant and Significant Investment Amount

All the investment transactions in insignificant entity and significant entity are bifurcated. Insignificant investment amount lower than 10% is stamped as "INSIG_RWA". Any amount above 10% is stamped as "INSIG_DED". The same logic is applied to significant investment amount in CET1. The CET1 amount in significant investment entity less than the 15% limit is stamped as "SIG_RWA" and the amounts more than 10% and 15% limit is stamped as "SIG_DED". The original transactions are deleted and new transactions are created with the stamping process. The new transaction, thus created, can be traced back, by considering the parent exposure ID.

The exposure to be deducted is marked with standard account head surrogate key based on whether the deduction is insignificant or significant investment and based on capital component group.

This splitting of exposures is done in Fact Non Sec Exposures (**FCT_NON_SEC_EXPOSURES)** and Market Risk Exposures (**FCT_MARKET_RISK_EXPOSURES)**. This splitting logic is carried to Equity Exposures (**FCT_EQUITY_EXPOSURES)** and Fact Sub Exposures (**FCT_SUB_EXPOSURES)** as well.

The following sub processes in the process – **BASELIII_CAPITAL_STRUCTURE** are involved in this processing:

- Non Sec Insignificant Investment Exposure Processing
- Market Risk Insignificant Investment Exposure Processing
- Non Sec Significant Investment Exposure Processing
- Market Risk Significant Investment Exposure Processing
- Non Regulatory Investment Sub Exposures Population
- Equity Non Regulatory Investment Processing

Net Capital Calculation

The net CET1, net AT1, and net T2 capital amount are calculated post all regulatory adjustments. Any shortfall in T2 capital amount is adjusted against Net AT1 amount and any shortfall of AT1 capital amount is adjusted against Net CET1 amount.

This is done in sub process – **Net Capital Calculations** in process **BASELIII_CAPITAL_STRUCTURE**.

RWA Calculation for Credit Risk, Market Risk, Operational Risk and Phase–in Arrangement

The RWA amount for Non Securitization, Securitization, Market Risk, Operational Risk and Regulatory Adjustments Phase-In arrangement for Capital Instrument are calculated by summing up the RWA amount and is reported under different headings such as 'Risk Weighted Asset amount for Standardized Portfolios/IRB portfolio' for Non Securitization, "Sec Std RWA" for Securitization portfolio, "Market Risk RWA" for Market Risk, "Operational RWA" for Operational Risk and "Regulatory Adjustments Phase-In RWA" for Phase-In Arrangement. The Phase-In RWA captures the capital instrument investments that goes for deduction from Capital but because of Phase-In arrangement are to be risk-weighted such as – Reciprocal Cross-holding, Treasury Stock, Insignificant Investment amount, Significant Investment amount and Threshold deduction amount.

The processing is done in sub process – **RWA Populations** in process – BASELIII_CAPITAL_STRUCTURE_CAPITAL_RATIO.

Capital Ratio Calculation

CET1 ratio, T1 ratio, T2 ratio, and Capital Adequacy ratio are calculated using the Total RWA amount and Net CET1 capital, Net T1 capital, Net T2 capital, and Total Capital (sum of Net T1 capital amount and Net T2 capital amount) amount.

This is done in sub process – **Capital Ratio Calculations** in process – 'BASELIII_CAPITAL_STRUCTURE_CAPITAL_RATIO'.

4.2.1.7.3 Key Data Elements

Key data elements to process the Capital Structure for the consolidated entity is as follows. For a complete list of tables and columns to be updated, see the Download Specifications document.

- Entity details which are part of regulatory consolidation and parent entity share holding percent. This data is captured in Stage Entity Shareholding Details (**STG_ENTITY_SHR_HLD_PERCENT**) table.

- The capital structure component for each tier of capital for all entities involved in regulatory consolidation.

- The total RWA, total CET1, AT1, and T2 amount and third party percentage of holdings in each tier of capital for minority interest calculation.

- The regulatory adjustment amount like goodwill, DTA, other intangible assets, cash flow hedge reserve, and defined pension fund asset, MSR, and so on.

- The transaction of the investment amount for accounting entity which is outside the scope of regulatory consolidation.

- The CET1, AT1, and T2 capital of the entity which has third party minority holdings in it are expected as a download in legal entity details (**STG_LEGAL_ENTITY_DETAILS**) table. Similarly, the third party investment in each tier of capital is also expected as a download in legal entity details table.

- The minimum required capital for each tier for each capital adequacy regulator (for the entity that has third party minority holding in it) is expected in the setup table - Setup Capital Heads (**FSI_SETUP_CAPITAL_HEAD)**. For more information, see the sample data.

N_CAPITAL_ COMPONENT_ VALUE	D_START_ DATE	D_END_ DATE	F_LATEST_ RECORD_ INDICATOR	V_STD_ACCT_ HEAD_DESC	V_CAPITAL_ ADEQUACY_ REGULATOR
0.035	1/1/2013	12/31/2013	Y	Required Common Equity Tier 1 Capital Ratio	RBI
0.04	1/1/2014	12/31/2014	Y	Required Common Equity Tier 1 Capital Ratio	RBI

N_CAPITAL_ COMPONENT_ VALUE	D_START_ DATE	D_END_ DATE	F_LATEST_ RECORD_ INDICATOR	V_STD_ACCT_ HEAD_DESC	V_CAPITAL_ ADEQUACY_ REGULATOR
0.045	1/1/2015	12/31/9999	Y	Required Common Equity Tier 1 Capital Ratio	RBI
0.045	1/1/2013	12/31/2013	Y	Required Tier 1 Capital Ratio	RBI
0.055	1/1/2014	12/31/2014	Y	Required Tier 1 Capital Ratio	RBI
0.06	1/1/2015	12/31/9999	Y	Required Tier 1 Capital Ratio	RBI
0.08	1/1/2013	12/31/9999	Y	Required capital Adequacy Ratio	RBI
0.035	1/1/2012	12/31/2012	Y	Required Common Equity Tier 1 Capital Ratio	BIS
0.04	1/1/2014	12/31/2014	Y	Required Common Equity Tier 1 Capital Ratio	BIS
0.045	1/1/2015	12/31/9999	Y	Required Common Equity Tier 1 Capital Ratio	BIS
0.045	1/1/2012	12/31/2013	Y	Required Tier 1 capital Ratio	BIS
0.055	1/1/2014	12/31/2014	Y	Required Tier 1 Capital Ratio	BIS
0.06	1/1/2015	12/31/9999	Y	Required Tier 1 Capital Ratio	BIS
0.08	1/1/2012	12/31/9999	Y	Required capital Adequacy Ratio	BIS

- The Total RWA (CAP838) for the entity that has third party minority holding in it is a download value in Stage Standard Accounting Head (**STG_STANDARD_ACCT_HEAD)**.

4.2.1.7.4 Limitations

The limitations in OFSCAP 8.0.5.0.0 release is as follows:

1. Investment in Own Shares Treatment

   The investment in own shares which goes for capital treatment, has a phase-in treatment, wherein during phase-in a portion of the exposure goes for deduction from capital, and the remaining portion of the exposure goes for 100% RW. This is handled in the processing by the Phase-In treatment table, and this RW gets added into the Regulatory RWA Accounting Head.

But for reporting, the reporting happens from an account level granularity, and not at a higher granularity of the accounting head. As the current application does not split the exposures into two in the processing table of Fact Non Sec Exposures (FCT_NON_SEC_EXPOSURES), the account level and the Phase-In treatment table values do not reconcile with each other. Currently, this has to be specifically addressed in the reporting layer, and is not part of the OOB product.

2. Reciprocal Cross Holdings Treatment

The reciprocal cross holding amount which goes for capital treatment, has a phase-in treatment, wherein during phase-in a portion of the exposure goes for deduction from capital, and the remaining portion of the exposure goes for 100% RW. This is handled in the processing by the Phase-In treatment table, and this RW gets added into the Regulatory RWA Accounting Head.

But for reporting, the reporting happens from an account level granularity, and not at a higher granularity of the accounting head. As the current application does not split the exposures into two in the processing table of Fact Non Sec Exposures (FCT_NON_SEC_EXPOSURES), the account level and the Phase-In treatment table values do not reconcile with each other. Currently, this has to be specifically addressed in the reporting layer, and is not part of the OOB product.

4.2.1.8 Capital Buffers

There are three types of Capital Buffers prescribed in the Basel III Accord which are as follows:

- Capital Conservation Buffer
- Countercyclical Buffer
- Additional Loss Absorbency Capital (for G-SIB)

A detailed description of each of these buffers is provided in the following sections.

Capital Conservation Buffer (CCB)

The Basel III Accord requires banks to maintain Capital Conservation Buffer (CCB) out of Common Equity Tier 1 Capital (CET1). This requirement is as per the transitional arrangement as stated in the Basel guidelines.

Countercyclical Buffer

The Basel III Accord requires banks to maintain Countercyclical Buffer that is prescribed by the respective jurisdiction's regulator through an extension of CCB. The application calculates the buffer requirement for internationally active banks as the weighted average of the buffers required across all the jurisdictions to which the bank has exposures, weighted on basis of the exposure amount to different countries of the counterparty of their exposures.

If the guarantor and credit default swap is present for an exposure, then as per the Basel guidelines the application considers the domicile country of these mitigants for the covered portion and country of the exposure counterparty for uncovered portion. After calculating the weighted average, the application then computes a single value for Countercyclical Buffer benchmark which is applicable on all exposures of all jurisdictions.

Additional Loss Absorbency Capital (for G-SIB)

If a banking organization is categorized a Globally–Systematically Important Banks (G-SIB), then the application identifies all subsidiaries in various jurisdictions as G-SIB as well. This is based on our interpretation of the Basel guidelines that are applicable for a specific group. Based on this assessment, banks are assigned a GSIB score and the applicable bucket is decided. Identification of this bucket is based on the score as per Basel guidelines. Loss absorbency is required to be met as an extension of CCB for computational purposes.

Calculation of Capital Conservation Buffer / Available Buffer from CET1 Capital

The value that the application calculates for available buffer from CET1 capital meets the buffer requirements for all three buffers - Capital Conservation Buffer (CCB), Countercyclical Buffer, and Additional Loss Absorbency Capital Requirement. No priority is given to any buffer over another. Hence, the shortfall or excess, if any, is calculated and reported at an aggregate level. The required total buffer is calculated as the sum of the required values of three individual buffers.

The application also computes CET1 and Buffer Lookup Ratio, which is further required for calculating Minimum Capital Conservation Ratio. To calculate the available buffer, remainder of following is taken:

> Excess of CET1 Capital Ratio over the benchmark (4.5%), after catering to the shortfall (if any), in the Additional Tier 1 and Tier 2 capital to their respective benchmark levels (1.5% and 2% respectively).

Hence, CCB excludes any additional CET1 needed to maintain 6% of Tier 1 capital Ratio and 8% of Total capital Ratio.

Capital Conservation Ratio

The required buffer from CET1 capital (sum of three required buffers) is compared with the Available Buffer from CET1 capital. If the banks are unable to meet their total buffer requirements for all the three buffers, then they are subject to constraints on the discretionary payments of earnings. In this case, the Capital Conservation Ratio is calculated and represents the percentage of net earnings after tax (positive) not distributed by the bank and held back as retained earnings. Capital Conservation Ratio of the current year is applied after 12 months from the time of calculation.

NOTE: The application calculates Capital Buffers at consolidated level for the reporting bank. However, at the discretion of national supervisors, this can be applied at solo level as well. In such cases, the calculation of solo level for the respective jurisdictions is included in the application.

4.2.1.8.1 Assumptions

Countercyclical Buffer requirement for each country should be provided by the client or the bank as the final percentage applicable for each country and this is dependent on the home regulator. G-SIB status and applicable bucket information for each entity should also be provided by the client/bank.

For Required Weighted Average Countercyclical Buffer calculation, the exposures used in the bank are all accounts exposed to credit risk (Securitized and Non Securitized) and those exposed to Market Risk. However, the application can be restructured to consider only those exposed to Credit Risk.

In Capital Conservation Ratio, for the computation of the quartiles that are used to arrive at Minimum Capital Conservation Ratio, the application is dependent on the required CCB ratio. From 2013 till 2016, CCB requirements keep changing every year as per the transitional arrangement, For the purpose of calculating the quartiles range, the application considers it as per the transitional arrangement. At the same time, the application has the flexibility to have the required CCB constant at 2.5% throughout. Also, the minimum required CET1 Ratio considered for the purpose of building these quartiles is 4.5%

4.2.1.8.2 Process Flow for Capital Buffers
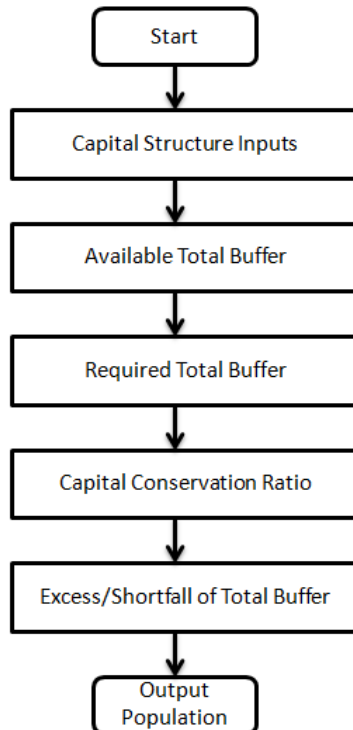
The tasks related to Capital Buffer calculations are present in the process named **CAPITAL_BUFFER**. The processing is as follows.

Capital Structure Inputs

The Capital Structure Rules are executed before the calculation of buffers. These Rules calculate the available capital ratios and required capital ratios of the three capital components which are Common Equity Tier 1 Capital Ratio, Tier 1 Capital Ratio, and Capital Ratio.

These line items are populated in the **Fact Standard Accounting Head** table.

Available Total Buffer

Calculation of Available Buffer from CET1 capital is performed using inputs taken from the previous step.

Required Total Buffer

Calculation of Required Capital Conservation Buffer (CAP823) - Required Total Buffer is the sum of three required buffers

Calculation of Required Additional Loss Absorbency

A Rule in the application contains additional source hierarchy to identify whether a bank is a G-SIB bank or not. The value is checked in the **Loss Absorbency Capital Bank Override** column of the table **Fact Entity Information (FCT_ENTITY_INFO)** and populated to **Fact Standard Accounting Head (FCT_STANDARD_ACCT_HEAD)**. This value has precedence over the bucket specified. If the value is not present in the **Loss Absorbency Capital Bank Override** column, then the loss absorbency percent is taken from the column **Bucket Loss Absorbency Capital** of the **Benchmark Loss Absorbency Ratio (FSI_SETUP_BENCHMARK_LOSS_ABS)** table based on the loss absorbency bucket the bank belongs to.

Calculation of Required Countercyclical Buffer

Required Countercyclical Buffer Ratio (**FSI_REQUIRED_CNTR_CYC_BUFFER**) table is updated with values using a T2T. The values are taken from **Benchmark Counter Cyclical Buffer Ratio** table. The **Regulator Code** column in Benchmark Counter Cyclical Buffer Ratio is compared to jurisdiction code column in Run Dimension. This T2T aggregates the country wise exposure amount for each country. In cases where no Countercyclical Buffer is available, the required weighted average is 0 as the benchmarks is assumed to be 0. (If there is no countercyclical requirement, we expect the regulator to provide 0 as the benchmark.)

After the T2T loading, based on each country's requirement for countercyclical buffer, the weighted average Countercyclical Buffer is calculated.

Calculation of Required Buffer from CET1 capital, Tier1 and Capital Adequacy Ratio

For the calculation of these required buffers, based on **Updated Capital Component Group Skey** (which corresponds to BFCET1 - Buffers from CET1 for Required Buffer from CET1 capital, BFT1 - Buffers from T1 for Required Buffer from T1 capital and BFCAR - Buffers from CAR for Required Capital Adequacy Ratio), the standard account head amount is summed up and populated against the corresponding Cap ID in **Fact Standard Accounting Head (FCT_STANDARD_ACCT_HEAD)** table.

Capital Conservation Ratio

Capital Conservation Ratio is calculated based on required CET1, buffers and the setup or semi-static tables as per the year when the Run is executed.

Capital Conservation ratio is updated in Fact Capital Conservation Ratio. The values are populated through a T2T. The application assigns minimum Capital Conservation Ratio range for a given CET1 and Buffer Lookup Ratio in a table (**FCT_CAPITAL_CONSERVATION_RATIO**). This table is dynamic and formula driven and is constructed by the application using the values of the three required buffers as per the Basel guidelines. The application constructs the range of CET1 and Buffer Look-up ratio (Lower Limit and Upper Limit) for the required Capital Conservation Ratio in four quartiles.

> **Lower Limit = 0.000001 + Upper Limit of (n-1)th quartile**
>
> **Lower Limit of first quartile =- 0.045**
>
> **Upper Limit = 0.045 + (Total Required Buffer from CET1 Capital * 0.25 * n)**
>
> Where **n** is the quartile number

Excess/Shortfall of Total Buffer

The calculated values (only positive values are considered) are stored against the corresponding Cap IDs as two separate line items of which one is 0.

4.2.1.8.3 Key Data Elements

Key data elements are elaborated in this section. For a complete list of tables to be updated, see the Download Specifications document.

Countercyclical Buffer requirement for each country should be provided by the client or the bank as the percentage applicable for each country is dependent on the home regulator's jurisdiction. The home regulator's jurisdiction can prescribe Countercyclical Buffer percentage that is higher than the percentage prescribed by the regulator of exposure country. Hence, the required Countercyclical Buffer percentage for each exposure country provided as input should be the one that the home regulator agrees to.

G-SIB status and applicable bucket information for each entity should be provided by the client or the bank. In case of a consolidated Run, loss absorbency charges applicable to the parent, as required by the regulator of parent, is applicable to the complete Run. This Run output is supposed to be reported to the jurisdictional regulator of the parent. For a Solo Run, loss absorbency charges as required by regulator for a subsidiary entity are applicable. Hence, for Solo and Consolidated Runs, G-SIB status of the reporting bank, and the applicable bucket, is provided by the bank itself.

As the required Capital Conservation Buffer (CCB) must be met as per the transitional arrangement, therefore the required buffer value must be setup in Setup Capital Heads (**FSI_SETUP_CAPITAL_HEAD)** table for different periods against the standard account head ID CAP823. Different CCB requirements specified by the different regulators can be setup by specifying the regulator codes against the same standard account head ID. This regulator code must be the same as the jurisdiction code assigned by the Rule **Jurisdiction Code Assignment**.

The required benchmark of Countercyclical Buffer for different countries as set by different regulators is expected as download in Stage Benchmark Counter Cyclical Buffer (**STG_BENCHMARK_CNTR_CYC_BUFFER**). This data is populated to Benchmark Counter Cyclical Buffer Ratio (**FSI_BENCHMARK_CNTR_CYC_BUFFER**) using a Slowly Changing Dimension (SCD) process. Buffer requirement given on a date is valid till the next buffer is specified. For a solo Run, the regulator of subsidiary specified buffer requirements are considered and for consolidation Run, the consolidating entity's regulator specified buffer requirements are considered.

The Additional Loss Absorbency requirement specified by different regulators for different buckets should be setup in the table Benchmark Loss Absorbency Ratio (**FSI_SETUP_BENCHMARK_LOSS_ABS**). For the solo Run, loss absorbency requirement set by the local regulator is considered. For consolidation Run, the consolidating entity's regulator specified loss absorbency requirement is considered.

There is an option to directly input the applicable loss absorbency percentage. This is also useful when the percentage applied is different from the corresponding bucket percentage. This should be provided in the column **N_LOSS_ABS_OVERRIDE** of the table Stage Legal Entity Details (**STG_LEGAL_ENTITY_DETAILS**). If this column has a value, it is given priority over loss absorbency percentage corresponding to the bucket.

The minimum Capital Conservation Ratios requirement for different quartiles (1, 0.8, 0.6, 0.4, 0) is expected as a download in Stage Benchmark Capital Conservation Ratio (**STG_BENCHMARK_CAP_CONS_RATIO**). This data is populated to the semi-static table **Benchmark Capital Conservation Ratio** (**FSI_BENCHMARK_CAP_CONS_RATIO**) using a SCD process. Conservation ratios specified once are valid till the next revision.

In the **FSI_REQUIRED_CNTR_CYC_BUFFER** table the post mitigation exposure amount is updated against each country code. This is applicable for Credit Risk (for Non Securitization and Securitization exposures) and Market Risk.

4.2.1.9 Revised Leverage Ratio

During the financial crisis, banking institutions built-up excessive on-balance sheet and off-balance sheet leverage which forced the banking sector to reduce its leverage. To prevent building of excessive leverage on the institutions' balance sheet, the RBI has introduced a non-risk based leverage ratio which is a new regulatory tool supplementing risk-based capital requirement. The leverage ratio guidelines were revised and published on 10th October 2014. The guidelines are mostly in sync with the revised leverage ratio guidelines issued in 2014 by BIS.

The solution supports this revised approach in the calculation. The application calculates the leverage ratio for a reporting bank. The minimum required leverage ratio is 3%.

The leverage ratio is calculated by dividing an institution's Tier 1 capital measure by the total leverage exposure measure.

$$\textbf{Leverage Ratio} = \frac{\textbf{Tier 1 Capital}}{\textbf{Leverage Exposure Measure}}$$

The Run **Basel III Revised Leverage Ratio Calculation** is used for computing the leverage ratio, as per the revised guidelines.

Net Tier 1 capital is the summation of Net CET1 and Net AT1 capital amount post regulatory adjustment. Exposure measure is the summation of on-balance sheet items, off-balance sheet items, Derivative Exposures and Structured Financial Transactions (SFT). The on-balance sheet items include the Non-Securitization exposures' amount and the Securitization exposures' amount. The off-balance sheet items include the Non-Securitization exposures' amount and the Securitization exposures' amount. Mitigation is not considered when calculating exposure amount.

NOTE: The leverage calculation happens at the consolidated parent entity level. The market risk data are not captured for the EU Jurisdiction, and hence that is expected as a download. This is expected in Stage Standard Account Head (**STG_STANDARD_ACCT_HEAD**) for the CAP843 (Leverage Ratio).

The leverage ratio calculations are a separate run, and not part of the regular capital calculation run. This is because of the changes in the Credit conversion factor assigned to the exposures, and also exemption of few exposures from the calculation which are part of the capital charge calculations. Also, the mitigation is not required for these exposures, and the exposure measure calculations are different from the regular EAD calculations.

4.2.1.9.1 Assumptions

The accord is not explicit on the inclusion of Securitization and market related transactions in the exposure measure calculations. However, the application has considered Securitization and the market related transactions in the calculation of total leverage exposure measure.

As the application does not support market related capital calculations pertaining to the BIS jurisdiction, the application expects the MR related Exposure measure as a download.

4.2.1.9.2 Process Flow for Revised Leverage Ratio
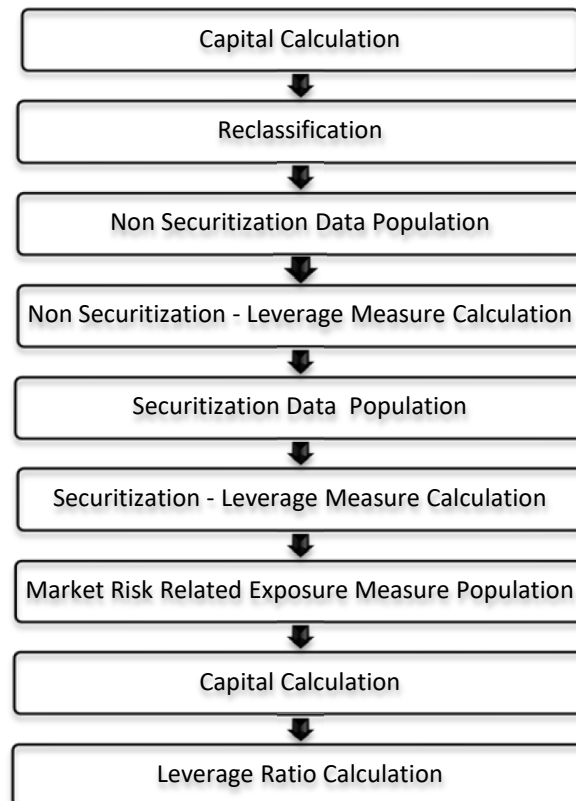
The leverage ratio is calculated by executing the Run **Basel III Revised Leverage Ratio Calculation**.

The details of the process flow for leverage ratio is as follows.

Capital Consolidation Process

The capital consolidation process remains the same as is existing in the capital calculation run.

Reclassification

The reclassification process remains the same as is existing in the capital calculation run.

Non Securitization Exposure Data Population

Data from the Product Processors are populated to **FCT_NON_SEC_EXPOSURES** table in the process **NON_SEC_DATA_POPULATION**. This data population also remains the same as existing in the capital calculation run.

Non Securitization Exposure Measure Calculation

After data is populated in non sec processing table, the exposure measure is calculated in the process **BASELIII_LEV_RATIO_EXPOSURE_MEASURE_CALCULATION**.

The Exposure measure is the sum of the Pre Mitigation EAD amount of the following exposure types:

- On-Balance Sheet Exposures
- Off-Balance Sheet Exposures
- SFT Exposures
- Derivative Exposures

Details on the calculation of these exposure measures are mentioned in the following sections. All the exposure measures are computed and populated into the Leverage Exposure amount (**N_LEVERAGE_EXPOSURE_AMOUNT**) column. And any exempted exposures are identified by the solution in the Regulatory Capital Exemption Criteria in the Non Sec Exposures processing table. These exempted criteria are part of the dimension table of Regulatory Capital Exemption Criteria Dimension (**DIM_REG_CAP_EXEMPTION_CRITERIA**).

On-Balance Sheet Exposures

The accounting value of the on-balance sheet exposures net of specific provisions and valuation adjustments are considered for the exposure measure. The valuation adjustments are captured at an instrument level, in the FSI setup table for Instrument Valuation Details (**FSI_SETUP_INSTR_VALUATION_DTLS**).

The exposure measure considered is the Pre-Mitigation amount, and does not consider the benefit of the mitigation.

Some of the exempted exposures are detailed as follows.

Fiduciary Assets

If the bank considers the assets of the fiduciary assets, as the bank's own assets, then, these assets are exempted from the calculation. The fiduciary assets are identified based on the exposures having the Parent Fiduciary Account Number (V_PARENT_FIDUCIARY_ACCT_NUMBER) in the product processor (PP) staging tables.

The bank has to select the run management option to select whether the exposures are derecognized in the balance sheet or not. If the run management option of Y is selected, all the fiduciary assets with the parent fiduciary account is exempted from the Leverage Exposure Measure calculations. If the run management option of N is selected, specific fiduciary assets can be exempted from the Leverage Exposure Measure calculations. These specific fiduciary assets are expected to be provided in the FSI Fiduciary Assets setup table (**FSI_SETUP_DEREC_FIDUCIARY_ASST**).

This is handled in the **Fiduciary Assets Exemption** subprocess of the **BASELIII_LEV_RATIO_EXPOSURE_MEASURE_CALCULATION** process.

Off-Balance Sheet Exposures

The exposure amount for off-balance sheet exposures is the undrawn amount of the exposure multiplied by the CCF. The CCF of the exposures remain the same as in the Capital Calculation Run, except that the CCF is floored at 10%. The flooring of the CCF to 10% is handled by the rule **Non Sec Off Balance Sheet Exposures CCF Percent Flooring** in the **Non Sec CCF Assignment** sub process.

This exposure measure does not consider the mitigation effect.

SFT Exposures

The exposure amount of the SFT Exposures to be considered for the leverage measure is post the effect of the collateral. The SFT Exposures data provided in the staging must not consider the accounting netting.

The data capture for the SFT exposures remain the same as in the Capital calculation run. The bank role in the SFT transaction is also captured in the staging table.

The Gross amount and the Add-on amount, as expected in the accord are computed by the application. The Gross amount is the actual transaction amount of the SFT exposures, as provided in the Repo contracts staging table. And the Add-on amount is the difference between the fair value of the repo exposures and the fair value of the collateral placed or received.

The fair value of the exposures, including the placed collateral are captured at an instrument level, in the FSI setup table for Exposure Fair Value Details (**FSI_SETUP_INSTR_VALUATION_DTLS**), and the fair value of the mitigants are captured in the FSI setup table for Mitigant Fair Value (**FSI_SETUP_MTGNT_VALUATION_DTLS**).

The mitigants which are used to offset the fair value of the repo exposures, are stamped accounting heads, to ensure that they can be tracked.

The exposure amount calculations are different for the bank acting as a principal in the SFT transactions, and an agent in the SFT transactions. The solution supports both the treatments.

For bank acting as an agent, the solution handles all the treatment mentioned in the accord. The data expectation for them are as follows:

- *Case 1: Bank is an agent, and does not get involved in any other role with the SFT Exposure*

   In this case, the data is not expected in the Repo contracts staging table.

- *Case 2: Bank is an agent, and provides a guarantee equal to the difference between the SFT Exposure and the collateral amount*

  In this case, the data is expected in the Repo contracts staging table, with the bank role as an agent, and the indemnity indicator **(F_INDEMNITY_IND)** as 'Y'.

  The application computes only the Add-on amount for this SFT transaction, inline with the guidelines. And this Add-on amount is populated into the Add-on column of the processing table. This Add-on amount is caluclated in the data transformation **Lev_Ratio_SFT_Addon_amt.**

  This is handled in the sub process (**Leverage Ratio Computations**) of the process (**BASELIII_LEV_RATIO_EXPOSURE_MEASURE_CALCULATION**).

- *Case 3: Bank is an agent, and provides a guarantee more than the difference between the SFT Exposure and the collateral amount*

  In this case, the data is expected in the Repo contracts staging table, with the bank role as an agent, and the indemnity indicator **(F_INDEMNITY_IND)** as Y. And a separate guarantee transaction is expected to be recorded in the guarantee staging table. This guarantee transaction is also provided as a mitigant with the mitigant table also storing the guarantee contract ID (**V_GUARANTEE_CONTRACT_ID**). And the exposure and the mitigant must be mapped to each other in the exposure mitigant mapping table **(STG_EXP_MITIGANT_MAPPING)**.

  This guarantee is not for a mitigant treatment, and hence, this is expected with the mitigant eligibility flag as 'N'. This identified guarantee is populated in FNSE.n_repo_contract_skey.

  The application computes both the gross exposure amount and the addon amount for this SFT transaction, inline with the guidelines. This Add-on amount is caluclated in the data transformation **Lev_Ratio_SFT_Addon_amt.**

  This is handled in the sub process (**Leverage Ratio Computations**) of the process (**BASELIII_LEV_RATIO_EXPOSURE_MEASURE_CALCULATION**).

Derivative Exposures

Derivative transactions (OTC Derivatives) exposure measure are calculated using the Mark to Market Method. The add-on assignment is same as what is mentioned in the Capital Calculation Run. The exposure measure is the sum of market value, and the notional amount multiplied by the add-on percent.

The derivative exposure measure has few specific treatment, in terms of the Leverage Exposure Measure calculations. They are as detailed as follows.

Collateral of Derivative

The collateral received with reference to the derivatives, cannot be used in netting, and reducing the exposure amount of the derivatives. Based on whether the operative accounting framework allows for netting of the collateral or not, the solution updates the exposure measure. The solution expects a run management selection to identify whether the bank considers netting of the collateral outside the application, and provides the netted amount as input to the product processor staging tables.

The collateral of derivative is given in the mitigant table. There is a run management option to capture whether the operative accounting framework allows for netting of the collateral as per the master netting agreement or not.

If 'Yes' is selected, assuming that the bank has provided the MTM value based on already considering the collateral amount, the collateral amount is added to the MTM of the exposure. And if 'No' is selected, there is no change to the MTM value.

Data Expectations

- Collateral for the derivatives, which is already considered in the MTM calculation, are provided in the **STG_MITIGANTS** table with the eligibility flag as 'N' and the corresponding entry is added into the **STG_EXP_MITIGANT_MAPPINGS** table.

- The MTM provided for the derivatives' instruments, must be after following the corresponding operational accounting framework.

Cash Variation Margin

As per the guideline, the Replacement cost of the derivatives can be reduced by cash variation margin if certain conditions are satisified. This is handled in the solution by using the above run management option, wherein it mentions whether the exposure is being offset with the collateral or not.

In the run management, if the option of 'No' is selected, the cash variation margin is used to offset the exposure measure. If all the conditions are satisfied, the flag to indicate that the Variation Margin has satisfied the conditions is updated. And if this flag is 'Y', then, the cash variation margin is used to reduce the replacement cost of the derivative.

This is handled in the sub process (**Cash Variation Margin Exemptions**) of the process (**BASELIII_LEV_RATIO_EXPOSURE_MEASURE_CALCULATION**).

Clearing Member of a QCCP

For clearing member of a QCCP, the exposures where Bank acts as a clearing member, and the trade exposures, wherein the bank is not obligated to reimburse the losses suffered by the client, for CCP default are exempted, from the leverage ratio calculation.

This is handled in the sub process (**QCCP Related Exemptions**) of the process (**BASELIII_LEV_RATIO_EXPOSURE_MEASURE_CALCULATION**).

Written Credit Derivatives or Sold Credit Derivatives

The effective notional amount of the credit derivative transactions are reduced by any change in the fair value of derivative liabilities. The fair value of the exposures are captured in the FSI setup table for Fair Value (**FSI_SETUP_INSTR_VALUATION_DTLS**), at an instrument level. And the difference between the Fair value and the MTM value of these exposures result in the unrealized gain and loss of the derivative exposures.

This is subtracted from the notional principal of these derivatives to arrive at the effect notional principal before offsetting.

The sold credit protection is offset against the bought credit protection based on the conditions mentioned in the guidelines. This offset happens in the data transformation (**SCP_BCP_Offset_Mapping**) which is in the sub process (**Written Credit Derivatives SCP BCP Offset Mapping**).

All the other written credit derivative treatment is handled in the sub process (**Written Credit Derivative Related Exemptions**) of the process (**BASELIII_LEV_RATIO_EXPOSURE_MEASURE_CALCULATION**).

Securitization Data Population

Securitization exposure data is populated to securitization processing table in the process **SEC_DATA_POPULATION**. The population remains the same as in the capital calculation run.

Securitization Exposure – Leverage Measure Calculation

After securitization exposure data is populated, exposure measure is calculated in the process **SEC_EXP_MITIGANT_MAPPING_POP**.

The exposure measure calculation remains the same as in the capital calculation run, except that the CCF for the off balance sheet exposures are floored at 10%. And the mitigation is not considered for the leverage measure calculations.

Market Risk – Leverage Measure Calculation

Leverage Measure for Market Risk is directly expected as a download in the Stage Standard Accounting Head (**STG_STANDARD_ACCOUNT_HEAD**) with the CAP1809 (On Balance and Off Balance Total Leverage Exposure Measure for Securitized Exposures). This is expected as a download, as the EU jurisdiction does not support the MR calculations.

Capital Calculation

Capital measure is calculated in EU_CAPITAL_STRUCTURE process. Capital Measure used in the leverage ratio is equal to Net Tier 1 which is post all regulatory adjustments. The capital structure is the same as the capital calculation run.

Leverage Ratio Calculation

The leverage ratio is calculated as follows.

Leverage Ratio = Tier 1 Capital / Total Leverage Exposure Measure

This is computed in the process – **BASELIII_LEV_RATIO_LEVERAGE_RATIO_CALCULATION**.

4.2.1.9.3 Key Data Elements

Key data elements are elaborated in this section. For a complete list of tables and columns to be populated, see the *Download Specifications* document.

To calculate the leverage ratio, exposure amount for all product types and the total capital are required.

The key data elements for exposure measure calculation of the various product types are as follows:

- ♦ On-Balance Sheet Exposures: For on-balance sheet items, End of Period (EOP) balance amount, write-off, and accrued interest amount is required.
- ♦ SFT Exposures: For repo products, exposure amount, and instrument rating are required.

♦ Derivative Exposures: For derivative products, exposure mark to market value, notional principal amount, and underlying instrument types are required.

♦ Off-Balance Sheet Exposures: For off-balance sheet items, undrawn amount is required.

♦ Securitization Transaction: For securitization transactions, exposure amount is required.

♦ Capital Calculation: See the Capital Structure for more details.

♦ Cash Variation Margin: The collateral segregated flag, exchange traded flag, and netting agreement code are required.

♦ Netting Agreement: The margin threshold and the minimum transfer amount are required, which are captured in the Stage Net Exposures table (**STG_NET_EXPOSURES**).

4.2.2   Basel III – Internal Ratings Based Approach

4.2.2.1 BIS III – High Level Process Flow for Internal Ratings Based Approach

The Basel defined Capital Adequacy ratio is delivered out of box in OFSAAI as a building block approach. The application includes capital computations for Credit Risk (Internal Ratings Based Approach), Market Risk, and Operational Risk along with Capital Structure and Capital Consolidation processes.

For more information on the pre-defined Runs available with the application, see *OFS Basel Regulatory Capital Run Charts*.

4.2.2.1.1 Process Flow for Capital Adequacy Ratio Calculation
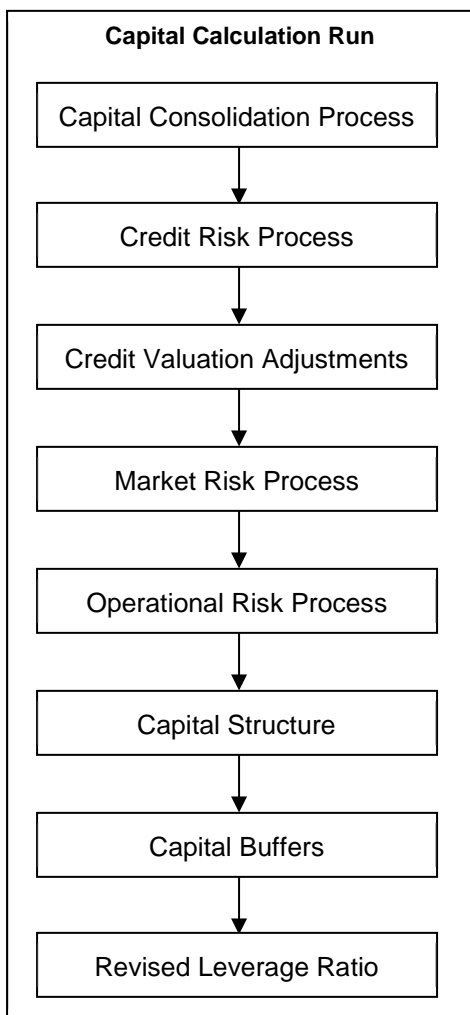
The Capital Calculation Run, depicted in the preceding process flow, is a single Run joined together with multiple processes. Each process considered as blocks, consists of tasks defined in a sequence to complete the processing of the entire Capital Adequacy Run. The individual blocks like Credit Risk process, Market Risk process, and so on exists as individual runs as well. Capital Consolidation is a process common across each of the individual blocks when executed separately as individual risk runs.

4.2.2.1.2 Capital Consolidation Process

The Capital Consolidation is explained is explained in the following section and is not repeated under the Non Securitization process, Securitization process, Market Risk process, or Operational Risk section of this document.

For example: the standard out of box Market Risk Run has Capital Consolidation and the Market Risk process bundled together as a Single Market Risk Run. This applies for Credit Risk and Operational Risk Runs.

The processing of Capital Consolidation is as follows.

Capital Consolidation Level Selection

The reporting bank can be a part of a financial group that has multiple legal entities like parent or child entities (subsidiaries) under its name. The entity on which you are required to process should be selected by you. Subsequently, level at which a Run is to be executed (solo or consolidated) should also be selected. You can select these options in the Run Management UI. However, if the Run is executed in the Run Rule Framework (RRF), then these options have to be set using the Rule '**Capital Consolidation Level Selection**' in the process '**CAPITAL_CONSOLIDATION**'.

CAPITAL_CONSOLIDATION is the first process to be added in all the Runs defined in the RRF except for the Staging Data Population Run. The Run Management UI selects this process by default.

Run Parameters Assignment

The Basel accord states different approaches for calculating RWA. The Run Management UI in the application allows the reporting bank to define and execute a Run by selecting a combination of different Basel II approaches for RWA computation.

Run Parameter Assignment is also part of **Capital Consolidation** process. The Rule '**Run Definition User Defined Run Param Assignment**' is used to assign the Run parameters if a Run is executed in the RRF. If the Run is executed from the Run Management UI, then the parameters are populated based on the Run defined in the Run Definition window.

Currency Conversion

The Rules pre-defined in the application performs currency conversion of all General Ledger amount attributes to be used for Capital Consolidation from the Natural currency to the Reporting currency, based on the exchange rate provided.

Shareholding Percent Multiplication

For all entities in the Capital Consolidation process, the application updates the shareholding percentage against each entity data in the fact capital accounting head from the fact entity shareholding percent table. The parent data in the processing table of fact capital accounting head is updated with the value 1 and for each child entity the data is based on the parent's holding percentage specified for each child in fact entity share holding percent table.

4.2.2.1.3 Process Flow for Credit RWA

Credit RWA Run is a combination of Non Securitization RWA, Credit Valuation Adjustment RWA, and Securitization RWA computation. A few processes like credit rating, party type reclassification, and mitigant data population are common between Non Securitization and Securitization processes and are executed only once under the Credit RWA Run even though these sub processes are explained separately under Non Securitization and Securitization section of this document.

Certain sub processes under Non Securitization process like Reclassification, are common across all types of exposures for example: banking book, over the counter derivative transactions, and securities financing transactions, and are executed only once in the Run. The details of this sub processes are explained under Reclassification sub process of the Basel III Non Securitization exposures section of this document. Likewise, details of Credit Risk Mitigation for Non Securitization process is detailed under the Basel III Non Securitization section of this document and details of Credit Risk Mitigation for Securitization process is detailed under the Basel III Securitization section of this document

For more information on the sub processes as detailed in the preceding process flow for the Non Securitization process, CVA processes, and Securitization process, see Credit RWA.

For example: Non Sec Data Population is detailed under data population and currency conversion of Credit RWA (Non Securitization - Standardized approach) section of this document. Likewise, CRM eligibility, haircuts, and so on, is detailed in the Credit RWA (Securitization) section of this document.

4.2.2.1.4 Process Flow for Credit Valuation Adjustments

Basel committee has introduced a new Credit Valuation Adjustment (CVA) capital charge, which is added to default risk capital charge to arrive at the new Counterparty Credit Risk (CCR) capital charge. The mark to market counterparty credit losses or the spread migration risk is captured with CVA, which were not directly capitalized before. CVA is the difference between the risk-free portfolio value and the true portfolio value that takes into account the possibility of the counterparty's default. In other words, CVA is the market value of counterparty credit risk.

This process flow is divided into two sections: Simple Approach and Advanced Approach.

For more information on the sub processes as detailed in the process flow, see Credit Valuation Adjustments.

4.2.2.1.5 Process Flow for Market RWA

```
                    Market Risk Process

              ┌─────────────────────────┐
              │ Market Risk Exposure Data│
              │       Population         │
              └─────────────────────────┘
                          │
                          ▼
              ┌─────────────────────────┐
              │      Rating Process      │
              └─────────────────────────┘
                          │
                          ▼
              ┌─────────────────────────┐
              │    Position Conversion   │
              └─────────────────────────┘
                          │
                          ▼
              ┌─────────────────────────┐
              │Capital charge for Interest Rate│
              │       Instruments        │
              └─────────────────────────┘
                          │
                          ▼
              ┌─────────────────────────┐
              │ Capital charge for Equities│
              └─────────────────────────┘
                          │
                          ▼
              ┌─────────────────────────┐
              │ Capital charge for Foreign│
              │   Exchange Transaction   │
              └─────────────────────────┘
                          │
                          ▼
              ┌─────────────────────────┐
              │ Capital charge for Commodity│
              │       Transaction        │
              └─────────────────────────┘
                          │
                          ▼
              ┌─────────────────────────┐
              │Options Risk charge calculation│
              └─────────────────────────┘
                          │
                          ▼
              ┌─────────────────────────┐
              │  Total Market Risk charge│
              └─────────────────────────┘
```

Market RWA Run is made up of multiple sub processes specific to Market Risk. However, when Market Risk is bundled under a Consolidated Run and triggered, Capital Consolidation and Rating process is executed only once for Credit Risk and Market Risk. The details of each of the sub process mentioned in the preceding flow chart are present under Market Risk section of this document.

For example: 'Capital Charge for Interest Rate Instruments' sub process is detailed elaborately under 'Capital Charge for Interest Rate Instruments' section of Market Risk. Likewise 'Capital Charge for Equities', 'Capital Charge for Foreign Exchange Transaction' 'Capital Charge for Commodity transaction', and 'Options risk charge calculation' has a detailed explanation present under 'Capital Charge for Equities', 'Capital Charge for Foreign Exchange Transactions' 'Capital Charge for Commodity Transactions', and 'Capital Charge for Options' sub process of the Market Risk section of this document, respectively.

For more information on Market RWA computation, see Market RWA.

4.2.2.1.6 Process Flow for Operational RWA

Operational RWA Run is executed with Capital Consolidation process. For more information on Operational RWA computation, see Fundamental Review of Trading Books (FRTB) – Standardized Approach

In January 2016, the Basel Committee for Banking Supervision replaced the existing minimum capital requirements with revised standards for market risk. These revised standards include amendments that were made to the Basel III: International Convergence of Capital Measurement and Capital Standards - Comprehensive Version that was published in June 2006. These guidelines are referred to as the Fundamental Review of Trading Books (FRTB). In the Standardised Approach (SA), the Market Risk Capital is calculated as a sum of the following three instrument types:

- Sensitivities Based Method

    In the Sensitivities Based Method, the market risk capital charge is calculated from sum of the Delta, Vega, and Curvature risk measures of the seven risk classes.

    Depending on the characteristics of a bank portfolio's instrument, one or more these risk classes might be applicable. Under the Sensitivities Based Method, the risk charge for each of the risk classes is calculated by aggregating the following risk measures:

    - Delta

    - Vega

    - Curvature

- Default Risk Charge

    The Default Risk Charge is a risk measure that captures the Jump-to-Default (JTD) risk of an instrument, which is the loss suffered by a holder if the issuer of a bond or equity defaults. This

Default Risk Charge is computed separately for each instrument. Changes in market value due to credit quality are captured by the Sensitivities Based Method's Delta charge for Credit Spread Risk factors. In the Standardized Approach, the Default Risk Charge is independent of capital charges for CSR non-securitizations and securitizations.

The Default Risk Charge is classified into three types of risk classes based on; securitization, non-securitization, and the positions that qualify and do not qualify for Correlation Trading Portfolio (CTP).

- Residual Risk Add-on

The Residual Risk Add-On was introduced as not all market risks can be captured by the standardized approach. The Residual Risk Add-On is calculated for all instruments in addition to risk charges that arise from the Sensitivities Based Method and the Default Risk Charge. Instruments that are subjected to the Residual Risk Add-on do not have an impact in increasing or decreasing the scope of risk factors with respect to the Delta, Vega, Curvature, and Default Risk Charge.

NOTE: The regulatory capital requirements for market risk under the standardized approach on FRTB must be computed separately for each of the trading desks of the banks on a daily basis and reported to their supervisors on monthly basis or/and at the demand of their supervisors.

4.2.2.1.7 Sensitivities Based Method

4.2.2.1.7.1 _Risk Measures_

Process Flow for the Delta Risk Measure

The Delta sensitivities are calculated by using the baseline Present Values (PV) and stressed PVs. The fetched sensitivities are based on risk factors of the respective risk class. Based on the position of the exposure, for non-swap instruments or swap instrument, whether a leg is pay or receive, the exposures are netted. The risk weights, as prescribed by the regulator, are pre-defined in the solution and can be changed if desired. The calculation of the WSK is done on the basis of the risk-weighted sensitivities. Correlation values are computed for both Intra and Inter-bucket correlation. The computation of different prescribed correlation scenarios such as High, Medium, and Low are executed simultaneously by the application. The scenario that yields the highest delta risk weight is used for aggregating the total risk charge for the trading desk.

Process Flow for the Vega Risk Measure

The calculation for the Vega sensitivity is based on Vega inputs and values. The Vega sensitivity is only calculated for an instrument's optionality. The Vega sensitivities are mapped to the relevant risk factors of the respective risk class post interpolation. Based on the position of the exposure, in the case of non-swap or swap instruments i.e. long or short, or whether a leg is pay or receive, the exposures are netted. The risk weights as prescribed by the regulator are pre-defined in the solution and can be modified. The calculation of the WSK is done on the basis of the risk-weighted sensitivities. Correlation values are then computed on the fly for both Intra and inter bucket correlation. The computation of different prescribed correlation scenarios such as High, Medium, and Low are executed simultaneously by the application. The scenario that yields the highest Vega risk is used for the aggregation of total risk charge for the trading desk.

Process Flow for the Curvature Risk Measure

A risk measure that accounts for the incremental risk of the price changes in the value of an option not captured by a delta risk measure. The calculation for this measure is based on two stress scenarios; the upward and downward stress shock of a risk factor. The Vega and Curvature risk measures only apply to instruments that contain optionality.

4.2.2.1.7.2 Risk Classes

GIRR – The General Interest Rate Risk is the risk due to the absolute value of the interest rate or the relationship between interest rates changing that in turn changes the value of the investment. The risk factors in FRTB for the General Interest Rate Risk are identified as the yield curve in the denominated currency, the term structure as time vertices, and the flat curve of inflation in the denominated currency. Cross currency basis with term structure not recognized.

> **Delta** – The delta sensitivity is computed for two risk factors; a risk-free yield curve for interest rate sensitive instruments for each currency and the maturity for the   vertices: 0.25 years, 0.5 years, 1 year, 2 years, 3 years, 5 years, 10 years, 15 years, 20 years, and 30 years. The GIRR delta risk factor also includes a cross currency basis risk-factor and a flat curve of market-implied inflation rates for each currency.

> **Vega-** The implied volatilities of options that reference GIRR-sensitive underlyings in two dimensions; the maturity of the option and the residual maturity of the underlying of the option for the vertices: 0.5 years, 1 year, 3 years, 5 years, and 10 years. Vega sensitivities are assigned to their respective buckets by bilinear interpolation.

> **Curvature-** The Curvature sensitivity is computed for only one risk factor; the risk-free yield curve for interest rate sensitive instruments for each currency. Similar to the Delta risk measure for GIRR, all the vertices are shifted in parallel. The Curvature sensitivity does not include the risk

factors of cross currency basis risk and inflation. There will be no intra-bucket correlation as the bucket and CVRk granularity are the same in GIRR. There will be only one CVRk per bucket.

Equity – Equity risk is due to the volatility in the price of the equity, where the risk is incurred due to holding equity exposures and equity instruments. The equity risk factors in FRTB are all the equity spot prices and the equity repurchase agreement rates.

> **Delta** – The delta sensitivity is computed for two risk factors; the equity's spot price and the equity's repurchase agreement (repo) rate.

> **Vega-** The implied volatility of options that reference the equity spot price as underlying and the maturity for the vertices; 0.5 years, 1 year, 3 years, 5 years, and 10 years.

> **Curvature-** The Curvature sensitivity is computed for one risk factor; all the equity's spot prices. Equity repo rates do not contain a curvature risk charge.

Foreign Exchange - Foreign Exchange Risk or Forex risk is due to the value change of an exposure due to changes in the currency exchange rates. The risk factor in FRTB for Forex risk is identified as the exchange rates between the currency in which the instrument is denominated and the reporting currency.

> **Delta** – The delta sensitivity is computed for risk factor that is the exchange rate between the denominated currency and the reporting currency of the instrument.

> **Vega-** The optionality's volatility for exchange rates and the maturity for the vertices; 0.5 years, 1 year, 3 years, 5 years, and 10 years.

> **Curvature-** The Curvature sensitivity is computed for only one risk factor; the exchange rate between the denominated currency and the reporting currency of the instrument.

Credit Spread Risk - Non Securitization – A credit spread is the difference in yield between a risk-free interest curve, e.g. a Government Bond, and the yield of a marketable security e.g. a Corporate Bond, with the same maturity but of lesser quality. Based on the credit rating of instrument, credit spreads vary from one security to another. Credit Spread Risk buckets are based on a combination of party types and industries to arrive at the 'Sector' for the bucketing. The credit quality is divided into two parts; 'Investment Grade' and 'High Yield & Non – Rated' are based on the credit rating of the security. Securities that do not in which the application is unable to assign any security to any of the bucket will be assigned to "Others" bucket.

> **Delta** – The delta sensitivity is computed for two risk factors; the issuer's credit spread curve, bonds and Credit Default Swap (CDS), and the maturity for the vertices; 0.5 years, 1 year, 3 years, 5 years, and 10 years. The calculation of the 'Others' bucket is done after the risk charge calculation.

> **Vega-** The implied volatilities of options that reference the credit issuers name as underlying for bonds for one dimension; CDs and the maturity for the vertices; 0.5 years, 1 year, 3 years, 5 years, and 10 years. The calculation of the 'Others' bucket is done after the risk charge calculation.

> **Curvature-** The Curvature sensitivity is computed for one risk factor; the risk-free yield curve per currency of the issuer. All the vertices are shifted in parallel. The CVRk is calculated at the Issuer granularity level; hence one bucket contains multiple correlations.

Credit Spread Risk - Securitization (CTP) – The Credit Spread Risk - Securitization (CTP) criteria and calculations are similar to the ones in Credit Spread Risk - Non Securitization.

Delta – The delta sensitivity is computed for two risk factors; the issuer's credit spread curve, bonds and CDS and the maturity for the vertices; 0.5 years, 1 year, 3 years, 5 years, and 10 years. The calculation of the 'Others' bucket is done after the risk charge calculation.

Vega- The implied volatility of the options that reference the credit spread curve as underlying, for bonds and CDs, for one dimension; the maturity for the vertices; 0.5 years, 1 year, 3 years, 5 years, and 10 years. The calculation of the 'Others' bucket is done after the risk charge calculation.

Curvature- The Curvature sensitivity is computed for one risk factor; the underlying credit spread curve for bonds and CDS.

Credit Spread Risk - Securitization (Non CTP)- The risk for holding securitized instrument, when the credit spreads change gets captured by this risk class. Defined buckets are reclassified in to standard pool types to arrive at the sectors. Credit quality selection depends upon the seniority of the tranche and the credit rating of the instrument.

Delta – The Delta sensitivity are defined on two dimensions; tranche, credit spread curves and the following vertices: 0.5 years, 1 year, 3 years, 5 years, 10 years to which delta risk factors are assigned.

Vega- The Vega sensitivity is allocated for the maturity of the option represented on the standard vertices; 0.5 years, 1 year, 3 years, 5 years, 10 years, through linear interpolation.

Curvature- The CSR securitization curvature risk factors are defined on one dimension: the relevant tranche credit spread curves (bond and CDS). The CVrK is calculated along tranche granularity and contains multiple CVrKs per bucket.

Commodity - The commodity price risk is the volatility in market price due to the price fluctuation of a commodity. A commodity's price is affected by politics, seasonal changes, technology, and current market conditions. Based on the underlying commodity, the exposures are allocated to buckets.

Delta – The delta sensitivity is computed for the following risk factors; the commodity's spot prices, which depends on the contract grade, the city of the commodities legal terms and the maturity of the vertices from 0 to 30 years.

Vega- The implied volatility of the option for a commodity's spot price as underlying for one dimension; the maturity for the vertices; 0.5 years, 1 year, 3 years, 5 years, and 10 years.

Curvature- The Curvature sensitivity is computed for one dimension; the constructed curve of the commodity's' spot price.

4.2.2.1.8   Default Risk Charge

The Default Risk Charge (DRC) is used to capture the Jump-to-Default (JTD) risk of an instrument i.e. the loss that would be suffered by the holder if the issuer of the bond or equity were to default. It is computed for each instrument separately and is a function of the face amount or notional, market value of the instrument, and the Loss Given Default (LGD). The change in market value due to credit quality is captured by the Sensitivities Delta charge for Credit Spread Risk factors.

The Default Risk Charge is distinct from a counterparty to a trade defaulting in which it is capitalized under the Credit Risk and not Market Risk.

Default Risk Charge is broadly classified into three types of risk classes based on non-securitisation and securitisation positions and as the positions that qualify and do not qualify to the Correlation Trading Portfolio (CTP).

- Default Risk Charge Non – Securitization.

- Default Risk Charge Securitization Non – CTP

- Default Risk Charge Securitization CTP.

Process Flow for the Default Risk Charge

The Default Risk Charge for Non – Securitised instrument is only applicable for equity and credit instruments. With an instrument type filter, all the applicable exposures are populated in the landing table. The Credit Direction allocation is based on the position of the exposure and the option type for option instruments. The P&L Calculation depends on the instrument type, position, and the option type of the exposure. Based on the claim seniority the exposure are netted. DRC of each bucket is calculated which later gets aggregated to arrive at final risk charge.

4.2.2.1.9   Residual Risk Add-on

The Residual Risk Add-On captures any market risk that has not been captured by the Sensitivities Based Method and Default Risk Charge of the standardized approach. The Residual Risk Add-on is applicable in addition to any other risk charge i.e. a Residual Risk Add-on does not increase or decrease the scope of any other risk charges and is separately calculated and added to the risk charge from the Sensitivities Based Method and Default Risk Charge. A set of conditions, but not limited to, are prescribed by BIS that decides if a certain exposure will carry a Residual Risk Add- on or not are described below:

- All instruments with an exotic underlying.

- Asian options.

- Callable bonds issued by a retail issuer.

- Instruments that fall under the definiton of the Correlation Trading Portfolio (CTP), except those that are recognised in the market risk framework as eligible hedges of risks within the CTP.

- Options without an option maturity and that have been assigned to the largest maturity vertex for Vega computation.

The following scenarios are excluded from the Residual Risk Add-On instrument type:

- Instruments that have been used in a back-to-back transaction.

- Instrument that are listed and/or eligible for central clearing.

4.2.2.1.10 Market Risk Measurement and Management (MRMM) Integration for FRTB Standardized Approach

The integration of the MRMM services of the Stress Framework and Instrument Valuation for the Sensitivities Based Approach (SBM) of FRTB Standardised Approach allows you to have seamless valuation and market risk charge calculation.

You can use MRMM's stress framework and valuation services, supported by Numerix, or any third-party valuation services. An integration between OFSAA applications allows you to avoid reduant data and provides you with single point valuation and risk charge computation. You can expect the following possibilites with this integration:

13. The Basel FRTB solution uses the services of MRMM's stress framework to shock the market data and the valuation services to obtain the Present Values (PVs), Vega, and Implied Volatility. These are then used to compute the risk charges under the Sensitivities Based Method of the FRTB standardised approach. To do this, the application seeds the required standard scenarios for different calculations to stress the market data on the MRMM Stress Framework.

14. For the Delta risk charge calculations, the Delta sensitivities are calculated by using the PV values at a baseline level i.e. PV values witout any shock to the market data, and the stressed PV values i.e. PV values with shocked market data with shocks as prescribed by BIS.

15. For the Vega risk charge calculations, the Vega sensitivity is calculated by multiplying the Vega of the exposure with the implied volatility of the exposure. The Vega and the implied volatility are provided by MRMM for all the required exposures.

16. For the Curvature risk charge calculations, the PV with upward shock to the market data, the baseline PV i.e. the PV without any shock to the market data, and the PV with downward shock to the market data are provided by MRMM. This is achieved by making use of the stress framework and using multiple scenarios to stress the market data in the required manner.

17. Only the Sensitivities Based Method (SBM) approach uses MRMM services. The Default Risk Charge and Residual Risk Add-on are independent of MRMM.

18. If you do not use the services of MRMM, then you need to manually add the required valuation inputs in the Delta, Vega and Curvature input tables along with the scenario definition table in the required format..

4.2.2.1.10.1 *Process Flow*

In an integrated scenario the user is provided with the needed set of scenarios predefined and packaged with the product. These scenarios will be used by the application to not just stress the market data but the unique identifier of the scenarios i.e. N_SCENARIO_ID is also used to identify various other parameters of the exposure.

The solution detailing below details the requirements for both cases; an integrated situation with MRMM services being used and a situation with no integration i.e. only Basel FRTB std. approach being used without any of the MRMM services being used.

As stated previously, the MRMM services of valuation and stress testing are only required for the Sensitivities Based Method of the FRTB standardised approach. The Delta, Vega, and Curvature risk measures are handled in the following ways with the MRMM integration:

VII.   Delta

      xi.   The Delta calculations requires two types of PVs; the PV of the exposure without shocking the market data and the PV of the exposure with the prescribed shocks.

      xii.   The pre-configured scenarios for MRMM stress framework are available. In an execution, all the scenarios are executed through the market data, and then based on the market data, the scenario is applied per exposure.

      xiii.   The different scenarios are then used to apply shocks to different market data. Depending on the market data followed by an instrument, the shock value stresses the market data

      xiv.   The scenario ID of an is also used to identify the risk class, risk measure, time vertex, shock value, credit spread curve type, and the shock direction needed for the calculations associated with that scenario. This assigns an exposure to the correct calculation template and in order to proceed with the calculations.

      xv.   If an exposure is associated with a swap instrument type or not is based on the instrument type of the exposure.

VIII.   Vega

      vii.   For the Vega sensitivity, the Vega value and the implied volatility per exposure are multiplied.

      viii.   There is no stressing of marked data for calculating the Vega sensitivity.

      ix.   The credit spread curve type indicator for an exposure, whether an exposure follows a bond curve or the CDS curve, cannot be identified from the scenario IDs. To fetch the Vega values and the implied volatilities, the baseline scenario is used, where the baseline scenario must not be associated with a certain credit spread curve. Each exposure that carries the Credit Spread Risk (CSR) is associated with a credit spread curve, where Vega is a subset of Delta. After identifying the credit

spread curve type for an exposure, the Vega and implied volatility is fetched from the baseline scenario of the exposure, and then the credit spread indicator is fetched from the upward shock scenario used by the exposure.

IX. Curvature

xv. For curvature calculations, the baseline PV, the PV without any shock applied to the market data, the upward shocked PV, and downward shocked PVs are used with the sum of the delta sensitivities for the exposure and the shock value to arrive at the CVRk value.

xvi. The market is shocked upward and downward as prescribed by FRTB for all exposures.

xvii. Multiple scenarios are used to shock the market data. The upward shock and the downward shock are provided in different scenarios on the market data type for a risk class where the upward shock is provided as a positive shock value and the downward shock is provided as a negative shock value.

xviii. Similar to Delta calculations, the scenarios IDs are used to fetch information on the shock direction, shock value, and risk class as well as obtaining PVs. The curvature calculation is not associated time vertices.

xix. For the Equity risk class, the curvature stress scenarios are based on the bucket that an exposure falls into.

xx. The Delta, Vega, and curvature risk measures are handled in the following ways with the MRMM integration:

xxi. The Delta, Vega, and curvature risk measures are handled in the following ways with the MRMM integration:

In the case where the MRMM integration is not used, the Delta, Vega, and Curvature risk measures are handled in the following ways:

III. Delta

v. You are required to manually provide all the required values for calculation such as the shocked and baseline PVs, the shock direction indicator, tenor, shock values, the risk measures, and risk classs.

vi. You must follow the following criteria when adding data to the Delta input table:

a. For GIRR, CSR, and Commodity risk classes, the PV values are to be provided at the standard vertices as prescribed by BIS:

i. **GIRR:** Depending on the residual maturity of the exposure, 0.25 years, 0.5 years, 1 year, 2 years, 3 years, 5 years, 10 years, 15 years, 20 years, and 30 years. Cross currency and inflation curves do not contain any vertices. In the Delta input and the scenario definition tables, you must provide the cross currency scenario with a time vertex value of -8888, and then you must provide the inflation scenario with a time vertex value of -9999.

ii. **CSR non-sec, sec (CTP) and sec (non-CTP):** The vertices are; 0.5 years, 1 year, 3 year, 5 year, 10 year

iii. **Commodities:** Depending on the residual maturity of the exposure, the commodities spot are associated with the 0 year vertex, the commodity forwards are associated with 0.25 years, 0.5 years, 1 year, 2 years, 3 years, 5 years, 10 years, 15 years, 20 years, and 30 years.

iv. The **Equity** and **Commodity** risk classes are not associated with any vertices for the delta risk charge calculations. You must provide a value of -1 in the Delta input table and scenario definition table for the vertices against these scenarios. Similarly, you must provide a value of -1 in the baseline scenario table.

v. The time vertex value must always be expressed in years.

b. For each exposure, a baseline scenario PV; a PV without shock or 0 shock to the market data, and PV with an upward shock to the market data must be provided.

   Note: In the Delta Input and Scenario Definition Tables, the shock values are always expected to be provided in Basis Points (BPS) only. This restricts the Shock Type to only 'BPS'.

c. You must create separate scenarios to stress the market data associated with bond and CDS curves. 5 scenarios, 1 each for each of the time vertices to stress the CDS market data types, and another 5 scenarios, 1 each for each of the time vertices to stress the bond, market data types are to be created.

d. Based on the instrument type of the exposure, you must indicate per exposure if an exposure belongs to a swap instrument type or not.

e. You must provide details on the risk class to which the required entry in the Delta input table is made.

f. All the inputs provided in the Delta Input table must be converted in the reporting currency of the bank. For currency conversion, you must use the same exchange rates as used by the application for DRC and RRAO as well as any other areas where the currency conversion is being done. From the next release onwards this will not be the case and you will be able to provide the inputs in any desired currency and the currency conversion for the input table will be taken care of.

Vega

ix. You must provide the Vega number and the implied volatility for all of the exposures of the option instrument types, including instrument types with built in optionality like callable bonds and cap floors in the Vega input table.

x. You must use the standard prescribed vertices as well the residual maturity of the option. The underlying from the maturity of the option are interpolated to arrive at the standard vertices.

xi.   You must provide details on the risk class and the credit spread curve with the associated entry in the Vega input table.

xii.   All the inputs provided in the Delta Input table must be converted in the reporting currency of the bank. For currency conversion, you must use the same exchange rates as used by the application for DRC and RRAO as well as any other areas where the currency conversion is being done. From the next release onwards this will not be the case and you will be able to provide the inputs in any desired currency and the currency conversion for the input table will be taken care of.

Curvatue

xiii.   You must provide the required inputs for curvature calculation in the curvature input table and the required inputs in the scenario definition table.

xiv.   The exposures eligible for curvature, exposures in option instrument types, must be involved with 3 scenarios; a baseline scenario, a scenario to provide upward shock, and a scenario to provide downward shock. You must provide all 3 scenarios for a curvature eligible exposure. The scenarios depend on what risk class a certain exposure falls into.

xv.   You must provide the parameters for the shock direction, shock value from the required scenario in a record, and the risk class the record corresponds to.

Note: The credit spread curve indicator in the curvature input table is not relevant.

xvi.   For exposures carrying an equity curvature charge, the scenarios are configured per bucket and you must provide the shock values and the shocked PV values,both upward and downward, on the basis of which bucket the exposure falls into.

xvii.   The baseline scenario is exposure specific.

xviii.   All the inputs provided in the Delta Input table must be converted in the reporting currency of the bank. For currency conversion, you must use the same exchange rates as used by the application for DRC and RRAO as well as any other areas where the currency conversion is being done. From the next release onwards this will not be the case and you will be able to provide the inputs in any desired currency and the currency conversion for the input table will be taken care of.

NOTE:

iii.   MRMM provides the output in the reporting currency of the bank. For a selected portfolio, you must execute the MRMM services and the Basel FRTB standardised approach by use of the same reporting currency.

4.2.2.1.11   Assumptions

Our interpretations of a few sections:

- The Vega sensitivities are obtained by multiplying the Vega number of the exposure with the implied volatility.

- The Baseline scenario is needed for all the participating exposures in all the cases.

- The list of supported instrument types and the applicable risks for each of the instrument types are seeded out of box in the FSI_INSTR_TYPE_RISK_CLASS_MAP table. For the purpose of this table, the RRAO is also treated as a risk measure.

- Inter bucket correlation for CSR and Commodity risk classes are considered as 100%.

4.2.2.1.11.1 *Data Expectations*

The following are some key data expectations:

- We expect one instrument or exposure to be mapped to only one Credit Spread Curve.

- In the FSI_BASEL_MR_SCENARIO_DEFN table, you must provide N_SHOCK_VAL column values in Basis Points, and then the V_SHOCK_TYPE value should be 'BPS'. This also applies to the Delta and Curvature INPUT tables. You are also expected to provide the shock values in Basis points.

- In an integrated scenario, you must run the MRMM valuation, stress testing services, and the Basel FRTB Standardized approach by using the same reporting currency.

- If user is using a third party or in-house valuation engine instead of MRMM, you must populate the FSI_BASEL_MR_SCENARIO_DEFN table and adhere to the conditions of scenario creation as required by the application. The following are the detailed set of conditions and expectations in a non- MRMM case

- User must follow the standard vertices in providing the input data in for the GIRR, CSR, and Commodity risk classes as there is no interpolation of data for Delta.

- While seeding the scenarios for cross currency and inflation scenarios in the FSI_BASEL_MR_SCENARIO_DEFN table, you must use the N_TIME_VERTEX values -8888 and -9999 for cross currency and inflation scenarios respectively.

4.2.2.1.11.2 *Limitations*

- Index instruments and Multi-underlying instruments are not supported.

- Exotic Instruments are not supported.

- Covered Bond is not supported.

- DRC Sec (CTP) is not supported.

- Replication of Securitization exposures cannot be done.

- Multiple strikes and barrier instruments are not supported.

Operational RWA.

4.2.2.1.12   Process Flow for Capital Structure
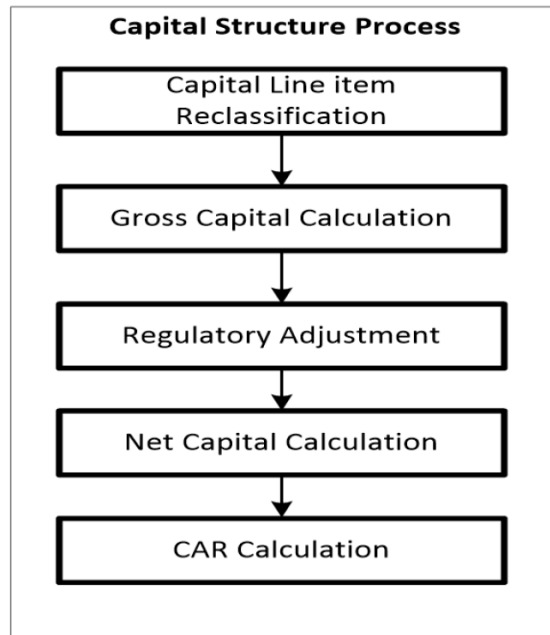
Capital Structure is executed with Capital Consolidation, Credit Risk, Market Risk, and Operational Risk RWA processes. For more information on the sub processes of Capital Structure, see Capital Structure.

For example: 'Gross Capital Calculation' mentioned in the preceding flow chart is explained in detail under 'Gross Capital Calculation for T1, T2 and T3' sub process section of the Basel III Capital Structure in this document. Likewise 'Regulatory Adjustment' and 'Net Capital Calculation' is detailed under 'Regulatory Adjustment to Tier 1 and Tier 2' and 'Calculation of Net Capital' sub process section of the Basel III Capital Structure in this document.

4.2.2.1.13   Process Flow for Capital Buffers
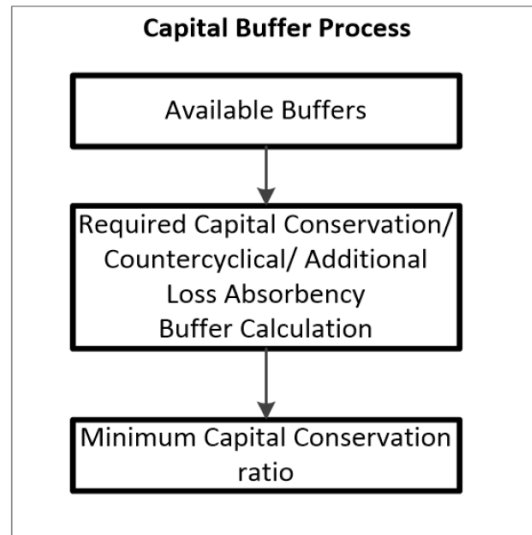
Capital Buffer is calculated after the calculation of capital ratios, as these ratios are input to buffer calculation.

For more information on each sub process within the Capital Structure process flow, see Capital Buffers.

For example, 'Required Capital Conservation Buffer' and 'Required Countercyclical Buffer' calculation are detailed in the 'Required Total Buffer' section of Basel III Capital Buffers, in this document. Similarly, Minimum Capital Conservation ratio is detailed in the 'Capital Conservation Ratio' section of Basel III Capital Buffers, in this document.

4.2.2.1.14   Process Flow for Revised Leverage Ratio
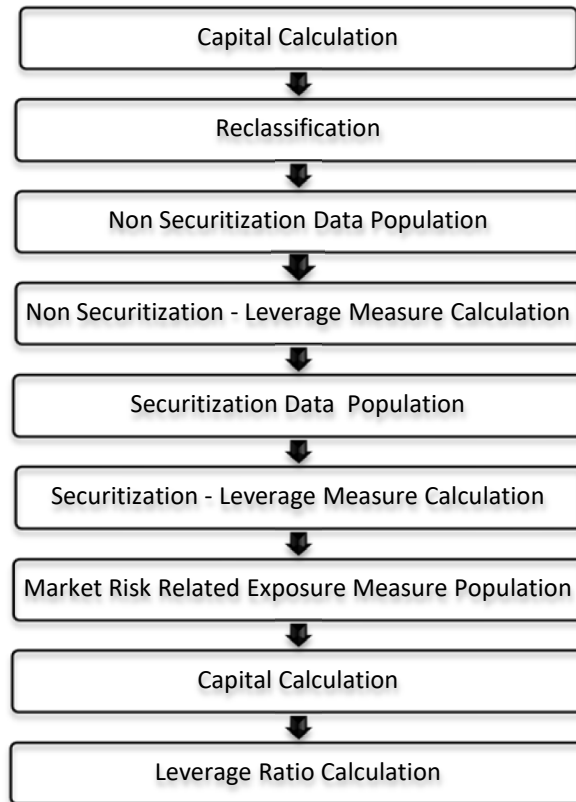
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┌─────────────────────────────────────────────────┐
│              Capital Calculation                │
└─────────────────────────────────────────────────┘
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┌─────────────────────────────────────────────────┐
│               Reclassification                  │
└─────────────────────────────────────────────────┘
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┌─────────────────────────────────────────────────┐
│        Non Securitization Data Population        │
└─────────────────────────────────────────────────┘
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┌─────────────────────────────────────────────────┐
│   Non Securitization - Leverage Measure Calculation   │
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│          Securitization Data  Population          │
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┌─────────────────────────────────────────────────┐
│     Securitization - Leverage Measure Calculation     │
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│   Market Risk Related Exposure Measure Population   │
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┌─────────────────────────────────────────────────┐
│              Capital Calculation                │
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┌─────────────────────────────────────────────────┐
│           Leverage Ratio Calculation            │
└─────────────────────────────────────────────────┘
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The leverage ratio calculations are a separate run, and not part of the regular capital calculation run. This is because of the changes in the Credit conversion factor assigned to the exposures, and also exemption of few exposures from the calculation which are part of the capital charge calculations. Also, the mitigation is not required for these exposures, and the exposure measure calculations are different from the regular EAD calculations.

For more information on revised leverage ratio, see Revised Leverage Ratio.

4.2.2.2 Credit RWA

The application supports the computation of Credit RWA as per the guidelines laid out in the Basel accord. Credit RWA computation is broken down into Credit Risk for Non Securitized Exposures and Credit Risk for Securitized Exposures. For Credit Risk for Non Securitized Exposures, the application follows the Standardized Approach, Foundation IRB Approach, and Advanced IRB Approach. Credit RWA computation also consists of computation of Credit Valuation Adjustments which is explained in the later section.

4.2.2.2.1   Non Securitization – Internal Ratings Based Approach

The process begins with rating reclassification. All exposures are rated by different agencies. However, the naming convention of these ratings might not be the same as mentioned in the Basel accord. Hence, the application reclassifies the rating information shared in the bank's data to standard rating, as stated in

the Basel accord.

The exposure amount and other amount data columns that are provided as an input (in stage tables) are in the Natural Currency (exposure currency) and this is usually different for exposures across different countries. The application converts them to reporting currency columns so that processing for all exposures happens in one single currency.

The credit risk exposures are identified by their product types, counterparty types, and their corresponding asset classes. A sample list of products types, party types, mitigant types, and credit ratings are pre-defined in the Basel application. However, this list and naming convention differs from one bank to another. Hence, the application reclassifies the bank's data into standard data as per the accord. The application reclassifies the bank's product types and party types to Basel standard product and party types. Further, based on standard Basel product and standard party type, it forms an asset class for each exposure. For equity exposures, the asset class is formed on the basis of equity type and Basel product type.

In the current release, a few additional product types are added in the list and the application is updated to reclassify these products. Some exposures can be hedged against credit risk through various mitigants like guarantors, collaterals, credit derivatives, and so on. These provide mitigation to credit risk and should be considered while computing Credit RWA as per Basel norms. Hence, the application calculates pre-mitigation risk weighted assets amount and post mitigation risk weighted assets amount.

The application calculates the correlation factor using the formula specified for each asset class. The current release considers the updates to correlation factor calculation as per Basel III guidelines. Using Correlation factor, PD, and LGD, the application calculates the pre-mitigation capital charge for each exposure. This value signifies the capital charge the bank has to maintain for each exposure, prior to considering any mitigation effects.

The application calculates pre-mitigation exposure at default amount and risk weight for each exposure. Further, it computes pre-mitigation risk weighted assets (Pre-CRM RWA) by multiplying the EAD by risk weight. The risk weight is arrived at by multiplying pre-mitigation capital charge with 12.5.

Through the Credit Risk Mitigation (CRM) process, the bank considers the effects of mitigation. The application checks mitigant eligibility based on the Basel specifications and assigns a haircut to each mitigant based on their currency, residual maturity, and expected volatility in their market value. FOREX and Maturity haircut considers any currency and maturity mismatches the mitigants have with the exposures that they are covering. Volatility haircut takes into consideration the change in the mitigation effect that arises due to future fluctuations in the mitigant's value. Basel committee has revised CRM guidelines to a large extent. The changes at the higher level are with respect to the recognition of the eligible mitigants, applicable for the Securitized and the Non Securitized exposures. BCBS has also revised the haircuts to be applied for the debt securities issued by a Securitization transaction which act as collateral. The remaining procedures for computation of CRM are the same as in the existing Basel II process. The application allocates mitigants to exposures based on optimizer function and capital charge for each mitigant is calculated by the application.

The application later calculates the post mitigation RWA Unexpected Loss (Post CRM RWA UL) and post mitigation RWA Expected Loss (Post CRM RWA EL). Some credit risk exposures that fall under the category of internal transactions like holding own subsidiaries shares or investment in its capital,

reciprocal cross holding, and so on, are treated separately under Capital Structure.

Process Flow for Non Securitization – Internal Ratings Based Approach

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Rating Information Processing
          ↓
     Data Population
          ↓
   Currency Conversion
          ↓
    Reclassification
          ↓
  Risk Parameters Assignment
          ↓
Non Sec Asset Value Correlation Factor
          ↓
Pre-Mitigation Capital Charge Calculation
          ↓
Pre-CRM Exposure at Default (EAD)
          ↓
Pre-CRM Risk Weights Assets Calculation
          ↓
   Mitigant Eligibility
          ↓
     PD/LGD for CRM
          ↓
 Mitigant Haircut Assignment
          ↓
CRM Capital Charge Calculation
          ↓
 Mitigant Correlation Factor
          ↓
Allocation of Mitigant to Exposures
          ↓
  Post CRM RWA Computation
```

The processing of the following items in the process flow is different in the Basel III processing of the current release of the application. For more information on the processing of the remaining line items, see Non Securitization - FIRB/AIRB Approach.

Non Sec Asset Value Correlation Factor

Non Sec Asset Value Correlation Factor is calculated as per Basel guidelines. The application updates the correlation factor's calculated value for a multiplier of 1.25, if required.

Mitigant Correlation Factor

Mitigant Correlation Factor is similar to mitigant correlation factor for Non Securitization Exposures – IRB Approach in Basel II for BIS jurisdiction wherein correlation factor for collaterals or mitigants is also calculated for mitigants belonging to all asset classes based on their Probability of Default (PD), as per guidelines of Basel accord. However, additionally the application updates the correlation factor's calculated value for a multiplier of 1.25, if required. For more information on the processing of the remaining line items, see Non Securitization - FIRB/AIRB Approach.

The following section provides you with details on Asset Value Correlation (AVC) Multiplier. AVC related changes are applicable for **Non Sec Correlation Factor**, **Sec Correlation Factor**, **Non Sec CRM Correlation factor**, and **Sec CRM Correlation Factor** sub processes.

Asset Value Correlation Multiplier

In the Basel III accord, BCBS has introduced a multiplier of 1.25 to the Asset Value Correlation (AVC) of exposures. These exposures relate to regulated financial firms with assets of at least 100 billion USD and to exposures of unregulated financial firms (regardless of size). The revised correlation formula for financial entities is as follows:

Correlation (R_FI) = 1.25 x [0.12 x (1 - EXP (-50 x PD))

AVC Rule is applicable for Non Securitization accounts and for issuers of credit risk mitigation.

NOTE: The computation of AVC does not change for any entity executing a Solo or Consolidation Basel Run.

Assumptions

The Basel III Accord mentions only one formula wherein the new correlation factor is a multiplier of 1.25 for corporate, sovereign, and bank exposures. Therefore, our interpretation of the accord is that the conditions for the multiplier of 1.25 are applicable only for asset classes related to these types of exposures.

Process Flow

NOTE: The T2Ts of all Product Processors populate Financial Entity Indicator, Regulated or Unregulated

Indicator, Group Asset Size Amount and Group Asset Size Currency into processing tables from the data provided as a download, for each party.

The description of the process flow is as follows.

Financial Entity

The Basel Regulatory capital application identifies a financial entity based on the standard counterparty type. The application also identifies a financial entity based on the downloaded flag that is a part of the table **Party Financial Information**. Therefore, the two ways in which the application identifies a financial entity are as follows:

The counterparty types are mapped as financial entities in the Rule. This Rule is re-configurable, which the client can modify to add or remove counterparty types based on their interpretation of the term "Financial Entity". Based on this mapping the application identifies a financial entity.

The application selects a financial entity as per the Financial Entity Flag that is a part of table Party Financial Information. Preference is given to this flag over mapping of counterparty.

If the counterparty is not a Financial Entity, then the calculation of AVC remains unchanged. However, if the counterparty is identified as a financial entity, then the application checks whether the financial entity is a regulated entity or not.

Regulated Entity

The application checks whether the financial entity is a regulated entity or not based on the downloaded flag that is a part of the table **Party Financial Information**. If the financial entity is not a regulated entity, then the application directly calculates the AVC using the correlation formula and is populated in the column where the AVC was calculated previously. If the financial entity is a regulated entity then the application checks for the group asset size.

Group Asset Size >= $100 billion

The application checks whether the regulated financial entity is a part of a group with asset size of or equivalent to 100 billion USD. The group asset size can be in any currency; however the asset size is converted to USD and should be equivalent to USD 100 billion or more. If the application does not identify the counterparty as being a part of group asset size of greater than or equal to USD 100 billion, then the calculation of AVC remains unchanged or else the AVC is calculated using the correlation formula and is populated in the column where the AVC was calculated previously.

Key Data Elements

Key data elements for computation of Asset Value Correlation are provided in this section. For a complete list of tables, see the Download Specifications document.

Data that is populated helps the application identify each firm as financial and non financial entity. With the data populated the application also identifies whether the financial entity is a regulated entity or not. Additionally, for a regulated financial entity, the group asset size of the counterparty and the currency pertaining to the asset size is also required.

Equity Investments in Funds – (Collective Investment Units (CIU) Processing)

The CIU are funds which have invested in various exposures. The accord has specified various criteria for risk weighting the CIU Exposures. The solutions supports all the approaches. In the case of CIU, the solution follows a hierarchy of approaches – Look Through Approach, Mandate Based Approach, Fall Back Approach.

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┌──────────────────────────────────────────────────────────────┐
│         Data Population to Equity Exposure Processing Table    │
└──────────────────────────────────────────────────────────────┘
                              │
                              ▼
┌──────────────────────────────────────────────────────────────┐
│                    Asset Reclassification                     │
└──────────────────────────────────────────────────────────────┘
                              │
                              ▼
┌──────────────────────────────────────────────────────────────┐
│                  Risk Weigtht for Rated CIUs                  │
└──────────────────────────────────────────────────────────────┘
                              │
                              ▼
┌──────────────────────────────────────────────────────────────┐
│                 Risk Weight for Unrated CIUs                  │
└──────────────────────────────────────────────────────────────┘
```

The exposures to the CIU are expected in the Stage Investments table (STG_INVESTMENTS), and the instrument code is expected to be populated for these exposures. The static information related to the instruments are expected in the Instrument contract dimension table (DIM_INSTRUMENT_CONTRACT), and the information pertaining to the instruments which changes periodically like the current outstanding issue amount is expected in the Stage Instrument Contract Detail table (STG_INSTRUMENT_CONTRACT_DTL).

The underlying exposures of the CIU are expected in STG_FUND_CIS_COMPOSITION with the fund code (instrument_code) populated also into V_PARENT_INSTRUMENT_CODE. The underlying composition of the CIU are expected in the Stage Fund Underlying Composition table (STG_FUND_UNDERLYNG_COMPOSITION). This has the underlying composition details of the fund, across various products, and the maximum permissible limit of investment in each of the product types, with the fund code as the Instrument ID.

NOTE: The fund underlying composition and/or the underlying exposures are required for processing, only when the underlying of the fund is not available and when there is manadate information avaialble for the fund. When the derivatives products are the underlying for a CIU, then the MTM value of the derivative is expected to be given as N_ASSET_MTM_VALUE in STG_FUND_CIS_COMPOSITION. MTM value of the derivative must also be populated to N_COMPOSITION_VALUE to check for the complete underlying exposure availability of the CIU underlyings. The instrument code of the CIU funds are also expected to be given STG_EXPOSURE_MASTER for the correct processing.

NOTE: Unless operational criteria are met, the look through approach is not applicable.

Look Through Approach

The first approach in the hierarchy that application assigns based on the operational criteria given in the accord. For the purpose of validating the operational criteria or conditions given, data is expected as input. Along with the suggested conditions application also checks for the availability of the underlying

information. If all the sufficient information is available the application assigns the Look Through Approach (LTA) and computation will be followed as given in the accord. If operational criteria are not met, the application checks for the immediate next approach.

To check the information provided is verified by the third party or not a column (STG_INSTRUMENT_CONTRACT_DTL .F_INFO_VERIFIED_BY_THIRD_PARTY) is introduced where value 'Y or N" is given as input by the bank.

Under this approach for IRB, accord suggests few logics to calculate or use risk weights. The case where accord suggests to use risk weights same as standardized approach when banks cannot calculate risk weights using IRB will not be handled by the application as there is a mention of "partial use of provision" which relates to the mixed pool, the rest of the cases will be taken care by the application.

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Mandate Based Approach

This approach is applied when the information of the underlying and the third party risk weights that can be used under the look through approach are not available. To continue with this approach banks need to have the mandate information required. Once the application checks for the information and assigns the approach, computations for MBA under Standardized approach are in line with the Basel Accord.

Fall Back Approach

If no approach from the hierarchy is applicable based on the checks performed, then application assigns Fall Back Approach. In this approach, all the exposures will be risk weighted at 1250%.

The entire processing of CIU happens in the sub process "CIU Equity Exposure Risk Weight Assignment" and "Equity Investment in Funds Computation".

Partial use of an approach

A bank may use a combination of the three approaches when determining the capital requirements for an equity investment in an individual fund, provided that the conditions for all the approaches are met.

This will be applicable only in the case of treatment of funds in other funds, as within a fund the method cannot be different.

Treatment of funds invested in other funds

If the underlying information is available then application check for the approach that is used by the funds, if the approach is not same across then FBA will be assigned i.e. if the approach used for determining the RW of a fund and same approach is also where it is invested further, if same then application carry on with the same approach (Look through or Mandate based approach respectively), if not then we will assign 1250% under Fall Back Approach.

4.2.2.2.2 Securitization – Revised Framework for BIS

As per the revised guidelines for securitization framework, which is focused on addressing the short comes of the existing guidelines, a revised hierarchy of approaches that replaces the existing approaches have been introduced.

The application assigns the appropriate approach to the exposures, based on the criteria specified in the Revised guidelines. The application assigns any of the three approaches under securitization:

1. Sec-Internal Rating Based Approach (SEC-IRBA)

2. Sec-External Ratings Based Approach (SEC-ERBA)

3. Sec-Standardized Approach (SEC-SA)

Process Flows for Securitization – Revised Framework

The procedure by which the application handles the advanced approach of securitization exposures is as follows:

Credit Rating Process

The entire rating information of the exposures and the mitigants are populated from the staging tables to the processing tables. The exposure and the tranche rating information are captured in the account rating (**STG_ACCOUNT_RATING_DETAILS**) tables and the mitigant rating information is captured in the instrument rating details (**STG_INSTRUMENT_RATING_DETAILS**) table. The rating processing is handled in the process **BIS Credit Rating Processing**.

Securitization and Mitigant Data Population with Mitigant Mapping

The data pertaining to the pool, tranche, and exposures are populated from the respective staging tables to the processing tables. The underlying exposures are captured in the underlying exposures (**STG_UNDERLYING_EXPOSURES**) table wherein the underlying is a non securitized exposure, and are captured in Securitized Exposures (**STG_SEC_EXPOSURES**) wherein the underlying is a securitized exposure.

The underlying exposures, which are not securitization exposures, follow the process pertaining to the non securitization exposures. The underlying exposures, which are securitization exposures, follow the process pertaining to the securitization exposures.

The mitigants data are populated from the staging table to the processing table. The exposures which are mapped to the mitigants are captured and populated from the staging table to the processing table. Securitization data population is handled by the process **SEC_DATA_POPULATION** in BIS Standard,FIRB and AIRB runs.

Mitigant data population is handled by the process **MITIGANT_DATA_POPULATION_STD** in BIS Standard run and **MITIGANT_DATA_POPULATION_IRB** in BIS FIRB and AIRB runs. Exposure mitigant mapping population is handled in the process **SEC_EXP_MITIGANT_MAPPING_POP** in BIS Standard,FIRB and AIRB runs.

Sec Reclassification

The application uses the standard data for all kinds of calculations (product type like Eligible Liquidity Facility, bank role like Originator, pool type like Mortgage Backed Securities). Before any calculation, the application reclassifies the bank specific data to standard data. The application reclassifies the bank role to the standard bank role of an Originator or Investor. Other bank roles like Sponsor, Credit Protection Provider, and so on, are reclassified into Originator, Investor, and so on, respectively. The application also reclassifies the pool type to the standard pool type like Credit Cards Receivable Pool, Auto Loans, and so on. The application also reclassifies the product type to the standard product type like Mortgage Backed Securities, Eligible Liquidity Facility, and so on. It reclassifies the mitigant type to the standard mitigant type like the Debt Securities, Credit Derivative, Cash, and so on. It reclassifies the mitigant issuer type to the standard mitigant issuer type like Banks, Corporate, and so on. These reclassification tasks are present in **Sec Reclassification** sub process.

Sec Approach Selection

Due Diligence Requirement for Securitization Exposures

If a banking organization is able to meet due diligence requirements, a Bank can follow any risk weight appraoch under securitisation, to all its securitized exposures, as per the revised hierarchy of approaches. If bank is not able to meet the due diligence requirements, then all the exposures will be risk weighted at 1250%.

The application assigns the appropriate approach to the exposures, based on the criteria specified in the Revised Accord.

Sec Approach Selection

If the underlying assets of the exposure is qualified for the IRB approach, the SEC-IRB Approach will be applicable for the exposures, and the risk weight will be computed as per the SSFA Approach. If the IRB approach is not applicable, then banks will look for next approach from the hierarchy that is, SEC-ERBA subject to supervisory approval. In case of absence of external rating, the exposures will undergo SEC-IAA Approach. And if none of the approaches are applicable then the exposures will be assigned a risk weight of 1250%. This approach selection is handled in the **Sec Approach Selection Sub-process.**

In the computations, if more than one approach is followed, then the mixed pool treatment must be followed.

Mixed Pool

A mixed pool is a treatment where IRB is followed for a few underlying exposures and SA for others, then it calculates using the approach corresponding to the predominant share of exposures for mixed pools. As part of approach selection, application checks for mixed case scenario first and based on the availability of mixed pool, the computations are performed. For this purpose application is designed in sync with the criteria / inputs given in the Basel accord.

Pre-CRM EAD Computation

The application assigns the Credit Conversion Factor (CCF) to the off-balance sheet items, Further, it computes the Pre-Mitigation EAD based on whether the exposure is an off-balance sheet item or not, by assigning the applicable CCF.

Risk Weight Assignment

Securitization Internal Rating Based Approach (SEC-IRBA)

SEC-IRBA is the first approach to be calculated. The model that is used to calculate capital charge (KIRB) for underlying exposures using IRB is Simplified Supervisory Formula Approach (SSFA).

For exposures which follow the sec-internal ratings based approach, the application calculates the underlying weighted average capital of the securitization pool (KIRB). Further, the application calculates the required parameters based on the pool and tranche details. The application calculates these, using the logic specified by the accord. It also checks the exposure to identify whether the exposure should be straddled or not. This check is based on the credit enhancement level of the tranche to which the exposure belongs to, the thickness of the tranche to which the exposure belongs to, and the underlying capital of the securitization pool. After all the parameters are calculated application computes SSFA capital and uses below mentioned logic for risk weight computation.

The exposures for which are detachment point less than that of the KIRB, the exposures are risk weighted at 1250%. The exposures for which the credit enhancement level is more than that of the KIRB, the exposures have the SSFA capital charge computed as per the formulae suggested in the accord. The exposures for which the credit enhancement level is less than that of the KIRB but the sum of the credit enhancement level and the tranche thickness are more than the KIRB, the exposures are straddled, and

that is, the tranche to which the exposure belongs is split into a position below KIRB and a position above KIRB. All the exposures mapped to the straddled tranche are also split by the application in the same proportion as the split tranche. Post straddling risk weight is computed using the computation logic mentioned by the accord.
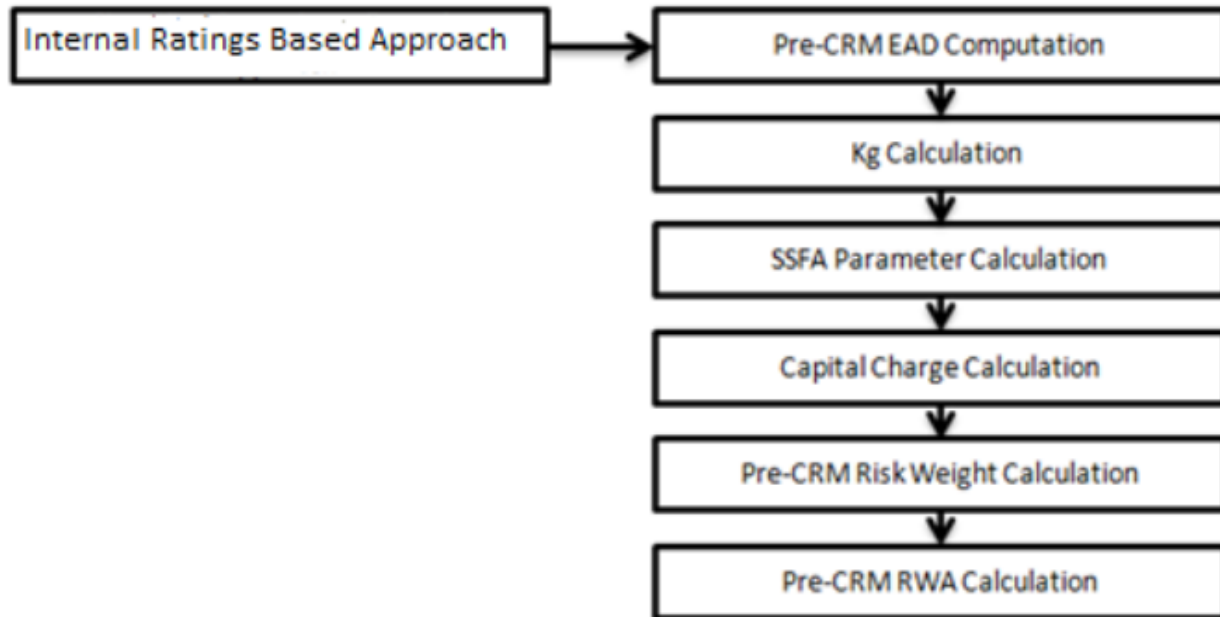
Sec-External Ratings Based Approach (SEC-ERBA)

If there is a supervisory approval, application continues with the computations else it will look for the next approach.

For exposures that follow the external ratings based approach, the risk weight assignment is based on the criteria used for risk weighting. The application uses the seniority position of the exposure, maturity, thickness of the exposure and the credit rating to assign the risk weight to the exposure. To ensure that the exposures have the risk weight assigned based on their maturity term, the solution supports interpolation of the risk weight to accommodate the varying maturity of the exposures.

The DT which is used for interpolation is "Sec_Interpolated_RW" which updates interpolated risk weights for each exposures in "FCT_SEC_EXPOSURES" table. Exposures updated include both "STC condition met" "exposures and "STC condition not met " exposures.

Sec-Standardized Approach (SEC-SA)

For exposures following the sec-standardized approach, the application calculates the underlying weighted average capital requirement of the securitization pool (K_{SA}). Other parameters needed for SSFA are calculated by the solution based on underlying data.

After all the parameters are calculated, application computes SSFA capital and uses below mentioned logic for risk weight computation. The exposures for which are detachment point (D) less than that of the K_A, the exposures are deducted (it will be risk weighted at 1250%). The exposures for which the credit enhancement level is more than that of the K_A, the exposures have the K_{SSFA} (SSFA capital

charge) computed. The exposures for which the credit enhancement level is less than that of the K_A but the sum of the credit enhancement level and the tranche thickness are more than the K_A, the exposures are straddled, and that is, the tranche to which the exposure belongs to is split into a position below K_A and a position above K_A. All the exposures mapped to the straddled tranche are also split by the application in the same proportion as the split tranche. Post straddling risk weight is computed using the computation logic mentioned by the accord.
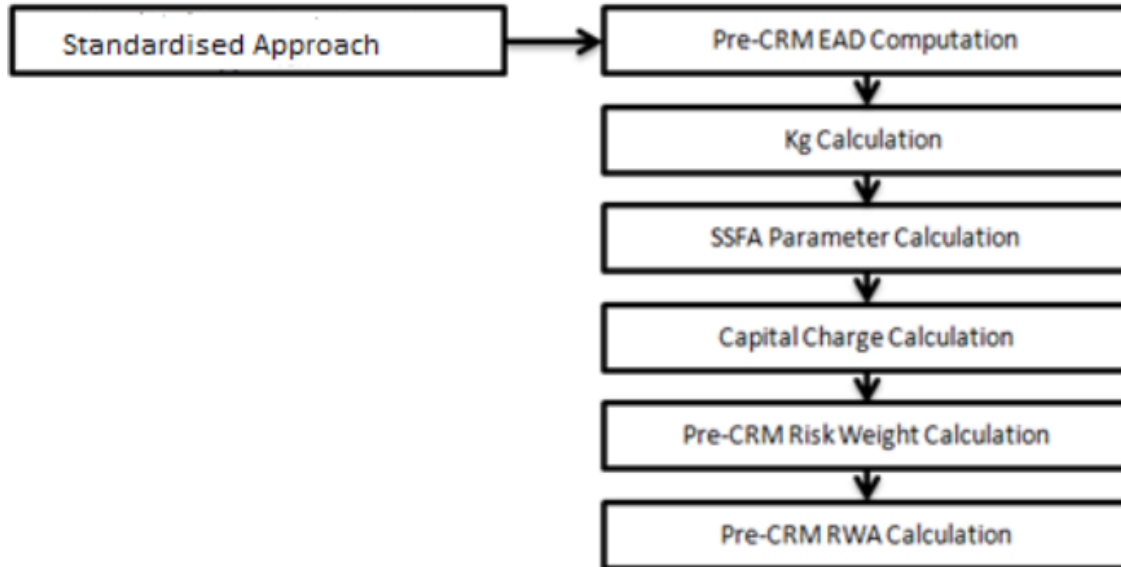
Maximum risk weight requirements for senior exposures for all the pools (mixed, IRB, SA) is handled by the application as per the logic given in the accord.

For Maximum capital requirement, in order to apply a maximum capital charge to a bank's securitisation exposure, the following inputs are required: The largest proportion of interest that the bank holds for each tranche of a given pool (P). In particular: – For a bank that has one or more securitisation exposure(s) that reside in a single tranche of a given pool, P equals the proportion (expressed as a percentage) of securitisation exposure(s) that the bank holds in that given tranche (calculated as the total nominal amount of the bank's securitisation exposure(s) in the tranche) divided by the nominal amount of the tranche. For a bank that has securitisation exposures that reside in different tranches of a given securitisation, P equals the maximum proportion of interest across tranches, where the proportion of interest for each of the different tranches must be calculated as described above.

Sec Pre-CRM RWA Computation

The application calculates the Pre-CRM RWA for the exposures by multiplying the Pre-CRM EAD with the risk weight of the exposures. Pre-CRM RWA is computed in the **Sec Pre-CRM RWA Computation** sub process.

Sec CRM Process

Mitigant eligibility, mitigant risk weight, haircut assignment, and allocation of mitigants to exposures are handled in **Sec CRM** sub-process.

Mitigant Eligibility

The application identifies the following mitigants in the case of securitized exposures – collateral, guarantees, and credit derivatives. The mitigants are identified as eligible, based on the eligibility criteria as specified by the Basel Accord. For collateral, the eligibility is based on the criteria whether the mitigant is a re-securitized exposure, belongs to the investment grade, a standard mitigant type, and whether the mitigant belongs to the conforming residential mortgage. For guarantees and credit derivatives, the eligibility criteria are based on the issuer type and the satisfaction of the other criteria as specified in the Basel Accord.

Mitigant Risk Weight

The risk weight to the guarantees and credit derivatives are assigned based on the PD, LGD, and the correlation calculated for the mitigant. The financial collateral issued by different issuers and belonging to various ratings, are assigned different risk weights as per specified in the Accord.

Haircut Assignment

The application assigns the various haircuts, as applicable to the mitigants, specified by the Basel Accord. This is based on the risk weight assigned to the mitigant, standard issuer type, and the residual maturity associated with that mitigant. The minimum holding period of the financial collateral is 5 business days. The mitigant volatility haircut can be scaled up if the minimum holding period is more than 5 days.

The same scaling up is done for FOREX haircut. After the haircut assignment is complete, zero risk weight is assigned to financial collaterals. Only eligible mitigants are considered for haircut assignment and for further processing. Post haircut assignment, the eligible mitigants are moved from mitigants table to sub exposures table.

Allocation of Mitigants to Exposures

The application computes the mitigant value post all haircuts. Then it uses the pooling and optimizer logic to allocate the exposures to the mitigants. This is slightly different from the optimizer logic of non-securitization exposures as the securitization exposures have priority in the cashflow and the senior most exposure (or tranche) gets the maximum protection by the mitigants. The senior most exposure (or tranche) is denoted with seniority 1 and the second senior exposure is denoted with seniority 2 and so on. For mitigant allocation of securitization exposures, senior exposures are given preference over junior exposures. The other parameters which are considered in the allocation logic are the risk weight and the mitigant value post haircut.

The application uses the linear programming logic to allocate the mitigants to the exposures. The pooling logic in securitization is the same as that of non-securitization. The optimizer logic for securitization is slightly different and the difference is as follows:

Based on the seniority of the exposures, risk weight of the exposures, the mitigants, and the mitigant value, the order in which the mitigants are allocated to the exposures is arrived at. The order of allocation can be changed by editing the database function. You have to choose the allocation rank measure in the optimizer definition screen (see below figure) while defining the optimizer logic.

The remaining steps to create optimizer definitions are same as those mentioned in the non-securitization process. The optimizer works on the minimization constraint logic.

Single Mitigant Mapped to Single or Multiple Exposures

If there are one or more than one exposures mapped to a single mitigant, the mitigant is allocated to the exposure with the highest seniority.

If there is more than one exposure with the same highest seniority, then the mitigant is allocated to the exposure which yields the highest mitigant value post haircut.

Single Exposure Mapped to Single or Multiple Mitigants

If there is one or more than one mitigants mapped to a single exposure, the least risk weighted mitigant is allocated to the exposure.

If there are more than one mitigants with the same least risk weight, then the mitigant which has the highest mitigant value post haircut is allocated to the exposure

Multiple Exposures Mapped to Multiple Mitigants

This is treated as a case of a single mitigant mapped to single or multiple exposures to identify a mitigant to be assigned to the exposures. Then, the treatment pertaining to single exposure mapped to multiple mitigants is followed to yield the credit risk weighted exposure amount. Using this logic, the application calculates the factor of exposure covered by the mitigant and the factor of the exposure uncovered (without any protection).

Sec Post CRM RWA Computation

The application computes the covered amount and the uncovered amount for the exposures. The covered amount is computed by multiplying the covered factor with the exposure amount. To this covered amount, the application assigns the mitigant risk weight. The product of the covered amount and the mitigant risk weight is the covered RWA. The uncovered amount is computed by multiplying the uncovered factor (which is 1 – sum of all covered factors for that exposure) with the exposure amount. This uncovered amount is multiplied by the exposure risk weight to get the uncovered RWA. The sum of the covered RWA and the uncovered RWA is the Post CRM RWA of the exposure.

Key Data Elements

A few key data elements are provided in this section. For an entire list of tables and columns to be populated, see the Download Specifications document.

Securitization Exposures

For an investing bank, the data is expected in the Stage Underlying Exposures (**STG_UNDERLYING_EXPOSURES**) for the underlying of the pool, Total Pool Level attributes in the Stage Pool table (**STG_SECURITIZATION_POOL**), Tranche Level attributes in the Stage Tranche table (**STG_SECURITIZATION_TRANCHE**), and the Exposure Level Attributes in the respective PP tables.

For an originator, the data is expected in the same manner as the Investor.

For a credit protection exposure in the form of guarantee, it is expected in the Stage Guarantees table (**STG_GUARANTEES**); and if it is a credit derivative, it is expected in the Stage Credit Derivatives table (**STG_CREDIT_DERIVATIVES**). If it is a regular investment in the Tranches by an investing bank, or it is part of the mandate for retention in the pool or tranche for an originating bank, the data is expected in the Stage Investments table (**STG_INVESTMENTS**).

For a liquidity facility exposure, or servicer cash advance, the exposures are expected in the Stage Commitment Contracts table (**STG_COMMITMENT_CONTRACTS**).

Miscellaneous

The following data is expected to be provided by the bank:

- Balance of the underlying exposures with various statuses which are required to compute SSFA Parameter W.

- Balance of all the subordinate tranches and their seniority in the cash flow, including tranches where the bank has no exposures is required to compute Parameter A, Credit Enhancement Level, and Eligibility of Nth to Default Credit Derivative Mitigant.

- Balance of any funded credit reserve and its seniority in the cash flow which is required to compute Parameter A, Credit Enhancement Level, Eligibility of Nth to Default Credit Derivative Mitigant.

4.2.2.2.3 Securitization – Internal Ratings Based Approach

4.2.2.3 Credit Valuation Adjustments

The CVA for IRB Approach is calculated similar to the Standardized Approach. See Credit Valuation Adjustments for more information.

4.2.2.4 Market RWA

The Market Risk of Non Securitized and Securitized exposures in the Foundation IRB Approach (FIRB) and Advanced IRB Approach (AIRB) is calculated under the Internal Model Method Approach. See the IMM Approach in the Standardized Approach section for more information.

4.2.2.5 Fundamental Review of Trading Books (FRTB) – Standardized Approach

In January 2016, the Basel Committee for Banking Supervision replaced the existing minimum capital requirements with revised standards for market risk. These revised standards include amendments that were made to the Basel III: International Convergence of Capital Measurement and Capital Standards - Comprehensive Version that was published in June 2006. These guidelines are referred to as the Fundamental Review of Trading Books (FRTB). In the Standardised Approach (SA), the Market Risk Capital is calculated as a sum of the following three instrument types:

- Sensitivities Based Method

  In the Sensitivities Based Method, the market risk capital charge is calculated from sum of the Delta, Vega, and Curvature risk measures of the seven risk classes.

  Depending on the characteristics of a bank portfolio's instrument, one or more these risk classes might be applicable. Under the Sensitivities Based Method, the risk charge for each of the risk classes is calculated by aggregating the following risk measures:

  - Delta
  - Vega
  - Curvature

- Default Risk Charge

  The Default Risk Charge is a risk measure that captures the Jump-to-Default (JTD) risk of an instrument, which is the loss suffered by a holder if the issuer of a bond or equity defaults. This Default Risk Charge is computed separately for each instrument. Changes in market value due to credit quality are captured by the Sensitivities Based Method's Delta charge for Credit Spread Risk factors. In the Standardized Approach, the Default Risk Charge is independent of capital charges for CSR non-securitizations and securitizations.

  The Default Risk Charge is classified into three types of risk classes based on; securitization, non-securitization, and the positions that qualify and do not qualify for Correlation Trading Portfolio (CTP).

- [Residual Risk Add-on](#)

   The Residual Risk Add-On was introduced as not all market risks can be captured by the standardized approach. The Residual Risk Add-On is calculated for all instruments in addition to risk charges that arise from the Sensitivities Based Method and the Default Risk Charge. Instruments that are subjected to the Residual Risk Add-on do not have an impact in increasing or decreasing the scope of risk factors with respect to the Delta, Vega, Curvature, and Default Risk Charge.

NOTE: The regulatory capital requirements for market risk under the standardized approach on FRTB must be computed separately for each of the trading desks of the banks on a daily basis and reported to their supervisors on monthly basis or/and at the demand of their supervisors.

```
                          ┌─────────────────────────┐
                          │  Standardized Approach  │
                          └─────────────────────────┘
```

Standardized Approach

- **Sensitivities Based Method**
  - **General Interest Rate Risk (GIRR)**
  - **Credit Spread Risk Non-Securitization**
  - **Credit Spread Risk Securitization Non-Corelation Trading Portfolio (CTP)**
  - **Credit Spread Risk Securitization CTP**
  - **Equity Risk**
  - **Commodity Risk**
  - **Foreign Exchange Risk**

- **Default Risk Charge (DRC)**
  - **DRCNon-Securitization**
  - **DRC Securitization (Non-CTP)**
  - **DRC Securitization (CTP)**

- **Residual Risk Add-on**

4.2.2.5.1   Sensitivities Based Method

4.2.2.5.1.1 *Risk Measures*

Process Flow for the Delta Risk Measure

```
┌─────────────────────────────┐
│  Netting of Long and Short  │
│         Instruments         │
└─────────────────────────────┘
              │
              ▼
┌─────────────────────────────┐
│    Risk Weight Assignment   │
└─────────────────────────────┘
              │
              ▼
┌─────────────────────────────┐
│       WSₖ Calculation       │
└─────────────────────────────┘
              │
              ▼
┌─────────────────────────────┐
│  Intra- bucket Correlation  │
│       for all Scenarios     │
└─────────────────────────────┘
              │
              ▼
┌─────────────────────────────┐
│      Calculation of Kᵦ      │
└─────────────────────────────┘
              │
              ▼
┌─────────────────────────────┐
│  Inter- bucket Correlation  │
│       for all Scenarios     │
└─────────────────────────────┘
              │
              ▼
┌─────────────────────────────┐
│ Delta Risk Charge           │
│ Calculation                 │
└─────────────────────────────┘
```

The Delta sensitivities are calculated by using the baseline Present Values (PV) and stressed PVs. The fetched sensitivities are based on risk factors of the respective risk class. Based on the position of the exposure, for non-swap instruments or swap instrument, whether a leg is pay or receive, the exposures are netted. The risk weights, as prescribed by the regulator, are pre-defined in the solution and can be changed if desired. The calculation of the WS_K is done on the basis of the risk-weighted sensitivities. Correlation values are computed for both Intra and Inter-bucket correlation. The computation of different prescribed correlation scenarios such as High, Medium, and Low are executed simultaneously by the application. The scenario that yields the highest delta risk weight is used for aggregating the total risk charge for the trading desk.

Process Flow for the Vega Risk Measure

```
┌─────────────────────────────┐
│   Netting of Long and Short │
│         Instruments         │
└─────────────────────────────┘
              │
              ▼
┌─────────────────────────────┐
│    Risk Weight Assignment   │
└─────────────────────────────┘
              │
              ▼
┌─────────────────────────────┐
│       WSₖ Calculation       │
└─────────────────────────────┘
              │
              ▼
┌─────────────────────────────┐
│   Intra- bucket Correlation │
│       for all Scenarios     │
└─────────────────────────────┘
              │
              ▼
┌─────────────────────────────┐
│      Calculation of Kᵦ      │
└─────────────────────────────┘
              │
              ▼
┌─────────────────────────────┐
│   Inter- bucket Correlation │
│       for all Scenarios     │
└─────────────────────────────┘
              │
              ▼
┌─────────────────────────────┐
│  Vega Risk Charge Calculation│
└─────────────────────────────┘
```

The calculation for the Vega sensitivity is based on Vega inputs and values. The Vega sensitivity is only calculated for an instrument's optionality. The Vega sensitivities are mapped to the relevant risk factors of the respective risk class post interpolation. Based on the position of the exposure, in the case of non-swap or swap instruments i.e. long or short, or whether a leg is pay or receive, the exposures are netted. The risk weights as prescribed by the regulator are pre-defined in the solution and can be modified. The calculation of the WS_K is done on the basis of the risk-weighted sensitivities. Correlation values are then computed on the fly for both Intra and inter bucket correlation. The computation of different prescribed correlation scenarios such as High, Medium, and Low are executed simultaneously by the application. The scenario that yields the highest Vega risk is used for the aggregation of total risk charge for the trading desk.

Process Flow for the Curvature Risk Measure

```
┌────────────────────────────────┐
│   Calculate the CVR_K Value for │
│          each Bucket            │
└────────────────────────────────┘
                ↓
┌────────────────────────────────┐
│   Intra- bucket Correlation for all │
│            Scenarios            │
└────────────────────────────────┘
                ↓
┌────────────────────────────────┐
│       Calculation of K_b        │
└────────────────────────────────┘
                ↓
┌────────────────────────────────┐
│   Inter- bucket Correlation for all │
│            Scenarios            │
└────────────────────────────────┘
                ↓
┌────────────────────────────────┐
│     Curvature Risk Charge       │
│         Calculation             │
└────────────────────────────────┘
```

A risk measure that accounts for the incremental risk of the price changes in the value of an option not captured by a delta risk measure. The calculation for this measure is based on two stress scenarios; the upward and downward stress shock of a risk factor. The Vega and Curvature risk measures only apply to instruments that contain optionality.

4.2.2.5.1.2Risk Classes

GIRR – The General Interest Rate Risk is the risk due to the absolute value of the interest rate or the relationship between interest rates changing that in turn changes the value of the investment. The risk factors in FRTB for the General Interest Rate Risk are identified as the yield curve in the denominated currency, the term structure as time vertices, and the flat curve of inflation in the denominated currency. Cross currency basis with term structure not recognized.

> **Delta** – The delta sensitivity is computed for two risk factors; a risk-free yield curve for interest rate sensitive instruments for each currency and the maturity for the vertices: 0.25 years, 0.5 years, 1 year, 2 years, 3 years, 5 years, 10 years, 15 years, 20 years, and 30 years. The GIRR delta risk factor also includes a cross currency basis risk-factor and a flat curve of market-implied inflation rates for each currency.

> **Vega**- The implied volatilities of options that reference GIRR-sensitive underlyings in two dimensions; the maturity of the option and the residual maturity of the underlying of the option for the vertices: 0.5 years, 1 year, 3 years, 5 years, and 10 years. Vega sensitivities are assigned to their respective buckets by bilinear interpolation.

> **Curvature**- The Curvature sensitivity is computed for only one risk factor; the risk-free yield curve for interest rate sensitive instruments for each currency. Similar to the Delta risk measure for GIRR, all the vertices are shifted in parallel. The Curvature sensitivity does not include the risk

factors of cross currency basis risk and inflation. There will be no intra-bucket correlation as the bucket and CVR_k granularity are the same in GIRR. There will be only one CVR_k per bucket.

Equity – Equity risk is due to the volatility in the price of the equity, where the risk is incurred due to holding equity exposures and equity instruments. The equity risk factors in FRTB are all the equity spot prices and the equity repurchase agreement rates.

Delta – The delta sensitivity is computed for two risk factors; the equity's spot price and the equity's repurchase agreement (repo) rate.

Vega- The implied volatility of options that reference the equity spot price as underlying and the maturity for the vertices; 0.5 years, 1 year, 3 years, 5 years, and 10 years.

Curvature- The Curvature sensitivity is computed for one risk factor; all the equity's spot prices. Equity repo rates do not contain a curvature risk charge.

Foreign Exchange - Foreign Exchange Risk or Forex risk is due to the value change of an exposure due to changes in the currency exchange rates. The risk factor in FRTB for Forex risk is identified as the exchange rates between the currency in which the instrument is denominated and the reporting currency.

Delta – The delta sensitivity is computed for risk factor that is the exchange rate between the denominated currency and the reporting currency of the instrument.

Vega- The optionality's volatility for exchange rates and the maturity for the vertices; 0.5 years, 1 year, 3 years, 5 years, and 10 years.

Curvature- The Curvature sensitivity is computed for only one risk factor; the exchange rate between the denominated currency and the reporting currency of the instrument.

Credit Spread Risk - Non Securitization – A credit spread is the difference in yield between a risk-free interest curve, e.g. a Government Bond, and the yield of a marketable security e.g. a Corporate Bond, with the same maturity but of lesser quality. Based on the credit rating of instrument, credit spreads vary from one security to another. Credit Spread Risk buckets are based on a combination of party types and industries to arrive at the 'Sector' for the bucketing. The credit quality is divided into two parts; 'Investment Grade' and 'High Yield & Non – Rated' are based on the credit rating of the security. Securities that do not in which the application is unable to assign any security to any of the bucket will be assigned to "Others" bucket.

Delta – The delta sensitivity is computed for two risk factors; the issuer's credit spread curve, bonds and Credit Default Swap (CDS), and the maturity for the vertices; 0.5 years, 1 year, 3 years, 5 years, and 10 years. The calculation of the 'Others' bucket is done after the risk charge calculation.

Vega- The implied volatilities of options that reference the credit issuers name as underlying for bonds for one dimension; CDs and the maturity for the vertices; 0.5 years, 1 year, 3 years, 5 years, and 10 years. The calculation of the 'Others' bucket is done after the risk charge calculation.

Curvature- The Curvature sensitivity is computed for one risk factor; the risk-free yield curve per currency of the issuer. All the vertices are shifted in parallel. The CVR_k is calculated at the Issuer granularity level; hence one bucket contains multiple correlations.

Credit Spread Risk - Securitization (CTP) – The Credit Spread Risk - Securitization (CTP) criteria and calculations are similar to the ones in Credit Spread Risk - Non Securitization.

Delta – The delta sensitivity is computed for two risk factors; the issuer's credit spread curve, bonds and CDS and the maturity for the vertices; 0.5 years, 1 year, 3 years, 5 years, and 10 years. The calculation of the 'Others' bucket is done after the risk charge calculation.

Vega- The implied volatility of the options that reference the credit spread curve as underlying, for bonds and CDs, for one dimension; the maturity for the vertices; 0.5 years, 1 year, 3 years, 5 years, and 10 years. The calculation of the 'Others' bucket is done after the risk charge calculation.

Curvature- The Curvature sensitivity is computed for one risk factor; the underlying credit spread curve for bonds and CDS.

Credit Spread Risk - Securitization (Non CTP)- The risk for holding securitized instrument, when the credit spreads change gets captured by this risk class. Defined buckets are reclassified in to standard pool types to arrive at the sectors. Credit quality selection depends upon the seniority of the tranche and the credit rating of the instrument.

Delta – The Delta sensitivity are defined on two dimensions; tranche, credit spread curves and the following vertices: 0.5 years, 1 year, 3 years, 5 years, 10 years to which delta risk factors are assigned.

Vega- The Vega sensitivity is allocated for the maturity of the option represented on the standard vertices; 0.5 years, 1 year, 3 years, 5 years, 10 years, through linear interpolation.

Curvature- The CSR securitization curvature risk factors are defined on one dimension: the relevant tranche credit spread curves (bond and CDS). The CV_rK is calculated along tranche granularity and contains multiple CV_rKs per bucket.

Commodity - The commodity price risk is the volatility in market price due to the price fluctuation of a commodity. A commodity's price is affected by politics, seasonal changes, technology, and current market conditions. Based on the underlying commodity, the exposures are allocated to buckets.

Delta – The delta sensitivity is computed for the following risk factors; the commodity's spot prices, which depends on the contract grade, the city of the commodities legal terms and the maturity of the vertices from 0 to 30 years.

Vega- The implied volatility of the option for a commodity's spot price as underlying for one dimension; the maturity for the vertices; 0.5 years, 1 year, 3 years, 5 years, and 10 years.

Curvature- The Curvature sensitivity is computed for one dimension; the constructed curve of the commodity's' spot price.

4.2.2.5.2 Default Risk Charge

The Default Risk Charge (DRC) is used to capture the Jump-to-Default (JTD) risk of an instrument i.e. the loss that would be suffered by the holder if the issuer of the bond or equity were to default. It is computed for each instrument separately and is a function of the face amount or notional, market value of the instrument, and the Loss Given Default (LGD). The change in market value due to credit quality is captured by the Sensitivities Delta charge for Credit Spread Risk factors.

The Default Risk Charge is distinct from a counterparty to a trade defaulting in which it is capitalized under the Credit Risk and not Market Risk.

Default Risk Charge is broadly classified into three types of risk classes based on non-securitisation and securitisation positions and as the positions that qualify and do not qualify to the Correlation Trading Portfolio (CTP).

- Default Risk Charge Non – Securitization.

- Default Risk Charge Securitization Non – CTP

- Default Risk Charge Securitization CTP.

Process Flow for the Default Risk Charge

```
┌─────────────────────────────┐
│      Bucket Allocation       │
└─────────────────────────────┘
               │
               ▼
┌─────────────────────────────┐
│  Credit Direction Allocation │
└─────────────────────────────┘
               │
               ▼
┌─────────────────────────────┐
│   P&L Calculation for every  │
│           Exposure           │
└─────────────────────────────┘
               │
               ▼
┌─────────────────────────────┐
│   JTD Calculation for every  │
│           Exposure           │
└─────────────────────────────┘
               │
               ▼
┌─────────────────────────────┐
│  Netting based on Senority and│
│       Credit Direction       │
└─────────────────────────────┘
               │
               ▼
┌─────────────────────────────┐
│  Risk Weight Assignment based │
│          on Rating           │
└─────────────────────────────┘
               │
               ▼
┌─────────────────────────────┐
│ Hedge Benefit Ration Calculation│
└─────────────────────────────┘
               │
               ▼
┌─────────────────────────────┐
│ Default Risk Charge Calculation│
└─────────────────────────────┘
```

The Default Risk Charge for Non – Securitised instrument is only applicable for equity and credit instruments. With an instrument type filter, all the applicable exposures are populated in the landing table. The Credit Direction allocation is based on the position of the exposure and the option type for option instruments. The P&L Calculation depends on the instrument type, position, and the option type of the exposure. Based on the claim seniority the exposure are netted. DRC of each bucket is calculated which later gets aggregated to arrive at final risk charge.

4.2.2.5.3   Residual Risk Add-on

The Residual Risk Add-On captures any market risk that has not been captured by the Sensitivities Based Method and Default Risk Charge of the standardized approach. The Residual Risk Add-on is applicable in addition to any other risk charge i.e. a Residual Risk Add-on does not increase or decrease the scope of any other risk charges and is separately calculated and added to the risk charge from the Sensitivities Based Method and Default Risk Charge. A set of conditions, but not limited to, are prescribed by BIS that decides if a certain exposure will carry a Residual Risk Add- on or not are described below:

- All instruments with an exotic underlying.
- Asian options.
- Callable bonds issued by a retail issuer.
- Instruments that fall under the definiton of the Correlation Trading Portfolio (CTP), except those that are recognised in the market risk framework as eligible hedges of risks within the CTP.
- Options without an option maturity and that have been assigned to the largest maturity vertex for Vega computation.

The following are excluded from the Residual Risk Add-On:

- Instruments that have been used in back-to-back transactions.
- Instrument that are listed and/or eligible for central clearing.

4.2.2.5.4   Market Risk Measurement and Management (MRMM) Integration for FRTB Standardized Approach

The integration of the MRMM services of the Stress Framework and Instrument Valuation for the Sensitivities Based Approach (SBM) of FRTB Standardised Approach allows you to have seamless valuation and market risk charge calculation.

You can use MRMM's stress framework and valuation services, supported by Numerix, or any third-party valuation services. An integration between OFSAA applications allows you to avoid reduant data and provides you with single point valuation and risk charge computation. You can expect the following possibilites with this integration:

1. The Basel FRTB solution uses the services of MRMM's stress framework to shock the market data and the valuation services to obtain the Present Values (PVs), Vega, and Implied Volatility. These are then used to compute the risk charges under the Sensitivities Based Method of the FRTB standardised approach. To do this, the application seeds the required standard scenarios for different calculations to stress the market data on the MRMM Stress Framework.

2. For the Delta risk charge calculations, the Delta sensitivities are calculated by using the PV values at a baseline level i.e. PV values witout any shock to the market data, and the stressed PV values i.e. PV values with shocked market data with shocks as prescribed by BIS.

3. For the Vega risk charge calculations, the Vega sensitivity is calculated by multiplying the Vega of the exposure with the implied volatility of the exposure. The Vega and the implied volatility are provided by MRMM for all the required exposures.

4. For the Curvature risk charge calculations, the PV with upward shock to the market data, the baseline PV i.e. the PV without any shock to the market data, and the PV with downward shock to the market data are provided by MRMM. This is achieved by making use of the stress framework and using multiple scenarios to stress the market data in the required manner.

5. Only the Sensitivities Based Method (SBM) approach uses MRMM services. The Default Risk Charge and Residual Risk Add-on are independent of MRMM.

6. If you do not use the services of MRMM, then you need to manually add the required valuation inputs in the Delta, Vega and Curvature input tables along with the scenario definition table in the required format.

4.2.2.5.4.1 Process Flow

In an integrated scenario the user is provided with the needed set of scenarios predefined and packaged with the product. These scenarios will be used by the

application to not just stress the market data but the unique identifier of the scenarios i.e. N_SCENARIO_ID is also used to identify various other parameters of the exposure.

The solution detailing below details the requirements for both cases; an integrated situation with MRMM services being used and a situation with no integration i.e. only Basel FRTB std. approach being used without any of the MRMM services being used.

As stated previously, the MRMM services of valuation and stress testing are only required for the Sensitivities Based Method of the FRTB standardised approach. The Delta, Vega, and Curvature risk measures are handled in the following ways with the MRMM integration:

X. Delta

   i. The Delta calculations requires two types of PVs; the PV of the exposure without shocking the market data and the PV of the exposure with the prescribed shocks.

   ii. The pre-configured scenarios for MRMM stress framework are available. In an execution, all the scenarios are executed through the market data, and then based on the market data, the scenario is applied per exposure.

   iii. The different scenarios are then used to apply shocks to different market data. Depending on the market data followed by an instrument, the shock value stresses the market data

   iv. The scenario ID of an is also used to identify the risk class, risk measure, time vertex, shock value, credit spread curve type, and the shock direction needed for the calculations associated with that scenario. This assigns an exposure to the correct calculation template and in order to proceed with the calculations.

   v. If an exposure is associated with a swap instrument type or not is based on the instrument type of the exposure.

XI. Vega

   i. For the Vega sensitivity, the Vega value and the implied volatility per exposure are multiplied.

   ii. There is no stressing of marked data for calculating the Vega sensitivity.

   iii. The credit spread curve type indicator for an exposure, whether an exposure follows a bond curve or the CDS curve, cannot be identified from the scenario IDs. To fetch the Vega values and the implied volatilities, the baseline scenario is used, where the baseline scenario must not be associated with a certain credit spread curve. Each exposure that carries the Credit Spread Risk (CSR) is associated with a credit spread curve, where Vega is a subset of Delta. After identifying the credit spread curve type for an exposure, the Vega and implied volatility is fetched from the baseline scenario of the exposure, and then the credit spread indicator is fetched from the upward shock scenario used by the exposure.

XII. Curvature

i. For curvature calculations, the baseline PV, the PV without any shock applied to the market data, the upward shocked PV, and downward shocked PVs are used with the sum of the delta sensitivities for the exposure and the shock value to arrive at the CVR_k value.

ii. The market is shocked upward and downward as prescribed by FRTB for all exposures.

iii. Multiple scenarios are used to shock the market data. The upward shock and the downward shock are provided in different scenarios on the market data type for a risk class where the upward shock is provided as a positive shock value and the downward shock is provided as a negative shock value.

iv. Similar to Delta calculations, the scenarios IDs are used to fetch information on the shock direction, shock value, and risk class as well as obtaining PVs. The curvature calculation is not associated time vertices.

v. For the Equity risk class, the curvature stress scenarios are based on the bucket that an exposure falls into.

vi. The Delta, Vega, and curvature risk measures are handled in the following ways with the MRMM integration:

vii. The Delta, Vega, and curvature risk measures are handled in the following ways with the MRMM integration:

In the case where the MRMM integration is not used, the Delta, Vega, and Curvature risk measures are handled in the following ways:

I. Delta

i. You are required to manually provide all the required values for calculation such as the shocked and baseline PVs, the shock direction indicator, tenor, shock values, the risk measures, and risk classs.

ii. You must follow the following criteria when adding data to the Delta input table:

a. For GIRR, CSR, and Commodity risk classes, the PV values are to be provided at the standard vertices as prescribed by BIS:

i. **GIRR:** Depending on the residual maturity of the exposure, 0.25 years, 0.5 years, 1 year, 2 years, 3 years, 5 years, 10 years, 15 years, 20 years, and 30 years. Cross currency and inflation curves do not contain any vertices. In the Delta input and the scenario definition tables, you must provide the cross currency scenario with a time vertex value of -8888, and then you must provide the inflation scenario with a time vertex value of -9999.

ii. **CSR non-sec, sec (CTP) and sec (non-CTP):** The vertices are; 0.5 years, 1 year, 3 year, 5 year, 10 year

iii. **Commodities:** Depending on the residual maturity of the exposure, the commodities spot are associated with the 0 year vertex, the commodity forwards are associated with 0.25

years, 0.5 years, 1 year, 2 years, 3 years, 5 years, 10 years, 15 years, 20 years, and 30 years.

    iv. The **Equity** and **Commodity** risk classes are not associated with any vertices for the delta risk charge calculations. You must provide a value of -1 in the Delta input table and scenario definition table for the vertices against these scenarios. Similarly, you must provide a value of -1 in the baseline scenario table.

    v. The time vertex value must always be expressed in years.

b. For each exposure, a baseline scenario PV; a PV without shock or 0 shock to the market data, and PV with an upward shock to the market data must be provided.

Note: In the Delta Input and Scenario Definition Tables, the shock values are always expected to be provided in Basis Points (BPS) only. This restricts the Shock Type to only 'BPS'.

c. You must create separate scenarios to stress the market data associated with bond and CDS curves. 5 scenarios, 1 each for each of the time vertices to stress the CDS market data types, and another 5 scenarios, 1 each for each of the time vertices to stress the bond, market data types are to be created.

d. Based on the instrument type of the exposure, you must indicate per exposure if an exposure belongs to a swap instrument type or not.

e. You must provide details on the risk class to which the required entry in the Delta input table is made.

f. All the inputs provided in the Delta Input table must be converted in the reporting currency of the bank. For currency conversion, you must use the same exchange rates as used by the application for DRC and RRAO as well as any other areas where the currency conversion is being done. From the next release onwards this will not be the case and you will be able to provide the inputs in any desired currency and the currency conversion for the input table will be taken care of.

Vega

    i. You must provide the Vega number and the implied volatility for all of the exposures of the option instrument types, including instrument types with built in optionality like callable bonds and cap floors in the Vega input table.

    ii. You must use the standard prescribed vertices as well the residual maturity of the option. The underlying from the maturity of the option are interpolated to arrive at the standard vertices.

    iii. You must provide details on the risk class and the credit spread curve with the associated entry in the Vega input table.

    iv. All the inputs provided in the Delta Input table must be converted in the reporting currency of the bank. For currency conversion, you must use the same exchange rates as used by the application for DRC and RRAO as well

as any other areas where the currency conversion is being done. From the next release onwards this will not be the case and you will be able to provide the inputs in any desired currency and the currency conversion for the input table will be taken care of.

Curvatue

i. You must provide the required inputs for curvature calculation in the curvature input table and the required inputs in the scenario definition table.

ii. The exposures eligible for curvature, exposures in option instrument types, must be involved with 3 scenarios; a baseline scenario, a scenario to provide upward shock, and a scenario to provide downward shock. You must provide all 3 scenarios for a curvature eligible exposure. The scenarios depend on what risk class a certain exposure falls into.

iii. You must provide the parameters for the shock direction, shock value from the required scenario in a record, and the risk class the record corresponds to.

Note: The credit spread curve indicator in the curvature input table is not relevant.

iv. For exposures carrying an equity curvature charge, the scenarios are configured per bucket and you must provide the shock values and the shocked PV values,both upward and downward, on the basis of which bucket the exposure falls into.

v. The baseline scenario is exposure specific.

vi. All the inputs provided in the Delta Input table must be converted in the reporting currency of the bank. For currency conversion, you must use the same exchange rates as used by the application for DRC and RRAO as well as any other areas where the currency conversion is being done. From the next release onwards this will not be the case and you will be able to provide the inputs in any desired currency and the currency conversion for the input table will be taken care of.

NOTE:

i. MRMM provides the output in the reporting currency of the bank. For a selected portfolio, you must execute the MRMM services and the Basel FRTB standardised approach by use of the same reporting currency.

4.2.2.5.5   Assumptions

Our interpretations of a few sections:

- The Vega sensitivities are obtained by multiplying the Vega number of the exposure with the implied volatility.

- The Baseline scenario is needed for all the participating exposures in all the cases.

- The list of supported instrument types and the applicable risks for each of the instrument types

are seeded out of box in the FSI_INSTR_TYPE_RISK_CLASS_MAP table. For the purpose of this table, the RRAO is also treated as a risk measure.

- Inter bucket correlation for CSR and Commodity risk classes are considered as 100%.

4.2.2.5.5.1 Data Expectations

The following are some key data expectations:

- We expect one instrument or exposure to be mapped to only one Credit Spread Curve.

- In the FSI_BASEL_MR_SCENARIO_DEFN table, you must provide N_SHOCK_VAL column values in Basis Points, and then the V_SHOCK_TYPE value should be 'BPS'. This also applies to the Delta and Curvature INPUT tables. You are also expected to provide the shock values in Basis points.

- In an integrated scenario, you must run the MRMM valuation, stress testing services, and the Basel FRTB Standardized approach by using the same reporting currency.

- If user is using a third party or in-house valuation engine instead of MRMM, you must populate the FSI_BASEL_MR_SCENARIO_DEFN table and adhere to the conditions of scenario creation as required by the application. The following are the detailed set of conditions and expectations in a non- MRMM case

- User must follow the standard vertices in providing the input data in for the GIRR, CSR, and Commodity risk classes as there is no interpolation of data for Delta.

- While seeding the scenarios for cross currency and inflation scenarios in the FSI_BASEL_MR_SCENARIO_DEFN table, you must use the N_TIME_VERTEX values -8888 and -9999 for cross currency and inflation scenarios respectively.

- You need to execute 3 runs in the below sequence:
  - The Basel FRTB thin run - Equity Curvature Scenario Population Run
  - The MRMM valuation run - MR Instrument Valuation
  - The Basel FRTB main run - Standardized Approach Capital Calculation

- You must run all the runs for the same reporting currency, legal entity, and portfolio. The configuration of all the runs must be done on the execution screen.

- You need to select if you want to go for the significant currency treatment or not in the case of GIRR or FX risk class. Choosing to use the significant currency treatment will divide all the risk weights in the GIRR and FX risk class for the specified currencies/currency pairs by BIS by square root of 2.

4.2.2.5.5.2 Limitations

- Index instruments and Multi-underlying instruments are not supported.
- Exotic Instruments are not supported.
- Covered Bond is not supported.
- DRC Sec (CTP) is not supported.

- Replication of Securitization exposures cannot be done.

- Multiple strikes and barrier instruments are not supported.

4.2.2.6 Operational RWA

The Basel accord has prescribed three methods for calculating Operational Risk capital charges in the Foundation IRB Approach (FIRB) and Advanced IRB Approach (AIRB). Banks can use any of these methods to calculate capital charge same as in the Standardized Approach.

- Basic Indicator Approach

- Standardized Approach

- Alternative Standardized Approach

See Operational RWA for more information.

4.2.2.7 Capital Structure

Basel III Capital Structure is calculated for the Foundation IRB Approach (FIRB) and Advanced IRB Approach (AIRB) similar to the Standardized Approach.

See Capital Structure for more information.

4.2.2.8 Capital Buffers

Basel III Capital Buffers is calculated for the Foundation IRB Approach (FIRB) and Advanced IRB Approach (AIRB) similar to the Standardized Approach.

See Capital Buffers for more information.

4.2.2.9 Revised Leverage Ratio

Basel III Revised Leverage Ratio is calculated for the Foundation IRB Approach (FIRB) and Advanced IRB Approach (AIRB) similar to the Standardized Approach.

See Revised Leverage Ratio for more information.

5 US Jurisdiction

Capital Adequacy related regulations as issued in the US Final Rules of December 2007 is incorporated in this OFS Financial Services Basel Regulatory Capital Release 6.1.2. In this jurisdiction, the following approaches for Risk Weighted Assets (RWA) and Capital Adequacy Ratio, as stated in the US Basel III Final Rule, are supported:

- Credit Risk
    - o Non Securitization – Foundation Internal Ratings Based Approach
    - o Non Securitization – Advanced Internal Ratings Based Approach

        - Equity – Simple Risk Weighted Approach

        - Equity – Internal Models Approach

        - Equity – Simple Modified Look Through Approach

        - Equity – Alternative Modified Look Through Approach

        - Equity – Full Look Through Approach
    - o Securitization - IRB Approach

        - Ratings Based Approach

        - Internal Assessment Approach

        - Supervisory Formula Approach
- Capital Structure

5.1 US II Regulatory Capital Rules

5.1.1 US II Regulatory Capital Rules – Internal Ratings Based Approach

5.1.1.1 US II - High Level Process Flow for Internal Ratings Based Approach

The application supports capital computations for Credit Risk along with Capital Structure and Capital Consolidation process, as per the guidelines laid down by Federal Reserve Board.

For more information on the pre-defined Runs available with the application, see *OFS Basel Regulatory Capital Run Charts*.

The flow of the processes in the order in which it is executed the application is as follows:

5.1.1.1.1 Process Flow for Capital Adequacy Ratio Calculation
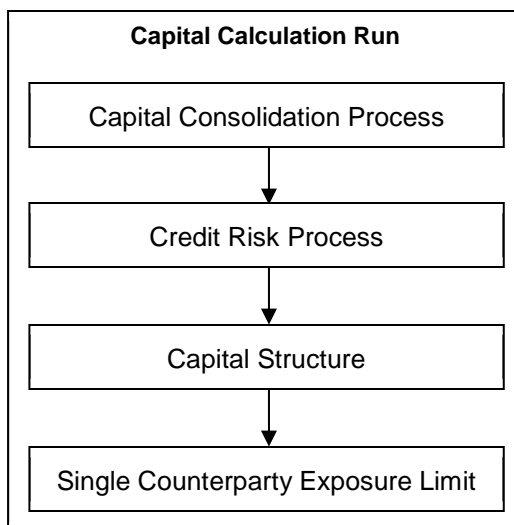
```
┌─────────────────────────────────────────┐
│          Capital Calculation Run         │
│                                          │
│  ┌────────────────────────────────────┐  │
│  │   Capital Consolidation Process    │  │
│  └────────────────────────────────────┘  │
│                    │                     │
│                    ▼                     │
│  ┌────────────────────────────────────┐  │
│  │        Credit Risk Process         │  │
│  └────────────────────────────────────┘  │
│                    │                     │
│                    ▼                     │
│  ┌────────────────────────────────────┐  │
│  │          Capital Structure         │  │
│  └────────────────────────────────────┘  │
│                    │                     │
│                    ▼                     │
│  ┌────────────────────────────────────┐  │
│  │  Single Counterparty Exposure Limit│  │
│  └────────────────────────────────────┘  │
└─────────────────────────────────────────┘
```

The Capital Calculation Run depicted in the preceding process flow is a single run which is a joined together by multiple processes. Each process is a block, compiled together to form an entire Capital Adequacy run. The individual blocks like the Credit Risk process, and so on, also exist as individual runs which is described in the following section.

5.1.1.1.2 Capital Consolidation Process

Capital Consolidation is a process common to each of the individual block when they are triggered separately as an individual run. For example: the standard out-of-box Market Risk run has Capital Consolidation and Market Risk process bundled together as a single Market Risk run. This is applicable for a Credit Risk run and Operational Risk run as well. The Capital Consolidation is explained in the following section and is not repeated under the Non Securitization process and Securitization process section of this document.

In Capital Consolidation, the application processes the following.

Capital Consolidation Level Selection

The reporting bank can be a part of a financial group that has multiple legal entities like parent or child entities (subsidiaries) under its name. The entity on which you are required to process should be selected by you. Subsequently, level at which a Run is to be executed (solo or consolidated) should also be selected. You can select these options in the Run Management UI. However, if the Run is executed in the Run Rule Framework (RRF), then these options have to be set using the Rule '**Capital Consolidation Level Selection**' in the process '**CAPITAL_CONSOLIDATION**'.

CAPITAL_CONSOLIDATION is the first process to be added in all the Runs defined in the RRF except for the Staging Data Population Run. The Run Management UI selects this process by default.

Run Parameters Assignment

The US regulations states different approaches for calculating RWA. The Run Management UI in the application allows the reporting bank to define and execute a Run by selecting a combination of different Basel II approaches for RWA computation.

Run Parameter Assignment is also part of **Capital Consolidation** process. The Rule '**Run Definition User Defined Run Param Assignment**' is used to assign the Run parameters if a Run is executed in the RRF. If the Run is executed from the Run Management UI, then the parameters are populated based on the Run defined in the Run Definition window.

Currency Conversion

The Rules pre-defined in the application performs currency conversion of all General Ledger amount attributes to be used for Capital Consolidation from the Natural currency to the Reporting currency, based on the exchange rate provided.

Shareholding Percent Multiplication

For all entities in the Capital Consolidation process, the application updates the shareholding percentage against each entity data in the fact capital accounting head from the fact entity shareholding percent table. The parent data in the processing table of fact capital accounting head is updated with the value 1 and for each child entity the data is based on the parent's holding percentage specified for each child in the fact entity share holding percent table.

5.1.1.1.3 Process Flow for Credit RWA
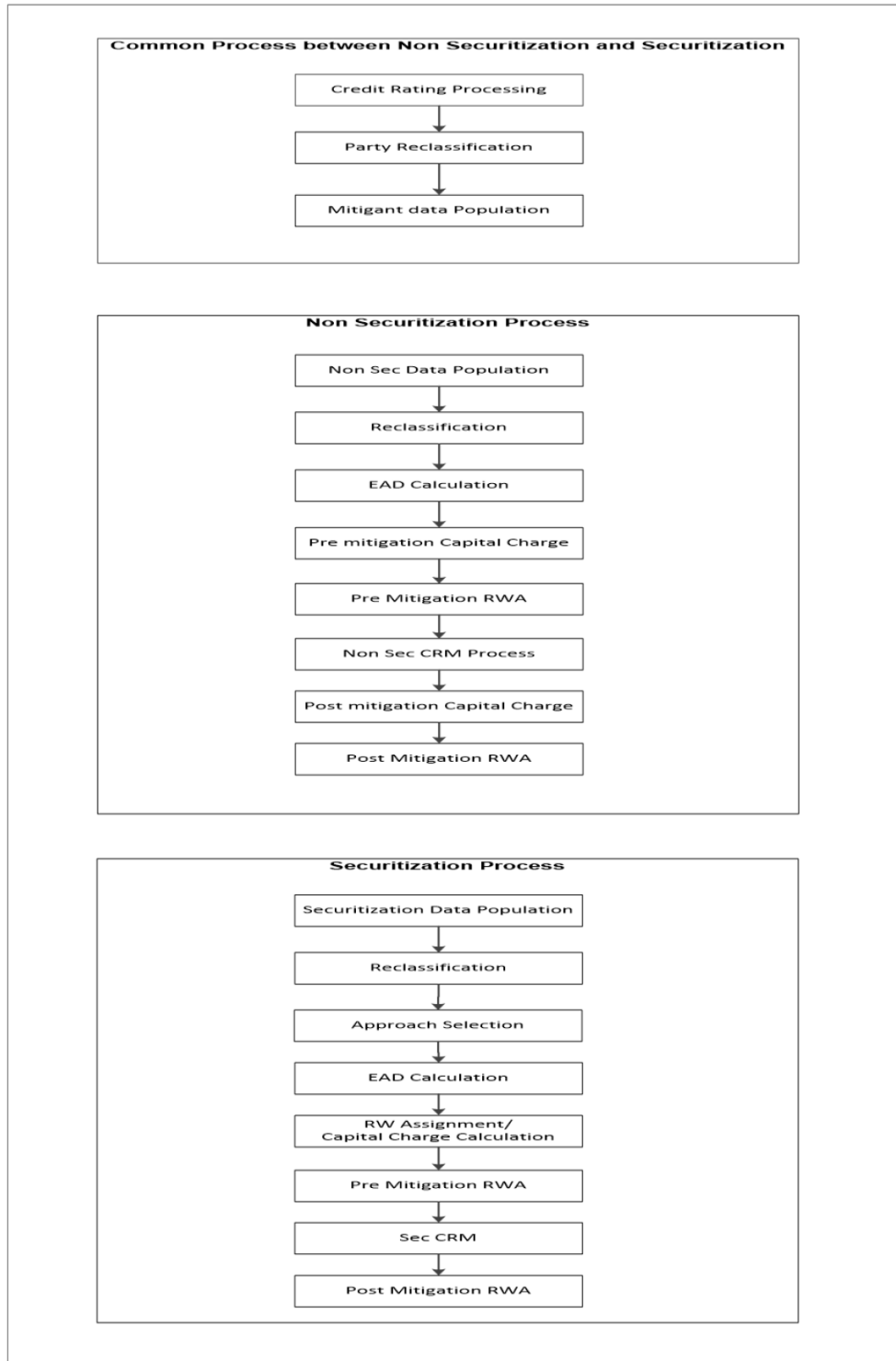
Credit RWA Run is a combination of the Non Securitization RWA process and Securitization RWA process. For Credit Risk of Non Securitized exposures and Securitization positions, the application follows Internal Ratings Based Approach.

A few processes like Credit Rating, Party Type Reclassification, and so on are common between Non Securitization and Securitization process. Though these sub processes are explained separately under Non Securitization and Securitization section of this document, it is executed only once under the Credit RWA run.

Certain sub processes under the Non Securitization process like Reclassification, are common across Non Securitization exposures such as Over the Counter derivative transactions and Securities Financing Transactions and are executed only once in the Run. The details of this sub processes are explained under 'Reclassification' sub process of the Non Securitization section of this document.

For more information on the sub processes as detailed in the preceding process flow for the Non Securitization process and Securitization process, see Credit RWA.

For example: Non Sec Data Population is detailed in section under Data Population and Currency Conversion of Non Securitization process, under Credit RWA section of this document. Likewise, details of Credit Risk Mitigation for Non Securitization process is detailed under the US Non Securitization section of this document and details of Credit Risk Mitigation for Securitization process is detailed under the US Securitization section of this document.

5.1.1.1.4 Process Flow for Capital Structure
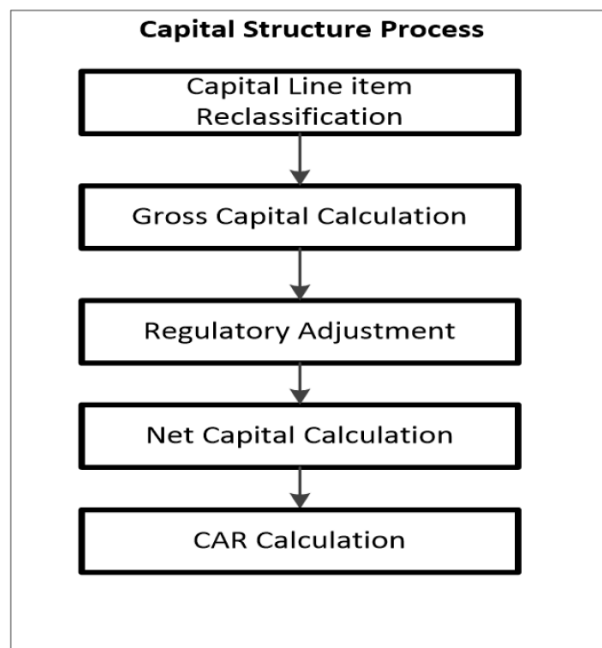
Capital Structure is executed along with Capital Consolidation and Credit RWA process.

For more information on the sub processes of Capital Structure, see Capital Structure.

For example: 'Gross Capital Calculation' mentioned in the preceding process flow is explained in detail under 'Gross Capital Calculation for T1, T2 and T3' sub process section of Capital Structure. This is applicable for 'Regulatory Adjustment' and 'Net Capital Calculation' which is detailed under 'Regulatory Adjustment to Tier 1 and Tier 2' and 'Calculation of Net Capital' sub process section of Capital Structure, in this document.

5.1.1.1.5 Process Flow for Single Counterparty Exposure Limit
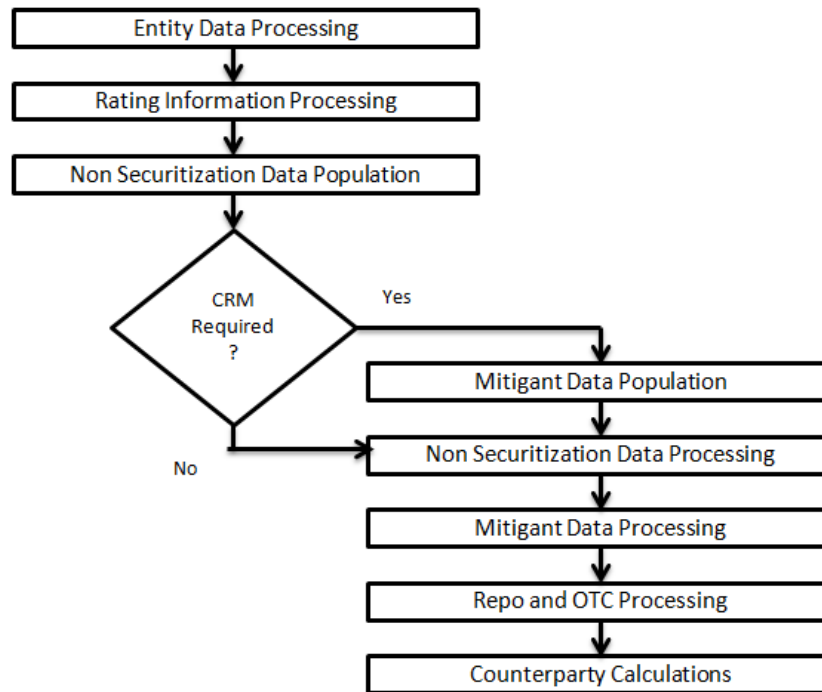
The Single Counterparty Exposure Limit calculation is designed to identify the counterparties whose aggregate credit exposure to the bank breaches the maximum limit as described by the Dodd Frank Single Counterparty Limit proposal. The Exposure Limit proposal is mitigating the threat to financial stability posed by systemically important financial companies.

For more information, see Single Counterparty Exposure Limit.

5.1.1.2 Credit RWA

The application supports the computation of Credit RWA as per the guidelines laid out in the US Final Rules. Credit RWA is computed for Non Securitized Exposures and Securitized Exposures.

5.1.1.2.1 Non Securitization – Internal Ratings Based Approach

For Credit RWA computation of Non Securitized exposures, the application follows the Internal Ratings Based Approaches.

The Internal Ratings Based Approach processes the following broad functional areas:

- Banking Book Products
- Securities Financing Transactions
- Over the Counter Derivative Products
- Credit Risk Mitigation

Banking Book Products

All exposures are rated by different agencies. However, the naming convention of these ratings might not be the same as mentioned in the US Final Rules. Hence, the application re-classifies the rating information shared in the bank's data to standard ratings. The exposure amount and other amount attributes that are provided as input (in the staging tables) are in the natural currency (exposure currency) and this is usually different for exposures across different countries. The application converts them to reporting currency so that processing for all exposures occurs in a single currency.

The credit risk exposures are identified by their product types, counterparty types, and their corresponding asset classes by the application. A sample list of products types, party types, mitigant types, credit ratings are pre-defined in the application. However, this list and naming convention differs from one bank to another. Hence, the application re-classifies the bank's data into standard data as per the US Final Rule. The application reclassifies the bank's product types and party types to standard product and party types. Based on standard product and standard party types, it forms an asset class for each exposure.

For equity exposures, the asset class is formed on the basis of standard issuer type and standard Basel product type. The application does further data processing based on these standard reclassifications. Some exposures can be hedged against credit risk through various mitigants like guarantors, collaterals, credit derivatives, and so on. These provide mitigation to credit risk and should be considered while computing Credit RWA. Hence, the application calculates pre-mitigation RWA amount and post-mitigation RWA amount.

The application calculates the correlation factor using the formula specified for each asset class. Further, using the Correlation factor, Probability of Default (PD), and Loss given Default (LGD), the application calculates the pre-mitigation capital charge for each exposure. This value signifies the capital charge the bank has to maintain for each exposure, prior to considering any mitigation effects.

The application calculates pre-mitigation exposure at default amount and risk weight for each exposure. Later, it computes the pre-mitigation RWA (Pre CRM RWA) by multiplying the EAD with the risk weight. The risk weight arrived at by multiplying pre-mitigation capital charge with 12.5.

Through the Credit Risk Mitigation (CRM) process, the bank takes into account the effects of mitigation. The application checks for mitigant eligibility based on the Final Rule specifications. It assigns a haircut to each mitigant based on their currency, residual maturity, and expected volatility in their market value. FOREX and Maturity haircuts consider any currency and maturity mismatches the mitigants hold with the exposures that they are covering. Volatility haircut considers the change in the mitigation effect that arises due to future fluctuations in mitigant's value. The application allocates mitigants to exposures based on the optimizer function and then the capital charge for each mitigant is calculated by the application.

The application then calculates the post mitigation RWA Unexpected Loss (post CRM RWA UL) and post mitigation RWA Expected Loss (Post CRM RWA EL). Some credit risk exposures that fall under the category of internal transactions like holding own subsidiaries shares, investment in its capital, and reciprocal cross holding, and so on are treated separately under the capital structure process.

Process Flow for Banking Book Products
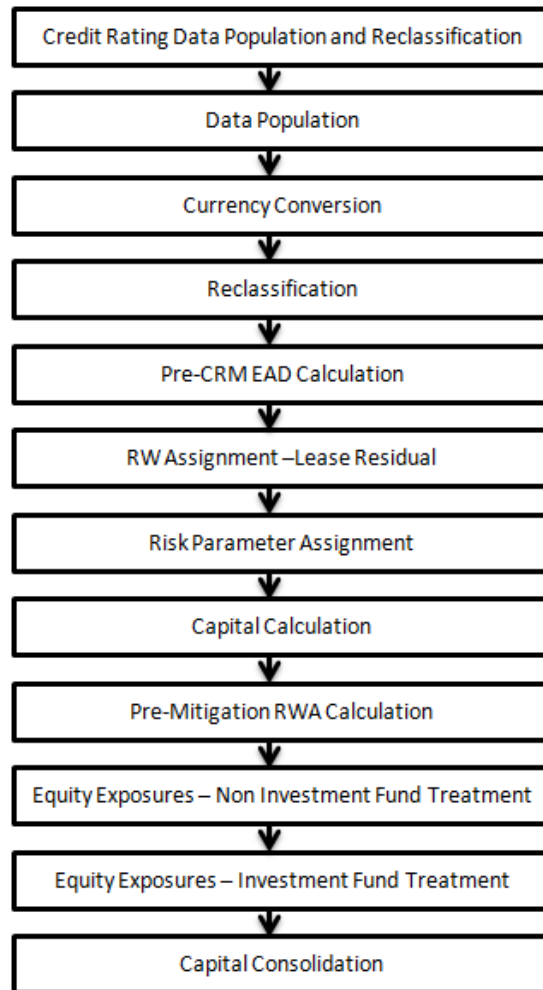
Credit Rating Data Population and Reclassification

Pre-processing Steps

Data for credit ratings should be provided as an input in the following tables:

- **Accounts Rating Table (STG_ACCOUNT_RATING_DETAILS)**

  Ratings of all Credit Risk Non Securitized Exposures, Securitized Exposures and Securitized Positions are captured in this table.

  The value in **F_CAPITAL_CHARGE_EXCLUSION** column of STG_INVESTMENTS table is expected as a download value. When the value of F_CAPITAL_CHARGE_EXCLUSION is 'Y', it indicates that the exposures are not processed further in **FCT_NON_SEC_EXPOSURES** table. Also, these exposures are excluded from capital charge calculation.

- **Instrument Rating Table (STG_INSTRUMENT_RATING_DETAILS)**

  Ratings for all market risk exposures, investment exposures subject to credit risk (one that are in STG_INVESTMENTS), and mitigants, are captured in this table.

- **Party Rating Table (STG_PARTY_RATING_DETAILS)**

  Credit Rating for all customers and issuers are captured in this table.

- **Sovereign Rating Table (STG_SOVEREIGN_RATING_DETAILS)**

  Credit Rating for all countries is captured in this table.

Processing Steps

The application re-classifies the rating information to Standard Basel ratings.

The rating reclassification lookup table (**FSI_RATING_CLASSIFICATION**) is used to lookup reclassified Basel ratings, so that the reclassification rule is not repeated for each of the rating processing tables. Ratings are populated from the stage tables (**STG_PARTY_RATINGS_DETAILS**) to FSI tables (**FSI_PARTY_RATING_DETAILS**) using the lookup table (**FSI_RATING_RECLSSIFICATION**) to obtain reclassified rating.

Note: In the **STG_PARTY_RATINGS_DETAILS** table ensure that the following columns are mandatorily populated with data:

- Rating source code (**V_RATING_SRC_CODE**)

- Party Code (**V_PARTY_CD**)

- Purpose (**V_PURPOSE**): In this field whether the rating is a domestic rating or foreign rating should be indicated. If any other rating is provided, then the exposure is considered as unrated.

- Rating Code (**V_RATING_CODE**)

After ratings reclassification, the risk weight is updated in risk weight to rating mapping table (**FSI_RW_MAP_MASTER**). The multiple assessments data transformation logic, updates the rating and the risk weights to the exposures. For each exposure, the application checks the risk weight generated by each of its ratings. It then assigns the higher of the two lowest risk weight and the rating corresponding to this risk weight, to the exposure.

For unrated Non Securitized exposures, the application does an issue-issuer assessment to infer a rating of the unrated exposures, based on the rating of a similar instrument (referred as reference issue hereafter) issued by the same issuer. The reference issue is used only when it is of the same currency as the exposure and the exposure is senior or equivalent to the same.

Data Population

Pre-processing Steps

Credit Risk exposures are updated in the application for all the product types through their respective input tables known as Product Processors. Main categories of Credit Risk Non Securitization exposures, along with their respective table names that are used as an input, are as follows:

Product	Source Product Processor
Bills	STG_BILLS_CONTRACTS
Credit Cards	STG_CARDS

Product	Source Product Processor
Swaps	STG_SWAPS_CONTRACTS
Futures	STG_FUTURES
Guarantees	STG_GUARANTEES
Investments	STG_INVESTMENTS
Lease Contracts	STG_LEASE_CONTRACTS
Letters of Credit	STG_LC_CONTRACTS
Line of Credit	STG_CREDIT_LINE_DETAILS
Commitment Contracts	STG_COMMITMENT_CONTRACTS
Loans	STG_LOAN_CONTRACTS
Money market instruments	STG_MM_CONTRACTS
Overdraft	STG_OD_ACCOUNTS
Options	STG_OPTION_CONTRACTS
Re purchase contracts	STG_REPO_CONTRACTS
Equity Exposures	STG_INVESTMENTS
Underlying Exposures for Derivatives, Securitization and Covered Bonds	STG_UNDERLYING_EXPOSURES
Underlying Exposures for Derivatives (if Derivative is either a cleared transaction or an instrument, and the underlying reference asset is an instrument)	STG_UNDERLYING_MASTER/ STG_UNDERLYiNG_DTL
Underlying Exposures for Derivatives (if Derivative is not a cleared transaction or an instrument, or the underlying reference asset is not an instrument)	STG_UNDERLYING_EXPOSURES
Underlying Exposure for Mutual Fund / CIU	STG_FUND_CIS_COMPOSITION
Underlying Exposures for Repo contracts	STG_PLACED_COLLATERAL / STG_MITIGANTS
Credit Derivatives	STG_CREDIT_DERIVATIVES
Fixed Assets	STG_FIXED_ASSETS_DETAILS

Processing Steps

Stage data from the Product Processors or other stage tables is populated in the respective processing tables. Information from all Product Processors data is populated in a common Fact table for all non sec exposures (**FCT_NON_SEC_EXPOSURES**), except equity data.

Data related to equity and investment fund are stored in its respective Stage Equity Exposures (**STG_EQUITY_EXPOSURES)** and Stage Fund Equity Investments (**STG_FUND_EQUITY_INVESTMENTS).** It is then populated in the respective Equity Exposures (**FCT_EQUITY_EXPOSURES)** and Equity Investment Fund (**FCT_FUND_EQUITY_INVESTMENTS)** table and data subsequently flows to the common fact table for all Non Securitization exposures. For more information on the list of columns to be populated within each table, see the *Download Specifications* document.

Shareholding Percent Multiplication

The exposure amount which is a part of the input data (Product Processors) is the exposure amount for a solo entity. However, for a consolidated Run, the parent exposure is considered only by the shareholding percentage, based on the following calculation:

> **Exposure Amount   X   Share Holding Percent = Updated Exposure Amount**

> Where:

> Share holding percent is allotted a value by the Rule **Cap Consl Effective Shareholding Percent for an Entity** in the process - **Capital Consolidation**

This is assigned in the Rules '**<Attribute> Shareholding Percent Multiplication'**. The following attributes undergo shareholding percent multiplication:

- Outstanding Principal
- Current Exposure Amount
- Undrawn Amount
- Exposure Market Value
- Exposure Accrued Interest
- Provision Amount
- Write Off Amount
- Original Book Balance Amount
- Lease Residual Value
- Notional Principal and Contract Amount for OTC products

Currency Conversion

The application converts the amount attributes, which are in natural currency, to reporting currency which is used for further calculations. The column names suffixed with '_ncy' are in the natural currency and are multiplied by currency conversion factor to populate values in the reporting currency. The Rule **Reporting Currency Code Assignment** assigns the reporting currency. For more information on Currency Conversion, see Exhibit 4 in *Annexure A: Key Concepts*.

> **NOTE:** Rule Reporting Currency Code Assignment is set to 'USD' out-of-box; however you can modify this currency. If the Run is executed from the Run Management window, then

you can select this reporting currency in the Run Management window.

Reclassification

The application reclassifies the bank's product types and party types to standard product and party types. Based on standard product and party type, it forms an asset class for each exposure. Equity is reclassified by the application in a separate Rule. Similarly, the application does reclassification for mitigant on the basis of its mitigant types and reclassifies it to standard mitigant types.

Product Type Reclassification

Product types used by the reporting bank as input data are reclassified to standard product types as defined in the US Final Rules. The product types, after reclassification, are stored as Basel product types. For Example: Housing Loan is reclassified as Residential Mortgage Exposure.

Party Type Reclassification

Similar to the product type, the customer type and issuer type (which are stored as counterparty type) are also reclassified as standard counterparty type. The application is designed to include customer type, issuer type, and legal entity type in a single table (**STG_PARTY_MASTER**) and these are reclassified together as well. Party type reclassification Rules handle reclassification for customer types, issuer types, and entity types. For example, Individual is reclassified as Retail.

Asset Class Reclassification

On the basis of Basel product type and standard counterparty type, an asset class is formed by the application. For example: If standard counterparty is Bank, the asset class is Wholesale Exposure - Bank. For Basel product type gold, the asset class is Gold, except if standard counterparty type is Central Counter Party, the asset class is Central Counter Party. For standard counterparty type Corporate Non SME and Basel product type as Loan, the asset class is Wholesale Exposures- Corporate. Similarly, QRRE is reclassified into Other Retail if EAD is greater than 100000 dollar. This check happen post pre-CRM EAD calculation.

Asset class for all equity products is reclassified on the basis of equity type and Basel product type. Asset class for all mitigants is reclassified on the basis of their standard mitigant types and standard issuer type.

Basel CRM methodology is assigned for OTC, SFT, On-Balance Sheet, and Off-Balance Sheet items. OTC and SFT are assigned the Comprehensive CRM Method. On-Balance Sheet and Off-Balance Sheet are assigned LGD Adjustment Method.

Mitigant Reclassification

For mitigants the application reclassifies the mitigant type to the standard mitigant type like the debt securities, credit derivative, cash, and so on. It also reclassifies the mitigant issuer type to the standard mitigant issuer type like Banks, Corporate, and so on. The reclassification tasks are present in the **Mitigant Reclassification** sub process.

Pre-CRM EAD Computation

EAD is calculated for all asset classes based on the 'Available for Sale' indicator. If the 'Available for Sale' indicator is 'Yes', then based on the current exposure amount, accrued interest, unrealized gains or losses, and undrawn amount EAD is calculated. If the reporting bank has exposure to one of its own subsidiaries, then that exposure is classified as an internal exposure.

EAD for equity exposures is calculated based on the following components:

- Equity adjusted carrying value of on-balance sheet component
- Equity unrealized gains reflected in carrying value
- Equity unrealized gain included in Regulatory Capital

The calculation of Equity OTC Derivatives EAD is similar to the calculation of Equity EAD. However, calculation of Equity OTC Derivatives EAD is based on the indicator of conditional unfunded equity commitment flag. Lease Residual transaction EAD is calculated by considering the lease residual amount.

Risk-Weight Assignment for Lease Residual

Basel asset class which has an indicator for lease residual as 'Yes' is assigned a risk weight of 100%. Prior to risk weight assignment, and create the residual portion of the lease transaction. The creation of the lease residual transaction is achieved through the Data Transformation - Residual_Exp_Creation.

The details of the Data Transformation are as follows:

Data Transformation Name	Objective	Processing Logic
Residual_Exp_Creation	The objective of this Data Transformation is to create an exposure in dim exposure for lease transaction which has residual value.	Create a record in dim exposure table with the same acct skey as that of parent exposure acct skey but postfix with '_RESIDUAL' for lease transaction which have residual value.

Risk Parameters Assignment

The application assigns risk weight parameters of PD, LGD, and maturity to all exposures. LGD and PD assignment for purchase receivables occur through a rule. For exposures falling under retail asset class, irrespective of the seniority, the LGD has a floor value of 0.1. PD has a floor value of 0.0003 for all asset classes, except for defaulted exposures for which the value is 1.

Capital Calculation

Capital is calculated for all asset classes using the correlation factor, PD, and LGD. The correlation factor is calculated for each asset class on the basis of PD and LGD. While calculating the capital charge, if the method assignment is Comprehensive approach, then pre-CRM LGD is used in the capital formula. If LGD Adjustment method is used, then the adjusted LGD value is used in the capital formula. Capital for defaulted exposures and failed trades is calculated through separate Rules.

For exposures that have defaulted, the application uses two inputs - LGD and Best Estimated Expected Loss of a Bank. For failed trade transactions, the capital requirement is assigned by the application on the basis of the number of failed business days.

Data Transformation Name	Objective	Processing Logic
Mult_Assessment_SCP	The objective of this Data Transformation is to perform multiple assessment of the ratings and assign a normalized rating and risk weight to the sold credit protection exposures.	For each exposure, the various standard ratings associated with that exposure and the respective risk weights are identified. If the number of ratings are 1, then the same rating gets assigned as the standard rating for the exposure and the risk weight associated with that standard rating gets assigned as the Pre-mitigation risk weight. If the number of ratings are greater than or equal to 2, then the exposure is assigned a risk weight which is the worst of the best two risk weight. And the corresponding rating is assigned to the exposure.

For more information on setting up this Rule, see *Run Parameters Setup for Run Creation.*

Pre-Mitigation RWA Calculation

RWA is calculated for the asset class by multiplying the pre-mitigation EAD amount and the capital charge with 12.5.

Equity Non-Investment Fund Risk Weight Assignment

Two approaches are used to assign the risk weight for Non Investment Fund: Simple Risk Weight method and Internal Model method. You can select either of the two approaches to assign the risk weight and thereby calculate the RWA. Based on the approach selected, the public traded equity and private traded equity exposure are assigned a risk weight. RWA amount is calculated by multiplying the RW, Equity EAD, and Equity Banks Proportional Ownership Share of the Fund.

Equity Investment Fund RW Assignment

Risk weight assignment for investment fund equity is calculated using the Simple Modified Look through Approach, Alternate Modified Look through Approach, Money Market Fund Approach, or Full Look through Approach. You can select any of these approaches to assign a risk weight to Equity Investment Fund exposures. Risk Weight is assigned based on the Equity Asset class and Equity Investment Class type. Post risk weight assignment, the selected RWA amount is calculated by multiplying the risk weight with the adjusted carrying value of equity.

Post processing of Equity Investment Fund and Equity Non Investment fund, the processed data in the Equity Exposures (**FCT_EQUITY_EXPOSURES)** table is populated to Fact Non Sec Exposures (**FCT_NON_SEC_EXPSOURES)** table.

Bank Owned Life Insurance (BOLI) and Stable Value Wrap

BOLI is classified into two accounts, "General Account" and "Separate Account".

- General account is carried by the insurance carrier and this carrier makes all the investment decisions.

- Where Separate account provides several asset class choices to the banks, and also this allows diversifying their assets within the same product.

- BOLI's separate account is frequently structured with Stable Value Protection (SVP), in the form of Special Value Wrap (SVW), which helps the smooth returns of the underlying portfolio.

- Generally SVW invest in a variety of investment like short-to- intermediate-term and fixed – income investment including government, corporate and mortgage-backed bonds.

- Under the US Regulatory Capital Final Rules, Banking organization that owns general account BOLI applies 100 percent risk weight to its claim on the insurance company for risk-based capital purposes.

- A BOLI investment in general account exposure value is Cash Surrender Value (CSV) - Surrender charge.

- The banking organization which is having investment in the BOLI in separate account is treated as an equity exposure to an investment fund. The banking organization uses one of the following look through approach from:
    - Simplified Modified Look-Through Approach
    - Alternative Modified Look-Through Approach
    - Full Look-Through Approach

Calculating Risk Weight Asset (RWA)

BOLI in a separate account consisting several funds, where each fund has an underlying. BOLI account exposure amount is carrying value net of portion attributable to DAC and Mortality Reserves. Against BOLI one of the above mentioned look through approaches is applied. The approach selected is applied on all of the funds that are the part of that particular BOLI. BOLI account RWA exposure value is multiplied with the weighted average risk weight.

The weighted average risk weight is calculated as:

Weighted average risk weight =

$$\frac{\text{Sum of the each fund risk-weight * Exposure amount of the particular fund}}{\text{Total exposure amount across all the funds}}$$

A banking organization purchases SVP on its investment in BOLI which is a separate account.

The SVP contract protects the policy owner from declines in the value of the assets in the separate account arising from changes in interest rates.

The SVW exposure value is carrying a value attributable to SVP. The downloaded value and BOLI exposure amount is the adjusted value post deducting the amount which belongs to SVP. This can be a downloaded value.

Portion of the carrying value attributable to an SVP is at risk weighted as an exposure to the provider of the protection. The remaining portion that belongs to BOLI is treated as an equity exposure to an investment fund.

The transaction of SVW is related to the BOLI account. A relation in the staging table is provided to identify which SVW is purchased for which BOLI account.

Banking organization that provides SVP through SVW is treated as the exposures, as if it was equity derivative on an investment fund. SVW underlying is the BOLI account for which the SVP is provided.

RWA for the SVW (where bank is a provider) is calculated by applying one of the above mentioned three look-through approaches.

Assumption

Detailing on the treatment for the amount belonging to SVP, where bank purchase the SVW is not provided in the US Regulatory Capital Final Rule but a reference is provided in the footnote of the accord.

The following is the link for the treatment for the amount belonging to SVP:

http://www.federalreserve.gov/boarddocs/srletters/2004/SR0419a1.pdf.

See page number 19 for more information on the treatment for SVW.

Capital Consolidation

If the reporting bank has exposure to one of its own subsidiaries, then that exposure is classified as internal exposure. Each of the internal transaction, that is, transaction between parent and its subsidiary is marked as deduction line item. The deduction is processed as part of the Basel II capital structure in the capital structure processing and all the internal transactions are eliminated from any RWA calculation.

Approaches Followed in Capital Consolidation

The three approaches followed by the Capital Consolidation are:

- Consolidation Approach (CONSL): Under this approach, all the entities of the bank's organizational structure are considered. This includes all the entities/subsidiaries that belong to the same jurisdiction. All the exposures of the entities in the organizational structure are considered for computing risk weighted exposures, except the intra-group exposures.

- Aggregation Approach (AGG): This approach is similar to the Consolidation approach but is used in the cases, where some of the entities that are part of bank's organizational structure belong to a different jurisdiction. The capital requirement of the affiliate is computed as per the jurisdiction that it is subject to and is then aggregated with the rest of the group's capital requirement. Intra-group exposures are not excluded in this approach.

- Deduction Approach (DED): This approach is used in the case where some of the subsidiaries/entities that are part of bank's organizational structure are excluded from consolidation. In such a scenario, the regulatory investment in the excluded subsidiary attributable to the rest of the group are deducted from the consolidated capital requirements.

Credit Risk Securities Financing Transactions (SFT)

Securities Financing Transactions includes repo style transactions, margin lending, security financing borrowing, and so on. The SFT portfolio of a bank should be included for capital charge calculations as per Foundation IRB approach (FIRB).

The SFT EAD calculation follows three methodologies:

- Collateral Haircut Approach
- Internal Model method
- Simple VaR Approach

Currently, the application supports the Collateral Haircut Approach only. The application computes CRM based on the RWA approach undertaken by the bank. For FIRB approach, the mitigation is based on the IRB capital calculation as provided in the US Final Rules for Credit Risk.

Process Flow for Securities Financing Transactions

SFT EAD calculation is computed in the sub process **SFT Exposures RWA - Comprehensive Approach**.

SFT Underlying Data Population

The two data elements present in the SFT transactions are captured as follows:

Firstly, the parent transaction is captured in the Repo Contracts Staging table (**STG_REPO_CONTRACTS**) and secondly the underlying information, on which the parent transaction is built, is captured separately in the mitigant table **(STG_MITIGANTS)** or Placed collateral staging table **(STG_PLACED_COLLATERAL)**, depending on the product type**.**

The underlying data is identified by using the Exposure Mitigant Mapping Staging table **(STG_EXP_MITIGANT_MAPPING)**, wherein this is linked to the data in the repo contracts staging table, for any collateral which is provided to the repo contracts.

And the underlying data for any collateral placed with the counterparty, is identified by using the Account

Placed Collateral Mapping Staging table **(STG_ACCT_PLACED_COLL_MAP)**, wherein this is linked to the data in the repo contracts staging table.

Volatility Haircut Assignment for SFT Underlying

This is computed by the following Rules:

- Exposure Volatility Haircut Assignment for Supervisory Haircut

- CRM Exposure Volatility Haircut for Equity and Mutual Fund

- Exposure Volatility Haircut Assignment - Scaling Up for "Capital Market Driven" or "Repo Style" transaction types

- Exposure Volatility Haircut Assignment - Own Estimate, FOREX Haircut.

Pre-Mitigation Post Volatility Haircut EAD Amount Calculation for Exposures

For SFT transaction, the application calculates EAD for the parent exposure, based on the underlying information. The underlying exposures are moved to **FCT_SFT_UNDERLYING** table from **FCT_NON_SEC_EXPOSURES**. Each underlying exposure is assigned a volatility haircut, if the underlying exposures are financial instruments.

FOREX haircut is applied if the underlying currency and the parent exposure currency are different. Each SFT underlying exposure adjusted for haircut (EAD + haircut value) is added as EAD to the parent contract.

Nettable Pool Data Population

The application nets SFT contracts based on the same customer, common netting agreement identifier, transaction of repo, re-repo or margin lending, trading or banking book, and so on. Margin lending transaction being SFT also follows the same EAD calculation methodology, however repo or reverse repo and margin lending are not netted together.

Pre-Mitigation Risk Weighted Assets Unexpected Loss Calculation for the Pool

Pre-Mitigation Risk Weighted Assets Unexpected Loss is calculated for the pool as EAD multiplied by risk weight or capital * 12.5.

Over the Counter Derivative Products

Process Flow for Over the Counter Derivatives – Exposure at Default (EAD) Approach
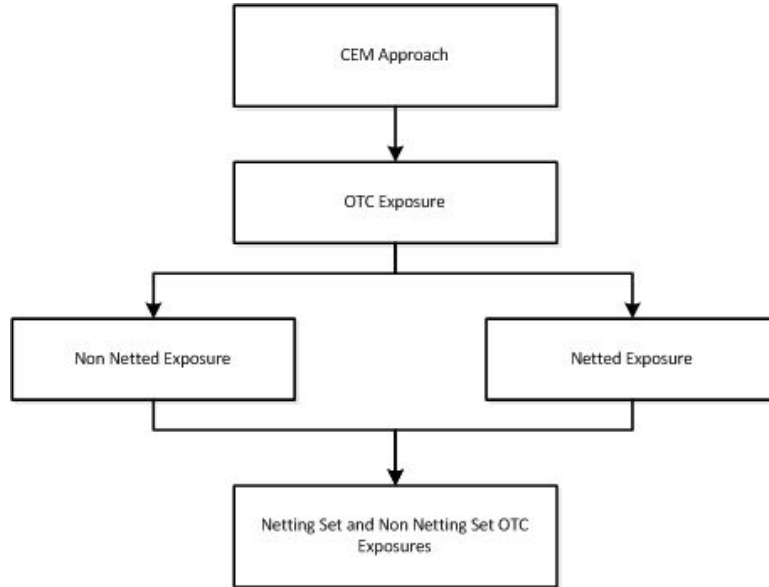
Exposure amount subject to CCR is estimated with Current Exposure Method.

- **Current Exposure Method (CEM)**

  The application calculates the exposure at default for two different sets of the records with a different methodology for Netting Agreement Records and Non Netting Agreement Records.

- **OTC Exposure**

  For the calculation of EAD, the exposure amounts from the exposure table are moved to a different table for OTC and REPO transaction. The application also creates a new record for each netting Agreement in the data.

- **Non Netted Exposure**

  To compute EAD for non netting records the application reads the following inputs:

  Total replacement cost which is greater than mark to market or Zero for all the contracts.

  An amount for potential future credit exposure is calculated based on the notional and multiplied by the add-on factor based on the underlying type of the contracts. Add-on is assigned based on the following as represented in a tabular format.

	Interest Rates	FX and Gold	Equities	Precious Metals Except Gold	Other Commodities
One year or less	0.00%	1.00%	6.00%	7.00%	10.00%
Over one year to five years	0.50%	5.00%	8.00%	7.00%	12.00%
Over five years	1.50%	7.50%	10.00%	8.00%	15.00%

  The application assigns the add-on percent in the processing Non Securitization table by using the Rule: **Non Sec Add - on Estimation.** Data is populated to the Nettable Pool (**FCT_NETTABLE_POOL**) table by T2T: **NETTABLE_POOL_OTC_POPULATION_OTHERS.**

- **Netted Exposure**

  To compute EAD for the netting agreement records the application reads the following inputs:

  Total replacement cost which is greater than mark to market for all the contracts.

  An amount for potential future credit exposure is calculated based on the notional and multiplied by the add-on factor based on the following formula:

  $$A_{net} = 0.4 * A_{Gross} + 0.6 * NGR * A_{Gross}$$

  The application creates new records for netting agreement and then populates into the OTC Exposure table. It selects all the records with the following attributes which are similar to computing the netting agreement exposure:

  - Trades with Entity
  - Customer
  - Product Level – All OTC trades
  - Netting Agreement
  - Book Code: Trading or Banking
  - Long Settlement transaction Flag
  - GAAP Code

  The following T2Ts are used to create and populate the OTC exposure table:

  - NETTABLE_POOL_OTC_POPULATION
  - NET_POOL_EXPOSURE_CREATION

  The add-on percent netting agreement is achieved by using the following calculations:

  - Gross Current Exposure Calculation for OTC Derivatives
  - Gross Potential Exposure Calculation for OTC Derivatives
  - Net Current Exposure Calculation for OTC Derivatives
  - Net Gross Ratio Calculation for OTC Derivatives
  - Net Potential Exposure Calculation for OTC Derivatives
  - Exposure at default for all instruments with CCR risk is calculated using the following calculations:
  - Exposure Calculation for OTC Derivatives

Risk Weighted Asset (RWA)

RWA calculation for the instruments which are subject to CCR risk is similar to RWA calculation of other instruments. Any specific treatment is not applied in the application.

Credit Risk Mitigation (CRM)

CRM calculation for the instruments which are subject to CCR risk is similar to CRM calculation for other instruments. Any specific treatment is not applied in the application.

Key Data Elements

Key data elements are noted while computing Counterparty Credit Risk. To view the complete list of tables used for CCR computation, see the *Download Specification* document.

For instruments participating in netting agreement, the Nettability flag should be set as 'Y'.

Instruments with the same agreement code are netted in the same netting agreement. The application handles cross product and product netting with respect to netting agreement.

Credit Risk Mitigation

The application handles multiple mitigants for credit risk mitigation like financial collateral, on-balance sheet netting, guarantees, credit derivatives, and so on. CRM reclassification is computed by reclassifying collateral and issuer to standard collateral and issuer type. The mitigant is identified as eligible or not based on the eligibility rules for CRM.

Process Flow for Credit Risk Mitigation

Mitigant Eligibility

In the Comprehensive Approach, credit rating of the mitigant of the collateral is considered for all mitigant types issued by all party types while deciding whether the mitigant is eligible for a particular exposure or not. Separate eligibility Rules exist for mitigants types like equity, mutual funds, or debt security, to perform these checks. For the remaining, a mitigant is marked as eligible only if its credit rating is better than the exposure to which it is providing protection and also if it is classified as senior in position. This is handled in the sub process- **Mitigant Collateral Eligibility - Comprehensive Approach**.

Mitigant eligibility is also checked based on the original and residual maturity of the collateral. Collateral is classified as eligible only if its original maturity is more than 1 year and residual maturity is more than 3

months.

PD/LGD for CRM

The application assigns the PD and LGD to the mitigants as follows:

As per the US Final Rule, if guarantee and credit derivatives are used as an eligible mitigant, then you can select either the LGD Adjustment Approach or PD Substitution Approach for the two mitigants against an exposure.

If the LGD Adjustment Approach is selected, then the covered portion of the exposures is assigned the LGD of the mitigant and uncovered portion is assigned the LGD of the exposures. The PD assigned is of the obligor for the covered and uncovered portion.

If PD Substitution Approach is used, then LGD assigned to the covered and uncovered portion is the adjusted LGD. PD assigned to the covered portion is of the mitigant and to the uncovered portion is that of the obligor.

While for other collateral where comprehensive approach is used, LGD used for the covered is that of mitigant and for uncovered the LGD is that of exposures.

For LGD assignment the application also takes care of minimum collateralization effect as stated in Basel II guidelines. Additionally, if there is any over collateralization amount, the application does the mitigant value adjustment based on over collateralization percentages as stated in Basel II guidelines.

Mitigant Haircut Assignment

The application does computations for three kinds of mitigant haircut which is, volatility haircut, FOREX haircut, and maturity mismatch haircut. Volatility haircuts are calculated and amount of the exposure to the counterparty and the value of collateral or mitigant is adjusted to account for any future fluctuations in the market value. After the adjustment, the application provides the volatility adjusted amounts for the exposure (higher than original exposure amount) and the collateral (lower than original amount).

When the exposure and collateral are in different currencies, the application makes an adjustment by applying FOREX haircut. If the residual maturity of CRM is less than the underlying credit exposure, then a maturity mismatch applied. If there is a maturity mismatch and CRM has an original maturity of more than a year, the maturity mismatch haircut is applied to adjust the value.

There are two methods for assigning volatility haircut:

- Supervisory Haircut: the application assigns volatility haircut based on issuers, issuer's ratings, mitigants residual maturity, and type of mitigants.

- Scaling Up: the haircut is scaled up based on the minimum holding period for the transaction type.

The FOREX haircut is also assigned based on these transaction types as per Basel accord. Only eligible mitigants are considered for haircut assignment. The eligible mitigants data flows from mitigants table to sub exposures table. Haircuts mentioned in the Basel accord assume a holding period of 10 days. However, if mitigants holding period is more than 10 days, then the application scales up the haircut value to reflect the correct value as per the holding period.

CRM Capital Charge Calculation

Mitigant Correlation Factor

Similar to Non Securitization exposures, correlation factor for collaterals or mitigants are also calculated for mitigants belonging to all asset classes based on their PD.

Capital Charge Calculation

Capital charge is calculated for all mitigants using their effective maturity, correlation factor, PD, LGD, and maturity adjustment value. Similarly, for failed trade and defaulted exposures capital charge is calculated.

Allocation of Mitigants to Exposures

This process loads the mitigant mapping data from stage table to its corresponding processing table. Mitigants are allocated to the respective exposures it covers and the application defines the amount of the bank's exposure the mitigant is covering. Shareholding percent is also applied to the mitigant amounts. The application has a pre-built optimizer for optimum allocation of mitigants to the exposures for CRM purposes. One-to-One, Many-to-One, and Many-to-Many mapping of mitigants are handled in an efficient manner involving storage of intermediate computations for traceability.

All mitigants which are eligible and mapped to an exposure are then populated to a new table where each exposure is broken down into mitigant types. It includes an additional row which treats the exposure as having covered and uncovered portion. The covered factor and uncovered factor is also populated in this table.

The application uses the linear programming logic to allocate the mitigants to the exposures. Pooling identifies the exposure and mitigant data from sub exposures (**FCT_SUB_EXPOSURES)** table. Exposure identifier and mitigant identifier are the attributes on which pooling is performed. It assigns a pool ID for each exposure to mitigant combination. Based on these pool Ids, the optimizer allocates a covered factor to exposures. Optimizer allocates mitigants to exposures to attain the most favorable EAD output

For more information on pooling and optimizer, see Exhibit 1 and Exhibit 3 in *Annexure A: Key Concepts.*

Post-CRM RWA Computation

Pre - mitigation EAD is split into post mitigation EAD for covered portion (mitigant's EAD - portion of exposure that is covered by mitigant) and uncovered portion (portion of the exposure that is not covered by mitigant). For multiple mitigants covering one exposure, there are more than one record for the covered portion of that exposure. Post mitigation RWA UL (Post CRM RWA UL) is calculated by multiplying post mitigation EAD and its Capital Required UL with 12.5. Post mitigation RWA Expected Loss is calculated by multiplying the PD, LGD, and post mitigation EAD amount with 12.5.

5.1.1.2.2 Securitization – Internal Ratings Based Approach

US Final Rules differentiate the Credit Risk computation of the Securitized exposures from Non Securitized exposures. As securitized exposures are part of off-balance sheet transactions, it follows a waterfall cash flow mechanism unlike the other exposures. Hence these exposures are treated differently. Due to the economic crisis of 2008, the Basel Rule has categorized securitized exposures into securitized and re-securitized exposures.

Securitized exposures are exposures which are issued out of a pool of underlying exposures for the transfer of risk. Re-securitized exposures are the exposures which are issued out of a pool of underlying exposures which constitutes non-securitized exposures and some portion of securitized exposures. The application is capable of handling both securitized exposures and re-securitized exposures. It also handles the calculation for the originator and the investor bank roles. At a broad level, there are two categories of Investors:

- An Investing Bank who has invested heavily in securitization.
- An Investing Bank who has invested minimal in securitization.

For both the investors, the data is expected in the Stage Underlying Exposures (**STG_UNDERLYING_EXPOSURES**) for the underlying of the pool, Total Pool Level attributes in the Stage Pool table (**STG_SECURITIZATION_POOL**), Tranche Level attributes in the Stage Tranche table (**STG_SECURITIZATION_TRANCHE**), and the Exposure Level Attributes in the respective product processor (PP) tables.

For an originator, the data is expected in the same manner as the Investor, except for the Underlying Exposures. The underlying exposures of the pool are expected in the respective PP tables, depending on the product type of the underlying exposures.

If the exposure is a credit protection in the form of guarantee, it is expected in the Stage Guarantees table (**STG_GUARANTEES**), and if it is a credit derivative, it is expected in the Stage Credit Derivatives table (**STG_CREDIT_DERIVATIVES**). If it is a regular investment in the Tranches by an investing bank, or it is part of the mandate for retention in the pool or tranche for an originating bank, the data is expected in the Stage Investments table (**STG_INVESTMENTS**).

For exposures being a facility like liquidity facility, or servicer cash advance, the exposures are expected in the Stage Commitment Contracts table (**STG_COMMITMENT_CONTRACTS**).

US guidelines specify two broad approaches for the calculation of the capital charge of Securitization exposures:

- Standardized Approach
- IRB Approach
    - o Ratings Based Approach
    - o Internal Assessment Approach
    - o Supervisory Formula approach

For the US Jurisdiction, the IRB approach is the only approach supported by the application. For a few procedures, the calculations pertaining to the underlying exposures of the Securitization transaction are required before processing the Securitization exposures.

Process Flow for Securitization – Internal Ratings Based (IRB) Approach
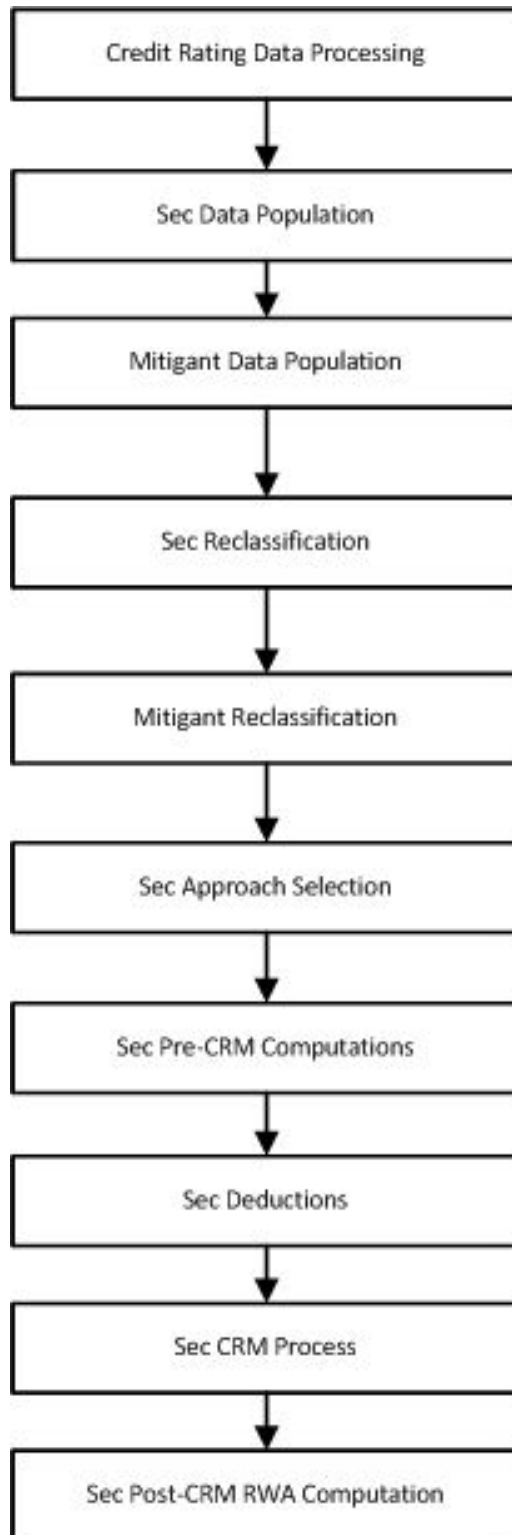
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┌─────────────────────────────────┐
│   Credit Rating Data Processing  │
└─────────────────────────────────┘
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│      Sec Data Population         │
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│      Sec Reclassification        │
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│      Sec Approach Selection      │
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│     Sec Pre-CRM Computations     │
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┌─────────────────────────────────┐
│  Sec Post-CRM RWA Computation    │
└─────────────────────────────────┘
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The application handles the IRB Approach of the Securitization Exposures as follows:

Credit Rating Data Processing

All the rating information of the exposures and the mitigants are populated from the staging tables to the processing tables. The exposure and the tranche rating information are captured in the account rating tables and the mitigants rating information are captured in the instrument rating details.

Sec Data Population

The data pertaining to the pool, tranche, and exposures are populated from the staging tables to the processing tables. The underlying exposures data are captured in the respective Product Processor tables (and for these the process pertaining to the non-securitization exposures is followed).

Mitigant Data Population

The mitigants data are populated from the staging table to the processing table. The exposures which are mapped to the mitigants are captured and populated from the staging table to the processing table. This is handled in the **Securitization Data Population** process.

Sec Reclassification

The application uses the standardized data for all kinds of calculation (product type like eligible liquidity facility, bank role like originator, pool type like mortgage backed securities). Before any calculation, the application reclassifies the bank specific data to standard data, similar to the terms used in US Final Rules. It reclassifies the bank role to the standard bank role of an originator or investor. Any other bank roles like sponsor, credit protection provider, and so on, are reclassified into originator, investor, and so on, respectively. The application also reclassifies the pool type to the standard pool type like credit cards receivable pool, auto loans, and so on. It also reclassifies the product type to the standard product type like Mortgage Backed Securities (MBS), eligible liquidity facility, and so on.

Mitigant Reclassification

For mitigants, the application reclassifies the mitigant types to the standard mitigant types like the debt securities, credit derivative, cash, and so on. It also reclassifies the mitigant issuer type to the standard mitigant issuer type like banks, corporate, and so on.

Sec Approach Selection

The application assigns the appropriate approach to the exposures, based on the criteria specified in the US Final Rules. The application assigns any of the three approaches under IRB process:

Sec-Internal Assessment Approach

For ABCP exposures having internal ratings, the application assigns the Sec-Internal Assessment Approach.

Sec-Ratings Based Approach

It assigns the Sec-Ratings Based Approach when there is at least one rating assigned to the exposures. For exposures qualified for SFA approach (SFA Qualified flag is 'Y') and having more than one rating, the application assigns the Sec-Ratings Based Approach to that exposure.

Sec Supervisory Formulae Approach

It assigns the Sec-Supervisory formula approach to originator exposures where the exposure is qualified for the SFA approach (SFA Qualified flag is 'Y') and there is one or no external ratings assigned for that exposure.

In case of exposures are not qualified for any of these approaches, then the application assigns the Sec-Internal Ratings Based Approach. This approach selection is handled in the **Sec Approach Selection** sub-process.

Sec Pre CRM Computations

The application calculates the Pre-CRM RWA for the exposures by multiplying the Pre-CRM EAD with the Risk Weight of the exposures. This is handled in the Pre-CRM Computations sub-process.

Pre-CRM EAD Computation

The application assigns the Credit Conversion Factor (CCF) to the off-balance sheet items as specified by the US Final Rules. The CCF percentages are assigned based on the product type (like the eligible liquidity facility). The CCF percentages are also assigned to the exposures based on whether there is any early amortization provision applicable to the transaction. In such cases, the CCF assignment is based on the early amortization type (controlled or uncontrolled), the pool type, and the ratio of three month average excess spread to the trapping point. Later, the application computes the Pre-Mitigation EAD. This is computed based on the bank role and the product type. The application calculates the EAD for the investor's interest separately. Pre-mitigation EAD for on-balance sheet and off-balance sheet exposures are calculated separately based on the calculations given in the US guidelines. This is handled in the Pre-CRM Computations sub-process.

Risk Weight Assignment

Ratings Based Approach

For exposures that follow the ratings based approach, the risk weight assignment is similar to the standardized approach, except for the difference on the criteria used for risk weighting. The application uses the granularity of the pool, seniority position of the exposure, and the credit rating of the exposure for the risk weighting the exposures which follow the ratings based approach.

In the case of exposures which are unrated, the application checks the criteria required for inferring the rating. This is based on the presence of the subordinate tranche information (based on seniority) for the same pool, regardless of whether the bank has an exposure in that tranche or not, residual maturity of the subordinate tranche being more than the unrated tranche's residual maturity, the credit enhancement level of the unrated tranche being equal to or more than the subordinate tranche's credit enhancement level.

The ratings of the tranches also undergo multiple assessments and the application assigns a single rating for all the rated tranches. This multiple assessment of ratings happens in the Data Transformation "Mult_Assessment_Tranche". The details of the Data Transformation are as follows:

Data Transformation Name	Objective	Processing Logic
Mult_Assessment_Tranche	The objective of this Data Transformation is to perform multiple assessments of the ratings and assign a normalized rating and risk weight to the securitization tranche. This is required for processing the inferred ratings treatment.	For each securitization tranche the various standard ratings associated with that exposure and the respective risk weights are identified. If the number of ratings are 1, then the same rating gets assigned as the standard rating for the tranche. If the number of ratings are greater than or equal to 2, then the tranche is assigned a standard rating which corresponds to the worst of the best two risk weights associated with the various tranche ratings.

Based on all the previous criteria, the rating for the unrated exposure is considered to be equal to the identified subordinate tranche. Due to the seniority of the exposure in the cash flow and in the securitization structure, a subordinate tranche does not have ratings more than that of the immediate senior tranche.

This is handled in the Pre-CRM Computations sub-process.

Internal Assessment Approach

For exposures that follow the internal assessment approach, the risk weight assignment is similar to the standardized approach, except for the difference on the criteria used for risk weighting. The application uses the granularity of the pool, seniority position of the exposure, and the credit rating of the exposure for the risk weighting the exposures that follow the internal assessment approach. The internal rating of the exposures is reclassified by the application into standard ratings, for applying the internal assessment approach consistent with the US guidelines.
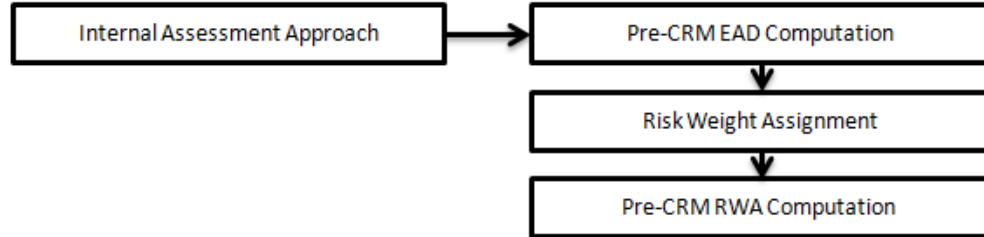
This is handled in the **Pre-CRM Computations** sub-process.

Supervisory Formula Approach

For exposures which follow the supervisory formula approach, the application calculates the underlying capital of the securitization pool (K_{IRB}), using the Non Securitization IRB process. Further, the application calculates the SFA parameters based on the pool and tranche details. The application calculates these, using the calculation logic specified in US guidelines. It also checks the exposure to identify whether the exposure should be straddled or not. This check is based on the credit enhancement level of the tranche to which the exposure belongs to, the thickness of the tranche to which the exposure belongs to, and the underlying capital of the securitization pool.

The exposures for which the sum of the credit enhancement level and the tranche thickness are less than that of the KIRB, the exposures are deducted from the capital. The exposures for which the credit enhancement level is more than that of the K_{IRB}, the exposures have the SFA Parameters computed. The exposures for which the credit enhancement level is less than that of the K_{IRB} but the sum of the credit enhancement level and the tranche thickness are more than the KIRB, the exposures are straddled, that is, the tranche to which the exposure belongs is split into a position below K_{IRB} and a position above K_{IRB}. All the exposures mapped to that tranche are split in the same manner.

The application populates straddled tranche information into Securitization Straddled Tranche (**FSI_SEC_STRADDLED_TRANCHE)** table. The application splits each of the exposures of the identified straddled tranche, into two. The account skey of the parent exposure, which is undergoing the split, is added as the parent account skey for the new exposures formed. The straddled tranche deduction amount (the K_{IRB} amount less the tranche amount) is calculated and populated from the **FSI_SEC_STRADDLED_TRANCHE** in a pro-rated manner to all the exposures of the straddled tranche which are identified for deductions. The remaining amount (which is the tranche amount above the KIRB) is the exposure amount of the senior exposure belonging to the category of split exposures. After the original exposures are split into two and their amounts are populated, the original exposure is deleted from the Exposure table. The splitting of the identified straddled exposures are done with the help of the Data Transformation "Sec_Straddling_Sfa" for securitized exposures and with the help of the Data Transformation "Resec_Straddling_Sfa" for resecuritized exposures. The details of the Data Transformation are as follows:

Data Transformation Name	Objective	Processing Logic
Sec_Straddling_Sfa	The objective of this Data Transformation is to split the sec position (excluding resec position) belonging to straddling qualifying tranche into two positions (senior and junior) and treat them as per regulator guidelines.	Cases where L < KIRB < (L+T), the position is split into two position, where junior position is calculated as pool capital in amount terms minus the sum of amount of all tranches junior to the one to which bank has exposure to. The remaining amount is assigned to senior position, which gets assigned risk weight calculated as per Supervisory Formula. The junior position is assigned 1250% risk weight.
Resec_Straddling_Sfa	The objective of this Data Transformation is to split the re-sec position belonging to straddling qualifying tranche into two positions (senior and junior) and treat them as per regulator guidelines.	Cases where L < KIRB < (L+T), the position is split into two position, where junior position is calculated as pool capital in amount terms minus the sum of amount of all tranches junior to the one to which bank has exposure to. The remaining amount is assigned to senior position, which gets assigned risk weight calculated as per Supervisory Formula. The junior position is assigned 1250% risk weight. The Data Transformation inserts record corresponding to the straddled tranche into DIM_EXPOSURE and FCT_SEC_EXPOSURES. The Data Transformation updates N_SEC_EXP_RW_UL & N_PRE_CRM_SEC_EXP_CAPITAL_UL. of FCT_SEC_EXPOSURES.

Once all the SFA Parameters are computed, the capital charge is calculated using the SFA Parameters. This capital charge is subsequently converted into the risk weight.

This is handled in the **Pre-CRM Computations** sub-process.
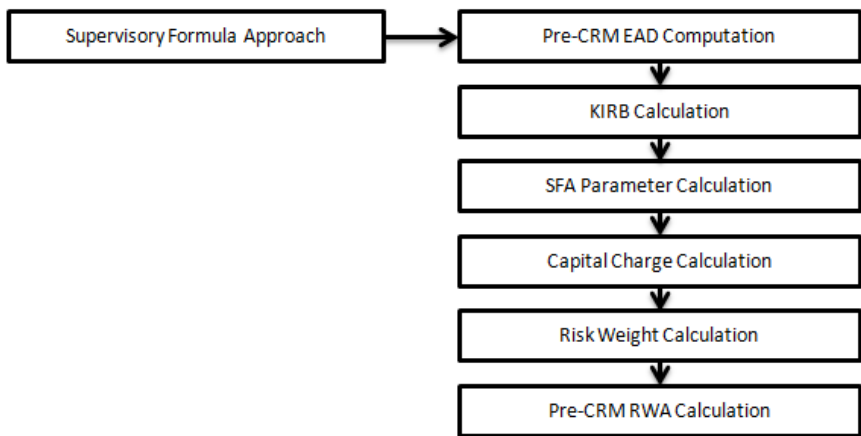
Sec Deductions

Exposures under Ratings Based Approach that are unrated, rated BB-, or below are marked as deduction exposure. For exposures falling under Supervisory Formula Approach, the exposures risk weighted at 1250% (including exposure going for straddling), are marked as deduction exposure. All unrated ABCP exposures (irrespective of their SFA qualification indicator) and originator records are deducted. The process also handles deduction related to synthetic securitization transactions. All unrated credit protections that are not **Nth to Default** or SFA qualified are also marked for deduction.

Sec CRM Process

Mitigant Risk Weight, Mitigant Eligibility, Haircut Assignment, and Allocation of Mitigants to Exposures are handled in Sec CRM sub-process.

Mitigant Risk Weight

The application calculates the mitigant risk weight similar to the exposure risk weight of Non Securitized exposures. This is based on the standard issuer type and the credit rating which includes the unrated issuers as well. The application performs multiple assessments for the mitigants, similar to the process followed for Non Securitized exposures, and arrives at a single rating for the mitigant. Further, the application assigns the final risk weight to the mitigant. For financial collateral mitigants like cash and gold, zero risk weight is assigned.

Mitigant Eligibility

The application identifies the eligible mitigants based on the criteria as mentioned in the US guidelines. The application identifies the following mitigants in the case of Securitized exposures: collateral, guarantees, and credit derivatives. The application is capable of using the Comprehensive Approach for the mitigants which are part of the collateral. This is similar to the mitigant eligibility of the Non Securitization process. The application processes multiple assessments of ratings for the mitigants and some of the mitigant eligibility criteria are based on the ratings and risk weight of the mitigants.

The eligibility of the collateral mitigants are based on the party type of the mitigant, mitigant types, the credit rating assigned to the mitigant or the party (as applicable), and whether the collateral is classified as a senior or not. For equity, the eligibility is based on the main index equity and the equity trading status. For mutual funds, the eligibility is based on the eligible mutual fund indicator. The application identifies the eligibility of the guarantees and credit derivatives based on the party type of the mitigant and the credit rating assigned to the issuer of the mitigant.

For Nth to default credit derivatives, the application further identifies the eligible credit derivative, based on the number of defaults in the exposures and the defaulted position covered by the mitigant. The application identifies the number of defaults in the tranches based on the attachment point of the tranche to which the exposure belongs, the initial pool exposure amount, and the cumulative default amount. Further, it computes the number of tranches in default and compares it with the defaulted position covered by the mitigant.

Based on the criteria of eligibility mentioned in the Basel accord, the application identifies whether the mitigant is eligible or not. If eligible, the application considers the least risk weighted exposure as the eligible mapping for the least eligible nth to default mitigant for the exposure.

This identification of the eligible nth to default credit derivative and the eligible exposure-mitigant mapping is performed with the help of the Data Transformation "CD_Sec_Mitigant_Elig_STD". The details of the Data Transformation are as follows:

Data Transformation Name	Objective	Processing Logic
CD_Sec_Mitigant_Elig_STD	The objective of this Data Transformation is to identify an eligible sec exposure mitigant mapping wherein the mitigant is an Nth to default credit derivative, in the case of IRB Approach.	The eligible nth to default credit derivative mitigant is identified and processed based on the exposures mapped to the same pool id. All the exposures mapped to the same pool ID are identified and the corresponding mitigants mapped to them are also identified. In the sec pool id, the cumulative pool default amount is compared with the tranche attachment point as a number (obtained by multiplying the tranche attachment percentage by the initial pool exposure amount). The number of tranches for which the tranche attachment point is less than the cumulative pool default amount is calculated. This number is compared with the minimum defaulted position of the credit derivative mitigant. For a basket of exposures covered by multiple credit derivatives, eligible mitigant is minimum defaulted position in the basket minus 1. Also other credit derivative in the basket of exposures which are having the defaulted position consecutively iscome eligible. For each eligible mitigant, the exposure mitigant mapping wherein the exposure has the least risk weight or capital charge iscome eligible. All other exposure mitigant mapping for that mitigant is marked ineligible.

The application also identifies the eligibility of the mitigants based on the comparison of the risk weight of the exposures and the mitigants. If the mitigants risk weight is lesser than that of the exposures, then the mitigants become eligible or else the application makes them ineligible.

Haircut Assignment

The application assigns various haircuts as applicable to the mitigants. Haircut is assigned to mitigants in the **FCT_SUB_EXPOSURES** table For collateral following Comprehensive Approach, the application is flexible to use the supervisory haircuts and scale up, if required, based on the minimum holding period. Alternatively, the application can use the bank's own estimate of haircuts. The application applies the volatility haircut, FOREX haircut, and the maturity mismatch haircut to the mitigants as appropriate. Only eligible mitigants are considered for haircut assignment. The eligible mitigants data flows from Mitigants (**FCT_MITIGANTS)** table to Sub Exposures (**FCT_SUB_EXPOSURES)** table.

The application populates an uncovered mitigant for each exposure in the **FCT_SEC_EXPOSURES** table. This uncovered mitigant has the same feature as that of the exposure and are created in the **FCT_MITIGANTS** table.

Allocation of Mitigants to Exposures

The application computes the mitigant value after all haircuts. The application uses the pooling and optimizer logic to allocate the exposures to the mitigants. This is a bit different from the optimizer logic of Non Securitization exposures as the Securitized exposures have priority in the cash flow and gets the maximum protection by the mitigants. The senior most exposure (or tranche) is denoted with seniority 1 and the second senior exposure is denoted with seniority 2 and so on.

In the case of securitization exposures, the mitigants are always given preference over the senior most exposure and subsequently to the other exposures based on the seniority. The other parameters which are considered in the allocation logic are the risk weight and the mitigant value post haircut. The application uses the linear programming logic to allocate the mitigants to the exposures. The optimizer logic for the Securitization exposures is as follows:

Based on the seniority of the exposures, risk weight of the exposures, the mitigant, and the mitigant value, the ordering of ranking in which the mitigants are allocated to the exposures, is arrived at. The order of allocation can be modified by updating the operation type and the optimizer constraints of the objective function. You have to select the allocation rank measure in the **Optimizer Definition** window, while defining the optimizer logic.

The optimizer functions on the minimization constraint logic.

If there is one or more than one exposure mapped to a single mitigant, then the mitigant is allocated to the exposure with the highest seniority. If there is more than one exposure with the same highest seniority, then the mitigant is allocated to the exposure which yields the highest mitigant value post haircut.

Single Exposure Mapped to Single or Multiple Mitigants

If there is one or more than one mitigant mapped to a single exposure, then the least risk weighted mitigant is allocated to the exposure. If there is more than one mitigant with the same least risk weight, then the mitigant which has the highest mitigant value post haircut is allocated to the exposure.

Multiple Exposures Mapped to Multiple Mitigants

The treatment in this case is similar to a single mitigant mapped to single or multiple exposures, for the identification of the mitigant which is assigned to the exposures. Later, the treatment pertaining to single exposure mapped to multiple mitigants is followed to yield the credit Risk weighted exposure amount.

Using the logic mentioned in the preceding list, the application calculates the factor of exposure covered by the mitigant and the factor of the exposure uncovered (without any protection).

Sec Post CRM RWA Computation

The application computes the covered amount and the uncovered amount for the exposures. The covered amount is computed by multiplying the covered factor with the exposure amount. To this covered amount, the application assigns the mitigant risk weight. The product of the covered amount and the mitigant risk weight is the covered RWA. The uncovered amount is computed by multiplying the uncovered factor (which is 1 – sum of all covered factors for that exposure) with the exposure amount. This uncovered amount is multiplied by the exposure risk weight to get the uncovered RWA. The sum of the covered RWA and the uncovered RWA is the Post CRM RWA of the Exposure.

$$Post\text{-}CRM\ RWA = Covered\ Amount\ *\ Risk\ Weight\ of\ the\ Mitigant$$
$$+\ Uncovered\ Amount\ *\ Risk\ Weight\ of\ the\ Exposure$$

This logic is handled in **Sec Post-CRM RWA Computation** sub process.

Key Data Elements

Key data elements for Securitization computation is as follows. For a complete list of tables and columns, see the Download Specifications document.

Securitization Exposures (IRB Approach)

The key attributes required in the case of an investor or third party that does not provide the complete pool and tranche details are as follows:

- Credit Enhancement Level
- Pool Exposure Amount
- Sec Second Loss Position of the Tranche
- Granularity of the Pool
- Largest Exposure of the Pool
- Seniority of the Tranche
- Sec Trading Book Approach

For an investing bank, the data is expected in the Stage Underlying Exposures (**STG_UNDERLYING_EXPOSURES**) for the underlying of the pool, Total Pool Level attributes in the Stage Pool table (**STG_SECURITIZATION_POOL**), Tranche Level attributes in the Stage Tranche table (**STG_SECURITIZATION_TRANCHE**), and the Exposure Level Attributes in the respective PP tables.

For an originator, the data is expected in the same manner as the Investor, except for the Underlying Exposures. The underlying exposures of the pool are expected in the respective PP tables, depending on the product type of the underlying exposures.

For a credit protection exposure in the form of guarantee, it is expected in the Stage Guarantees table (**STG_GUARANTEES**); and if it is a credit derivative, it is expected in the Stage Credit Derivatives table (**STG_CREDIT_DERIVATIVES**). If it is a regular investment in the Tranches by an investing bank, or it is part of the mandate for retention in the pool or tranche for an originating bank, the data is expected in the Stage Investments table (**STG_INVESTMENTS**).

For a liquidity facility exposure, or servicer cash advance, the exposures are expected in the Stage Commitment Contracts table (**STG_COMMITMENT_CONTRACTS**).

Mitigant Eligibility (IRB Approach)

Eligible Mutual Fund Indicator, Main Index Equity Indicator, and Equity Traded Indicator.

Miscellaneous

All tranche information, regardless of whether the bank has exposure or not is required for inferring the ratings, credit enhancement level computation, eligibility of nth to default credit derivative mitigant.

Mitigant Value is to be assigned at an Exposure level (not to the tranche).

Mitigant Pool ID in the Exposure Mitigant Mapping table for nth to default mitigants is required for eligibility of 'Nth to Default' credit derivative mitigant.

5.1.1.3 Capital Structure

The capital structure of US Jurisdiction calculates the total capital of the Bank Holding Company. The total capital consists of the following components:

- Tier 1 (T1) capital
- Tier 2 (T2) capital

Tier 1 capital consists of core equity capital, retained earnings, and disclosed reserves. Tier 2 capital consists of cumulative perpetual preferred stock and hybrid debt capital. These are used in the capital calculation, and for the reporting purpose.

The total capital amount arrived for each tier of capital is followed by deduction of various regulatory adjustments. Some Securitization Exposures, failed market transactions, investment in the subsidiary engaged in BFSI, and reciprocal cross holding is deducted 50% from Tier 1 capital and 50% from Tier 2 capital. Goodwill and other intangibles, gain on sale related to Securitization transaction, expected loss greater than total provision amount, and DTA are deducted from Tier 1 capital.

Tier 2 capital is limited to 100% of Tier1 capital. The total capital ratio must not be lower than 8%.

NOTE: While executing Solo Run the parent entity data is processed. Investment into the subsidiary data undergoes RWA calculation as per the Credit Risk and Market Risk rule. Capital line item pertaining to parent entity is only processed. For consolidation approach, the parent entity and the subsidiary data is considered. All the GL line items are expected at solo level for each entity. The consolidated data is discarded.

5.1.1.3.1 Assumption

The GL codes are expected to be unique across entities in **STG_GL_DATA** and **DIM_CAPITAL_ACCT_HEAD**.

5.1.1.3.2 Process Flow for Capital Structure

Level Selection and Approach Selection Calculation

To process the capital for a bank, a solo or consolidated entity selection should be made, based on which the capital is calculated at organization level. If solo is selected, then only for that particular selected banking organization the capital is calculated. If consolidation is selected, then all the entities that fall under the umbrella of the selected organization are part of capital calculation. This is done in the task – '**Capital Consolidation Level Selection**' in process '**CAPITAL_CONSOLIDATION**'

Based on the share-holding percentage of the parent bank in the subsidiary and the consolidation approach to be followed (consolidation approach and deduction approach) for each of the entity, the Basel approach is selected.

For example: if the share-holding for an entity is 35% and is part of the consolidation process, then the approach selected for this entity is pro-rata consolidation. The reclassification is performed in task – '**Cap Consl Basel Approach Type Reclassification for an Entity**' in the process '**CAPITAL_CONSOLIDATION'.**

Gross Capital Calculation for T1and T2

The total gross capital for each tier of capital that is, T1and T2 are calculated as per the definition of T1and, T2 by adding the relevant financial instrument in each tier of capital. The calculation is done in sub process – '**Capital Components Calculations**' in process '**USA_CAP_STRUCT**'.

Identification of Internal Transaction and Reciprocal cross holdings

All inter-group and reciprocal-cross holding capital investments are marked as internal customer transaction and reciprocal cross holding, respectively. The marking is done by populating appropriate standard account head surrogate key for the exposures which qualifies as internal transaction or reciprocal cross holding.

Expected Loss Vs Total Provision Calculation

If the total provision amount is greater than the expected loss, then the difference is added into Tier 2 capital up to a maximum of 0.6% of CR RWA under the IRB approach. The processing is done in Rule – **CS Total Provision for IRB** in sub process – **Capital Components Calculations** under the process '**CAP_STRUCT'**. If expected loss is greater than the total provision amount, the difference is deducted, where 50% is deducted from Tier 1 capital and remaining 50% is deducted from Tier 2 capital. The processing is done in the Rules – '**CS General Provisions for IRB**' and '**CS Total Provision for IRB**' in the sub process – '**Capital Components Calculations**' under the process 'USA_CAP_STRUCT'.

Regulatory Adjustment from Tier 1 and Tier 2

All the regulatory adjustment line items are identified and 50% of the total amount is deducted from Tier 1 capital and 50% from Tier 2 capital. In order to handle this 50-50 deduction, all the regulatory adjustment line items are moved to table **FCT_CALC_ACCT_HEAD** where each of the regulatory adjustment line items are equally split into 2 records. The capital component group of one record is marked as 'T1-50' and the other record is marked as 'T2-50'. The processing is computed in the sub processes – **Calc Acct Head Population** and **Std Acct Head Population** in the process **USA_CAP_STRUCT**.

Calculation of Net Capital

Net Tier 1 capital is calculated by deducting the Securitization transaction, DTA, and 50% of regulatory adjustment line item. Similarly, net Tier 2 capital is calculated by deducting 50% of regulatory adjustment line item. If net tier 2 is greater than net tier 1 capital, then the net tier 2 capital is limited to net tier 1 capital.

Total Capital Calculation

The total Net Tier 1 capital, and Net Tier 2 capital is summed up to obtain the Total Eligible capital.

Risk Weighted Asset (RWA) Amount – Credit Risk, Market Risk and Operational Risk

The RWA amount for Non Securitization, Securitization, Market Risk, and Operational Risk are calculated by summing up the RWA amount as reported under different headings as 'Risk Weighted Asset amount for Standardized Portfolios' for Non Securitization, "Sec Std RWA" for Securitization portfolio, "Market RWA" for Market Risk and "Operational RWA" for Operational Risk. The Market RWA and the Operational RWA are expected to be provided as an input.

Capital Ratio Calculation

Tier 1 ratio and capital adequacy ratio is calculated using the Total RWA amount and Net T1 capital, and Total capital amount. This is processes in the sub process – **Capital Components Calculations** in the process **USA_CAP_STRUCT**.

5.1.1.3.3 Key Data Elements

Key data elements to process the capital structure for the consolidated entity are as follows. For a complete list of tables and columns to be updated, see the Download Specifications document:

Entity details which are part of regulatory consolidation and parent entity share holding percent is required. This data is captured in Stage Entity Shareholding Details (**STG_ENTITY_SHR_HLD_PERCENT**) table.

The capital structure component for each tier of capital for all entities involved in regulatory consolidation is required.

The General Ledger line items are captured as download in Stage General Ledger Data (**STG_GL_DATA**).

If a capital line item like 'MR RWA' or 'OR RWA' is available as download, then these non GL line items are expected as download in Stage Standard Accounting Head (**STG_STANDARD_ACCT_HEAD**).

The standard account head ID of line items like 'Net Tier 1 capital', 'capital ratio', and so on, which are computed by application, are expected to be mapped to Capital Account Identifier –'OTHERS', as the application populates these line items into Fact Standard Accounting Head (**FCT_STANDARD_ACCT_HEAD**) table with initial value as 0. Later, this value is over written by the application.

Information stored in Capital Standard Mapping (**FSI_CAPITAL_STANDARD_MAPPING)** table is a mapping of GL capital line items with seeded data in DIM_STD_ACCT_HEAD. For all jurisdictions this mapping should be present. For more information on the mapping of all jurisdictions in **FSI_CAPITAL_STANDARD_MAPPING** table, see Exhibit 5 in *Annexure A: Key Concepts.*

5.1.1.4 Single Counterparty Exposure Limit

The Single Counterparty Exposure Limit calculation is designed to identify the counterparties whose aggregate credit exposure to the bank breaches the maximum limit as described by the Dodd Frank Single Counterparty Limit proposal. The Exposure Limit proposal is mitigating the threat to financial stability posed by systemically important financial companies.

The Single Counter Party Exposure Limit is an effort to reduce the concentration risk of a particular bank against any particular counterparty (customer and counterparty). The Dodd Frank proposal for US documents suggests stringent benchmarks to be followed by any bank for credit exposures. The application applies two limits for the reporting banks to follow in the US which are as follows:

- Any covered company together with its subsidiaries, should not have an aggregate net credit exposure to any affiliated counterparty more than 25 percent of the consolidated capital stock and surplus of the covered company.

- Any major covered company together with its subsidiaries, cannot have aggregate net credit exposure to any counterparty more than 10 percent of the consolidated capital stock and surplus of the major covered company.

Covered company, including its subsidiaries, is a company whose assets are equal to $50 billion or more. Any company which has a lesser asset size of less than $50 billion is not eligible for single counterparty credit calculation. Any covered company with a total asset size of more than $500 billion is considered to be a major covered company.

The application is designed to be flexible enough so that you can decide on the product types and customer types to be considered for the calculations. You can also decide on whether or not to compute Credit Risk Mitigation process so as to reduce its credit risk toward counterparty during the calculations.

NOTE: Single Counterparty Exposure Limit calculations are done only at a consolidated level of the ultimate parent. However, there are no restrictions by the application on this. The Run is executed at any level of the hierarchy of the legal entity structure.

5.1.1.4.1 Assumptions

Our interpretation of a few sections pertaining Single Counterparty Exposure Limit from the US Regulatory Capital Rules is as follows:

- The Dodd Frank proposal is silent on features like calculation of the exposure for OTC Derivative products. In such cases, the existing mode of calculation is as per the US Regulatory Capital Final Rules which is considered standard and replicated in the calculation process.

- The add-ons for the OTC are the same as that in the US jurisdiction.

- There is no CCF % for converting the off balance sheet items to on balance sheet items and as a result the full exposure amount for credit exposure calculation is not considered.

- The application does not consider failed trades and DVP and non-DVP trades as a part of the credit exposure as these are not explicitly mentioned in the guidelines.

5.1.1.4.2 Process Flow for Single Counterparty Exposure Limit
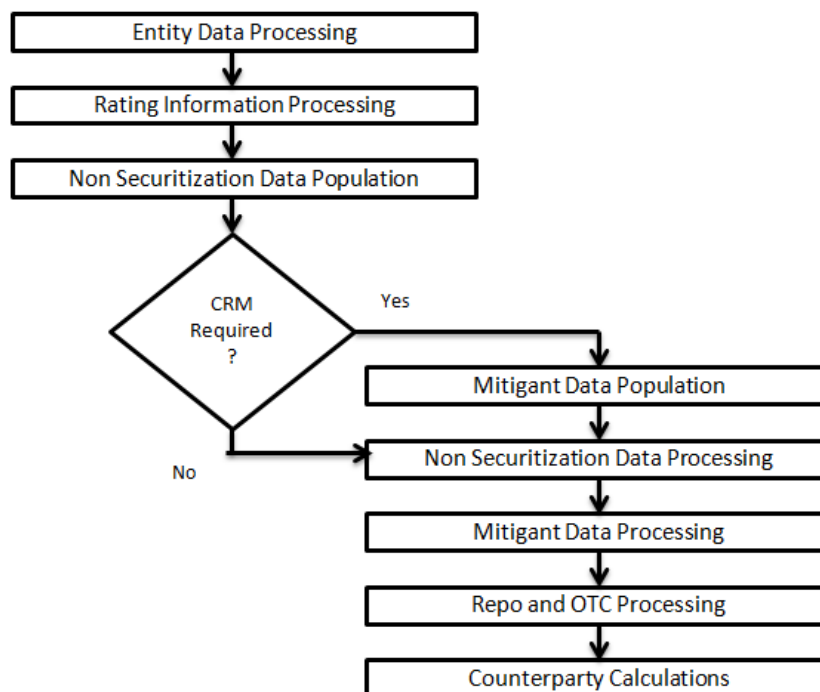
Entity Data Processing

The entities for which the concentration ratio is calculated, are processed and identified here. Single Counterparty processing is always done at a consolidated level based on the group asset size (asset size here includes consolidated asset size of parent and all its subsidiaries). Hence, the application identifies the legal entities for which Single Counterparty Run is being executed, sorts them and the ultimate parent of the legal entities are figured out and marked. This data is required in the other tasks during processing.

User defined Run parameters are set in this process. This sets the parameters which controls how the Single Counterparty Exposure Limit Run is to be performed. The main parameter set in Single Counterparty Run during this process is the 'CRM required' indicator, which controls whether the risk mitigation process is required or not. While running the user defined Run for Single Counterparty Exposure Calculation, Run Definition User Defined Run Param Assignment Rule is modified to set the user defined Run parameter to the following values depending on whether CRM is required or not:

Setup Code	CRM
USASCP-MIT-NO	No
USASCP-MIT-YES	Yes

From the Run Management screen, the required CRM can be set using the option icons.

Rating Information Processing

The application does the following in this process:

- Rating data population

- Rating reclassification into the standard ratings

- Sovereign ratings population

In single counterparty Run, ratings are required during the assignment of haircuts. Dodd Frank act proposes the use of only ECA scores (to be referred like sovereign ratings) in the Single counterparty Run. Therefore, all the credit ratings by the external agencies are disregarded. The application re-classifies the rating information (ECA score) shared in the bank's data to standard rating, according to which risk treatment is done.

Non Securitization Data Population

This process takes care of all the data population for the all the eligible product types from the available product processors. The valid credit exposures as per the Dodd – Frank's proposal are as follows:

- Loans, deposits, lines of credit, leases

- Debt securities (held till maturity and held for trading)

- Equity securities

- Repo and reverse Repo Transactions

- Securities lending and borrowing Transactions

- Guarantees, acceptances, or letters of credit

- Derivative transactions – Qualifying and Non Qualifying for master netting agreement

- Credit or equity derivative

Data should be loaded in the application for all the product types. Main categories of CR non sec exposures, along with their respective table names that are used for data input are as follows.

Higher Level Product Type	Table name for data input (Also known as Product Processor)
Bills	STG_BILLS_CONTRACTS
Credit Cards	STG_CARDS
Swaps	STG_SWAPS_CONTRACTS
Futures	STG_FUTURES
Guarantees	STG_GUARANTEES
Investments	STG_INVESTMENTS
Lease Contracts	STG_LEASE_CONTRACTS
Letters of Credit	STG_LC_CONTRACTS
Line of Credit	STG_CREDIT_LINE_DETAILS
Commitment Contracts	STG_COMMITMENT_CONTRACTS
Loans	STG_LOAN_CONTRACTS

Money market instruments	STG_MM_CONTRACTS
Overdraft	STG_OD_ACCOUNTS
Options	STG_OPTION_CONTRACTS
Re purchase contracts	STG_REPO_CONTRACTS
Equity Exposures	STG_INVESTMENTS
Underlying Exposures for Derivatives and Securitization	STG_UNDERLYING_EXPOSURES
Underlying Exposures for Repo contracts	STG_PLACED_COLLATERAL / STG_MITIGANTS
Credit Derivatives	STG_CREDIT_DERIVATIVES
Leases	STG_LEASES_CONTRACTS
Fixed Assets	STG_FIXED_ASSETS_DETAILS

Stage data from the product processors or other stage tables is populated in the required tables, where data is further processed. For more information on the list of columns to be populated within each table, see the *Download* Specifications document. The application identifies counterparties that are eligible to be processed under single counterparty Run are marked as eligible through rule RLBL0147: **Single Counterparty - Concentration Treatment Eligibility**.

The eligibility Rule is based on the counterparty type. This is a reconfigurable Rule that can be modified to include or exclude the counterparty type as per customer's requirement. Currently, the following counterparty types are marked as eligible for Single Counterparty calculations:

- Banks
- Corporate – Large
- Corporate – Medium
- Corporate – Small
- PSE - sovereign status
- Securities Firm treated as Bank
- Securities firm treated as Corporate Non -SME

Currency Conversion

The amount data columns that are provided as input (in stage tables) are in the natural currency. In this step, the application converts them to reporting currency columns which are used for further calculations. The column names suffixed as '_ncy' are in the natural currency and they are multiplied by currency conversion factor to populate values in the reporting currency.

Shareholding Percent Multiplication

The exposure amount, that is, a part of input data (product processors) is the exposure amount for a solo entity. However, for a consolidated Run, the parent exposure is considered only on the basis of shareholding percentage, based on the following calculation:

Exposure Amount × Share Holding Percent = Updated Exposure Amount

Where, share holding percent is allotted a value by the application during the process-Capital Consolidation.

Mitigant Data Population

The data related to the mitigants associated to the exposures are captured in this process. The application does the following in this task:

- Mitigant data population to their corresponding tables is done.
- Currency conversion from natural currency to reporting currency for the required columns
- Shareholding percent multiplication for the required mitigant data
- Mitigant to Non Sec Exposure mapping population

Non Securitization Data Processing

The Non Securitization related data is processed here. The application processes in the following way:

Reclassification: Product types used by reporting bank in the input data are reclassified to standard product types recommended by Basel Committee in the accord. The product types after reclassification are stored as Basel product types. The reclassification is based on a simple logic.

For example: Unsecured Bonds is reclassified as Debt Securities. Exposure at Default – EAD of the exposures is calculated for each product. The EAD calculation for all the exposures is done on the basis of standard product types as per the recommendations of US III.

If a new standard product type is added to the single counterparty Run, then it is mapped to one of the EAD calculation Rules if the EAD calculations are similar. If it is not similar, a new Rule is created for this purpose.

Mitigant Data Processing

The application handles multiple mitigants for credit risk mitigation like cash, debt securities, Guarantees, Credit derivatives, and so on. The mitigant types are reclassified as standard mitigant types. These are then identified as eligible or not based on the eligibility Rules. The application has pre-configured Rules to carry out the mitigant eligibility checks. There are separate eligibility Rules for different standard mitigants types. All cash and debt securities are marked as eligible. Equity is classified as eligible mitigant based on whether it is publicly traded equity or not. All Credit derivatives and guarantees are treated as eligible based on their standard issuer types.

Repo and OTC Processing

The processing of OTC and SFT products are done in the process. For SFT calculations the application does the following:

- The exposure volatility haircut for the underlying instruments of SFT is calculated. Haircut for debt securities issued by sovereign and non sovereign issuers is calculated in two separate Rules based on the US III recommendations. The input to haircut calculation for debt securities with non sovereign issuers is the residual maturity. The inputs to haircut calculation for debt securities with non sovereign issuers are the residual maturity, ECA score of the country. Haircut of 0.25 is applied to all equity collaterals through a separate Rule.

- Forex haircut for the underlying instruments of SFT is calculated via the FOREX haircut rule. 8% FOREX haircut is applied for any currency mismatches between the collateral and the exposure that is being covered by that collateral.

- Pre mitigation and post haircut exposure amount (exposure at default) is calculated for SFT.

- Gross current exposure amount for OTC products represents the current exposure that the bank is subjected to through these instruments. It is calculated for all OTC products based on their current market value.

- Gross potential exposure amount for OTC products is the potential exposure that the bank can be subjected to for credit event. This is calculated based on the notional amount. Gross potential exposure amount of all credit derivatives (where reporting bank has sold credit protection) is calculated on the basis of unpaid premium, notional principal and Non Sec Add on Percent.

- Net Current exposure amount is calculated based on the market value.

- Net Gross Ratio Calculation for OTC Derivatives is done by dividing Net Current Exposure Amount by Gross Current Exposure Amount.

  Net potential exposure value is calculated as:

  0.4 * Gross Potential Exposure Amount + 0.6 * Net Gross Ratio * Gross Potential Exposure Amount

  Net current and potential exposure values for OTC and its derivatives are calculated.

  Total exposure values are calculated by summing Net Potential Exposure Amount and Net Current Exposure Amount.

Counterparty Calculations

All the credit risk mitigation process and the final Single counterparty calculations are done in this process. The major tasks that are performed in this process are:

- CRM volatility haircut is applied for all mitigants and FOREX haircut is applied for currency mismatches.

- Mitigation allocation process is handled through the optimizer. The process to allocate Mitigants are as follows:

  o The group of all the exposures which are mapped to a mitigant and all the mitigants which are mapped to an exposure are grouped under a pool and a pool ID is given.

    For example, consider the mapping between few exposures and mitigants as follows:

    Exposure 1 → Mitigant 1

    Exposure 2 → Mitigant 1

    Exposure 2 → Mitigant 2

    Exposure 3 → Mitigant 2

    The Exposures 1, 2, and 3 and Mitigants 1 and 2 form a pool and a pool ID is provided for it. The mitigants within the same pool are allocated to the exposures in the following order:

    i. Pre mitigation EAD in descending order

    ii. Residual maturity of the exposure in ascending order

    iii. Probability of default in ascending order

    iv. Loss given default in ascending order

    v. If the mitigant is Cash or Gold, then it gets the top priority

    vi. Mitigant value in descending order

    vii. Residual maturity of the mitigant in ascending order

    viii. Probability of default of the mitigant in ascending order

    ix. Loss given default of the mitigant in ascending order

The exposure mitigant mapping is given a rank within the pool before they are fed into the optimizer for mitigant allocation. This rank is again modified for the cases where N exposures are mapped to 1 mitigant *(N – 1 referred to as 'N to 1' case)*. For an N – 1 pool, the mitigant allocation rank is reversed. For a non N – 1 pool, if the exposure is mapped to an Uncovered mitigant, then the rank is modified to MAX(rank) within the pool + 1 so that the uncovered mitigant is allocated in the last.

This rank ordering of the mitigants with respect to the exposure are handled using the Data Transformation "Counterparty_Miti_Rank". The details of the Data Transformation are as follows:

Data Transformation Name	Objective	Processing Logic
Counterparty_Miti_Rank	The objective of this Data Transformation is to allocate the ranks to the exposures and the mitigants in the case of N-1, 1-N and N-N mappings, for single counterparty.	For each exposures and mitigants within a pool, the solution first identifies whether the exposure-mitigant mapping belongs to N-1 or Other mapping. Then, for the N-1 mapping, the solution rank orders the exposures and the mitigants based on the least residual maturity of the mitigant, least PD percent and least LGD percent.

Post CRM covered amount is calculated as the product of Pre-Mitigation EAD Amount and Covered Factor. Single Counterparty Threshold Limit is calculated for covered companies and major covered companies as 25% and 10% of accounting capital and surplus. The application compares the Net Credit exposure with Single Counterparty Threshold Limit. If Counterparty Net Credit Exposure > Counterparty Threshold Amount, the application updates the Counterparty Threshold Limit Breach column as Y, else it is updated as N.

5.1.1.4.3 Key Data Elements

There are certain mandatory details about the product that are provided as download which cannot be calculated in the product processor table without which the exposure value cannot be computed. For a complete list of tables and columns, see the Download Specifications document.

The mandatory data that is provided for the different products are as follows:

- o   Lending Instruments - Current Exposure Value

- o   Equities – Equity Market value, Carrying cost

- o   Debt Securities – EOP Balance

- o   REPO - Underlying exposure value

- o   Guarantees and Letter of Credit - the exposure value, maximum potential loss

- o   OTC Derivatives - MTM value, Notional principal of the derivative

- o   Credit or Equity Derivatives - Exposure value, maximum potential loss

All of the above mentioned product types are included in the Gross Exposure calculation. While populating data the application also takes care of the currency conversion from natural currency to the reporting currency. The capital and surplus for the consolidating entity is expected as a download in **Stage Legal Entity Details** (**STG_LEGAL_ENTITY_DETAILS)** table as a single line item. Asset size of the entity is expected to be a download in **Stage Party Financials** (**STG_PARTY_FINANCIALS)**.

5.2   US III Regulatory Capital Rules

5.2.1   US III Regulatory Capital Rules – Standardized Approach

5.2.1.1 US III – High Level Process Flow for Standardized Approach

The application supports capital computations for Credit Risk along with Capital Structure, Capital Buffers, and Capital Consolidation process as per US Regulatory Capital Rules for Implementation of Basel III in US as finalized by the agencies.

For more information on the pre-defined Runs available with the application, see *OFS Basel Regulatory Capital Run Charts*.

NOTE:	The US Regulatory Capital Rules are termed as Regulatory Capital, Implementation of Basel III, Capital Adequacy, Transition Provisions, Prompt Corrective Action, Standardized Approach for Risk Weighted Assets, Market Discipline and Disclosure Requirements, Advanced Approaches Risk-Based Capital Rule, and Market Risk Capital Rule.

The sequence wise flow of processes included in the application is as follows.

5.2.1.1.1 Process Flow for Capital Adequacy Ratio Calculation
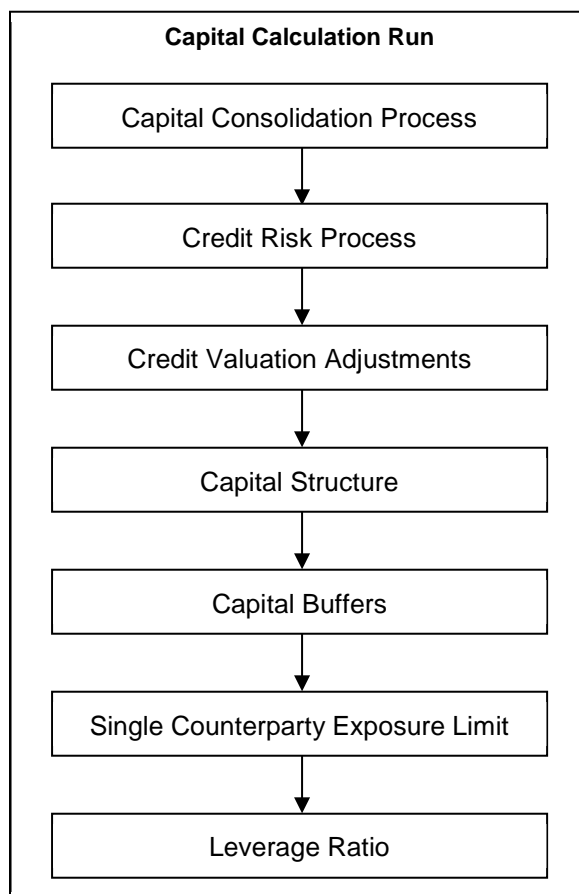
Capital Calculation Run

Capital Consolidation Process

↓

Credit Risk Process

↓

Credit Valuation Adjustments

↓

Capital Structure

↓

Capital Buffers

↓

Single Counterparty Exposure Limit

↓

Leverage Ratio

The Capital Calculation Run depicted in the preceding process flow, is a single run which is joined together by multiple processes. Each process is a block, compiled together to form an entire Capital Adequacy run. The individual blocks like the Credit Risk process exists as individual run which is described in the following sections.

5.2.1.1.2 Capital Consolidation Process

Capital Consolidation is a process common to each of the individual block when they are triggered separately as an individual run. For example: the standard out-of-box Market Risk run has Capital Consolidation and Market Risk process bundled together as a single Market Risk run. This is applicable for a Credit Risk run and Operational Risk run as well.

The Capital Consolidation is explained in the following section and is not repeated under the Non Securitization process and Securitization process section of this document.

In Capital Consolidation, the application processes the following.

Capital Consolidation Level Selection

The reporting bank can be a part of a financial group that has multiple legal entities like parent or child entities (subsidiaries) under its name. The entity on which you are required to process should be selected by you. Subsequently, the level at which a Run is to be executed (solo or consolidated) should also be selected. You can select these options in the Run Management UI. However, if the Run is executed in the Run Rule Framework (RRF), then these options have to be set using the Rule '**Capital Consolidation Level Selection**' in the process '**CAPITAL_CONSOLIDATION**'.

CAPITAL_CONSOLIDATION is the first process to be added in all the Runs defined in the RRF except for the Staging Data Population Run. The Run Management UI selects this process by default.

Run Parameters Assignment

The US Regulations states different approaches for calculating RWA. The Run Management UI in the application allows the reporting bank to define and execute a Run by selecting a combination of different approaches for RWA computation.

Run Parameter Assignment is also a part of **Capital Consolidation** process. The Rule '**Run Definition User Defined Run Param Assignment**' is used to assign the Run parameters if a Run is executed in the RRF. If the Run is executed from the Run Management UI, then the parameters are populated based on the Run defined in the Run Definition window.

Currency Conversion

The exposure amount and other general ledger amount data attributes that are provided as input (in stage tables) are in the natural currency (exposure currency) and this is usually different for exposures across different countries. The application converts them to reporting currency columns so that processing for all exposures happens in one single currency. The rules which do the currency conversion from natural currency into reporting currency are based on the exchange rate provided.

Reclassification

The application reclassifies the bank's product types and party types to Basel standard product and party types. Based on standard Basel product and party type, it forms an asset class for each exposure. Equity is reclassified by the application in a separate Rule. Similarly, the application does reclassification for mitigant on the basis of its mitigant types and reclassifies it to standard mitigant types.

Product Type Reclassification

Product types used by the reporting bank as input data are reclassified to standard product types as recommended in the US Basel III Final Accord. The product types after reclassification are stored as Basel product types. For Example: Housing Loan is reclassified as Residential Mortgage Exposure as per the Basel II guidelines.

Party Type Reclassification

Similar to the product type, the customer type and issuer type (which are stored as counterparty type) are also reclassified as standard counterparty type. The Basel application is designed to include customer type, issuer type, and legal entity type in a single table (**STG_PARTY_MASTER**). This is applicable for staging and the dimension model. These are reclassified together as well. Party type reclassification Rules handle reclassification for customer types, issuer, and entity types. For Example: Individual is reclassified as Retail.

Asset Class Reclassification

On the basis of Basel product type and standard counterparty type, an asset class is formed by the application. This asset class is used for data processing.

For example:

When standard counterparty is a large corporate, the asset class is large corporate, except when exposure has product types like cash and real estate.

For Basel product type gold, the asset class is gold, however when standard counterparty type is Central Counter Party, the asset class is Central Counter Party.

For standard counterparty type Corporate Non SME and Basel product type as Loan, the asset class is Corporate Non SME.

Asset class for all equity products is reclassified on the basis of equity type and Basel product type.

Mitigant Reclassification

For mitigants the application reclassifies the mitigant type to the standard mitigant type like the debt securities, credit derivative, cash, and so on. It also reclassifies the mitigant issuer type to the standard mitigant issuer type like Banks, Corporate, and so on. The reclassification tasks are present in the **Mitigant Reclassification** sub process.

The following file has details of asset re-classification, product type reclassification, and party type reclassification for Non Sec only. Equity reclassification remains the same as defined in USA Basel III Advanced Approach (US III Reclassification Rule).

Shareholding Percent Multiplication

For all entities in Capital Consolidation, the application updates the shareholding percentage against each entity data in fact capital accounting head table from fact entity share holding percent table. The parent data in fact capital accounting head is updated with 1 as value and for each child entity the data is based on the parent's holding percentage specified for each child in the fact entity share holding percent table.

5.2.1.1.3 Process Flow for Credit RWA

Credit RWA Run is a combination of Non securitization RWA, Credit Valuation Adjustment (CVA) RWA, and Securitization RWA. For Credit Risk for Non Securitized exposures and Securitization positions, the application follows the Standardized Approach.

CVA calculation has two approaches, the Standardized Approach and Advanced Approach, which is detailed separately under Credit Valuation Adjustment section under Credit RWA.

A few processes like Credit Rating, Party Type Reclassification, and Mitigant data population are common between Non Securitization, CVA, and Securitization process. These are executed only once under the Credit RWA Run even though these sub processes are explained separately under Non Securitization, CVA, and Securitization section of this document.

Certain sub processes under the Non Securitization process, like Reclassification, are common across Non Securitization exposures for over the counter derivative transactions and securities financing transactions. These are executed only once in the Run. The details of these sub processes are explained under 'Reclassification' and 'Risk Weight Assignment' sub process of the Non Securitization section of the user guide.

For more information on these sub processes, see Non Securitization – Advanced Approach for US.

Risk Weight assignment method, which is a part of Pre-Mitigation Capital Charge, is explained in the 'Pre-Mitigation Capital Charge' section under Non Securitization exposures. Credit Risk Mitigation for Securitization and Non Securitization is handled in two separate sub processes. For more details, see Risk Weight Assignment sections in the User Guide.

5.2.1.1.4 Process Flow for Credit Valuation Adjustments

Basel committee has introduced a new Credit Valuation Adjustment (CVA) capital charge, which is added to default risk capital charge to arrive at the new Counterparty Credit Risk (CCR) capital charge. The mark to market counterparty credit losses or the spread migration risk is captured with CVA, which were not directly capitalized before. CVA is the difference between the risk-free portfolio value and the true portfolio value that takes into account the possibility of the counterparty's default. In other words, CVA is the market value of counterparty credit risk.

This process flow is divided into two sections: Simple Approach and Advanced Approach.

For more information on the sub processes as detailed in the process flow, see Credit Valuation Adjustments.

5.2.1.1.5 Process Flow for Capital Structure
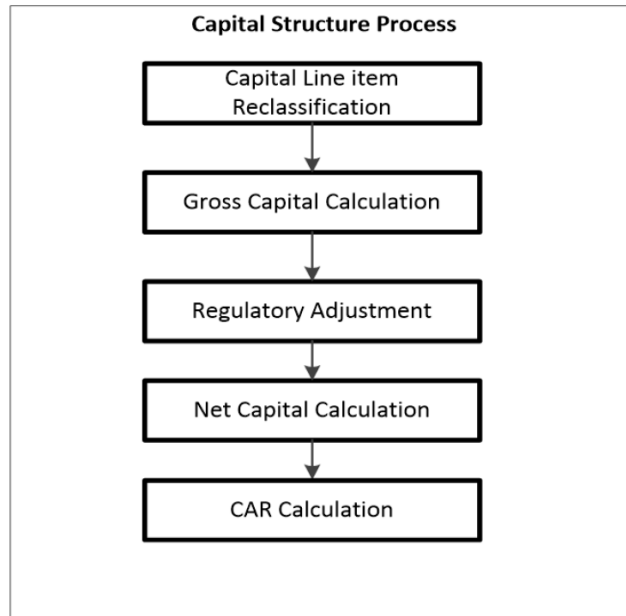
Capital Structure is executed along with Capital Consolidation and Credit RWA process. Each sub process mentioned in the preceding flow chart has a detailed explanation present in the Capital Structure section of this document.

For example: 'Gross Capital Calculation' mentioned in the preceding flow chart is explained in detail under 'Gross Capital Calculation' sub process section of the Capital Structure. Likewise 'Regulatory Adjustment' and 'Net Capital Calculation' is detailed under 'Regulatory Adjustment' and 'Net Capital Calculation' sub process section of Capital Structure.

For more information, see Capital Structure

5.2.1.1.6 Process Flow for Capital Buffers
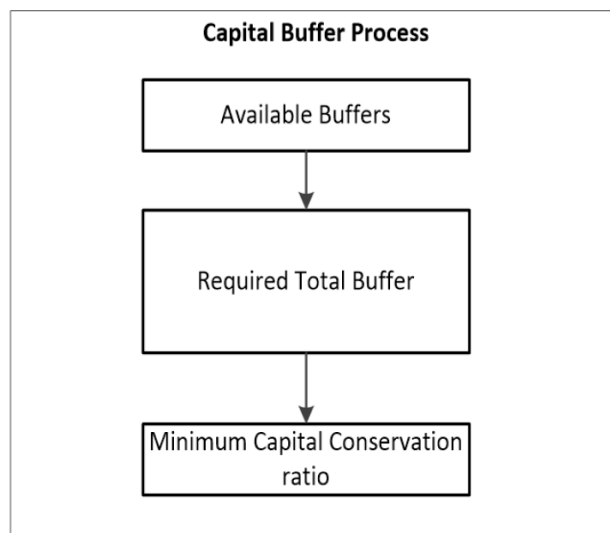
Capital Buffer is calculated post capital ratios are calculated, as they go as an input to Buffer calculation. Each sub-process is explained in detail under Capital Buffer section of this document.

For example, required total buffer and capital conservation buffer calculation are detailed of this document. For more information, see Capital Buffers.

5.2.1.1.7 Process Flow for Single Counterparty Exposure Limit
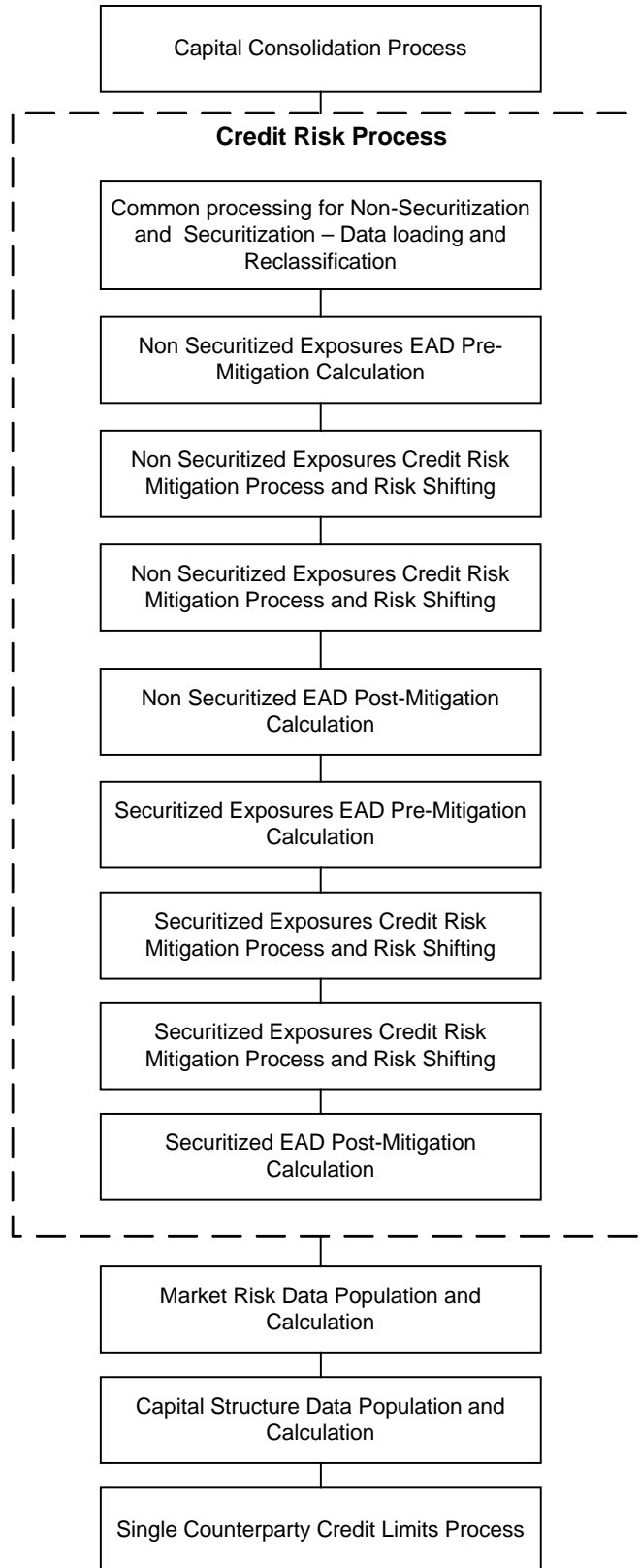
```
┌─────────────────────────────────────┐
│    Capital Consolidation Process     │
└─────────────────────────────────────┘

╔═════════════════════════════════════════╗
║            Credit Risk Process            ║
║  ┌─────────────────────────────────────┐ ║
║  │ Common processing for Non-Securitization │ ║
║  │   and  Securitization – Data loading and  │ ║
║  │           Reclassification           │ ║
║  └─────────────────────────────────────┘ ║
║  ┌─────────────────────────────────────┐ ║
║  │   Non Securitized Exposures EAD Pre-  │ ║
║  │       Mitigation Calculation         │ ║
║  └─────────────────────────────────────┘ ║
║  ┌─────────────────────────────────────┐ ║
║  │  Non Securitized Exposures Credit Risk │ ║
║  │ Mitigation Process and Risk Shifting  │ ║
║  └─────────────────────────────────────┘ ║
║  ┌─────────────────────────────────────┐ ║
║  │  Non Securitized Exposures Credit Risk │ ║
║  │ Mitigation Process and Risk Shifting  │ ║
║  └─────────────────────────────────────┘ ║
║  ┌─────────────────────────────────────┐ ║
║  │    Non Securitized EAD Post-Mitigation │ ║
║  │           Calculation                │ ║
║  └─────────────────────────────────────┘ ║
║  ┌─────────────────────────────────────┐ ║
║  │  Securitized Exposures EAD Pre-Mitigation │ ║
║  │           Calculation                │ ║
║  └─────────────────────────────────────┘ ║
║  ┌─────────────────────────────────────┐ ║
║  │    Securitized Exposures Credit Risk  │ ║
║  │ Mitigation Process and Risk Shifting  │ ║
║  └─────────────────────────────────────┘ ║
║  ┌─────────────────────────────────────┐ ║
║  │    Securitized Exposures Credit Risk  │ ║
║  │ Mitigation Process and Risk Shifting  │ ║
║  └─────────────────────────────────────┘ ║
║  ┌─────────────────────────────────────┐ ║
║  │    Securitized EAD Post-Mitigation    │ ║
║  │           Calculation                │ ║
║  └─────────────────────────────────────┘ ║
╚═════════════════════════════════════════╝

┌─────────────────────────────────────┐
│  Market Risk Data Population and     │
│           Calculation                │
└─────────────────────────────────────┘
┌─────────────────────────────────────┐
│ Capital Structure Data Population and │
│           Calculation                │
└─────────────────────────────────────┘
┌─────────────────────────────────────┐
│ Single Counterparty Credit Limits Process │
└─────────────────────────────────────┘
```

The Single Counterparty Exposure Limit calculation is designed to identify the counterparties whose aggregate credit exposure to the bank breaches the maximum limit as described by the Dodd Frank Single Counterparty Limit proposal. The Exposure Limit proposal is mitigating the threat to financial stability posed by systemically important financial companies.

For more information, see Single Counterparty Exposure Limit.

5.2.1.1.8 Process Flow for Leverage Ratio
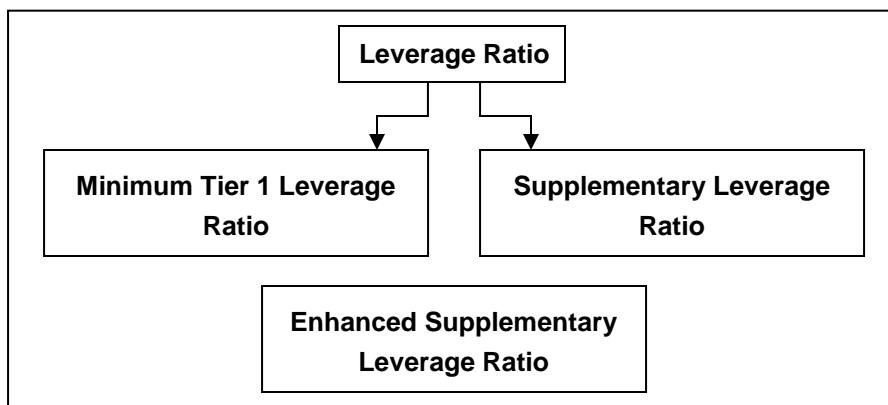
```
                        ┌─────────────────────┐
                        │   Leverage Ratio    │
                        └─────────────────────┘
                                  │
                   ┌──────────────┴──────────────┐
                   ▼                              ▼
        ┌─────────────────────┐        ┌─────────────────────┐
        │ Minimum Tier 1      │        │ Supplementary       │
        │ Leverage Ratio      │        │ Leverage Ratio      │
        └─────────────────────┘        └─────────────────────┘
                        ┌─────────────────────┐
                        │ Enhanced            │
                        │ Supplementary       │
                        │ Leverage Ratio      │
                        └─────────────────────┘
```

The leverage ratio calculations are a separate run, and not part of the regular capital calculation run. This is because of the changes in the Credit conversion factor assigned to the exposures, and also exemption of few exposures from the calculation which are part of the capital charge calculations. Also, the mitigation is not required for these exposures, and the exposure measure calculations are different from the regular EAD calculations.

For more information on revised leverage ratio, see Leverage Ratio.

5.2.1.2 Credit RWA

The application supports the computation of Credit RWA as per the guidelines laid out in the US Regulatory Capital Rules. Credit RWA computation is broken down into Credit Risk for Non Securitized Exposures and Credit Risk for Securitized Exposures. For Credit Risk for Non Securitized Exposures, the application follows the Standardized Approach, Foundation Advanced Approach for US, and Advanced Approach for US. Credit RWA computation also consists of computation of Credit Valuation Adjustments that follows Advanced and the Standardized Approach which is explained in later section.

5.2.1.2.1 Non Securitization – Standardized Approach for US

All the credit risk exposures are identified by their product types, counterparty types, and their corresponding asset classes. A sample list of products types, party types, mitigant types, and credit ratings are pre-defined in the Basel application. However, this list and naming convention differs from one bank to another. Hence, the application reclassifies the bank's data into standard data as per the US Regulatory Capital Rules. The application reclassifies the bank's product types and party types to Basel standard product and party types.

Based on these standard Basel product types and party types, an asset class for each exposure is formed. For equity exposures, the asset class is formed on the basis of equity type and Basel product type. A further data processing is done based on these standard reclassifications.

Some exposures can be hedged against Credit Risk through various mitigants like guarantors, collaterals, credit derivatives, and so on. These provide mitigation to credit risk and should be considered while computing Credit RWA as per US Regulatory Capital Rules. Hence, the application calculates pre-mitigation exposure amount and post-mitigation exposure amount.

The Basel committee has revised Credit Risk Mitigation (CRM) guidelines to a large extent and the same is incorporated in the application. The changes at a macro level relate to the recognition of the eligible mitigants, applicable for the Securitized and the Non-Securitized exposures. The US regulators have also revised the haircuts to be applied for the debt securities issued by a securitization transaction which act as collateral.

The remaining processing for CRM remains the same as per the previous releases of the Basel application. Depending upon the asset class, the application calculates the pre-CRM exposure amount for each exposure. This value signifies the maximum loss that the bank can suffer in case of default on this exposure, prior to considering any mitigation effects. Through the CRM process, the bank takes into account the mitigation effect and calculates the post mitigation exposure at default amount.

This signifies the maximum loss that the bank can suffer in case of default on this exposure, after considering all the mitigation effects.

The application also computes pre-mitigation risk weighted assets (Pre-CRM RWA) and post mitigation risk weighted assets (Post CRM RWA) by multiplying the respective exposure amount by risk weight. The risk weight in this case is arrived at by analyzing the OECD Country Risk Classifications (CRCs) of the exposures or other such criteria as specified in the US Regulatory capital rules. Some Credit Risk exposures that fall under the category of internal transactions like holding own subsidiaries shares or investment in its capital, reciprocal cross holding, and so on, are treated separately under Capital Structure.
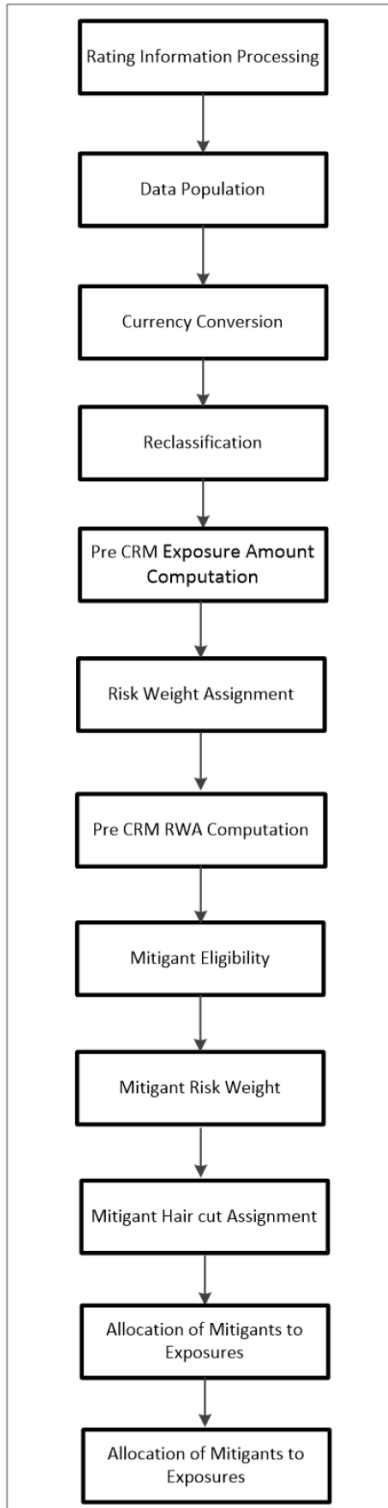
For processing of all the other line items for banking book products, securities financial transactions, and over the counter products, see Non Securitization – Standardized Approach.

CCF Assignment

As per the US Regulatory Capital Final Rules for Standardized Approach, following are the CCF assigned to off-balance sheet items:

1. **0% CCF** to the unused portion of a commitment that is unconditionally cancelable by the bank.

2. **20% CCF** to commitments with an original maturity of one year or less that are not unconditionally cancelable by the bank.

3. **20% CCF** to self-liquidating trade-related contingent items with an original maturity of one year or less.

4. **50% CCF** to commitments with an original maturity of more than one year that are not unconditionally cancelable by the bank.

5. **50% CCF** to transaction-related contingent items.

6. **100% CCF** to guarantees, repurchase agreements, c redit-enhancing representation and warranties that are not securitization exposure, securities lending and borrowing transactions, financial standby letters of credit and forward agreements.

Also banking organizations must apply the lower of 20% or 50% CCFs to the exposures related to commitments to extend letters of credit. Banking organizations must make this determination based upon the individual characteristics of each letter of credit.

Equity commitments are assigned as conversion factor as follows:

1. Conditional equity commitments with an original maturity of one year or less receive a CF of 20%.

2. Conditional equity commitments with an original maturity of over one year receive a CF of 50%.

3. Unconditional equity commitments receive a CF of 100%.

Basel II Product	Original Maturity	Non Sec Unconditionally Cancellable Facility	CCF Assignment (%)
Loan Commitment	-	Yes	0
Loan Commitment	Less than equal to1 year	No	20
Loan Commitment	More than 1 year	No	50
On Balance sheet	Less than equal to1 year	-	20
On Balance sheet	More than 1 year	-	50
Off-Balance sheet	Less than equal to1 year	-	20
Off-Balance sheet	More than 1 year	-	50
Short-term Self-liquidating Trade Contingencies	Less than equal to1 year	-	20

The following is the mapping of CCF Assignment according to the Basel product.

Basel II Product	Drawn CCF Assignment (%)
Transaction-related Contingencies	50
Financial Standby Letter of Credit	100
Guarantee	100
Forward Agreements	100

Equity Commitments depending upon the conditional or unconditional flag are also assigned conversion factor values which are as follows:

Basel II Product	Conditional Equity Commitments	Original Maturity	CF
Equity Commitments	Y	Less than equal to1 year	20%
Equity Commitments	Y	More than 1 year	50%
Equity Commitments	N	Higher level	100%

Credit-Enhancing Representations and Warranties

The accord states that Credit-Enhancing Representations and Warranties does not include the following:
1. Early default clause, covering, one-to-four family first-lien residential mortgage loans that qualify for a 50 percent risk weight for a period not to exceed 120 days from the date of transfer.
2. Premium refund clauses covering, one-to-four family first-lien residential mortgage loans that qualify for a 50 percent risk weight for a period not to exceed 120 days from the date of transfer.
3. Premium refund clauses that cover assets guaranteed by the U.S. government, a U.S. Government agency, or a GSE, provided the premium refund clauses are for a period not to exceed 120 days from the date of transfer.
4. Warranties that permit the return of underlying exposures in instances of misrepresentation, fraud, or incomplete documentation.

If the Credit-Enhancing Representations and Warranties are fulfilling these criteria, the capital need not be calculated and hence applied a risk weight of zero, for these exposure. If these criteria is not met a CCF of 100% is assigned.

The mapping must be as follows:

Basel II Product	Early Default Clause	Transfer Days	RW
CER	Y	<=120	0
WARNTY	Y	<=120	0

Basel II Product	Premium Refund Clause	Transfer Days	RW
CER	Y	<=120	0
WARNTY	Y	<=120	0

If Credit-Enhancing Representations and Warranties do not follow any of the criteria as mentioned, CCF of 100% is assigned.

Basel II Product	Early Default Clause	Premium Refund Clause	Securitized Flag	Return of Underlying Exposure	CCF (%)
Credit Enhancement Facility	N	N	N	N	100
Warranties	N	N	N	N	100

The accord also states that warranties and Credit Enhancing representation that have a premium refund clause and the asset against which the warranties and Credit Enhancing representation is provided are guaranteed by the U.S. government, a U.S. Government agency, or a GSE and original maturity of warranties is below 120 days and no capital is kept. Hence, zero risk weight is assigned.

Basel II Product	Underlying Exposure Guaranteed by Soveriegn/US/GSE	Premium Refund Clause	Transfer Day	RW
CRE	Y	Y	<=120	0
WARNTY	Y	Y	<=120	0

For Warranties that permit the return of underlying exposures in instances of misrepresentation, fraud, or incomplete documentation, the mapping is as follows:

Basel II Product	Return of Underlying Exposure	RW
WARNTY	Y	0

Exposure amount against Warranties that have premium refund clause should be equal to servicing premium and other earned fees. Exposure amount against Warranties that have return refund clause should be equal to full loan value. Both the exposure amount should be stored in column 'n_exposure_amount'.

EAD Computation

EAD amount computation for on-balance sheet exposure, each OTC contract, off-balance sheet commitment exposure type is same as that of BIS Standardized Approach.

Exposure amount for AFS or held-to-maturity debt securities and AFS preferred stock not classified as equity that are held by a banking organization that has made an AOCI opt-out election, the exposure amount is the banking organization's carrying value (including net accrued but unpaid interest and fees) for the exposure, less any net unrealized gains, and plus any net unrealized losses.

Exposure amount for AFS preferred stock classified as an equity security under GAAP that is held by a banking organization that has made an AOCI opt-out election, the exposure amount is the banking organization's carrying value (including net accrued but unpaid interest and fees) for the exposure, less any net unrealized gains that are reflected in such carrying value but excluded from the banking organization's regulatory capital.

Equity/ UCITS/ Mutual Fund/ Equity Commitments EAD Calculation

The EAD calculation for Equity/ UCITS/ Mutual Fund is as follows:

Equity /UCITS / Mutual Fund EAD amount = Exposure carrying value – Exposure Unrealized Gain + Exposure Unrealized Gain Loss

Here,

Equity commitments EAD = Effective notional principal amount * Conversion Factor

The equity derivative EAD calculation is same as defined in the USA Advanced run and the failed transaction EAD computation is same as defined in the USA Advance Approach.

Risk Weight Assignment

Non Sec Risk Weight Assignment for Exposures on US Government, Supranational and MDB, GSE, Corporate, Statutory Multifamily Mortgages, HVCRE and Others.

Risk weight assignment is based on Basel Asset class which is formed based on Basel Standard Party Type and Standard Product Type. The following are the risk weight assignments for other asset types:

Sovereign Exposures

Exposure to US Government - A rule termed as USA - US III - Non Sec RW Assignment based on asset class is created to assign risk weight based on Basel Asset class, this rule caters to risk weight assignment for multiple asset classes, namely – Domestic Sovereign, Supranational and MDB, GSE, Corporate, Statutory Multifamily Mortgages, HVCRE and others.

The rule is termed as "USA - US III - Non Sec RW Assignment based on asset class.".

The mapping is as follows:

Basel II Asset Class	Risk Weight
Domestic Sovereign	0%
Supranational Entities	0%
Government-sponsored Entities	20%
Corporate Exposure	100%
Statutory Multifamily Mortgages	50%
High-Volatility Commercial Real Estate (HVCRE) Exposure	150%
Cash	0%
Cash items in the process of collection	20%
Other Asset	100%

Other Sovereign Exposure

A new rule "USA - US III - Non Sec RW Assignment for Other Sovereign Exposures" is created to assign Risk weight based on Basel II Asset Class, Issuer CRC class, OECD Country Indicator and Sovereign Default Indicator.

The required source hierarchy is present. The mapping is as follows:

Basel II Asset Class	Issuer CRC class	OECD Country Indicator	Sovereign Default Indicator	Risk Weight
Sovereign Exposure	Issuer CRC class	OECD Country Indicator	Y	150%
Sovereign Exposure	CRC0	OECD Country Indicator	N	0%
Sovereign Exposure	CRC1	OECD Country Indicator	N	0%
Sovereign Exposure	CRC2	OECD Country Indicator	N	20%
Sovereign Exposure	CRC3	OECD Country Indicator	N	50%
Sovereign Exposure	CRC4	OECD Country Indicator	N	100%
Sovereign Exposure	CRC5	OECD Country Indicator	N	100%
Sovereign Exposure	CRC6	OECD Country Indicator	N	100%
Sovereign Exposure	CRC7	OECD Country Indicator	N	150%
Sovereign Exposure	No CRC	Y	N	0%
Sovereign Exposure	No CRC	N	N	100%

If an exposure, or the portion of an exposure, that is conditionally guaranteed by the S Government or FDIC or National Credit Union Administration, must assign 20% Risk weight through the rule "USA - US III - Mitigant RW Assignment for exposures Guaranteed by US Government".

Certain Sovereign Exposures

As per the US Regulatory Capital Final Rule, wherein bank assigns to a sovereign exposure a risk weight that is lower than the applicable risk weight if:

- The exposure is denominated in the sovereign's currency.
- The bank has at least an equivalent amount of liabilities in that currency; and

- The risk weight is not lower than the risk weight that the home country supervisor allows banks under its jurisdiction to assign to the same exposures to the sovereign.

In such cases, the conditions related to applying lower risk weight is more subjective in nature. Hence, the standard product does not have any specific rule for it. Other Risk weight assignment rules are customized to accommodate this requirement, if required.

Since the conditions related to applying lower risk weight is more subjective in nature, standard product does not have any specific rule for it. Customize the other risk weight assignment rules to accommodate these requirements.

- Certain supranational entities and Multilateral Development Banks (MDBs): Exposures on MDBs which qualifies for 0% risk weight are classified as Supranational entities asset class through asset reclassification rules. The rule "USA - US III - Non Sec RW Assignment based on asset class" caters to Risk Weight assignment. See section Exposure to US Government for details of the mapping.

- Exposures to Government-Sponsored Entities (GSEs): The rule "USA - US III - Non Sec RW Assignment based on asset class" assigns 20% Risk Weight to an exposure to a GSE that are not an equity exposure or preferred stock. Also, a new rule "USA - US III - Non Sec RW Assignment - GSE Exposures on Preferred Stock" is created to assign 100% Risk weight to preferred stock, based on Basel Asset class and Standard Product Type.

Basel II Asset Class	Standard Product Type	Risk Weight
Government-sponsored Entities	Preferred Stock	100%

- Exposures to Depository Institutions, Foreign Banks and Credit Unions

  Exposures to U.S. depository institutions and credit unions: A new rule "USA - US III – Non Sec RW Assignment - Depository Institutions and Credit Unions" is created to assign risk weight based on Basel Asset class and Sovereign Default indicator.

Basel II Asset Class	Sovereign Default Indicator	Risk Weight
U.S. depository institutions and credit unions	Y	150%
U.S. depository institutions and credit unions	N	20%

The conditions for assigning 100% risk weights are handled in capital structure.

Exposures to Foreign Banks: A new rule "USA - US III - Non Sec RW Assignment - Foreign Banks" is created to assign risk weight based on Basel II Asset Class, Issuer CRC class, OECD Country Indicator, Sovereign Default Indicator and Standard Product Type. For risk weight assignment for exposure to foreign bank, data of trade-related contingent items are expected to be related to only those contingencies that arise from movement of goods.

- Exposures to public sector entities (PSEs)

  Exposure to US PSEs: A new rule ""USA - US III - Non Sec RW Assignment - US PSEs" is created to assign risk weight based on Basel Asset class and PSE Obligation Type. A new hierarchy for PSE obligation type is created and PSE Obligation Type data is available at an exposure level.

Basel II Asset Class	PSE Obligation Type	Risk Weight
US PSEs	General Obligation	20%
US PSEs	Revenue Obligation	50%

- Exposures to Foreign PSEs: A new rule ""USA - US III - Non Sec RW Assignment - Non-US PSEs" is created to assign risk weight based on Basel II Asset Class, Issuer CRC class, OECD Country Indicator, Sovereign Default Indicator and PSE Obligation Type. The mapping is as follows:

Basel II Asset Class	Issuer CRC Class	OECD Country Indicator	Sovereign Default Indicator	PSE Obligation Type	Risk Weight
Foreign PSE	Issuer CRC class	OECD Country Indicator	Y	PSE Obligation Type	150%
Foreign PSE	CRC0	OECD Country Indicator	N	General Obligation	20%
Foreign PSE	CRC1	OECD Country Indicator	N	General Obligation	20%
Foreign PSE	CRC2	OECD Country Indicator	N	General Obligation	50%
Foreign PSE	CRC3	OECD Country Indicator	N	General Obligation	100%
Foreign PSE	CRC4	OECD Country Indicator	N	General Obligation	150%
Foreign PSE	CRC5	OECD Country Indicator	N	General Obligation	150%
Foreign PSE	CRC6	OECD Country Indicator	N	General Obligation	150%
Foreign PSE	CRC7	OECD Country Indicator	N	General Obligation	150%
Foreign PSE	No CRC	Y	N	General Obligation	20%
Foreign PSE	No CRC	N	N	General Obligation	100%
Foreign PSE	CRC0	OECD Country Indicator	N	Revenue Obligation	50%
Foreign PSE	CRC1	OECD Country Indicator	N	Revenue Obligation	50%

Basel II Asset Class	Issuer CRC Class	OECD Country Indicator	Sovereign Default Indicator	PSE Obligation Type	Risk Weight
Foreign PSE	CRC2	OECD Country Indicator	N	Revenue Obligation	100%
Foreign PSE	CRC3	OECD Country Indicator	N	Revenue Obligation	100%
Foreign PSE	CRC4	OECD Country Indicator	N	Revenue Obligation	150%
Foreign PSE	CRC5	OECD Country Indicator	N	Revenue Obligation	150%
Foreign PSE	CRC6	OECD Country Indicator	N	Revenue Obligation	150%
Foreign PSE	CRC7	OECD Country Indicator	N	Revenue Obligation	150%
Foreign PSE	No CRC	Y	N	Revenue Obligation	50%
Foreign PSE	No CRC	N	N	Revenue Obligation	100%

The conditions related to applying lower risk weight is more subjective in nature; hence standard product does not have any specific rule for it. Customize the risk weight assignment rules to accommodate this requirement.

Residential Mortgage Exposures (RMEs)

A new rule "USA - US III - Non Sec RW Assignment - Residential Mortgage Exposures" is created to assign risk weight based on Basel II Asset Class, Non Sec Past Due Flag, Assumed Lien position on RME, Occupancy Type and Restructured indicator. Restructured indicator is expected as "No" when a residential mortgage exposure modified or restructured on a permanent or trial basis solely pursuant to the U.S. Treasury's Home Affordable Mortgage Program (HAMP) assumption that prudent underwriting standard is followed by the bank for the Residential Mortgage Exposure. The assumption is that prudent underwriting standard is followed by the bank for the Residential Mortgage Exposure.

The mapping is follows:

Basel II Asset Class	Non Sec Past Due Flag	Assumed Lien Position on RME	Occupancy Type (v_occupancy_cd)	Restructured Indicator	Risk Weight
Residential Mortgage exposure	Non Sec Past Due Flag	Assumed Lien position on RME	Occupancy Type	Restructured Indicator	100%
Residential Mortgage exposure	N	First	Owner Occupied	N	50%

Basel II Asset Class	Non Sec Past Due Flag	Assumed Lien Position on RME	Occupancy Type (v_occupancy_cd)	Restructured Indicator	Risk Weight
Residential Mortgage exposure	N	First	Rented	N	50%

The Non Sec Past Due flag, which is an existing hierarchy, indicates whether Residential Mortgage Exposure is past due or not.

Three new hierarchies must to be created for the rule:

- **Assumed Lien Position on RME**: It is necessary to identify whether exposure must be treated like a first-lien residential mortgage exposure or junior-lien RME. Lien Position is typically an attribute of mitigant. However, at the mitigant level, specify it as an absolute lien position number. It cannot clarify whether the bank holds the first-lien and junior-lien(s) RMEs and no other party holds an intervening lien; and hence it is treated like first lien. Therefore, it is it is required to directly capture assumed lien position at an exposure level. More so, as there is a column v_lien_position_cd in stg_loan_contracts, which can be brought to fct table and metadata can be defined on it. It is assumed that bank provides Lien position data as per the applicable treatment. This means, if the bank holds the first-lien and junior-lien(s) RMEs, and no other party holds an intervening lien then it must combine the exposures and treat them as a single first-lien residential mortgage exposure. In such case, Assumed Lien position on RME is given as "First".

- **Occupancy Type**: The Occupancy Type indicates whether RME is "Owner-occupied" or "Rented" or "Others" (like, vacation home and so on; it is inferred that Owner-occupied means primary residence of the home loan borrower). There is a column v_occupancy_cd in stg_loan_contracts, which can be brought to fct table and metadata can be defined on it.

- **Restructured Indicator**: It is to indicate that the loan is restructured for the key attributes like rate, amount, tenor and so on. The values can be "Yes" or "No". There is a column f_restructured_ind in stg_loan_contracts for this purpose, which can be brought to fct table and metadata can be defined on it. The null values in the column can be treated as "No".

  The condition regarding mortgage is made in accordance with prudent underwriting standards, including standards relating to the loan amount as a percent of the appraised value of the property; is an operational requirement. For the standard Basel product release, it is assumed that the bank has fulfilled this operational requirement before classifying such exposures eligible for 50% risk weight. If there are any exceptions to fulfill such due-diligence and, due to which, applicable risk weight is 100%; then the application is customized accordingly.

Pre-sold Construction Loans

The existing rule "USA - US III - Non Sec Pre-Mitigation RW Assignment - Pre-sold construction Loan - STD" can be used for treatment to Pre-sold construction loans.

Past Due Exposures

A new rule "USA - US III - Non Sec RW Assignment for Past Due Exposures" is created to assign 150% risk weight to uncovered portion of the exposure, based on Basel asset class (that is, except for US Government, Sovereign Exposure and Residential Mortgage exposure asset class) and past due flag.

Other Assets

The rule "USA - US III - Non Sec RW Assignment based on asset class" caters to risk weight assignment for Cash, Cash items in the process of collection and other assets. See section exposure to US government for details of the mapping.

A rule "USA - US III - Non Sec RW Assignment - Gold" is created to assign zero percent risk weight to Gold asset class.

The requirement for assigning 100% risk weight for DTAs is covered in the rule- USA - US III RWA Calculation for DTA due to temporary Difference. The DTAs should be provided as net of any related valuation allowances and net of DTLs.

The requirement for assigning 250% risk weight for MSAs and DTAs is covered under capital structure. It is mapped to Credit RWA capital component group.

Sold Credit Protection

The sold credit protection in the form of guarantees and credit derivatives is under the regulatory framework. The treatment specific to the sold credit protection are as follows:

- Guarantees and Credit Derivatives

  Protection Provided to Non-Sec Exposures: In the case of guarantees and credit derivatives provided to the exposures which are not securitized, the protection provided is treated as an exposure to the underlying reference asset.

- Guarantees and Credit Derivatives

  Protection Provided to Sec Exposures: In the case of guarantees and credit derivatives provided to the exposures which are securitized, the protection provided is treated as if the portion of the reference exposure is held by the protection provider.

- Nth to Default Credit Derivatives

  In the case of nth to default credit derivatives, it is risk weighted using SSFA approach. If the SSFA Approach is not applicable for the transaction, then it is risk weighted at 1250%.

Assumptions

As per Accord:

> A bank that is the protection provider under an OTC credit derivative must treat the OTC credit derivative as an exposure to the underlying reference asset.

Interpretation in the application:

> This is a mention of the treatment for the credit derivative which is sold as credit protection to exposures which are not securitized.

Guarantees and non- nth to default credit derivatives are treated using the same guidelines for the recognition of the credit risk mitigant and the treatment for protection provided to securitized exposures.

And, it is not specified of the guarantees which are sold as credit protection to non-securitized exposures.

Hence this is assumed that the same treatment is applied for guarantees which are provided as protection to the non-securitized exposures.
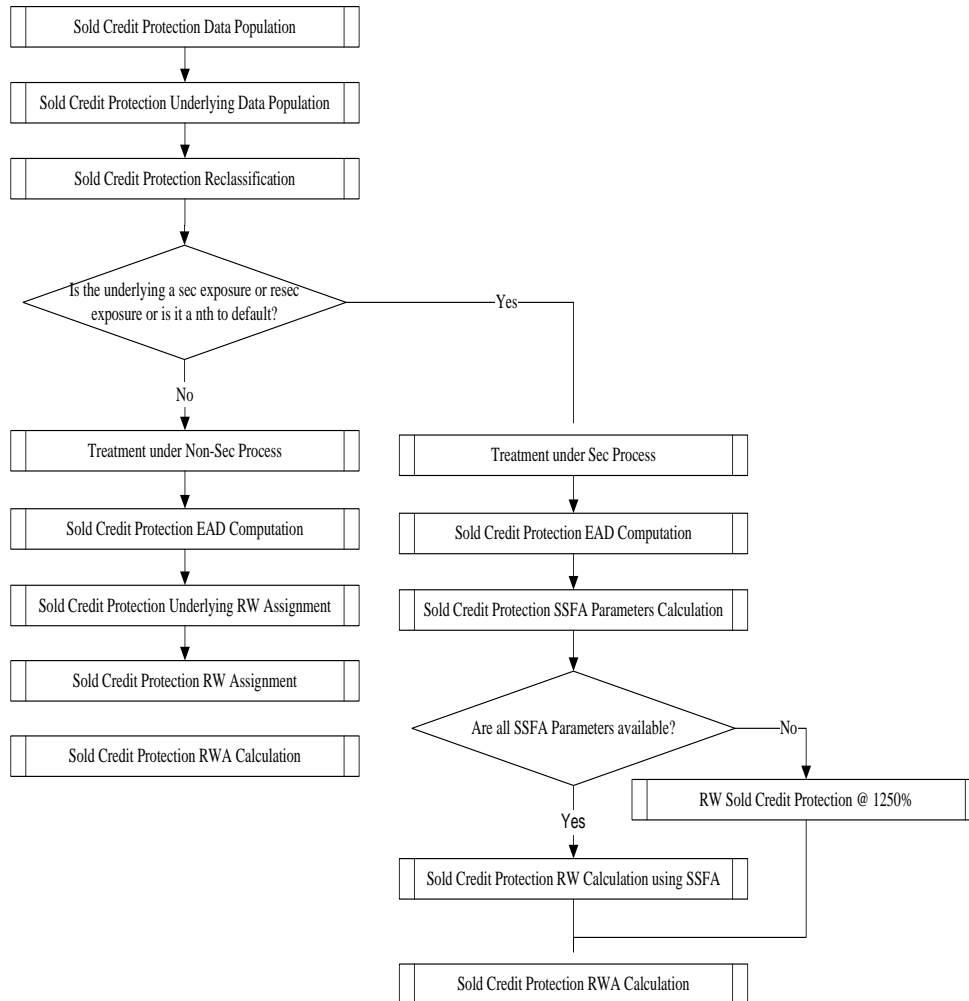
Sold Credit Protection Data Population

The sold credit protection data is specific to the sold guarantees and sold credit derivatives. These data is available in the product processor tables of STG_GUARANTEES and STG_CREDIT_DERIVATIVES. These sold credit protection exposures has the following data:

"F_COVERS_SEC_EXPOSURE_FLAG" or "F_COVERS_RESEC_EXPOSURE_FLAG" has flag as "Y" in the case of the exposure satisfying the following condition:

- The sold credit protection is provided on a securitized or resecuritized exposure.

- In the case of nth to default credit derivative, unless the sold credit protection is provided to a resecuritized exposure, the F_COVERS_SEC_EXPOSURE_FLAG must be "Y".

If the F_COVERS_SEC_EXPOSURE_FLAG or the F_COVERS_RESEC_EXPOSURE_FLAG have a value of "Y", then these sold credit protection data is processed under securitization framework. Hence this is processed to FCT_SEC_EXPOSURES table.

Else, the sold credit protection data is processed under non-securitization framework. Hence is processed to FCT_NON_SEC_EXPOSURES table.

Sold Credit Protection Data Population
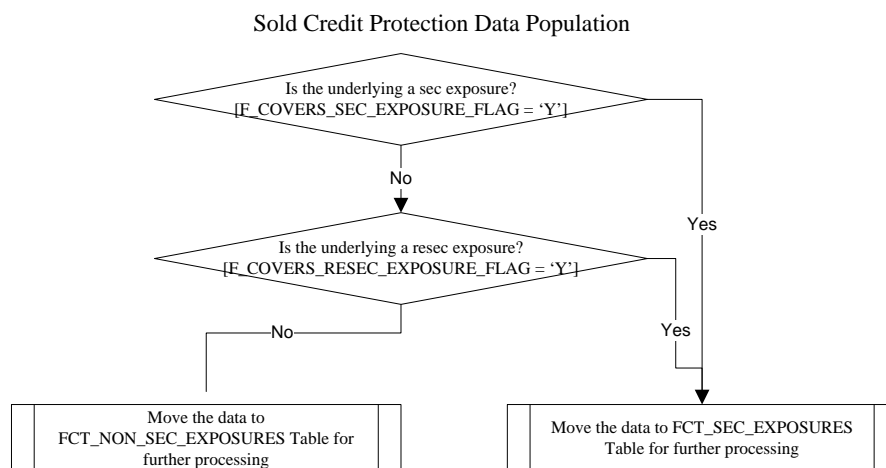
Sold Credit Protection Underlying Data Population

The underlying data are required for all the sold credit protection. The underlying data is provided in the STG_UNDERLYING_EXPOSURES table.

These underlying for the sold credit protection have the following data:

- V_UNDERLYING_DATA_IDENTIFIER: The underlying of the sold credit protection have the "V_UNDERLYING_DATA_IDENTIFIER" as "SCP", to recognize this for the Sold credit protection treatment.

- V_PARENT_EXPOSURE_ID: The underlying of the sold credit protection have the "V_PARENT_EXPOSURE_ID" as the "V_EXPOSURE_ID" of the sold credit protection.

- In the case of guarantees and credit derivatives, there is only one underlying for the sold credit protection.

- In the case of nth to default credit derivative, there is more than one underlying for the sold credit protection.

These underlying for the sold credit protection is processed to the FCT_NON_SEC_EXPOSURES table, wherein all the calculations required are processed. At the end of the processing, this is moved to the FCT_SCP_UNDERLYING table.

Note: If the underlying data for the sold credit protection are not provided, this is treated as sold credit protection, and hence is treated as a regular exposure.

Treatment Specific to Sold Credit Protection

The sold credit protection is treated specifically in the case of the protection covering sec exposures and non-sec exposures.

Sold Credit Protection Covering Non-Sec Exposures

- The risk weight for the sold credit protection is based on the underlying exposure's asset class.
- The risk weighting applicable based on the underlying exposure's asset class.

Process Flow for the Calculations

Treatment specific to Sold Credit Protection Covering Non-Sec Exposures

| EAD calculation of the Sold Credit Protection |
| Underlying Data Asset Type Reclassification |
| Risk Weight Assignment Based on the Underlying Asset Type |
| Calculate the RWA |

EAD Calculation of the Sold Credit Protection

The EAD for the sold credit protection is equal to the notional amount of the contract.

Underlying Data Asset Type Reclassification

The asset type reclassification for the underlying of the sold credit protection is same as any other non-sec exposure Asset type reclassification. This is handled in the Non-Sec Exposures asset type reclassification.

Risk Weight Assignment based on the Underlying Asset Type

- The risk weight assignment for the sold credit protection is based on the asset type of the underlying exposure, which is the same as any other non-sec exposure.
- The risk weight for the underlying exposure is calculated and this is updated to the sold credit protection exposure.

Calculate the Risk Weight Assessment

- The RWA is calculated as the Pre-mitigation EAD multiplied by the Pre-Mitigation Risk Weight.
- In the case of sold credit protection exposures, the Pre-Mitigation EAD and the Post Mitigation EAD are the same since there are no mitigants for these exposures.

Sold Credit Protection Covering Sec Exposures

- The risk weight for the sold credit protection is calculated using the SSFA Approach.
- If any of the SSFA parameters are not available for calculation, then the sold credit protection is risk weighted 1250%.
- Hence the hierarchy of approaches for SCP is, SSFA Approach and Risk Weight @ 1250%
- This hierarchy of approaches is different from the securitization exposures.

Process Flow for the Calculations

Treatment specific to Sold Credit Protection Covering Sec Exposures

EAD Calculation of the Sold Credit Protection

- The EAD for the sold credit protection is the notional amount of the transaction.
- In the case of nth to default credit derivative, the EAD is the largest notional amount of all underlying exposures.

SSFA Parameters Calculation

In the case of nth to default credit derivative, the pool parameters of SSFA (Kg, W and p) are calculated in the same manner as any other securitized exposure.

The tranche parameters A and D are calculated differently, from the calculation for the securitized exposures. They are calculated as follows:

- Parameter A:
  - o It is calculated as the ratio of the sum of the notional amount of all underlying exposures that are subordinated to the bank's exposure to the total notional amount of all underlying exposures.
  - o The smallest (n-1) exposures are subordinated to the bank's exposure.
  - o This is the same as the existing calculation in the US Basel III Advanced approach SCP treatment under SSFA.
- Parameter D
  - o It is equal to Parameter A + the ratio of the notional amount of the bank's exposure to the

total notional amount of all underlying exposures.

- o This is the same as the existing calculation in the US Basel III Advanced approach SCP treatment under SSFA.

In the case of guarantee and credit derivative, the pool parameters of SSFA (Kg, W and p) and the tranche parameters (A and D) are calculated in the same manner as any other securitized exposure.

Check to find whether all the SSFA Parameters are available

- There is a check to identify whether all the SSFA parameters (KG, W, p, A and D) are available for the sold credit protection exposure.
- If yes, calculate the risk weight as per the SSFA Approach,
- If not, assign the sold credit protection with 1250% Risk weight.

Calculate the RWA

- The RWA is calculated as the Pre-mitigation EAD multiplied by the Pre-Mitigation Risk Weight.
- In the case of sold credit protection exposures, the Pre-Mitigation EAD and the Post Mitigation EAD is one and the same since there are no mitigants for these exposures.

Simple Risk-Weight Approach (SRWA)

Assigning Risk weights based on equity issuer, and categorization of Risk Weights and calculation of RWA is similar to US Advanced Approach.

This means:

- Risk Weight = 0% for equity exposure to Standard party type Sovereign, Highly Rated Multilateral Development Bank, Multilateral Development Bank, US Government
- Risk Weight = 20% for equity exposure to Standard party type US PSE, Federal Home Loan Bank or the Federal Agricultural Mortgage Corporation (Farmer Mac)
- Risk Weight = 100% for equity exposure to Community Development Institution, effective portion of a hedge pair, Non-significant equity exposures.

Effective portion of a hedge pair is calculated from effective hedge wherein two equity exposures either have the same remaining maturity or each has a remaining maturity of at least three months; the hedge relationship is formally documented in a prospective manner specifying measure of effectiveness (E). A hedge is called effective if measure of effectiveness (E) is greater than or equal to 0.8. This condition is same as in Advanced approach and US Basel II. Additionally, the calculation of effective and ineffective portion of hedge pair also remains same as in Advanced approach and US Basel II.

The definition of Non-significant equity exposures remains same as in the advanced approach.

Which is:

- Risk Weight = 250% for Significant investments in the capital of unconsolidated financial institutions in the form of common stock that are not deducted from capital. This is same as in advanced approach.
- Risk Weight = 300% for Publicly-traded equity exposure and other than those equity exposure that receives 600 percent risk weight

- Risk Weight = 400% for Equity exposure that is not publicly-traded and other than those equity exposure that receives 600 percent risk weight
- Risk Weight = 600% for Equity exposure to an investment firm meeting the definition of a traditional securitization and has greater than immaterial leverage. These conditions are same as in Advanced approach.

The look-through approaches for the equity exposure to investment funds remains same as in advanced approach.

Most of the rules and processes used for Equity exposure treatment in US Advanced approach can be used for Equity exposure treatment in US Standardized approach; except following changes:

- A rule "US - US III - STD - Equity RW Assignment for Sovereign Fed Home Loan and Community Development – SRWA" is created in the sub-process "Equity Exposures - Simple Risk Weight Method"for Standardised approach run. This is similar to the rule "USA - Equity Non Inv Fund RW Assignment Hedge Pair – SRWA" in the Advanced approach run.

The mapping for Risk Weight Assignment is as follows:

Basel II Asset Class	USA - Non Investment Fund Equity Approach	Standard Equity Issuer Type	Risk Weight
Equity Exposures	Simple Risk Weight Approach	Sovereign	0%
		Highly Rated Multilateral Development Bank	0%
		Multilateral Development Bank	0%
		US Government	0%
		Federal Home Loan Bank	20%
		Government Sponsored Entities	20%
		US PSE	20%
		Community Development Institution	100%

- A rule "US - US III - STD - Equity RWA Calculation for Sovereign Fed Home Loan And Community Development – SRWA" is created, for RWA calculation, in the sub-process Equity Exposures - Simple Risk Weight Method in standardized approach run. It is similar to calculation rule USA - Equity RWA Calculation for Sovereign Fed Home Loan And Community Development – SRWA in the Advanced approach run, is replaced with RWA calculation formula and, hence, the associated BP is same as in US advanced approach. However, the following is the mapping for Standard Equity Issuer type:

Basel II Asset Class	USA - Non Investment Fund Equity Approach	Standard Equity Issuer Type
Equity Exposures	Simple Risk Weight Approach	Sovereign
		Highly Rated Multilateral Development Bank
		Multilateral Development Bank
		US Government

		Federal Home Loan Bank
		Government Sponsored Entities
		US PSE
		Community Development Institution

- Hedge Effectiveness and Calculation of Effective Portion of Hedge pairs:- Two equity exposures form an effective hedge if the measure of hedge effectiveness is >= 0.8, in addition to the other conditions on remaining maturity and documentation criteria. The measure of hedge effectiveness is given as download (n_msr_hedge_effectiveness). Effective Portion of hedge pair is calculated through DT CAL_EFF_PORTION_HEDGE.

  While calculating the effective Portion of the hedge, check if the measure of hedge effectiveness is greater than or equal to 0.8.

  Which means:

  IF Hedge Effectiveness Measure >= 0.8

  Then,

  Effective Portion of Hedge Pair = Hedge effectiveness measure X greater of the adjusted carrying values of the equity exposures forming a hedge pair.

  Ineffective Portion of Hedge Pair = (1- Hedge effectiveness measure) X greater of the adjusted carrying values of the equity exposures forming a hedge pair.

  Else,

  Ineffective Portion of Hedge Pair = Greater of the adjusted carrying values of the equity exposures forming a hedge pair.

  Ensure to check if it calculates the effective portion of hedge pair, it is required to have a check on value of measure of hedge effectiveness.

- Significant investments in the capital of unconsolidated financial institutions that are not deducted from capital, as per capital structure treatment is mapped to Credit RWA capital component group. The risk weight of 250% is applicable to such equity exposures.

Mitigant Eligibility and Haircut Assignment

As per the Regulatory Capital rules guidelines, BCBS recognizes the must change certain criteria in the eligibility of mitigants due to the economic crisis of 2008. It has revised the criteria for recognition of the eligible mitigants, applicable for the Securitized and the Non-Securitized exposures. The US regulator has also revised the haircuts to be applied for the debt securities issued by a securitization transaction which act as collateral. These changes are an outcome of the financial crisis of 2008, as these transactions are sensitive to fluctuations in the price. This is applicable in the case of Standardized Approach and Advanced Approach for US.

The process flow for CRM is the same as in the existing Basel II computation except for a few differences. The differences are in the Mitigant Eligibility and the Mitigant Haircut Assignment procedures. The Mitigant Eligibility depends on the original ratings in the case of Securitized exposures. Hence, this has an effect on the credit rating processing.

All the rating information of the mitigants is populated from the staging tables to the processing tables. The mitigants rating information are captured in the instrument rating details. The flag Y in the **F_ORIG_CREDIT_RATING_IND** indicates that the rating is the original rating or the rating of the instrument at the time the protection was given and N indicates that the rating is the current rating.

This is handled in the **CREDIT_RATING_PROCESSING** process.

Also, multiple assessment is performed for the mitigants current rating and the original rating. This is handled along with the multiple assessment of the exposures.

The Mitigant Eligibility, Mitigant Risk Weight, Haircut Assignment, and Allocation of Mitigants to Exposures are handled in CRM sub process.

Mitigant Eligibility

The application identifies the eligible mitigants based on the criteria as mentioned by the US Regulatory Capital Rules. The application identifies the following mitigants– collateral, guarantees, and credit derivatives. The application is capable of using the Simple Approach and the Collateral Haircut Approach for the mitigants which are part of the collateral. The application identifies the eligibility of the financial collateral separately for the simple approach and the Collateral Haircut Approach. The eligibility of the collateral mitigants are based on issue of the mitigant, mitigant types, the credit rate with investment grade assigned to the party (as applicable), and the classification of collateral as senior or not. For equity, the eligibility is based on the equity trading status.

The application also identifies whether the mitigant is a Re-securitized exposure and if yes, makes it ineligible. The application identifies the eligibility of the guarantees and credit derivatives based on the party type of the mitigant and the credit rating assigned to the issuer of the mitigant. This is based on the satisfaction of the criteria as specified in the US Regulatory Capital Rules. All the guarantees and credit derivative issued by issuers who are reclassified as Other Entities are treated as eligible for Non Securitization exposures if at the time the guarantee is issued or anytime thereafter, has issued and outstanding an unsecured debt security without credit enhancement that is investment grade. All the guarantees and credit derivative issued by issuers that are reclassified as Other Entities are treated as eligible for Securitization exposures if they satisfy the current rating and the original rating criteria specified by the US Regulatory Capital Rules.

For processing the original rating of these issuers, the solution performs the multiple assessments of the initial ratings. This is performed by the Data Transformation "Mult_Asses_Initial". The details of the Data Transformation for Securitization are as follows:

Data Transformation Name	Objective	Processing Logic
Mult_Asses_Initial	The objective of this Data Transformation is to perform multiple assessments of the initial ratings and assign a normalized rating and risk weight to the mitigants. This is specific to the Basel III	For each mitigant, the various standard ratings associated with that mitigant as of the time it was initially issued and the respective risk weights are identified. If the number of ratings are 1, then the same rating gets assigned as the standard initial rating for the mitigant. If the number of ratings are greater than or equal to 2, then the mitigant is assigned a standard initial rating which

Data Transformation Name	Objective	Processing Logic
	Securitization CRM framework.	corresponds to the worst of the best two risk weights associated with the initial ratings assigned.

Haircut Assignment

The application assigns the various haircuts, as applicable to the Mitigants. For collateral following Simple Approach for recognition, no haircuts are assigned to the mitigant. For collateral following the Collateral Haircut Approach, the application is flexible to use the supervisory haircuts and scale up, if required, based on the minimum holding period. The application can also use the bank's own estimate of haircuts. The application applies the volatility haircut, FOREX haircut, and the maturity mismatch haircut to the mitigants as appropriate. This is as per the US Regulatory Capital Rules regulations. The volatility haircuts for debt securities which are mitigants are modified to include the Securitized exposures.

Only eligible mitigants are considered for haircut assignment. The eligible mitigants are moved from mitigants table to sub exposures table.

The CRM change is applied in the following processes:

- USA - US III - Non-securitization Exposure Treatment – STD
- USA - US III - Securitization Exposure Treatment - STD

This is applicable for Basel III Standardized Approach, Advanced Approach. This change has an impact for the Securitized Exposures and the Non-Securitized exposures.

Key Data Elements

For a complete list of tables and columns to be updated, see the Download Specifications document.

- *For Mitigants*
  - Re-securitized exposures Mitigant – The mitigants belonging to re-securitized exposures have "Y" value in this field. The is marked as ineligible mitigants.
  - Securitized exposures Mitigant – The mitigants belonging to securitized exposures have "Y" value in this field. The application assigns different volatility haircuts for these, depending on the current ratings and the residual maturity.
- *For Ratings*
  - Current Rating for the Guarantees and Credit derivatives issued to Non-Securitized Exposures.
  - Current Rating and Original Rating for the guarantees and credit derivatives issued to Securitized Exposures.

5.2.1.2.2 Cleared Transactions

The G20 Leaders, at their Pittsburgh summit in September 2009, agreed to a number of measures to improve the over-the-counter (OTC) derivatives markets, including creating incentives for banks to increase their use of Central Counterparties (CCP). Central clearing decreases the possibility of systemic risk by reducing the possibility of transferring financial contagion risk problems from one institution to another institution. This movement of a transaction to a CCP and the eventual failure of CCP can be catastrophic to the entire financial system. The US III, in line with Basel committee guidelines, has introduced a new capital requirement for a bank's exposure arising from OTC, exchange traded derivatives, and repo style transactions which are cleared through CCP. The application calculates the risk charge for the transaction involving CCP's as per the guidelines laid out in US III.

This concept is applicable for all the OTC and exchange traded derivatives and SFT products cleared through Qualified Central Counterparty (QCCP). For more information on terms such as Central Counterparty, Qualifying Central Counterparty, Clearing Member, Clearing Member Client, and Bankruptcy Remote, see *Glossary*.

Assumption

Fair value of collateral is at counterparty and collateral type level.

Interpretation

US III does not clearly mention treatment of collateral posted with non qualifying CCP. Therefore, the application currently applies the treatment of bilateral trade for the exposure of bank with non qualifying CCP (NQCCP).

For the collateral posted with NQCCP, with reference to Reserve Bank of India (RBI) directives, the application currently applies the same risk weight to the collateral posted with NQCCP with transactions of the same nature.

US III does not state a differential treatment for transactions between clearing member and client, which arises due to the clearing member acting as an intermediary between client and CCP. The application currently does not support any such functionality.

__Process Flow__

EAD Calculation

EAD calculation is computed as per Current Exposure Method (CEM) or should be provided as an input for Standardized or IMM approach. The Rule **Non Sec Pre-Mitigation EAD Amount for Cleared Transaction Collaterals** under the EAD Calculation sub process computes this.

Treatment of Exposure with Qualified CCP when Reporting Bank act as Clearing Member

The application expects you to identify all the transactions which fall under the group of cleared transactions. The application calculates risk charge separately for exposures and collaterals posted with the QCCP. All the exposures with the QCCP are assigned a risk weight of 2%. If the collateral posted with the QCCP is not bankruptcy remote, then a risk weight of 2% is assigned. Otherwise a 0% risk weight is assigned.

Treatment of Exposure with Qualified CCP when Reporting Bank act as Clearing Member Client

The application expects you to identify all the transactions which fall under the group of cleared transaction. Risk weight assignment for the exposure with QCCP is based on the validation of the collateral posted by the reporting bank with the clearing member or QCCP. A risk weight of 2% is assigned if the following conditions are met:

- If the collateral posted covers all the losses arising for the clearing member or QCCP

- Due diligence is conducted on the collateral wherein there is no restrictions on the clearing member or QCCP for using posted collateral, in case of any legal proceeding at 2%.

Note: These two conditions (that is, collateral covers the loss and due diligence conducted) are expected to be provided as an input.

If the preceding two conditions are not met, then a risk weight of 4% is assigned. These conditions are collateral specific and the application expects it for the collateral posted with QCCP. It automatically assigns the same to all the exposures of reporting bank with the QCCP. Collateral posted with the QCCP is also assigned the same risk weight which gets assigned to the exposure.

Treatment of Exposure with Non-qualifying CCP when Bank acts as Clearing Member or Clearing Member Client

The application expects you to identify all the transactions which fall under the group of the cleared transaction. Risk weight assignment for exposure and collateral posted with the non-qualifying CCP is assigned the same risk weight as that of a bilateral trade. The CCP is considered as bank or corporate for the treatment.

The Risk Weight is assigned by the Rule **Risk Weight Assignment for Cleared Transactions** under the sub process **Risk Weight Assignment** and the Capital Charge for these transactions are calculated by the Rule **Non Sec Pre-Mitigation Capital Charge Calculation for Cleared Transactions** under the sub process **Capital Calculation.**

The US Regulatory Capital Final Rules provides that a clearing member banking organization,

(i)   Acts for its own account,

(ii)   Is acting as a financial intermediary (with an offsetting transaction or a guarantee of the client's performance to a QCCP)

(iii)   Guarantees a QCCP's performance to a client

Which is applied to a 2% risk weight to the banking organization's exposure to the QCCP. Transaction details where reporting bank role is a Clearing member (CM) or a Clearing member client (CMC):

Banking Organization Clearing Member (Bank CM) – Own Account

Bank CM – Client Trade

- Financial intermediary with offsetting transaction to QCCP

| Client | ←T_2— | Bank CM | —T_3→ | QCCP |

- Agency with guarantee of client performance

(Agent)

| Client | ←T_4— | Bank CM | —T_5→ | QCCP |

Guarantee

- Guarantee of QCCP performance

| Client | ←T_6— | Bank CM | —T_7→ | QCCP |

Guarantee

Banking organization can play agency role for a direct transaction between CMC and CCP by providing guarantee to CCP on behalf of client or guarantee to client on behalf of CCP.

In case of guarantee to CCP on behalf of client, there is no exposure to CCP but guarantee is an exposure to client. This is treated as OTC exposure to client.

In case of guarantee toward performance of CCP, exposure is taken for client and CCP as displayed in the following chart detailing for all the transactions.

Transaction details where reporting bank role is a Clearing member client (CMC):

Bank Client – CM Trade

- Financial Intermediary with offsetting transaction to QCCP

| Bank Client | —T_8→ | CM | — | QCCP |

- Agency with guarantee of client performance

(Agent)

| Bank Client | —T_9→ | CM | — | QCCP |

Guarantee

Treatment details for Cleared Transactions

	Exposure to	Description	Risk-weighting treatment under the US Regulatory Capital Final Rule
T1	QCCP	Own Account	2% risk weight on trade exposure amount
T2	Client	Financial intermediary with offsetting trade to QCCP	OTC derivatives with CEM scalar**
T3	QCCP	Financial intermediary with offsetting trade to QCCP	2% risk weight on trade exposure amount
T4	Client	Agent with guarantee of client performance	OTC derivatives with CEM scalar**
T5	QCCP	Agent with guarantee of client performance	No exposure
T6	Client	Guarantee of QCCP performance	OTC derivatives with CEM scalar**
T7	QCCP	Guarantee of QCCP performance	2% risk weight on trade exposure amount
T8	CM	CM financial intermediary with offsetting trade to QCCP	2% or 4% risk weight on trade exposure amount
T9	QCCP	CM agent with guarantee of client performance	2% or 4% risk weight on trade exposure amount

*Risk weight varies depending on compliance with bankruptcy remoteness of collateral and probability of client positions.

**Advanced approaches banking organizations using the IMM can reduce the margin period of risk. Under the US Regulatory Capital Final Rules, a clearing member banking organization treats its counterparty credit risk exposure to clients as an OTC derivative contract, irrespective of whether the clearing member banking organization guarantees the transaction or acts as an intermediary between the client and the QCCP. Consistent with the BCBS CCP interim framework, to recognize the shorter close-out period for cleared transactions, under CEM approach a clearing member banking organization can calculate its exposure amount to a client by multiplying the exposure amount, calculated using the CEM, by a scaling factor.

Holding Period (days)	Scaling Factor
5	0.71
6	0.77
7	0.84
7	0.89

Holding Period (days)	Scaling Factor
9	0.95
10	1.00

Key Data Elements

Some key data expectations are as follows:

- For the exposure, the application expects the counterparty for the trades which are stamped as cleared transaction, to be CCP.

- The application also has captured the clearing member code if the role of the bank for the transaction is a clearing member client.

- For the collateral posted with clearing member, the application expects the counterparty to be clearing member and in addition the application also captures the QCCP for which collateral is posted.

- When the collateral is posted with CCP, transactions similar to exposures are expected. Collateral is also expected at counterparty and collateral type level.

- All the collateral records are assigned the risk weight separately.

The following data elements are expected as an input from the client:

- Central Counterparty is Qualifying or Non Qualifying.

- Collateral covering losses and due diligence conducted by CMC for the collateral contract.

- Bankruptcy Remote status for the collateral posted with CCP.

- Fair value of collateral at counterparty and collateral type.

- Bank's role in the transaction with the Central Counterparty

5.2.1.2.3 Default Fund Contribution

According to the US Regulatory Capital Final Rule, a default fund contribution refers to the funds contributed or commitments made by a clearing member to a Central Counterparty's (CCP) equalized loss sharing agreement. The purpose of such default funds is to provide capital, in addition to the collateral posted by participants and in addition to capital provided by the clearinghouse, as a safeguard against extraordinary losses that might occur in connection with.

For example a financial crisis in the market or the simultaneous defaults of several large members. The clearing members contribute to such default funds kept with the central counterparty (clearing house) in the proportion of their exposure to the central counterparty. The default fund contributions by the clearing members contribute toward the central counterparty's regulatory capital along with CCP's own contributions to the default fund. These contributions act as collaterals to mutually share in the losses incurred by the clearing members due to counterparty defaults.

For each clearing member, a contribution is made to the central counterparty's default fund. This contribution acts as a relief's against the defaults by any clearing member of the central counterparty.

US Regulatory Capital Final Rules explains the methods that the banking organization playing the part of a clearing member of the CCP, must adopt and compute risk weighted assets (RWA) for a non-qualifying and a qualifying CCP.

If the CCP is not a qualified CCP (Non-QCCP), then the risk weighted asset amount for the banking organization's default fund contribution is the sum of default fund contribution multiplied by 1250%.

If the CCP is a qualified CCP (QCCP), then the RWA amount is computed using one of the following two approaches stated below:

Approaches	Sub – Process
Total Default Fund Contribution Approach	RWA for Default Fund Contribution with QCCP Total Default Fund Contribution Approach
Bank's Own Default Fund Contribution Approach	RWA for Default Fund Contribution with QCCP Banks Own Default Fund Contribution Approach

Approach 1

For the purpose of computing the clearing member's capital requirement, which is the reporting bank's capital requirement for the contributions made to the CCP's default fund, the hypothetical capital requirement of the central counterparty for the default fund must be known. This must be computed by the central counterparty based on the exposures of all the clearing members to the default fund. After this figure is calculated by the CCP, it is shared with all the clearing members to enable them and to compute their respective capital requirements against the default fund.

When the reporting bank gets the hypothetical capital requirement from the QCCP, next step is to compute the capital requirement of the reporting bank by finding out the proportion of the reporting bank's contribution in the total default fund contribution.

The parameters considered for this purpose include the following QCCP's:

- Net potential exposure to the two largest clearing members,

- The total net potential exposure to all the clearing members,

- Total default fund contribution by all the clearing members,

- QCCP's own contribution to the default fund, and

- The total number of clearing members for the default fund.

The last step is to compute the risk weighted assets of the reporting bank corresponding to the default fund contribution to the QCCP by using the capital computed in the previous step.

These steps and the calculation involved are the following:

- *Step 1:*

    It requires the QCCP to calculate its hypothetical capital requirement (K_{CCP}) for the default fund. This is done by the QCCP and is published to the clearing members for them to use for their respective capital calculations.

- *Step 2:*

  Compare K_{CCP} with the funded portion of the default fund of a QCCP and calculate the capital requirement of the bank (K_{CM}) by using the total of all the clearing members' capital requirements (K^{*}_{CM}). This capital requirement is considered on the contribution that the clearing members make to the default fund of the QCCP.

Approach 2

RWA amount for the default fund contribution is equal to 1250% multiplied by default fund contribution subject to a cap based on banking organization's trade exposure amount for all of its transactions with a QCCP. RWA amount for default fund contributions is minimum of:

(**1250% * default fund contribution to the QCCP, 18% * Trade Exposure Amount to the QCCP**).

Key Data Elements

Key data elements to be noted are listed in this section. To view the complete list of tables used, see the *Download Specification* document.

- Default fund contributions and related data are expected at Default fund – Central Counterparty level in the entity Stage Central Counterparty Details (STG_CCP_DETAILS).

- Hypothetical Capital Requirement of CCP, Maximum Net Potential Exposure of clearing member of CCP, 2nd Maximum Net Potential Exposure of clearing member of CCP, Total Net Potential Exposure of clearing member of CCP, Number of Clearing Members to the CCP, Total funded Default Fund Contribution of all clearing members to the CCP, Total unfunded Default Fund Contribution of all clearing members to the CCP and Default fund contribution of CCP from its own funds for each central counterparty level required.

- Application supports only the capital requirement of the bank (K_{CM}) based on Funded/Unfunded default contributions from all clearing members not by Initial Margin. But data model supports place holders to capture Total Initial Margin by all clearing members to CCP and Bank's initial margin posted to CCP.

Other Amendments

Eligible Guarantees

US III has amended the definition of eligible guarantee. An eligible guarantee, as per the proposed rule, now includes a contingent obligation of the U.S. Government or an agency of the U.S. Government, the validity of which is dependent on some affirmative action on the part of the beneficiary or a third party.

Hence, the following list of agencies (if issued a guarantee) is termed as eligible guarantor:

- US Government
- Federal Home Loan Bank
- Federal Agricultural Mortgage Corporation (Farmer Mac)
- Depository institution
- Bank holding company

- Savings and loan holding company
- Credit union
- Foreign Bank
- Securities Firm

Party type reclassification Rule and mitigant eligibility Rule are modified to incorporate this amendment in the current release.

Qualified Revolving Exposure

As per US III, unsecured and unconditionally cancellable revolving exposures with a pre-established maximum exposure amount of $100,000 (such as credit cards) are classified as Qualified Revolving Exposure (QRE). Unsecured, unconditionally cancellable exposures that require payment in full and have no communicated maximum exposure amount (often referred to as charge cards) are instead classified as 'other retail'. Hence, as proposed in US III, charge card qualifies as a QRE, subject to an upper exposure limit of $100,000. Based on the exposure limit, the revolving exposure is classified into different asset classes. Hence, the reclassification rules are modified to include charge card which is reclassified into QRE in the product re-classification to standard product

Cash Item in Process of Collection

Cash item in process of collection is now risk weighted at 20%. To assign this risk weight a new Rule (**USA - Non Sec RW Assignment for Cash in Process of Collection**) is introduced in the application.

Trade-Related Letter of Credit

In US III, trade-related letter of credit exposure's effective maturity must be not less than one day. Hence, the effective maturity floor of 1 year is removed from the application. This change is brought into effect in the Rule **Non Sec Effective Maturity Assignment for all Exposures.**

Money Market Fund Approach

Under the Money Market Fund approach, banks were permitted to assign a 7 percent risk weight to exposures to money market funds. These exposures were subject to restrictions under SEC rule 2a-7 and had an applicable external rating in the highest investment grade rating category. US III has proposed to eliminate the money market fund approach. The agencies believe it is appropriate to eliminate the preferential risk weight for money market fund investments due to their experience with them during the recent financial crisis, in which they demonstrated, elevated credit risk at times. Therefore, Money Market Fund rule is removed in the current release.

Defaulted Exposures Guaranteed by US Government

Under the US Regulatory Capital Final Rules 2007 for defaulted exposure banking the organization should apply a capital charge of 8% for each wholesale and retail exposures.

Now as per US Regulatory Capital Final Rules, the treatment to defaulted exposure is made more risk sensitive. Any wholesale or retail defaulted exposures must assign a 1.6 percent capital charge for the portion of exposure that is covered by an eligible guarantee from the US government.

For portion that is not covered by an eligible guarantee from the US government continues to be assigned as 8.0 percent capital requirement.

Eligible Double Default Guarantor

US Regulatory Capital Final Rules has introduced a term called Eligible Double Default Guarantor. The Eligible Double Default Guarantor for a guarantee or credit derivative obtained by a bank are as follows:

- Depository institution
- Bank holding company
- Savings and loan holding company
- Credit union
- Foreign Bank
- Securities Firm
- Non US Based Securities Firm

Standard Supervisory Haircuts for Repo, Margin Loans and Financial Collateral

Earlier in the US Regulatory Capital Final Rules the volatility haircut for collateral and repo transactions was based on the credit rating of the issuer. However, now as per US Regulatory Capital Final Rule, the volatility haircut for Repo and Collateral is based on the risk weight of the issuer. The risk weight assigned to a different issuer is based on the risk classification or based on the investment grade definition.

Risk-Weight Assignment to Sovereign Issuer

The risk-weight assignment for the sovereign issuer is based on the sovereign's Country Risk Classification (CRC). This is applicable for exposure volatility haircut for repo transactions. The following table details the risk-weight assignment based on the different CRC:

Issuer Type - Sovereign	
CRC	**Risk Weight**
0	0%
1	0%
2	20%
3	50%
4	100%
5	100%
6	100%
7	150%
No CRC	100%
Sovereign Default	150%

For the following issuers, the risk weight assigned is detailed as follows:

- US Depository Institutions: a direct risk weight of 20% is assigned.

- Credit Unions: a direct risk weight of 20% is assigned.

- For a corporate issuer, a direct risk weight of 100% is assigned.

- Risk-weight assignment for foreign banks and foreign PSEs depends on the bank's native sovereign's CRC. For example, if a foreign bank is giving financial collateral to an entity in US, and the foreign bank's headquarters is in UK, then the CRC of UK is used.

Issuer Type - Foreign Banks	
CRC of entity's home country	Risk Weight
0	20%
1	20%
2	50%
3	100%
4	150%
5	150%
6	150%
7	150%
No CRC	100%
Sovereign Default	150%

For all other issuers a risk weight of 100% is assigned.

Securitization Exposures - Definition of Investment Grade

Securitization exposures which are of investment grade are applicable as eligible financial collateral. Securitization exposures' investment grade is defined in the following table:

Rating						Rating Type
Moody's		S&P		Fitch		
LT	ST	LT	ST	LT	ST	
Aaa	P-1	AAA	A-1+	AAA	F1+	Investment Grade
Aa1		AA+		AA+		Investment Grade
Aa2		AA		AA		Investment Grade
Aa3		AA-		AA-		Investment Grade
A1		A+	A-1	A+	F1	Investment Grade
A2		A		A		Investment Grade
A3	P-2	A-	A-2	A-	F2	Investment Grade
Baa1		BBB+		BBB+		Investment Grade
Baa2	P-3	BBB	A-3	BBB	F3	Investment Grade
Baa3		BBB-		BBB-		Investment Grade

If a bank has two ratings provided by two different rating agencies, where one rating is a Non-Investment Grade and other is Investment Grade, then perform multiple assessments. Based on this risk weight assignment to different categories of issuers, the Standard Supervisory Volatility Haircut is as follows:

Residual Maturity	Issuer - Sovereign				Issuer - Non-Sovereign			Investment grade securitization exposures
	RW @ 0%	RW @ 20%	RW @ 50%	RW @ 100%	RW @ 20%	RW @ 50%	RW @ 100%	
<= 1 year	0.50%	1.00%	1.00%	15.00%	1.00%	2.00%	4%	4.00%
> 1 year and <= 5 years	2.00%	3.00%	3.00%	15.00%	4.00%	6.00%	8%	12.00%
> 5 years	4.00%	6.00%	6.00%	15.00%	8.00%	12.00%	16%	24.00%
Main Index Equities	N/A	N/A	N/A	N/A	15.00%			
Gold	N/A	N/A	N/A	N/A	15.00%			
Other publicly traded equities	N/A	N/A	N/A	N/A	25.00%			
Mutual Funds	N/A	N/A	N/A	N/A	Highest haircut applicable to any fund (this is currently happening in the solution as equal to 25%)			
Cash Collateral	N/A	N/A	N/A	N/A	0.00%			

The volatility haircut is based on the ten-business day holding period. Sovereign issuers include the foreign PSEs. Foreign PSE that has a 0% risk-weight is allocated the same volatility haircut as that of a sovereign issuer that is being risk weighted at 20%. For counterparty to be reclassified to a 'Foreign PSE' party type reclassification Rules and asset class reclassification Rules are modified in this current release.

5.2.1.2.4 Securitization – Standardized Approach for US

The US Regulatory Capital Rules differentiates the Credit Risk computation of the Securitized exposures from Non Securitized exposures. As securitized exposures are part of off-balance sheet transactions, it follows a waterfall cash flow mechanism unlike the other exposures. Hence these exposures are treated differently. Due to the economic crisis of 2008, the Basel Rule has categorized securitized exposures into securitized and re-securitized exposures.

Securitized exposures are exposures which are issued out of a pool of underlying exposures for the transfer of risk. Re-securitized exposures are the exposures which are issued out of a pool of underlying exposures which constitutes non-securitized exposures and some portion of securitized exposures. The application is capable of handling both securitized exposures and re-securitized exposures. It also handles the calculation for the originator and the investor bank roles. At a broad level, there are two categories of Investors:

- An Investing Bank who has invested heavily in securitization.
- An Investing Bank who has invested minimal in securitization.

For both the investors, the data is expected in the Stage Underlying Exposures (**STG_UNDERLYING_EXPOSURES**) for the underlying of the pool, Total Pool Level attributes in the Stage Pool table (**STG_SECURITIZATION_POOL**), Tranche Level attributes in the Stage Tranche table (**STG_SECURITIZATION_TRANCHE**), and the Exposure Level Attributes in the respective product processor (PP) tables.

For an originator, the data is expected in the same manner as the Investor, except for the Underlying Exposures. The underlying exposures of the pool are expected in the respective PP tables, depending on the product type of the underlying exposures.

If the exposure is a credit protection in the form of guarantee, it is expected in the Stage Guarantees table (**STG_GUARANTEES**), and if it is a credit derivative, it is expected in the Stage Credit Derivatives table (**STG_CREDIT_DERIVATIVES**). If it is a regular investment in the Tranches by an investing bank, or it is part of the mandate for retention in the pool or tranche for an originating bank, the data is expected in the Stage Investments table (**STG_INVESTMENTS**).

For exposures being a facility like liquidity facility, or servicer cash advance, the exposures are expected in the Stage Commitment Contracts table (**STG_COMMITMENT_CONTRACTS**).

The US Regulatory Capital Rules specifies two broad approaches for the calculation of the capital charge for the Securitization exposures:

- Standardized Approach
- Advanced Approach for US
    - o Ratings Based Approach (RBA)
    - o Internal Assessment Approach (IAA)
    - o Supervisory Formula Approach (SFA)

Both the standardized approach and Advanced Approach for US is handled by the application. In some computations, the calculations pertaining to the underlying exposures of the securitization transaction are required. This is computed before processing the Securitization exposures.

Standardized Approach

Due to the economic crisis in 2008 and other amendments brought in by the Dodd-Frank Act, US III has revised the treatment of securitized exposures. The application supports the following revised hierarchy of approaches for securitization exposures:

- Gross up Approach
- Simplified Supervisory Formula Approach (SSFA)
- Risk Weight at 1250%

Assumptions

The following is an interpretations pertaining to SSFA:

- In sec USA, investment grade is not based on Ratings; for low rated exposures, CRC ratings of the Originator are used for applying risk weight to the low rated exposures.

The following interpretation is pertaining to Gross up Approach:

- Banks which are not subject to market risk rule can only opt for Gross up Approach Assuming that the Bank is aware of its trading activity portfolio (for the Market Risk Rule Check), the Bank provides the approach selection that it wants to apply to all its sec exposures.

A few of the interpretations pertaining to SSFA are as follows:

- Investment grade are ratings equivalent to BBB- or above
- Low ratings are ratings equivalent to BB+ or below

The following interpretation is pertaining to Gross up Approach:

- Banks which are not subject to market risk rule can only opt for Gross up Approach Assuming that the Bank is aware of its trading activity portfolio (for the Market Risk Rule Check), the Bank provides the approach selection that it wants to apply to all its sec exposures.

Process Flows for Securitization – Standardized Approach

The process flow for Standardized Approach of Securitization exposures are as follows:

The only change in the computation of the Securitization - Standardized Approach process, in the Basel III processing of the current release of the application is in the Sec Pre-CRM Computation Process. Under this process, for Sec Deduction Process, the exposures which are lower than the investment grade and the unrated exposures are risk weighted at 1250%.

For more information on the processing of the remaining line items Securitization –Standardized approach process flow, see *Securitization* on page *193.*

Credit Rating Process

The entire rating information of the exposures and the mitigants are populated from the staging tables to the processing tables. The exposure and the tranche rating information are captured in the account rating (**STG_ACCOUNT_RATING_DETAILS**) tables and the mitigant rating information is captured in the instrument rating details (**STG_INSTRUMENT_RATING_DETAILS**) table. Though the ratings are no longer relevant, the investment grade criteria are handled in the application with the help of these ratings. Any rating below BBB, are all non-investment grades and are low rated. The rating processing is handled in the process **USA Credit Rating Processing**.

Securitization and Mitigant Data Population with Mitigant Mapping

The data pertaining to the pool, tranche, and exposures are populated from the staging tables to the processing tables. The underlying exposures data are captured in the respective product processor tables for originator records. The underlying exposures are captured in the underlying exposures (**STG_UNDERLYING_EXPOSURES**) table for investor and sold credit protection. The underlying exposures data follows the process pertaining to the non securitization exposures. The securitization transactions which are backed by non-financial assets or by operating companies are excluded from the securitization treatment. They are instead treated as non-securitization exposures. Exposures created out of re-tranching of single asset such as Re-Remic positions need not be treated as re-securitization positions. Exposures which are created by re-tranching a single asset (like Re-Remic positions) are treated as securitization exposures, as mentioned by the accord. Case where bank has provided clean up call, that is:

- If Eligible clean up call indicator ='Y', then the call option exposure is a part of Sec RWA.
- If Eligible clean up call indicator ='N/Null', then the call option exposure which includes all the underlying exposures associated with securitization is a part or Non- Sec RWA.
- If Implicit support indicator ='Y', then the exposure is a part of Non-Sec RWA.
- If Implicit support indicator ='N/Null', then the exposure which includes all the underlying exposures associated with securitization is a part or Sec RWA.

For Sec portfolio reporting purpose, capital of sec exposures belonging to the pool on which originator has provided implicit support is 0.

If a securitization (1) includes one or more underlying exposures in which the borrower is permitted to vary the drawn amount within an agreed limit under a line of credit, and (2) contains an early amortization provision, then Risk based capital for these transferred exposures are calculated as per non securitization framework.

If bank has provided Early amortization provision, that is, at pool level, pool type= Revolving and Early amortization type is:

- Controlled committed Early Amortization Provision
- Controlled uncommitted Early Amortization Provision
- Uncontrolled committed Early Amortization Provision
- Uncontrolled uncommitted Early Amortization Provision

Then RWA for this condition is calculated as per non sec framework, RWA is calculated for the Underlying of the Pool and for regulatory purpose, RWA, EAD and Risk weight for the securitized exposures are updated as zero. Early amortization type is expected as a download value at pool level.

The mitigants data are populated from the staging table to the processing table. The exposures which are mapped to the mitigants are captured and populated from the staging table to the processing table. Securitization data population is handled by the process US III Sec Data Population. Mitigant data population is handled by the process USA Mitigant Data Population and exposure mitigant mapping population is handled in the process USA Sec Exp Mitigant Mapping Pop.

Sec Reclassification

The application uses the standard data for all kinds of calculations (product type like Eligible Liquidity Facility, bank role like Originator, pool type like Mortgage Backed Securities). Before any calculation, the application reclassifies the bank specific data to standard data. The application reclassifies the bank role to the standard bank role of an Originator or Investor. Other bank roles like Sponsor, Credit Protection Provider, and so on, are reclassified into Originator, Investor, and so on, respectively. The application also reclassifies the pool type to the standard pool type like Credit Cards Receivable Pool, Auto Loans, and so on. The application also reclassifies the product type to the standard product type like Mortgage Backed Securities, Eligible Liquidity Facility, and so on. It reclassifies the mitigant type to the standard mitigant type like the Debt Securities, Credit Derivative, Cash, and so on. It reclassifies the mitigant issuer type to the standard mitigant issuer type like Banks, Corporate, and so on. These reclassification tasks are present in **Sec Reclassification** sub process.

Approach Selection

Due Diligence Requirement for Securitization Exposures

Except for exposures that are deducted from CET1 capital and exposures which are subject to Small-business loans and leases on personal property transferred with retained contractual exposure, if a banking organization is not able to meet due diligence requirements, it is required to assign a risk weight of 1250% to the exposures.

Due diligence requirement includes a comprehensive understanding of features of securitized exposures which affects the performance of the exposures which includes:

- Conducting an analysis of the risk characteristics of a securitization exposure prior to acquiring the exposure,
- Understanding the Structural features of securitization that materially impacts the performance of the exposure,
- Relevant information regarding the performance of the underlying credit exposure
- Relevant market data of the securitization.

If a banking organization is able to meet due diligence requirements, a Bank can opt for SSFA, Gross up Approach or 1250% risk weight consistently to all its securitized exposures. For all the three approaches (opted by the bank), based on data availability, methodology is assigned by the application. If the exposures are not qualified for the approaches opted by the bank, the exposures are risk weighted at 1250%.

The application assigns the appropriate approach to the exposures, based on the criteria specified in the US III. SSFA parameters Kg for re-securitization positions are arrived by using capital of underlying securitization positions.

These approaches are applicable for all the bank roles. If the bank has opted for Gross up Approach for all its securitized exposures, the same cannot be assigned to the sold credit protection to calculate the risk weight, instead it is risk weighted @ 1250%. This approach selection is handled in the sub-process **Sec Approach Selection**.

That is, in case of re-securitization positions, if any of the underlying securitization positions are using any approach other than SSFA (Example: 1250%), the solution does not assign SSFA for re-securitization position.

5.2.1.3 Credit Valuation Adjustments

Basel committee has introduced a new Credit Valuation Adjustment (CVA) capital charge, which is added to default risk capital charge to arrive at the new counterparty credit risk capital charge. In line with US Regulatory Capital Rules, The US Federal Reserve System has also introduced CVA as part of US III**.** The mark to market counterparty credit losses or the spread migration risk is captured with CVA, which were not directly capitalized before. CVA is the difference between the risk-free portfolio value and the true portfolio value that takes into account the possibility of the counterparty's default. In other words, CVA is the market value of counterparty credit risk.

The application calculates CVA charge for OTC portfolio of a bank. When using the standardized approach, it is calculated at portfolio level and for advanced approach it is calculated at counterparty level. CVA charge is not applicable for the trades with a Central Counterparty and Structured Financial Transactions. Structured Financial Transaction is applicable only if the supervisor specifically mentions the same. You can include or exclude Structured Financial Transaction in CVA calculations in the Run Management screen. Portfolio level considers all the trades in different OTC products with all counterparties. The charge is calculated for the entire exposure of OTC products.

Counterparty level calculations consider all trades in different OTC products with counterparty for calculation of CVA Charge. Charge is calculated for all counterparties with which banks have OTC exposures. The CVA charge for all the counterparties is summed up to ascertain the portfolio level charge. The manner of consolidation is dependent on the IMM approval status and Specific Interest Rate (SIR) Value at Risk (VaR) model approval status of the bank. The following section describes two ways of consolidating default risk charge and CVA capital charge:

- If the bank does not have IMM approval and SIR risk as a part of approved VaR model for bonds,

   CCR Capital Charge = Default Risk Capital Charge (Current Exposure Method or Standardized Method based, whichever the bank is using for CCR) + Standardized CVA Capital Charge

- If the bank has IMM approval SIR risk as a part of approved VaR model for bonds,

   CCR Capital Charge = Default Risk Capital Charge + Advanced CVA Capital Charge

NOTE: All the OTC Derivative products are part of CVA calculations. SFTs are included if you select the option from Run Management Screen. Also, trades with Central Counterparty (CCP) are excluded from CVA charge calculations.

5.2.1.3.1 Assumptions

CVA hedge should be identified by the clients separately. Only single name CDS and Index Hedge are eligible for CVA. The US Federal Agency does not clearly mention whether index hedge position should be marked to the counterparty or not. The Basel Regulatory Capital application handles the index position in the following manner:

Both index positions marked to the level of counterparty or not marked to the level of counterparty is handled by the application.

Effective index hedge amount is considered in CVA charge calculation at portfolio level without considering whether it is marked to the counterparty or not.

If the index position is marked to the counterparty, then index hedge amount is considered while allocating total CVA charge to the counterparty CVA Charge, while using the standardized approach.

This process flow is divided into two sections: for standardized (Simple CVA) approach and advanced approach.

5.2.1.3.2 Simple CVA Approach

The application calculates CVA capital charge at portfolio level using the following formula as specified by US III guidelines:

$$K_{CVA} = 2.33 \times \sqrt{\left(\sum_i 0.5 \times w_i \times \left(M_i \times EAD_i^{total} - M_i^{hedge} \times B_i \right) - \sum_{ind} w_{ind} \times M_{ind} \times B_{ind} \right)^2 + A}$$

Where:

$$A = \sum_i 0.75 \times w_i^2 \times \left(M_i \times EAD_i^{total} - M_i^{hedge} \times B_i \right)^2$$
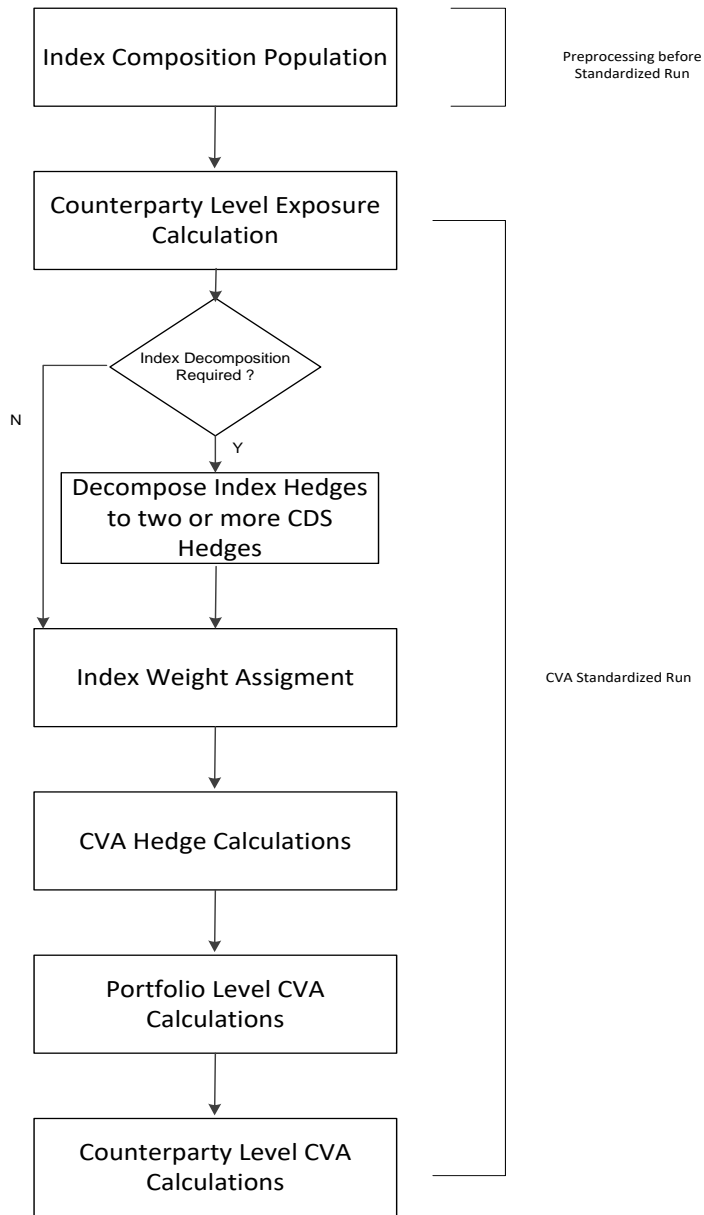
CDS Spread Population and Index Composition Population

Pre-processed data for CVA is required to be populated only once for a particular execution date. The process **USA_USIII_CVA_DATA_POPULATION** in the **Run Staging Data Population - USA Credit Value Adjustment is** is responsible for populating pre-processed data for CVA.

CVA Hedge Data Population

Mitigants data marked as CVA hedge is populated as a part of the CVA hedge data population. The application loads all the single name CDS hedge and index hedge data. The hedge data marked as CVA does not flow in the application during the CCR process. New tables are not added for hedge records; however a few columns are added to the existing table to capture CVA specific data. CVA specific data is present in the following tables:

- **Fact Mitigants (F_CVA_HEDGE)**: Identifier for CVA hedge records by which the application identifies it as CVA hedge.

- **Stage Mitigants (V_REF_ENTITY_PARTY_ID)**: This field captures the counterparty of the hedge transaction.

Counterparty Level Exposure Population

The application expects the uncovered EAD at netting agreement level or at trade level. This is available as an output of Current Exposure Method (CEM). If more than one netting agreement is available, then the exposures are summed at counterparty level. These aggregated data is stored in **FCT_REG_COUNTERPARTY_CVA** table using **COUNTERPARTY_EXPOSURE_POPULATIO** T2T.

Maturity adjustment discount factor is computed at netting agreement level or for each netting agreement using the formula **1- exp (-0.05*M$_i$)/ (0.05*M$_i$).**

Maturity is the notional weighted maturity at netting agreement level. The application sums the data for exposure at counterparty level. If more than one netting agreement is available, the exposures are discounted and then summed at counterparty level. Weight Assignment is done based on the Counterparty PD as specified in the following table. Data is aggregated at counterparty level and stored in separate counterparty table.

Internal PD (in percent)	Weight (in percent)
0.01 to 0.07	0.7
>0.07 to 0.15	0.8
>0.15 to 0.4	1.0
> 0.4 to 2	2.0
>2 to 6	3.0
>6	10.0

Index Decomposition Required

You can select index decomposition from the Run Management screen. Index decomposition option, creates single name CDS hedge positions for the counterparties which are part of the CDS Index and also have exposures. Index hedge amount is adjusted by the same amount for which the single name CDS hedge is created, so as to get maximum benefit from hedging. Maturity of the single name CDS hedge is considered same as the maturity of index.

Index Weight Assignment

For index weight assignment, index composition and counterparty probability of default is expected as a download in the application. Weight for the index is the sum of all counterparty weights multiplied by the weight of the counterparty in the index.

CVA Hedge Calculations

After population of hedge data and creation of single name CDS hedge from index, the application sums the notional to counterparty level and populates in the CVA specific table. Maturity adjustment discount factor is computed by using the formula **(1-exp (-0.05* Mihedge))/ (0.05* Mihedge)**. If more than one CDS Contract is available for the counterparty, then this amount is summed at counterparty level. Index hedge notional amount is computed after subtracting the notional of all single name CDS hedge created by the decomposition process from index notional. Maturity adjustment discount factor for index position is computed using the formula **(1-exp (-0.05* Mind)) / (0.05* Mind)**. If more than one index hedge is available, then the index hedge amount is summed up. All the data required for CVA calculation is populated from mitigants data to CVA specific table. The data is summed for each counterparty and stored.

Portfolio Level CVA Calculation

As per the final rule, the time horizon is short (the square root of time scaling to 1 year is applied).

The CVA charge calculated at portfolio level is populated in the **FCT_REG_CVA_SUMMARY** table. Single Name CDS Hedge component for CVA at portfolio level is calculated and the summary table is populated using **CVA_SUMMARY_POPULATION** T2T.

Counterparty Level CVA Calculation

CVA Capital Charge at counterparty level is allocated using the following formula:

> **CVA at Counterparty = Total CVA at Portfolio *W_{CVAi}**
>
> **W_{CVAi} = Absolute [0.5*W_i *(M_i * EAD_{itotal} - M_i^{hedge} * Bi) - $\sum_{indi}(W_{ind} * M_{ind} * B_{ind})$]/**
>
> **Σ^n_iAbsolute[0.5*W_i * (M_i * EAD_{itotal} - M_i^{hedge} * B_i) - $\sum_{indi}(W_{ind} * M_{ind} * B_{ind})$]**

5.2.1.3.3 Advanced CVA Approach

The process flow for Advanced CVA Approach is as follows.
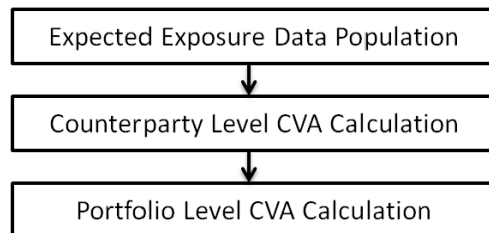
The application calculates the CVA charge at counterparty level and is aggregated at portfolio level using the following formula:

> **K = 3* ($CVA_{Unstressed VAR}$ + $CVA_{Stressed VAR}$)**

The application calculates the CVA charge at counterparty level using this formula for each counterparty and sums the CVA charge for all counterparties to compute portfolio level capital charge.

These aggregated data is stored in **FCT_REG_COUNTERPARTY_CVA** table using "**COUNTERPARTY_EXPOSURE_POPULATION**" T2T.

The CVA charge calculated at portfolio level is populated in the **FCT_REG_CVA_SUMMARY** table. Single Name CDS Hedge component for CVA at portfolio level is calculated and the summary table is populated using "**CVA_SUMMARY_POPULATION" T2T**.

Counterparty charge is calculated for two different scenarios:

- Expected Exposure calculated with Current Market Data.

- Expected Exposure calculated with Stressed Market Data.

Expected Exposure Data Population

The data requirement which is required as input for calculation of CVA Charge using Advanced Approach is as follows:

$$CVA = (LGD_{MKT}) \cdot \sum_{i=1}^{T} Max\left(0; exp\left(-\frac{s_{i-1} \cdot t_{i-1}}{LGD_{MKT}}\right) - exp\left(-\frac{s_i \cdot t_i}{LGD_{MKT}}\right)\right) \cdot \left(\frac{EE_{i-1} \cdot D_{i-1} + EE_i \cdot D_i}{2}\right)$$

LGDMKT: This is the LGD of the counterparty based on the spread of the market instrument of the counterparty. It should be based on market assessment and not an internal estimate. LGD market should be an input for each counterparty.

Si: This is the credit spread of the counterparty at each tenor Ti, which is used to calculate CVA of the counterparty. Spread data is an input for each counterparty and tenor level.

Ti: This is the tenor at which the Expected Exposure (EE) and spread are provided. Tenor is an input for each EE and spread.

EEi: This is the Expected Exposure (EE) of the counterparty at revaluation time **ti** where exposures of different netting agreements of counterparties is added. Expected exposure is an input at each counterparty and tenor level.

Di: This is the default risk free discount factor for each revaluation time bucket. Default risk free rate is an input for each counterparty and tenor ti.

Counterparty Level CVA Calculation

CVA RWA calculation at counterparty level is computed by the following formula:

CVA RWA = 12.5 * K

Where K= CVA Capital charge calculated as per formula specified in standardized or advanced method for each counterparty.

Portfolio Level CVA Calculation

CVA RWA calculation at portfolio level is computed using the following formula:

CVA RWA = 12.5 * K

Where K= CVA Capital charge calculated as per formula specified in standardized or advanced method at portfolio level.

NOTE: CVA RWA is added to Credit RWA and is not multiplied by the factor 1.06.

5.2.1.3.4 Key Data Elements

A few key data elements are provided in this section for computation for Credit Valuation Adjustment (CVA). For a complete list of tables and columns to be updated, see the Download Specifications document.

- CDS index composition data requirement.
- CDS spread data for rating and tenor.
- Average index spread for all the index hedge position.

5.2.1.3.5 Out of Scope

The following is not covered by the application in the computation of CVA:

- Treatment of specific wrong way risk.

5.2.1.4 Capital Structure

Under Regulatory Capital Rules for Implementation of Basel III in US, compliant with the Proposed rules, the capital calculations remain the same except for the AOCI treatment and the Non qualifying capital instruments treatment. The regulatory capital ratios are calculated as the minimum of the standardized and the advanced capital ratios only for advanced approaches banking organizations that is, advanced banks. This does not apply to standardized approaches banking organizations.

Under Regulatory Capital Rules for implementation of Basel III in US (compliant with the Basel III Regulations), the Tier 1 capital has become the main constituent of the Capital Structure. The entire Capital Structure of US has undergone changes to be compliant with the Basel III Regulations and the Dodd-Frank Act. The total capital requirement of 8% remains the same as in the US Regulatory Capital Rule compliant with Basel II. However, the total capital increases after addition of the capital conservation buffer and countercyclical buffer. The countercyclical capital buffer are applicable only to banks that are subject to the Advanced Approach.

Under Regulatory Capital Rules for Implementation of Basel III in US, Tier 3 is not part of the Capital Structure. Hence, remove the rule that captures T3 capital component processing in Capital Structure.

Mapping pertaining to T3 capital component are deleted from the bank **Capital Group Components Reclassification**

Also, the rules present in the Capital Component Calculations sub-process are deleted.

Components of Capital Structure

As per Regulatory Capital Rules for Implementation of Basel III in US, the total capital consists of the sum of the following elements:

- Tier 1 capital
    - o Common Equity Tier 1(CET1)
    - o Additional Tier 1 (AT1)
- Tier 2 (T2) Capital
    - o Minimum Capital Requirement

The following are the minimum capital ratios to be maintained by the bank. These values of capital are net of regulatory adjustments and deductions:

- Common Equity Tier 1 must be at least 4.5% of Risk Weight Assets (RWA).
- Tier 1 capital must be at least 6.0% of RWA.
- Total Capital (summation of Tier 1 and Tier 2 capital) must be at least 8.0% of RWA.

The Regulatory Capital Rules for Implementation of Basel III in US does not state any limitations on the T2 capital and hence the application does not have any restrictions in the amount of T2 capital. All the capital instruments which have become non-qualifying due to these regulations is phased out using the transitional arrangements.

The non-qualifying capital instruments identified are Cumulative Perpetual Preferred Stock and Trust Preferred Securities.

5.2.1.4.1 Assumptions

Deduction of Non-Significant Investments in the Capital of Unconsolidated Financial Institutions

As per Accord:

> The amount of a banking organization's non-significant investments in the capital of unconsolidated financial institutions that does not exceed 10 percent threshold for non-significant investments are generally assigned the applicable risk weight under sections 32 (in the case of non common stock instruments), 52 (in the case of common stock instruments), or 53 (in the case of indirect investments via a mutual fund) of the proposal, as appropriate.

Interpretation in the application:

> Investment below the 10% threshold is risk weighted as per Advanced Approach for US of Banking Book products for banking book and trading book exposures. The trading book exposures are expected to be provided in the Stage Investment (**STG_INVESTMENTS**) table.

Treatment of REIT Subsidiary in Minority Interest calculation

As per Accord:

> REIT preferred shares issued by a REIT subsidiary that meets the proposed definition of an operating entity qualifies for inclusion in the regulatory capital of a banking organization. This is subject to the limitations outlined in section 21 of the proposed rule, only if the REIT preferred shares meet the criteria for additional tier 1 or tier 2 capital instruments outlined in section 20 of the proposed rule.

Interpretation in the application:

> REIT is treated as any other banking subsidiary and hence the value of the CET1, AT1 and T2 capital, Capital Ratio for each tier of capital, total RWA, and the percentage of shareholding in each of the component of capital is required for calculating Minority Interest. The third party holding percentage must be 0% for the CET1.

Treatment of Investments in Hedge Funds and Private Equity Funds

As per Accord:

> In the Accord, the investments in Hedge Funds and Private Equity Funds have to be deducted from Tier 1 capital. There is not much clarity on when these investments must be deducted – whether it is along with the other regulatory adjustments or prior to that. Also, it is not clear whether these are investments in the trading book or investments in the capital ownership.

Interpretation in the application:

> These investments in Hedge Funds and Private Equity Funds are deducted in the Tier 1 capital along with the other internal transactions. These investments are the ones where the Reporting Bank has an ownership (that is, the Hedge Funds and Private Equity Funds are the subsidiary of the reporting bank). These investments are generally outside the regulatory consolidation and hence is available as data in the Investments (**STG_INVESTMENTS**) table.

Calculation of Minority Interest

As per Accord:

> In the Accord, the example detailed for the Minority Interest computation uses the sum of its minimum CET1 capital (4.5%) and the capital conservation buffer (2.5%). However, there is a statement which discusses about the assumption of countercyclical buffer to be at 0% without any details on the usage of countercyclical buffer in the computation.

Interpretation in the application:

> The application uses the sum of Minimum CET1 Capital, Capital Conservation Buffer, Countercyclical Buffer and Additional Loss Absorbency Buffer.

AOCI Transition

As per Accord:

> The AOCI Transition, as per the US Regulatory Capital Final Rule, lists the item "Amount in AOCI attributed to Defined Benefit Post retirement plans".

Interpretation in the application:

> This is the same as the "Accumulated net gain and loss on defined Pension Fund Obligations". Hence, the application does not rename the line item, and uses the existing line item of "Accumulated net gain and loss on defined Pension Fund Obligations" in the calculations pertaining to AOCI and AOCI Transition. This amount is expected to be provided as specified by the regulator.

Tier 2 Capital

As per Accord:

> As per the US Regulatory Capital Final Rule, " for Advanced Approach, banking organization includes tier 2 capital, the excess of its eligible credit reserves over its total expected credit loss, provided the amount does not exceed 0.6 percent of its credit risk-weighted assets. Advanced approaches banking organization that is in parallel run includes in tier 2 capital, ALLL limited upto 1.25%. To follow this the you must to add the below following rule in Pre Regulatory Adjustment Capital Calculation process:
>
> - `USA - US III - CS - ALL Standard Acct Head to Capital Comp Group Assignment during Parallel Run`
>
> - `USA - US III - CS - Allowance of Loan and Lease Losses for STD during Parallel Run`
>
> Whereas for Standardized Approach Total RWA, the Allowance for Loan and Lease Losses (ALLL) is added to the T2 capital up to 1.25%. But in the US Regulatory Capital Final Rule, the portion of ALLL to be added to the T2 capital, the amount of ALLL should exclude the amount of reserves held for residential mortgage loans sold with recourse. And in the total capital ratio, subtract the ALLL added in T2 and instead the Eligible credit reserves which are more than the expected credit loss are added upto a maximum of 0.6% of the credit RWA.

Interpretation in the application:

> But in the solution, since the calculations are specific to the Advanced Approach Bank, the Eligible credit reserves specific to the Advanced Approach are directly added in the Gross T2.

Non Qualifying Capital Instruments belonging to AT1 and T2 Capital

As per Accord:

> The non-qualifying capital instruments identified are Cumulative Perpetual Preferred Stock and Trust Preferred Securities. The Trust Preferred Securities are clearly mentioned to be non-qualifying in both the tier of capital. The Cumulative Perpetual Preferred Stock is non-qualifying in AT1, where as it is not clear whether it is non-qualifying in T2 also.

Interpretation in the application:

> We can interpret that Cumulative Perpetual Preferred Stock is non-qualifying in AT1 but qualifying in T2 capital.

Treatment of the Non-Qualifying Capital Instruments

As per Accord:

> The advanced approach banking organization has a total consolidated assets of $250 billion or more, or has $10 billion or more of on-balance sheet foreign exposures, or the bank has got permission to follow the advanced approach.

Interpretation in the application:

> The depository institution holding companies with less than $15 billion consolidated assets are not part of the Advanced Approach. Hence, it is assumed that these companies are only Non-Advanced Approach Banks.

> Also, the 2010 Mutual Holding companies are also part of Non-Advanced Approach Banks, and their general asset size is less than $15 billion.

Resecuritization of TRUPS CDOs

As per Accord:

> In the global market, there are very few cases of resecuritization of TRUPS.

> TRUPS are covered bonds, and hence as per the regulation, they can be securitized only once.

> There are no resecuritization cases, wherein the underlying is a TRUPS CDO.

Interpretation in the application:

> We can interpret that we can prorate the amount columns in the final capital calculations, as it currently occurs. This does not affect the resecuritization process.

5.2.1.4.2 Process Flow for Capital Structure

```
┌─────────────────────────────────────────────────────────────────┐
│                      Capital Consolidation                        │
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┌─────────────────────────────────────────────────────────────────┐
│                Surplus of Minority Interest Calculation           │
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┌─────────────────────────────────────────────────────────────────┐
│  Internal Transactions and Private Equity and Hedge Fund Investments Identification  │
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                                  ▼
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│                    Gross Capital Calculation                      │
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                                  │
                                  ▼
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│                      Regulatory Adjustments                       │
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│             Phase-in treatment for Regulatory Adjustments         │
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┌─────────────────────────────────────────────────────────────────┐
│              Treatment specific to Insignificant Investments      │
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│               Treatment specific to Significant Investments       │
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│                       Threshold Deductions                        │
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│  Post Phase-in treatment for Insignificant investments, Significant Investments and Threshold deductions  │
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│      Bifurcation of Insignificant and Significant Investment Amount      │
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│                     Net Capital Calculation                       │
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│       RWA Calculation for CR, MR, OR and Phase-in treatment       │
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│                     Capital Ratio Calculation                     │
└─────────────────────────────────────────────────────────────────┘
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The Capital Structure Run, which is depicted in the preceding process flow diagram, is a single run which is a joined together by multiple processes. Each process is a block, compiled together to form an entire Capital Adequacy Run.

Capital Consolidation Process

To process the capital for a bank, the organization level at which the capital is calculated and whether a Solo Run or Consolidation Run should be executed, is defined. If Solo is selected, then only for that particular selected banking organization the capital is calculated. If consolidation is selected, then all the entities that fall under the umbrella of the selected organization are part of capital calculation. This is done in the task – '**Capital Consolidation Level Selection**' in process '**CAPITAL_CONSOLIDATION**'.

Approaches Followed in Capital Consolidation

The three approaches followed by the Capital Consolidation are:

1. **Consolidation Approach(CONSL)**: Under this approach, all the entities of the bank's organizational structure are considered. This includes all the entities/subsidiaries that belong to the same jurisdiction. All the exposures of the entities in the organizational structure are considered for computing risk weighted exposures, except the intra-group exposures.

2. **Aggregation Approach(AGG)**: This approach is similar to the Consolidation approach but is used in the cases, where some of the entities that are part of bank's organizational structure belong to a different jurisdiction. The capital requirement of the affiliate is computed as per the jurisdiction that it is subject to and is then aggregated with the rest of the group's capital requirement. Intra-group exposures are not excluded in this approach.

3. **Deduction Approach(DED)**: This approach is used in the case where some of the subsidiaries/entities that are part of bank's organizational structure are excluded from consolidation. In such a scenario, the regulatory investment in the excluded subsidiary attributable to the rest of the group are deducted from the consolidated capital requirements.

Surplus of Minority Interest Calculation

Minority interest (also known as non-controlling interest) refers to the portion of a subsidiary corporation's stock that is not owned by the parent corporation. For example: Company A acquires 80% of the outstanding stock of Company S. Since Company A owns more than 50% of Company S, Company A consolidates Company S's financial results with its own. The 20% of Company S's equity that Company A does not own is recorded on Company A's balance sheet as Minority Interest. Consolidated net income is allocated to the parent and non-controlling interests (minority shareholders) in proportion to their percentages ownership; in this case 80% to Company A and Company 20% to the non-controlling interests.

As per the US III, the REITs is treated for Minority Interest. As per the US Regulatory Capital Final Rules, the REITs are considered for Minority Interest, only if this is an operating entity. This operating entity is an operational criterion and hence this is taken as a download.

As per the US III, the minority interest calculation is calculated based on the total RWA. As per the US Regulatory Capital Final Rules, the minority interest calculation is based on the minimum of the amount in the respective tier, the subsidiary must hold and the Standardized total RWA multiplied by the respective minimum tier percentage. This is interpreted as the comparison between the Standardized Approach total RWA and the Advanced Approach total RWA.

This minimum RWA is expected to be provided as an input to the solution.

Surplus of Minority Interest is calculated and the surplus amount in each tier of capital which is attributed to third parties is deducted from the gross capital of each tier of capital.

Minority interest is calculated as the third party's interest (share holding percent) in the surplus capital (available capital – Minimum required capital). This is calculated tier-wise. The available capital is expected from the client tier-wise (CET1, AT1 and T2).

The minimum required capital of the CET1, T1 and Total Capital is calculated by multiplying the total RWA by minimum required tier-wise capital as a percentage (Total RWA * Minimum Required CET1%, Total RWA * Minimum Required T1%, Total RWA * Minimum Required Total Capital %). The surplus of the CET1, T1 and Total Capital is calculated as the difference between the available CET1, T1 and Total capital and the minimum required CET1, T1 and Total capital. The surplus of the AT1 capital is calculated as the difference between the Surplus T1 capital and Surplus CET1 capital. The surplus of T2 capital is calculated as the difference between the surplus total capital and the surplus T1 capital. The surplus in each tier attributable to the third party is calculated by multiplying the surplus in each tier by the third party minority holding percentage in each tier.

All the values required for processing are populated into Minority Interest Capital (**FSI_MINORITY_INTEREST**) table which is the processing table for minority interest calculations.

The sub process – **Surplus of Minority Interest Calculations** in **USA_BASELIII_CAPITAL_STRUCTURE** process covers this processing.

Internal Transactions, Equity Investment in Financial Subsidiaries and Private Equity and Hedge Fund Investments Identification

The private equity funds and hedge funds are identified and the amount of investments in hedge funds and private equity funds are identified and deducted from the Tier 1 Capital. The instruments pertaining to CET1 are deducted from CET1 and the instruments pertaining to AT1 are deducted from AT1 capital. These deducted items are not processed further under any other process.

As per the US Regulatory Capital Final Rules, the financial subsidiaries are identified and the amount of equity investments (CET1) in these financial subsidiaries are identified and deducted from the CET1 capital.

The deduction also includes internal transactions in each tier of capital among the various entities which are part of the regulatory consolidation. The internal transactions are identified in the Non Securitization process. The internal transactions are identified as any capital related transactions within the organization structure group, which is part of the regulatory consolidation.

These deducted items are not processed further under any other process.

The equity investment in financial subsidiaries, which are in the banking book and trading book provided as download data in the product processor tables, should not be consolidated and processed.

The financial subsidiary is identified with the help of the flag "F_FINANCIAL_SUBSIDIARY_INDICATOR" available in the DIM_ORG_STRUCTURE table.

Gross Capital Calculation

For Gross Capital calculation all the components are classified into their respective tiers (CET1, AT1, and T2) based on their purpose. This reclassification is achieved in the **FSI_STD_ACCT_HEAD_COMP_GRP_MAP** table so that reclassification happens at a single instance. The total gross capital for each tier of capital (CET1, AT1, and T2) is calculated as per the definition of CET1, AT1, and T2 by adding the relevant financial instrument in each tier of capital. In the case of CET1 capital, the application initially calculates the AOCI amount. This AOCI amount is calculated as the sum of the following elements:

- Unrealized gain and loss on Available for sale equity securities (preferred stock and non-preferred stock). Unrealized gain and loss on Available-for-sale, Debt Securities.

- Unrealized gain and loss on Held-to-maturity, Debt Securities.

- Accumulated Net gain or loss on cash flow hedges Accumulated net gains and loss related to Defined Pension Benefit Fund Obligations.

- Unrealized gain and loss on Foreign Currency Translation Adjustment.

Also, the unrealized gains on AFS Equity Securities that are preferred stock are added to the CET1, as per the transition, by splitting this capital line item into two. These exposures are split in the **FSI_PHASE_IN_TREATMENT** (Phase in Treatment) table into phase-in amount and balance phase-in amount.

The AT1 and T2 instruments include the non-qualifying capital instruments. This is included as per the specified transition percentage present in the **FSI_ SETUP_CAPITAL_HEAD** table. This is populated into the **FSI_PHASE_IN_TREATMENT** table and multiplied by the phase-in percentage, to arrive at the phase-in amount, which is part of Gross AT1 or T2.

The sub process – **Provisions and Gross Capital Calculations** in **USA Basel III Capital Structure** process covers this processing.

Regulatory Adjustments

Goodwill, DTL associated with goodwill, other intangibles, DTL associated with other intangibles, DTA, DTL associated with DTA, cash flow hedge not fair valued (asset), cash flow hedge reserve not fair valued (liability), gain on sale of securitization transaction, cumulative gain and losses due to change in own credit risk, defined pension fund asset, DTL associated with defined pension fund asset, and defined pension fund liabilities, Mortgage servicing rights and DTL related to Mortgage servicing rights are expected to be direct download values in Stage General Ledger Data (STG_GL_DATA) table. The application computes the regulatory adjustment line items which are net of DTL, that is, goodwill net of DTL, other intangibles net of DTL, DTA net of DTL, defined pension fund asset net of DTL, and net cash flow hedge reserve, and 'Mortgage Servicing Rights net of DTL and Transition AOCI use these in the deduction of regulatory adjustments and in threshold deduction treatment.

While in other jurisdictions, banks recognized gain on sale in the P&L and deduct from CET1.

Shortfall of stock of provision to expected loss is applicable only for the advanced approaches portfolio. The allowance for loan and lease losses for Advanced Approach for US is obtained by prorating the allowance for loan and lease losses (download in **STG_GL_DATA** table) between the percentage of exposures using the standardized approach and the percentage of exposures using the advanced approach. The allowance for loan and lease losses for Advanced Approach for US is the applicable allowance for exposures using the advanced approach.

The sub process – **Provisions and Gross Capital Calculations** in **USA Basel III Capital Structure** process covers the above processing.

The Investment in own shares are calculated as the sum of the pre-mitigation EAD (**EAD Pre-mitigation Measure Value (N_EAD_PRE_MITIGATION)** in **Fact Non Sec Exposures** (**FCT_NON_SEC_EXPOSURES)** table**)** of the exposures which have the flag of treasury stock indicator (**F_TREASURY_STOCK_INDICATOR**) as "Y".

The Investment in reciprocal cross holdings Are calculated as the sum of the pre-mitigation EAD (**EAD Pre-mitigation Measure Value (N_EAD_PRE_MITIGATION)** in **Fact Non Sec Exposures** (**FCT_NON_SEC_EXPOSURES)** table**)** of the exposures which have the flag of reciprocal cross holding indicator (**F_RECIPROCAL_CROSS_HLDG_IND**) as "Y".

All the regulatory adjustment line items are deducted from its respective tier of capital post minority and internal transaction deduction.

AOCI Opt-Out Calculation

As per USA Basel III Final rule, the bank that are not subject to the advanced approaches risk-based capital rules (that is, following the Standardized Approach) who have opted for AOCI opt-out election must adjust common equity tier 1 capital elements with the following line items:

1. Subtract net unrealized gains and add net unrealized losses on Available-for-sale, Debt Securities.

2. Subtract net unrealized losses on AFS preferred stock classified as an equity security and net unrealized losses on AFS equity exposures.

3. Subtract Accumulated net gains and add back any accumulated net losses on cash-flow hedges.

4. Subtract amounts attributed to defined benefit postretirement plans.

5. "Subtract any net unrealized gains and add any net unrealized losses on held-to-maturity securities.

Also, the banks must incorporate 45 % of any pre-tax net unrealized gains on AFS preferred stock classified as an equity security and any net unrealized gains on AFS equity exposures in their Tier 2 capital.

The above line items are adjusted using the AOCI opt-out option flag.

The banks that have selected opt-out for AOCI calculation must use the above line items to adjust the CET 1. Whereas, the banks that are not subject to the advanced approaches risk-based capital rules but opted not to go for AOCI opt-out must treat AOCI as defined in the Capital Structure of Advanced Approach. In this the bank is allowed to include AOCI in their CET1 and this can be identified through an option provided at the organization level through a flag called AOCI opt-out option flag.

The treatment of pre-tax values of AFS equity securities (This is added to Tier 2 capital with limit of 45%) and AFS preferred stock/non-preferred stock classified as equity (part of AOCI) is not currently configured. See question 45 under Annexure B: Frequently Asked Questions section. These is required only if organization is on US Basel III standardized approach and elected for AOCI opt-out option. Otherwise, no changes are required.

Impact of Solo/ Consolidation

If going for solo only, AOCI line item pertaining to that bank is adjusted to CET1. If you are going for consolidation, parent bank and its associated entity/subsidiary line item is adjusted against CET1.

Similarly, if going for solo run, 45% pre-tax of net unrealized gains on AFS preferred stock classified as an equity security and AFS equity exposures for the bank for which run is executed are added to Gross Tier2. If going for consolidation, 45% pre-tax of net unrealized gains on AFS preferred stock classified as an equity security and AFS equity exposures of parent bank and its associated entity/subsidiary line item are added to Gross Tier2.

Phase-in Treatment for Regulatory Adjustments

The regulatory adjustment line items that include Goodwill net of DTL, Other Intangibles net of DTL, DTA net of DTL, Net Cash Flow Hedge Reserves, Gain on Sale related to Securitization transaction, Defined Pension Fund Asset net of DTL, Transition AOCI Amount Cumulative gains and losses due to changes in own credit risk, Investment in Treasury Stock, and Reciprocal Cross Holding follows phase-in arrangement as per the timelines mentioned by the US Basel III Accord. The phase-in deduction percent for each year is available in a setup table - **Setup Capital Heads** (**FSI_SETUP_CAPITAL_HEAD) table**.

Treatment Specific to Insignificant Investments

Investment in all financial entities, which are outside the scope of regulatory consolidation, is identified for significant and insignificant investments.

The shareholding percent for these parties are expected as download in STG_PARTY_SHR_HLD_PERCENT. The parties are identified as significant when the shareholding percentage is greater than or equal to 10%. And the others are identified as insignificant investment. The parties are identified as significant when the shareholding percentage is greater than or equal to 10%. And the others are identified as insignificant investment. This processing happens in the USA_US_III_CAPITAL_CONSOLIDATION process.

The total investment amount in insignificant entities is computed by summing up the Pre Mitigation EAD **(EAD Pre-mitigation Measure Value (N_EAD_PRE_MITIGATION**)) from the **Fact Non Sec Exposures (FCT_NON_SEC_EXPOSURES**) table. And also the tier wise computation of investment amount happens. The total amount is compared with the 10% of the CET1 amount of the parent bank amount post regulatory adjustments. The amount above 10% limit is processed for deduction. This summing up includes the direct, indirect and synthetic investments. The Indirect investments are investments in Investment funds, and which are invested in capital instruments. The synthetic investments are the investments in synthetic transactions on capital instruments. For all these exposures, the net long position amount, updated in **N_EAD_PRE_MITIGATION** is considered.

The total deduction amount is pro-rated among each tier of capital based on the percentage of investment in each tier of capital. The amount arrived is deducted from each tier of Capital.

The investment amount below the 10% limit is treated as per banking book rule for the instrument.

The application computes as follows:

- Parties are marked as insignificant investment parties by updating the flag: **F_SIGNIFICANT_INVESTMENT_IND** in Fact Party Shareholding Percent (FCT_PARTY_SHR_HLD_PCT**)** with value N.

- The exposure amount of banking book and trading book exposures to these entities are summed by grouping their component of capital and compared against 10% of parent bank's CET1 capital. The portion of amount which exceeds the 10% limit is deducted.

This is computed by calculating tier wise deduction percentage and multiplying this percentage with the exposure amount to arrive at the amount to be deducted from each tier of capital.

The total investment values are populated into **Non Regulatory Consolidation Entity Investment** (**FSI_NON_REG_CONSL_ENTITY_INVST) table** which is the processing table for insignificant and significant investment deductions.

The sub process – **Insignificant Investment in entities outside Regulatory Consolidation Processing** in **USA Basel III Capital Structure** process covers the above processing.

After the application of this treatment, the Insignificant Investments line item also follow phase–in arrangement which is similar to the phase-in arrangement for Regulatory Adjustments.

Treatment Specific to Significant Investments

The total investment amount is checked against the set limit of 10% of CET1 amount of the parent bank, post insignificant investment amount adjustment. The CET1 amount above 10% is deducted from the CET1 post insignificant investment amount deduction. The CET1 amount below 10% follows threshold deduction. The investment amount in AT1 and T2 is fully deducted from its respective AT1 and T2 tier of capital. The application computes as follows:

- Entities are marked as significant investment entities by updating the flag – **Significant Entity Indicator** (**F_SIGNIFICANT_INVESTMENT_IND)** in **Fact Entity Information** (**FCT_ENTITY_INFO)** with value 'Y'.

- The exposure amount of banking book and trading book exposures to these entities are summed by grouping their component of capital and compared against 10% of parent bank's CET1 capital. The portion of amount which exceeds the 10% limit is deducted from CET1. The exposures of AT1 and T2 are fully deducted from respective tier of capital. This is done by calculating deduction percentage for CET1 and by multiplying this percentage with the CET1 exposure's exposure amount to arrive at the amount to be deducted from CET1 capital.

The sub process – **Significant Investment in Entities outside Regulatory Consolidation Processing** in **USA Basel III Capital Structure** process covers the above processing.

After the application of this treatment, the Significant Investments line item also follow phase–in arrangement which is similar to the phase-in arrangement for Regulatory Adjustments.

Treatment of Synthetic and Indirect Investments

In the case of Indirect Investments, the solution provides an option to either follow the Simple Calculation else apply the Insignificant Investment treatment. The solution captures the fund investment percentage in the Capital instrument (Fund Capital Instrument Investment Limit), in the Stage Fund Equity Investments table (STG_FUND_EQUITY_INVESTMENTS). The solution subtracts the Carrying value of the capital instrument from CET1, along with Insignificant Investment calculation for the Simple Calculation.

The solution processes these investments as per the treatment for exposures pertaining to Insignificant and Significant Investment, if the option of Insignificant Investment treatment is selected. And the deduction, as applicable per phase-in, is from CET1.

Threshold Deduction

The three line items, (Significant Investment in the Common Shares of Accounting entities from the **FSI_NON_REG_CONSL_ENTITY_INVST**, Mortgage Servicing Rights net of DTL from the **FCT_STANDARD_ACCT_HEAD** table, and DTAs that arises from temporary differences that comes from the **FCT_CAPITAL_ACCT_HEAD**) are populated in the **FSI_THRESHOLD_TREATMENT** table and the threshold calculations are processed in this table.

Threshold Treatment

The three line items are individually compared with the 10% of CET1 calculated post Regulatory Adjustments, Insignificant Investments and Indirect Investments. The amounts which are above 10% CET1 limit are deducted from CET1 following the phase-in arrangements. During the transition period, any amount of these three line items, which is not deducted as per the 10% mentioned earlier, goes for risk weighting at 100%.. During the transition period, the check of 15% is against the CET1 post all regulatory adjustments and adjustments to insignificant investments and significant investments. In the post transition period, instead of 15%, the aggregate check is 17.65% of CET1, post all regulatory adjustments and adjustments to insignificant investments, less 100% of the sum of the line items which goes for threshold deduction. The amount which is not deducted due to this 10% and 15% check is risk weighted 100% during the transition period and is risk weighted 250% post the transition period.

The same phase-in treatment is followed by the aggregate 15% limit for Significant Investment in the Common Shares of Accounting entities, Mortgage Servicing Rights, and DTAs that arises from temporary differences.

If the amount of Mortgage Servicing Assets (MSA) deducted after the application of the threshold is less than 10% of the fair value of the MSAs, then there is an additional deduction of MSA. The additional amount of MSAs are deducted from CET1 so that the deducted MSA is at least 10% of the fair value of the MSA. For example: assume that in the year 2013 the fair value of MSA is 20 and after applying the threshold deduction percentage (which is 0%), the amount to be deducted is 0. Then, the minimum amount of deduction of MSA is 10% of the fair value of MSA which is 2. Hence, 2 is deducted from MSA due to this provision.

The sub process – **Threshold Treatment Calculations** in **USA Basel III Capital Structure** process covers the above processing.

Post Phase-in Treatment for Insignificant Investments, Significant Investments, and Threshold Deductions

In this step, the balance phase-in deduction amount for Insignificant, Significant, and Threshold deductions are calculated and they are assigned the applicable risk weight. The RWA of these amounts are also computed. The sub process – **Threshold Treatment Calculations** in **USA Basel III Capital Structure** process covers the above processing.

Bifurcation of Insignificant and Significant Investment Amount

All the investment transactions in Insignificant Entity and Significant Entity go for bifurcation. Insignificant investment amount below 10% are stamped as 'INSIG_RWA' and any amount above 10% are stamped as 'INSIG_DED'. The same logic is applied to Significant Investment amount in CET1. The CET1 amount in Significant Investment entity that is below 10% and 15% limit is stamped as 'SIG_RWA' and amount above 15% limit is stamped as 'SIG_DED'. The original transactions are deleted and new transactions are created with stamping as described above. The new transaction thus created can be traced by looking into the parent exposure ID.

The exposure to be deducted is marked with standard account head surrogate key based on whether the deduction is Insignificant or Significant investment and based on capital component group.

This splitting of exposures is done in Fact Non Sec Exposures (FCT_NON_SEC_EXPOSURES) and Fact Sec Exposures (FCT_SEC_EXPOSURES). This splitting logic is carried to **Equity Exposures** (**FCT_EQUITY_EXPOSURES)** and Fact **Sub Exposures** (**FCT_SUB_EXPOSURES)**.

The entire processing is done in the sub processes:

- **Sec Insignificant Investment Exposure Processing**,
- **Non Sec Insignificant Investment Exposure Processing**,
- **Non Sec Significant Investment Exposure Processing**,
- **Non Regulatory Investment Sub Exposures Population,**
- **Non Regulatory Investment Nettable Pool Population**, and
- **Equity Non Regulatory Investment Processing** in the process – **USA Basel III Capital Structure**.

Non-Qualifying Capital Instruments

The non-qualifying capital instruments are instruments which were qualifying as per US Basel II Guidelines or by US General Risk Based Guidelines, and currently do not meet the eligibility criteria for qualification in the respective tiers of capital. These instruments are expected to be issued prior to May 19, 2010. The Non-qualifying data in PP is provided prior to the issue date.

These non-qualifying instruments belong to any of the following criteria (at a broad level), for any bank:

- Instruments which were previously qualifying in T1 Capital, but now non-qualifying in AT1 Capital. These instruments can satisfy any of the following criteria:
    - Currently qualifying in T2 Capital
    - Currently non-qualifying in T2 Capital
- Instruments which were previously qualifying in T2 Capital, but now non-qualifying in T2 Capital.
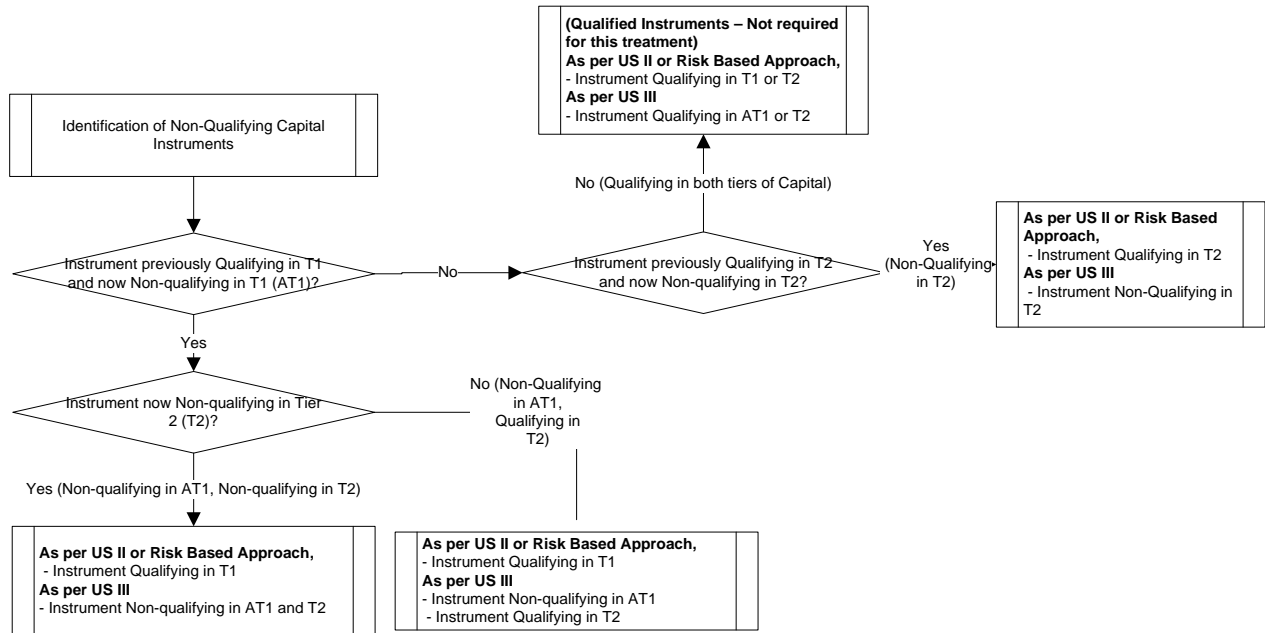
The treatment for the identified non-qualifying capital instruments depends on the bank type. The applicable bank types are as follows:

- Depository Institution Holding Company
- 2010 Mutual Holding Company
- Depository Institutions

In the case of banks which are adopting advanced approaches, the transition percentages are applicable starting from the year 2014. In the case of banks which are adopting of non-advanced approach, the transition percentages start from the year 2015.

Identification of the Non-Qualifying Capital Instruments

The non-qualifying capital instruments are identified with the help of a flag. The non-qualifying instruments are identified as to which is the core group from which they are non-qualified. Also, they are identified as to which is the group to which they are non-qualifying. Hence, they are identified to belong to one of the following:

- Qualified as per existing treatment under Tier 1, but currently non-qualifying in AT1 and T2.

- Qualified as per existing treatment under Tier 1, but currently non-qualifying in AT1 but Qualifying in T2.

- Qualified as per existing treatment under Tier 2, but currently non-qualifying in T2.

Also, the accord specifies the treatment for non-qualifying capital instruments at an aggregate level across each tier and not individually. Hence the solution must aggregate these instruments and use it for further calculation.

Also, there is an operational requirement for the non-qualifying instruments to be issued prior to May 19, 2010. This is a data expectancy from the client to validate and provide the data only for those non-qualifying instruments which satisfies this criteria.

The following are the instruments which are identified as non-qualifying:

- TRUPS

- CPPS

Identification of the Treatment Specific to the Non-Qualifying Capital Instruments

The treatment of the Non-qualifying capital instruments depends if the bank belongs to any of the following criteria:

- Depository Institution Holding Company with consolidated group assets more than $15 billion.

- Depository Institution Holding Company with consolidated group assets less than $15 billon or Mutual Holding Companies as of 2010.

- Depository Institutions.

The identification of the parent entity type is essential for the identification of the treatment to apply to the bank. The identification of the entity type are as follows:

- **Depository Institution Holding Company**:
  In this case, the reporting bank is the ultimate parent. This is identified with the help of the ultimate parent flag.

- **2010 MHCs**:
  This is identified as institutions which were MHCs before May 19, 2010. Since it is an operational criterion, this is identified with the help of a flag.

- **Depository Institutions**:
  In this case, the reporting bank is not an ultimate parent and is also not a 2010 MHC.

The identification of the entities for the treatment can be summarized as follows.

Reporting Bank	Ultimate Parent Flag	Mutual Holding Companies Flag	Group Consolidated Assets	Treatment Identification for Non-Qualifying Capital Instruments
Reporting Bank	Y	N or Null	>= $15 billion	Depository Institution Holding Company with consolidated group assets more than $15 billion.
Reporting Bank	Y	N or Null	< $15 billion	Depository Institution Holding Company with consolidated group assets less than $15 billon or Mutual Holding Companies as of 2010.
Reporting Bank	Y	Y	Any	Depository Institution Holding Company with consolidated group assets less than $15 billon or Mutual Holding Companies as of 2010.
Reporting Bank	N	Y	Any	Depository Institution Holding Company with consolidated group assets less than $15 billon or Mutual Holding Companies as of 2010.
Reporting Bank	N	N or Null	Any	Depository Institutions.

Treatment Specific for Advanced Approaches Bank

The Advanced Approaches Bank is a bank that satisfies any of the following three criteria:

1. They have a consolidated group asset size of more than or equal to $250 billion.

2. They have a consolidated group on-balance sheet foreign exposures of more than or equal to $10 billion.

3. They have obtained the permission from the regulator to calculate RWAs using the Advanced Approach.

Depending upon the identification of the parent entity, the treatment for the non-qualifying capital instruments are as follows:

1. Depository Institution Holding Company with consolidated group assets more than $15 billion.
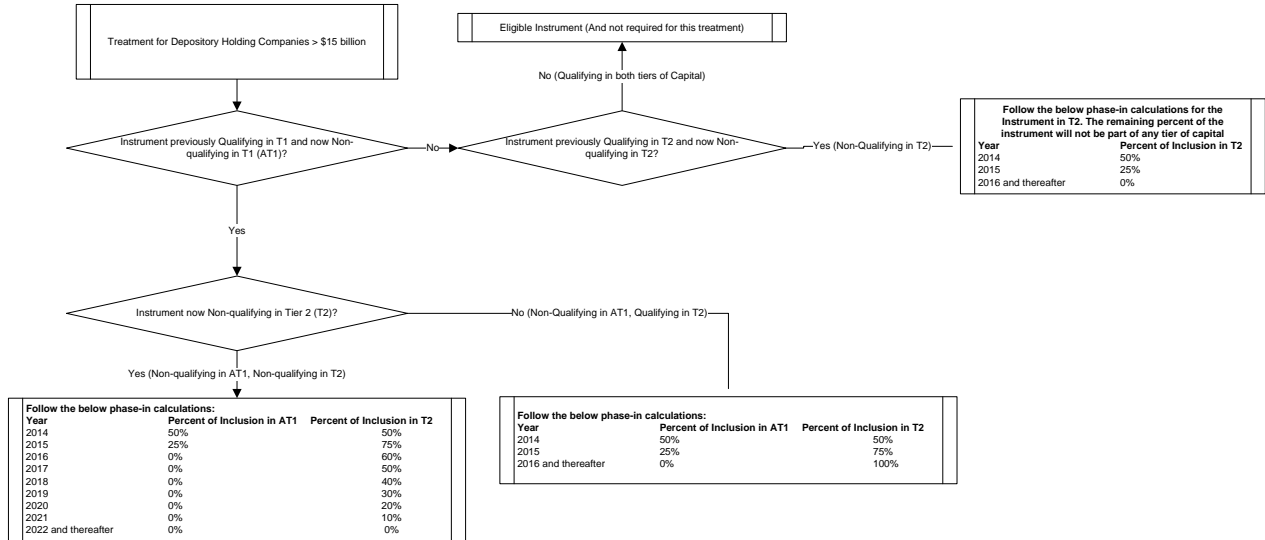
2. Depository Institution Holding Company with consolidated group assets less than $15 billon or Mutual Holding Companies as of 2010.

   This is not applicable for the Advanced Approaches Bank, since they have the consolidated assets of $250 billion or more.
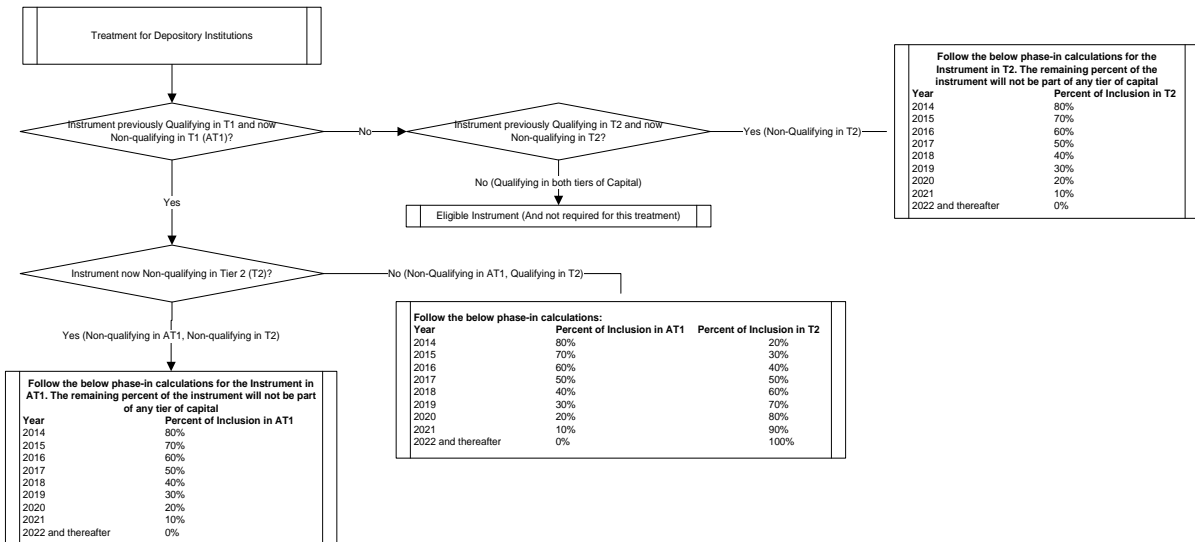
Treatment Specific for Non-Advanced Approaches Bank

This is the detailing of the treatment specific for Non-Advanced Approaches Bank. In the case of Non-Advanced Approaches Bank, the transition is applicable only from the year 2015. Apart from that, the other difference is that the treatment specific to Depository Institution Holding Companies with less than $15 billion consolidated assets or the 2010 MHCs is applicable only for the Non-Advanced Approaches Bank.

Depending upon the identification of the parent entity, the treatment for the non-qualifying capital instruments is as follows:

1. Depository Institution Holding Company with consolidated group assets more than $15 billion.
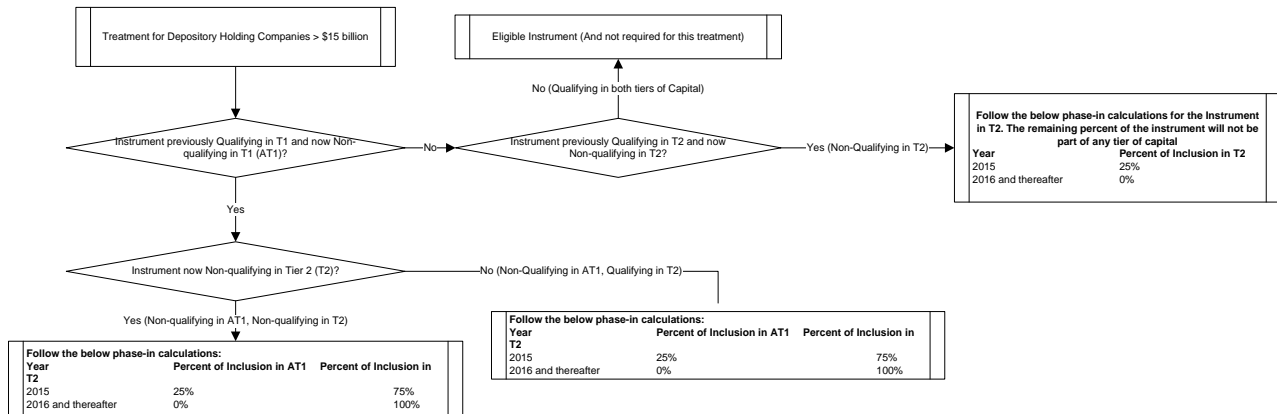
2. Depository Institution Holding Company with consolidated group assets less than $15 billon or Mutual Holding Companies as of 2010.
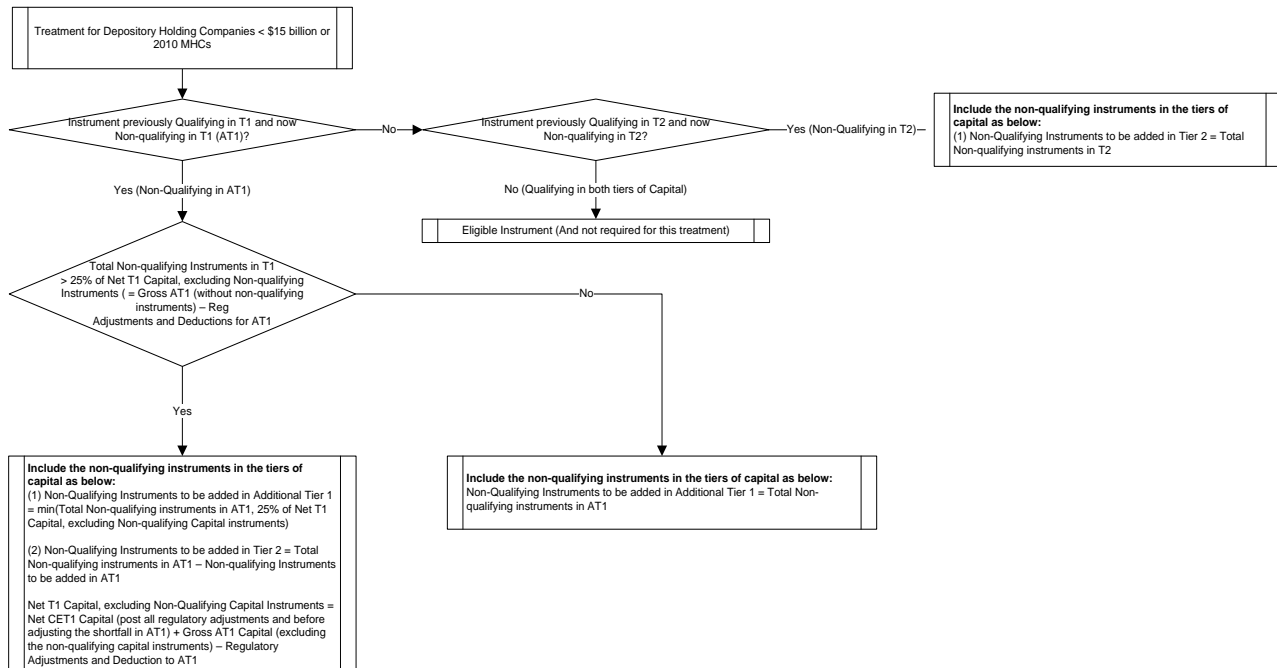
This treatment is different from the other two entity types. In this, the application calculates the Net T1 Capital considering post all adjustments, excluding the Non-qualifying instruments. The total non-qualifying capital instruments is included in the AT1 which are non-qualifying in T2, are based on the Net T1 Capital.

- Total Non-qualifying capital instruments, which were previously qualifying in T1 = Total Non-qualifying capital instruments, which were previously qualifying in T1, but currently Non-qualifying in AT1 and T2 + Total Non-qualifying capital instruments, which were previously qualifying in T1, but currently Non-qualifying in AT1 and qualifying in T2.

- Total Non-qualifying capital instruments, which were previously qualifying in T2 = Total Non-qualifying capital instruments, which were previously qualifying in T2, but currently Non-qualifying in T2.

- Total Non-qualifying capital instruments, which were previously qualifying in T1. The amount of Non-qualifying capital instruments, which were previously qualifying in T1 is based on the Net T1 Capital.

The calculations are as follows:

Net T1 Capital = Net CET1 capital post Insignificant Investments and Indirect Exposures – Significant Investment amount above individual threshold amount post phase-in – DTA related to temporary differences above individual threshold post phase-in – MSA net of DTL above individual threshold post phase-in – Aggregate threshold phase-in Deduction Amount + Gross AT1, excluding non-qualified instruments – Regulatory Adjustments related to AT1.

Regulatory Adjustments Related to AT1

Balance Phase-in applicable Regulatory Adjustments from CET1 + Investments in Own shares in AT1 + Reciprocal Cross Holdings in AT1 + Insignificant Investments related to AT1 + Indirect Exposures related to AT1 + Significant Investments related to AT1.

Total Non-Qualifying Instruments of AT1 is based on 25% of Net T1 Capital. If the total is less than or equal to 25% of Net T1 Capital, then, the total non-qualifying instruments of AT1 are added to the AT1 Capital.

If the total is more than 25% of Net T1 Capital, then, minimum of 25% of Net T1 Capital and the total non-qualifying instruments in AT1 are added to the AT1 capital. The remaining is added to the T2 Capital.

Total Non-qualifying capital instruments, which were previously qualifying in T2. The amount of Non-qualifying capital instruments, which were previously qualifying in T2 is added to the T2 Capital. There is no cap on the amount added to the T2 Capital.

Depository Institutions

Net Capital Calculation

The Net CET1, Net AT1, and Net T2 capital amount are calculated post all regulatory adjustments, including the insignificant, significant, and threshold treatment. Any shortfall in T2 capital amount is adjusted against Net AT1 amount and any shortfall of AT1 capital amount is adjusted against Net CET1 amount.

This is done in sub process – **Net Capital Calculations** in process **USA Basel III Capital Structure**.

RWA Calculation for Credit Risk, Market Risk, Operational Risk and Phase–in Arrangement

The following data is collated and RWA is computed:

- Non-securitized exposures data and the associated mitigants data to compute as Risk Weighted Asset amount for Advanced Approach for US portfolio.
- CVA Exposures Data to compute CVA RWA.
- Securitized exposures data and the associated mitigants data to compute Sec RWA.

The **Market Risk RWA** for Market Risk and **Operational RWA** for Operational Risk are expected as a download. The Regulatory Adjustment RWA is the sum of RWA calculated for all the exposures which undergo the processing of Regulatory Deductions, Insignificant Investments, Significant Investments, and the Threshold deduction line items which are risk weighted.

The Total RWA amount is the summation of Non Securitization, Securitization, Market Risk, Operational Risk, and Regulatory Adjustment RWA.

The above processing is done in sub process – **RWA Populations** in process – **USA Basel III Capital Structure Capital Ratio**.

The DTAs arising due to the temporary difference is at a risk weight of 100% and after the RWA is calculated as a part of Credit RWA.

Net Long Position and Total RWA

The investment in own shares, insignificant and significant investments considers the direct, indirect and synthetic investments. The direct investments are the capital instruments which are directly held by the bank. The indirect investments are the capital instruments which are held by the bank through an investment fund that is, the bank invests in investment fund, and the investment fund has invested in a capital instrument. The synthetic capital instruments are the capital instruments on which the bank has a synthetic transaction in the form of guarantees, credit derivatives or options.

For all these transactions, the capital considered is the net long position, which is the gross long position net of any qualified short position in the same exposure. You must provide value ("Y" or "N") against the flag "F_CAPITAL_NETTING_QUALIFICATION_FLAG" whether the gross long position is allowed to be deducted from the net of short positions in the same underlying instrument. This is done only if the short positions involve no counterparty risk and both long and short position have same maturity.

The total RWA is the sum of the RWA of all the exposures, for which the bank has an exposure, summed up based on the risk types. It is the sum of the following:

- Total RWA for Credit Risk Exposures, calculated using the Standardized Approach. This includes the following:
    - o Total RWA for Credit Risk Exposures, apart from the ones listed below, calculated using the Standardized Approach.
    - o Total RWA for Cleared Transactions, and Default Fund Contributions, calculated using the Standardized Approach.
    - o Total RWA for Unsettled Transactions, calculated using the Standardized Approach.
    - o Total RWA for Securitization Exposures, calculated using the Standardized Approach.
    - o Total RWA for Equity Exposures, calculated using the Standardized Approach.
    - o Total CVA RWA, calculated using the same approach as applicable in the Advanced Approach (this is applicable only in the case of Advanced Approach Banks for comparison purpose).
- Total RWA for Market Risk Exposures, calculated using the Standardized Approach.
- Total RWA for Operational Risk (this is applicable only in the case of Advanced Approach Banks for comparison purpose).

And the following is subtracted from this summation to arrive at the Total RWA applicable for Standardized Approach:

- Amount of ALLL that is not included in tier 2 capital and
- Amount of allocated transfer risk reserves.

Capital Ratio Calculation

CET1 ratio, T1 ratio, T2 ratio, and Capital Adequacy ratio are calculated using the Total RWA amount and Net CET1 Capital, Net T1 Capital, Net T2 capital and Total Capital (sum of Net T1 Capital amount and Net T2 capital amount) amount.

Starting from the year 2015, the solution calculates the ratios as minimum of Standardized approach Ratios and Advanced Approach Ratios. The standardized approach ratios are expected as download values in the stage standard accounting head table (STG_STANDARD_ACCT_HEAD).

For the year 2014, the solution calculates the Total Ratios as the Advanced Approach Ratios.

This is done in sub process – **Capital Ratio Calculations** in process in **USA Basel III Capital Structure Capital Ratio**.

5.2.1.4.3 Key Data Elements

The key data elements are listed in this section. For more information on the tables and columns to be updated, see the *Download Specifications* document.

- The data for third party investment, with the investment percentage in each tier of capital along with the total amount available in each tier of capital is expected as a download value, for the surplus of Minority Interest computation.

- The entity level Market Risk RWA is expected as a download value in the Standard Account (**DIM_STANDARD_ACCT_HEAD**) table. This is required for calculating the Total RWA.

- The Market Risk data for significant and insignificant investment exposures is expected as download value in the Stage Investments (**STG_INVESTMENTS**) table (for equity and non-equity trading book exposures except the mutual fund trading book exposures) along with the other investment data.   This data is also expected in the Fund Equity Investments (**STG_FUND_EQUITY_INVESTMENTS**) table (for mutual fund investments in the trading book) along with other mutual fund investment data.

- The data for indirect capital instruments are expected in the Stage Fund Equity Investments (**STG_FUND_EQUITY_INVESTMENTS**) table and the underlying of these investments are expected in the Stage Investments (**STG_INVESTMENTS**) table.
  The synthetic capital instruments are expected in the Credit derivatives (**STG_CREDIT_DERIVATIIVES**), guarantee (**STG_GUARANTEES**), Option Contracts (**STG_OPTION_CONTRACTS**), Futures (**STG_FUTURES**) and Swap Contracts (**STG_SWAP_CONTRACTS**). The underlying information for these exposures is expected in the Underlying Exposures (**STG_UNDERLYING_EXPOSURES**) table.

- The synthetic capital investment pertaining to the securitization framework is expected in the Stage Investments (**STG_INVESTMENTS**) table and the underlying of the exposures available in the Stage Investments (**STG_INVESTMENTS**) table or in the Stage Underlying Exposures (**STG_UNDERLYING_EXPOSURES**) table.

- The short position amount to be netted against a long position is expected as a download.

- The flag to identify whether the netting is applicable is expected as 'Y' to calculate the net long position amount.

- The Operational Risk RWA is expected as a download value in the Standard Account (**DIM_STANDARD_ACCT_HEAD**) table. This is required for calculating the total RWA.

- All the amounts are converted into the same currency for ease of processing and reporting.

- The application expects the GL IDs and the description to be unique across an entity and the data is expected at a solo level. The application ignores consolidated data and calculates the data for consolidation.

- ESOP common shares, which are included in Paid up common shares have a value of 0 or greater than 0. This cannot be a negative number. This is a component of Gross CET1 and included in the Paid up common shares.

- ESOP Debt Other capital instruments, which are included in other AT1 capital instruments have a value of 0 or greater than 0. This cannot be a negative number. This is a component of Gross AT1 and included in other AT1 capital instruments.

- AOCI Amount Data Expectation

  The Accumulated Other Comprehensive Income (AOCI) is expected as individual various components. This data expectation is uniform for all the values across the organization structure of the parent entity.

  The individual components, which constitute the AOCI Transition Amount, are summed up and undergoes transitional arrangements.

  The total AOCI amount is provided as a download line item, the Transition AOCI is expected as a download.

  There are unrealized gain and loss on Held-to-maturity, Debt Securities. This can be either positive or negative number and it is a component of AOCI element. This is expected to be an amount net of any associated deferred tax component (DTA/ DTL).

  There are unrealized gain and loss on Foreign Currency Translation Adjustment. This can be either positive or negative number and it is a component of AOCI element. This is expected to be an amount net of any associated deferred tax component (DTA/ DTL).

  There is unrealized gain on Available-for-sale Equity Securities that are not preferred stock classified as an equity security under GAAP or equity exposures. This can be either positive or negative number and it is a component of AOCI element. This is expected to be an amount net of any associated deferred tax component (DTA/ DTL).

  There is unrealized gain on Available-for-sale Equity Securities that are preferred stock classified as an equity security. This can be either positive or negative number. A portion of this is a component of AOCI element (as per the transition percentage) and the remaining is a component of Gross T2. This is expected to be an amount net of any associated deferred tax component (DTA/ DTL).

There are accumulated Net Gain (Loss) on Cash Flow Hedges that are realized in the balance sheet on fair value. This can be either positive or negative number and it is a component of AOCI element. This is expected to be an amount net of any associated deferred tax component (DTA/ DTL).

The unrealized gain and loss on Defined Pension Fund Obligations is expected to be provided as an input after excluding (at the Bank's option) the portion related to defined pension fund assets which are deducted according to the applicable regulatory deductions.

NOTE: All the line items related to AOCI calculation (Except the line items related to Net Cash flow hedge Reserve) are expected to be provided as a download net of any associated deferred tax component.

If the AOCI is provided a download line item, then the Transition AOCI is also expected as a download. Else, this is a calculated line item)

- Minority Interest Calculations Data Expectation

The application expects the capital ratios, tier wise capital amount, third party investment percentage, and the total RWA of the subsidiary as download for the Minority Interest calculation.

The entities which are processed for Minority interest computation are provided with the F_THIRDPARTY_MINORITY_HOLD_IND flag in the **STG_ENTITY_SHR_HLD_PERCENT** table as "Y".

The application expects only the preferred shares data for the REIT subsidiary. Hence for the Minority Interest computation to happen correctly, the REIT subsidiaries should enter the CET1, AT1, T2 and Total RWA amount. The stage data expectation for minority interest calculation in REIT is the third party holding percentage that is 0% for the CET1, and must have the applicable percentage only for the portion of preferred shares data in the REIT subsidiary.

The application processes the REIT subsidiaries available as part of the DIM_ORG_STRUCTURE table, wherein the operating entity flag is "Y", regardless of the third party minority holding indicator flag as "Y" or "N". The REIT subsidiaries should have the regulatory entity indicator flag as "Y" in the DIM_ORG_STRUCTURE table.

- Regulatory Adjustments Data Expectation

The application expects the goodwill value to be provided, which is net of the goodwill for the entity and any goodwill used in the valuation of the significant investments

The application expects the deferred tax liabilities value associated with the various regulatory adjustments to be populated wherever the entity expects the value to be netted, satisfying the criteria for netting

The application expects the 'Other Intangible Assets' as a single line item, which includes all the intangible assets other than goodwill.

The defined pension fund net asset is not required to be deducted for insured depository institution. Since the insured depository institutions are not part of regulatory consolidation, this data is not expected for those institutions in the **STG_GL_DATA** table.

It is instead expected to be provided in the Product processor tables, and the capital charge is calculated as per the applicable rules.

The defined pension fund asset reported is the defined pension fund asset net of the unrestricted access and unfettered access to the assets in the fund, based on supervisory approval. The applicable amount which corresponds to the unrestricted and unfettered access to the assets in the fund, is expected as download in the Product Processor tables. Hence the capital charge is calculated on this.

- Internal Transactions Data Expectation

The Customer Reference code of the exposures should be of any entity's party id, which is part of the Organization Structure Dimension (**DIM_ORG_STRUCTURE)**, to be identified as internal transactions.

- Investment in Own Shares Data Expectation

The Customer Reference code of the exposures should be of the parent entity's own party id, which is to be identified as investment in own shares

- Reciprocal Cross Holdings Data Expectation

The reciprocal cross holdings flag should be 'Y'.

- Investment in Private Equity and Hedge Funds Data Expectation

The issuer type or the customer type of the exposures should be 'HEDFND' or 'PVTEQ'

- Threshold Treatment Data Expectation

The Deferred Tax Assets (DTA) related to temporary differences which are processed for the threshold treatment is expected as the download value net of deferred tax liabilities associated with that.

- Non-qualifying Capital Instruments Treatment

The instruments issued prior to September 12, 2010, and which were previously qualifying in the tiers of capital are provided as input, in the case of Depository Institutions.

The instruments issued prior to May 19, 2010, and which were previously qualifying in the tiers of capital are provided as input, in the case of Depository Holding Institutions.

- Capital Ratios

In the year 2014, the ratios are expected as a minimum of Advanced Approach and General Risk Ratios. The solution does not handle the General Risk based Ratios. The comparison is expected to be done outside the system.

Starting from the year 2015, the standardized capital ratios are expected to be provided as an input.

5.2.1.4.4 Limitations

The limitations in OFSCAP 8.0.5.0.0 release is as follows:

1. Investment in Own Shares Treatment

   The investment in own shares which goes for capital treatment, has a phase-in treatment, wherein during phase-in a portion of the exposure goes for deduction from capital, and the remaining portion of the exposure goes for 100% RW. This is handled in the processing by the Phase-In treatment table, and this RW gets added into the Regulatory RWA Accounting Head.

   But for reporting, the reporting happens from an account level granularity, and not at a higher granularity of the accounting head. As the current application does not split the exposures into two in the processing table of Fact Non Sec Exposures (FCT_NON_SEC_EXPOSURES), the account level and the Phase-In treatment table values do not reconcile with each other. Currently, this has to be specifically addressed in the reporting layer, and is not part of the OOB product.

2. Reciprocal Cross Holdings Treatment

   The reciprocal cross holding amount which goes for capital treatment, has a phase-in treatment, wherein during phase-in a portion of the exposure goes for deduction from capital, and the remaining portion of the exposure goes for 100% RW. This is handled in the processing by the Phase-In treatment table, and this RW gets added into the Regulatory RWA Accounting Head.

   But for reporting, the reporting happens from an account level granularity, and not at a higher granularity of the accounting head. As the current application does not split the exposures into two in the processing table of Fact Non Sec Exposures (FCT_NON_SEC_EXPOSURES), the account level and the Phase-In treatment table values do not reconcile with each other. Currently, this has to be specifically addressed in the reporting layer, and is not part of the OOB product.

5.2.1.5 Capital Buffers

There are three types of Capital Buffers prescribed in the US III Rules, which are as follows:

1. Capital Conservation Buffer
2. Countercyclical Buffer
3. Additional Loss Absorbency Capital (for G-SIB)

A detailed description of each of these buffers is provided in the following sections.

Capital Conservation Buffer

The US III requires banks to maintain Capital Conservation Buffer (CCB) out of Common Equity Tier 1 Capital (CET1). This requirement is as per the transitional arrangement as stated in the US Regulatory Capital Final Rules.

Countercyclical Buffer

The US III Rules requires banks to maintain Countercyclical Buffer (aplicable for Advance Appraoch Bank only) that is prescribed by the respective jurisdiction's regulator through an extension of CCB. Banks determine their countercyclical capital buffer amount by calculating the weighted average of the countercyclical capital buffer amounts established for the national jurisdictions where the banking organization has private sector credit exposures. For more information on private sector credit exposures, see the *Glossary*.

If the guarantor and credit default swap is present for an exposure, then as per the US Regulatory Capital Final Rules the application considers the domicile country of these mitigants for the covered portion and country of the exposure counterparty for uncovered portion.

The location of a securitization exposure is the location of the borrowers of the underlying exposures. If the borrowers on the underlying exposures are located in multiple jurisdictions, the location of a securitization exposure is the location of the borrowers having the largest proportion of the aggregate End of Period (EOP) principal balance of the underlying exposures. If the sum of the amount of EOP principal balance is equal across jurisdictions, then this EOP principal balance is split between these two countries equally, likewise it is split in three countries if EOP principal balance is same across three countries.

While calculating the weighted average countercyclical buffer, the non securitized, covered positions under the market risk and securitized exposures are considered. For re-securitized, retail pool, and SCP transactions the country where the transaction is originated is considered. After calculating the weighted average, the application then computes a single value for Countercyclical Buffer benchmark which is applicable on all exposures of all jurisdictions.

Additional Loss Absorbency Capital (for G-SIB)

If a banking organization is categorized a Globally–Systematically Important Banks (G-SIB), then the application identifies all subsidiaries in various jurisdictions as G-SIB. This is based on our interpretation of the US III that are applicable for a specific group. Based on this assessment, banks are assigned a GSIB score and the applicable bucket is decided. Identification of this bucket is based on the score as per US III Rules. Loss absorbency is required to be met as an extension of CCB for computational purposes.

Calculation of Capital Conservation Buffer / Available Buffer from CET1 Capital

The value that the application calculates for available buffer from CET1 capital meets the buffer requirements for all three buffers - Capital Conservation Buffer (CCB), Countercyclical Buffer, and Additional Loss Absorbency Capital Requirement. No priority is given to any buffer over another. Hence, the shortfall or excess, if any, is calculated and reported at an aggregate level. The required total buffer is calculated as the sum of the required values of three individual buffers.

The application also computes CET1 and Buffer Lookup Ratio, which is further required for calculating Minimum Capital Conservation Ratio. To calculate the available buffer, remainder of following is taken:

> Excess of CET1 Capital Ratio over the benchmark (4.5%), after catering to the shortfall (if any), in the Additional Tier 1 and Tier 2 capital to their respective benchmark levels (1.5% and 2% respectively).

Hence, CCB excludes any additional CET1 needed to maintain 6% of Tier 1 Capital Ratio and 8% of Total Capital Ratio.

Maximum Payout Ratio

The required buffer from CET1 capital (sum of three required buffers) is compared with the Available Buffer from CET1 capital. If the banks are unable to meet their total buffer requirements for all the three buffers, then they are subject to constraints on the discretionary payments of earnings. In this case, the Maximum Payout Ratio is calculated and represents the percentage of net earnings after tax (positive) not distributed by the bank and held back as retained earnings. Maximum Payout Ratio of the current year is applied after 12 months from the time of calculation.

NOTE: The application calculates Capital Buffers at consolidated level for the reporting bank. However, at the discretion of national supervisors, this can be applied at solo level as well. In such cases, the calculation of solo level for the respective jurisdictions is included in the application.

5.2.1.5.1 Process Flow for Capital Buffers

The tasks related to capital buffer calculations are present in the process named **CAPITAL_BUFFER**. The processing is as follows.

Capital Structure Inputs

The Capital Structure Rules are executed before the calculation of buffers. These Rules calculate the available capital ratios and required capital ratios of the three capital components which are Common Equity Tier 1 Capital Ratio, Tier 1 Capital Ratio, and Capital Ratio. These line items are populated in the **Fact Standard Accounting Head (FCT_STANDARD_ACCT_HEAD)** table.

Available Total Buffer

Calculation of Available Buffer from CET1 Capital is performed using inputs taken from the preceding step.

Required Total Buffer

Calculation of Required Total Buffer is the sum of three required buffers:

- Calculation of Required Additional Loss Absorbency: A Rule in the application contains an additional source hierarchy to identify whether a bank is a G-SIB bank or not. The value is checked in the **Loss Absorbency Capital Bank Override (N_LOSS_ABS_OVERRIDE)** column of the table **Fact Entity Information (FCT_ENTITY_INFO)** and populated to **Fact Standard Accounting Head (FCT_STANDARD_ACCT_HEAD)**. This value has precedence over the bucket specified. If the value is not present in the **Loss Absorbency Capital Bank Override (N_LOSS_ABS_OVERRIDE)** column, then the loss absorbency percent is taken from the column **Bucket Loss Absorbency Capital (N_MIN_ADD_LOSS_ABS_CAP)** of the **Benchmark Loss Absorbency Ratio (FSI_SETUP_BENCHMARK_LOSS_ABS)** table based on the loss absorbency bucket the bank belongs to.

- Required Countercyclical Buffer: Required Countercyclical Buffer Ratio (**FSI_REQUIRED_CNTR_CYC_BUFFER**) table is updated with values. The values are taken from **Benchmark Counter Cyclical Buffer Ratio (FSI_BENCHMARK_CNTR_CYC_BUFFER)** table. The **Regulator Code (V_CAPITAL_ADEQUACY_REGULATOR)** column in Benchmark Counter Cyclical Buffer Ratio is compared to jurisdiction code column in Run Dimension. If no Countercyclical Buffer is available, the required weighted average is 0 as the benchmarks are assumed to be 0. (If there is no countercyclical requirement, the regulator must provide 0 as the benchmark.)

  After the T2T loading, based on each country's requirement for countercyclical buffer, the weighted average Countercyclical Buffer is calculated.

- Calculation of Required Buffer from CET1 Capital, Tier1, and Capital Adequacy Ratio: For the calculation of these required buffers, based on **Updated Capital Component Group Skey** (**N_UPD_CAP_COMP_GROUP_SKEY,** which corresponds to BFCET1 - Buffers from CET1 for Required Buffer from CET1 Capital, BFT1 - Buffers from T1 for Required Buffer from T1 Capital and BFCAR - Buffers from CAR for Required Capital Adequacy Ratio), the standard account head amount is summed up and populated against the corresponding Cap ID in **Fact Standard Accounting Head (FCT_STANDARD_ACCT_HEAD)** table.

Maximum Payout Ratio

Maximum Payout Ratio is calculated based on required CET1, buffers and the setup or semi-static tables as per the year when the Run is executed.

The application assigns Maximum Payout Ratio range for a given CET1 and Buffer Lookup Ratio in table (**FCT_CAPITAL_CONSERVATION_RATIO**). This table is dynamic and formula driven and is constructed by the application using the values of the three required buffers as per the Basel guidelines. The application constructs the range of CET1 and Buffer Look-up ratio (Lower Limit and Upper Limit) for the Maximum Payout Ratio in four quartiles.

Lower Limit = 0.000001 + Upper Limit of $(n-1)^{th}$ quartile

Lower Limit of first quartile = 0.045

Upper Limit = 0.045 + (Total Required Buffer from CET1 capital * 0.25 * n)

Where **n** is the quartile number.

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Excess/Shortfall of Total Buffer

The calculated values (only positive values are considered) are stored against the corresponding Cap IDs as two separate line items of which one is 0.

5.2.1.5.2 Key Data Elements

A few key data elements is elaborated in this section. For a complete list of tables to be updated, see the Download Specifications document.

Countercyclical Buffer requirement for each country should be provided by the client or the bank as the percentage applicable for each country and this is dependent on the home regulator's jurisdiction as it can prescribe Countercyclical Buffer percentage that is higher than the percentage prescribed by the regulator of the exposure country. Hence, the required Countercyclical Buffer percentage for each exposure country provided as an input should be the one that the home regulator agrees to.

G-SIB status and the applicable bucket information for each entity should be provided by the client or the bank. For a consolidated Run, loss absorbency charges applicable to the parent, as required by the regulator of parent, is applicable for complete run. This Run output is supposed to be reported to the jurisdictional regulator of the parent. For a solo Run, loss absorbency charges as required by the regulator for a subsidiary entity are applicable. Hence, for solo and consolidated Runs, G-SIB status of the reporting bank and the applicable bucket is provided by the bank itself.

As the required Capital Conservation Buffer (CCB) must be met as per the transitional arrangement, set up the required buffer value in Setup Capital Heads (**FSI_SETUP_CAPITAL_HEAD)** for different periods against the standard account head ID CAP823. Different CCB requirements specified by the different regulators can be setup by specifying the regulator codes against the same standard account head ID. This regulator code must be the same as the jurisdiction code assigned by the Rule **Jurisdiction Code Assignment**.

The required benchmark of Countercyclical Buffer for different countries as set by different regulators is expected as download in **Stage Benchmark Counter Cyclical Buffer** (**STG_BENCHMARK_CNTR_CYC_BUFFER**). This data is populated to **Benchmark Counter Cyclical Buffer Ratio** (**FSI_BENCHMARK_CNTR_CYC_BUFFER**) using a Slowly Changing Dimension (SCD) process. Buffer requirement given on a date is valid till the next buffer is specified. For a solo Run, the regulator of subsidiary specified buffer requirements are considered and for consolidation Run, the consolidating entity's regulator specified buffer requirements are considered.

The additional loss absorbency requirement specified by different regulators for different buckets should be setup in the table **Benchmark Loss Absorbency Ratio** (**FSI_SETUP_BENCHMARK_LOSS_ABS**). For the solo Run, loss absorbency requirement set by the local regulator is considered. For consolidation Run, the consolidating entity's regulator specified loss absorbency requirement is considered.

There is an option of direct input of applicable loss absorbency percentage. This is also useful when the percentage applied is different from the corresponding bucket percentage. This should be given in the column (**N_LOSS_ABS_OVERRIDE)** of the table **Stage Legal Entity Details** (**STG_LEGAL_ENTITY_DETAILS**). If this column has value, it is given priority over loss absorbency percentage corresponding to the bucket.

The minimum Payout Ratio requirement for different quartiles specified by different regulators is expected as a download in **Stage Benchmark Capital Conservation Ratio** (**STG_BENCHMARK_CAP_CONS_RATIO**). This data is populated to the semi-static table **Benchmark Capital Conservation Ratio** (**FSI_BENCHMARK_CAP_CONS_RATIO**) using a SCD process. Payout ratios specified once are valid till the next revision.

In the **Required Counter Cyclical Buffer Ratio** (**FSI_REQUIRED_CNTR_CYC_BUFFER)** table the Risk Weight Amount column is updated against each country code. This is applicable for Credit Risk (for Non Securitization and Securitization exposures).

5.2.1.7   Single Counterparty Exposure Limit

The Single Counterparty Credit Limits calculation is designed to identify the counterparties whose net aggregate credit exposure to the bank breaches the maximum limit as described by the Federal Reserve guidelines. The Exposure Limit proposal is mitigating the threat to financial stability posed by systemically important financial companies.

The Single Counter Party Exposure Limit is an effort to reduce the concentration risk of a particular bank to a single client or a group of inter connected clients

The final rule applies to all U.S. global systemically important banks (GSIBs), U.S. bank holding companies (BHCs) and Foreign Banking Organizations (FBOs) with total consolidated assets of $250 billion or more and U.S. Intermediate Holding Companies (IHCs) with total consolidated assets of $50 billion or more.

The final rule requires U.S. GSIBs, major FBOs, and major IHCs must comply with the final rule by January 1, 2020; all other covered entities must comply by July 1, 2020.

SINGLE COUNTEPARTY CREDIT LIMITS PROCESS FLOW

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    Counterparty Gross Exposure Amount Processing

    ┌─────────────────────────────────────────────┐
    │    Direct Exposure Amount Calculation        │
    └─────────────────────────────────────────────┘

    ┌─────────────────────────────────────────────┐
    │ Risk Shifting- Indirect Exposure Amount Calculation │
    └─────────────────────────────────────────────┘

    ┌─────────────────────────────────────────────┐
    │   Additional Exposure Amount Calculation     │
    └─────────────────────────────────────────────┘
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Counterparty Exemption Identification

Aggregation of Connected Counterparty

Large Exposure Identification

Counterparty Threshold Calculation

Counterparty Threshold Breach Calculation

5.2.1.7.1   Non Securitization Data Population

Data should be loaded in the application for all the product types and is same as BASEL III data expectation. Main categories of CR non sec exposures, along with their respective table names that are used for data input are as follows.

Higher Level Product Type	Table name for data input (Also known as Product Processor)
Bills	STG_BILLS_CONTRACTS
Credit Cards	STG_CARDS
Swaps	STG_SWAPS_CONTRACTS
Futures	STG_FUTURES
Forwards	STG_FORWARDS
Guarantees	STG_GUARANTEES
Investments	STG_INVESTMENTS
Lease Contracts	STG_LEASE_CONTRACTS
Letters of Credit	STG_LC_CONTRACTS

Line of Credit	STG_CREDIT_LINE_DETAILS
Commitment Contracts	STG_COMMITMENT_CONTRACTS
Loans	STG_LOAN_CONTRACTS
Money market instruments	STG_MM_CONTRACTS
Overdraft	STG_OD_ACCOUNTS
Options	STG_OPTION_CONTRACTS
Re purchase contracts	STG_REPO_CONTRACTS
Equity Exposures	STG_INVESTMENTS
Underlying Exposures for Derivatives and Securitization	STG_UNDERLYING_EXPOSURES
Underlying Exposures for Repo contracts	STG_PLACED_COLLATERAL / STG_MITIGANTS
Credit Derivatives	STG_CREDIT_DERIVATIVES
Placed Collaterals	STG_PLACED_COLLATERAL

Stage data from the product processors or other stage tables is populated in the required tables, where data is further processed. For more information on the list of columns to be populated within each table, see the *Download* Specifications document.

Currency Conversion

The amount data columns that are provided as input (in stage tables) are in the natural currency. In this step, the application converts them to reporting currency columns which are used for further calculations. The column names suffixed as '_ncy' are in the natural currency and they are multiplied by currency conversion factor to populate values in the reporting currency.

Mitigant Data Population

The data related to the mitigants associated to the exposures are captured in this process. The application does the following in this task:

- Mitigant data population to their corresponding Mitigant table, **STG_MITIGANTS**
- Currency conversion from natural currency to reporting currency for the required columns
- Mitigant to Non Sec Exposure mapping population

Non Securitization Data Processing

The Non Securitization related data is processed here and consist of the following broad functional areas:

- Credit Risk for Banking Book Products
- Counterparty Credit Risk for Banking and Trading book exposures
  - Over-the-Counter Derivative Products
  - Securities Financing Transactions
- Credit Risk Mitigation for the Credit Risk

The application processes the Non Securitised exposures in the same way as it is done in BASEL III and

there is no specific changes for Single counterparty credit limits. The corresponding gross exposure amounts required for credit limit calculations are identified in the process **USA_US_III_LARGE_EXP_PROCESSING_DATA_POPULATION**.

7.1.1.6.2 Securitization Data Population and Processing

The application is capable of handling both securitized exposures and re-securitized exposures and the processing is same as the current BASELIII calcualtions,. It also handles the calculation for the originator and the investor bank roles. At a broad level, there are two categories of Investors:

* An Investing Bank who has invested heavily in securitization.
* An Investing Bank who has invested minimal in securitization.

For both the investors, the data is expected in the Stage Underlying Exposures (**STG_UNDERLYING_EXPOSURES**) for the underlying of the pool, Total Pool Level attributes in the Stage Pool table (**STG_SECURITIZATION_POOL**), Tranche Level attributes in the Stage Tranche table (**STG_SECURITIZATION_TRANCHE**), and the Exposure Level Attributes in the respective product processor (PP) tables.

If the exposure is a credit protection in the form of guarantee, it is expected in the Stage Guarantees table (**STG_GUARANTEES**), and if it is a credit derivative, it is expected in the Stage Credit Derivatives table (**STG_CREDIT_DERIVATIVES**). If it is a regular investment in the Tranches by an investing bank, or it is part of the mandate for retention in the pool or tranche for an originating bank, the data is expected in the Stage Investments table (**STG_INVESTMENTS**).

For exposures being a facility like liquidity facility, or servicer cash advance, the exposures are expected in the Stage Commitment Contracts table (**STG_COMMITMENT_CONTRACTS**), along with any respective entry in Stage Credit Line Details table (**STG_CREDIT_LINE_DETAILS**), if there is a credit line involved.

7.1.1.6.3 Mitigant Data Processing

The application handles multiple mitigants for credit risk mitigation like cash, debt securities, Guarantees, Credit derivatives, and so on. The mitigant types are reclassified as standard mitigant types. These are then identified as eligible or not based on the eligibility Rules. The application has pre-configured Rules to carry out the mitigant eligibility checks. There are separate eligibility Rules for different standard mitigants types. All cash and debt securities are marked as eligible. Equity is classified as eligible mitigant based on whether it is publicly traded equity or not. All Credit derivatives and guarantees are treated as eligible based on their standard issuer types.

5.2.1.6.1 Entity Identification and Applicable Single Counterparty Limits

The percentage for the credit limit and the eligible capital base against which the credit limit is measured vary depending on the size and regulatory status of the covered firm and also on the counterparty type being major or non-major.

A "major counterparty" is defined as a global systemically important banking organization or a nonbank financial company supervised by the Board.

The entitty identification happens based on the holding company type and consolidated assets of the holding company. The identification is detailed in the following table:

Category of U.S. BHC	Applicable Credit Exposure Limit
U.S. BHCs with total consolidated global assets less than $250 billion	None; Not a Covered Company
Covered U.S. BHCs that are not Major Covered Companies	25 percent of the Covered Company's tier 1 capital
U.S. BHCs that are GSIBs using the global methodology (Major Covered Companies)	15 percent of the Major Covered Company's tier 1 capital for exposures to Major Counterparties 25 percent of the Major Covered Company's tier 1 capital for all other counterparty exposures

Category of FBO	Applicable Credit Exposure Limit
U.S. FBO with total consolidated global assets less than $250 billion	None; Not a Covered Company
Combined U.S. operations of FBOs with total consolidated global assets that equal or exceed $250 billion but are not Major FBOs	25 percent of the FBO's tier 1 capital
Top tier FBOs that are GSIBs using global methodology (Major FBOs)	15 percent of the Major FBO's tier 1 capital for exposures to Major Counterparties 25 percent of the Major FBO's tier 1 capital for all other exposures

Category of U.S. IHC	Applicable Credit Exposure Limit
U.S. IHCs that have total consolidated assets less than $50 billion	None; Not a Covered Company
U.S. IHCs that have total consolidated assets of at least $50 billion but less than $250 billion	25 percent of the IHC's total regulatory capital plus the balance of its allowance for loan and leases losses (ALLL) not included in tier 2 capital under the capital adequacy guidelines
U.S. IHCs that have $250 billion or more in total consolidated assets but are not Major U.S. IHCs	25 percent of the IHC's tier 1 capital

U.S. IHCs that have $500 billion or more in total consolidated assets (Major U.S. IHCs)	15 percent of the IHC's tier 1 capital for exposures to Major Counterparties
	25 percent of the IHC's tier 1 capital for all other exposures

NOTE: Single Counterparty Exposure Limit calculations are done only at a consolidated level of the ultimate parent. However, there are no restrictions by the application on this. The Run is executed at any level of the hierarchy of the legal entity structure.

5.2.1.6.2 Counterparty Gross Exposure Amount Calculation

Products covered under credit limits are as follows:

- Calculation of gross credit exposure depends on the specific product category of on-balance sheet, off-balance sheet exposure, derivative products, Secured lending and borrowings, exposures arising from CIU, exposures arising from SPVs along with the exposures to third parties of the SPVs and trade exposures.
- Calcualtion also coveres indirect exposures of the counterparty arising out of the mitigant exposures of the bank.
- Calculaton also takes into, the amount of initial margin and variation margin in excess of that needed to secure the mark-to-market value of a derivative that is posted to a bilateral or central counterparty would be treated as credit exposure to the counterparty unless the margin is held in a segregated account at a third-party custodian account With respect to both cleared and uncleared derivatives.

The solution populates all the exposures pertaining to each of the counterparties without considering their relationship with other counterparties into Counterparty Exposure processing table **(FCT_COUNTERPARTY_EXPOSURES)**. The exposure amount pre mitigation, as well as post mitigation, and the exempted amount are considered in this data population.

The data population considers even the indirect exposures, wherein the bank holds a mitigant that is issued by a counterparty. The eligible net mitigant amount, post haircut adjustment is considered as an indirect exposure of the Bank towards the issuer of the mitigant, and is capped at the orginal exposure amount for which the mitigant has beeen placed so as to take overcollateralisation value into consideration

The data population also considers the logic for additional exposures, wherein the bank is a counterparty (customer or issuer, depending on the product code), for the underlying exposures of Securitization or CIU.

5.2.1.6.3 Exempted Exposures

The guidelines provides mainly six types of exclusions from the calcualation which is as below :

- Direct claims on, and portions of claims that are directly and fully guaranteed as to

principal and interest by the Federal National Mortgage Association and the Federal Home Loan Mortgage Corporation, while these entities are operating under the conservatorship or receivership of the Federal Housing Finance Agency;

- Any intraday credit exposure to a counterparty is exempted from single counterparty limts guidelines. The application currently does not expect any intraday credit exposure to a counterparty as a data input and this exemption gets handled aoutomatically throght the data expectation.

- Trade exposures to a central counterparty that meets the definition of a qualifying central counterparty

- Any credit transaction with the Bank for International Settlements, the International Monetary Fund, or institutions that are members of the World Bank Group (namely, the International Bank for Reconstruction and Development, the International Finance Corporation, the International Development Association, the Multilateral Investment Guarantee Agency, and the International Centre for Settlement of Investment Disputes)

- Any credit transaction with the European Commission or European Central Bank exempt any transaction which the Board determines to be in the public interest and consistent with the purposes of section 165(e) of the Dodd-Frank Act. This is expected to be a customised input from the customer side as this exemption criteria is not explicitly mentioned in the guidelines.

Each of the exemption is identifed and and stamped with specific exemption criteria codes that will identify the exempted counterparties. The application also calculates the exempted gross and net exposures of a counterparty.

5.2.1.6.4 Risk Shifting

A covered company must also take into account the adjusted market value of any eligible collateral when calculating its gross credit exposure to a counterparty. The eligible mitigant value post haircut is considered as an indirect exposures of the holding company towards the collateral issuer. The solution also take into account the collateral eligibility check, haircut value adjusted net mitigant value and also capping the net mitigant value to the orginal exposure amount incase of over collateralisation.

5.2.1.6.5 Aggregation of Connected Counterparties

The core aim of a large exposure regime is to act as an overlay "to prevent a financial institution from incurring large losses as a result of the failure of an individual client or group of connected clients due to the occurrence of unforeseen events". The large exposures framework requires aggregation of exposures to counterparties, where the counterparties are connected through various relationships like economic interdependence, Business control relationship and so on.

While aggregating the counterparties the following check must be done:

- All the counterparty exposure must be aggregated based on the party relationship defined and

is aggregated against the ultimate parent. This aggregation logic is used for every party types except for retail party type for which the aggregation logic is different.

- For retail party type aggregation and population logic is based on the cumulative amount of all the related parties that is, if the ultimate party is retail and if all the related party exposure sum crosses 5% of the corresponding limits set as per the entity types then the aggregation needs to be done.

A connected group is identified as a large exposure if the net exposure amount crossed the 5% of the eligible capital base. The regulatory thresholds are assigned based on the ultimate parent party type and is used to identify the threshold breach.

Data Expectation

Bank must provide an exhaustive list of Party-Party relationship in the table Stage Party To Party Relationship (**STG_PARTY_PARTY_RELATIONSHIP**). This gets reclassified into the Regulatory Party Relationship type as part of the Process : **Party Relationship Population and Reclassification**.

The relationship list must include direct and indirect relationships between the parties. The solution sums up the exposures for all the counterparties belonging to the same parent, along with the parent, and populates the Fact Party Group Exposure table (**FCT_PARTY_GROUP_LARGE_EXPOSURE**). The expectation is that all the parties which are related to each other, have the Parent ID i the Party table as the same. On the party group, the threshold limit check is applied, and the large exposure is also found.

Assumption

As per the guidelines the Federal Reserve can determine certain relationships between the counterparties to be relevant or irrelevant, which will influence the aggregation of the exposures of connected counterparties. Such discretionary relationships are expected to be handled while the Bank provides the relationship data in **STG_PARTY_PARTY_RELATIONSHIP**.

5.2.1.7.2 Process Flow for Single Counterparty Exposure Limit

Key Data Elements

Data for identification of an entity's holding company type is expected as a dowload in organizational structure data and expectation is to define the holding company type as Bank holding Company(BHC), Foreign Banking Organisation(FBO) or Intermediate Holding Company(IHC). This holding type of the entity along with the consolidated asset value; which is expected as party of download in Stage party financials **(STG_PARTY_FINANCIALS)** is used to identify the entity as Major or Non- Major entity and ultimately the regulatory threshold limits applicable to counterparties.

There are certain mandatory details about the product that are provided as download which cannot be calculated in the product processor table without which the exposure value cannot be computed. For a complete list of tables and columns, see the Download Specifications document.

The mandatory data that is provided for the different products are as follows:

  o   Lending Instruments - Current Exposure Value

- o Equities – Equity Market value

- o Debt Securities – EOP Balance

- o REPO - Underlying exposure value

- o Guarantees and Letter of Credit - the exposure value, maximum potential loss

- o OTC Derivatives - MTM value, Notional principal of the derivative

- o Credit or Equity Derivatives - Exposure value, maximum potential loss

All of the above mentioned product types are included in the Gross Exposure calculation. While populating data the application also takes care of the currency conversion from natural currency to the reporting currency.

The solution is expecting the Market risk exposure post offset amount of the holding company in **FSI_SETUP_LE_MKT_RISK_DETAIL** as a download. As part of processing, new FSI tables are introduced specifically for counterparty limits processing- all the direct exposures and market risk exposures are moved to **FSI_LARGE_EXPOSURE_ACCT_DETAILS**, Mitigant data is moved to **FSI_LARGE_EXPOSURE_MITIGANTS** and underlying data is moved to **FSI_UNDERLYING_LARGE_EXPOSURE**. The capital related inputs which will be used for checking the threshold limit amounts is expected as a download in **FSI_STANDARD_ACCT_HEAD** which will provided at the GL codes level (GL entries in **DIM_CAPITAL_ACCT_HEAD**). The custome rule reclassify the capital account head ID to standard account head ID and reclassified data gets populated **FCT_CAPITAL_ACCT_HEAD**. The reclassified capital data moves to **FSI_ENTITY_INFO_DETAILS** and finally the capital structure specific inputs for SCCL computation is moved to **FSI_CAPITAL_INFO**.

To capture the third party SPV exposure of the holding company new FSI table - **FSI_SETUP_SPV_THIRD_PARTY_DTLS** has been introduced and the data is expected as download, which moves into **FSI_SPV_THIRD_PARTY_DTLS**. This will be part of setup table population batch.

In large exposures processing, the market risk details are captured in the FSI setup table **FSI_SETUP_LE_MKT_RISK_DETAIL**. The data in this table has to be provided at the instrument level. The data from this setup table is then populated into **FSI_LARGE_EXP_MKT_RISK_DETAIL** through a T2T.

As our large exposure processing starts at the exposure level, the application creates dummy exposures for these market risk instruments in **DIM_EXPOSURE** and then inserts these dummy exposures into the **FSI_LARGE_EXPOSURE_ACCT_DETAIL** table.

The dummy exposure are created with exposure id as '**MR_LE_'|| DIM_INSTRUMENT_CONTRACT.N_INSTRUMENT_SKEY || '_' || DIM_PARTY.N_PARTY_SKEY** for any record present in **FSI_LARGE_EXP_MKT_RISK_DETAIL**.

You can identify the dummy market risk exposures created in **DIM_EXPOSURE** by using the exposure id mentioned above.

5.2.1.7 Leverage Ratio

US Regulatory Capital Final Rules have identified two types of leverage ratios which are as follows:

- **Minimum Tier 1 Leverage Ratio**: As per US Regulatory Capital Final Rules Minimum Tier 1 Leverage Ratio should be 4 percent. Minimum Tier 1 Leverage Ratio is calculated by dividing the organization's net tier 1 capital (post regulatory adjustment) by its average consolidated assets subtracted by the regulatory adjustment amount that is deducted from the tier 1 capital. A separate Run **USA - Basel III - Minimum Tier 1 Leverage Ratio Calculation** is incorporated in the application to compute Minimum Tier 1 Leverage Ratio.

- **Supplementary Leverage Ratio**: As per US Regulatory Capital Final Rules Supplementary Leverage Ratio is set to minimum of 6% to qualify under 'Well-Capitalized' category while it remains same as 3% for 'Adequately Capitalized' category. The application does not capture these benchmarks and is captured in the system for US jurisdiction.

  Supplementary Leverage Ratio is defined as tier 1 capital / total leverage exposure. A separate Run **USA - Basel III - Supplementary Leverage Ratio Calculation** is incorporated in the application to compute Supplementary Leverage Ratio.

5.2.1.7.1 Process Flow for Minimum Tier 1 Leverage Ratio
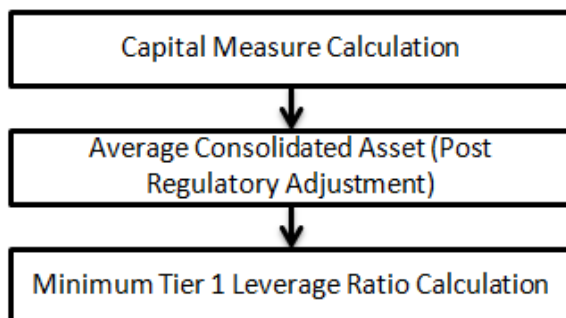
Capital Measure Calculation

The Net Tier 1 Capital amount is calculated in the Capital Structure process (as per US III). For more information on Calculation of Net Tier 1 Capital, see the US Capital Structure process.

Average Consolidated Asset (Post Regulatory Adjustment)

The average consolidated asset value is at the consolidated Bank Holding Company level. The average consolidated asset value is at the consolidated Bank Holding Company level. The average consolidated asset value used in the Minimum Tier 1 Leverage Ratio should be provided by the bank. The value should be provided in stage legal entity detail (**STG_LEGAL_ENTITY_DETAILS**) table. The line items that are deducted from Average Consolidated Assets are as follows:

- Goodwill
- Other Intangible Asset
- DTA
- Accumulated Other Comprehensive Income – AOCI

- Cash Flow Hedge Reserve
- Gain on Sale associated with Securitized Exposures
- Defined Pension Fund Asset
- Cumulative gains and losses due to changes in own credit risk
- Threshold deduction line item above 10% which is arrived at during the processing of Capital Structure and should be provided by the bank
- Threshold deduction line item in aggregate that is above 15% which is arrived at during the processing of Capital Structure and should be provided by the bank

The above mentioned deduction line items are marked as "Deduction from Leverage Ratio" in the **FCT_STANDARD_ACCT_HEAD** and these are deducted from the average consolidated asset.

The above line items deducted from average consolidated asset follows a phase-in arrangement as defined in Capital Structure. Hence, for DTA a deduction line item, 20% of the amount is deducted from CET1 in the year 2016 and the remaining 80% is deducted from AT1. The same deduction amount is deducted from the average consolidated asset. Therefore, 20% of the amount and 80% of the amount is deducted from the average consolidated asset.

Similarly, for Other Intangible Assets in which 20% is deducted from CET1 and remaining 80% is risk-weighted, then only the part that is deducted (that is 20%) is reduced from average consolidated asset. The risk weighted portion is not deducted.

Hence, for the following line items (where the entire amount is being deducted as per phase-in arrangement from CET1 and AT1) is reduced from Average Consolidated Asset:

- DTA
- Cash Flow Hedge Reserve
- Gain on Sale associated with Securitized Exposures
- Defined Pension Fund Asset
- Changes in Banking Organization Creditworthiness

Whereas, for other intangible assets (threshold deduction amount above 10% and 15%) where only a certain portion, as per the phase-in arrangement, is being deducted from CET1, the same amount is reduced from the average consolidated asset. The remaining amount being risk-weighted is not deducted.

Minimum Tier 1 Leverage Ratio

Minimum Tier 1 Leverage Ratio is calculated by dividing the organization's tier 1 capital by its average consolidated assets subtracted by the amount deducted from tier 1 capital. The tier 1 capital is considered as the net tier 1 capital. Net tier 1 capital is the summation of net common equity tier 1 (CET1) capital and net additional tier 1 capital and regulatory adjustment applied on its respective tier of capital. The Minimum Tier1 Leverage ratio, thus calculated, is stored in the **FCT_STANDARD_ACCT_HEAD** table under the "USA: Leverage ratio" standard accounting head description.

5.2.1.7.2 Process Flow for Supplementary Leverage Ratio

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┌─────────────────────────────────────────────┐
│            Capital Calculation              │
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┌─────────────────────────────────────────────┐
│              Reclassification               │
└─────────────────────────────────────────────┘
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┌─────────────────────────────────────────────┐
│      Non Securitization Data Population      │
└─────────────────────────────────────────────┘
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┌─────────────────────────────────────────────┐
│  Non Securitization - Leverage Measure Calculation │
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┌─────────────────────────────────────────────┐
│        Securitization Data  Population       │
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│  Securitization - Leverage Measure Calculation │
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┌─────────────────────────────────────────────┐
│  Market Risk Related Exposure Measure Population │
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┌─────────────────────────────────────────────┐
│            Capital Calculation              │
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┌─────────────────────────────────────────────┐
│          Leverage Ratio Calculation          │
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During the financial crisis, banking institutions built-up excessive on-balance sheet and off-balance sheet leverage which forced the banking sector to reduce its leverage. To prevent building of excessive leverage on the institutions' balance sheet, the EBA has introduced a non-risk based leverage ratio which is a new regulatory tool supplementing risk-based capital requirement. The leverage ratio guidelines were revised and published on 10[th] October 2014. The guidelines are mostly in sync with the revised leverage ratio guidelines issued in 2014 by BIS.

The solution supports this revised approach in the calculation. The application calculates the leverage ratio for a reporting bank. The minimum required leverage ratio is 3%.

The leverage ratio is calculated by dividing an institution's Tier 1 capital measure by the total leverage exposure measure.

$$\text{Leverage Ratio} = \frac{\text{Tier 1 Capital}}{\text{Leverage Exposure Measure}}$$

The Run **USA - US III - Revised Supplementary Leverage Ratio Calculation** is used for computing the leverage ratio, as per the revised guidelines.

Net Tier 1 capital is the summation of Net CET1 and Net AT1 capital amount post regulatory adjustment. Exposure measure is the summation of on-balance sheet items, off-balance sheet items, Derivative Exposures and Structured Financial Transactions (SFT). The on-balance sheet items include the Non-Securitization exposures' amount and the Securitization exposures' amount.

The off-balance sheet items include the Non-Securitization exposures' amount and the Securitization exposures' amount. Mitigation is not considered when calculating exposure amount.

NOTE:	The leverage calculation happens at the consolidated parent entity level. The market risk data are not captured for the EU Jurisdiction, and hence that is expected as a download. This is expected in Stage Standard Account Head (**STG_STANDARD_ACCT_HEAD**) for the CAP843 (Leverage Ratio).

The leverage ratio calculations are a separate run, and not part of the regular capital calculation run. This is because of the changes in the Credit conversion factor assigned to the exposures, and also exemption of few exposures from the calculation which are part of the capital charge calculations. Also, the mitigation is not required for these exposures, and the exposure measure calculations are different from the regular EAD calculations.

The details of the process flow for leverage ratio is as follows.

Capital Consolidation process

The capital consolidation process remains the same as is existing in the capital calculation run.

Reclassification

The reclassification process remains the same as is existing in the capital calculation run.

Non Securitization Exposure Data Population

Data from the Product Processors are populated to **FCT_NON_SEC_EXPOSURES** table in the process **USA - US III - Non-securitized Exposure Data Population - STD**. This data population also remains the same as existing in the capital calculation run.

Non Securitization Exposure Measure Calculation

After data is populated in non sec processing table, the exposure measure is calculated in the process **USIII_LEV_RATIO_EXPOSURE_MEASURE_CALCULATION**.

The Exposure measure is the sum of the Pre Mitigation EAD amount of the following exposure types:

- On-Balance Sheet Exposures
- Off-Balance Sheet Exposures
- SFT Exposures
- Derivative Exposures

Details on the calculation of these exposure measures are mentioned in the following sections. All the exposure measures are computed and populated into the Leverage Exposure amount (**N_LEVERAGE_EXPOSURE_AMOUNT**) column. And any exempted exposures are identified by the solution in the Regulatory Capital Exemption Criteria in the Non Sec Exposures processing table. These exempted criteria are part of the dimension table of Regulatory Capital Exemption Criteria Dimension (**DIM_REG_CAP_EXEMPTION_CRITERIA**).

On-Balance Sheet Exposures

The accounting value of the on-balance sheet exposures net of specific provisions and valuation adjustments are considered for the exposure measure. The valuation adjustments are captured at an instrument level, in the FSI setup table for Instrument Valuation Details (**FSI_INSTR_VALUATION_DETAILS**).

The exposure measure considered is the Pre-Mitigation amount, and does not consider the benefit of the mitigation.

Some of the exempted exposures are detailed as follows.

Fiduciary Assets

If the bank considers the assets of the fiduciary assets, as the bank's own assets, then, these assets are exempted from the calculation. The fiduciary assets are identified based on the exposures having the Parent Fiduciary Account Number (V_PARENT_FIDUCIARY_ACCT_NUMBER) in the product processor (PP) staging tables.

The bank has to select the run management option to select whether the exposures are derecognized in the balance sheet or not. If the run management option of Y is selected, all the fiduciary assets with the parent fiduciary account is exempted from the Leverage Exposure Measure calculations. If the run management option of N is selected, specific fiduciary assets can be exempted from the Leverage Exposure Measure calculations. These specific fiduciary assets are expected to be provided in the FSI Fiduciary Assets setup table (**FSI_SETUP_DEREC_FIDUCIARY_ASST**).

This is handled in the **Fiduciary Assets Exemption** subprocess of the **USIII_LEV_RATIO_EXPOSURE_MEASURE_CALCULATION** process.

Off-Balance Sheet Exposures

The exposure amount for off-balance sheet exposures is the undrawn amount of the exposure multiplied by the CCF. The CCF of the exposures remain the same as in the Capital Calculation Run, except that the CCF is floored at 10%. The flooring of the CCF to 10% is handled by the rule **Non Sec Off Balance Sheet Exposures CCF Percent Flooring** in the **Non Sec CCF Assignment** sub process.

This exposure measure does not consider the mitigation effect.

SFT Exposures

The exposure amount of the SFT Exposures to be considered for the leverage measure is post the effect of the collateral. The SFT Exposures data provided in the staging must not consider the accounting netting.

The data capture for the SFT exposures remain the same as in the Capital calculation run. The bank role in the SFT transaction is also captured in the staging table.

The Gross amount and the Add-on amount, as expected in the accord are computed by the application. The Gross amount is the actual transaction amount of the SFT exposures, as provided in the Repo contracts staging table. And the Add-on amount is the difference between the fair value of the repo exposures and the fair value of the collateral placed or received.

The fair value of the exposures, including the placed collateral are captured at an instrument level, in the FSI setup table for Exposure Fair Value Details (**FSI_SETUP_INSTR_VALUATION_DTLS**), and the fair value of the mitigants are captured in the FSI setup table for Mitigant Fair Value (**FSI_SETUP_MTGNT_VALUATION_DTLS**).

The mitigants which are used to offset the fair value of the repo exposures, are stamped accounting heads, to ensure that they can be tracked.

The exposure amount calculations are different for the bank acting as a principal in the SFT transactions, and an agent in the SFT transactions. The solution supports both the treatments.

For bank acting as an agent, the solution handles all the treatment mentioned in the accord. The data expectation for them are as follows:

- *Case 1: Bank is an agent, and does not get involved in any other role with the SFT Exposure*

    In this case, the data is not expected in the Repo contracts staging table.

- *Case 2: Bank is an agent, and provides a guarantee equal to the difference between the SFT Exposure and the collateral amount*

    In this case, the data is expected in the Repo contracts staging table, with the bank role as an agent, and the indemnity indicator **(F_INDEMNITY_IND)** as 'Y'.

    The application computes only the Add-on amount for this SFT transaction, inline with the guidelines. And this Add-on amount is populated into the Add-on column of the processing table.

    This Add-on amount is caluclated in the data transformation **Lev_Ratio_SFT_Addon_amt.**

    This is handled in sub process (**Leverage Ratio Computations**) of the process (**USIII_LEV_RATIO_EXPOSURE_MEASURE_CALCULATION**).

- *Case 3: Bank is an agent, and provides a guarantee more than the difference between the SFT Exposure and the collateral amount*

    In this case, the data is expected in the Repo contracts staging table, with the bank role as an agent, and the indemnity indicator **(F_INDEMNITY_IND)** as Y. And a separate guarantee transaction is expected to be recorded in the guarantee staging table. This guarantee transaction is also provided as a mitigant with the mitigant table also storing the guarantee contract ID (**V_GUARANTEE_CONTRACT_ID**). And the exposure and the mitigant must be mapped to each other in the exposure mitigant mapping table **(STG_EXP_MITIGANT_MAPPING)**.

    This guarantee is not for a mitigant treatment, and hence, this is expected with the mitigant eligibility flag as 'N'. This identified guarantee is populated in FNSE.n_repo_contract_skey.

    The application computes both the gross exposure amount and the addon amount for this SFT transaction, inline with the guidelines.

    This Add-on amount is caluclated in the data transformation **Lev_Ratio_SFT_Addon_amt.**

    This is handled in sub process (**Leverage Ratio Computations**) of the process (**USIII_LEV_RATIO_EXPOSURE_MEASURE_CALCULATION**).

Derivative Exposures

Derivative transactions (OTC Derivatives) exposure measure are calculated using the Mark to Market Method. The add-on assignment is same as what is mentioned in the Capital Calculation Run. The exposure measure is the sum of market value, and the notional amount multiplied by the add-on percent.

The derivative exposure measure has few specific treatment, in terms of the Leverage Exposure Measure calculations. They are as detailed as follows.

Collateral of Derivative

The collateral received with reference to the derivatives, cannot be used in netting, and reducing the exposure amount of the derivatives. Based on whether the operative accounting framework allows for netting of the collateral or not, the solution updates the exposure measure. The solution expects a run management selection to identify whether the bank considers netting of the collateral outside the application, and provides the netted amount as input to the product processor staging tables.

The collateral of derivative is given in the mitigant table. There is a run management option to capture whether the operative accounting framework allows for netting of the collateral as per the master netting agreement or not.

If 'Yes' is selected, assuming that the bank has provided the MTM value based on already considering the collateral amount, the collateral amount is added to the MTM of the exposure. And if 'No' is selected, there is no change to the MTM value.

Data Expectations

- Collateral for the derivatives, which is already considered in the MTM calculation, are provided in the **STG_MITIGANTS** table with the eligibility flag as 'N' and the corresponding entry is added into the **STG_EXP_MITIGANT_MAPPINGS** table.

- The MTM provided for the derivatives' instruments, must be after following the corresponding operational accounting framework.

Cash Variation Margin

As per the guideline, the Replacement cost of the derivatives can be reduced by cash variation margin if certain conditions are satisified. This is handled in the solution by using the above run management option, wherein it mentions whether the exposure is being offset with the collateral or not.

In the run management, if the option of 'No' is selected, the cash variation margin is used to offset the exposure measure. If all the conditions are satisfied, the flag to indicate that the Variation Margin has satisfied the conditions is updated. And if this flag is 'Y', then, the cash variation margin is used to reduce the replacement cost of the derivative.

This is handled in the sub process (**Cash Variation Margin Exemptions**) of the process (**USIII_LEV_RATIO_EXPOSURE_MEASURE_CALCULATION**).

Clearing Member of a QCCP

For clearing member of a QCCP, the exposures where Bank acts as a clearing member, and the trade exposures, wherein the bank is not obligated to reimburse the losses suffered by the client, for CCP default are exempted, from the leverage ratio calculation.

This is handled in the sub process (**QCCP Related Exemptions**) of the process (**USIII_LEV_RATIO_EXPOSURE_MEASURE_CALCULATION**).

Written Credit Derivatives or Sold Credit Derivatives

The effective notional amount of the credit derivative transactions are reduced by any change in the fair value of derivative liabilities. The fair value of the exposures are captured in the FSI setup table for Fair Value (**FSI_SETUP_INSTR_VALUATION_DTLS**), at an instrument level. And the difference between the Fair value and the MTM value of these exposures result in the unrealized gain and loss of the derivative exposures.

This is subtracted from the notional principal of these derivatives to arrive at the effect notional principal before offsetting.

The sold credit protection is offset against the bought credit protection based on the conditions mentioned in the guidelines. This offset happens in the data transformation (**SCP_BCP_Offset_Mapping**) which is in the sub process (**Written Credit Derivatives SCP BCP Offset Mapping**).

All the other written credit derivative treatment is handled in the sub process (**Written Credit Derivative Related Exemptions**) of the process (**USIII_LEV_RATIO_EXPOSURE_MEASURE_CALCULATION**).

Securitization Data Population

Securitization exposure data is populated to securitization processing table in the process **USA - US III - Securitized Exposure Data Population - STD**. The population remains the same as in the capital calculation run.

Securitization Exposure – Leverage Measure Calculation

After securitization exposure data is populated, exposure measure is calculated in the process **USA - Exposure - Mitigant Mapping Data Population**.

The exposure measure calculation remains the same as in the capital calculation run, except that the CCF for the off balance sheet exposures are floored at 10%. And the mitigation is not considered for the leverage measure calculations.

Market Risk – Leverage Measure Calculation

Leverage Measure for Market Risk is directly expected as a download in the Stage Standard Accounting Head (**STG_STANDARD_ACCOUNT_HEAD**) with the CAP1809 (On Balance and Off Balance Total Leverage Exposure Measure for Securitized Exposures). This is expected as a download, as the EU jurisdiction does not support the MR calculations.

Capital Calculation

Capital measure is calculated in EU_CAPITAL_STRUCTURE process. Capital Measure used in the leverage ratio is equal to Net Tier 1 which is post all regulatory adjustments. The capital structure is the same as the capital calculation run.

Leverage Ratio Calculation

The leverage ratio is calculated as follows.

Leverage Ratio = Tier 1 Capital / Total Leverage Exposure Measure

This is computed in the process – **USIII_LEV_RATIO_LEVERAGE_RATIO_CALCULATION**.

5.2.1.7.3 Process Flow for Enhanced Supplementary Leverage Ratio
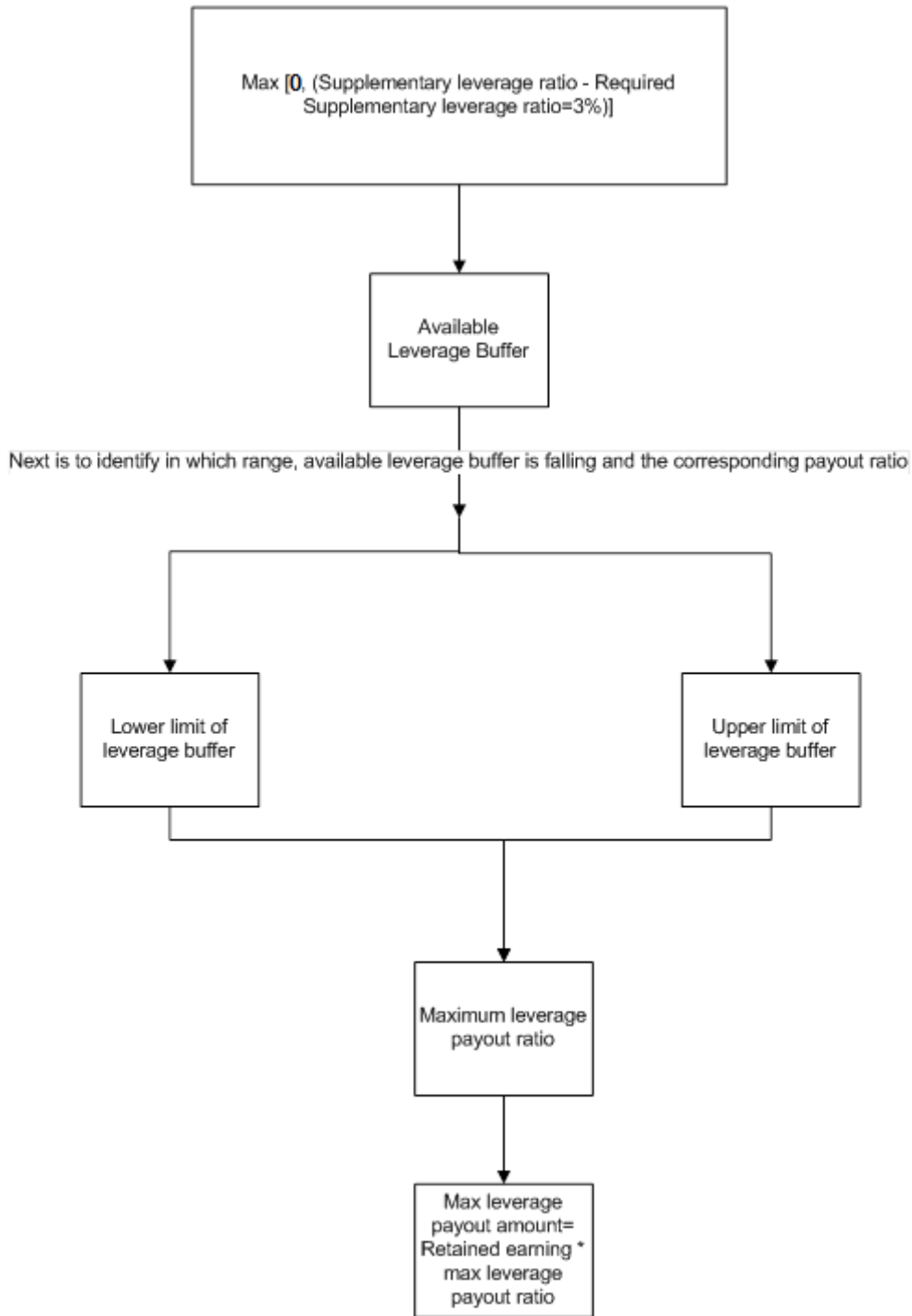
The Enhanced Supplementary Leverage Ratio (SLR) standards are applicable to any U.S. top-tier BHCs, that have more than $700 billion in total consolidated assets or more than $10 trillion in assets under custody (covered BHC) and any advanced approaches insured depository institution (IDI) subsidiary of these BHC. The effective date of this rule January 1st, 2018. An IDI that is a subsidiary of a covered BHC must maintain a supplementary leverage ratio of at least 6 percent, to be well capitalized.

The final rule is adopting a supplementary leverage ratio buffer (leverage buffer) of two percent, above the minimum supplementary leverage ratio requirement of three percent for covered BHCs.

Leverage buffer imposes constraints on making discretionary payments. A covered BHC that maintains a leverage buffer of tier 1 capital in an amount greater than two percent of its total leverage exposure is not subject to limitations on distributions and discretionary bonus payments. If a covered BHC maintains a leverage buffer (in amount) of two percent or less of its total leverage exposure, it is subject to limitations on distributions and discretionary bonus payments.

Calculation of Leverage Buffer

The leverage buffer is composed of tier 1 capital. A covered BHC's leverage buffer can be formulated as follows:

> *Leverage Buffer = SLR (calculated as of the last day of the previous quarter) - Minimum SLR (3 %)*

If the covered BHC's supplementary leverage ratio is less than or equal to 3 percent, then the covered BHC's leverage buffer becomes zero.

After calculating leverage buffer ratio, covered BHC calculates the Maximum leverage payout ratio, in order to calculate the maximum leverage payout amount. Covered BHC's maximum leverage payout amount for the current quarter can be formulated as follows:

> *Leverage Payout Amount = Eligible Retained Income * Applicable Maximum Leverage Payout Ratio*

Where, Maximum Leverage Payout Ratio is the percentage of eligible retained income that a covered BHC can pay out in the form of distributions and discretionary bonus payments, during the current quarter.

Eligible retained income is the net income (as reported in the banking organization's quarterly regulatory reports) for the four calendar quarters preceding the current calendar quarter, net of any capital distributions and associated tax effects not already reflected in net income.

The following table indicates the relationship between the leverage buffer and the maximum leverage payout ratio.

Leverage Buffer	Maximum Leverage Payout Ratio (As a percentage of eligible retained income.)
Greater than 2.0 percent	No payout ratio limitation applies
Less than or equal to 2.0 percent and greater than 1.5 percent	60 percent
Less than or equal to 1.5 percent and greater than 1.0 percent	40 percent
Less than or equal to 1.0 percent and greater than 0.5 percent	20 percent
Less than or equal to 0.5 percent	0 percent

NOTE: A covered BHC is subject to the lower of the maximum payout amount as determined under capital conservation buffer and the maximum leverage payout amount as determined under leverage buffer.

SLR in OFS Basel Application

The leverage buffer is calculated by adding the required minimum supplementary leverage ratio, required leverage buffer, and required leverage buffer amount in DIM_STANDARD_ACCT_HEAD table. For this purpose, new CAPIDs are created in DIM_STANDARD_ACCT_HEAD table. Required leverage buffer amount is calculated as Tier 1 capital * required leverage buffer. Tier 1 capital is the sum of Gross CET1 capital (CAP947) and Gross ATI capital (CAP953). Required leverage buffer amount is stored in FCT_STANDARD_ACCT_HEAD table.

Based on Standard account head code, the required SLR is added to the FSI_SETUP_CAPITAL_HEAD table from DIM_STANDARD_ACCT_HEAD. In FSI_SETUP_CAPITAL_HEAD table, the component value for the above mentioned items are included.

To calculate the leverage buffer, the SLR and the required SLR are compared via a consolidation run. Final value of leverage buffer gets stored in DIM_STANDARD_ACCT_HEAD table. This is stored using a new CAPID. After calculating leverage buffer, the leverage buffer (lower/upper limit and maximum leverage payout ratio) is populated in FSI_BENCHMARK_LEVERAGE_BUFFER_RATIO table.

After populating the upper and lower limit of the leverage buffer and maximum leverage payout ratio, the range at which the leverage buffer falls is checked. Based on this check, the maximum leverage payout ratio and maximum leverage payout amount are calculated. These amounts are directly populated to FCT_STANDARD_ACCT_HEAD table.

*Maximum leverage payout amount = N_MAX_LEVERAGE_PAYOUT_RATIO * Retained Earnings (FCT_STANDARD_ACCT_HEAD).*

This amount is stored in FCT_STANDARD_ACCT_HEAD table. A new CAPID is created in DIM_STANDARD_ACCT_HEAD table to store the value of Maximum leverage payout amount. After this, a new CAPID is updated in DIM_STANDARD_ACCT_HEAD table to capture the available distributions and discretionary bonus payments, that is the Maximum leverage payout amount and Maximum payout amounts.

5.2.1.7.4 Key Data Elements

Key data elements are elaborated in this section. For a complete list of tables and columns to be populated, see the *Download Specifications* document.

To calculate the leverage ratio, exposure amount for all product types and the total capital are required.

The key data elements for exposure measure calculation of the various product types are as follows:

- ♦ On-Balance Sheet Exposures: For on-balance sheet items, End of Period (EOP) balance amount, write-off, and accrued interest amount is required.
- ♦ SFT Exposures: For repo products, exposure amount, and instrument rating are required.
- ♦ Derivative Exposures: For derivative products, exposure mark to market value, notional principal amount, and underlying instrument types are required.
- ♦ Off-Balance Sheet Exposures: For off-balance sheet items, undrawn amount is required.
- ♦ Securitization Transaction: For securitization transactions, exposure amount is required.
- ♦ Capital Calculation: See the Capital Structure for more details.

◆ Cash Variation Margin: The collateral segregated flag, exchange traded flag, and netting agreement code are required.

◆ Netting Agreement: The margin threshold and the minimum transfer amount are required, which are captured in the Stage Net Exposures table (**STG_NET_EXPOSURES**).

5.2.1.8 Total Loss-Absorbing Capacity (TLAC)

On December 15th 2016, the Federal Reserve (Fed) finalized its long-discussed Total Loss-Absorbing Capacity (TLAC) requirements. The Fed's TLAC requirements apply to US bank holding companies (BHCs) of global systemically important banks (GSIBs) and US intermediate holding companies (IHCs) of foreign GSIBs. It requires them to have enough capital and debt in order to reduce the likelihood of failure and to minimize the risk for government support.

TLAC is comprised of a bank's Tier 1 capital and a minimum amount of "plain vanilla" Long Term Debt (LTD). The Fed included the minimum LTD requirement because LTD is designed to become equity following a bank failure, and this would enable a newly capitalized bank to continue operations even if its equity has been depleted prior to the failure and the whole requirement is to maintain sufficient TLAC and LTD.

In addition, the guidelines also prescribes certain buffers, the breach of which would result in limitations on the capital distributions and discretionary bonus payments of the firm. The proposal also included a separate requirement that these companies maintain a minimum amount of LTD. The TLAC and LTD requirements proposal has two overall objectives: 1) improving the resiliency of these companies and 2) improving their resolvability in the event of their failure or material financial distress (both objectives help to reduce risks to financial stability).

The final rule of TLAC and LTD requirements is built on, and is complement to, the regulatory capital requirements (common equity tier 1 capital ratio, tier 1 capital ratio, leverage ratio etc.). While regulatory capital requirements are intended to ensure that a banking organization has sufficient capital to remain a going concern, the objective of the TLAC and LTD requirements in the final rule is to reduce the financial stability impact of a failure by requiring companies to have sufficient loss-absorbing capacity on both a going concern and a gone-concern basis.

As part of compliance, the effective date is from January 1, 2019 and it's mandatory for all the Covered BHCs and Covered IHCs to follow the minimum TLAC requirements.

5.2.1.8.1 Entity Identification and Applicable Single Counterparty Limits

TLAC guidelines are only applicable to Top-tier U.S. bank holding companies identified by the Federal Reserve as U.S. global systemically important banking organizations (G-SIBs) (covered BHCs); and U.S. intermediate holding companies (covered IHCs) of foreign G-SIBs with at least $50 billion in U.S. nonbranch assets. The inputs for the total risk weighted asset of the bank and the total leverage exposure amount of the bank come from the Capital Adequacy Requirements (CAR) guideline and the Leverage Requirements guideline respectively. The following are the ways we identify the entities as Covered BHCs and Covered IHCs:

- To identify SIBs, in the column **F_SIB_TYPE_IND in DIM_PARTY**, for TLAC purpose the GSIB type value 'G' will be considered as a global systemically important banking.

- Since the calculations differs depending on whether the entity is a Covered BHC or a Covered IHC, identification of entity as a Covered BHCs or a Covered IHCs is the initial step. The user is expected to privide the holding company type as IHC(Intermediate Holding company) or BHC (Bank Holding Company) in the organisation structure table **DIM_ORG_STRUCTURE.**

- For covered IHCs, the amount of eligible TLAC and TLD amounts required to be maintained depends on whether the Covered IHC is a resolution covered IHC or non-resolution covered IHC. This differentiation of IHCs as a resolution or a non- resolution entity, will depend on the resolution strategy of the entity i.e. MPOE (multiple-point-of entry) strategy will be a resolution covered IHC and SPOE (single-point-of-entry) strategy will be a non-resolution covered IHC, which is expected to be a download value in the organisation structure table **DIM_ORG_STRUCTURE**

As per the guidelines only Covered BHCs and Covered IHCs are expected to comply with the TLAC regulations. Also the calculation for covered IHCs depends on if the entity is Resolution IHC or non-Resolution entity.

Data expectancy

Holding company type of the entity is expected as a download in the organisation structure table.

An entity's resolution strategy - MPOE (multiple-point-of entry) and SPOE (single-point-of-entry), is expected as a download in the organisation structure table **DIM_ORG_STRUCTURE**.

5.2.1.8.2 Total Loss Absorbing Capacity and Long Term Debt Calculations

Calculations for Covered Bank Holding company(BHC)

TLAC guideline establishes two minimum standards:
1. The risk-based TLAC ratio, which builds on the risk-based capital ratios described in the CAR guideline.
2. The TLAC leverage ratio, which builds on the leverage ratio described Leverage Requirements guideline.

The Calculation of Total Loss Absorbing Capacity (TLAC):

Risk-based TLAC Ratio: The risk-based TLAC ratio is defined as the TLAC Measure (the numerator) divided by Risk Weighted Assets (the denominator), with this ratio expressed as a percentage:

$$\text{TLAC ratio} = \frac{\text{TLAC Measure}}{\text{Risk-weighted Assets}}$$

TLAC Leverage Ratio: The TLAC leverage ratio is defined as the TLAC Measure (the numerator) divided by the Exposure Measure (the denominator), with this ratio also expressed as a percentage:

$$\text{TLAC leverage ratio} = \frac{\text{TLAC Measure}}{\text{Exposure Measure}}$$

Like the minimum TLAC requirements as noted above, the minimum LTD requirements also include both risk-based and leverage-based measures.

The eligible external LTD is defined as a debt that is issued directly by the covered BHC which is unsecured, is "plain vanilla", and is governed by U.S. law. While considering eligibility of LTD towards calculation of Total eligible external TLAC, a 50% haircut should be applied to the Long term debt with the principal due to be paid on external LTD in one year or more but less than two years.

Even though we consider only 50 % of the amount of eligible external LTD that is due to be paid between one and two years for purposes of the external LTD requirement , this haircut reduction is not applicable for external TLAC and such debt would count in full for purposes of the external TLAC requirement. The amount of eligible external LTD due to be paid in less than one year will not count toward the external TLAC requirement or the external LTD requirement.

For a covered BHC, eligible LTD includes debt that is:

i.   is paid in and issued directly by the covered BHC;

ii.   is unsecured;

iii.   has a maturity of more than one year from the date of issuance;

iv.   is "plain vanilla"; and

v.   is governed by U.S. law

Also Eligible external LTD instruments are prohibited from

vi.   Being structured notes;

vii.   Having a credit-sensitive feature;

viii. Including a contractual provision for conversion into or exchange for equity in the covered BHC; or

ix.   Including a provision that gives the holder a contractual right to accelerate payment (including automatic acceleration), other than a right that is exercisable on a one or more dates specified in the instrument, in the event of the insolvency of the covered BHC, or the covered BHC's failure to make a payment on the instrument when due that continues for 30 days or more.

Calculation of eligible long term debt:

Total eligible external LTD of covered BHC (with the 50% haircut for eligible LTD that is due to be paid between one and two years) = 50%* (Total eligible external LTD of covered BHC that is due to be paid between one and two years) + Total eligible external LTD of covered BHC that is due to be paid after two years

Calculation of total eligible total loss absorbing capital:

Total Eligible total loss absorbing capital (TLAC) amount of the Bank = (Net Tier 1 Capital)- Net Tier 1 Minority Interest + Total eligible long term debt which will be part of total eligible TLAC (without 50% haircut for eligible LTD that is due to be paid between one and two years and which will also include the eligible Tier 2 instruments as well)

Calculations for Covered Intermediate Holding Company (IHC)

Unlike a covered BHC, the amount of outstanding eligible TLAC depends on whether the IHC's top-tier FBO's planned resolution:

I.   Involves the covered IHC or its subsidiaries entering into resolution, receivership, insolvency or similar proceeding (i.e., an MPOE strategy) (referred as a "resolution covered IHC"); or

II. Does not involve the covered IHC or its subsidiaries entering into resolution, receivership, insolvency or similar proceedings in the United States (i.e., an SPOE strategy) (referred as a "non-resolution covered IHC").

A resolution covered IHCs have the option to issue capital and long-term debt externally ("eligible external debt security") to third-parties under the final rule. Additionally a resolution covered IHCs also have the option to issue debt internally to a foreign parent or foreign wholly owned subsidiary of a global systemically important foreign banking organization that directly or indirectly controls the covered IHC. The "eligible external debt security" is the same as the eligible debt securities issued by covered BHCs.

Additionally a resolution covered IHC can issue debt internally ("eligible internal debt security") to a foreign parent or foreign wholly owned subsidiary of a global systemically important foreign banking organization that directly or indirectly controls the covered IHC.

Non-resolution covered IHCs are required under the final rule to issue debt internally ("eligible internal debt security") to a foreign parent or foreign wholly owned subsidiary of a global systemically important foreign banking organization that directly or indirectly controls the covered IHC.

So covered IHCs (irrespective of resolution or non-resolution) may issue internal TLAC and LTD to any foreign affiliate of the covered IHC that is wholly owned, directly or indirectly, by the top-tier parent foreign banking organization, in addition to foreign parent entities of the covered IHC.

Requirement	Covered BHCs	Resolution Covered IHCs	Non Resolution Covered IHCs
Minimum external TLACand external LTD, plus covered BHCor covered IHC external TLAC buffer	✓	✓ (Can issue any combination of external and internal TLAC and LTD to satisfy requirements)	Cannot issue external TLACand LTD to satisfy requirements
Minimum internal TLAC and internal LTD, plus covered IHCinternal TLAC buffer	N/A		✓

The "eligible external debt security" is the same as the eligible debt securities issued by the Covered BHCs.

The requirements for an "eligible internal debt security" are generally the same as the terms for an "eligible external debt security" for a resolution covered IHC and "eligible debt security" for a covered BHC with a few key differences explained below.

- Is applicable to both resolution and non-resolution covered IHCs

- Grand fathering condition for instruments issued prior to 31 December, 2016 is not applicable which means that for a non-resolution covered IHC the debt instruments do not have a grandfathering provision.

- Issued directly by the covered IHC to a foreign parent or foreign wholly owned subsidiary of a global systemically important foreign banking organization that directly or indirectly controls the covered IHC.

- Irrespective of entity being resolution or non-resolution covered IHC the issued debt instruments must have a Contractual trigger provision clause that allows Federal reserve to require non resolution IHC to convert debt instruments to CET1 capital

- Additionally the eligible internal debt requires to be contractually or structurally subordinated instrument in order to qualify as eligible instrument for TLAC calculation

Calculation Summary

Resolution Covered IHC:

Total Eligible external debt security of resolution covered IHC which will be part of total eligible TLAC =

Total Eligible external debt security of resolution covered IHC which has maturity between one and two years +

Total Eligible external debt security of resolution covered IHC which has maturity more than two years +

Total Eligible internal debt security of resolution covered IHC which has maturity between one and two years +

 Total Eligible internal debt security of resolution covered IHC which has maturity more than two years

Total Eligible Long term debt of resolution covered IHC =

50 % * (Total Eligible external debt security of resolution covered IHC which has maturity between one and two years) +

Total Eligible external debt security of resolution covered IHC which has maturity more than two years +

50 % * (Total Eligible internal debt security of resolution covered IHC which has maturity between one and two years) +

Total Eligible internal debt security of resolution covered IHC which has maturity more than two years

Total Eligible total loss absorbing capital (TLAC) amount of the Bank = CAP058 (Net Tier 1 Capital)- Net Tier 1 Minority Interest + Total Eligible external debt security of resolution covered IHC which will be part of total eligible TLAC

Non-Resolution Covered IHC :

Total Eligible internal debt security of non-resolution covered IHC which will be part of total eligible TLAC =

Total Eligible internal debt security of resolution covered IHC which has maturity between one and two years +

Total Eligible internal debt security of resolution covered IHC which has maturity more than two years

Total Eligible Long term debt of non-resolution covered IHC =

50 % * (Total Eligible internal debt security of non-resolution covered IHC which has maturity between one and two years) +

Total Eligible internal debt security of non-resolution covered IHC which has maturity more than two years

Total Eligible total loss absorbing capital (TLAC) amount of the Bank = (Net Tier 1 Capital) - Net Tier 1 Minority Interest + Total Eligible internal debt security of non-resolution covered IHC which will be part of total eligible TLAC

Data Expectation

- An entity's issued instruments are expected as download with the All the instrument attributes are expected in **DIM_INSTRUMENT_CONTRACT** and the details of the issued instruments of the entity is expected as download in the **STG_ISSUED_INSTR_POSITIONS** and the corresponding outstanding issu amounts of the issued instruments are expected in **STG_INSTRUMENT_CONTRACT_DTL** which is moved to **FSI_ISSUED_INSTR_POSITIONS**. The Long term debt identification as internal and external as well as eligiblilty of Long term debt is done in **FSI_ISSUED_INSTR_POSITIONS.**

- The **FSI_SETUP_CAPITAL_HEAD** data is seeded by the application and is not expected from the bank.

- The Payout Ratio is seeded in **FSI_BENCHMARK_CAP_CONS_RATIO** by the application and is not expected from the bank.

- The download CAP IDs are expected to be reclassified in to the appropriate Standard Account head in the rule **USA - US III - Capital - Standard Acct Head Reclassification**.

- The run Option for GSIB Surcharge Method has to be set up by the Bank in **USR_DEFINED_RUN_PARAMETERS** against the Run Parameter Setup Code (V_RUN_PARAMETER_SETUP_CODE) that is assigned to the Run in the rule **USA - Run Exe Parameter Value Code Assignment**.

5.2.1.8.3 TLAC Buffer Amounts

As per the final guidelines, both covered BHCs and covered IHCs are expected to maintain certain TLAC buffers for the RWAs component as well as the leverage component, above the minimum capital requirements in order to avoid restrictions on capital distributions and discretionary bonus payments.

A covered BHC's external TLAC buffer for the risk-weighted asset component (TLAC risk-weighted assets buffer) is equal to the sum of 2.5 percent plus the GSIB surcharge applicable to the covered BHC under method 1 of the GSIB surcharge rule plus any applicable countercyclical capital buffer.

A covered BHC's external TLAC buffer for the total leverage exposure component of the external TLAC requirement (TLAC leverage buffer) is equal to 2 percent of total leverage exposure and the TLAC leverage buffer must be filled solely with tier 1 capital.

A covered IHCs has to maintain a buffer similar to the buffer applied to Covered BHCs, except that the internal TLAC buffer would not have included a GSIB surcharge component because covered IHCs are not subject to the Board's GSIB surcharge rule and also is subject solely to an RWA related TLAC buffer. A covered IHC's internal TLAC buffer would thus be equal to the sum of 2.5 percent plus any applicable countercyclical capital buffer.

Data expectancy

For calcualtion of buffer amounts G-SIB surcharge is considered only it the bank is following the Method I for calcualting the surcharge and this will be a run management option expected to be provided by the user.

The data for countercyclical buffer is expected as a download from the user and the expectation is as below:

Standard Account Head ID	Standard Account Head Description	Input table
CAP819	Required Weighted Average Countercyclical Buffer	FSI_BENCHMARK_CNTR_CYC_BUFFER

The **F_SALE_RESTRICTED** column needs to be added in **STG_INSTRUMENT_CONTRACT_MASTER**. The **F_SALE_RESTRICTED** column is present in **DIM_INSTRUMENT_CONTRACT**. Once this column is added in **STG_INSTRUMENT_CONTRACT_MASTER** it needs to be mapped to **DIM_INSTRUMENT_CONTRACT**.

5.2.1.8.4 Minimum TLAC Requirements

As proposed, covered BHCs would be required to comply with the external LTD and TLAC requirements by January 1, 2019. The Covered IHCs would be subject to similar effective dates and the regulatory capital deduction would become effective as of January 1, 2019.

Minimum Required level of TLAC to be maintained by BHCs:

Under the external TLAC requirement of the final rule, a covered BHC is required to maintain outstanding eligible external total loss-absorbing capacity in an amount not less than the greater of; 18% of the total risk weighted assets of the BHC and 7.5% of the total leverage exposure of the BHC.

Summary: Minimum Required level of Eligible TLAC for BHCs = Greatest (18% of Total RWA, 7.5% of Total Leverage Exposure)

Minimum Required level of LTD to be maintained by BHCs:

Under the external LTD requirement of the final rule, a covered BHC is required to maintain outstanding eligible external long-term debt instruments (eligible external LTD) in an amount not less than the greater of; 6 percent plus the surcharge applicable under the GSIB surcharge rule (expressed as a percentage) of total risk-weighted assets and 4.5 percent of total leverage exposure.

Summary: Minimum Required level of Eligible LTD for BHCs = Greatest (6%+ G-SIB Surcharge of Total RWA, 4.5% of Total Leverage Exposure)

The above G-SIB surcharge will be applicable only if the bank follows the Method I score to calculate the G-SIB surcharge.

Minimum Required level of TLAC to be maintained by IHCs:

For a Resolution IHC, below are the minimum TLAC requirements:

Must maintain the amount greatest of:

     i.   18% of the covered IHC's total RWAs;

    ii.   6.75% of the covered IHC's total leverage exposure (if applicable) and;

iii.   9% of the covered IHC's average total consolidated assets.

For a Non Resolution IHC, below is the TLAC requirement:

Must maintain the amount greatest of:

i.   16% of the covered IHC's total RWAs;

ii.   6% of the covered IHC's total leverage exposure (if applicable); and

iii.   8% of the covered IHC's average total consolidated assets.

Minimum Required level of LTD to be maintained by IHCs:

Irrespective of IHC being Resolution IHC or Non resolution IHC, the below minimum requirement must be met by IHCs:

The amount Greatest of:

i.   6% of total RWAs;

ii.   2.5% of the total leverage exposure (if applicable); and

iii.   3.5% of average total consolidated assets.

Data expectancy

The corresponding regulatory defined percentages used for calculation of the minimum required level of TLAC and LTD is expected in the set up table FSI_SETUP_CAPITAL_HEAD against the corresponding CAPIDs detailed in the below table

Standard Account Head ID	Standard Account Head Description	Input table
CAP1262	Leverage exposure based required percentage for Eligible minimum TLAC applicable to Non-Resolution Covered IHC	FSI_SETUP_CAPITAL_HEAD
CAP1251	Risk weight based required percentage for Eligible minimum LTD applicable to Covered BHC	FSI_SETUP_CAPITAL_HEAD
CAP1265	Leverage exposure based required percentage for Eligible minimum LTD applicable to Non-Resolution Covered IHC	FSI_SETUP_CAPITAL_HEAD
CAP1256	Leverage exposure based required percentage for Eligible minimum TLAC applicable to Resolution Covered IHC	FSI_SETUP_CAPITAL_HEAD
CAP1260	Average total consolidated assets based required percentage for Eligible minimum LTD applicable to Resolution Covered IHC	FSI_SETUP_CAPITAL_HEAD
CAP1250	Leverage exposure based required percentage for Eligible minimum TLAC to Covered BHC	FSI_SETUP_CAPITAL_HEAD

CAP1264	Risk weight based required percentage for Eligible minimum LTD applicable to Non-Resolution Covered IHC	FSI_SETUP_CAPITAL_HEAD
CAP1259	Leverage exposure based required percentage for Eligible minimum LTD applicable to Resolution Covered IHC	FSI_SETUP_CAPITAL_HEAD
CAP1261	Risk weight based required percentage for Eligible minimum TLAC applicable to Non-Resolution Covered IHC	FSI_SETUP_CAPITAL_HEAD
CAP1263	Average total consolidated assets based required percentage for Eligible minimum TLAC applicable to Non-Resolution Covered IHC	FSI_SETUP_CAPITAL_HEAD
CAP1255	Risk weight based required percentage for Eligible minimum TLAC applicable to Resolution Covered IHC	FSI_SETUP_CAPITAL_HEAD
CAP1278	Risk-Based TLAC Buffer Level of non-resolution covered IHC	FSI_SETUP_CAPITAL_HEAD
CAP1249	Risk weight based required percentage for Eligible minimum TLAC applicable to Covered BHC	FSI_SETUP_CAPITAL_HEAD
CAP1254	Leverage exposure based buffer percentage required for TLAC Buffer applicable to Covered BHC	FSI_SETUP_CAPITAL_HEAD
CAP1253	Risk weight based buffer percentage required for TLAC Buffer applicable to Covered BHC	FSI_SETUP_CAPITAL_HEAD
CAP1258	Risk weight based required percentage for Eligible minimum LTD applicable to Resolution Covered IHC	FSI_SETUP_CAPITAL_HEAD
CAP1252	Leverage exposure based required percentage for Eligible minimum LTD to Covered BHC	FSI_SETUP_CAPITAL_HEAD
CAP1257	Average total consolidated assets based required percentage for Eligible minimum TLAC applicable to Resolution Covered IHC	FSI_SETUP_CAPITAL_HEAD
CAP1277	Risk-Based TLAC Buffer Level of resolution covered IHC	FSI_SETUP_CAPITAL_HEAD
CAP1268	Maximum allowed Cap percentage on Unrelated Third-Party Liability as per TLAC regulation	FSI_SETUP_CAPITAL_HEAD

Capital related amounts including GSIB Surcharge which are required for calculation are expected as download in FSI_STANDARD_ACCT_HEAD and the expected download values are detailed in the below table

Standard Account Head ID	Standard Account Head Description
CAP505	Minority Interest - Capital attributable to Third Party included in Common Equity Tier 1 Capital
CAP966	Average consolidated asset
CAP902	Net AT1 Capital post Regulatory Adjustment
CAP962	Supplementary Leverage Ratio
CAP019	Operating Expenses
CAP1286	GSIB Surcharge
CAP1270	Total Amount of Non-contingent liability arising out of any means other than through a contract
CAP210	Total eligible capital
CAP901	Net AT1 Capital post Minority Interest Adjustment
CAP003	Retained earnings
CAP058	Net Tier 1 Capital
CAP586	Allowance for Loans and Lease Losses not included in Tier 2 Capital
CAP838	Total RWA
CAP853	Minority Interest - CET1 Capital Surplus attributable to Third Party
CAP854	Minority Interest - AT1 Capital Surplus attributable to Third Party
CAP841	Net Common Equity Tier 1 Capital
CAP848	Total Exposure Amount

5.2.1.8.5 Third-party Liability Amount Capping

The final rule imposes a cap on the aggregate amount, measured on an unconsolidated basis, of certain unrelated liabilities equal to 5% of the particular covered BHC's or covered IHC's eligible TLAC.

Unrelated liabilities means any non-contingent liability, owed to a third party in case of a covered BHC or a non-resolution covered IHC and, in the case of a resolution covered IHC, owed to any person (including an affiliate;) other than a subsidiary, except for:

- Eligible TLAC;

- Any dividend or other liability arising from eligible TLAC;

- An instrument that is an eligible debt security with a remaining maturity of less than one year that does not provide the holder of the instrument with a currently exercisable put right; and

- A secured liability, to the extent that it is secured, or a liability that otherwise represents a claim that would be senior to eligible debt securities under Title II of the Dodd-Frank Act or the Bankruptcy Code.

$$\frac{\text{Unrelated Liabilities}}{\text{Eligible TLAC}} \leq 5\% \text{ Cap}$$

Additionally the final rule adds a new provision to make clear that in the event the covered bank holding company chooses to contractually subordinate all of its long term debt, there is no capping on the amount. Therefore irrespective of the entity type of the holding entity the Cap amount mentioned above will be applicable only if the holding company has issued any instrument which is not contractually subordinated.

5.2.1.8.6 Restriction on Payouts and Payout Ratio

The maximum TLAC payout ratio is the percentage of eligible retained income that a Covered IHC can pay out in the form of distributions and discretionary bonus payments during the current calendar quarter. A maximum TLAC payout amount for the current calendar quarter is equal to the Covered IHC's eligible retained income, multiplied by the applicable maximum TLAC payout ratio.

For Covered BHCs:

A covered BHC's external TLAC risk-weighted asset buffer level will be equal to its common equity tier 1 capital ratio minus that portion (if any) of its common equity tier 1 capital ratio (expressed as a percentage) that could be used to meet the risk-weighted assets component of the external TLAC requirement.

To calculate its external TLAC risk-weighted assets buffer level, a covered BHC will subtract from its common equity tier 1 capital ratio the greater of 0 percent and the following figure:

the risk-weighted assets component of the covered BHC's external TLAC requirement minus the ratio of its additional tier 1 capital (excluding tier 1 minority interest) to its risk-weighted assets and minus the ratio of its outstanding eligible external LTD to its risk-weighted assets.

Summary:

Risk-Based TLAC Buffer Level of covered BHC* = CET1 risk-based ratio - greater of (0, (18% – AT1 (less Tier 1 minority interests) risk-based ratio – eligible LTD risk-based ratio))

*All the values will be expressed as a ratio/percentage

After the Risk-Based TLAC Buffer Level is calculated the payout ratio will be based on the below table:

Calculation of Maximum External TLAC Risk- Weighted Asset Payout Amount of Covered BHC	
External TLAC risk-weighted buffer level	**Maximum External TLAC risk-weighted payout ratio (as a percentage of eligible retained income)**
Greater than the external TLAC risk-weighted buffer	No payout ratio limitation applies
Less than or equal to the external TLAC risk-weighted buffer, and greater than 75 percent of the external TLAC risk weighted buffer	60 percent
Less than or equal to 75 percent of the external TLAC risk-weighted buffer , and greater than 50 percent of the external TLAC risk-weighted buffer	40 percent
Less than or equal to 50 percent of the external TLAC risk-weighted buffer , and greater than 25 percent of the external TLAC risk-weighted buffer	20 percent
Less than or equal to 25 percent of the external TLAC risk-weighted buffer	0 percent

The covered BHC's external TLAC leverage buffer level would be equal to its supplementary leverage ratio minus that portion (if any) of its supplementary leverage ratio (expressed as a percentage) that is used to meet the leverage component of the external TLAC requirement.

 To calculate its external TLAC leverage buffer level, a covered BHC would subtract from its supplementary leverage ratio the greater of 0 percent and the following figure:

7.5 percent (the leverage component of the covered BHC's external TLAC requirement) minus the ratio of its outstanding eligible external LTD amount to its total leverage exposure.

Summary:

TLAC leverage buffer level of covered BHC = supplementary leverage ratio - greater of (7.5% - Eligible leverage exposure based LTD)

After the Risk-Based TLAC Buffer Level is calculated the payout ratio will be based on the below table:

Calculation of Maximum External TLAC Leverage Payout Amount	
External TLAC leverage buffer level	**Maximum External TLAC leverage payout ratio (as a percentage of eligible retained income)**
Greater than 20 percent	No payout ratio limitation applies

Less than or equal 20 percent and greater than 1.5 percent	60 percent
Less than or equal 1.5 percent and greater than 1.0 percent	40 percent
Less than or equal 1.0 percent and greater than 0.5 percent	20 percent
Less than or equal to 0.5 percent	0 percent

Even if a single BHC's both TLAC risk-weighted assets buffer level and TLAC leverage buffer level are available then the BHC would be bound by the TLAC risk-weighted assets buffer because it would be more restrictive.

For Covered IHCs:

A Covered IHC's maximum Covered IHC TLAC payout amount for the current calendar quarter is equal to the Covered IHC's eligible retained income, multiplied by the applicable maximum Covered IHC TLAC payout ratio. The maximum Covered IHC TLAC payout ratio is the percentage of eligible retained income that a Covered IHC can pay out in the form of distributions and discretionary bonus payments during the current calendar quarter.

A Covered IHC's Covered IHC TLAC buffer level is equal to the Covered IHC's common equity tier 1 capital ratio (expressed as a percentage) minus the greater of zero and the following amount:

(A) 16 percent for a non-resolution Covered IHC, and 18 percent for a resolution Covered IHC; minus

(B)(i) For a non-resolution Covered IHC, the ratio (expressed as a percentage) of the Covered IHC's additional tier 1 capital (excluding any tier 1 minority interest) to the Covered IHC's total risk-weighted assets;

(ii) For a resolution Covered IHC, the ratio (expressed as a percentage of the Covered IHC's additional tier 1 capital (excluding any tier 1 minority interest) to the Covered IHC's total-risk weighted assets; and minus

(C) The ratio (expressed as a percentage) of the Covered IHC's outstanding eligible Covered IHC long-term debt amount to total risk-weighted assets.

Summary:

Risk-Based TLAC Buffer Level of non-resolution Covered IHC * = CET1 risk-based ratio - greater of (0, (16% – AT1 (less Tier 1 minority interests) risk-based ratio – eligible LTD risk-based ratio non-resolution Covered IHC))

Risk-Based TLAC Buffer Level of resolution Covered IHC * = CET1 risk-based ratio - greater of (0, (18% – AT1 (less Tier 1 minority interests) risk-based ratio – eligible LTD risk-based ratio non-resolution Covered IHC))

*All the values will be expressed as a ratio/percentage

After the Risk-Based TLAC Buffer Level is calculated the payout ratio will be based on the below table:

Calculation of Maximum Covered IHC TLAC Payout Amount	
Covered IHC TLAC buffer level	**Maximum Covered IHC TLAC payout ratio (as a percentage of eligible retained income)**

Greater than the covered IHC TLAC buffer	No payout ratio limitation applies
Less than or equal to the covered IHC TLAC buffer, and greater than 75 percent of the covered IHC TLAC buffer	60 percent
Less than or equal to 75 percent of the covered IHC TLAC buffer, and greater than 50 percent of the covered IHC TLAC buffer	40 percent
Less than or equal to 50 percent of the covered IHC TLAC buffer, and greater than 25 percent of the covered IHC TLAC buffer	20 percent
Less than or equal to 25 percent of the covered IHC TLAC buffer	0 percent

5.2.2 US III Regulatory Capital Rules – Advanced Approach

5.2.2.1 US III – High Level Process Flow for Advanced Approach

The application supports capital computations for Credit Risk along with Capital Structure, Capital Buffers, and Capital Consolidation process as per US Regulatory Capital Rules for Implementation of Basel III in US as finalized by the agencies.

For more information on the pre-defined Runs available with the application, see *OFS Basel Regulatory Capital Run Charts*.

NOTE:	The US Regulatory Capital Rules are termed as Regulatory Capital, Implementation of Basel III, Capital Adequacy, Transition Provisions, Prompt Corrective Action, Standardized Approach for Risk Weighted Assets, Market Discipline and Disclosure Requirements, Advanced Approaches Risk-Based Capital Rule, and Market Risk Capital Rule.

The sequence wise flow of processes included in the application is as follows:

5.2.2.1.1 Process Flow for Capital Adequacy Ratio Calculation
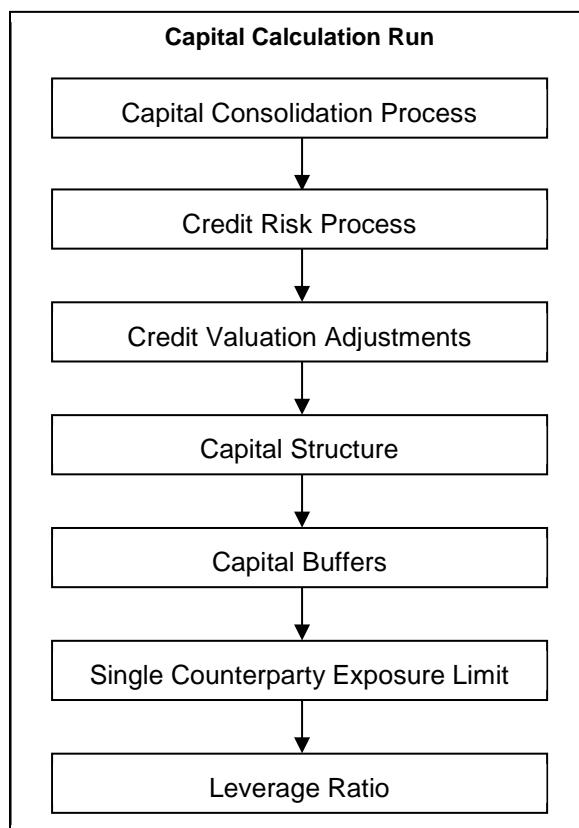
The Capital Calculation Run depicted in the preceding process flow, is a single run which is joined together by multiple processes. Each process is a block, compiled together to form an entire Capital Adequacy run. The individual blocks like the Credit Risk process exists as individual run which is described in the following sections.

5.2.2.1.2 Capital Consolidation Process

Capital Consolidation is a process common to each of the individual block when they are triggered separately as an individual run. For example: the standard out-of-box Market Risk run has Capital Consolidation and Market Risk process bundled together as a single Market Risk run. This is applicable for a Credit Risk run and Operational Risk run as well.

The Capital Consolidation is explained in the following section and is not repeated under the Non Securitization process and Securitization process section of this document.

In Capital Consolidation, the application processes the following.

Capital Consolidation Level Selection

The reporting bank can be a part of a financial group that has multiple legal entities like parent or child entities (subsidiaries) under its name. The entity on which you are required to process should be selected by you. Subsequently, the level at which a Run is to be executed (solo or consolidated) should also be selected. You can select these options in the Run Management UI. However, if the Run is executed in the Run Rule Framework (RRF), then these options have to be set using the Rule '**Capital Consolidation Level Selection**' in the process '**CAPITAL_CONSOLIDATION**'.

CAPITAL_CONSOLIDATION is the first process to be added in all the Runs defined in the RRF except for the Staging Data Population Run. The Run Management UI selects this process by default.

Run Parameters Assignment

The US Regulations states different approaches for calculating RWA. The Run Management UI in the application allows the reporting bank to define and execute a Run by selecting a combination of different approaches for RWA computation.

Run Parameter Assignment is also a part of **Capital Consolidation** process. The Rule '**Run Definition User Defined Run Param Assignment**' is used to assign the Run parameters if a Run is executed in the RRF. If the Run is executed from the Run Management UI, then the parameters are populated based on the Run defined in the Run Definition window.

Currency Conversion

The exposure amount and other general ledger amount data attributes that are provided as input (in stage tables) are in the natural currency (exposure currency) and this is usually different for exposures across different countries. The application converts them to reporting currency columns so that processing for all exposures happens in one single currency. The rules which do the currency conversion from natural currency into reporting currency are based on the exchange rate provided.

Shareholding Percent Multiplication

For all entities in Capital Consolidation, the application updates the shareholding percentage against each entity data in fact capital accounting head table from fact entity share holding percent table. The parent data in fact capital accounting head is updated with 1 as value. For each child entity, the data is based on the parent's holding percentage specified for each child in the fact entity share holding percent table.

5.2.2.1.3 Process Flow for Credit RWA
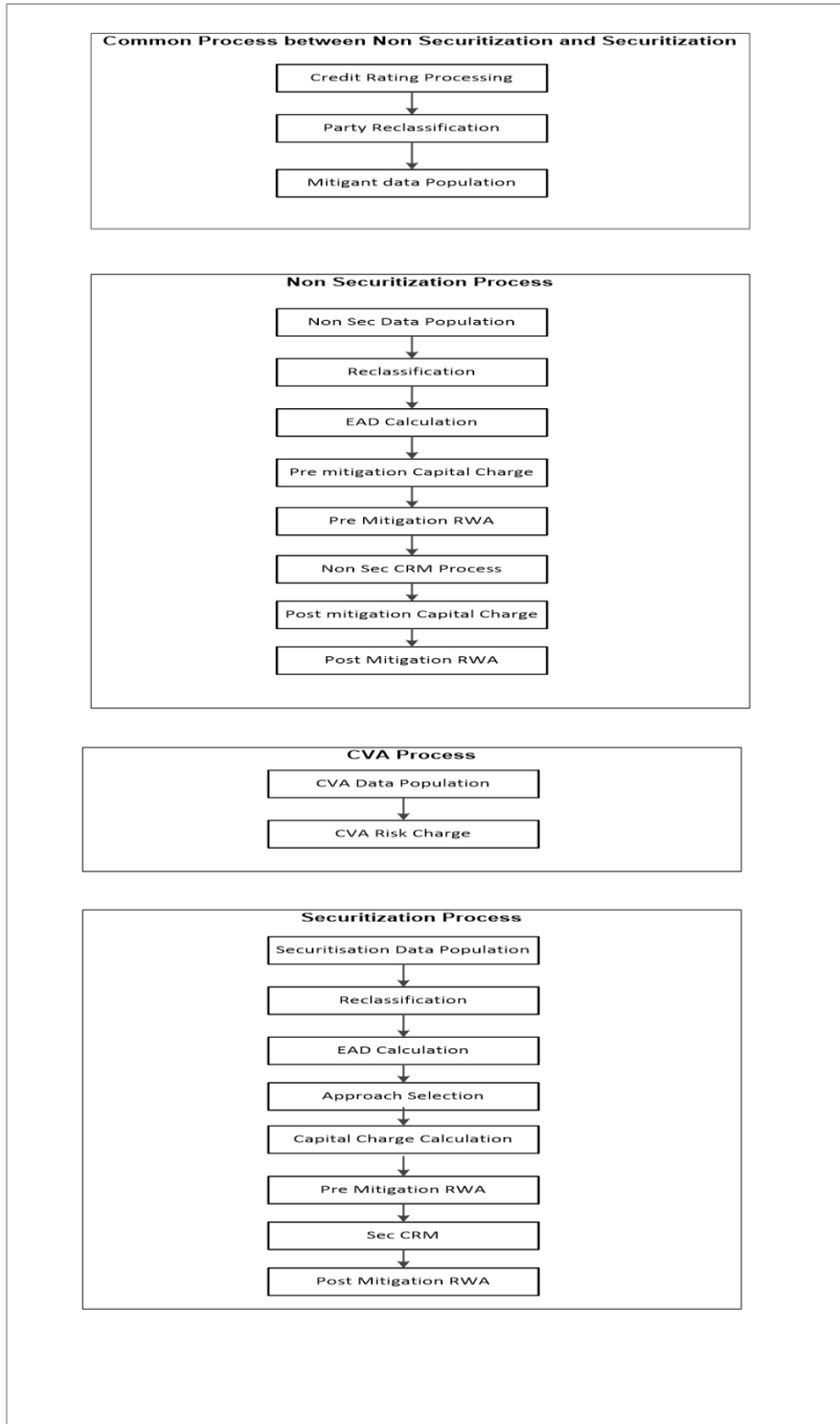
Credit RWA Run is a combination of Non securitization RWA, Credit Valuation Adjustment (CVA) RWA, and Securitization RWA. For Credit Risk for Non Securitized exposures and Securitization positions, the application follows the Advanced Approach for US.

CVA calculation has two approaches, the Standardized Approach and Advanced Approach, which is detailed separately under Credit Valuation Adjustment section under Credit RWA.

A few processes like Credit Rating, Party Type Reclassification, and Mitigant data population are common between Non Securitization, CVA, and Securitization process. These are executed only once under the Credit RWA Run even though these sub processes are explained separately under Non Securitization, CVA, and Securitization section of this document.

Certain sub processes under the Non Securitization process, like Reclassification, are common across Non Securitization exposures for over the counter derivative transactions and securities financing transactions. These are executed only once in the Run. The details of these sub processes are explained under 'Reclassification' and 'Risk Weight Assignment' sub process of the Non Securitization section of the user guide.

For more information on these sub processes, see US Regulatory Capital Rules - Standardized Approach section.

PD and LGD assignment method, which is a part of Pre-Mitigation Capital Charge, is explained in the 'Pre-Mitigation Capital Charge' section under Non Securitization exposures. Credit Risk Mitigation for Securitization and Non Securitization is handled in two separate sub processes. Details of these are present as separate sections in the user guide.

5.2.2.1.4 Process Flow for Credit Valuation Adjustments

Basel committee has introduced a new Credit Valuation Adjustment (CVA) capital charge, which is added to default risk capital charge to arrive at the new Counterparty Credit Risk (CCR) capital charge. The mark to market counterparty credit losses or the spread migration risk is captured with CVA, which were not directly capitalized before. CVA is the difference between the risk-free portfolio value and the true portfolio value that takes into account the possibility of the counterparty's default. In other words, CVA is the market value of counterparty credit risk.

This process flow is divided into two sections: Simple Approach and Advanced Approach.

For more information on the sub processes as detailed in the process flow, see Credit Valuation Adjustments.

5.2.2.1.5 Process Flow for Capital Structure
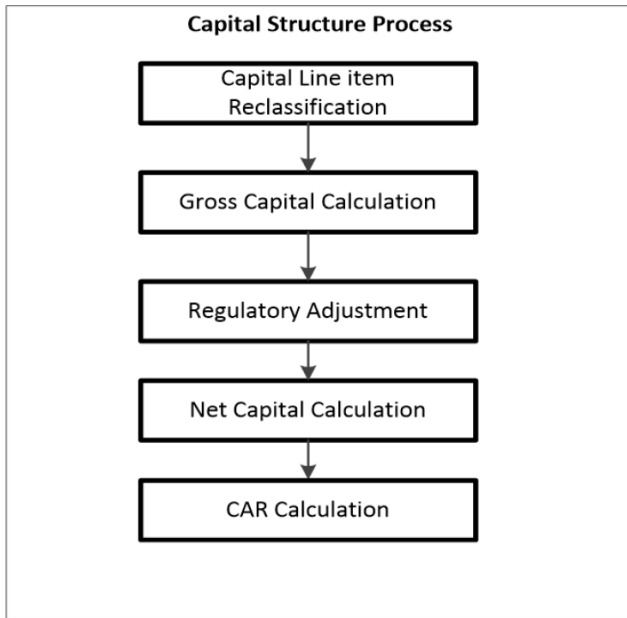
Capital Structure is executed along with Capital Consolidation and Credit RWA process. Each sub process mentioned in the preceding flow chart has a detailed explanation present in the Capital Structure section of this document.

For example: 'Gross Capital Calculation' mentioned in the preceding flow chart is explained in detail under 'Gross Capital Calculation' sub process section of the Capital Structure. Likewise 'Regulatory Adjustment' and 'Net Capital Calculation' is detailed under 'Regulatory Adjustment' and 'Net Capital Calculation' sub process section of Capital Structure.

For more information, see Capital Structure.

5.2.2.1.6 Process Flow for Capital Buffers
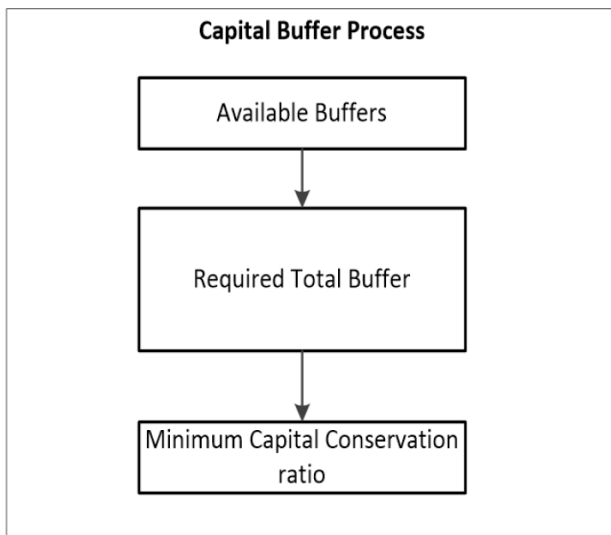
Capital Buffer is calculated post capital ratios are calculated, as they go as an input to Buffer calculation. Each sub-process is explained in detail under Capital Buffer section of this document.

For example, required total buffer and capital conservation buffer calculation are detailed of this document. For more information, see Capital Buffers.

5.2.2.1.7 Process Flow for Single Counterparty Exposure Limit
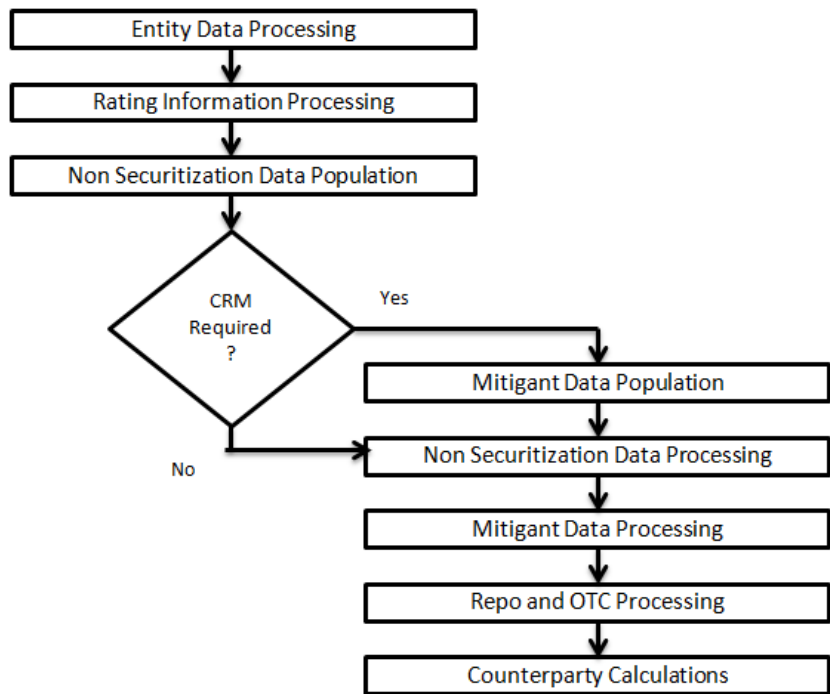
The Single Counterparty Exposure Limit calculation is designed to identify the counterparties whose aggregate credit exposure to the bank breaches the maximum limit as described by the Dodd Frank Single Counterparty Limit proposal. The Exposure Limit proposal is mitigating the threat to financial stability posed by systemically important financial companies.

For more information, see Single Counterparty Exposure Limit.

5.2.2.1.8 Process Flow for Leverage Ratio
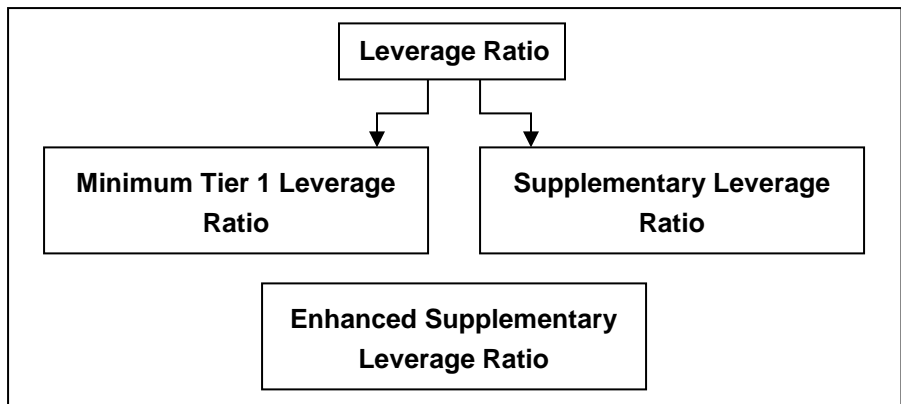
The leverage ratio calculations are a separate run, and not part of the regular capital calculation run. This is because of the changes in the Credit conversion factor assigned to the exposures, and also exemption of few exposures from the calculation which are part of the capital charge calculations. Also, the mitigation is not required for these exposures, and the exposure measure calculations are different from the regular EAD calculations.

For more information on revised leverage ratio, see [Leverage Ratio](#).

5.2.2.2 Credit RWA

The application supports the computation of Credit RWA as per the guidelines laid out in the US Regulatory Capital Rules. Credit RWA computation is broken down into Credit Risk for Non Securitized Exposures and Credit Risk for Securitized Exposures. For Credit Risk for Non Securitized Exposures, the application follows the Standardized Approach, Foundation Advanced Approach for US, and Advanced Approach for US. Credit RWA computation also consists of computation of Credit Valuation Adjustments that follows Advanced and the Standardized Approach which is explained in later section.

5.2.2.2.1 Non Securitization – Advanced Approach for US

The application supports the computation of Credit RWA as per the guidelines laid out in the US Regulatory Capital Final Rule. Credit RWA computation is broken down to credit risk for Non Securitized exposures and credit risk for Securitized exposures. If a Bank provides implicit support to a securitization transaction, the securitized exposures are treated as if the exposures had not been securitized and exposure is a part of non sec RWA. Else, it is a part of sec RWA if the bank has not provided implicit support. For Sec portfolio reporting purpose, capital of sec exposures belonging to the pool on which originator has provided implicit support is 0.

Similarly, if a Bank provides eligible clean up call indicator, then the call option exposure is a part of sec RWA. And, if the Bank doesn't provide an eligible clean up indicator, then the call option exposure which includes all the underlying exposure associated with securitization is a part of Non-sec RWA. This section details the Credit Risk computation for Non Securitized exposures.

Process Flow for Non Securitization – Advanced Approach

Rating Information Processing

Pre-processing Steps

Data for credit ratings is uploaded in the application through the following ratings tables:

- Accounts Rating Table (**STG_ACCOUNT_RATING_DETAILS**):

  This table stores ratings of all Credit Risk Non Securitized Exposures, Securitized Exposures and Securitized Positions.

- Instrument Rating Table (**STG_INSTRUMENT_RATING_DETAILS**):

  This table stores ratings for all Market Risk Exposures, Investment Exposures subject to Credit Risk (one that are in **STG_INVESTMENTS**), and Mitigants.

- Party Rating Table (**STG_PARTY_RATING_DETAILS**):

   This table stores credit rating information of all customers and issuers.

- Sovereign Rating Table (**STG_SOVEREIGN_RATING_DETAILS**):

   This table stores credit rating for all countries.

Processing Steps

Banks obtain credit ratings from different sources which are uploaded to the application through the four rating tables. The application re-classifies the rating information to standard Basel ratings.

Note: In the **STG_PARTY_RATINGS_DETAILS** table ensure that the following columns are mandatorily populated with data:

○ Rating source code (**V_RATING_SRC_CODE**)

○ Party Code (**V_PARTY_CD**)

○ Purpose (**V_PURPOSE**): In this field whether the rating is a domestic rating or foreign rating should be indicated. If any other rating is provided, then the exposure is considered as unrated.

○ Rating Code (**V_RATING_CODE**)

The rating reclassification lookup table (**FSI_RATING_CLASSIFICATION**) is used to reclassify all the bank ratings to their Basel ratings. Ratings are populated from the stage tables to FSI tables using the lookup table to fetch reclassified rating.

After the application identifies the reclassified ratings, risk weight Rules update the risk weights in the rating risk weight mapping table. Further, the multiple assessments Data Transformation updates the rating and the risk weights to the exposures. For each exposure, the application checks the risk weight yielded by each of its ratings. It then assigns the second greatest risk weight and the rating that yields such risk weight to the exposure.

For unrated Non Securitized exposures, the application does an issue issuer assessment as per the guidelines in the US Regulatory Capital Rules. This is done to infer a rating of the unrated exposures, based on the rating of a similar instrument (referred as reference issue hereafter) issued by the same issuer. The reference issue is used only when it is of the same currency as the exposure and the exposure is senior or equivalent to the same.

Data Population

Pre-processing Steps

Load Credit risk exposures' data in the application for all the product types through their respective input tables known as product processors. The important categories of Credit Risk (CR) Non Securitization exposures, along with their respective table names, that are used for data input are as follows:

Product	Source Product Processor
Bills	STG_BILLS_CONTRACTS
Credit Cards	STG_CARDS

Product	Source Product Processor
Swaps	STG_SWAPS_CONTRACTS
Futures	STG_FUTURES
Guarantees	STG_GUARANTEES
Investments	STG_INVESTMENTS
Lease Contracts	STG_LEASE_CONTRACTS
Letters of Credit	STG_LC_CONTRACTS
Line of Credit	STG_CREDIT_LINE_DETAILS
Commitment Contracts	STG_COMMITMENT_CONTRACTS
Loans	STG_LOAN_CONTRACTS
Money market instruments	STG_MM_CONTRACTS
Overdraft	STG_OD_ACCOUNTS
Options	STG_OPTION_CONTRACTS
Re purchase contracts	STG_REPO_CONTRACTS
Equity Exposures	STG_INVESTMENTS
Underlying Exposures for Derivatives, Securitization and Covered Bonds	STG_UNDERLYING_EXPOSURES
Underlying Exposures for Derivatives (if Derivative is either a cleared transaction or an instrument, and the underlying reference asset is an instrument)	STG_UNDERLYING_MASTER/ STG_UNDERLYiNG_DTL
Underlying Exposures for Derivatives (if Derivative is not a cleared transaction or an instrument, or the underlying reference asset is not an instrument)	STG_UNDERLYING_EXPOSURES
Underlying Exposure for Mutual Fund / CIU	STG_FUND_CIS_COMPOSITION
Underlying Exposures for Repo contracts	STG_PLACED_COLLATERAL / STG_MITIGANTS
Credit Derivatives	STG_CREDIT_DERIVATIVES
Fixed Assets	STG_FIXED_ASSETS_DETAILS

Processing Steps

Stage data from the product processors or other stage tables is populated in the required tables. All product processor data is populated in a common fact table for all Non Securitization exposures

(**FCT_NON_SEC_EXPOSURES**) except equity data.

Equity data related to equity and investment fund are stored in the respective equity exposures (**STG_EQUITY_EXPOSURES)** and fund equity investments table (**STG_FUND_EQUITY_INVESTMENTS**).

It is then populated in the respective fact tables for equity exposures (**FCT_EQUITY_EXPOSURES)** and fund equity investments (**FCT_FUND_EQUITY_INVESTMENTS)** table.

From here the data is populated in the common fact table (**FCT_NON_SEC_EXPOSURES**) for all Non Securitization exposures. For more information on the list of columns to be populated within each table, see the *Download Specifications* document.

Shareholding Percent Multiplication

The exposure amount that is a part of the input data (product processors) is the exposure amount for a solo entity. However, in case of a consolidated Run, the parent exposure is considered only on the basis of shareholding percentage, based on the following calculation:

> **Exposure amount   X   share holding percent = Updated Exposure Amount**
>
> (where share holding percent is allotted a value by the application during the process - **Capital Consolidation** in the Rule **Cap Consl Effective Shareholding Percent for an Entity**)

This assignment is performed by the Rule **<Attribute > Shareholding Percent Multiplication**. The following attributes undergo shareholding percent multiplication:

- Outstanding Principal
- Current Exposure Amount
- Undrawn Amount
- Exposure Market Value
- Exposure Accrued Interest
- Provision Amount
- Write Off Amount
- Original Book Balance Amount
- Lease Residual Value
- For OTC products, Notional Principal and Contract Amount undergo shareholding percent multiplication.

Currency Conversion

In this step, the application converts data columns (represented as amount) that are in the natural currency, to reporting currency columns which are used for any further calculations. The column names suffixed as '_ncy' are in the natural currency and are multiplied by the Currency Conversion Factor (CCF) to populate values in the reporting currency. The Rule **Reporting Currency Code Assignment** is used to assign the reporting currency in case of a Run Rule Framework (RRF) execution. For more information on Currency Conversion, see Exhibit 4 in *Annexure A: Key Concepts*.

NOTE: The Rule **Reporting Currency Code Assignment** is set to 'USD'; however you can modify the currency according to your requirements. You can select the reporting currency in the Run Execution screens, if the Run is executed from the Run Execution screen.

Reclassification

The application reclassifies the banks' product types and party types to standard product and party types. Further, based on standard Basel product and party type, it forms an asset class for each exposure. Reclassification for equity is done by the application in a separate Rule. Similarly, the application does reclassification for mitigant on the basis of its mitigant type and reclassifies it to standard mitigant type.

Product Type Reclassification

Product types used by the reporting bank as input data are reclassified to standard product types as defined in the US Regulatory Capital Final Rule. These product types after reclassification are stored as Basel product types. For Example: Housing Loan is reclassified as Residential Mortgage Exposure.

As proposed in US III, charge card qualifies as a QRE, subject to an upper exposure limit of $100,000. Based on the exposure limit, the revolving exposure is classified into different asset classes. Hence, the reclassification rules are modified to include charge card which is reclassified into QRE in the product re-classification to standard product type.

Cash item in process of collection is now risk weighted at 20%. A new Rule (US III - Non Sec Asset Class Reclassification – Advanced Approach for US) is used map the product type 'cash items in process of collection' to asset type 'cash in process of collections' rather than to asset type 'cash'.

Party Type Reclassification

Similar to the product type, the customer type and issuer type (which are stored as counterparty type) are also reclassified as standard counterparty type. The application is designed to include customer type, issuer type, and legal entity type in the same table (**STG_PARTY_MASTER**). All of these are reclassified together as well. Party type reclassification rules handle reclassification for customer types, issuer, and entity types. For Example: Individual is reclassified as Retail.

US III has amended the definition of Eligible Guarantee and introduced a term called Eligible Double Default Guarantor. The following are termed as Eligible Double Default Guarantee:

- Depository institution
- Bank holding company
- Savings and loan holding company
- Credit Union
- Foreign Bank
- Securities Firm
- Non US Based Securities Firm

The following list of agencies (if issued a guarantee) is termed as eligible guarantor:

- US Government

- Federal Home Loan Bank

- Federal Agricultural Mortgage Corporation (Farmer Mac)

- Depository institution

- Bank holding company

- Savings and loan holding company

- Credit Union

- Foreign Bank

- Securities Firm

These mitigants types are reclassified into standard party types.

As per the US III, standard supervisory haircuts for repo, margin loans, and financial collateral amendments are introduced. In this case, a foreign PSE is reclassified into standard party type.

Asset Class Reclassification

In this step, on the basis of Basel product type and standard counterparty type, an asset class is formed by the application. This asset class is used for data processing.

For example: When standard counterparty is Bank, the asset class is Wholesale Exposure - Bank.

For Basel product type Gold, the asset class is Gold, and when standard counterparty type is Central Counter Party, the asset class is Central Counter Party. For standard counterparty type Corporate Non SME and Basel product type as Loan, the asset class is Wholesale Exposures- Corporate. Similarly, QRRE is reclassified into Other Retail, if EAD is greater than 100000 dollar. This check happens after the pre-CRM EAD calculation.

Asset class reclassification for all equity products is performed differently as it is performed on the basis of equity issuer type and Basel product type. Asset class, for all mitigants, is reclassified on the basis of their standard mitigant type and standard issuer type.

Basel CRM methodology is assigned for OTC, SFT, On-Balance Sheet, and Off-Balance Sheet items (where OTC and SFT are computed for Comprehensive CRM Method, On-Balance Sheet and Off-Balance Sheet are computed for LGD Adjustment Method).

Risk Parameters Assignment

The application assigns risk weight parameters of Probability of Default (PD), Loss Given Default (LGD), and maturity to all exposures. LGD and PD assignment for purchase receivables occurs through a rule. For exposures falling under retail asset class, irrespective of the seniority, the LGD has a floor value of 0.1. PD has a floor value of 0.0003 for all asset classes, except for defaulted exposures which has the value as 1.

Cash item in process of collection is now risk weighted at 20%. To assign this risk weight a new Rule (**USA - Non Sec RW Assignment for Cash in Process of Collection**) is introduced in the application.

Non Sec Asset Value Correlation Factor

US III has introduced a multiplier of 1.25 to the Asset Value Correlation (AVC) of exposures. These

exposures relate to regulated financial firms with assets of at least 100 billion USD and to exposures of unregulated financial firms (regardless of size). The revised correlation formula for financial entities is as follows:

Correlation (R_FI) = 1.25 x [0.12 x (1 - EXP (-50 x PD)) / (1 - EXP (-50)) + 0.24 x [1 - (1 - EXP (-50xPD)) / (1 - EXP (-50))]]

AVC Rule is applicable for Non Securitization accounts and for issuers of Credit Risk Mitigation.

NOTE: The computation of AVC does not change for any entity executing a Solo or Consolidation Basel Run.

Assumptions

US III mentions only one formula where new correlation factor is a multiplier of 1.25 for corporate, sovereign, and bank exposures. Therefore, our interpretation of the accord is that the conditions for the multiplier of 1.25 are applicable only for asset classes related to these types of exposures.

Process Flow

NOTE: The T2Ts of all product processors populate Financial Entity Indicator, Regulated or Unregulated Indicator, Group Asset Size Amount, and Group Asset Size Currency into processing tables from the data provided as a download for each party.

The description of the process flow is as follows:

- **Financial Entity**: The Basel Regulatory Capital application identifies a financial entity based on the standard counterparty type. The application also identifies a financial entity based on the downloaded flag that is a part of the table **Party Financial Info (STG_PARTY_FINANCIALS)**. Therefore, the two ways in which the application identifies a financial entity are as follows:

  a. The counterparty types are mapped as financial entities in the Rule. This Rule is re-configurable, which the client can modify to add or remove counterparty types based on their interpretation of the term "Financial Entity". Based on this mapping the application identifies a financial entity.

     The application selects a financial entity as per the Financial Entity Flag that is a part of the table **Party Financial Info (Stg_Party_Financials)**. Preference is given to this flag over mapping of counterparty.

  b. If the counterparty is not a Financial Entity, then the calculation of AVC remains unchanged. However, if the counterparty is identified as a financial entity, then the application checks whether the financial entity is a regulated entity or not.

- **Regulated Entity**: the application checks whether the financial entity is a regulated entity or not, based on the downloaded flag that is a part of the table **Party Financial Info (STG_PARTY_FINANCIALS)**. If the financial entity is not a regulated entity, then the application directly calculates the AVC using the correlation formula. This is populated in the column where the AVC was calculated previously. If the financial entity is a regulated entity, then the application checks for the group asset size.

- **Group Asset Size >= $100 billion**: The application checks whether the regulated financial entity is a part of a group with asset size of or equivalent to 100 billion USD. The group asset size can be in any currency; however the asset size is converted to USD and should be equivalent to USD 100 billion or more. If the application does not identify the counterparty as being a part of group asset size of greater than or equal to USD 100 billion, then the calculation of AVC remains unchanged or else the AVC is calculated using the correlation formula. This is then populated in the column where the AVC was calculated previously.

Key Data Elements

A few key data elements for computation of AVC are provided in this section. For information on the complete list of tables to be populated, see the *Download Specifications* document. We expect the bank to provide with the following data:

- The institution is a financial entity or non financial entity
- The institution is a regulated financial entity or non regulated entity
- Group asset size of the institution

Pre-Mitigation Capital Charge Calculation

This is computed for all asset classes using correlation factor, Probability of Default (PD), and Loss Given Default (LGD), where correlation factor is calculated for each asset class on the basis of Probability of

Default (PD). Capital calculation for defaulted exposures and failed trades is done through separate Rules. For defaulted exposures, the application uses two inputs - LGD and best estimated expected loss of a bank. For failed trade transactions, the capital requirement is assigned by the application on the basis of number of failed business days.

Credit Conversion Factor

This is applied to all the off balance sheet exposures. The CCF applied values are 0.2, 0.5, and 1. The various factors on the basis of which the CCF is applied are product type, type of facility (whether it is cancellable or not), and the maturity of the exposure.

Pre-CRM Exposure at Default (EAD): Exposure at Default is calculated for all asset classes based on:

- Current Exposure Amount
- Off-Balance Sheet Drawn CCF Percent
- Provision Amount
- Undrawn Amount
- CCF Percent
- Exposure Accrued Interest
- Write Off Amount

CCF percent for FIRB approach is assigned by the application and is taken as a value provided by the client for AIRB Approach.

If the reporting bank has an exposure to one of its own subsidiaries, then that exposure is classified as an internal exposure. Each of the internal transactions, that is, transaction between the parent and its subsidiary, is marked as a deduction line item. The deduction is processed as part of the capital structure processing and all the internal transactions are eliminated from any RWA calculation.

Of the total exposure amount, the exposures may have drawn amount and undrawn amount. The drawn amount is the direct credit exposure and undrawn amount can become a future exposure when that amount is drawn. Therefore, EAD related to undrawn amount is calculated by multiplying the CCF percent with undrawn amount. The application calculates the EAD related to drawn amount using:

- Exposure Accrued Interest
- Off-Balance Sheet Drawn CCF Percent
- Write Off Amount
- Provision Amount
- Current Exposure Amount

Risk Weight Assignment for Cleared Transactions

The application calculates the risk charge for the transaction involving Central Counterparties as per the guidelines laid out in US III.

Pre-CRM EAD Calculation

Exposure at Default (EAD) is calculated for all asset classes based on the 'Available for Sale' indicator. If 'Available for Sale' indicator is 'Yes', then based on the current exposure amount, accrued interest, unrealized gains or losses, and undrawn amount, the EAD is calculated. If reporting bank has an exposure to one of its own subsidiaries, then that exposure is classified as an internal exposure. Each of the internal transactions, that is, transaction between parent and its subsidiary is marked as a deduction line item. The deduction is processed as part of US III Capital Structure in the capital structure processing and all the internal transactions are eliminated from any RWA calculation.

EAD for equity exposures is calculated based on:

- Equity Adjusted Carrying Value of On-balance Sheet Component.
- Equity Unrealized Gains Reflected in Carrying Value.
- Equity Unrealized Gain Included in Regulatory Capital.

Calculation of Equity OTC Derivates EAD is similar to the calculation of Equity EAD, but is based on the indicator of conditional unfunded equity commitment flag. Lease residual transaction EAD is calculated by taking the lease residual amount.

Pre-CRM RWA Calculation

Pre-CRM RWA is calculated for all asset classes by multiplying the Pre-CRM EAD with Risk Weight.

Equity Exposures – Non Investment Fund Treatment

Two approaches are used to assign the Risk Weight (RW) for Non Investment Fund. They are Simple Risk Weight Method and Internal Model Method. You can select either of the two approaches to assign the RW and calculate the RWA. Based on the approach selected by you, public traded equity and private traded equity exposure are assigned a RW. Risk weighted asset amount is calculated by multiplying the RW, Equity EAD, and Equity Banks Proportional Ownership Share of the Fund.

Equity Exposures – Investment Fund Treatment

RW assignment for Investment Fund equity is calculated using either of the Simple Modified Look through Approach, Alternate Modified Look through Approach, Money Market Fund Approach, or Full Look through Approach. You can select either of the two approaches to assign the risk weight to Equity Investment Fund exposures. RW is assigned based on the equity asset class and equity investment class type. Post RW assignment for one of the approaches selected, RWA amount is calculated by multiplying the RW with the adjusted carrying value of the equity.

Mitigant Eligibility

Mitigant type, issuer type, and investment grade of issuer are being considered to determine whether the mitigant is eligible for a particular exposure or not. The application has configured Rules that carry out the eligibility checks. There is separate eligibility Rules for mitigants types that are equity, mutual funds, or debt security. Mitigant eligibility is also checked based on the original and residual maturity of the collateral. Collateral is classified as eligible only if its original maturity is more than 1 year and residual maturity is more than 3 months.

Eligible Guarantor

As per the final rule, eligible guarantor means**:**

1. A sovereign

2. the Bank for International Settlements,

3. the International Monetary Fund,

4. the European Central Bank,

5. the European Commission,

6. Federal Home Loan Bank,

7. Federal Agricultural Mortgage Corporation (Farmer Mac),

8. Multilateral Development Bank (MDB),

9. Depository institution,

10. Bank holding company,

11. Savings and loan holding company,

12. Credit Union,

13. Foreign bank,

14. Qualifying central counterparty (QCCP); or

15. An entity (other than a special purpose entity):

    a. That at the time the guarantee is issued or anytime thereafter, has issued and outstanding an unsecured debt security without credit enhancement that is investment grade;

    b. Whose creditworthiness is not positively correlated with the credit risk of the exposures for which it has provided guarantees; and

    c. That is not an insurance company engaged predominately in the business of providing credit protection (such as a monoline bond insurer or re-insurer).

List of eligible guarantors as mentioned in the points (1-14) is configurable. Also, other required criteria as mentioned in point (15) for other guarantors, requires a computation rule to update mitigant eligibility flag.

Mitigant eligibility is not present if, exposure guarantor is positively correlated with credit protection as main business indicator (standard party type). Similarly, mitigant eligibility is present if, exposure guarantor is positively not correlated with credit protection as main business indicator (standard party type).

Mitigant eligibility is not present if, exposure guarantor is positively correlated with credit protection as main business indicator (special purpose entity).

Mitigant eligibility is present if, exposure guarantor is positively not correlated with credit protection as main business indicator (insurance entity).

Maturity Mismatch

If there is a Maturity Mismatch between mitigant and exposure, then such mitigant is eligible only if its original maturity is greater than or equal to one year and its residual maturity is greater than three months. A maturity mismatch occurs when the residual maturity of a credit derivative or guarantee is less than that of the hedged exposure(s).

Hence, Mitigant Eligibility = 'Y' for the case of maturity mismatch only if, original maturity is more than or equal to a year and residual maturity is greater than 3 Months.

A new rule "**US – Maturity Mismatch Identification**" is used to identify if maturity mismatch has occurred between credit derivative or guarantee and the mapped exposure.

A **Maturity Mismatch flag** is used to hold the maturity mismatch indication.

Subsequently, the existing rule "**USA - Mitigants Eligibilty Based on Maturity Mismatch**" is used for eligibility purpose. However, it is executed based upon maturity mismatch.

Hence, Maturity mismatch = 'Y' if, the residual maturity of mitigant is less than or equal to 3 months.

Eligible Collateral

Financial collateral is defined as:

1. Cash on deposit with the banking organization (including cash held for the banking organization by a third-party custodian or trustee);

2. Gold bullion;

3. Short- and long-term debt securities that are not resecuritization exposures and that are investment grade;

4. Equity securities those are publicly-traded;

5. Convertible bonds that are publicly-traded; or

6. Money market fund shares and other mutual fund shares if a price for the shares is publicly quoted daily

New rule **US – US III - Mitigant Eligibility for Equity** is used to allow equity securities. The rule has a mitigant type (equity) and equity trading status as source hierarchy.

Rule **US – US III - Mitigant Eligibility for Mutual Fund** is used to allow money market fund shares and other mutual fund.

Assumption

Eligible Mutual fund indicator is Y only if mutual fund price is publicly quoted daily. Also, a new rule is required for other conditions like investment grade, not resecuritized and so on.

CRM Treatment to Collateral – Collateral Haircut Approach

Collateral Haircut approach is applicable when the financial collateral is for an eligible margin loan, repo-style transaction, collateralized derivative contract, or single-product netting agreement of such transactions and of any collateral that secures certain repo-style transaction that is included in VaR-based measure. Bank can use either Standard Supervisory haircut or own estimate.

All the conditions and the values related to Collateral Haircut approach (Comprehensive approach) is the same as in US Advanced approach, that is:

- Calculation of exposure amount as max $\{0, [(\Sigma E - \Sigma C) + \Sigma(Es \times Hs) + \Sigma(Efx \times Hfx)]\}$

- Apply Standard Supervisory volatility haircuts based on Residual Maturity, (Sovereign / Non Sovereign Issuers Risk Weight)

    o Currency Mismatch Haircut

    o Adjustments to Supervisory Haircut

- The following is the method for assigning volatility haircut.Supervisory Haircut

For supervisory haircut method, the application assigns volatility haircut based on issuers, issuer's ratings, mitigants residual maturity, and type of mitigant, as recommended by the US final rule. For Own Estimate method, the application considers the Basel transaction type of the exposure. Basel transaction types are stored in the Basel transaction type dimension (**DIM_BASEL_TRANSACTION_TYPE**) table.

The various transaction types available are capital market driven, repo style, and secured lending. The volatility haircut is assigned as per the Basel accord. The FOREX haircut is also assigned based on these transaction types as per Basel accord.

Only eligible mitigants are considered for haircut assignment. The eligible mitigants are moved from the mitigants (**FCT_MITIGANTS**) table to sub exposures (**FCT_SUB_EXPOSURES**) table. Haircuts mentioned in the Basel Accord assume a holding period for 10 days. However, if the holding period for mitigants is more than 10 days, then the application scales up the haircut value to reflect the correct value as per the holding period.

Mitigant Risk Weight

The application assigns the risk weight to the financial collateral based on the issuer type and the Country Risk Classification (CRC) assigned, if applicable. The risk weight to the guarantees and credit derivatives are assigned based on the CRC and the correlation calculated for the mitigant. The financial collateral issued by different issuers and belonging to various CRC classes, is assigned different risk weights as per specified in the US III. Also, countries which have defaulted are assigned a different risk weight. In the case of financial collateral by foreign banks, the application assigns the ratings based on the foreign bank's country code.

Based on this risk weight assignment to different categories of issuers, the Standard Supervisory Volatility Haircut is as follows:

Residual Maturity	Issuer - Sovereign				Issuer - Non-Sovereign			Investment grade securitization exposures
	RW @ 0%	*RW @ 20%*	*RW @ 50%*	*RW @ 100%*	*RW @ 20%*	*RW @ 50%*	*RW @ 100%*	
<= 1 year	0.50%	1.00%	1.00%	15.00%	1.00%	2.00%	4%	4.00%
> 1 year and <= 5 years	2.00%	3.00%	3.00%	15.00%	4.00%	6.00%	8%	12.00%
> 5 years	4.00%	6.00%	6.00%	15.00%	8.00%	12.00%	16%	24.00%
Main Index Equities	N/A	N/A	N/A	N/A	15.00%			
Gold	N/A	N/A	N/A	N/A	15.00%			
Other publicly traded equities	N/A	N/A	N/A	N/A	25.00%			
Mutual Funds	N/A	N/A	N/A	N/A	Highest haircut applicable to any fund (this is currently happening in the solution as equal to 25%)			
Cash Collateral	N/A	N/A	N/A	N/A	0.00%			

The volatility haircut is based on the ten-business day holding period. Sovereign issuers include the foreign PSEs (Public Sector Entity). Foreign PSE that has a 0% risk-weight is allocated the same volatility haircut as that of a sovereign issuer that is being risk weighted at 0%. For counterparty to be reclassified to a 'Foreign PSE' party type reclassification Rules and asset class reclassification Rules are modified in this current release.

Mitigant Haircut Assignment

The application performs computations for three kinds of mitigant haircut which is, volatility haircut, FOREX haircut, and maturity mismatch haircut. Volatility haircuts are calculated and amount of the exposure to the counterparty and the value of collateral or mitigants, is adjusted to account for any future fluctuations in the market value. After the adjustment, the application provides the volatility adjusted amounts for exposures (higher than original exposure amount) and collateral (lower than original amount).

When the exposure and collateral are in different currencies, the application makes an adjustment by applying FOREX haircut. When the residual maturity of the CRM is less than that of the underlying credit exposure, a maturity mismatch occurs. When there is a maturity mismatch and the CRM has an original maturity of more than one year, maturity mismatch haircut is applied to adjust the value.

There are three methods for assigning volatility haircut:

- Supervisory Haircut
- Scaling Up
- Own Estimation

In Supervisory Haircut method, the application assigns volatility haircut based on issuers, issuer's ratings, mitigants residual maturity, and type of mitigant. The assignment is done as per US Regulatory Capital Final Rules. In Scaling Up, the haircut is scaled up based on the minimum holding period for the transaction type. Bank can use the Supervisory Haircut and Bank Own Estimation to assign haircut on mitigants. Through Run Management option, user can execute Bank Own Estimation method for haircut.

The FOREX haircut is also assigned based on these transaction types as per US Regulatory Capital Rules. Only eligible mitigants are considered for haircut assignment and for further processing. The eligible mitigants are moved from mitigants table to the sub exposures table. Haircut mentioned by the US regulator capital rule assume a holding period of 10 days for eligible loan and derivative contracts and holding period of 5 days for repo-style transaction.

However if the holding period for eligible loan and derivative contracts is more than 10 days and if holding period more than 5 days for repo style transaction then the application scales up the haircut value to reflect the correct value as per the holding period.

CRM Capital Charge Calculation

Mitigant Correlation Factor: Correlation factor for collaterals or mitigants is also calculated for mitigants belonging to all asset classes based on their PD.

Capital Charge Calculation: Capital charge is calculated for all mitigants using their effective maturity, correlation factor, probability of default, loss given default, and maturity adjustment value. Similarly, for failed trades and defaulted exposures, capital charge is calculated.

Allocation of Mitigants to Exposures

This process loads the mitigant mapping data from the stage table to its corresponding processing tables. Mitigants are allocated to the respective exposures that they are covering. The application also defines how much of the bank's exposure the mitigant is covering. Shareholding percent is also applied to the mitigant amounts. The application has a pre-built optimizer for optimum allocation of mitigants to the exposures for credit risk mitigation purposes. One-to-One, Many-to-One, and Many-to-Many mapping of mitigants are handled in an efficient manner, involving storage of intermediate computations for traceability.

All mitigants which are eligible and mapped to an exposure are then populated to a new table where each exposure is broken down by mitigant type. This includes an additional row treating the exposure as having covered and uncovered portion. The covered factor and uncovered factor is also populated in this table.

The application uses linear programming logic to allocate the mitigants to the exposures. Pooling identifies the exposure and mitigant data from sub exposures table. Exposure identifier and mitigant identifier are the attributes on which pooling is performed. It assigns the pool ID for each exposure-mitigant combination. Based on these pool ids, optimizer task allocates covered factor to exposures. Optimizer does the optimum allocation of mitigants to exposures.

For more information on the Mitigant Allocation Optimizer, see Exhibit 1 and Exhibit 3 in *Annexure A: Key Concepts.*

Post CRM RWA Computation

Pre-Mitigation EAD is split into post-mitigation EAD for covered portion (mitigant's EAD - portion of exposure that is covered by mitigant) and uncovered portion (portion of the exposure that is not covered by mitigant). For multiple mitigants covering one exposure, there are more than one record for covered portion of that exposure. Post mitigation RWA Unexpected Loss (post CRM RWA UL) is calculated as the product of post mitigation EAD for and it's Capital Required Unexpected Loss with 12.5. Post mitigation RWA Expected Loss is calculated as the product of PD, LGD, and post mitigation EAD amount with 12.5.

Over the Counter Derivative Products

The Basel committee has introduced Counterparty Credit Risk (CCR), wherein the counterparty can default before the final settlement of a transaction. Unlike the firm's exposure to credit risk arising from a loan, CCR creates a bilateral risk of loss. Market value of the transaction can be positive or negative for either parties in the transaction at different points in time, till the maturity or closure of the transaction. This market value is dependent on the movement of the underlying risk factor. The Basel committee has proposed Rules to calculate the EAD or exposure amount for the instrument with CCR.

NOTE: All OTC Derivatives and Repo products are part of the CCR computation. Also, all the trades with Central Counterparty (CCP) are assigned a zero risk weight.

The application's treatment for the instrument with CCR is divided into three categories:

- Exposure at Default (EAD)
- Risk Weighted Asset (RWA)
- Credit Risk Mitigation (CRM)

Exposure at Default (EAD)

A comprehensive explanation of the process flow is as follows:
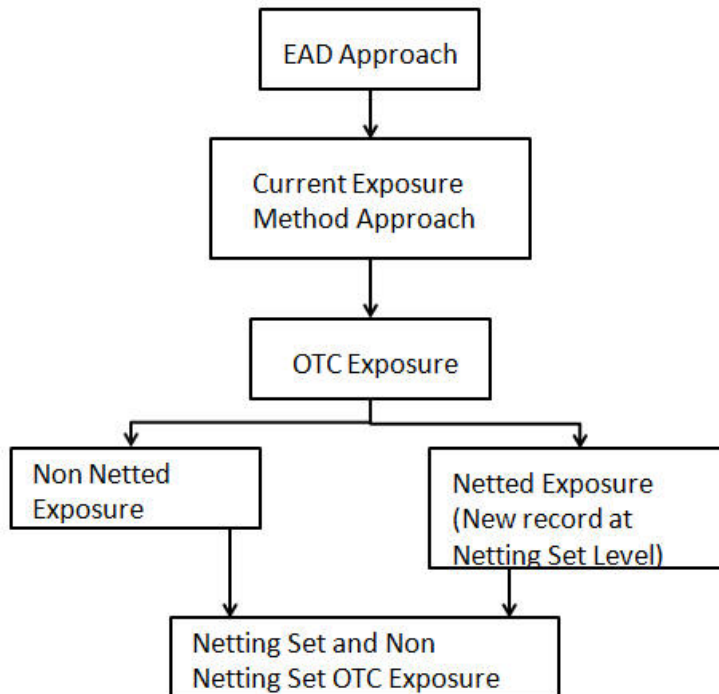
The exposure amount which is subject to CCR is estimated by the current exposure method approach as described in the US Regulatory Capital Rules. The application calculates EAD with Current Exposure Method as laid out in the US Regulatory Capital Rules.

Current Exposure Method

The application calculates the EAD for two different sets of the records with a different methodology - Netting agreement Records and Non Netting agreement Records.

OTC Exposure

For the calculation of EAD, the exposure amounts from the exposure table are moved to a different table for OTC and REPO transactions. The application also creates a new record for each netting agreements in the data.

Non Netted Exposure

To compute EAD for non netting records the application reads the following inputs:

- Total replacement cost which is greater than Mark to Market value or zero for all the contracts.
- An amount for potential future credit exposure is calculated based on the notional amount and multiplied by the add-on factor based on the underlying type in the contracts. The assignment of Add-on for different products is represented in the following table.

Remaining maturity[2]	Interest rate	Foreign exchange rate and gold	Credit (investment grade reference asset)[3]	Credit (non-investment grade reference asset)	Equity	Precious metals (except gold)	Other
One year or less	0.00	0.01	0.05	0.10	0.06	0.07	0.10
Greater than one year and less than or equal to five years	0.005	0.05	0.05	0.10	0.08	0.07	0.12
Greater than five years	0.015	0.075	0.05	0.10	0.10	0.08	0.15

The Rule: USA - Non Sec Add-on Estimation assigns the add-on percent in the processing Non Securitization table. Data is populated to Nettable Pool (**FCT_NETTABLE_POOL)** table by T2T: **NETTABLE_POOL_OTC_POPULATION_OTHERS**

Netted Exposure

To compute EAD for netting agreement records, the application reads the following inputs:

- Total replacement cost which is greater than Mark to Market value for all the contracts.

- An amount for potential future credit exposure is calculated based on the notional and multiplied by the add-on factor based on the following formula:

$$A_{net} = 0.4 * A_{Gross} + 0.6 * NGR * A_{Gross}$$

The application creates new records for netting agreement and then populates into the OTC Exposure table. It selects all the records with the following attributes which are similar to computing the netting agreement exposure:

- Trades with Entity

- Customer

- Product Level – All OTC trades

- Netting Agreement

- Book Code: Trading or Banking

- Long Settlement transaction Flag

- GAAP Code

The following T2Ts are used to create and populate the OTC exposure table:

- NETTABLE_POOL_OTC_POPULATION

- NET_POOL_EXPOSURE_CREATION

The add-on percent netting agreement is achieved by using the following calculations:

- Gross Current Exposure Calculation for OTC Derivatives

- Gross Potential Exposure Calculation for OTC Derivatives

- Net Current Exposure Calculation for OTC Derivatives

- Net Gross Ratio Calculation for OTC Derivatives

- Net Potential Exposure Calculation for OTC Derivatives

Exposure at default for all instruments with CCR risk is calculated using the following calculations:

- Exposure Calculation for OTC Derivatives

OTC Equity Derivatives

OTC Equity derivatives has two different treatment based on trade booked under trading or banking book. The banking book OTC equity derivatives goes through a Simple Risk Weight Approach as per the equity exposure treatment. The bank has the option to include the banking book exposure for the calculation of CCR Charge. If the bank includes CCR charge for the banking book transactions, all the transactions are included for CCR Charge. Option to include and exclude CCR charge for OTC equity derivative is Run time option. Also, trading book OTC equity derivatives is subject to CCR charge based on the Current Exposure Method and the user does not have any option to exclude the same.

The **USA - Equity OTC Derivative EAD Calculation** rule is used for equity computation.

Risk Weighted Asset (RWA) Approach

RWA calculation for the instruments which are subject to CCR risk is similar to RWA calculation for other instruments.

Credit Risk Mitigation (CRM) Approach

CRM calculation for the instruments which are subject to CCR risk is similar to CRM calculation for other instruments.

Key Data Elements

Key data elements to be noted are listed in this section. To view the complete list of tables, see to *Download Specification* document.

- For instruments participating in netting agreement, the nettability flag should be set as 'Y'.

- Instruments with the same agreement code are netted in the same netting agreement. The application handles cross product and product netting for netting agreements.

Credit Risk Securities Financing Transactions (SFT)

Securities Financing Transactions (SFT) includes Repo Style transactions, Margin Lending, Security Financing Borrowing, and so on. The SFT portfolio of a bank is included for capital charge calculations as per standardized, foundation Advanced Approach for US, and Advanced Approach for US. The application takes the notional amount as the EAD amount.

The SFT EAD calculation follows the Collateral Haircut Approach methodology.

- For all SFT contracts which have a mitigant mapped to it, the application computes CRM based on the RWA approach undertaken by the bank. For standardized approach, a risk weight is applied for all eligible mitigants based on mitigant value post haircut adjustment.

Process Flow for Credit Risk Securities Financing Transactions

SFT EAD is computed in the sub process **SFT Exposures RWA - Collateral Haircut Approach**.

A comprehensive explanation of the process flow is as follows:

SFT Underlying Data Population

The two data elements present in the SFT transactions are captured as follows:

Firstly, the parent transaction is captured in the Repo Contracts Staging table (**STG_REPO_CONTRACTS**) and secondly the underlying information, on which the parent transaction is built, is captured separately in the Mitigants Staging table **(STG_MITIGANTS)** or Placed Collateral Staging table **(STG_PLACED_COLLATERAL)**, depending on the product type**.**

The underlying data is identified by using the Exposure Mitigant Mapping Staging table **(STG_EXP_MITIGANT_MAPPING)**, wherein this is linked to the data in the repo contracts staging table, for any collateral which is provided to the repo contracts.

And the underlying data for any collateral placed with the counterparty, is identified by using the Account Placed Collateral Mapping Staging table **(STG_ACCT_PLACED_COLL_MAP)**, wherein this is linked to the data in the repo contracts staging table.

Haircut Assignment for SFT Underlying

This is computed by the following Rules:

- USA - US III - Exposure Volatility Haircut Assignment for Debt Securities
- USA - US III - CRM Exposure Volatility Haircut for Cash, Gold, Equity and Mutual Fund
- Exposure Volatility Haircut Assignment - Scaling Up
- Forex Haircut for SFT Underlying

Pre-Mitigation Post Volatility Haircut EAD Amount Calculation for Exposures

For SFT transaction, the application calculates EAD for the parent exposure, based on the underlying information. The underlying exposures are processed in **FCT_SFT_UNDERLYING** table and then the EAD computed is moved to parent record in **FCT_NON_SEC_EXPOSURES**. Each underlying exposure is assigned a volatility haircut, if the underlying exposures are financial instruments. FOREX haircut is applied if the underlying and the parent contract are in different currency. Each SFT underlying exposure adjusted for haircut (EAD + haircut value) is added as EAD to the parent contract (Pre mitigation, post volatility haircut EAD).

Nettable Pool Data Population

The application nets SFT contracts based on the same customer, common netting agreement identifier, transaction of Repo, Re-Repo or Margin Lending, Trading or Banking book, and so on. Margin lending transaction being SFT also follows the same EAD calculation methodology; however Repo or Reverse Repo and margin lending are not netted together. The EAD computations are taken from FCT_NON_SEC_EXPOSURES to FCT_NETTABLE_POOL after netting them based on the same netting agreement code.

Pre-Mitigation Risk Weighted Assets Calculation for the Pool

Pre-Mitigation Risk Weighted Assets are calculated for the pool as EAD, netted previously, multiplied by the risk weight.

Unsettled Transactions

Calculation of exposure for Delivery versus Payment (DvP) and Non DvP transactions is done by subtracting the mark-to-market value from contract amount (for DvP transactions) and assigning the mark-to-market value (for non-DvP transactions). This is done using the rule: "USA - Non Sec Pre-Mitigation EAD Amount for unsettled Transaction".

Risk weighted assets calculation for failed trade and unsettled transactions are done using the risk weights from the following table and multiplying the same with the EAD computed above in accordance with the US Final rule guidelines:

Number of business days after contractual settlement date	Risk weight to be applied to positive current exposure (in percent)
From 5 to 15	100%
From 16 to 30	625%
From 31 to 45	937.5%
46 or more	1,250 %

Specific Wrong Way Risk

Specific Wrong Way Risk (SWWR): Wrong-way risk is defined as the risk that occurs when "exposure to counterparty is adversely correlated with the credit quality of that counterparty". It arises when default risk and credit exposure increases together. The terms 'wrong-way risk' and 'wrong-way exposure' are often used interchangeably.

According to the definition given in the US Regulatory Capital Rules, SWWR is defined as follows:-

Specific wrong-way risk means wrong-way risk that arises when either:

> The counterparty and issuer of the collateral supporting the transaction.

> Or

> The counterparty and the reference asset of the transaction are affiliates or are the same entity.

Process Flow for SWWR
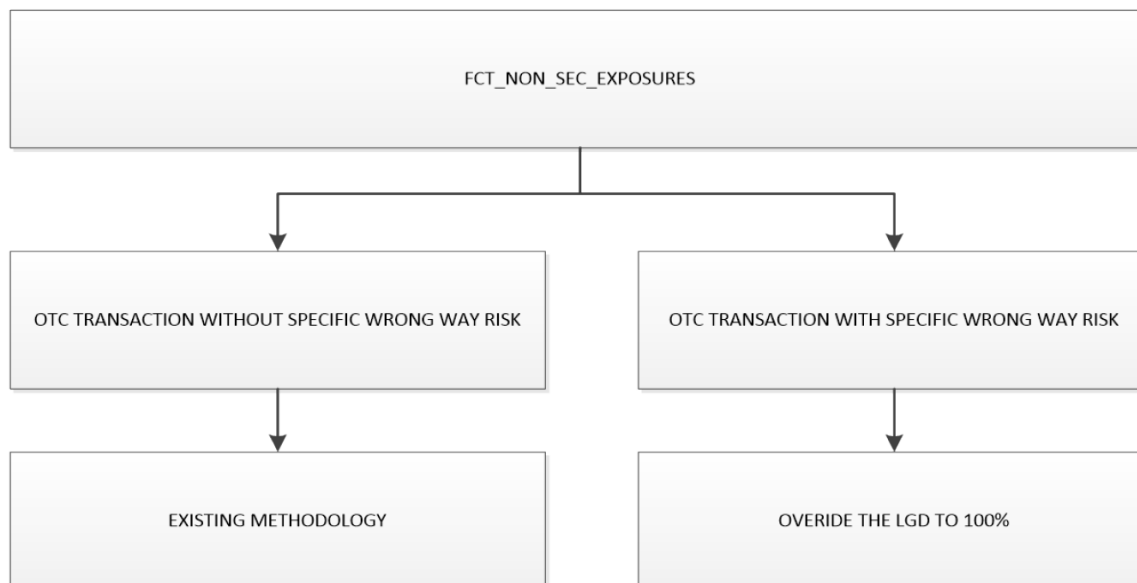
SWWR is identified by the clients and is captured in the product processor. Any exposure identified as SWWR is coming as netting agreement of its own is the data expectation.

Exposure at Default is expected as client input wherever the transaction is identified as SWWR. For all the transactions which are identified as SWWR, the LGD is overridden to 100%. PD for the counterparty is not changed. Capital Calculation process is not changed as part of SWWR treatment. Input for calculating the capital is modified as specified previously. Capital calculation is as per existing wholesale capital calculation treatment. Bought Credit Protection transactions which are currently flowing in Mitigants table are not part of SWWR treatment.

5.2.2.2.2 Cleared Transactions

The G20 Leaders, at their Pittsburgh summit in September 2009, agreed to a number of measures to improve the over-the-counter (OTC) derivatives markets, including creating incentives for banks to increase their use of Central Counterparties (CCP). Central clearing decreases the possibility of systemic risk by reducing the possibility of transferring financial contagion risk problems from one institution to another institution. This movement of a transaction to a CCP and the eventual failure of CCP can be catastrophic to the entire financial system. The US III, in line with Basel committee guidelines, has introduced a new capital requirement for a bank's exposure arising from OTC, exchange traded derivatives, and repo style transactions which are cleared through CCP. The application calculates the risk charge for the transaction involving CCP's as per the guidelines laid out in US III.

This concept is applicable for all the OTC and exchange traded derivatives and SFT products cleared through Qualified Central Counterparty (QCCP). For more information on terms such as Central Counterparty, Qualifying Central Counterparty, Clearing Member, Clearing Member Client, and Bankruptcy Remote, see *Glossary*.

Assumption

Fair value of collateral is at counterparty and collateral type level.

Interpretation

US III does not clearly mention treatment of collateral posted with non qualifying CCP. Therefore, the application currently applies the treatment of bilateral trade for the exposure of bank with non qualifying CCP (NQCCP).

For the collateral posted with NQCCP, with reference to Reserve Bank of India (RBI) directives, the application currently applies the same risk weight to the collateral posted with NQCCP with transactions of the same nature.

US III does not state a differential treatment for transactions between clearing member and client, which arises due to the clearing member acting as an intermediary between client and CCP. The application currently does not support any such functionality.

Process Flow

EAD Calculation

EAD calculation is computed as per Current Exposure Method (CEM) or should be provided as an input for Standardized or IMM approach. The Rule **Non Sec Pre-Mitigation EAD Amount for Cleared Transaction Collaterals** under the EAD Calculation sub process computes this.

Treatment of Exposure with Qualified CCP when Reporting Bank act as Clearing Member

The application expects you to identify all the transactions which fall under the group of cleared transactions. The application calculates risk charge separately for exposures and collaterals posted with the QCCP. All the exposures with the QCCP are assigned a risk weight of 2%. If the collateral posted with the QCCP is not bankruptcy remote, then a risk weight of 2% is assigned. Otherwise a 0% risk weight is assigned.

Treatment of Exposure with Qualified CCP when Reporting Bank act as Clearing Member Client

The application expects you to identify all the transactions which fall under the group of cleared transaction. Risk weight assignment for the exposure with QCCP is based on the validation of the collateral posted by the reporting bank with the clearing member or QCCP. A risk weight of 2% is assigned if the following conditions are met:

- If the collateral posted covers all the losses arising for the clearing member or QCCP

- Due diligence is conducted on the collateral wherein there is no restrictions on the clearing member or QCCP for using posted collateral, in case of any legal proceeding at 2%.

Note: These two conditions (that is, collateral covers the loss and due diligence conducted) are expected to be provided as an input.

If the preceding two conditions are not met, then a risk weight of 4% is assigned. These conditions are collateral specific and the application expects it for the collateral posted with QCCP. It automatically assigns the same to all the exposures of reporting bank with the QCCP. Collateral posted with the QCCP is also assigned the same risk weight which gets assigned to the exposure.

Treatment of Exposure with Non-qualifying CCP when Bank acts as Clearing Member or Clearing Member Client

The application expects you to identify all the transactions which fall under the group of the cleared transaction. Risk weight assignment for exposure and collateral posted with the non-qualifying CCP is assigned the same risk weight as that of a bilateral trade. The CCP is considered as bank or corporate for the treatment.

The Risk Weight is assigned by the Rule **Risk Weight Assignment for Cleared Transactions** under the sub process **Risk Weight Assignment** and the Capital Charge for these transactions are calculated by the Rule **Non Sec Pre-Mitigation Capital Charge Calculation for Cleared Transactions** under the sub process **Capital Calculation.**

The US Regulatory Capital Final Rules provides that a clearing member banking organization,

(iv) Acts for its own account,

(v) Is acting as a financial intermediary (with an offsetting transaction or a guarantee of the client's performance to a QCCP)

(vi) Guarantees a QCCP's performance to a client

Which is applied to a 2% risk weight to the banking organization's exposure to the QCCP. Transaction details where reporting bank role is a Clearing member (CM) or a Clearing member client (CMC):

Banking Organization Clearing Member (Bank CM) – Own Account
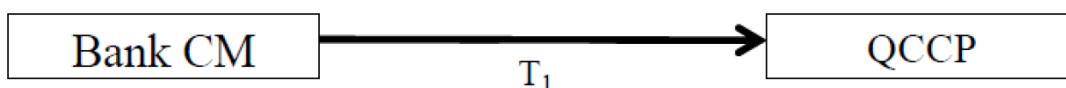
Bank CM – Client Trade

- Financial intermediary with offsetting transaction to QCCP

- Agency with guarantee of client performance
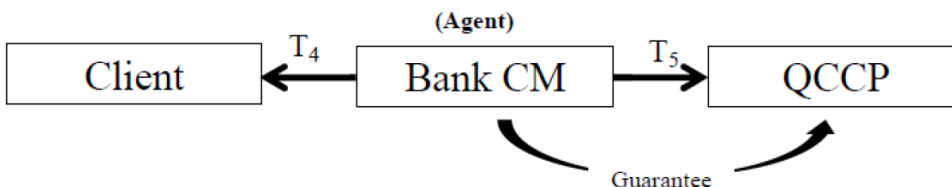
- Guarantee of QCCP performance

Banking organization can play agency role for a direct transaction between CMC and CCP by providing guarantee to CCP on behalf of client or guarantee to client on behalf of CCP.

In case of guarantee to CCP on behalf of client, there is no exposure to CCP but guarantee is an exposure to client. This is treated as OTC exposure to client.

In case of guarantee toward performance of CCP, exposure is taken for client and CCP as displayed in the following chart detailing for all the transactions.

Transaction details where reporting bank role is a Clearing member client (CMC):

Bank Client – CM Trade

- Financial Intermediary with offsetting transaction to QCCP

- Agency with guarantee of client performance

Treatment details for Cleared Transactions

	Exposure to	Description	Risk-weighting treatment under the US Regulatory Capital Final Rule
T1	QCCP	Own Account	2% risk weight on trade exposure amount
T2	Client	Financial intermediary with offsetting trade to QCCP	OTC derivatives with CEM scalar**
T3	QCCP	Financial intermediary with offsetting trade to QCCP	2% risk weight on trade exposure amount
T4	Client	Agent with guarantee of client performance	OTC derivatives with CEM scalar**
T5	QCCP	Agent with guarantee of client performance	No exposure
T6	Client	Guarantee of QCCP performance	OTC derivatives with CEM scalar**
T7	QCCP	Guarantee of QCCP performance	2% risk weight on trade exposure amount
T8	CM	CM financial intermediary with offsetting trade to QCCP	2% or 4% risk weight on trade exposure amount
T9	QCCP	CM agent with guarantee of client performance	2% or 4% risk weight on trade exposure amount

*Risk weight varies depending on compliance with bankruptcy remoteness of collateral and probability of client positions.

**Advanced approaches banking organizations using the IMM can reduce the margin period of risk. Under the US Regulatory Capital Final Rules, a clearing member banking organization treats its counterparty credit risk exposure to clients as an OTC derivative contract, irrespective of whether the clearing member banking organization guarantees the transaction or acts as an intermediary between the client and the QCCP. Consistent with the BCBS CCP interim framework, to recognize the shorter close-out period for cleared transactions, under CEM approach a clearing member banking organization can calculate its exposure amount to a client by multiplying the exposure amount, calculated using the CEM, by a scaling factor.

Holding Period (days)	Scaling Factor
5	0.71
6	0.77
7	0.84
7	0.89
9	0.95
10	1.00

Key Data Elements

Some key data expectations are as follows:

- For the exposure, the application expects the counterparty for the trades which are stamped as cleared transaction, to be CCP.

- The application also has captured the clearing member code if the role of the bank for the transaction is a clearing member client.

- For the collateral posted with clearing member, the application expects the counterparty to be clearing member and in addition the application also captures the QCCP for which collateral is posted.

- When the collateral is posted with CCP, transactions similar to exposures are expected. Collateral is also expected at counterparty and collateral type level.

- All the collateral records are assigned the risk weight separately.

The following data elements are expected as an input from the client:

- Central Counterparty is Qualifying or Non Qualifying.

- Collateral covering losses and due diligence conducted by CMC for the collateral contract.

- Bankruptcy Remote status for the collateral posted with CCP.

- Fair value of collateral at counterparty and collateral type.

- Bank's role in the transaction with the Central Counterparty

5.2.2.2.3 Default Fund Contribution

According to the US Regulatory Capital Final Rule, a default fund contribution refers to the funds contributed or commitments made by a clearing member to a Central Counterparty's (CCP) equalized loss sharing agreement. The purpose of such default funds is to provide capital, in addition to the collateral posted by participants and in addition to capital provided by the clearinghouse, as a safeguard against extraordinary losses that might occur in connection with.

For example a financial crisis in the market or the simultaneous defaults of several large members. The clearing members contribute to such default funds kept with the central counterparty (clearing house) in the proportion of their exposure to the central counterparty. The default fund contributions by the clearing members contribute toward the central counterparty's regulatory capital along with CCP's own contributions to the default fund. These contributions act as collaterals to mutually share in the losses incurred by the clearing members due to counterparty defaults.

For each clearing member, a contribution is made to the central counterparty's default fund. This contribution acts as a relief's against the defaults by any clearing member of the central counterparty.

US Regulatory Capital Final Rules explains the methods that the banking organization playing the part of a clearing member of the CCP, must adopt and compute risk weighted assets (RWA) for a non-qualifying and a qualifying CCP.

If the CCP is not a qualified CCP (Non-QCCP), then the risk weighted asset amount for the banking organization's default fund contribution is the sum of default fund contribution multiplied by 1250%.

If the CCP is a qualified CCP (QCCP), then the RWA amount is computed using one of the following two approaches stated below:

Approaches	Sub – Process
Total Default Fund Contribution Approach	RWA for Default Fund Contribution with QCCP Total Default Fund Contribution Approach
Bank's Own Default Fund Contribution Approach	RWA for Default Fund Contribution with QCCP Banks Own Default Fund Contribution Approach

Approach 1

For the purpose of computing the clearing member's capital requirement, which is the reporting bank's capital requirement for the contributions made to the CCP's default fund, the hypothetical capital requirement of the central counterparty for the default fund must be known. This must be computed by the central counterparty based on the exposures of all the clearing members to the default fund. After this figure is calculated by the CCP, it is shared with all the clearing members to enable them and to compute their respective capital requirements against the default fund.

When the reporting bank gets the hypothetical capital requirement from the QCCP, next step is to compute the capital requirement of the reporting bank by finding out the proportion of the reporting bank's contribution in the total default fund contribution.

The parameters considered for this purpose include the following QCCP's:

- Net potential exposure to the two largest clearing members,
- The total net potential exposure to all the clearing members,
- Total default fund contribution by all the clearing members,
- QCCP's own contribution to the default fund, and
- The total number of clearing members for the default fund.

The last step is to compute the risk weighted assets of the reporting bank corresponding to the default fund contribution to the QCCP by using the capital computed in the previous step.

These steps and the calculation involved are the following:

- *Step 1:*

  It requires the QCCP to calculate its hypothetical capital requirement (K_{CCP}) for the default fund. This is done by the QCCP and is published to the clearing members for them to use for their respective capital calculations.

- *Step 2:*

  Compare K_{CCP} with the funded portion of the default fund of a QCCP and calculate the capital requirement of the bank (K_{CM}) by using the total of all the clearing members' capital requirements (K^{*}_{CM}). This capital requirement is considered on the contribution that the clearing members make to the default fund of the QCCP.

Approach 2

RWA amount for the default fund contribution is equal to 1250% multiplied by default fund contribution subject to a cap based on banking organization's trade exposure amount for all of its transactions with a QCCP. RWA amount for default fund contributions is minimum of:

> (**1250% * default fund contribution to the QCCP, 18% * Trade Exposure Amount to the QCCP**).

Key Data Elements

Key data elements to be noted are listed in this section. To view the complete list of tables used, see the *Download Specification* document.

- Default fund contributions and related data are expected at Default fund – Central Counterparty level in the entity Stage Central Counterparty Details (STG_CCP_DETAILS).

- Hypothetical Capital Requirement of CCP, Maximum Net Potential Exposure of clearing member of CCP, 2nd Maximum Net Potential Exposure of clearing member of CCP, Total Net Potential Exposure of clearing member of CCP, Number of Clearing Members to the CCP, Total funded Default Fund Contribution of all clearing members to the CCP, Total unfunded Default Fund Contribution of all clearing members to the CCP and Default fund contribution of CCP from its own funds for each central counterparty level required.

- Application supports only the capital requirement of the bank (K_{CM}) based on Funded/Unfunded default contributions from all clearing members not by Initial Margin. But data model supports place holders to capture Total Initial Margin by all clearing members to CCP and Bank's initial margin posted to CCP.

Other Amendments

Eligible Guarantees

US III has amended the definition of eligible guarantee. An eligible guarantee, as per the proposed rule, now includes a contingent obligation of the U.S. Government or an agency of the U.S. Government, the validity of which is dependent on some affirmative action on the part of the beneficiary or a third party.

Hence, the following list of agencies (if issued a guarantee) is termed as eligible guarantor:

- US Government
- Federal Home Loan Bank
- Federal Agricultural Mortgage Corporation (Farmer Mac)
- Depository institution
- Bank holding company
- Savings and loan holding company
- Credit union
- Foreign Bank
- Securities Firm

Party type reclassification Rule and mitigant eligibility Rule are modified to incorporate this amendment in the current release.

Qualified Revolving Exposure

As per US III, unsecured and unconditionally cancellable revolving exposures with a pre-established maximum exposure amount of $100,000 (such as credit cards) are classified as Qualified Revolving Exposure (QRE). Unsecured, unconditionally cancellable exposures that require payment in full and have no communicated maximum exposure amount (often referred to as charge cards) are instead classified as 'other retail'. Hence, as proposed in US III, charge card qualifies as a QRE, subject to an upper exposure limit of $100,000. Based on the exposure limit, the revolving exposure is classified into different asset classes. Hence, the reclassification rules are modified to include charge card which is reclassified into QRE in the product re-classification to standard product

Cash Item in Process of Collection

Cash item in process of collection is now risk weighted at 20%. To assign this risk weight a new Rule (**USA - Non Sec RW Assignment for Cash in Process of Collection**) is introduced in the application.

Trade-Related Letter of Credit

In US III, trade-related letter of credit exposure's effective maturity must be not less than one day. Hence, the effective maturity floor of 1 year is removed from the application. This change is brought into effect in the Rule **Non Sec Effective Maturity Assignment for all Exposures.**

Money Market Fund Approach

Under the Money Market Fund approach, banks were permitted to assign a 7 percent risk weight to exposures to money market funds. These exposures were subject to restrictions under SEC rule 2a-7 and had an applicable external rating in the highest investment grade rating category. US III has proposed to eliminate the money market fund approach. The agencies believe it is appropriate to eliminate the preferential risk weight for money market fund investments due to their experience with them during the recent financial crisis, in which they demonstrated, elevated credit risk at times. Therefore, Money Market Fund rule is removed in the current release.

Defaulted Exposures Guaranteed by US Government

Under the US Regulatory Capital Final Rules 2007 for defaulted exposure banking the organization should apply a capital charge of 8% for each wholesale and retail exposures.

Now as per US Regulatory Capital Final Rules, the treatment to defaulted exposure is made more risk sensitive. Any wholesale or retail defaulted exposures must assign a 1.6 percent capital charge for the portion of exposure that is covered by an eligible guarantee from the US government.

For portion that is not covered by an eligible guarantee from the US government continues to be assigned as 8.0 percent capital requirement.

Eligible Double Default Guarantor

US Regulatory Capital Final Rules has introduced a term called Eligible Double Default Guarantor. The Eligible Double Default Guarantor for a guarantee or credit derivative obtained by a bank are as follows:

- Depository institution
- Bank holding company
- Savings and loan holding company
- Credit union
- Foreign Bank
- Securities Firm
- Non US Based Securities Firm

Standard Supervisory Haircuts for Repo, Margin Loans and Financial Collateral

Earlier in the US Regulatory Capital Final Rules the volatility haircut for collateral and repo transactions was based on the credit rating of the issuer. However, now as per US Regulatory Capital Final Rule, the volatility haircut for Repo and Collateral is based on the risk weight of the issuer. The risk weight assigned to a different issuer is based on the risk classification or based on the investment grade definition.

Risk-Weight Assignment to Sovereign Issuer

The risk-weight assignment for the sovereign issuer is based on the sovereign's Country Risk Classification (CRC). This is applicable for exposure volatility haircut for repo transactions. The following table details the risk-weight assignment based on the different CRC:

Issuer Type - Sovereign	
CRC	**Risk Weight**
0	0%
1	0%
2	20%
3	50%
4	100%
5	100%
6	100%
7	150%
No CRC	100%
Sovereign Default	150%

For the following issuers, the risk weight assigned is detailed as follows:

- US Depository Institutions: a direct risk weight of 20% is assigned.

- Credit Unions: a direct risk weight of 20% is assigned.

- For a corporate issuer, a direct risk weight of 100% is assigned.

- Risk-weight assignment for foreign banks and foreign PSEs depends on the bank's native sovereign's CRC. For example, if a foreign bank is giving financial collateral to an entity in US, and the foreign bank's headquarters is in UK, then the CRC of UK is used.

Issuer Type - Foreign Banks	
CRC of entity's home country	Risk Weight
0	20%
1	20%
2	50%
3	100%
4	150%
5	150%
6	150%
7	150%
No CRC	100%
Sovereign Default	150%

For all other issuers a risk weight of 100% is assigned.

Securitization Exposures - Definition of Investment Grade

Securitization exposures which are of investment grade are applicable as eligible financial collateral. Securitization exposures' investment grade is defined in the following table:

Rating						Rating Type
Moody's		S&P		Fitch		
LT	ST	LT	ST	LT	ST	
Aaa		AAA		AAA		Investment Grade
Aa1		AA+		AA+		Investment Grade
Aa2	P-1	AA	A-1+	AA	F1+	Investment Grade
Aa3		AA-		AA-		Investment Grade
A1		A+		A+		Investment Grade
A2		A	A-1	A	F1	Investment Grade
A3	P-2	A-	A-2	A-	F2	Investment Grade
Baa1		BBB+		BBB+		Investment Grade
Baa2	P-3	BBB	A-3	BBB	F3	Investment Grade
Baa3		BBB-		BBB-		Investment Grade

If a bank has two ratings provided by two different rating agencies, where one rating is a Non-Investment Grade and other is Investment Grade, then perform multiple assessments.

Based on this risk weight assignment to different categories of issuers, the Standard Supervisory Volatility Haircut is as follows:

Residual Maturity	Issuer - Sovereign				Issuer - Non-Sovereign			Investment grade securitization exposures
	RW @ 0%	*RW @ 20%*	*RW @ 50%*	*RW @ 100%*	*RW @ 20%*	*RW @ 50%*	*RW @ 100%*	
<= 1 year	0.50%	1.00%	1.00%	15.00%	1.00%	2.00%	4%	4.00%
> 1 year and <= 5 years	2.00%	3.00%	3.00%	15.00%	4.00%	6.00%	8%	12.00%
> 5 years	4.00%	6.00%	6.00%	15.00%	8.00%	12.00%	16%	24.00%
Main Index Equities	N/A	N/A	N/A	N/A	15.00%			
Gold	N/A	N/A	N/A	N/A	15.00%			
Other publicly traded equities	N/A	N/A	N/A	N/A	25.00%			
Mutual Funds	N/A	N/A	N/A	N/A	Highest haircut applicable to any fund (this is currently happening in the solution as equal to 25%)			
Cash Collateral	N/A	N/A	N/A	N/A	0.00%			

The volatility haircut is based on the ten-business day holding period. Sovereign issuers include the foreign PSEs. Foreign PSE that has a 0% risk-weight is allocated the same volatility haircut as that of a sovereign issuer that is being risk weighted at 20%. For counterparty to be reclassified to a 'Foreign PSE' party type reclassification Rules and asset class reclassification Rules are modified in this current release.

5.2.2.2.4 Securitization – Advanced Approach for US

Due to the economic crisis in 2008 and other amendments brought in by the Dodd-Frank Act, US III has revised the treatment of securitized exposures. The application supports the following revised hierarchy of approaches for securitization exposures:

1. Supervisory Formula Approach (SFA)
2. Simplified Supervisory Formula Approach (SSFA)
3. Risk Weight at 1250%

Assumptions

A few of the interpretations pertaining to SSFA are as follows:

1. Investment grade are ratings equivalent to BBB- or above
2. Low ratings are ratings equivalent to BB+ or below

Process Flows for Securitization – Advanced Approach

The procedure by which the application handles the advanced approach of securitization exposures is as follows:

```
┌─────────────────────────────────┐
│     Credit Rating Processing    │
└─────────────────────────────────┘
                 │
                 ▼
┌─────────────────────────────────┐
│   Securitization Data Population│
└─────────────────────────────────┘
                 │
                 ▼
┌─────────────────────────────────┐
│     Mitigant Data Population    │
└─────────────────────────────────┘
                 │
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┌─────────────────────────────────┐
│         Mitigant Mapping        │
└─────────────────────────────────┘
                 │
                 ▼
┌─────────────────────────────────┐
│        Sec Reclassification     │
└─────────────────────────────────┘
                 │
                 ▼
┌─────────────────────────────────┐
│      Sec Approach Selection     │
└─────────────────────────────────┘
                 │
                 ▼
┌─────────────────────────────────┐
│   Sec Pre-CRM RWA Computations  │
└─────────────────────────────────┘
                 │
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┌─────────────────────────────────┐
│         Sec CRM Process         │
└─────────────────────────────────┘
                 │
                 ▼
┌─────────────────────────────────┐
│   Sec Post CRM RWA Computation  │
└─────────────────────────────────┘
```

Credit Rating Process

The entire rating information of the exposures and the mitigants are populated from the staging tables to the processing tables. The exposure and the tranche rating information are captured in the account rating (**STG_ACCOUNT_RATING_DETAILS**) tables and the mitigant rating information is captured in the instrument rating details (**STG_INSTRUMENT_RATING_DETAILS**) table. Though the ratings are no longer relevant, the investment grade criteria are handled in the application with the help of these ratings. Any rating below BBB, are all non-investment grades and are low rated. The rating processing is handled in the process **USA Credit Rating Processing**.

Securitization and Mitigant Data Population with Mitigant Mapping

The data pertaining to the pool, tranche, and exposures are populated from the staging tables to the processing tables. The underlying exposures data are captured in the respective product processor tables for originator records. The underlying exposures are captured in the underlying exposures (STG_UNDERLYING_EXPOSURES) table for investor and sold credit protection. The underlying exposures data follows the process pertaining to the non securitization exposures. The securitization transactions which are backed by non-financial assets or by operating companies are excluded from the securitization treatment. They are instead treated as non-securitization exposures. Exposures created out of re-tranching of single asset such as Re-Remic positions need not be treated as re-securitization positions. Exposures which are created by re-tranching a single asset (like Re-Remic positions) are treated as securitization exposures, as mentioned by the accord.

The mitigants data are populated from the staging table to the processing table. The exposures which are mapped to the mitigants are captured and populated from the staging table to the processing table. Securitization data population is handled by the process US III Sec Data Population. Mitigant data population is handled by the process USA Mitigant Data Population and exposure mitigant mapping population is handled in the process USA Sec Exp Mitigant Mapping Pop.

Sec Reclassification

The application uses the standard data for all kinds of calculations (product type like Eligible Liquidity Facility, bank role like Originator, pool type like Mortgage Backed Securities). Before any calculation, the application reclassifies the bank specific data to standard data. The application reclassifies the bank role to the standard bank role of an Originator or Investor. Other bank roles like Sponsor, Credit Protection Provider, and so on, are reclassified into Originator, Investor, and so on, respectively. The application also reclassifies the pool type to the standard pool type like Credit Cards Receivable Pool, Auto Loans, and so on. The application also reclassifies the product type to the standard product type like Mortgage Backed Securities, Eligible Liquidity Facility, and so on. It reclassifies the mitigant type to the standard mitigant type like the Debt Securities, Credit Derivative, Cash, and so on. It reclassifies the mitigant issuer type to the standard mitigant issuer type like Banks, Corporate, and so on. These reclassification tasks are present in **Sec Reclassification** sub process.

Sec Approach Selection

The application assigns the appropriate approach to the exposures, based on the criteria specified in the US III. SSFA parameters Kg for re-securitization positions are arrived by using capital of underlying securitization positions.

The application first identifies whether the exposure is SFA qualified and assigns SFA accordingly. Further, the application checks whether the exposure is SSFA qualified and assigns SSFA accordingly. Both the approaches are selected by the application based on the availability of data. If data for underlying securitized exposures are available for SFA, then the exposure is marked as SFA qualified. Similarly, if data of underlying securitized exposures is available for SSFA, then the exposure is marked as SFA qualified. If the exposures are not qualified for both the approaches, the exposures are risk weighted at 1250%. These approaches are applicable for all the bank roles. For sold credit protection as well, SFA, SSFA, and 1250% risk weighting are applied in a similar way. This approach selection is handled in the sub-process **Sec Approach Selection**.

That is, in case of re-securitization positions, if any of the underlying securitization positions are using any approach other than SSFA (Example: 1250%), the solution does not assign SSFA for re-securitization position.

Sec Pre-CRM RWA Computation

The application calculates the Pre-CRM RWA for the exposures by multiplying the Pre-CRM EAD with the risk weight of the exposures. Pre-CRM RWA is computed in the **Sec Pre-CRM RWA Computation** sub process, after the Gross up Approach or Simplified Supervisory Formula Approach Risk Weight Assignment Rules are computed. For SBOC pool type if bank satisfies the following two condition, that is:

- Bank must a qualified institution, that is, well capitalized bank or reclassified as adequately capitalized bank with the approval by the regulation.

- Total obligation retain by the bank cannot exceed 15% total capital. If bank satisfies this criteria, then RWA is added to sec RWA else to Non sec RWA.

With respect to the treatment for transfer of a small business loan or lease of personal property with recourse, following operational criteria should be met:

- The transaction must be treated as a sale under GAAP. It should be a true sale.

- Banks maintains a Non-Capital Reserve as per GAAP, sufficient to meet the estimated liability under the contractual obligation.

Pre-CRM EAD Computation

The application assigns the Credit Conversion Factor (CCF) to the off-balance sheet items, For Eligible Liquidity facility, CCF assignment is based on Approach selection. Further, it computes the Pre-Mitigation EAD based on whether the exposure is an off-balance sheet item or not. On balance sheet EAD is calculated based on AOCI Opt out option and Exposures Available for sale indicator. For sold credit protection, the maximum notional amount of all the underlying exposures is the Pre-CRM EAD. This is handled in the sub-process Sec Pre-CRM EAD Computation.

For sold credit protection in the form of nth to default credit derivatives, the maximum notional amount of all the underlying exposures is the Pre-CRM EAD. For sold credit protection in the form of guarantees, Pre-CRM EAD amount is made equal to minimum of notional amount of protection sold as against sum of exposure amount of products covered by guarantee.

Risk Weight Assignment

Simplified Supervisory Formula Approach

For exposures following the Simplified Supervisory Formula Approach, the application expects the underlying weighted average capital requirement of the securitization pool (KG) as an input. Other inputs needed for SSFA are parameters w, A and D. These can be provided either as an input, or can be calculated by the solution based on underlying data. Ensure that underlying securitized and underlying non securitized data is considered in case of resecuritization for calculation of parameter W. The application also sums up the non-performing balance of the underlying exposures under each of the specified status like 90 or more days delinquent, 90 or more days with deferred interest, default, foreclosure, bankruptcy, and REO and uses the sum for parameter w calculation as per US III.

Later, the application calculates the tranche parameters A and D based on the subordinated tranche balance and the subordinated funded reserve balance and the tranche balance, as specified by the US III. The solution calculates the balance of the subordinated funded reserve balance using the Data Transformation "Subrdntd_Fndd_Amt_Pop".

For sold credit protection in the form of nth to default credit derivative, the tranche parameters A and D are calculated based on the underlying exposures. The parameter A is determined by using the sum of the least n-1 risk weighted assets' notional amount as the numerator and the sum of the notional amount of all the underlying exposures as the denominator. This calculation of tranche parameters of A and D happens using the Data Transformation "TRANCHE_A_D_CALC_SCP".

The details of the Data Transformation are as follows:

Data Transformation Name	Objective	Processing Logic
Subrdntd_Fndd_Amt_Pop	The objective of this Data Transformation is to calculate the sum of the subordinate tranche amounts of a securitization tranche.	For each tranche, pick the tranches which junior to the current tranche, sum those tranche's amount and update FCT_SECURITIZATION_TRANCHE.n_subordinated_tranches_amt.Similarly sum the funded reserves of the junior tranches and update FCT_SECURITIZATION_TRANCHE.n_funded_reserve_amount.
TRANCHE_A_D_CALC_SCP	The objective of this Data Transformation is to calculate SSFA parameters - Attachment Point and Detachment Point for exposures that arise as a result of sold credit protection (SCP) in the form of nth to default credit derivative.	EAD for Sold credit protection & Guarantees covering the sec exposures is calculated. A is calculated as [Sum of the notional amount of the n-1 least risk weighted amount of the underlying covered by the credit protection] / Sum of the notional amount of all underlying exposure covered by the credit protection. D is calculated as A + [Notional Amount of the Protection Provided / Sum of the notional amount of all underlying exposure covered by the credit protection] where Maximum EAD of underlying exposures is assigned as Notional Amount of the Protection Provided.

For sold credit protection other than nth to default credit derivative (example total return swap), all parameters are calculated using the same methodology for normal securitization positions. Like any other securitization position, you can also provide values of some parameters as a direct input to the application.

After all the SSFA parameters are calculated, the application calculates the capital charge (K_{SSFA}) of the exposures and hence the risk weight of the exposures. The application also checks the exposure to identify whether the exposure should be straddled or not, depending on the parameters A, D, and K_A. Based on the satisfaction of the straddling criteria, the exposures are risk weighted using the straddling risk weight formula or the normal risk weight formula. In this case, there is no splitting of the exposures as the straddling risk weight formula takes care of the splitting in one formula.

This is handled in the **Sec Pre-CRM RWA Computation** sub-process. The process flow for Simplified Supervisory Formula is as follows:
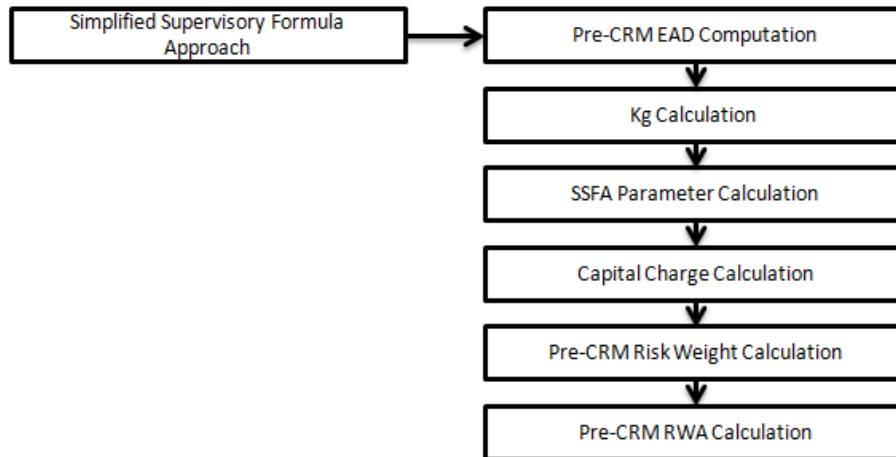
NOTE: Due to the hierarchy of approaches, all Sec Exposures which have valid Pool and Tranche level data go through and not SSFA. The remaining undergoes 1250% risk weight approach.

Risk Weight at 1250%

Bank can also opt to apply 1250% risk weight if it doesn't choose SSFA or Gross up approach. All exposures, for which no approach is assigned, are risk weighted 1250%. Also, any exposure to which SSFA is assigned and the tranche SSFA parameter D is less than pool SSFA parameter Ka or the application is unable to calculate any of the SSFA parameters, then the exposures are risk weighted 1250%.

Also, the following exposures are assigned 1250% risk weight regardless of the approach selected.

- Exposures belonging to credit enhancing interest only strips,
- Low rated securitization exposures
- Exposures which are below K_{IRB}

This is computed in the **Sec Pre-CRM RWA Computation** sub-process, under the applicable approaches.

Risk Weight Assignment for Exceptional Cases

Few of the exposures, regardless of the approach selected, are risk weighted as applicable to the standard product type. The application assigns the risk weight for the Eligible Liquidity Facility as the maximum risk weight of the underlying exposures. The application assigns the risk weight for the second loss position as the maximum of 100% and the maximum risk weight of the underlying exposures. In both these cases, if maximum risk weight of underlying exposures is not available, then it assigns them 1250% risk weight. As per the US Regulatory Capital Final Rules, the bank is required to assign the risk weight of at least 100% for a non-credit-enhancing interest-only mortgage-backed security. This exception in risk weight assignment is handled after the Gross up Approach or Simplified Supervisory Formula Approach tasks in the **Sec Pre-CRM RWA Computation** sub process.

In this current release of OFS Basel Regulatory Capital Release 6.1.2.0.0, the capital calculation of re-securitized positions has changed. For capital calculations of re-securitized positions, information of underlying exposures capital (SSFA this data is required for Kg calculation) is required as a direct input in the application. Hence, the application first calculates capital for all securitized positions and then calculates those parameters for SSFA that are dependent on underlying securitized positions' capital.

Gross up Approach

For all the Exposures, for which the Bank are not subject to market risk rule choose to apply Gross Up Approach instead of SSFA. They are able to calculate all the parameters required for the Gross up Approach, and qualify them. Else, the exposures is applied a risk weight of 1250%.

The Risk weight computed using the Gross up approach has a floor of 20%. That is, the Risk weight of the exposures is a maximum of 20% and the calculated risk weight.

To use the gross-up approach, a Bank calculates the following four inputs:

1. Pro rata share: value of the bank's exposure as a percent of the tranche that contains the exposure. It is expressed as a value between zero and one.

2. Enhanced amount: value of tranches that are more senior to the tranche containing the bank's exposure.

3. Exposure amount: of the bank's exposure.

4. Risk-Weight: weighted average risk-weight of underlying exposures of the securitization. Risk weight is calculated as per standardized approach for underlying exposures. Maximum risk weight that can be assigned is 1250% that is; it is capped at 1250%.

The four parameters are applicable for Sec and Resec except that the calculation of weighted average risk weight is different for Resec. For Resec, the underlying sec and non sec is required to calculate weighted average risk weight.

The process flow for Simplified Supervisory Formula is as follows:
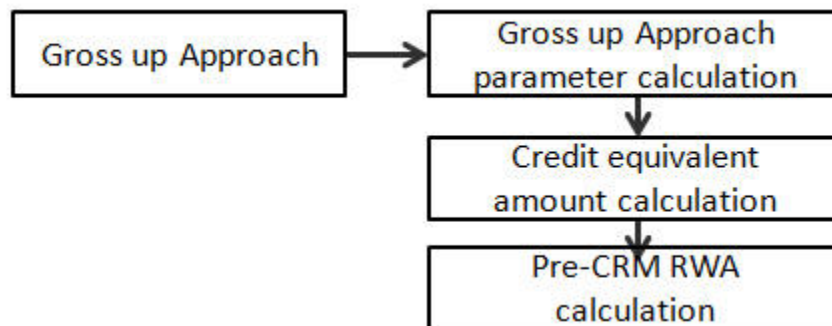
To calculate RWA for gross up approach, multiply risk weight and credit equivalent amount.

Sec CRM Process

Mitigant eligibility, mitigant risk weight, haircut assignment, and allocation of mitigants to exposures are handled in **Sec CRM** sub-process.

Mitigant Eligibility

The application identifies the following mitigants in the case of securitized exposures – collateral, guarantees, and credit derivatives. The mitigants are identified as eligible, based on the eligibility criteria as specified by the US III. For collateral, the eligibility is based on the criteria whether the mitigant is a re-securitized exposure, belongs to the investment grade, a standard mitigant type, and whether the mitigant belongs to the conforming residential mortgage. For guarantees and credit derivatives, the eligibility criteria are based on the issuer type and the satisfaction of the other criteria as specified in the US III.

Mitigant Risk Weight

The application assigns the risk weight to the financial collateral based on the issuer type and the Country Risk Classification (CRC) assigned, if applicable. The risk weight to the guarantees and credit derivatives are assigned based on the PD, LGD, and the correlation calculated for the mitigant. The financial collateral issued by different issuers and belonging to various CRC classes, is assigned different risk weights as per specified in the US III. Also, countries which have defaulted are assigned a different risk weight. In the case of financial collateral by foreign banks, the application assigns the ratings based on the foreign bank's country code.

Haircut Assignment

The application assigns the various haircuts, as applicable to the mitigants, specified by the US III. This is based on the risk weight assigned to the mitigant, standard issuer type, and the residual maturity associated with that mitigant. The minimum holding period of the financial collateral is 65 business days. The mitigant volatility haircut can be scaled up if the minimum holding period is more than 65 days.

The same scaling up is done for FOREX haircut. After the haircut assignment is complete, zero risk weight is assigned to financial collaterals. Only eligible mitigants are considered for haircut assignment and for further processing. Post haircut assignment, the eligible mitigants are moved from mitigants table to sub exposures table.

Allocation of Mitigants to Exposures

The application computes the mitigant value post all haircuts. Then it uses the pooling and optimizer logic to allocate the exposures to the mitigants. This is slightly different from the optimizer logic of non-securitization exposures as the securitization exposures have priority in the cashflow and the senior most exposure (or tranche) gets the maximum protection by the mitigants. The senior most exposure (or tranche) is denoted with seniority 1 and the second senior exposure is denoted with seniority 2 and so on. For mitigant allocation of securitization exposures, senior exposures are given preference over junior exposures. The other parameters which are considered in the allocation logic are the risk weight and the mitigant value post haircut.

The application uses the linear programming logic to allocate the mitigants to the exposures. The pooling logic in securitization is the same as that of non-securitization. The optimizer logic for securitization is slightly different and the difference is as follows:

Based on the seniority of the exposures, risk weight of the exposures, the mitigants, and the mitigant value, the order in which the mitigants are allocated to the exposures is arrived at. The order of allocation can be changed by editing the database function. You have to choose the allocation rank measure in the optimizer definition screen (see below figure) while defining the optimizer logic.

The remaining steps to create optimizer definitions are same as those mentioned in the non-securitization process. The optimizer works on the minimization constraint logic.

Single Mitigant Mapped to Single or Multiple Exposures

If there are one or more than one exposures mapped to a single mitigant, the mitigant is allocated to the exposure with the highest seniority.

If there is more than one exposure with the same highest seniority, then the mitigant is allocated to the exposure which yields the highest mitigant value post haircut.

Single Exposure Mapped to Single or Multiple Mitigants

If there is one or more than one mitigants mapped to a single exposure, the least risk weighted mitigant is allocated to the exposure.

If there are more than one mitigants with the same least risk weight, then the mitigant which has the highest mitigant value post haircut is allocated to the exposure

Multiple Exposures Mapped to Multiple Mitigants

This is treated as a case of a single mitigant mapped to single or multiple exposures to identify a mitigant to be assigned to the exposures. Then, the treatment pertaining to single exposure mapped to multiple mitigants is followed to yield the credit risk weighted exposure amount. Using this logic, the application calculates the factor of exposure covered by the mitigant and the factor of the exposure uncovered (without any protection).

Sec Post CRM RWA Computation

The application computes the covered amount and the uncovered amount for the exposures. The covered amount is computed by multiplying the covered factor with the exposure amount. To this covered amount, the application assigns the mitigant risk weight. The product of the covered amount and the mitigant risk weight is the covered RWA. The uncovered amount is computed by multiplying the uncovered factor (which is 1 – sum of all covered factors for that exposure) with the exposure amount. This uncovered amount is multiplied by the exposure risk weight to get the uncovered RWA. The sum of the covered RWA and the uncovered RWA is the Post CRM RWA of the exposure.

The following sub processes and tasks are handled in the **USA_NPR_III_SEC_IRB** process:

- Reclassification

- Approach selection

- Pre-CRM EAD Computation

- Risk Weight Assignment – Gross up Approach

- Risk Weight Assignment - Simplified Supervisory Formula Approach

- Risk Weight at 1250%

- Risk Weight Assignment for exception cases

- Pre-CRM RWA Computation

- Mitigant Eligibility

- Mitigant Risk Weight

- Haircut Assignment

- Allocation of Mitigants to Exposures

- Post CRM RWA Computation

Risk Weight Assignment OECD member based on CRC Rating

Under US Regulatory Capital Final Rule, Organization for Economic Co-operation and Development (here on mentioned as OECD) member countries without a CRC rating receives a risk weight of zero, whereas Non- member countries without a CRC rating receive a risk weight of 100 percent.

Bank exposures to sovereign, foreign bank and foreign PSE with a CRC rating continue to be assigned the risk weight that corresponds to the CRC ratings, as proposed in the US Regulatory Capital Final Rule.

Key Data Elements

A few key data elements are provided in this section. For an entire list of tables and columns to be populated, see the Download Specifications document. For the treatment indicator as non securitization, those securitization exposures should be excluded from securitization framework.

Securitization Exposures

For an investing bank, the data is expected in the Stage Underlying Exposures (**STG_UNDERLYING_EXPOSURES**) for the underlying of the pool, Total Pool Level attributes in the Stage Pool table (**STG_SECURITIZATION_POOL**), Tranche Level attributes in the Stage Tranche table (**STG_SECURITIZATION_TRANCHE**), and the Exposure Level Attributes in the respective PP tables.

For an originator, the data is expected in the same manner as the Investor, except for the Underlying Exposures. The underlying exposures of the pool are expected in the respective PP tables, depending on the product type of the underlying exposures.

For a credit protection exposure in the form of guarantee, it is expected in the Stage Guarantees table (**STG_GUARANTEES**); and if it is a credit derivative, it is expected in the Stage Credit Derivatives table (**STG_CREDIT_DERIVATIVES**). If it is a regular investment in the Tranches by an investing bank, or it is part of the mandate for retention in the pool or tranche for an originating bank, the data is expected in the Stage Investments table (**STG_INVESTMENTS**).

For a liquidity facility exposure, or servicer cash advance, the exposures are expected in the Stage Commitment Contracts table (**STG_COMMITMENT_CONTRACTS**).

Securitization Investments in a Non financial operating entity is treated under non securitization treatment. To handle this, it is expected that the Securitization Pool ID (**V_SEC_POOL_ID**) is not populated for these exposures. And this must be reclassified into a debt security or a commitment, depending on the type of the instruments.

If the reporting bank does not have data on the underlying exposures, then the following parameters are expected to be updated in the exposure table:

- Parameters for Gross up Approach are:
    - o n_tranche_enhanced amount
    - o n_tranche_percent
    - o n_sec_exp_amount
    - o n_sec_exp_RW_UL
- Parameters for SSFA are:
    - o n_pool_kg
    - o n_ssfa_pool_parameter_w
    - o n_ssfa_tranche_parameter_a
    - o n_ssfa_tranche_parameter_d

If the underlying exposure value and direct values are provided by the reporting bank, then the direct values are given preference over the underlying exposure values.

Mitigant Eligibility

- *Key Data Elements for Mitigants:*

  Conforming Residential Mortgages Indicator: The Residential Real Estate mitigants which belong to conforming residential mortgage category should have "Y" value in this field. The application marks them as ineligible mitigants.

  Re-securitized exposures mitigants: The mitigants belonging to re-securitized exposures should have "Y" value in this field. The application marks them as ineligible mitigants.

- *Key Data elements for Exposure Mitigant Mappings:*

  Exposure Mitigant Positively Correlated Indicator: If the exposures and mitigants are positively correlated then guarantees and credit derivatives become ineligible

- *Key Data elements with respect to Ratings:*

  The mitigants which are Non Investment Grade become ineligible. The Non Investment Grade mitigants are identified based on the Basel Ratings of the mitigants. The mitigants with ratings less than 'BBB' become Non Investment Grade mitigants.

Mitigant Risk Weight

- *Key Data Elements for Credit Rating:*

  Rating Description: The ratings corresponding to 'EC0' to 'EC7' are used for identifying 'CRC0' to 'CRC7' classes.

- *Key Data Elements for Country Dimension:*

  Default Indicator: The issuer countries which are defaulted are indicated by this attribute in the country master table.

Miscellaneous

The following data is expected to be provided by the bank:

- Balance of the underlying exposures with various statuses which are required to compute SSFA Parameter W.

- Balance of all the subordinate tranches and their seniority in the cash flow, including tranches where the bank has no exposures is required to compute Parameter A, Credit Enhancement Level, and Eligibility of Nth to Default Credit Derivative Mitigant.

- Balance of any funded credit reserve and its seniority in the cash flow which is required to compute Parameter A, Credit Enhancement Level, Eligibility of Nth to Default Credit Derivative Mitigant.

Financial Institutions

Under the US Regulatory Capital Final Rule, the following are the Financial Institutions mentioned in the rules:

1. Bank holding company
2. Banks
3. Credit union company
4. Depository institution
5. Foreign bank
6. Insurance companies
7. Merchant banking companies
8. Non-banking financial companies
9. Primary dealers
10. Private equity investment firm
11. Savings and loan holding company
12. Industrial loan company
13. Industrial bank
14. State member bank
15. State non-member bank
16. Future commission merchant
17. Swap dealer
18. Financial market utility company
19. Securities holding company
20. SPV (Special Purpose Vehicle)

Under the US Regulatory Capital Final Rules, the agreement stated that, any other company of which bank is having an investment in the equity instruments of the company with an adjusted carrying value of exposure amount equal to or greater than $10 million, or bank owns more than 10 percent of companies issued and outstanding common shares or similar equity interests and the company is mainly involved in:

- Lending money, securities or other financial instruments, including servicing loans.
- Insuring, guaranteeing, indemnifying against loss, harm, damage, illness, disability, or death, or issuing annuities.
- Underwriting, dealing in, making a market in, or investing as principal in securities or other financial instruments.
- Asset management activities.

The financial institutions rule is defined as - **USA - US III – Non Sec Financial Entity Identification**. The operational criteria like company that is mainly involved in the financial activity where bank has investment in equity instruments of the company with an adjusted carrying value or exposure amount equal to or greater than $10 million, or bank owns more than 10 percent of the companies issued and outstanding common shares, falls under the twenty categories of financial institution mentioned above. Also most of the criteria fall under the above mentioned twenty criterias.

Hence, bank can map either a company into one of the twenty criterias or it can customize on their own by adding the counter party in the stg_party_master. Ensure to provide the flag against "**f_financial_entity_ind**" as "**Y**".

References and Definitions

1. The term ''financial market utility'' means any person that manages or operates a multilateral system for the purpose of transferring, clearing, or settling payments, securities, or other financial transactions along with financial institutions or between financial institutions and the person.

   Reference - http://www.dodd-frank-act.us/Dodd_Frank_Act_Text_Section_803.html

2. An **Industrial Loan Company** (ILC) or Industrial Bank is a financial institution in the United States that lends money, and can be owned by non-financial institutions.
   Companies that have set up Industrial Banks include **UBS**, **General Electric**, **General Motors**, **American Express**, **Target Corp**, **Nordstrom**, **Harley-Davidson**, **First Data**, **UnitedHealth Group**, **BMW**, and **Sallie Mae**.

   Reference - http://en.wikipedia.org/wiki/Industrial_loan_company

3. An SHC is a nonbank company that owns at least one registered broker or dealer.

   Reference - http://www.federalreserve.gov/newsevents/press/bcreg/20120530a.htm

4. The term "STATE NONMEMBER BANK" means any State bank which is not a member of the Federal Reserve System.

   Reference - http://www.fdic.gov/regulations/laws/rules/1000-400.html

Treatment of RME Risk-Weight

Under the US Regulatory Capital Final Rules, it assigns either 50 percent or 100 percent risk weight to certain one-to-four family residential pre-sold construction loans and multifamily residential loans under the advanced approaches rule. And it is consistent with provisions of the RTCRRI Act (Resolution Trust Corporation Refinancing, Restructuring, and Improvement Act).

The supplementary information section of the US final rule, that contains comments and discussion, has a mention of assigning RW of 20% to a residential mortgage guaranteed by the federal government through the Federal Housing Administration (FHA) or the Department of Veterans Affairs(VA). However, there is no mention of such treatment in the final text of the rule para 32 (g). The application is following final text and hence, doesn't assign 20% RW to RME guaranteed by FHA or VA.

The RTCRRI Act of 1991 mandates that each agency provide in its capital regulation:

a) A 50 percent risk weight for one-to four-family residential pre-sold construction loans and multifamily residential loans that meet specific statutory criteria in the RTCRRI Act and underwriting criteria imposed by the agencies.

b) A 100 percent risk weight for one-to four family residential pre-sold construction loans for residences for which the purchase contract is cancelled.

Therefore according to the RTCRRI Act, Residential Mortgage Exposures receives the following risk-weight:

1. A 50 percent risk-weight to **one-to-four-family residential (residence consisting of 1 to 4 dwelling units) loan** if residences are pre-sold (that is the home is sold either before or during construction) to buyer and buyer who has made a substantial earnest money deposits. This can be used in defraying cost related to any cancellation of the purchase contract and the loans meet the certain underwriting characteristics such as documentation demonstrating that the buyer of the residence intends to purchase.

2. A 100 percent risk weight for **one-to four-family residential** pre-sold construction loans for a residence for which the purchase contract is cancelled.

3. A 50 percent risk weight for **multifamily residential (consist of more than 4 dwelling unit or an apartment building) loans** that meet the following criteria as per RTCRRI Act –

   a. If fixed interest rate loan:
      i. Loan- to- value is not exceed 80 percent.
      ii. Net operating income to Debt ratio is not less than 120 percent.
   b. If floating interest loan:
      i. Loan-to-value is not exceeding 75 percent.
      ii. Net operating income to Debt ratio is not less than 115 percent.
   c. Amortization of principal and interest occur over a period of not more than 30 years.
   d. The minimum maturity for repayment of principal is not less than 7 years that is, loan cannot be foreclosed before 7 years.

If the residential mortgage loan does not meet the relevant criteria according to this described rule then it is not going to qualify for the statutory risk weights and might be risk-weighted according to the Advanced Approach for US risk-based capital formula.

Reference

As the requirement specified in the accord, it does not mention the RTCRRI Act and also the criteria under which different risk weight are assigned. All the understanding stated can be referred from this link:

http://fraser.stlouisfed.org/download-page/page.pdf?pid=99&id=449705

Loss Given Default Floor for RME

Under US Regulatory Capital Final Rules, the Loss Given Default (LGD) value for each segment of residential mortgage exposures must not be less than 10 percent. Except for segments of residential mortgage exposures for which all of the principal of each exposure is either:

- Directly and unconditionally guaranteed by the full faith and credit of a sovereign entity.

  Or

- Guaranteed by a contingent obligation of the U.S. government or its agencies.

The requirement for the LGD flooring of 10 percent for the RME exposure class is not applicable if the exposure is guaranteed by sovereign or US government.

This requirement is already handled in the application through the rule – "USA - Non Sec LGD floor Value for Retail Exposures".

The only change that must included is Party type reclassification is where the US Government is mapped to Sovereign as a standard party type reclassification.

5.2.2.3 Credit Valuation Adjustments

The CVA for Advanced Approach is calculated similar to the Standardized Approach. See Credit Valuation Adjustments for more information.

5.2.2.4 Capital Structure

Basel III Capital Structure is calculated for the Advanced Approach similar to the Standardized Approach. See Capital Structure for more information.

5.2.2.5 Capital Buffers

Basel III Capital Buffers is calculated for the Advanced Approach similar to the Standardized Approach. See Capital Buffers for more information.

5.2.2.6 Single Counterparty Exposure Limit

The Single Counterparty Exposure Limit calculated for the Advanced Approach similar to the Standardized Approach.

See Single Counterparty Exposure Limit for more information.

5.2.2.7 Leverage Ratio

Basel III Leverage Ratio is calculated for the Advanced Approach similar to the Standardized Approach. See Leverage Ratio for more information.

5.2.2.8 Implementation Approach

- During implementation of US STD rules, reconfigure only the following rules.

Rule to be re-configured	Remarks
Basel III Capital Consolidation Approach Type Reclassification for an Entity	
Capital Consolidation Level Selection	
Credit Rating Reclassification	Reconfigure this rule only if the institution is using external ratings for determining the credit quality of the counterparty
Sec Basel II Bank Role Reclassification	
Standard Mitigant Type Reclassification - STD	
USA - Equity Product Type Reclassification	
USA - Non Sec HVCRE Product Type Reclassification	

USA - US III - Capital - Standard Acct Head Reclassification	
USA - US III - CS - Capital Component Group Mapping	Reconfigure this rule only if the institution has standard accounting heads apart from out-of-box standard accounting heads to be categorized into the respective capital component tier.
USA - US III - Equity Investment Fund Approach Selection	
USA - US III - Non Sec Standard Product type to Capital Comp Group Reclassification	Reconfigure this rule only if the institution has additional product types apart from out-of-box product types to be categorized into the respective capital component tier.
USA - US III - Sec Basel Product Type Reclassification	
USA - US III Party Type Reclassification - STD	
USA -US III Product Type Reclassification - STD	
USA Sec Basel II Pool Type Reclassification	

- The institution needs to source the data for the following hierarchies only. Others are pre-configured in the out-of-box product.

Hierarchy name
Bank Base Role
Bank Cap Consl Approach
Capital Accounting Head
Counterparty Type
Mitigant Type
Organisation Structure
Product
Rating
Securitisation Pool Type

- Run management screen should be used to define runs required considering the portfolio that the institution has and the methodology that the institution wants to opt wherever there is a choice.

6 Brazilian Jurisdiction

Capital Adequacy related regulations as issued in the circulars of Banco Central Do Brasil, is incorporated in this OFS Financial Services Basel Regulatory Capital Release 6.1. The circulars which are considered for this release are as follows:

- CIRCULAR 3.360: Credit Risk issued in December 2007
- CIRCULAR 3.383: Operational Risk issued in April 2008
- CIRCULAR 3.361, 3.362, 3.363, 3.364, 3.366, 3.368 and 3.3369: Market Risk issued in September 2007
- CMN Resolutions 3.490: Capital Requirement issued in August 2007

In the jurisdiction of Brazil, the following approaches for RWA and Capital Adequacy Ratio computation are supported:

- Credit Risk

    o Non Securitization – Standardized Approach

- Market Risk

    o Market Risk – Standardized Approach

- Operational Risk

    o Operational Risk – Basic Indicator approach

    o Operational Risk – Alternative Standardized Approach

    o Operational Risk – Simplified Alternative Standardized Approach

- Capital Structure

6.1 Basel II

6.1.1 Basel II – Standardized Approach

6.1.1.1 Brazil II – High Level Process Flow for Standardized Approach

Banco Central do Brasil (BCB) has defined the Capital Adequacy ratio which is delivered out-of-box in OFSAAI as a building block approach. The application has included Capital Computations for Credit Risk, Market Risk, and Operational Risk along with the Capital Structure and Capital Consolidation process.

For more information on the pre-defined Runs available with the application, see *OFS Basel Regulatory Capital Run Charts*.

6.1.1.1.1 Process Flow for Capital Adequacy Ratio Calculation
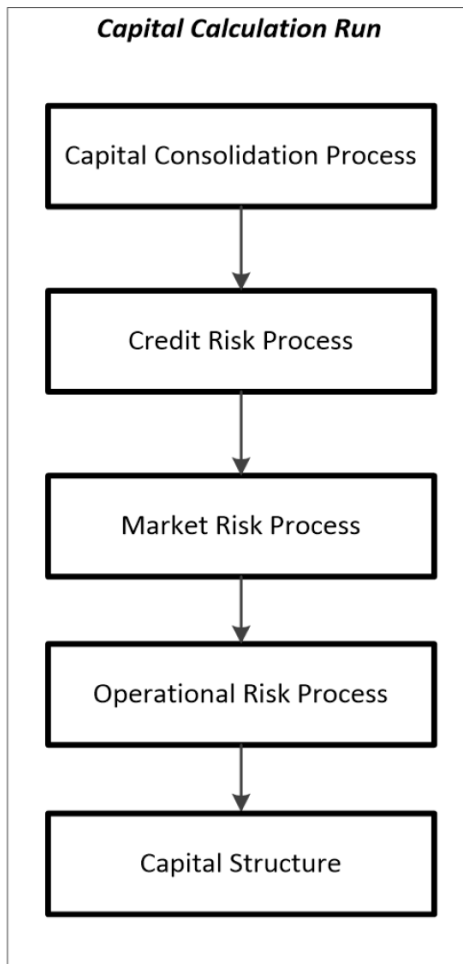
The Capital Calculation Run depicted in the preceding process flow is a single run which is a joined together by multiple processes. Each process is a block, compiled together to form an entire Capital Adequacy run. The individual blocks like the Credit Risk process and so on, also exist as individual runs which is described in the following sections.

6.1.1.1.2 Capital Consolidation Process

Capital Consolidation is a process common to each of the individual block when they are triggered separately as an individual run. For example: the standard out-of-box Market Risk run has Capital Consolidation and Market Risk process bundled together as a single Market Risk run. This is applicable for a Credit Risk run and Operational Risk run as well. The Capital Consolidation is explained in the following section and is not repeated under the Non Securitization process, Securitization process, Market Risk process, or Operational Risk section of this document.

In Capital Consolidation, the application processes the following.

Capital Consolidation Level Selection

The reporting bank can be a part of a financial group that has multiple legal entities like parent or child entities (subsidiaries) under its name. The entity on which you are required to process should be selected by you. Subsequently, level at which a Run is to be executed (solo or consolidated) should also be selected. You can select these options in the Run Management UI. However, if the Run is executed in the Run Rule Framework (RRF), then these options have to be set using the Rule '**Capital Consolidation Level Selection**' in the process '**BCB_CAPITAL_CONSOLIDATION'**

BCB_CAPITAL_CONSOLIDATION is the first process to be added in all the Runs defined in the RRF except for the Staging Data Population Run. The Run Management UI selects this process by default.

Run Parameters Assignment

BCB guidelines states different approaches for calculating RWA. The Run Management UI in the application allows the reporting bank to define and execute a Run by selecting a combination of different approaches for RWA computation.

Run Parameter Assignment is also part of **Capital Consolidation** process. The Rule '**Run Definition User Defined Run Param Assignment**' is used to assign the Run parameters if a Run is executed in the RRF. If the Run is executed from the Run Management UI, then the parameters are populated based on the Run defined in the Run Definition window.

Currency Conversion

The Rules pre-defined in the application performs currency conversion of all General Ledger amount attributes to be used for Capital Consolidation from the Natural currency to the Reporting currency, based on the exchange rate provided.

Shareholding Percent Multiplication

For all entities in the Capital Consolidation process, the application updates the shareholding percentage against each entity data in the Fact Capital Accounting Head from the Fact Entity Shareholding Percent table. The parent data in the processing table of Fact Capital Accounting Head is updated with the value 1 and for each child entity the data is based on the parent's holding percentage specified for each child in fact entity share holding percent table.

6.1.1.1.3 Process Flow for Credit RWA
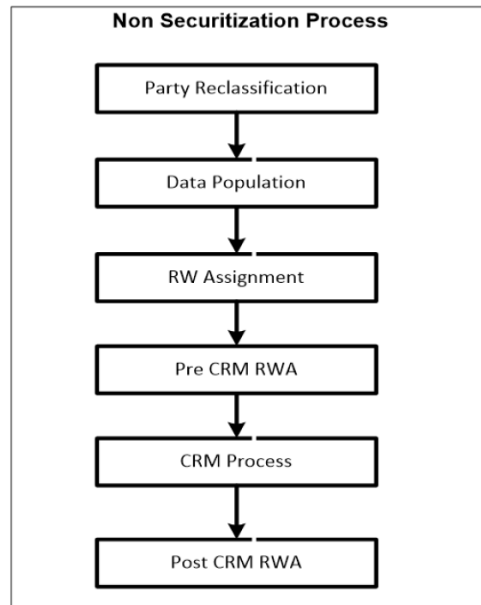
Credit RWA Run encompasses processes like Party Type Reclassification, Data Population, Pre-mitigation RWA computation, and Post-mitigation RWA Computation. These sub processes are explained separately under Non Securitization section of this document.

The sub process Party Reclassification is detailed in the section 'Reclassification' under 'Banking Book Product' in the Credit RWA section of this document. Similarly, Data Population, Risk Weight (RW) Assignment, and Pre-CRM RWA are detailed under the sub-sections 'Data Population', 'Risk-Weight Assignment', 'Pre-CRM RWA Computation' in Credit RWA section of this document, respectively.

CRM process along with the computation of post-CRM RWA is detailed in the section 'Credit Risk Mitigation' under Credit RWA section of this document.

For more information on the sub processes computed for Credit RWA, see Credit RWA.

6.1.1.1.4 Process Flow for Market RWA

Market RWA Run is made up of multiple sub processes specific to Market Risk. However, when Market Risk is bundled under a Consolidated Run and triggered, Capital Consolidation and Rating process is executed only once for Credit Risk and Market Risk. The details of each of the sub process mentioned in the preceding flow chart are present under Market Risk section of this document.

For more information on Market RWA computation, see Market RWA.

For example: 'Capital Charge for Interest Rate Instruments' sub process is detailed elaborately under 'Capital Charge for Interest Rate Instruments' section of Market Risk. Likewise 'Capital Charge for Equities', 'Capital Charge for Foreign Exchange Transaction' 'Capital Charge for Commodity transaction', and 'Options risk charge calculation' has a detailed explanation present under 'Capital Charge for Equity', 'Capital Charge for Foreign Exchange Transactions', 'Capital Charge for Commodities', and 'Capital Charge for Options' sub process of the Market Risk section of this document, respectively.

6.1.1.1.5 Process Flow for Operational RWA
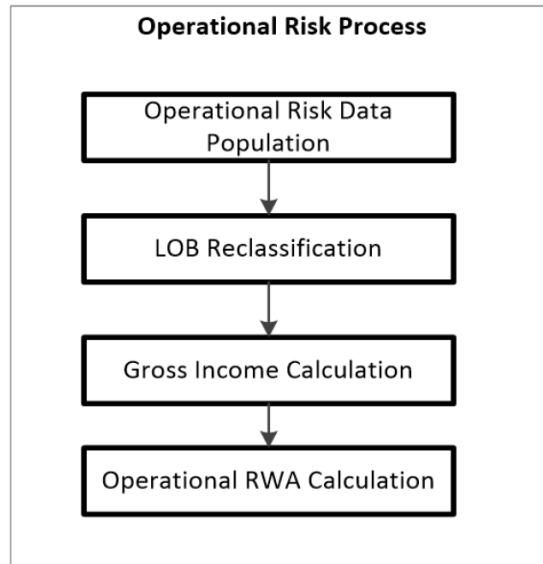
Operational RWA run is executed with the Capital Consolidation process. For more information on the Operational RWA computation, see Operational RWA.

For example: LOB Reclassification and Gross Income Calculation sub process are detailed as separate processes under the Operational RWA section of this document.

6.1.1.1.6 Process Flow for Capital Structure
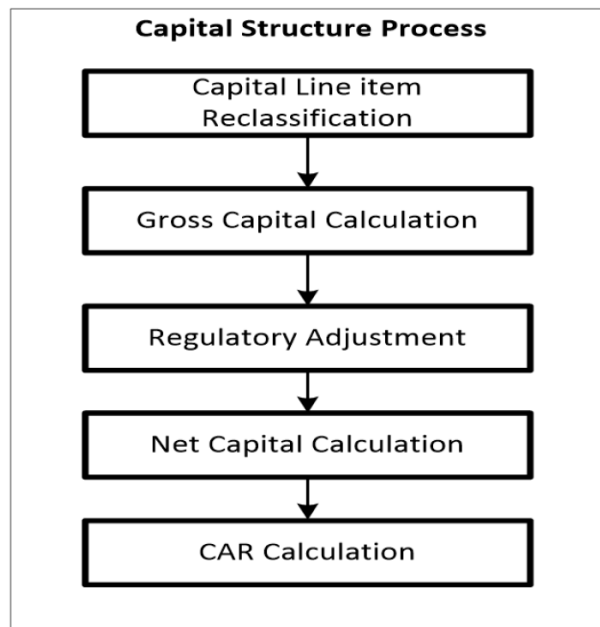
Capital Structure is executed with Capital Consolidation, Credit Risk, Market Risk, and Operational Risk RWA processes.

For more information on the sub processes of Capital Structure, see Capital Structure.

For example: 'Gross Capital Calculation' mentioned in the preceding flow chart is explained in detail under 'Gross Capital calculation' mentioned in the preceding process flow is explained in detail under 'Gross Capital Calculation for Shareholder's Equity and T2' sub process section of Capital Structure. Likewise, 'Regulatory Adjustment' and 'Net capital calculation' is detailed under 'Regulatory Adjustment from Shareholder's Equity and Tier 2' and 'Calculation of Net Capital' sub process section of the Capital Structure section, in this document.

6.1.1.2 Credit RWA

The application supports the computation of Credit Risk Weighted Assets (RWA) as per the guidelines laid out by Banco Central do Brasil issued in Circular 3.360.

6.1.1.2.1 Non Securitization – Standardized Approach

For computation of Credit RWA for Non Securitized exposures, the application follows the Standardized Approach.

Standardized Approach covers the following functional areas:

- Banking Book Products
- Securities Financing Transactions
- Credit Risk Mitigation

Banking Book Product

All the credit risk exposures are identified by the application, through their product type, counterparty type, and the corresponding derived asset classes. A sample list of products types, party types, mitigant types, and credit ratings are pre-defined in the application. However, this list and naming convention differs from one bank to another. Hence, the application re-classifies the bank's information on product type, party type, credit ratings and so on, into standard data as per the accord. The application reclassifies the bank's product types and party types to standard product and party types.

Some exposures can be hedged against credit risk through various mitigants like guarantors, collaterals, credit derivatives, and so on. These provide mitigation to credit risk and should be considered while computing Credit RWA, as per the issued circular. Hence, the application calculates pre-mitigation exposure amount and post-mitigation exposure amount.

Based on the standard counterparty type, the application calculates the pre-CRM EAD for each exposure. This value signifies the maximum loss that the bank can suffer, in case of default on this exposure, prior to considering any mitigation effects. Through the CRM process, the bank takes into account the effect of the mitigation and calculates the post mitigation exposure at default amount. This signifies the maximum loss that the bank can suffer in case of default on this exposure, after considering all the effects of mitigation.

The application also computes pre-mitigation RWA (Pre-CRM RWA) and post mitigation RWA (Post CRM RWA) by multiplying the respective EAD by the risk weight. Risk weight is assigned based on the standard counterparty type and standard product type, as issued in the circulars.

Some credit risk exposures that fall under the category of internal transactions like holding own subsidiaries shares or investment in its capital, reciprocal cross holding, and so on, are treated separately under capital structure.

Process Flow for Banking Book Products
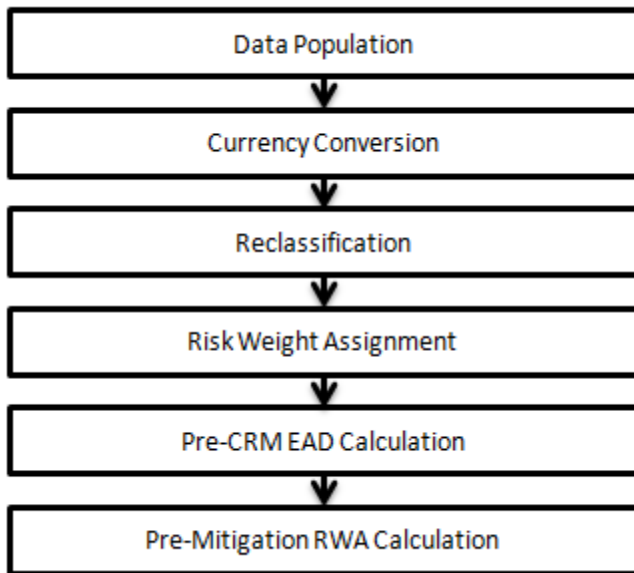
Data Population

Pre-processing Steps

Credit risk exposures data is provided as input for all the product types through their respective input tables known as Product Processors. The important categories of Credit Risk Non Securitization exposures, along with their respective table names that are used for data input, are as follows:

Product	Source Product Processor
Bills	STG_BILLS_CONTRACTS
Credit Cards	STG_CARDS
Swaps	STG_SWAPS_CONTRACTS
Futures	STG_FUTURES
Guarantees	STG_GUARANTEES
Investments	STG_INVESTMENTS
Lease Contracts	STG_LEASE_CONTRACTS

Product	Source Product Processor
Letters of Credit	STG_LC_CONTRACTS
Line of Credit	STG_CREDIT_LINE_DETAILS
Commitment Contracts	STG_COMMITMENT_CONTRACTS
Loans	STG_LOAN_CONTRACTS
Money market instruments	STG_MM_CONTRACTS
Overdraft	STG_OD_ACCOUNTS
Options	STG_OPTION_CONTRACTS
Re purchase contracts	STG_REPO_CONTRACTS
Equity Exposures	STG_INVESTMENTS
Underlying Exposures for Derivatives, Securitization and Covered Bonds	STG_UNDERLYING_EXPOSURES
Underlying Exposures for Derivatives (if Derivative is either a cleared transaction or an instrument, and the underlying reference asset is an instrument)	STG_UNDERLYING_MASTER/ STG_UNDERLYiNG_DTL
Underlying Exposures for Derivatives (if Derivative is not a cleared transaction or an instrument, or the underlying reference asset is not an instrument)	STG_UNDERLYING_EXPOSURES
Underlying Exposure for Mutual Fund / CIU	STG_FUND_CIS_COMPOSITION
Underlying Exposures for Repo contracts	STG_PLACED_COLLATERAL / STG_MITIGANTS
Credit Derivatives	STG_CREDIT_DERIVATIVES
Fixed Assets	STG_FIXED_ASSETS_DETAILS

The mitigants data which are required during the CRM process are populated from the staging table to the processing table. The exposures which are mapped to the mitigants are captured and populated from the staging table to the processing table. Mitigant data population is handled in the process **MITIGANT_DATA_POPULATION** and Exposure Mitigant Mapping Population is handled in the process **SEC_EXP_MITIGANT_MAPPING_POP**.

Processing Steps

Staging data from the Product Processors or other stage tables is populated in the required tables. The entire Product Processor data is populated to a common Fact table for all Non Securitization exposures (**FCT_NON_SEC_EXPOSURES**), except equity data which is first populated in the respective equity table

(**FCT_EQUITY_EXPOSURES**) and is then populated common Fact table for all non sec exposures. Similarly, mitigant data and exposure mitigant mapping data are populated to respective fact mitigants (**FCT_MITIGANTS)** and Exposure Mitigant Mapping (**EXP_MITIGANT_MAPPING)** processing table. For more information on the list of columns to be populated within each table, see the *Download Specifications* document.

Shareholding Percent Multiplication

The exposure amount which is a part of the input data (Product Processors) is the exposure amount for a solo entity. However, for a consolidated Run, the parent exposure is considered only by the shareholding percentage, based on the following calculation:

Exposure Amount   X   Share Holding Percent = Updated Exposure Amount

Where:

Share holding percent is allotted a value by the Rule **Cap Consl Effective Shareholding Percent for an Entity** in the process - **capital Consolidation.**

This assignment uses the Rule **'<Attribute > Shareholding Percent Multiplication**'. The following attributes undergo shareholding percent multiplication:

- Contract Amount
- Exposure Limit Amount
- Residual value
- Unpaid premium Amount
- Outstanding Principal
- Current Exposure Amount
- Undrawn Amount
- Exposure Market Value
- Exposure Accrued Interest
- Write Off Amount
- Notional Principal and Contract Amount for OTC products

Currency Conversion

The application converts the amount attribute that are in the natural currency to the reporting currency which are used for further calculation. The column names suffixed as '_ncy' are in the natural currency and multiplied by currency conversion factor to populate values in the reporting currency. The Rule '**Reporting Currency Code Assignment**' is used to assign the reporting currency for a Run Rule Framework (RRF) execution. The currency conversion logic and assignment is the same as that defined in the BIS section. The list of tables and corresponding columns in which currency conversion is carried out is listed in Exhibit 4 in *Annexure A: Key Concepts*. However, the table and column specific to the Brazilian jurisdiction which undergoes currency conversion is as follows:

Table Name	Target Measures - Description	Column Physical Name

Non Securitization Exposures	MSR - Non Sec Mortgage Lending Value	n_mortgage_lending_value

Reclassification

The application reclassifies the bank's product types and party types to BCB standard product and party types. A separate Rule is pre-defined in the application to reclassify equity. Similarly, the application reclassifies for mitigants on the basis of its mitigant types. The application reclassifies mitigants to standard mitigant types.

Party Type Reclassification

Customer type and issuer type (which are stored as counterparty type) are reclassified as standard counterparty type. The application is designed to include customer type, issuer type, and mitigant types, in a single table (**STG_PARTY_MASTER)** which is reclassified together. Party type reclassification Rules handle reclassification for customer types and issuer types. For Example: Individual is reclassified as Retail. Issuer of equity is reclassified separately by the application. This Rule is defined in the lookup table since the same reclassification can be used across exposure, equity, and the mitigant tables.

Product Type Reclassification

Product types used by the reporting bank as input data are reclassified to standard product types. The product types, after reclassification, are stored as Basel product types. For Example: Unsecured Bonds is reclassified as Debt Securities.

Mitigant Reclassification

For mitigants the application reclassifies the mitigant type to the standard mitigant type like the debt securities, credit derivative, cash, and so on. It also reclassifies the mitigant issuer type to the standard mitigant issuer type like Banks, Corporate, and so on. The reclassification tasks are present in the **Mitigant Reclassification** sub process.

Risk-Weight Assignment

Risk Weight is assigned on the basis of standard product and standard party type and its attributes. The process to assign risk weight is detailed as follows:
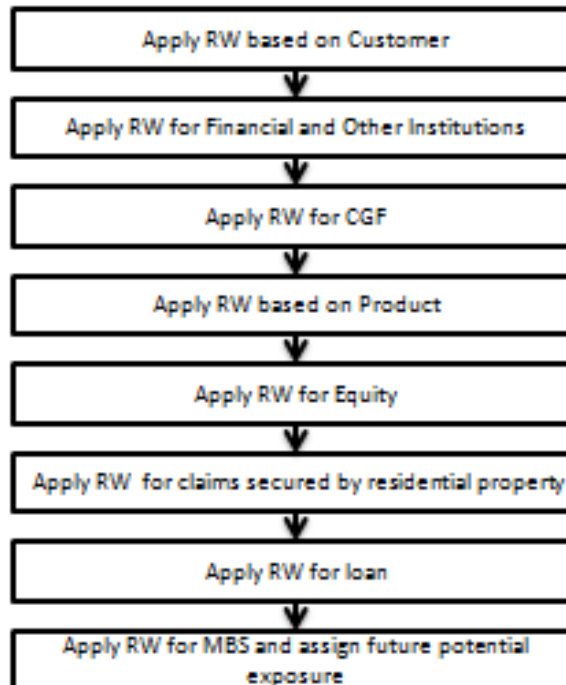
The exposure value for Counterparty Credit Risk (CCR) in the spot market is assigned a Credit Operation Settlement (FCL) and underlying type of derivative is assigned a Future Potential Exposure Factor (FEPF) through the Rule – "**BCB - Non Sec Credit Operation Settlement**" and "**BCB - Non Sec Future Potential Exposure Factor**" respectively. The future potential exposure factor and credit operation settlement for underlying exposures are calculated.

Pre-CRM RWA Computation

Credit Conversion Factor

This is applied to all the off-balance sheet exposures. The CCF applied values are 0.2, 0.5, and 1. The various factors on the basis of which the CCF is applied are standard product and the maturity of the exposure.

Pre CRM Exposure at default (EAD)

Exposure at Default (EAD) is calculated for all standard party types, based on the Current Exposure Amount, Off-Balance Sheet Drawn CCF Percent, Drawn CCF percent, and Undrawn Amount. Using the same inputs, drawn EAD amount and undrawn EAD amount is calculated. If the reporting bank has an exposure to one of its own subsidiaries, then that exposure is classified as an internal exposure. Each of the internal transactions, that is, transaction between parent and its subsidiary, is marked as deduction line item. The deduction is processed as part of the Basel II capital structure in the capital structure processing and all the internal transactions are eliminated from any RWA calculation.

For OTC products, the pre-Mitigation EAD is calculated by considering the value of Current Exposure Amount, Notional Principal, and Add-On Percent

Pre-Mitigation RWA

Pre-mitigation RWA is calculated by considering the pre-CRM EAD amount with the risk weight.

Securities Financing Transactions (SFT)

Securities Financing Transactions includes repo style transactions, margin lending, security financing borrowing, and so on. The SFT portfolio of a bank should be included for capital charge calculations as per the Standardized Approach.

Process Flow for Securities Financing Transactions (SFT)

SFT EAD calculation is computed in the sub process **SFT Exposures RWA:**
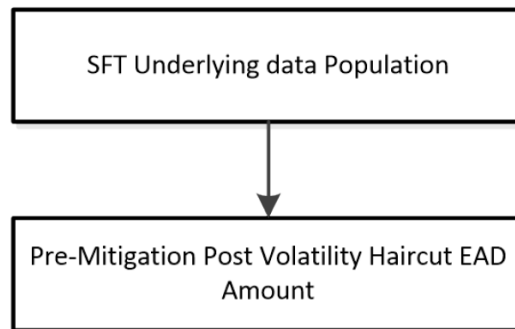
SFT Underlying Data Population

There are two elements present in SFT Transactions. Firstly, the parent transaction is captured. Secondly, the underlying information on which the parent transaction is built is captured separately with a data identifier (**STG_UNDERLYING EXPOSURES.V_UNDERLYING_DATA_IDENTIFIER**) as **REPO** for Repo transaction or MLT for Margin Lending Transaction. Additionally, the underlying data captures parent identifier code against each of the records (**V_Parent_exposure_ID**). For multiple underlying data for a single parent, the unique parent identifier code is repeated across the underlying data.

Pre-Mitigation Post Volatility Haircut EAD Amount Calculation for Exposures

For SFT transactions, the application calculates EAD for the parent exposure based on the underlying information. The underlying exposures are moved to the Sft Underlyings (**FCT_SFT_UNDERLYING)** table from Fact Non Sec Exposures (**FCT_NON_SEC_EXPOSURES)**. Each SFT underlying exposure is adjusted for volatility haircut and FOREX haircut, and the EAD with the haircut value (EAD + Haircut Value) is added as EAD for the parent contract.

Nettable Pool Account Identifier Population

For OTC products that are nettable, their account skey in the nettable pool table is updated in the nettable pool acct_skey column of **FCT_NON_SEC_EXPOSURES** table.

Credit Risk Mitigation

The application handles multiple mitigants for credit risk mitigation like financial collateral, on-balance sheet netting, guarantees, credit derivatives, and so on. CRM reclassification is computed by reclassifying

collateral and issuer to standard collateral and issuer type. The mitigant is identified as eligible or not based on the eligibility rules for CRM.

Process Flow for Credit Risk Mitigation

Mitigant Eligibility

The application handles multiple mitigants for credit risk mitigation like financial collateral, on-balance sheet netting, guarantees, credit derivatives, and so on. The mitigant is identified as eligible or not, based on the eligibility rules for CRM. Mitigant is considered for all mitigant types issued by all party types while deciding whether mitigant is eligible for a particular exposure or not. Pre-defined Rules in the application perform these eligibility tests.

Mitigant Risk Weight Assignment

Similar to Non Securitized exposures, collaterals and mitigants are also assigned a risk weight based on their issuer type.

Maturity Mismatch Haircut

The application performs computation for maturity mismatch haircut. If the residual maturity of the CRM is less than that of the underlying credit exposure, then a maturity mismatch is applied. If a maturity mismatch is present and the CRM has an original maturity of more than one year, then the maturity mismatch haircut is applied to adjust the value.

Allocation of Mitigants to Exposures

The application has a pre-built optimizer for optimum allocation of mitigants to the exposures for CRM purposes. One-to-One, Many-to-One, and Many-to-Many mapping of mitigants are handled in an efficient manner. This involves storage of intermediate computations for traceability.

All mitigants which are eligible and mapped to an exposure are then populated to a new table where each exposure is broken down to the mitigant types. An additional row is included which treats the exposure as having covered and uncovered portion. The covered factor and uncovered factor is also populated in

this table.

The application uses the linear programming method to allocate the mitigants to the exposures. Pooling identifies the exposure and mitigant data from sub exposures (**FCT_SUB_EXPOSURES**) table. It assigns the pool ID for each exposure-mitigant combination. Based on these pool ids, the optimizer allocates a covered factor to the exposures. Optimizer allocates mitigants to exposures to attain the most favorable EAD output. For more information on pooling and optimizer, see Exhibit 2 and Exhibit 3 in *Annexure A: Key Concepts.*

Post-CRM RWA Computation

Post CRM RWA is calculated by multiplying the post mitigation EAD with the corresponding Risk Weight. Post mitigation EAD is the summation of covered and uncovered exposure amount for each account.

6.1.1.3 Market RWA

Banco Central do Brasil (BCB) has published Market Risk Capital Charge calculation which is available in Portuguese. For Basel II Implementation in Brazil, the analysis is carried out based on the English translation of Basel II guidelines of Banco Central Do Brazil (BCB).

BCB Market Risk Capital outlays two basic approaches for Market Risk Capital Charge calculation.

- Standardized Approach
- Internal Model Method Approach

6.1.1.3.1 Standardized Approach

In the Standardized Approach (STD Approach), the Market Risk Capital Charge is calculated for the following instrument types:

- Interest Rate related Instruments (IR Instruments)
- Equity Position Risk
- Foreign Exchange Risk
- Commodities
- Options

Pre-requisite for Market Risk Processing

Execution of the Run **'Staging Data Population - Market Risk - BCB Standardized Approach'** is usually a onetime activity. This should be executed once before actual Market Risk run is executed. The tasks within this Run populate the following:

- IRC Data
- Market prices of the instruments
- Bank positions

This run populates the instrument level data that is required by the actual run for further processing. The instrument level data such as number of units of the instruments on that particular MIS date is downloaded in the bank instrument position (**STG_BANK_POSITIONS**) table. This data flows into the fact table for further processing. The OTC instrument price is expected as a download.

For non OTC instruments the data for instruments' price is captured in the Market Instrument Contract table (**STG_MKT_INSTRUMENT_CONTRACT**). This data flows into the fact table for further processing.

For IR instruments, the interest rate required is captured in the IRC Rate History (**STG_IRC_RATE_HIST**) table. This data flows into the fact table for further processing. This data is required for term structure that is used in Modified Duration and Greeks Parameter calculation.

Process Flow for Market Risk – Standardized Approach

The pre-defined Run which computes Market RWA is as follows:

Run: Risk Weighted Asset Calculation - Market Risk - BCB Standardized Approach
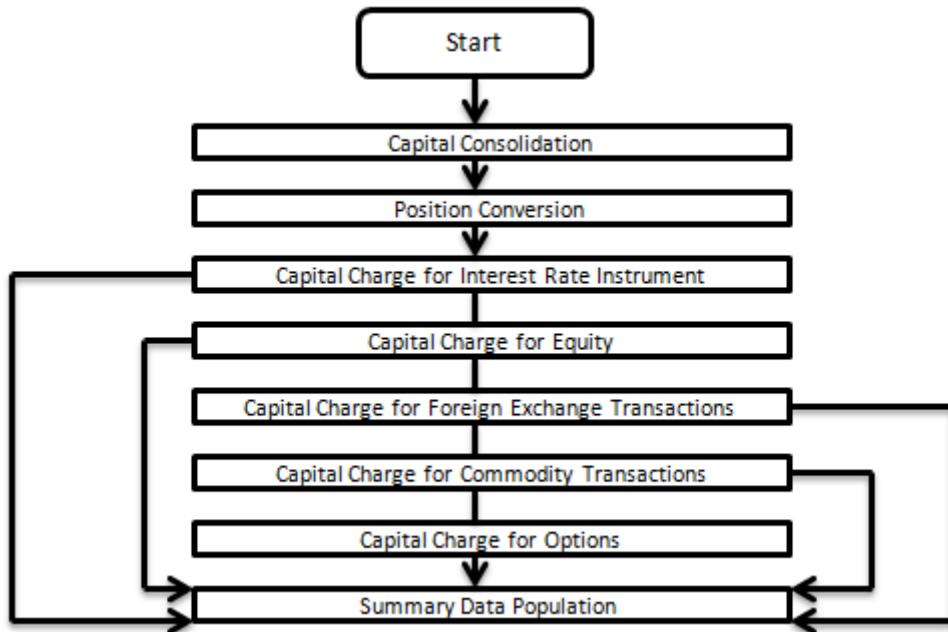
Capital Consolidation

For a reporting bank, the level at which the consolidation is done is identified by the application. You can choose Solo or Consolidation level for each entity in the rule present in the Capital Consolidation process. This particular process handles entity level details. The entity data is captured in Legal Entity Details (**STG_LEGAL_ENTITY_DETAILS**) table. All the child entities underlying a parent are considered for RWA consolidation. When consolidation is the level selected for a reporting bank, each child entity data is consolidated with the parent entity after entity shareholding percent multiplication.

Application Details

> *Process:* BCB_CAPITAL_CONSOLIDATION
>
> *Sub-process:* Capital Consolidation Approach

Approaches Followed in Capital Consolidation

The three approaches followed by the Capital Consolidation are:

- **Consolidation Approach(CONSL)**: Under this approach, all the entities of the bank's organizational structure are considered. This includes all the entities/subsidiaries that belong to the same jurisdiction. All the exposures of the entities in the organizational structure are considered for computing risk weighted exposures, except the intra-group exposures.

- **Aggregation Approach(AGG)**: This approach is similar to the Consolidation approach but is used in the cases, where some of the entities that are part of bank's organizational structure belong to a different jurisdiction. The capital requirement of the affiliate is computed as per the jurisdiction that it is subject to and is then aggregated with the rest of the group's capital requirement. Intra-group exposures are not excluded in this approach.

- **Deduction Approach(DED)**: This approach is used in the case where some of the subsidiaries/entities that are part of bank's organizational structure are excluded from consolidation. In such a scenario, the regulatory investment in the excluded subsidiary attributable to the rest of the group are deducted from the consolidated capital requirements.

Position Conversion

Position conversion is processed before capital charge calculation under Market Risk. In Position Conversion, different instruments are broken into long and short positions and carried forward for specific and general risk charge calculation. All derivative instruments undergo position conversion so that the instrument is broken down into simplified positions for further processing. For derivative positions in equities, commodities, gold, currencies, and so on, only one leg is exposed to the interest rate and other leg is exposed to the respective asset (equity, FOREX) as the case may be. The following information is required for position conversion: Long or short position, Value of Notional Position, Coupon Rate, and Maturity.

Methodology for Position Conversion

While calculating interest rate risk, each instrument is converted into multiple positions. The notional value of each position is derived based on the following methodology:

Notional positions in actual debt securities are valued as the nominal amount underlying the contract at the current market price of the debt security.

Positions in zero-specific-risk securities is valued using one of the following two methods:

- o The present value approach, under which the zero specific-risk security is assigned a value equal to the present value of all the future cash flows that it represents

- o The alternative approach, under which the zero specific-risk security is assigned a value equal to the market value of the underlying notional equity position in the case of an equity derivative; the notional principal amount in the case of an interest rate or foreign currency swap; or the notional amount in the case of any other financial instrument.

For options, the delta weighted values are processed for general risk charge calculation. Delta is computed by the application based on the instrument type, coupon, residual maturity, strike price, spread, option premium value, and so on.

For an Interest Rate (IR) Swap, the parent instrument is identified as a Receiver or Payer swap based on whether the bank is receiving fixed or paying fixed, respectively. After Position Conversion, the parent swap is converted to two child positions which is in zero specific risk securities.

The exposure amount for each of these positions is computed based on the coupon rate of receiving leg for the long child position and the coupon rate of the paying leg for short child position. Currently the notional amount for both the child positions is being computed using the current market price column of the parent.

Instrument Coverage

- Interest Rate Derivatives

    o Bond Forward

    o Forward Rate Agreement

    o Bond Future

    o Future on a Basket/Index of bonds

    o Interest Rate Futures

    o Receiver Swap (without deferred start)

    o Payer Swap (without deferred start)

    o Basis Swap (without deferred start)

    o Forward Basis Swap

    o Forward Receiver Swap

    o Forward Payer Swap

    o Dual Currency Bond

- Equity Derivatives

    o Equity Forward

    o Equity Future

    o Equity Swap

- Currency Derivatives

    o Currency Forward

    o Currency Future

    o Currency Swap

- Commodity Derivatives

    o Commodity Forward

    o Commodity Future

    o Commodity Swap

- o Gold Forward

- Credit Derivatives

  - o Credit Default Swap

  - o Total Rate of Return Swap

  - o Cash Funded Credit Linked Notes

  - o First and Second-to-Default Basket Credit Derivatives

- Options / Structured Products

  - o Option on Equity

  - o Option on Currency

  - o Option on Commodity

  - o Option on Currency Future

  - o Option on Currency Forward

  - o Currency Swaption

  - o Option on a bond

  - o Option on a bond future

  - o Option on a Forward Rate Agreement

  - o Option on an Interest Rate Future

  - o Caps

  - o Floors

  - o Collars

  - o Swaptions

  - o Bonds with Embedded Swaptions

  - o Callable Bonds

  - o Putable Bonds

  - o Floating Rate Notes with Caps

  - o Floating Rate Notes with Floors

  - o Reverse Floaters

  - o Leveraged Floaters

Position Conversion Process Flow

The process flow of market risk position conversion is as follows:

Position Conversion Data Population

The application populates **FCT_MARKET_RISK_EXPOSURES** with the details provided by the bank in **STG_BANK_POSITIONS** and **STG_INSTRUMENT_CONTRACT_MASTER**. FOREX exposures of the bank are populated into **FCT_MARKET_RISK_FOREX**. This exercise is done for all the trading book exposures.

For more information on the process and sub processes that compute this task, refer the following:

> *Process:* BCB_MKT_RISK_DATA_POPULATION

> *Sub-process:* Market Risk Data Population

Currency Conversion

All the positions in other currencies are converted into the reporting currency of the bank, based on the currency conversion rate between the exposure currency and reporting currency.

For more information on processes and sub processes that compute this, see the following:

> *Process:* BCB_MKT_RISK_POSITION_CONVERSION

> *Sub-process:* Currency Conversion

Shareholding Percent Multiplication

For consolidated runs, exposures of the child entities are multiplied by the entity shareholding percentage to arrive at the consolidated exposure at the parent level.

For more information on the process and sub processes that compute this task, refer the following:

> *Process:* BCB_MKT_RISK_POSITION_CONVERSION

> *Sub-process:* Shareholding Percent Multiplication

Position Conversion of Derivatives into Simple Positions

The application takes the contract details from the instrument table and breaks each contract into multiple positions into market risk exposures (**FCT_MARKET_RISK_EXPOSURES**) table. The application splits instruments which are derivatives in nature, into multiple positions based on the instrument position mapping available in the mapping table.

For example: A bank having a plain long position in a derivative instrument is split into one long and one short position. Therefore, for each position and nature of contract type, the application creates required number of positions in the processing table. The download information used for position conversion is contract details, instrument type, contract position, position mapping, and so on. Certain exotic instruments are split into more than two positions. For example: A long position in a reverse floater is converted into the following positions:

A long position in two straight bonds (double the notional amount and half the fixed interest rate).

A short position in a floating rate bond (a position in floating rate bond with notional amount and floating reference rate)

A long position in a cap (which is further broken down into its underlying positions).

The application reclassifies all bank instruments into standard instrument types based on contract type, contract position, market risk position, and so on. A fixed bond forward with a long position in the contract is reclassified into fixed rate bond for the long leg and zero risk security for the short leg created by position conversion. The reclassifications are then used for notional value calculation.

For more information on the process and sub processes that compute this task, refer the following:

> *Process*: BCB_MKT_RISK_POSITION_CONVERSION

> *Sub-process:*

>> Position Conversion Exotic Options

>> Position Conversion Options

>> Position Conversion Basket Futures - Interest Rate

>> Position Conversion Swaps

>> Position Conversion Forwards and Futures

>> Position Conversion Credit Derivatives

Position Conversion Parameter Assignment

After position conversion, that is, breaking each derivative instrument into long and short leg, the application assigns instrument parameters for each position leg created under the position conversion logic. For each leg, relevant information like: coupon rate, coupon frequency, maturity, strike price for options, option premium value, and so on, are updated from parent information. This information is used in identifying instruments to be grouped under Maturity Ladder Based approach on coupon rate (less than or greater than equal to 3%), duration calculation for Duration Ladder Approach, calculation of Greeks for option charge, and so on.

For more information on the process and sub processes that compute this task, refer the following:

>   *Process*: BCB_MKT_RISK_POSITION_CONVERSION

>   *Sub-process:*

>>   Position Conversion Exotic Options

>>   Position Conversion Options

>>   Position Conversion Basket Futures - Interest Rate

>>   Position Conversion Swaps

>>   Position Conversion Forwards and Futures

>>   Position Conversion Credit Derivatives

Notional Value Calculation

Notional value of each leg created by position conversion for each instrument is calculated based on the contract characteristics (market price, number of units). For options, it is the delta weighted position which is carried forward for Market Risk Capital Charge calculation.

For more information on the process and sub processes that compute this task, refer the following:

>   *Process*: BCB_MKT_RISK_POSITION_CONVERSION

>   *Sub-process:*

>>   Position Conversion Exotic Options

>>   Position Conversion Options

>>   Position Conversion Basket Futures - Interest Rate

>>   Position Conversion Swaps

>>   Position Conversion Forwards and Futures

>>   Position Conversion Credit Derivatives

There is some dependency on the different instrument types, like; the exotic options can further result into a vanilla option after position conversion, therefore position conversion is processed as per following order of instrument types:

- Exotic Options

- Options

- Basket Futures

- Swaps

- Forwards Futures

- Credit Derivatives

After position conversion of Basket Futures instrument types, position offsetting is processed on different positions of same kind of instrument types and the post offset exposure amount is arrived at.

Example of a Forward Rate Agreement (FRA) Position Conversion:

A purchased FRA can be depicted through two notional zero-coupon positions: one short position (liability) up to the maturity of the underlying credit transaction and one long position (claim) up to the settlement of the FRA. Suppose a firm purchases 3 x 6 month FRA, principal: 1000; interest rate 6%, then this position is broken down into two opposite zero coupon bond positions as given below:

- **First Position:**

Position	: Long
Value of Notional Position	: PV {1000/ ((1+5%) ^0.25) = 987.87}
Maturity	: 3 months
Coupon	: Zero (Coupon of less than 3%)

- **Second Position:**

Position	: Short
Value of Notional Position	: PV {1000/ ((1+5%) ^0.5) = 975.90}
Maturity	: 6 months
Coupon	: Zero (Coupon of less than 3%)

A sold FRA has positions exactly opposite to the one provided in this example: the long position becomes short and short position becomes long, with the value, maturity, and coupon remaining the same.

The actual discount rates for discounting the notional values of the two legs, as mentioned in the preceding example, is the interest rates pertaining to the respective maturities, that is, 3 months (long leg) and 6 months (short leg). For simplification purposes, an assumed rate of 5% is considered. Taking the preceding example into consideration, the procedure handled by the application is as follows:

- Initially, the FRA as contract is captured in the contract record details table with banks position in the contract in the position table. The application also captures the position mapping table for the above instrument type which is used for position conversion under the data population block.

- For the above FRA example, two positions are created, one long position with a maturity of 3 months and a short position for the life of the contract, that is, with a maturity of 6 months.

- Both the position legs are reclassified into zero specific risk security.

- The various contract parameters are assigned by the application to both the legs. Example: Coupon Rate, Maturity,

- The notional value of both the legs is calculated as per the logic stated in the example.

Capital Charge for Interest Rate Instruments

The total risk charge for Interest Rate (IR) instruments is comprised of the following calculations for various IR Instrument categories:

1. PJUR(1): Calculation of the daily value of the Reference Net Worth Required ('PRE') share for exposures subject to pre-fixed interest rates changes in the interest rates denominated in Brazilian Reals. This is computed using the Internal Models Approach.

2. PJUR(2): Calculation of the daily value of the Reference Net Worth Required ('PRE') share for exposures subject to rate changes in foreign currency coupons (US dollar, euro, Swiss franc, yen and pound sterling coupons).

3. PJUR(3): Calculation of the daily value of the Reference Net Worth Required ('PRE') share for exposures subject to changes in the rate of the price index coupons (Broad National Consumer Price Index (IPCA) and General Market Price Index (IGP-M) coupons).

4. PJUR(4): Calculation of the daily value of the Reference Net Worth Required ('PRE') share for exposures subject to changes in interest rate coupons (Reference Rate (TR), Long Term Interest Rate (TJLP) and Financial Basic Rate (TBF) coupons).

Process Flow for Interest Rate Risk
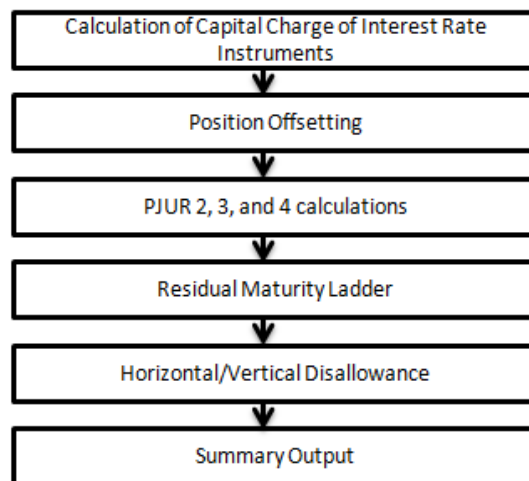
Position Offsetting and PJUR 2, 3, and 4 Calculations

In the Brazilian Market Risk, the interest rate risk is identified by grouping instruments into PJUR (2), PJUR (3), and PJUR (4). PJUR (1) is expected to be calculated as part of Internal Models Approach.

The application initially updates PJUR (4) based on reference benchmarks mentioned in BCB guidelines on market risk which are 'TBF', TJLP' and 'TR'. The application updates PJUR (3) based on the reference benchmarks which are general price index and national index of consumer prices wide.

The application does the last set of interest rate risk component identification by marking PJUR (2) where the exposures deal with British Pound, Swiss Franc, US Dollar, and Japanese Yen.

General risk charge is calculated for each of the Interest Rate Risk exposure identified for a reporting bank. General risk charge is calculated based on the Residual Maturity Ladder Approach.

Under Residual Maturity Method, the application creates time bands and based on the residual maturity each instrument in the respective time bands are processed for offsetting. The matched and unmatched position across time bands and across three zones attracts general risk charge as per the definition stated in BCB guidelines for Market Risk.

Residual Maturity Ladder

Under Residual Maturity Ladder Approach, the general risk charge is calculated for each group, namely PJUR (2), (3), and (4). Exposure value is calculated for each exposure using the formula listed in the BCB guidelines for the respective groups.

Under Residual Maturity Method, the application initially creates 11 residual maturity time bands. The time bands definitions are provided in the BCB guidelines. All the 11 time bands are grouped into 3 zones for horizontal disallowance as per the zone definition provided in the BCB Market Risk guidelines.

The entire end to end processing of general risk charge is calculated in a separate table meant only for it and can be selected and analyzed in the form of reports. All the processing steps and related data are stored in the table starting from time bands assignment, zone identification, the matched and unmatched position following horizontal and vertical disallowance, and net open position for each group.

For more information on the process and sub processes that compute this task, refer the following:

>   *Process*: BCB_MKT_RISK_STD_APPROACH
>   *Sub-process:* Market Risk Generic Risk Charge Calculation - IR and Equity

Horizontal/Vertical Disallowance

The application does horizontal/vertical disallowance by first netting opposite position within each time band and then across time bands for the carry over position In Maturity ladder approach, each instrument position within the time band is weighted with the general risk weight and summed as aggregate long and aggregate short position for each time band. The application does a vertical disallowance by offsetting the weighted long and short position in each time-band, resulting in a single short or long position for each band and carrying over the open position for offsetting across time bands and then across three zones.

The residual net portion in each zone is then carried over and offset against opposite portions in other zones. The net open portions left after matching non adjacent zones are carried over as net positions.

The capital charge is applied at each state for the matched and unmatched position as per the capital charge stated in BCB guidelines for market risk. The procedure by which the application handles horizontal and vertical disallowance is as follows:

The application initially populates weighted long and weighted short position amounts for each time band.

The next step is to offset the matched positions and populate them as 'offset matched position within the time band'. The unmatched positions are populated as 'offset unmatched position within the time band'.

Offset unmatched positions arrived at from the previous step, are then taken up for offsetting within a time zone. All the 'offset unmatched positions within time band' falling under the same zone are offset with each other and 'offset match same zone' and 'offset unmatched same zone are computed'.

Offset unmatched positions within same zone are then carried forward for calculating 'offset matched between zone' and 'offset unmatched between zones'. This is initially processed for zones 1 and 2, then for zones 2 and 3, and lastly for zones 1 and 3.

All the unmatched positions (within time band, same zone, between zones and net unmatched position) are multiplied by the factors listed in the BCB guidelines for maturity ladder approach as applicable.

This process is followed for all exposure groups, namely PJUR2, PJUR3 and PJUR4

For more information on the process and sub processes that compute this task, refer the following:

> *Process*: BCB_MKT_RISK_STD_APPROACH

> *Sub-process:* Market Risk Generic Risk Charge Calculation - IR and Equity

> *Procedures:*

>> Mkt_Risk_Cap_Chrge_PJUR2

>> Mkt_Risk_Cap_Chrge_PJUR3

>> Mkt_Risk_Cap_Chrge_PJUR4

Summary Output

For reporting purpose application moves data from Market Risk Capital (**FCT_MARKET_RISK_CAPITAL**) table to Market Risk Reporting (**FCT_MARKET_RISK_REPORTING**) table.

At the end, the risk weight asset is calculated in the market risk summary (**FCT_MARKET_RISK_SUMMARY**) table by multiplying capital charge with 12.5.The interest risk charge is reported from the market risk summary (**FCT_MARKET_RISK_SUMMARY**) table under interest risk charge reporting line. Specific and general risk charge for interest rate is also reported separately from the summary table.

For more information on the process and sub processes that compute this task, refer the following:

> *Process*: BCB_MKT_RISK_STD_APPROACH

> *Sub-process:* Market Risk Capital Risk Charge Calculation

Capital Charge for Equity

The application calculates equity capital charge as the sum of specific risk charge and general risk charge.

Process Flow for Equity Risk
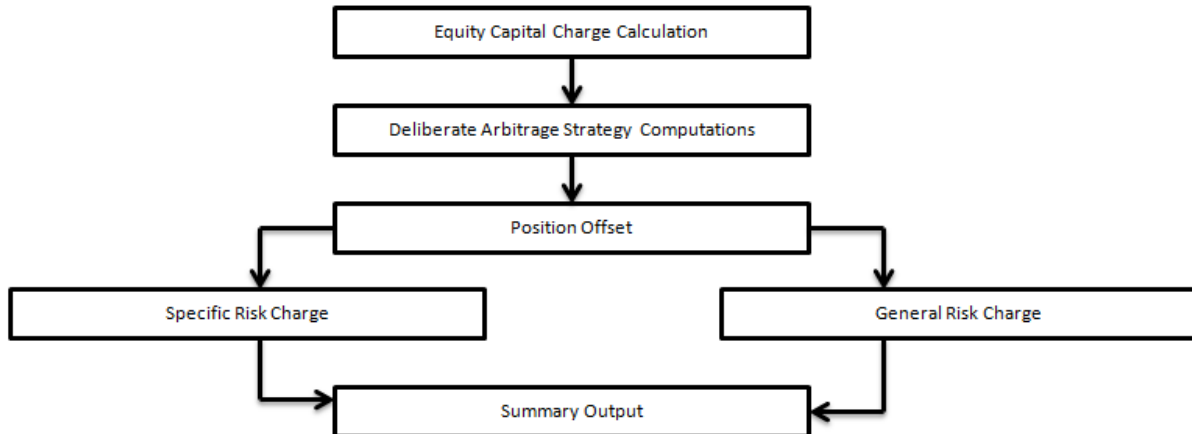
Market Risk Arbitrage Strategy

The application identifies the deliberate and future arbitrage strategies for equity positions under this process. Components as per the Basel guidelines for 10 percent slippage, exposure amount calculation under arbitrage, exclusions under deliberate arbitrage, and so on, are computed under this process.

For more information on the process and sub processes that compute this task, refer the following:

> *Process*: BCB_MKT_RISK_STD_APPROACH
>
> *Sub process*: Market Risk Arbitrage Strategy

Position Offset

Long and short position in the same equity instrument are offset for the matched position and net open position is carried forward as net long or net short position for specific and general risk charge calculation.

For more information on the process and sub processes that compute this task, refer the following:

> *Process*: BCB_MKT_RISK_STD_APPROACH
>
> *Sub-process:* Market Risk Equity Offsetting

Specific Risk Charge

The application assigns specific risk charge as 8% on gross equity positions. For an index equity, which is well diversified, a 4% specific risk charge is applied.

In the case of depository receipts with opposite position in underlying identical equities, the mapping is expected in a depository receipts and issue mapping table, where the depository receipts are mapped against the underlying equity with a conversion factor to take care of the conversion amount for offsetting.

The matched opposite position in underlying equity are offset and the net open position are carried forward for an equity specific and general risk charge.

For more information on the process and sub processes that compute this task, refer the following:

> *Process*: BCB_MKT_RISK_STD_APPROACH

> *Sub-process:*

>> Market Risk Specific Risk Equity

>> BCB - Market Risk Specific Risk Charge Calculation – Equity

General Risk Charge

The application applies 8% general risk charge for equity instrument type.

For more information on the process and sub processes that compute this task, refer the following:

> *Process*: BCB_MKT_RISK_STD_APPROACH

> *Sub-process:*

>> BCB - Mkt Risk General Risk Weight Assignment – Equity

>> Market Risk Generic Risk Charge Calculation - IR and Equity

Summary Output

The equity risk charge is reported out of the market risk summary (**FCT_MARKET_RISK_SUMMARY**) table under equity charge reporting line. Specific and general risk for equity is also reported separately from the summary table.

For more information on the process and sub processes that compute this task, refer the following:

> *Process*: BCB_MKT_RISK_STD_APPROACH

> *Sub-process:* Market Risk Capital Risk Charge Calculation

Capital Charge for Foreign Exchange Transactions

Process Flow Diagram for FOREX
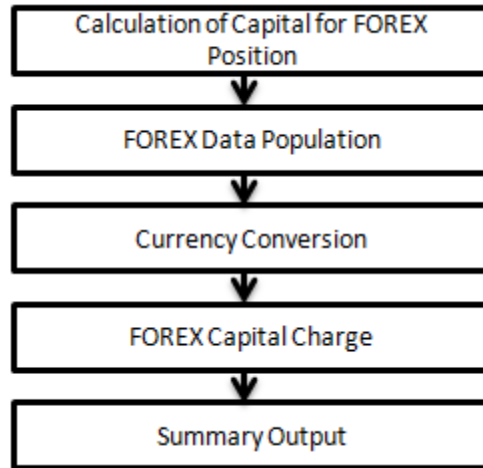
FOREX Data Population

All foreign exchange data is expected as a download in a separate table. This includes positions in gold as well. The data is then populated into the FOREX Capital table which is used for the calculation of EXP1, EXP2 and EXP3 as per BCB guidelines.

For more information on the process and sub processes that compute this task, refer the following:

> *Process*: BCB_MKT_RISK_DATA_POPULATION

> *Sub-process:* Market Risk Data Population

Currency Conversion

Currency conversion of FOREX positions to reporting currency is computed in the application within the following rules:

- FOREX Position Profit and Loss Attribute Natural CCY Conversion to Reporting CCY
- FOREX Position Attribute Natural CCY Conversion to Reporting CCY
- FOREX Position Other Attribute Natural CCY Conversion to Reporting CCY

This conversion is processed based on the exchange rate between the natural currency of the exposure and the reporting currency.

For more information on the process and sub processes that compute this task, refer the following:

> *Process*: BCB_MKT_RISK_STD_APPROACH

> *Sub-process:* Market Risk Options - Capital Charge Calculation - Delta Plus Approach

FOREX Capital Charge

FOREX Capital charge is computed as a product of total exposure and the factor applicable to gold

exposures. Total exposure is a sum of EXP1, EXP2 and EXP3 explained as follows:

- EXP1: This is calculated as the sum of the net position in each currency in the currency portfolio of the bank

- EXP2: This considers only the exposures in USD, Euro, Swiss Franc, Yen, Pound and Gold. The sum of excess of purchases (long positions) as compared to sales and excess of sales (short positions) as compared to purchases is computed for each currency. The minimum of the two values is then considered as EXP2 and multiplied by a factor 'H' specified in the BCB guidelines to be used for total exposure calculation

- EXP3: This considers the sum of the net positions in all the currencies (including gold) inside Brazil and of the net positions in all the currencies (including gold) outside Brazil. Minimum of these two values is assigned to EXP3 which is then multiplied by a factor 'G' specified in the BCB guidelines to be used for total exposure calculation.

The FOREX capital charge is hence computed as the sum of EXP1, EXP2, and EXP3, after multiplying by the factor 'F' as stated in the BCB guidelines.

For more information on the process and sub processes that compute this task, refer the following:

Process: BCB_MKT_RISK_STD_APPROACH

Sub-process: BCB - Market Risk FOREX Charge Calculation

Summary Output

The FOREX risk charge is reported from the market risk summary (**FCT_MARKET_RISK_SUMMARY**) table under FOREX charge reporting line.

For more information on the process and sub processes that compute this task, refer the following:

Process: BCB_MKT_RISK_STD_APPROACH

Sub-process: Market Risk Capital Risk Charge Calculation

Capital Charge for Commodities

Process Flow for Commodities
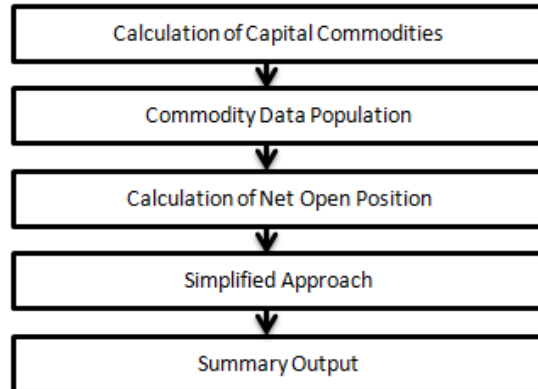
Commodity Data Population

Commodity data is captured at an exposure level with commodity identifier as information. Commodity identifier is referred from the list of commodities available in the dimension table meant only for commodities

For more information on the process and sub processes that compute this task, refer the following:

> *Process*: BCB_MKT_RISK_DATA_POPULATION

> *Sub-process:* Market Risk Data Population

Calculation of Net Open Position

The application computes a position offset for commodities based on common commodity group identifier. The net long and short position is carried forward for commodity risk charge application. In the case of any derivative position taken on the commodity, the capital charge is calculated based on position conversion to capture option or interest rate risk charge, if existing, and a capital charge for the commodity

For more information on the process and sub processes that compute this task, refer the following:

> *Process*: BCB_MKT_RISK_STD_APPROACH

> *Sub-process:* Market Risk Capital Charge Calculation - Simple Approach

Simplified Approach

For the Simplified Approach, the application moves data from market risk exposure (**FCT_MARKET_RISK_EXPOSURES**) table to market risk commodity capital (**FCT_MARKET_RISK_COM_CAPITAL**) table. In the Simplified Approach, the application calculates 15% capital charge on the net open long or open short position includes an additional 3% capital charge on gross position (long plus short) for each commodity group.

For more information on the process and sub processes that compute this task, refer the following:

>   *Process*: BCB_MKT_RISK_STD_APPROACH

>   *Sub-process:* Market Risk Capital Charge Calculation - Simple Approach

Summary Output

The commodity risk charge gets reported out of market risk summary table under commodity charge reporting line.

For more information on the process and sub processes that compute this task, refer the following:

>   *Process*: BCB_MKT_RISK_STD_APPROACH

>   *Sub-process:* Market Risk Capital Risk Charge Calculation

Capital Charge for Options

Process Flow for Options Capital Charge

Delta Plus Approach

In the Delta Plus Approach, the option taken on any underlying contract is processed for position conversion. The purpose of position conversion is to create multiple positions with delta weighted amounts and send each position for respective capital charge calculation.

Greeks Calculation

The application calculates Greeks for options based on the option contract information. The Greek calculation involves calculating implied volatility, delta, gamma, and vega. The information required for calculating Greek is explained under "**Position Conversion Parameter Assignment**". Each of the Greeks calculated then participates in sensitivity charge calculation.

For more information on the process and sub processes that compute this task, refer the following:

Process: BCB_MKT_RISK_STD_APPROACH

Sub-process: Market Risk Options - Delta and Gamma Calculations - Delta Plus Approach

Underlying Capital Charge

For options contract in equities, commodities, gold, currencies, and so on, one leg is processed for interest risk calculation and the underlying leg is processed in the respective asset (equity, FOREX, commodity) charge calculation.

NOTE: General Risk Charge Calculation for IR Leg. The Interest Rate legs of the options, arrived at after position conversion, are sorted into 11 maturity bands based on the residual maturity of the legs. The bands are defined in the BCB guidelines. Each of these 11 maturity bands (zones) has a risk weight assigned to it. The exposure value of the IR leg of the options is then multiplied by the corresponding risk weight as per the zone in which the residual maturity of the leg falls.

For more information on the process and sub processes that compute this task, refer the following:

Process: BCB_MKT_RISK_STD_APPROACH

Sub-process: Market Risk Options - Delta and Gamma Calculations - Delta Plus Approach

Sensitivity Charge Calculation

For options, total charge includes underlying capital; charge plus sensitivity risk charge. Sensitivity risk charge includes delta risk, gamma risk, and vega risk charge. The formula used against each of the sensitivity charge is as per BCB guidelines on Market risk.

The computation of Delta weighted positions and Gamma impact for options is done under the process 'Market Risk Options – Delta and Gamma calculations – Delta Plus Approach'. The delta weighted positions of options participate in the specific and general risk charge computations applicable for the respective underlying.

For more information on the process and sub processes that compute this task, refer the following:

Process: BCB_MKT_RISK_STD_APPROACH

Sub-process: Market Risk Options - Capital Charge Calculation - Delta Plus Approach

Summary Output

The capital charge for option is reported from summary table where reporting line is options where as the underlying risk charge gets reported under the respective reporting line.

For more information on the process and sub processes that compute this task, refer the following:

Process: BCB_MKT_RISK_STD_APPROACH

Sub-process: Market Risk Generic Risk Charge Calculation - IR and Equity

6.1.1.3.2 Key Data Elements

Key data elements are listed in this section. For a complete list of tables and columns to be populated, see the Download Specification document.

- Interest Rate Historical Data: Interest Rate information for IR instrument is stored here.

- Bank Positions: Position in the instrument (Long/Short), Price of Instrument and No of Units for OTC instruments are stored here.

- Market Instrument Contract: Price of Non-OTC instruments is stored here.

- Instrument contract: Instrument Type, Counter party type, currency code, coupon rate, effective date, maturity date, strike price, coupon rate, coupon frequency are stored here.

- FOREX Exposures: Exposure amount, asset amount, asset accrued interest, asset accrued profit are stored here.

6.1.1.4 Operational RWA

As per the Basel accord, "Operational Risk is the risk of loss resulting from inadequate or failed internal processes, people and systems, or from external events". External losses can occur due to theft of information or hacking of systems. The Brazilian jurisdiction has prescribed three methods for calculating OR capital charges and banks can use any of these methods to calculate capital charge:

- Basic Indicator Approach

- Alternative Standardized Approach

- Simplified Alternative Standardized Approach

NOTE: While executing Solo Run for computing Operational Risk, the parent entity data is processed. However, for a Consolidated Run the parent entity and the subsidiary data is processed.

6.1.1.4.1 Basic Indicator Approach

To calculate the capital charge under the Basic Indicator Approach, the exposure indicator for each of the past three years for a standard line of business is multiplied by a fixed percentage of 15%. Later, the average is considered to calculate the capital charge. The exposure indicator is the same as gross income of BIS Jurisdiction, except that in the case of Brazil, the values are reported half-yearly. Hence, to find the annual exposure indicator values, the application sums the half yearly values. If the annual exposure indicator is negative or zero in any of the past three years, then the value from the numerator is excluded, thereby, reducing the base denominator by the same count.

The capital charge formula is as follows:

$$P_{OPR} = Z . \frac{\sum_{t=1}^{3} \max\left[0.15 \times IE_t; 0\right]}{n}$$

Where:

P_{OPR} = capital charge for Operational Risk

Z = factor of 1.00 starting from 1st January 2010

IE$_t$ = Exposure Indicator for each financial year

n = Number of times in the last 3 years where IE is greater than zero

6.1.1.4.2 Alternative Standardized Approach

In this approach, banking activities are divided into eight lines of business. The Exposure Alternative Indicator (which is the same as the Exposure Indicator) for each line of business is multiplied by the beta factor which is pre-defined in the Brazil Accord. In this approach for two lines of business: Retail Banking and Commercial Banking, the loan and advance amount is used (rather than Exposure Indicator) which is multiplied by the fixed factor "m" and the beta factor. The constant factor "m" is equal to 0.035. Every year the exposure alternative indicator of the standard line of business is multiplied by respective beta factor. The total capital charge is calculated as the three-year average of the sum of the regulatory capital charges across each lines of business every year. The total capital charge is calculated as follows:

$$P_{OPR} = Z.\frac{\sum_{t=1}^{3}\max\left[\left(\sum_{i=1}^{2}IAE_{i,t}\times\beta_i\right)+\left(\sum_{i=3}^{8}IE_{i,t}\times\beta_i\right);0\right]}{3}$$

Where:

P$_{OPR}$ = capital charge for Operational Risk

Z = factor of 1.00 starting from 1st January 2010

IAE$_{i,t}$ = Exposure Alternative Indicator for each line of business and for each financial year

β$_i$ = Beta factor corresponding to each line of business

6.1.1.4.3 Simplified Alternative Standardized Approach

This approach is an extension of the alternative standardized approach. In this approach, the exposure alternative indicator amount and the exposure indicator amount are used, which are the same as calculated in the preceding section. The total capital charge is calculated as follows:

$$P_{OPR} = Z.\frac{\sum_{t=1}^{3}\max\left\{\left[(IAE_t\times0.15)+(IE_t\times0.18)\right];0\right\}}{3}$$

Where:

P$_{OPR}$ = capital charge for Operational Risk

Z = factor of 1.00 starting from 1st January 2010

IAE$_t$ = Exposure Alternative Indicator for each financial year

IE$_t$ = Exposure Indicator for each financial year

Process Flow for Operational RWA

Prerequisite

Before calculating the capital charge for Operational Risk, the following should be computed as a prerequisite:

- In the processes **BCB_OPS_RISK_BASIC_IND_APPROACH**, **BCB_OPS_RISK_ALTERNATE_STD_APPROACH** and **BCB_OPS_RISK_SIMPLIFIED_ALTERNATE_STD_APPROACH**, the task defined as **Opr_Risk_Capital_Charge_BCB**, **OR_Cap_Alt_Std_App_BCB**, and **OR_Cap_Sim_Alt_Std_App_B** respectively, should mention the number of years (in the past) as a parameter for capital calculation.

  For example: if the previous 3 years are considered, then assign 3 as a parameter against the task **Opr_Risk_Capital_Charge_BCB**. Therefore, in the future if the previous 4 years have to be considered then change that particular parameter only.

The process to compute Operational Risk is as follows:
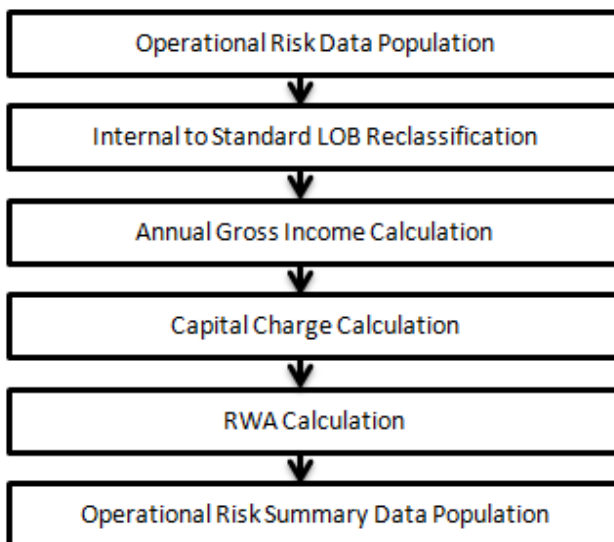
```
┌─────────────────────────────────────────┐
│   Operational Risk Data Population       │
└─────────────────────────────────────────┘
                    ↓
┌─────────────────────────────────────────┐
│  Internal to Standard LOB Reclassification│
└─────────────────────────────────────────┘
                    ↓
┌─────────────────────────────────────────┐
│     Annual Gross Income Calculation      │
└─────────────────────────────────────────┘
                    ↓
┌─────────────────────────────────────────┐
│       Capital Charge Calculation         │
└─────────────────────────────────────────┘
                    ↓
┌─────────────────────────────────────────┐
│            RWA Calculation               │
└─────────────────────────────────────────┘
                    ↓
┌─────────────────────────────────────────┐
│ Operational Risk Summary Data Population │
└─────────────────────────────────────────┘
```

Operational Risk Data Population

The input data for each of the financial years mapped along with the internal line of business are populated in the processing table.

Internal LOB to Standard LOB Reclassification

The internal lines of business are reclassified into standard lines of business.

Annual Gross Income Calculation

For each of the standard lines of business and for each financial year, the annual gross income is calculated.

Exposure Indicator or Exposure Alternative Indicator Calculation:

For each of the standard line of business and for each financial year, the exposure indicator or the exposure alternative indicator is calculated. This is similar to the gross income calculation.

Capital Charge Calculation

Capital charge is calculated by multiplying the alpha value or the beta value (for Basic Indicator Approach or Alternative Standardized Approach) with the annual income of each year across each standard line of business. Further, the average of 3 years is considered (if the values of all the 3 years are positive). If the values of all the 3 years are not positive, then exclude zero or the negative value from numerator and denominator.

Risk-Weight Asset Calculation

The capital charge value obtained is then converted to the equivalent RWA value by multiplying with the factor 12.5.

Operational Risk Summary Data Population

The RWA amount is populated into Operational Risk Summary (**FCT_OPS_RISK_SUMMARY**) table along with the entity, for which the OR RWA is calculated. The application converts all the elements in annual gross income and loan and advance amount reported in their respective national currency, to the reporting currency. While calculating annual gross income or loan and advance amount for the subsidiary that are part of regulatory consolidation, the amount is limited to the share-holding percentage. Hence, if a subsidiary which is part of regulatory consolidation and parent holding in the subsidiary is considered 45%, then the amount limited to 45% is considered for gross calculation. Similarly, if the holding is more than 50%, the entire amount is considered for gross calculation.

6.1.1.4.4 Key Data Elements

Key data elements to be noted are listed in this section. To view the complete list of tables used, see the *Download Specification* document.

Entity details which are part of regulatory consolidation and parent entity share holding percent is required. This data is captured in Stage Entity Shareholding Details (**STG_ENTITY_SHR_HLD_PERCENT**) table.

Net Interest Income, Net Provision Amount, Net Non Interest Income, Operating Expenses, Security Sale Gain or Loss from HTM, Insurance Irregular Loss, Security Sale Gain or Loss from AFS, and Insurance Irregular Gain for each line of business and for each financial year is required.

6.1.1.5 Capital Structure

The capital structure of the Brazilian jurisdiction calculates the total capital of the bank holding company. The total capital consists of the following components:

Shareholder's Equity capital

Tier 2 capital

Shareholder's Equity capital consists of core equity capital, retained earnings, and disclosed reserves. Tier 2 capital consists of hybrid debt capital and subordinate term debt.

The total capital amount arrived at for each tier of capital is followed by deduction of various regulatory adjustments. Investment in the subsidiary engaged in BFSI and Reciprocal Cross Holding are deducted from the total capital. Tax credit for capital deduction and DTA are deducted from Tier 1 capital.

Tier 2 capital is limited to 100% of Shareholder's Equity capital. The total capital ratio must be no lower than 11%.

NOTE: While executing Solo Run the parent entity data is processed. Investment into the subsidiary data undergoes RWA calculation as per the Credit Risk and Market Risk rule. Capital line item pertaining to parent entity is only processed. For consolidation approach, the parent entity and the subsidiary data is considered. All the General Ledger line items are expected at solo level for each entity. The consolidated data is discarded.

6.1.1.5.1 Assumption

The General Ledger codes are expected to be unique across entities in **STG_GL_DATA** and **DIM_CAPITAL_ACCT_HEAD**.

6.1.1.5.2 Process Flow for Capital Structure

Level Selection and Approach Selection Calculation

To process the capital for a bank, a solo or consolidated entity selection should be made, based on which the capital is calculated at organization level. If solo is selected, then only for that particular selected banking organization the capital is calculated. If consolidation is selected, then all the entities that fall under the umbrella of the selected organization are part of capital calculation. This is done in the task – '**Capital Consolidation Level Selection**' in process '**CAPITAL_CONSOLIDATION**'.

Based on the share-holding percentage of the parent bank in the subsidiary and the consolidation approach to be followed (consolidation approach and deduction approach) for each of the entity, the Basel approach is selected.

For example: if the share-holding for an entity is 35% and is part of the consolidation process, then the approach selected for this entity is pro-rata consolidation. The above reclassification is performed in task – '**Cap Consl Basel Approach Type Reclassification for an Entity**' in the process '**CAPITAL_CONSOLIDATION'.**

Gross Capital Calculation for Shareholder's Equity and T2

The total gross capital for each tier of capital that is, Shareholder's Equity and T2, are calculated as per the definition of Shareholder's Equity and T2, by adding the relevant financial instrument in each tier of capital. The above calculation is done in sub process – '**Capital Components Calculations**' in process '**BCB_CAP_STRUCT'**.

Identification of Internal Transaction and Reciprocal Cross Holdings

All inter-group and reciprocal-cross holding capital investments are marked as internal customer transactions and reciprocal cross holdings, respectively. The marking is done by populating appropriate standard account head surrogate key for the exposures which qualifies as internal transaction or reciprocal cross holding.

Regulatory Adjustment from Shareholder's Equity and Tier 2

All the regulatory adjustment line items are identified and 50% of the total amount is deducted from Shareholder's Equity and 50% from Tier 2 capital. In order to handle this 50-50 deduction, all the regulatory adjustment line items are moved to table **FCT_CALC_ACCT_HEAD** where each of the regulatory adjustment line items are equally split into 2 records. The capital component group of one record is marked as 'T1-50' and the other record is marked as 'T2-50'. The above processing is computed in the sub processes – **Calc Acct Head Population** and **Std Acct Head Population** in the process **BCB_CAP_STRUCT**.

Calculation of Net Capital

Net shareholder's equity capital is calculated by deducting the tax credit for capital deduction, DTA, and 50% of the regulatory adjustment line item. Similarly, the net Tier 2 capital is calculated by deducting 50% of regulatory adjustment line item. If net Tier 2 capital is greater than net Shareholder's Equity capital, then net Tier 2 capital is limited to Net Shareholder's Equity capital.

Total Capital Calculation

The total net Shareholder's Equity capital and Net Tier 2 capital is summed up, less the deduction line items which are deducted from total capital to obtain the total eligible capital.

Risk Weighted Asset (RWA) Amount – Credit Risk, Market Risk and Operational Risk

The RWA amount for Non Securitization, Market Risk, and Operational Risk are calculated by summing up the RWA amount as reported under different headings as 'Risk Weighted Asset amount for Standardized Portfolios' for Non Securitization "Market RWA" for Market Risk and "Operational RWA for Operational Risk.

Capital Ratio Calculation

Capital Adequacy ratio is calculated using the total RWA amount and total capital amount. This processing is done in the sub process – **Capital Components Calculations** in the process **BCB_CAP_STRUCT**.

6.1.1.5.3 Key Data Elements

Key data elements to be followed are listed in this section. For a complete list of tables and columns to be updated, see the Download Specifications document:

- Entity details which are part of regulatory consolidation and parent entity share holding percent. This data is captured in Stage Entity Shareholding Details (**STG_ENTITY_SHR_HLD_PERCENT**) table

- The capital structure component for each tier of capital for all entities involved in regulatory consolidation.

- The General Ledger line items are captured as download in Stage General Ledger Data (**STG_GL_DATA**).

- If Capital Line item like 'MR RWA' or 'OR RWA' are available as download, then these Non GL line items are expected as download in Stage Standard Accounting Head (**STG_STANDARD_ACCT_HEAD**).

- The standard account head ID of line items like 'Net Tier 1 capital', 'capital ratio', and so on, which are computed by the application, are expected to be mapped to Capital Account Identifier – 'OTHERS'. Hence, the application populates these line items into Fact Standard Accounting Head (**FCT_STANDARD_ACCT_HEAD**) with initial value as 0. Later, this value is over written by application.

- Information stored in Capital Standard Mapping (**FSI_CAPITAL_STANDARD_MAPPING)** table is a mapping of GL capital line items with seeded data in DIM_STD_ACCT_HEAD. For all jurisdictions this mapping should be present. For more information on the mapping of all jurisdictions in **FSI_CAPITAL_STANDARD_MAPPING** table, see Exhibit 5 in *Annexure A: Key Concepts.*

7 CBRC Jurisdiction

Capital Adequacy related regulations as issued in the following regulations are incorporated in this OFS Financial Services Basel Regulatory Capital Release 6.1:

CBRC Jurisdiction: Supervisory guidelines on Capital Adequacy Ratio of Commercial Banks issued by the China Banking Regulatory Commission (CBRC) for Basel II adoption in Chinese Banks on 1st October 2008.

In the jurisdiction of CBRC the following approaches for RWA and Capital Adequacy Ratio computation are supported:

- Credit Risk

    o Non Securitization – Foundation Internal Ratings Based Approach/Advanced Internal Ratings Based Approach

    o Securitization - Foundation Internal Ratings Based Approach

- Market Risk

    o Market Risk – Standardized Approach

- Operational Risk

    Operational Risk – Standardized Approach

- Capital Structure

7.1 Basel II

7.1.1 Basel II – Internal Ratings Based Approach

7.1.1.1 CBRC II – High Level Process Flow for Internal Ratings Based Approach

The application supports the capital computations for Credit Risk, Market Risk, and Operational Risk along with Capital Structure and Capital Consolidation process, as per the CBRC guidelines. For Credit Risk, the application follows the Internal Ratings Based Approach, whereas for Market Risk and Operational Risk, the application follows the Standardized Approach.

For more information on the pre-defined Runs available with the application, see *OFS Basel Regulatory Capital Run Charts*.

The order in which the processes are executed in the application, as are as follows.

7.1.1.1.1 Process Flow for Capital Adequacy Ratio Calculation
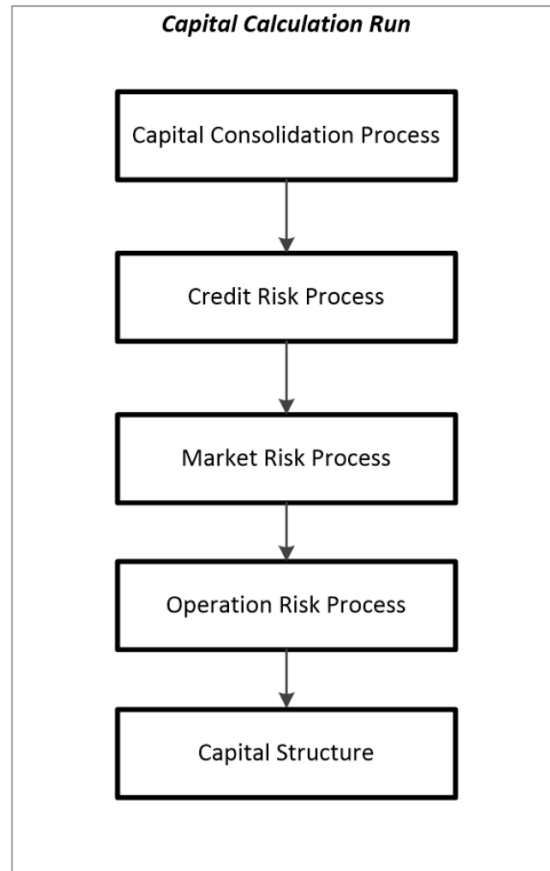
The Capital Calculation Run depicted in the preceding process flow is a single run which is a joined together by multiple processes. Each process is a block, compiled together to form an entire Capital Adequacy run. The individual blocks like the Credit Risk process, Market Risk process, and so on, also exist as individual runs which is described in the following sections.

7.1.1.1.2 Capital Consolidation Process

Capital Consolidation is a process common to each of the individual block when they are triggered separately as an individual run. For example: the standard out-of-box Market Risk run has Capital Consolidation and Market Risk process bundled together as a single Market Risk run. This is applicable for a Credit Risk run and Operational Risk run as well. The Capital Consolidation is explained in the following section and is not repeated under the Non Securitization process, Securitization process, Market Risk process, or Operational Risk section of this document.

In Capital Consolidation, the application processes the following.

Capital Consolidation Level Selection

The reporting bank can be a part of a financial group that has multiple legal entities like parent or child entities (subsidiaries) under its name. The entity on which you are required to process should be selected by you. Subsequently, level at which a Run is to be executed (solo or consolidated) should also be selected. You can select these options in the Run Management UI. However, if the Run is executed in the Run Rule Framework (RRF), then these options have to be set using the Rule '**Capital Consolidation Level Selection**' in the process '**CBRC_CAPITAL_CONSOLIDATION**'.

CBRC_CAPITAL_CONSOLIDATION is the first process to be added in all the Runs defined in the RRF except for the Staging Data Population Run. The Run Management UI selects this process by default.

Run Parameters Assignment

CBRC Regulations states different approaches for calculating RWA. The Run Management UI in the application allows the reporting bank to define and execute a Run by selecting a combination of different Basel II approaches for RWA computation.

Run Parameter Assignment is also part of **Capital Consolidation** process. The Rule '**Run Definition User Defined Run Param Assignment**' is used to assign the Run parameters if a Run is executed in the RRF. If the Run is executed from the Run Management UI, then the parameters are populated based on the Run defined in the Run Definition window.

Currency Conversion

The Rules pre-defined in the application performs currency conversion of all General Ledger amount attributes to be used for Capital Consolidation from the Natural currency to the Reporting currency, based on the exchange rate provided.

Shareholding Percent Multiplication

For all entities in the Capital Consolidation process, the application updates the shareholding percentage against each entity data in the Fact Capital Accounting Head from the Fact Entity Shareholding Percent table. The parent data in the processing table of Fact Capital Accounting Head is updated with the value 1 and for each child entity the data is based on the parent's holding percentage specified for each child in fact entity share holding percent table.

7.1.1.1.3 Process Flow for Credit RWA

A Credit RWA Run is a combination of the Non Securitization RWA process and Securitization RWA process. A few processes like Credit Rating, Party Type Reclassification, and Mitigant Data Population are common between Non Securitization and Securitization process. Though these sub processes are explained separately under Non Securitization and Securitization section of this document, it is executed only once under the Credit RWA run.

Certain sub processes under the Non Securitization process like Reclassification, are common across all types of exposures for example: banking book, over the counter derivative transactions, and securities financing transactions, and are executed only once in the Run. The details of this sub process are explained under Reclassification sub process of the Basel II Non Securitization exposures section of this document. Likewise, details of Credit Risk Mitigation for Non Securitization process is detailed under the CBRC Non Securitization section of this document and details of Credit Risk Mitigation for Securitization process is detailed under the CBRC Securitization section of this document.

For more information on the sub processes as detailed in the preceding process flow for the Non Securitization process and Securitization process, see Credit RWA.

For example: Non Sec Data Population is detailed under Data Population and Currency Conversion of Credit RWA (Non Securitization - Standardized approach) section of this document.

7.1.1.1.4 Process Flow for Market RWA
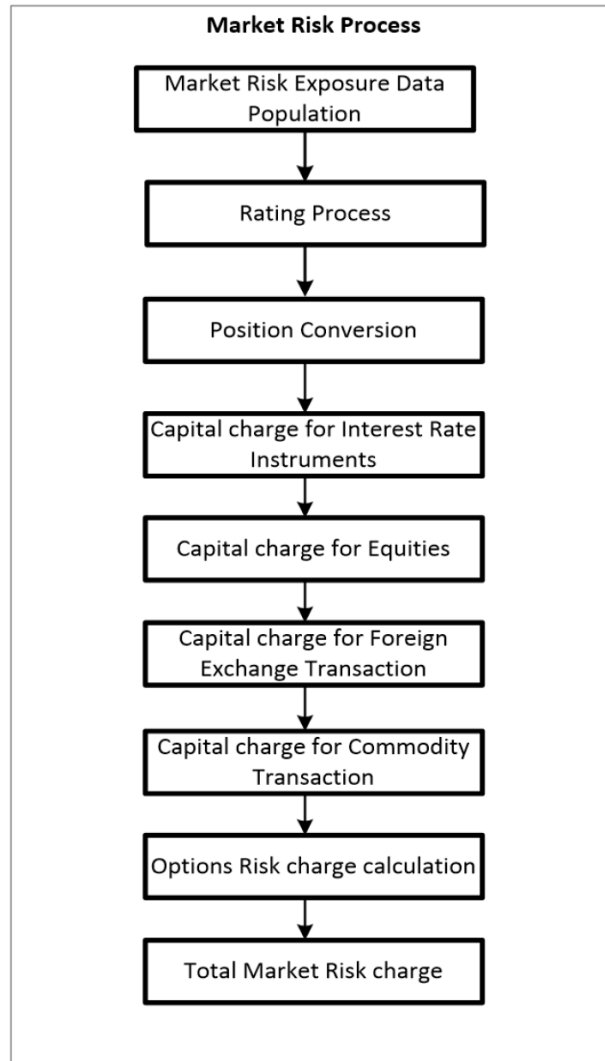
Market RWA Run is made up of multiple sub processes specific to Market Risk. However, when Market Risk is bundled under a Consolidated Run and triggered, Capital Consolidation and Rating process is executed only once for Credit Risk and Market Risk. The details of each of the sub process mentioned in the preceding flow chart are present under Market Risk section of this document.

For more information on Market RWA computation, see Market RWA.

For example: 'Capital charge for Interest rate Instruments' sub process above is detailed elaborately under 'Interest Rate risk Related Risk Charge' section of the market risk.

For example: 'Capital Charge for Interest Rate Instruments' sub process is detailed elaborately under 'Capital Charge for Interest Rate Instruments' section of Market Risk. Likewise 'Capital Charge for Equities', 'Capital Charge for Foreign Exchange Transaction', 'Capital Charge for Commodity Transaction', and 'Options risk charge calculation' has a detailed explanation present under 'Capital Charge for Equities', 'Capital Charge for Foreign Exchange Transactions', 'Capital Charge for Commodities', and 'Capital Charge for Options' sub process of the Market Risk section of this document, respectively.

7.1.1.1.5 Process Flow for Operational RWA
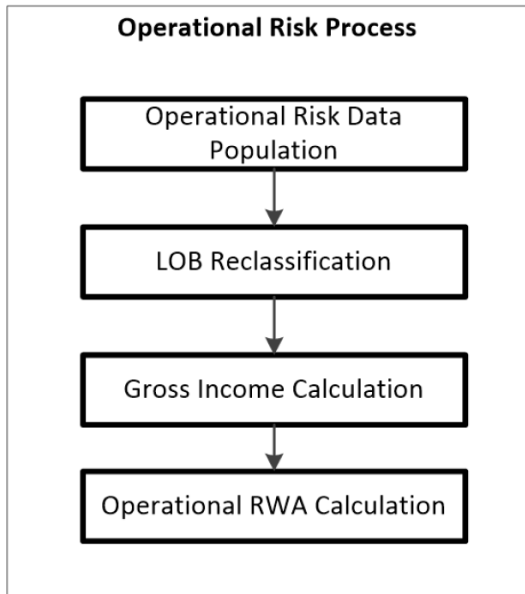
Operational RWA run is executed with the Capital Consolidation process. For more information on the Operational RWA computation, see Operational RWA.

For example: LOB Reclassification and Gross Income Calculation sub process are detailed as separate processes under the Operational RWA section of this document.

7.1.1.1.6 Process Flow for Capital Structure
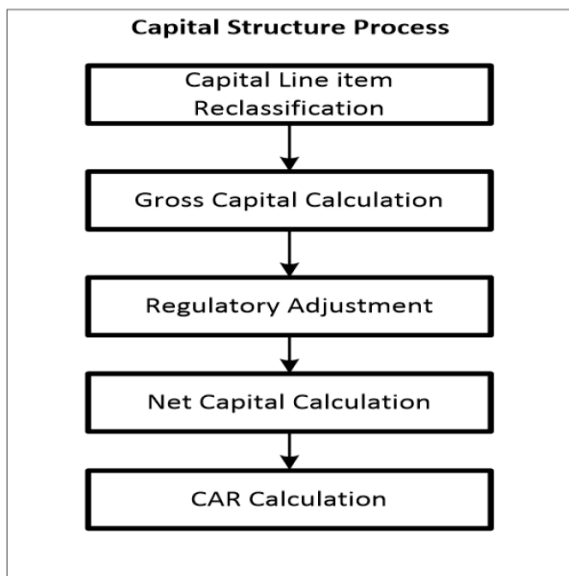
Capital Structure is executed with Capital Consolidation, Credit Risk, Market Risk, and Operational RWA processes.

For more information on the sub processes of Capital Structure, see Capital Structure.

For example: 'Gross capital calculation' mentioned in the preceding process flow is explained in detail under 'Gross Capital Calculation for T1, T2 and T3' sub process section of the Capital Structure in this document. Likewise, 'Regulatory Adjustment' and 'Net Capital Calculation' is detailed under 'Regulatory Adjustment to Tier 1 and Tier 2' and 'Calculation of Net capital' sub process section of the Capital Structure, in this document.

7.1.1.2 Credit RWA

The application supports the computation of Credit Risk Weighted Assets (RWA) as per the guidelines laid out by China Banking Regulatory Commission (CBRC).

7.1.1.2.1 Non Securitization – Foundation IRB / Advanced IRB Approach

The application follows the Foundation Internal Ratings Based (FIRB) Approach and Advanced Internal Ratings Based (AIRB) Approach to compute Credit RWA for Non Securitization exposures.

Foundation IRB covers the following functional areas:

- Banking Book Products
- Securities Financing Transactions
- Over the Counter Derivative Products
- Credit Risk Mitigation

Banking Book Products

All the credit risk exposures are identified by the application, through their product type, counterparty type, and the corresponding derived asset classes. A sample list of products types, party types, mitigant types, and credit ratings are pre-defined in the application. However, this list and naming convention differs from one bank to another. Hence, the application re-classifies the bank's information on product type, party type, credit ratings and so on, into standard data as per the accord. The application reclassifies the bank's product types and party types to Basel standard product and party types. Based on standard Basel product and party types, it forms an asset class for each exposure. For equity exposures, the asset class is formed on the basis of equity type and Basel product type.

The exposure amount and other amount attributes that are provided as an input in the stage tables are in the natural currency (currency of the exposure) is usually different for exposures across different countries. The application converts this natural currency into reporting currency for processing to occur in a single currency.

Some exposures can be hedged against credit risk through various mitigants like guarantors, collaterals, credit derivatives, and so on. These provide mitigation to credit risk and should be considered while computing Credit RWA as per CBRC norms. Hence, the application calculates pre-mitigation risk weighted assets amount and post-mitigation risk weighted assets amount.

The application calculates the correlation factor using the formula specified for each asset class. Using the Correlation factor, Probability of Default (PD), and Loss given Default (LGD), the application calculates the pre-mitigation capital charge for each exposure. This value signifies the capital charge the

bank has to maintain for each exposure before considering any mitigation effects.

The application calculates pre-mitigation exposure at default amount and risk weight for each exposure. Further, it computes Pre-Mitigation Risk Weighted Assets (Pre CRM RWA) by multiplying the EAD by the risk weight. The risk weight is arrived at by multiplying Pre-Mitigation Capital Charge with 12.5.

Through the Credit Risk Mitigation (CRM) process, the bank considers the mitigation effect. The application checks for mitigant eligibility based on CBRC specifications. It assigns a haircut to each mitigant based on their currency, residual maturity, and expected volatility in their market value. FOREX and Maturity haircuts consider any currency and maturity mismatches that the mitigants have with the exposures that they are covering. Volatility haircut considers the change in the mitigation effect that arises due future fluctuations in the mitigant's value. The application allocates mitigants to exposures based on the optimizer function and later the capital charge for each mitigant is calculated by the application.

The application calculates the Post Mitigation Risk Weighted Assets Unexpected Loss (Post CRM RWA UL) and Post Mitigation Risk Weighted Assets Expected Loss (Post CRM RWA EL). Some Credit Risk exposures that fall under the category of internal transactions like holding own subsidiaries shares or investment in its capital, reciprocal cross holding, and so on, are treated separately under capital structure.

Process Flow for Banking Book Products
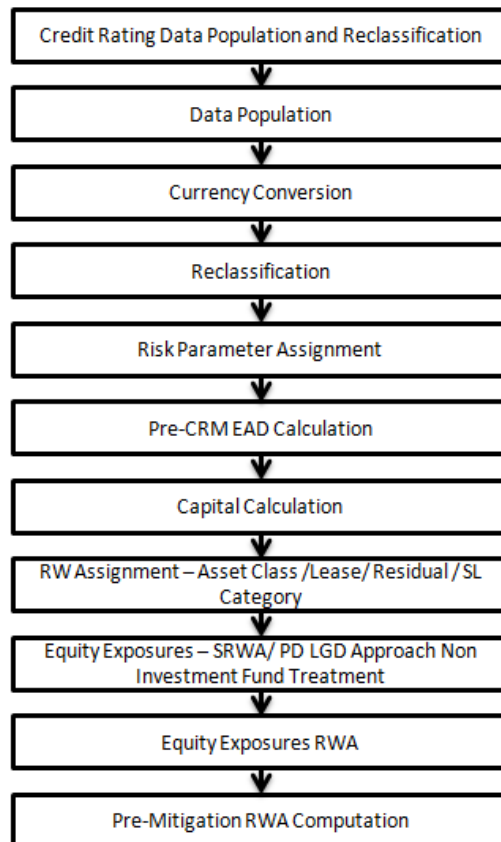
Credit Rating Data Population and Reclassification

Pre-processing Steps

Data for credit ratings is to be provided as an input in the following rating specific tables:

- Accounts Rating Table (**STG_ACCOUNT_RATING_DETAILS**)

  Ratings of all Credit Risk Non Securitized Exposures, Securitized Exposures and Securitized Positions are captured in this table.

- Instrument Rating Table (**STG_INSTRUMENT_RATING_DETAILS**)

  Ratings for all market risk exposures, investment exposures subject to credit risk (one that are in **STG_INVESTMENTS**), and mitigants, are required to be populated.

- Party Rating Table (**STG_PARTY_RATING_DETAILS**)

  Credit Rating for all customers and issuers are required to populated

- Sovereign Rating Table (**STG_SOVEREIGN_RATING_DETAILS**)

  Credit Rating for all countries are required to populated

Processing Steps

The application reclassifies the rating information to standard ratings.

The rating reclassification lookup table (**FSI_RATING_CLASSIFICATION**) is used to reclassify all the bank ratings to their standard ratings. Ratings are populated from the stage tables (**STG_PARTY_RATINGS_DETAILS)** to FSI tables (**FSI_PARTY_RATING_DETAILS)** using the lookup table to obtain the reclassified rating.

Note: In the **STG_PARTY_RATINGS_DETAILS** table ensure that the following columns are mandatorily populated with data:

- Rating source code (**V_RATING_SRC_CODE**)

- Party Code (**V_PARTY_CD**)

- Purpose (**V_PURPOSE**): In this field whether the rating is a domestic rating or foreign rating should be indicated. If any other rating is provided, then the exposure is considered as unrated.

- Rating Code (**V_RATING_CODE**)

Amongst the multiple standard ratings assigned to an exposure, the worst rating is selected and assigned against the exposures. The standard ratings for all asset classes and sovereign rating is assigned separately.

Data Population

Pre processing Steps

Credit Risk exposures data is populated in the application for all the Product Types through the respective input tables known as Product Processors. The important categories of Credit Risk Non Securitization Exposures, along with their respective table names that are used to input data are as follows:

Product	Source Product Processor
Bills	STG_BILLS_CONTRACTS
Credit Cards	STG_CARDS
Swaps	STG_SWAPS_CONTRACTS
Futures	STG_FUTURES
Guarantees	STG_GUARANTEES
Investments	STG_INVESTMENTS
Lease Contracts	STG_LEASE_CONTRACTS
Letters of Credit	STG_LC_CONTRACTS
Line of Credit	STG_CREDIT_LINE_DETAILS
Commitment Contracts	STG_COMMITMENT_CONTRACTS
Loans	STG_LOAN_CONTRACTS
Money market instruments	STG_MM_CONTRACTS
Overdraft	STG_OD_ACCOUNTS
Options	STG_OPTION_CONTRACTS
Re purchase contracts	STG_REPO_CONTRACTS
Equity Exposures	STG_INVESTMENTS
Underlying Exposures for Derivatives, Securitization and Covered Bonds	STG_UNDERLYING_EXPOSURES
Underlying Exposures for Derivatives (if Derivative is either a cleared transaction or an instrument, and the underlying reference asset is an instrument)	STG_UNDERLYING_MASTER/ STG_UNDERLYiNG_DTL
Underlying Exposures for Derivatives (if Derivative is not a cleared transaction or an instrument, or the underlying reference asset is not an instrument)	STG_UNDERLYING_EXPOSURES
Underlying Exposure for Mutual Fund / CIU	STG_FUND_CIS_COMPOSITION
Underlying Exposures for Repo contracts	STG_PLACED_COLLATERAL / STG_MITIGANTS
Credit Derivatives	STG_CREDIT_DERIVATIVES
Fixed Assets	STG_FIXED_ASSETS_DETAILS

Processing Steps

Stage data from the Product Processors or other stage tables is populated in the required tables. Information from all Product Processors data is populated in a common Fact table for all Non Securitized exposures (**FCT_NON_SEC_EXPOSURES**), except equity data which is first populated in the respective equity table (**FCT_EQUITY_EXPOSURES**) and is then (after risk weighing) populated in the common Fact table for all Non Securitized exposures. For more information on the list of columns to be populated within each table, see *Download Specifications* document.

Shareholding Percent Multiplication

The exposure amount which is a part of the input data (Product Processors) is the exposure amount for a solo entity. However, for a consolidated Run, the parent exposure is considered only by the shareholding percentage, based on the following calculation:

Exposure Amount   X   Share Holding Percent = Updated Exposure Amount

Where

Share holding percent is allotted a value by the Rule **Cap Consl Effective Shareholding Percent for an Entity** in the process - **Capital Consolidation**.

This assignment uses the Rule **<Attribute > Shareholding Percent Multiplication**. Shareholding percent multiplication is computed for the following attributes:

- Outstanding Principal
- Current Exposure Amount
- Undrawn Amount
- Exposure Market Value
- Exposure Accrued Interest
- Provision Amount
- Write Off Amount
- Notional Principal and Contract Amount for OTC products

Currency Conversion

The application converts the amount attributes, which are in natural currency, to reporting currency which is used for further calculations. The column names suffixed with '_ncy' are in the natural currency and are multiplied by currency conversion factor to populate values in the reporting currency. The Rule **Reporting Currency Code Assignment** assigns the reporting currency. For more information on Currency Conversion, see Exhibit 4 in *Annexure A: Key Concepts.*

NOTE: The data populated in the Product Processor is expected in natural currency of the exposure.

Reclassification

The application reclassifies the banks' product types and party types to standard product and standard party types. Based on standard product and party type, it forms an asset class for each exposure. Equity is reclassified by the application in a separate Rule. Similarly, the application does reclassification for

mitigant on the basis of its mitigant types and reclassifies it to standard mitigant types.

Product Type Reclassification

Product types used by the reporting bank as input data are reclassified to standard product types as recommended in the CBRC accord. After reclassification, the product types are stored as standard product types.

For Example: Unsecured Bonds is reclassified as Debt Securities. A separate Rule is pre-defined in the application to reclassify lease residual and equity products.

Party Type Reclassification

Similar to the product type, the customer type and issuer type (which are stored as counterparty type) are also reclassified to standard counterparty type. The Basel application is designed to include customer type, issuer type, and legal entity type in a single table (**STG_PARTY_MASTER**) and these are also reclassified together. Party type reclassification Rules reclassifies for customer types and issuer types.

For Example: Individual is reclassified as Retail.

This Rule is defined in the lookup table so that the same reclassification can be used across exposure, equity, and the mitigant tables. Issuer of equity is reclassified separately by the application.

Asset Class Reclassification

On the basis of standard product type and standard counterparty type, an asset class is formed by the application. This asset class is used for data processing.

For example: Standard counterparty is large corporate, the asset class is large corporate, except when exposure has product types like cash and real estate. For standard product type gold, the asset class is Gold, except that when standard counterparty type is Central Counter Party, the asset class is Central Counter Party. For standard counterparty type Insurance Entity and Standard product type as Line of Credit, the asset class is Corporate Non SME Non SL. Similarly, Corporate Non SME can be reclassified to Corporate SME based on the Total Annual Sale and Corporate SME can be reclassified to 'Other Retail' based on the counterparty Total Annual Sale, Counterparty Total Exposure to the bank, and Total Asset.

Asset class for all equity products is reclassified on the basis of equity type and standard product type.

Mitigant Reclassification

For mitigants the application reclassifies the mitigant type to the standard mitigant type like the debt securities, credit derivative, cash, and so on. It also reclassifies the mitigant issuer type to the standard mitigant issuer type like Banks, Corporate, and so on. The reclassification tasks are present in the **Mitigant Reclassification** sub process.

Risk Parameters Assignment

The application assigns risk weight parameters of PD, LGD, and maturity to all exposures.

For senior claim exposures, LGD is assigned as 0.45 and for non senior claim exposures LGD is assigned as 0.75. For exposures falling under retail asset class, irrespective of the seniority, the LGD has

a floor value of 0.1. The FIRB approach assigns the pre-mitigation LGD to all purchase receivables in a separate Rule. PD has a floor value of 0.0003 for all asset classes, except for defaulted exposures where the value is 1.

Pre-Mitigation Capital Calculation

Pre-mitigation capital is calculated for all asset classes using the Correlation factor, PD, and LGD, where correlation factor is calculated for each asset class on the basis of PD. Capital is calculated for defaulted exposures and failed trades using a separate Rule. For defaulted exposures, the application uses two inputs - LGD and Best Estimated Expected Loss of a Bank. For failed trade transactions, the capital requirement is assigned by the application on the basis of number of failed business days.

Credit Conversion Factor (CCF)

This is applied to all off-balance sheet exposures. The CCF applied values are 0.2, 0.5, and 1. The various factors on the basis of which the CCF is applied are product type, type of facility (whether it is cancellable or not), and the maturity of exposure.

Pre CRM Exposure at Default (EAD)

EAD is calculated for all asset classes based on the following attributes:

- Current Exposure Amount
- Off-Balance Sheet Drawn CCF Percent
- Provision Amount
- Undrawn Amount
- CCF Percent
- Exposure Accrued Interest
- Write Off Amount

Of the total exposure amount, the exposures can have drawn amount and undrawn amount. The drawn amount is the direct credit exposure and undrawn amount can become a future exposure when that amount is drawn. Therefore, EAD related to undrawn amount is calculated by multiplying CCF percent with the undrawn amount. The application calculates the EAD related to drawn amount using the following attributes:

- Exposure Accrued Interest
- Off-Balance Sheet Drawn CCF Percent
- Write Off Amount
- Provision Amount
- Current Exposure Amount

Capital Consolidation

If the reporting bank has exposure to one of its own subsidiaries, then that exposure is classified as internal exposure. Each of the internal transactions, that is, the transaction between the parent and its subsidiary is marked as a deduction line item. The deduction is processed as part of the CBRC Capital

structure in the capital structure processing and all the internal transaction are eliminated from the RWA calculation.

Approaches Followed in Capital Consolidation

The three approaches followed by the Capital Consolidation are:

- **Consolidation Approach(CONSL)**: Under this approach, all the entities of the bank's organizational structure are considered. This includes all the entities/subsidiaries that belong to the same jurisdiction. All the exposures of the entities in the organizational structure are considered for computing risk weighted exposures, except the intra-group exposures.

- **Aggregation Approach(AGG)**: This approach is similar to the Consolidation approach but is used in the cases, where some of the entities that are part of bank's organizational structure belong to a different jurisdiction. The capital requirement of the affiliate is computed as per the jurisdiction that it is subject to and is then aggregated with the rest of the group's capital requirement. Intra-group exposures are not excluded in this approach.

- **Deduction Approach(DED)**: This approach is used in the case where some of the subsidiaries/entities that are part of bank's organizational structure are excluded from consolidation. In such a scenario, the regulatory investment in the excluded subsidiary attributable to the rest of the group are deducted from the consolidated capital requirements.

RW Assignment for Asset Class/ Lease Residual and SL Category

Risk weight is calculated for all the asset classes by multiplying the capital charge by 12.5. If the lease residual indicator is 'Yes' for any asset class, then a RW of 100% is assigned. Specialized lending category is assigned a RW based on the supervisory slotting criteria.

Equity Exposures – SRWA/ PD LGD Approach Non Investment Fund Treatment

Equity Exposures are treated in the Equity Exposures (**FCT_EQUITY_EXPOSURES**) table where EAD is calculated using the post off-set amount. This is further deducted by the exposure excess investment amount. The excess investment amount is to be provided as an input. For more information, see the *Download Specifications* document.

Equity Exposure can be treated using the Simple Risk Weight Assignment (SRWA) method, PD/LGD approach, or Internal Model Method. You can define the approach to be used to calculate the RWA for equity approach. If PD/LGD approach is selected Correlation, Capital charge and RWA is calculated. If SRWA is the selected RW is calculated based on equity being Public Traded or Private traded. If IMM is selected, then the Capital Charge Derived from VaR Model is taken as input and RW is assigned.

Equity Exposures RWA

Equity Exposure RWA is calculated by multiplying the risk weight with the Equity EAD. Equity data is processed in Equity Exposures (**FCT_EQUITY_EXPOSURES**) table. From Equity Exposures (**FCT_EQUITY_EXPOSURES**), data is populated to Fact Non Sec Exposures (**FCT_NON_SEC_EXPOSURES)** table.

Pre-Mitigation RWA Calculation

For all asset classes, the pre-mitigation RWA is calculated using the RW and pre-mitigation EAD amount.

Credit Risk Securities Financing Transactions (SFT)

Securities Financing Transactions includes repo style transactions, margin lending, security financing borrowing, and so on. The SFT EAD calculation follows two methodologies as follows:

- Collateral Haircut Approach
- Simple VaR Approach

Currently, the application supports Collateral Haircut approach only.

For all SFT contracts which have a mitigant mapped, the application computes Credit Risk Mitigation (CRM) based on the RWA approach selected by the bank. For Foundation IRB, the mitigation is based on IRB capital calculation as per the guidelines on Credit Risk.

Process Flow for Securities Financing Transactions (SFT)

SFT EAD calculation is computed in the sub process **SFT Exposures RWA - Comprehensive Approach**.

SFT Underlying Data Population

The two data elements present in the SFT transactions are captured as follows:

Firstly, the parent transaction is captured in the Repo contracts table (**STG_REPO_CONTRACTS**) and secondly the underlying information, on which the parent transaction is built, is captured separately in the mitigant table **(STG_MITIGANTS)** or Placed collateral staging table **(STG_PLACED_COLLATERAL)**, depending on the product type**.**

The underlying data is identified by using the Exposure Mitigant Mapping Staging table **(STG_EXP_MITIGANT_MAPPING)**, wherein this is linked to the data in the repo contracts staging table, for any collateral which is provided to the repo contracts.

And the underlying data for any collateral placed with the counterparty, is identified by using the Account placed collateral Mapping Staging table **(STG_ACCT_PLACED_COLL_MAP)**, wherein this is linked to the data in the repo contracts staging table.

Volatility Haircut Assignment for SFT Underlying

This is computed by the following Rules:

- Exposure Volatility Haircut Assignment for Supervisory Haircut
- CRM Exposure Volatility Haircut for Equity and Mutual Fund
- Exposure Volatility Haircut Assignment - Scaling Up for "Capital Market Driven" or "Repo Style" transaction types
- Exposure Volatility Haircut Assignment - Own Estimate
- FOREX Haircut.

Pre-Mitigation Post Volatility Haircut EAD Amount Calculation for Exposures

For SFT transaction, the application calculates EAD for the parent exposure based on the underlying information. The underlying exposures are moved to SFT Underlying (**FCT_SFT_UNDERLYING)** table from Fact Non Sec Exposures (**FCT_NON_SEC_EXPOSURES)**. If the underlying exposures are financial instruments and FOREX haircut, where the underlying and the parent contract are in different currency, then each underlying exposure is assigned a volatility haircut based on the haircut application criteria. Each SFT underlying exposure, adjusted for haircut (EAD + haircut value), is added as EAD for the parent contract.

Nettable Pool Data Population

The application nets SFT contracts based on the same customer, common netting agreement identifier, transaction being Repo/Re-Repo or Margin lending, product book being trading or banking, and so on. Margin lending transaction for SFT also follows the same EAD calculation methodology however Repo/Reverse Repo and margin lending are not netted together.

Pre-Mitigation Risk Weighted Assets Unexpected Loss Calculation for the Pool

Pre-Mitigation Risk Weighted Assets Unexpected Loss is calculated for the pool as EAD multiplied by risk weight or capital * 12.5.

Over the Counter Derivative Products

CBRC has introduced Counterparty Credit Risk (CCR) wherein the counterparty defaults before the final settlement of a transaction. Unlike the firm's exposure to credit risk arising from a loan, the CCR creates a bilateral risk of loss. Market value of the transaction can be positive or negative to either party in the transaction at different points in time, till the maturity or closure of the transaction. The market value of the transaction depends on the movement of the underlying risk factor. CBRC committee has proposed rules to calculate the EAD or exposure amount for the instrument with CCR.

NOTE: All OTC derivatives and repo products are part of the CCR computation. Also, all the trades with Central Counterparty (CCP) are assigned a zero risk weight.

The application's treatment for the instrument with CCR is divided into three categories:

- Exposure at Default (EAD) Approach
- Risk Weighted Asset (RWA) Approach
- Credit Risk Mitigation (CRM) Approach

Process Flow for Over the Counter Derivatives – EAD Approach
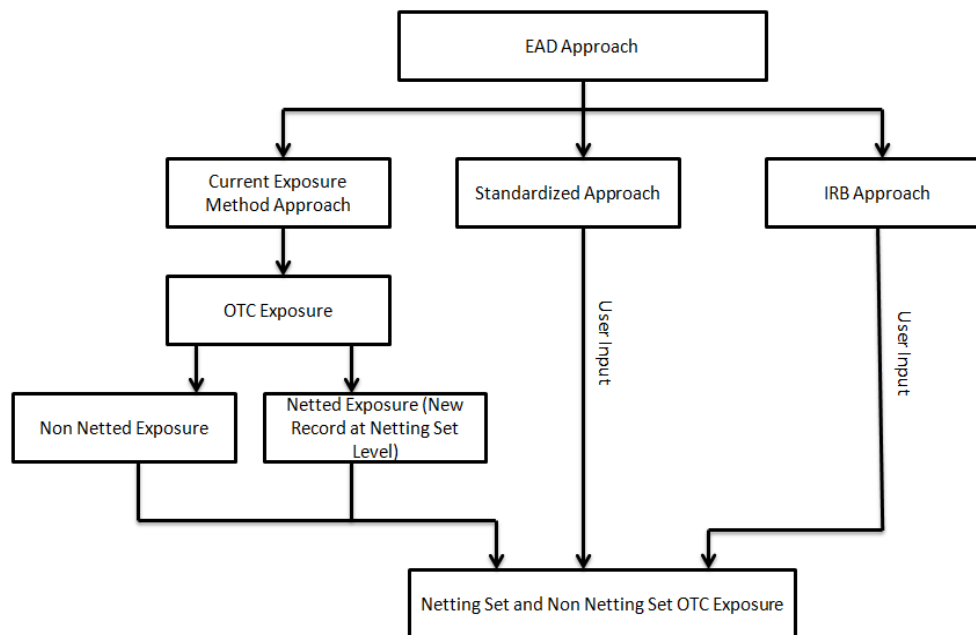
Exposure amount subject to CCR is estimated by three different approaches as described in the CBRC accord. The application calculates EAD with Current Exposure Method (CEM) as recommended in the CBRC accord. For other approaches, that is, the Standardized Approach and Internal Rating Based (IRB) Approach, the application expects the exposure amount of the transaction as direct user input for further processing.

Current Exposure Method

The application calculates the EAD for two different sets of the records with a different methodology as prescribed in the CBRC Accord which are Netting agreement Records and Non Netting agreement Records.

OTC Exposure

For the calculation of EAD, the exposure amounts from the exposure table are moved to a different table for OTC and REPO transaction. The application also creates a new single record for each netting agreements in the data.

Non Netted Exposure

To compute EAD for non netting records, the application does the following:

- Total replacement Cost: Greater than Mark to Market or zero for all the contracts

An amount for potential future credit exposure is calculated based on the notional and multiplied by the add-on factor based on the underlying type of the contracts. Add-on is assigned based on the following attributes as represented in a tabular format.

	Interest Rates	FX and Gold	Equities	Precious Metals Except Gold	Other Commodities
One year or less	0.00%	1.00%	6.00%	7.00%	10.00%
Over one year to five years	0.50%	5.00%	8.00%	7.00%	12.00%
Over five years	1.50%	7.50%	10.00%	8.00%	15.00%

The Rule: **Non Sec Add - on Estimation,** assigns the add-on percent in the processing Non Securitization table**.** Data is populated to Nettable Pool (**FCT_NETTABLE_POOL**) table by the T2T: **NETTABLE_POOL_OTC_POPULATION_OTHERS**

Netted Exposure

To compute EAD for the netting agreement records, the application does the following:

- Total replacement Cost: Greater than Mark to Market or zero for all the contracts.

An amount for potential future credit exposure is calculated based on the notional and multiplied by the add-on factor based on the following formula:

$$A_{net} = 0.4 * A_{Gross} + 0.6 * NGR * A_{Gross}$$

The application creates new records for netting agreement and data is populated into the OTC Exposure table. The application selects all the records with the following attributes which are similar to computing the netting agreement exposure:

- Trades with Entity
- Customer
- Product Level – All OTC trades
- Netting Agreement
- Book Code: Trading or Banking
- Long Settlement transaction Flag
- GAAP Code

The following T2Ts are used to create and populate the OTC exposure table:

- NETTABLE_POOL_OTC_POPULATION
- NET_POOL_EXPOSURE_CREATION

The add-on percent netting agreement is achieved by using the following calculations:

- Gross Current Exposure Calculation for OTC Derivatives

- Gross Potential Exposure Calculation for OTC Derivatives

- Net Current Exposure Calculation for OTC Derivatives

- Net Gross Ratio Calculation for OTC Derivatives

- Net Potential Exposure Calculation for OTC Derivatives

Exposure at default for all instruments with CCR risk is calculated using the following calculations:

- Exposure Calculation for OTC Derivatives

Risk Weighted Asset (RWA) Approach

RWA calculation for the instruments which are subject to CCR risk is similar to RWA calculation of other instruments.

Credit Risk Mitigation (CRM) Approach

CRM calculation for the instruments which are subject to CCR risk is similar to CRM calculation for other instruments.

Key Data Elements

Key data elements to be noted are listed in this section. To view the complete list of tables to be populated, see the *Download Specification* document.

For instruments participating in netting agreement, the Nettability flag should be set as 'Y'.

Instruments with the same agreement code are netted in the same netting agreement. The application handles cross product and product netting with respect to a netting agreement.

Credit Risk Mitigation

The application handles multiple mitigants for CRM such as financial collateral, on-balance sheet netting, guarantees, credit derivatives, and so on. CRM reclassification is computed by reclassifying collateral and issuer to standard collateral and issuer type. The mitigant is identified as eligible or not, based on the eligibility rules for CRM.

Process Flow for Credit Risk Mitigation

```
┌─────────────────────────────────────┐
│        Mitigant Eligibility          │
└─────────────────────────────────────┘
                 │
                 ▼
┌─────────────────────────────────────┐
│           PD/LGD for CRM             │
└─────────────────────────────────────┘
                 │
                 ▼
┌─────────────────────────────────────┐
│      Mitigant Haircut Assignment     │
└─────────────────────────────────────┘
                 │
                 ▼
┌─────────────────────────────────────┐
│     CRM Capital Charge Calculation   │
└─────────────────────────────────────┘
                 │
                 ▼
┌─────────────────────────────────────┐
│    Allocation of Mitigants to Exposures │
└─────────────────────────────────────┘
                 │
                 ▼
┌─────────────────────────────────────┐
│      Post CRM RWA Computation        │
└─────────────────────────────────────┘
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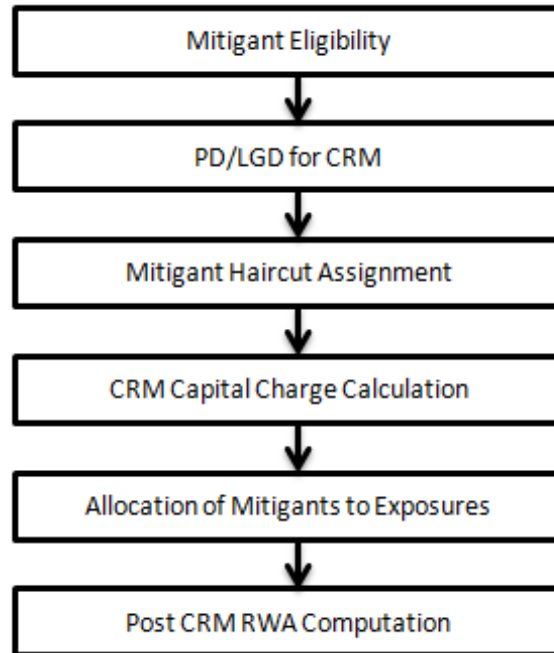
Mitigant Eligibility

For the comprehensive approach, the credit rating of the mitigant of the collateral is considered for all mitigant types issued by all party types, while deciding whether the mitigant is eligible for a particular exposure or not. The application has pre-defined Rules to perform eligibility checks. Separate eligibility rules exist, for mitigants types such as equity, mutual funds, or debt security. For the remaining mitigant types, a mitigant is marked as eligible, only if its credit rating is better than the exposure to which it is providing protection and is classified as senior in position.

Mitigant eligibility is also checked based on the original and residual maturity of the collateral. Collateral is classified as eligible, if its original maturity is more than 1 year and residual maturity is more than 3 months.

PD/LGD for CRM

The application assigns the PD and LGD to the mitigants as follows:

For financial collateral using the FIRB approach, the PD used is that of the exposure that the collateral is covering and the LGD used is 0. For other mitigants in the form of guarantees or credit derivative, the PD used is that of the mitigant (expected as down load from bank) and LGD used is that of the exposure that the mitigant is covering.

For LGD assignment, the application also takes care of the minimum collateralization effect as stated in the CBRC guidelines. Additionally, if there is an over collateralization amount, then the application adjusts the mitigant value based on the over collateralization percentages, as stated in CBRC guidelines.

In the AIRB approach, the bank needs to provide the PD or LGD data at a mitigant level. However, the application offers the flexibility to the reporting bank to include the mitigation effects at exposure level, if the bank can model the PD or LGD of the exposure, considering the mitigation effects. In this case, the bank must not provide mitigant data separately as they have already factored its effects at the exposure level PD and LGD.

Effective Asset Class

The asset class for the covered portion of the exposure undergoes asset reclassification, where based on the issuer of the mitigants, the asset class is assigned.

Mitigant Haircut Assignment

The application computes for three kinds of mitigant haircut, which are volatility haircut, FOREX haircut, and maturity mismatch haircut. Volatility haircuts are calculated and the amount of exposure to the counterparty and the value of collateral or mitigant are adjusted to account for any future fluctuations in the market value. After the adjustment, the application provides volatility adjusted amounts for the exposure (higher than original exposure amount) and the collateral (lower than original amount).

If the exposure and collateral are in different currencies, then the application does an adjustment by applying the FOREX haircut. If the residual maturity of the CRM is less than that of the underlying credit exposure, then a maturity mismatch is applied. If maturity mismatch is applied and the CRM has an original maturity of more than one year, then maturity mismatch haircut is applied to adjust the value.

The two methods for assigning volatility haircut are as follows:

- Supervisory Haircut
- Own Estimate

In the supervisory haircut method, the application assigns volatility haircut based on issuers, issuer's ratings, mitigant's residual maturity, and type of mitigant, as stated in the CBRC accord. In Own Estimate method, the application considers the standard transaction type of the exposure. Standard transaction types are stored in the standard transaction type dimension table. The various transaction types available are capital market driven, repo style, and secured lending. The volatility haircut is assigned as per the CBRC guideline.

The FOREX haircut is also assigned based on these transaction types as per CBRC guidelines. Only eligible mitigants are considered for haircut assignment and further processing. The eligible mitigants data flows from the mitigants table to sub exposures table.

Haircuts, as mentioned in the CBRC accord, assume a holding period of 10 days. However if the mitigant's holding period is more than 10 days, then the application scales up the haircut value to reflect the correct value as per the holding period.

CRM Capital Charge Calculation

Mitigant Correlation Factor

Similar to Non Securitization exposures, correlation factor for collaterals or mitigants is also calculated for mitigants belonging to all asset classes based on their PD.

Capital Charge Calculation

Capital charge is calculated for all mitigants using their effective maturity, correlation factor, PD, LGD, and maturity adjustment value.

Allocation of Mitigants to Exposures

This process loads the mitigant mapping data from the stage table to its corresponding processing table. Mitigants are allocated to the respective exposures that they are covering and the application also defines the amount of the bank's exposure the mitigant is covering. Shareholding percent is also applied to the mitigant amounts. The application has a pre-built optimizer for optimum allocation of mitigants to the exposures for CRM purposes. An Optimizer allocates mitigants to exposures to attain the most favorable EAD output. One-to-One, Many-to-One, and Many-to-Many mapping of mitigants are handled in an efficient manner involving storage of intermediate computations for traceability. For more information on Pooling and Optimizer, see Exhibit 1 and Exhibit 3 in *Annexure A: Key Concepts*.

All mitigants which are eligible and mapped to an exposure are populated to another table where each exposure is broken down by mitigant types. This includes an additional row treating the exposure as having covered and uncovered portion. The covered factor and uncovered factor is also populated in this table.

The application uses linear programming logic to allocate the mitigants to the exposures. Pooling identifies the exposure and mitigant data from the sub exposures table. Exposure identifier and mitigant identifier are the attributes on which Pooling is performed. It assigns the pool ID for each exposure-mitigant combination. Based on these pool ids, the optimizer allocates a covered factor to exposures.

> **NOTE:** **NOTE:** A tag <ALTER_STATEMENTS> is present in Optimizer_Config.xml. This statement is used to enable the parallel Data Manipulation Language (DML) for optimizer. This is tag is disabled by default, due to which a warning appears as follows which is printed in the Optimizer log:
> "Error: **Could not find node ALTER_STATEMENTS in the xml**"
> The administrator can uncomment this tag to enable parallel DML for the optimizer.

Post-CRM RWA Computation

Pre mitigation EAD is divided into Post Mitigation EAD for the covered portion and Post Mitigation EAD for uncovered portion. Covered portion is the portion of the exposure covered by the mitigant and uncovered portion is portion of the exposure not covered by the mitigant. For multiple mitigants covering one exposure, more than one record is present for the covered portion of that exposure. Post mitigation RWA Unexpected Loss (Post CRM RWA UL) is calculated by multiplying post mitigation EAD for and its capital required UL with 12.5. Post mitigation RWA Expected Loss (Post CRM RWA EL) is calculated as the product of PD, LGD, and post mitigation EAD amount with 12.5.

7.1.1.2.2 Securitization – Foundation IRB / Advanced IRB Approach

CBRC guidelines differentiate the Credit Risk computation of Securitized exposures from Non Securitized exposures. As securitized exposures are part of off-balance sheet transactions, it follows a waterfall cash flow mechanism unlike the other exposures. Hence these exposures are treated differently. Due to the economic crisis of 2008, the Basel Rule has categorized securitized exposures into securitized and re-securitized exposures.

Securitized exposures are exposures which are issued out of a pool of underlying exposures for the transfer of risk. Re-securitized exposures are the exposures which are issued out of a pool of underlying exposures which constitutes non-securitized exposures and some portion of securitized exposures. The application is capable of handling both securitized exposures and re-securitized exposures. It also handles the calculation for the originator and the investor bank roles. At a broad level, there are two categories of Investors:

- An Investing Bank who has invested heavily in securitization.
- An Investing Bank who has invested minimal in securitization.

For both the investors, the data is expected in the Stage Underlying Exposures (**STG_UNDERLYING_EXPOSURES**) for the underlying of the pool, Total Pool Level attributes in the Stage Pool table (**STG_SECURITIZATION_POOL**), Tranche Level attributes in the Stage Tranche table (**STG_SECURITIZATION_TRANCHE**), and the Exposure Level Attributes in the respective product processor (PP) tables.

For an originator, the data is expected in the same manner as the Investor, except for the Underlying Exposures. The underlying exposures of the pool are expected in the respective PP tables, depending on the product type of the underlying exposures.

If the exposure is a credit protection in the form of guarantee, it is expected in the Stage Guarantees table (**STG_GUARANTEES**), and if it is a credit derivative, it is expected in the Stage Credit Derivatives table (**STG_CREDIT_DERIVATIVES**). If it is a regular investment in the Tranches by an investing bank, or it is part of the mandate for retention in the pool or tranche for an originating bank, the data is expected in the Stage Investments table (**STG_INVESTMENTS**).

For exposures being a facility like liquidity facility, or servicer cash advance, the exposures are expected in the Stage Commitment Contracts table (**STG_COMMITMENT_CONTRACTS**).

CBRC guidelines specify two broad approaches for the calculation of the capital charge for the Securitization exposures:

- Standardized Approach
- IRB Approach
  - o Ratings Based Approach
  - o Internal Assessment Approach
  - o Supervisory Formula Approach

For CBRC jurisdiction, the application computes the IRB approach only. For a few procedures, the calculations pertaining to the underlying exposures of the Securitization transaction are required before processing the Securitization exposures. This change has an impact on the Securitized exposures and the Non Securitized exposures.

Process Flow for Securitization – Foundation IRB Approach

The application handles the IRB Approach of the Securitization Exposures as follows:

Credit Rating Data Processing

All the rating information of the exposures and the mitigants are populated from the staging tables to the processing tables. The exposure and the tranche rating information are captured in the account rating (**STG_ACCOUNT_RATING_DETAILS**) tables and the mitigants rating information are captured in the instrument rating details (**STG_INSTRUMENT_RATING_DETAILS**).

Mitigant Data Population

The mitigants data are populated from the staging table to the processing table. The exposures which are mapped to the mitigants are captured and populated from the staging table to the processing table.

Sec Data Population

The data pertaining to the pool, tranche, and exposures are populated from the staging tables to the processing tables. The underlying exposures data are captured in the respective Product Processor tables (and for these the process pertaining to the non-securitization exposures is followed)

Sec Reclassification

The application uses standardized data for all kinds of calculations (product types like eligible liquidity facility, bank role like originator, pool type like mortgage backed securities, and so on). Before any calculation, the application reclassifies the bank specific data to standard data, similar to the terms used in the CBRC guidelines. It reclassifies the bank role to the standard bank role of an originator or investor. The other bank roles like sponsor, credit protection provider, and so on are reclassified into originator, investor, and so on respectively. The application also reclassifies the pool type to the standard pool type like credit cards receivable pool, auto loans, and so on. It also reclassifies the product type to the standard product type like Mortgage Backed Securities (MBS), eligible liquidity facility, and so on.

Sec Approach Selection

The application assigns the appropriate approach to the exposures, based on the criteria specified in the CBRC guidelines. The application assigns any of the three approaches under the IRB process:

- Sec-Internal Assessment Approach: If exposures are qualified for SFA approach (SFA Qualified flag is 'Y') and have more than one rating, then the application assigns the Sec-Ratings Based Approach to that exposure.

- Sec-Ratings Based Approach: The application assigns the Sec-Ratings Based Approach if there is at least one rating assigned to the exposures.

- Sec Supervisory Formulae Approach: The application assigns the Sec-Supervisory formulae approach to originator exposures if the exposure is qualified for the SFA approach (SFA Qualified flag is 'Y') and there is one or no external ratings assigned for that exposure.

For Asset Backed Commercial Paper (ABCP) exposures having internal ratings, the application assigns the Sec-Internal Assessment Approach. For exposures not qualifying for any of the approaches, the application assigns the Sec-Internal Ratings Based Approach. This approach selection is handled in the Sec Approach selection sub-process.

Mitigant Reclassification

For mitigants, the application reclassifies the mitigant types to the standard mitigant types like the debt securities, credit derivative, cash, and so on. It also reclassifies the mitigant issuer type to the standard mitigant issuer type like banks, corporate, and so on.

Sec Pre CRM Computations

The application calculates the Pre-CRM RWA for the exposures by multiplying the Pre-CRM EAD with the risk weight of the exposures. This is handled in the **Pre-CRM Computations** sub process.

Pre-CRM EAD Computation

The application assigns the Credit Conversion Factor (CCF) to the off-balance sheet items as specified by the CBRC guidelines. The CCF percentages are assigned based on the product type (like the Eligible Liquidity Facility) and applicable ratings. The CCF Percentages are also assigned to the exposures based on whether any early amortization provision is applicable to the transaction. In such cases, the CCF assignment is based on the early amortization type (controlled or uncontrolled), the pool type, and the ratio of three month average excess spread to the trapping point. Further, the application computes the Pre-Mitigation EAD. This is computed based on the bank role and the product type. The application calculates the EAD for the investor's interest separately. Pre mitigation EAD for on-balance sheet and off-balance sheet exposures are calculated separately based on the calculations given in the CBRC guidelines. This is handled in the **Pre-CRM Computations** sub-process.

Risk Weight Assignment

Ratings Based Approach

For exposures which follow the Ratings Based Approach, the risk weight assignment is similar to the Standardized Approach, except for the difference on the criteria used for risk weighting. In the RBA Approach, to compute the RWA of exposures, the application considers the following attributes of the exposure: granularity of the pool, seniority of the exposure, and the credit rating for the exposures.

For exposures which are unrated, the application checks the criteria required for inferring the rating. This is based on the presence of subordinate tranche information (based on seniority) for the same pool, regardless of whether the bank has an exposure in that tranche or not, residual maturity of the subordinate tranche being more than the unrated tranche's residual maturity, and the credit enhancement level of the unrated tranche being equal to or more than the subordinate tranche's credit enhancement level. The ratings of the tranches also undergo multiple assessments and the application assigns a single rating for all the rated tranches.

Based on all of the above criteria, the rating for the unrated exposure is inferred equal to that of the identified subordinate tranche. For more than one subordinate exposure, the application assigns the rating of the immediate subordinate tranche. This is due to the seniority of the exposure in the cash flow and in the Securitization structure rating of a subordinate tranche cannot be more than that of the immediate senior tranche.

This is handled in the **Pre-CRM Computations** sub-process.
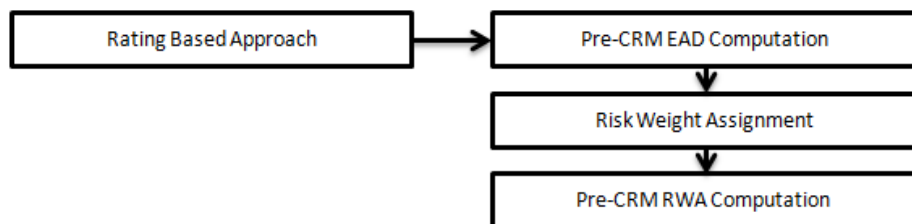
Internal Assessment Approach

For exposures which follow the Internal Assessment Approach, the risk weight assignment is similar to the Standardized Approach, except for the difference on the criteria used for risk weighting. The application uses the granularity of the pool, seniority position of the exposure, and the credit rating of the exposure for risk weighting the exposures which follow the Internal Assessment Approach. The internal rating of the exposures is reclassified by the application into standard ratings, as stated in the CBRC guidelines.

This is handled in the **Pre-CRM Computations** sub-process.
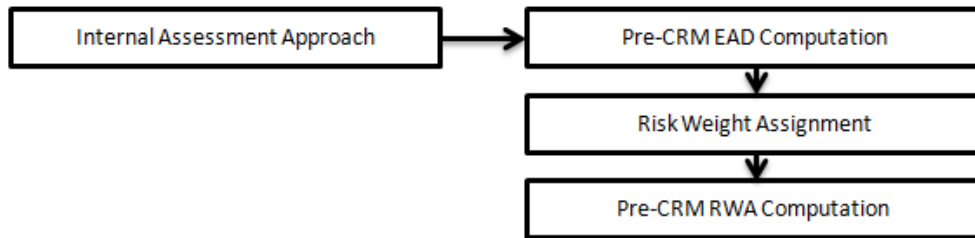
Supervisory Formula Approach

For exposures that follow the Supervisory Formula Approach, the application calculates the underlying capital of the securitization pool (KIRB), using the Non Securitization process. The application calculates the SFA parameters based on the pool and tranche details, by using the calculation logic specified in CBRC guidelines. The application also checks the exposure to identify whether the exposure should be straddled or not. This check is based on the credit enhancement level of the tranche to which the exposure belongs, the thickness of the tranche to which the exposure belongs, and the underlying capital of the securitization pool.

The exposures for which the sum of the credit enhancement level and the tranche thickness are less than that of the KIRB, the exposures are deducted from the capital. The exposures for which the credit enhancement level is more than that of the KIRB, the SFA parameters of these exposures are computed. The exposures for which the credit enhancement level is less than that of the KIRB but the sum of the credit enhancement level and the tranche thickness are more than the KIRB, the exposures is straddled, that is, the tranche to which the exposure belongs is split into a position lower than KIRB and a position more than KIRB. All the exposures mapped to that tranche are split in the same manner.

The application populates straddled tranche information into the securitization straddled tranche (**FSI_SEC_STRADDLED_TRANCHE)** table. The application splits each of the exposures of the identified straddled tranche into two. The account skey of the parent exposure, which is undergoing the split, is added as the parent account skey for the new exposures formed. The straddled tranche deduction amount (the KIRB amount less than the tranche amount) is calculated and populated from the Securitization Straddled Tranche (**FSI_SEC_STRADDLED_TRANCHE)** in a prorated manner to all the exposures of the straddled tranche which are identified for deductions. The remaining amount (which is the tranche amount above the KIRB) is the exposure amount of the senior exposures (the exposures of the straddled tranche which are identified for risk weighting under SFA) of the split exposures.

After the original exposures are split into two and their amounts are populated, the original exposure is deleted from the exposure table.

After all the SFA Parameters are computed, the capital charge is calculated using the SFA Parameters. This capital charge is converted into the risk weight.

This is handled in the **Pre-CRM Computations** sub-process.
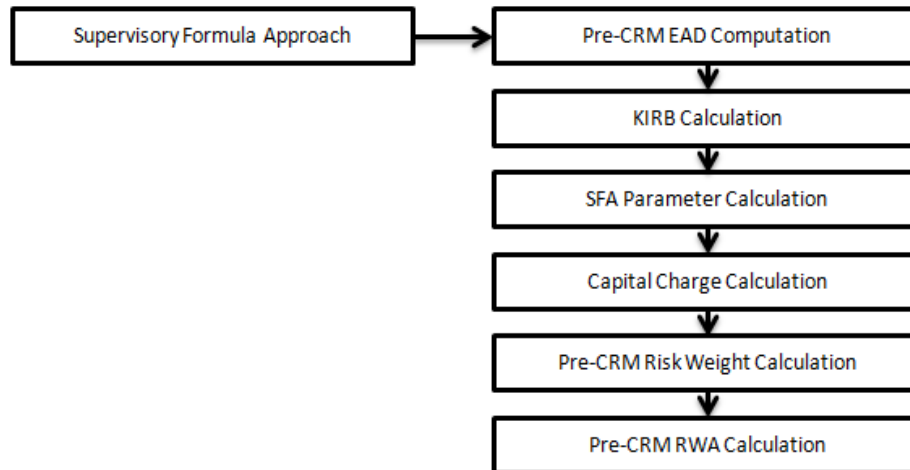
Sec Deductions

For exposures using the Ratings Based Approach that are unrated, or rated BB- or lower, are marked as deduction exposures. For exposures using the Supervisory Formula Approach, all those that are risk weighted at 1250% (including exposure going for straddling) are marked as deduction exposure. All unrated ABCP exposures (irrespective of their SFA qualification indicator) and originator records are deducted. The process also handles deduction related to synthetic securitization transactions. All unrated credit protections that are not 'Nth to Default' or SFA qualified, are also marked for deduction.

Sec CRM Process

Mitigant Risk Weight, Mitigant Eligibility, Haircut Assignment, and Allocation of Mitigants to Exposures are handled in **Sec CRM** sub-process.

Mitigant Risk Weight

The application calculates the mitigant risk weight similar to the exposure risk weight of Non Securitization exposures. This is based on the standard issuer type and the credit rating which includes the unrated issuers also. The application performs the multiple assessments for the mitigants, similar to the process followed for Non Securitized exposures, and arrives at a single rating for the mitigant. Further, the application assigns the final risk weight to the mitigant. For a financial collateral, mitigants like cash and gold zero risk weight are assigned.

Mitigant Eligibility

The application identifies the eligible mitigants based on the criteria as mentioned in the CBRC guidelines. The application identifies the following mitigants in the case of securitized exposures – collateral, guarantees, and credit derivatives. The application is capable of using Comprehensive Approach for the mitigants which are part of the collateral. This is similar to the mitigant eligibility of the Non Securitization process. The application processes the multiple assessments of ratings for the mitigants as well. This is required since some of the mitigant eligibility criteria are based on the ratings and risk weight of the mitigants.

The eligibility of the collateral mitigants are based on the party type of the mitigant, mitigant types, the credit rating assigned to the mitigant or the party (as applicable), and the classification of collateral as a senior or not. For equity, the eligibility is based on the main index equity and the equity trading status. For mutual funds, the eligibility is based on the eligible mutual fund indicator. The application identifies the eligibility of the guarantees and credit derivatives based on the party type of the mitigant and the credit rating assigned to the issuer of the mitigant. The application also identifies the eligibility of the mitigants based on the comparison of the risk weight of the exposures and the mitigants. If the mitigants risk weight is lesser than that of the exposures, then the mitigant become eligible or else the application makes them ineligible.

Haircut Assignment

The application assigns various haircuts as applicable to the mitigants. Haircut is assigned to mitigants in the **FCT_SUB_EXPOSURES** table. For collateral following Comprehensive Approach, the application is flexible to use the supervisory haircuts and scale up, if required, based on the minimum holding period. The application also uses the bank's own estimate of haircuts. The application applies the volatility haircut, FOREX haircut, and the maturity mismatch haircut to the mitigants, as appropriate. Only eligible mitigants are considered for haircut assignment. The eligible mitigants data flows from Mitigants (**FCT_MITIGANTS)** table to Sub Exposures (**FCT_SUB_EXPOSURES)** table.

The application populates an uncovered mitigant for each exposure in the **FCT_SEC_EXPOSURES** table. This uncovered mitigant has the same feature as that of the exposure and are created in the **FCT_MITIGANTS** table.

Allocation of Mitigants to Exposures

The application computes the mitigant value post all haircuts. Further, it uses the pooling and optimizer logic to allocate the exposures to the mitigants. This allocation is a bit different from the optimizer logic of Non Securitization exposures as the Securitized exposures have priority in the cash flow and gets the maximum protection by the mitigants. The senior most exposure (or tranche) is denoted with seniority 1 and the second senior exposures (the exposures of the straddled tranche which are identified for risk weighting under SFA) is denoted with seniority 2 and so on.

For securitization exposures, the mitigants are always given preference over the senior most exposure and then to the other exposures based on the seniority. The other parameters which are considered in the allocation logic are the risk weight and the mitigant value post haircut. The application uses the linear programming logic to allocate the mitigants to the exposures. The optimizer logic for Securitization exposures is explained as follows:

Based on the seniority of the exposures, risk weight of the exposures, and the mitigant and the mitigant value, the rank order in which the mitigants are allocated to the exposures is arrived at. The order of allocation can be modified by updating the Operational type and the optimizer constraints of the objective function. You can select the allocation rank measure in the **Optimizer Definition** window, while defining the optimizer logic. For more information on defining the optimizer, see Exhibit 1 and Exhibit 3 in *Annexure A: Key Concepts*.
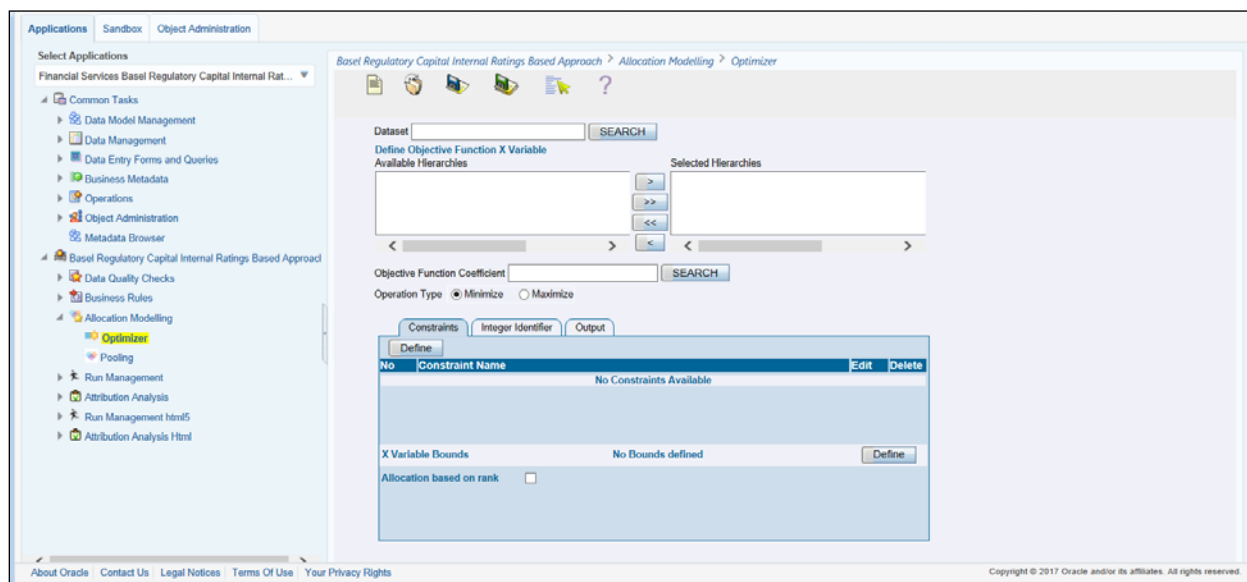
The remaining steps for creating optimizer definitions are same as that mentioned in Non Securitization process. The optimizer functions on the minimization constraint logic.

Single Mitigant Mapped to Single or Multiple Exposures

If there is one or more than one exposure mapped to a single mitigant, the mitigant is allocated to the exposure with the highest seniority. If there is more than one exposure with the same highest seniority, then the mitigant is allocated to the exposure which yields the highest mitigant value post haircut.

Single Exposure Mapped to Single or Multiple Mitigants

If there is one or more than one mitigants mapped to a single exposure, the least risk weighted mitigant is allocated to the exposure. If there is more than one mitigant with the same least risk weight, then the mitigant which has the highest mitigant value post haircut is allocated to the exposure.

Multiple Exposures Mapped to Multiple Mitigants

The treatment for this case is similar to the treatment of single mitigant mapped to single or multiple exposures, for the identification of the mitigant which is assigned to the exposures. The treatment pertaining to single exposure mapped to multiple mitigants is followed to yield the credit risk weighted exposure amount.

Using the above logic, the application calculates the factor of exposure covered by the mitigant and the factor of the exposure uncovered (without any protection).

Sec Post CRM RWA Computation

The application computes the covered amount and the uncovered amount for the exposures. The covered amount is computed by multiplying the covered factor with the exposure amount. To this covered amount, the application assigns the mitigant risk weight. The product of the covered amount and the mitigant risk weight is the covered RWA. The uncovered amount is computed by multiplying the uncovered factor (which is 1 – sum of all covered factors for that exposure) with the exposure amount. This uncovered amount is multiplied by the exposure risk weight to get the uncovered RWA. The sum of the covered RWA and the uncovered RWA is the Post CRM RWA of the Exposure.

$$\text{Post-CRM RWA} = \text{Covered Amount} * \text{Risk Weight of the Mitigant} + \text{Uncovered Amount} * \text{Risk Weight of the Exposure}$$

This is computed in the **Sec Post-CRM RWA Computation** sub process.

Key Data Elements

Key data elements for Securitization computation is as follows. For a complete list of tables and columns, see the *Download Specifications* document.

Securitization Exposures (IRB Approach)

Key attributes required for an investor or third party that does not provide the complete pool and tranche details are as follows:

- Credit Enhancement Level
- Pool Exposure Amount
- Sec Second Loss Position of the Tranche
- Granularity of the Pool
- Largest Exposure of the Pool
- Seniority of the Tranche
- Sec Trading Book Approach

For an investing bank, the data is expected in the Stage Underlying Exposures (**STG_UNDERLYING_EXPOSURES**) for the underlying of the pool, Total Pool Level attributes in the Stage Pool table (**STG_SECURITIZATION_POOL**), Tranche Level attributes in the Stage Tranche table (**STG_SECURITIZATION_TRANCHE**), and the Exposure Level Attributes in the respective PP tables.

For an originator, the data is expected in the same manner as the Investor, except for the Underlying Exposures. The underlying exposures of the pool are expected in the respective PP tables, depending on the product type of the underlying exposures.

For a credit protection exposure in the form of guarantee, it is expected in the Stage Guarantees table (**STG_GUARANTEES**); and if it is a credit derivative, it is expected in the Stage Credit Derivatives table (**STG_CREDIT_DERIVATIVES**). If it is a regular investment in the Tranches by an investing bank, or it is part of the mandate for retention in the pool or tranche for an originating bank, the data is expected in the Stage Investments table (**STG_INVESTMENTS**).

For a liquidity facility exposure, or servicer cash advance, the exposures are expected in the Stage Commitment Contracts table (**STG_COMMITMENT_CONTRACTS**).

Mitigant Eligibility (IRB Approach)

Eligible Mutual Fund Indicator, Main Index Equity Indicator, and Equity Traded Indicator are required.

Miscellaneous

All tranche information, regardless of whether the bank has exposure or not, is required for inferring the ratings, credit enhancement level computation, and eligibility of 'Nth to Default' credit derivative mitigants.

Mitigant Value is assigned at an Exposure level (not to the tranche).

Mitigant Pool ID in the Exposure Mitigant Mapping (**STG_EXP_MITIGANT_MAPPINGS**) table for 'Nth to Default' mitigants is required for eligibility of 'Nth to Default' credit derivative mitigants.

7.1.1.3 Market RWA

China Banking Regulatory Commission (CBRC) has published Market Risk capital charge calculation which is available in Chinese. The Chinese team of OFSAAI has translated the requirements and has made the application compliant based on their understanding of the accord.

CBRC Market Risk Capital outlays two basic approaches for calculating the capital charge for Market risk

1. Standardized Approach
2. Internal Model Method Approach

7.1.1.3.1 Standardized Approach

In the Standardized Approach (STD Approach) the Market Risk Capital Charge is calculated for the following instrument types:

- Interest Rate related Instruments (IR Instruments)
- Equity Position Risk
- Foreign Exchange Risk
- Commodities
- Options

Prerequisite for Market Risk Processing

Execution of the Run, **Staging Data Population - Market Risk - CBRC Standardized Approach** is usually a onetime activity. This should be executed once before actual Market Risk Run is executed. The following tasks are performed when the Run is executed:

- Interest Rate Curve Data
- Market prices of the instruments
- Bank positions

This Run populates the instrument level data that is required by the actual Run for further processing. The instrument level data such as number of units of the instruments on that particular MIS date is downloaded in the bank instrument position (**STG_BANK_POSITIONS**) table. This data flows into the fact table for further processing.

The OTC instrument price is expected as a download. For non-OTC instruments the data for instruments' price is captured in the Market Instrument Contract (**STG_MKT_INSTRUMENT_CONTRACT**) table. This data flows into the fact table for further processing. For IR instruments, the interest rate required is captured in IRC Rate History (**STG_IRC_RATE_HIST**) table. This data flows into the fact table for further processing. This data is required for term structure that is used in Modified Duration and Greeks parameter calculation for options.

Process Flow for Market Risk- Standardized Approach

The pre-defined Run in the application that computes Market RWA is as follows:

Run: Risk Weighted Asset Calculation - Market Risk - CBRC Standardized Approach

Capital Consolidation

For a reporting bank, the level at which the consolidation is processed is identified by the application. You can select solo or consolidation level for each entity in the rule, present in the Capital Consolidation process. This particular process handles entity level details. The entity data is captured in Legal Entity Details (**STG_LEGAL_ENTITY_DETAILS**) table. All the child entities underlying a parent are considered for RWA consolidation. When consolidation is the level selected for a reporting bank, each child entity data is consolidated with the parent entity post entity shareholding percent multiplication.

For more information on the process and sub processes that computes this, see the following:

> *Process: CBRC_CAPITAL_CONSOLIDATION*
>
> *Sub-process:* Capital Consolidation Approach

Approaches Followed in Capital Consolidation

The three approaches followed by the Capital Consolidation are:

1. **Consolidation Approach(CONSL)**: Under this approach, all the entities of the bank's organizational structure are considered. This includes all the entities/subsidiaries that belong to the same jurisdiction. All the exposures of the entities in the organizational structure are considered for computing risk weighted exposures, except the intra-group exposures.

2. **Aggregation Approach(AGG)**: This approach is similar to the Consolidation approach but is used in the cases, where some of the entities that are part of bank's organizational structure belong to a different jurisdiction. The capital requirement of the affiliate is computed as per the jurisdiction that it is subject to and is then aggregated with the rest of the group's capital requirement. Intra-group exposures are not excluded in this approach.

3. **Deduction Approach(DED)**: This approach is used in the case where some of the subsidiaries/entities that are part of bank's organizational structure are excluded from consolidation. In such a scenario, the regulatory investment in the excluded subsidiary attributable to the rest of the group are deducted from the consolidated capital requirements.

Rating Process

Rating data is expected for all instruments which bear an interest rate risk. The rating data is reclassified into Basel equivalent standard rating and the standard rating is considered for assigning specific risk charge for interest rate instruments, wherever applicable. If there are multiple ratings for the same issue, then the application does a multiple assessment check as per the multiple assessment logic detailed in the CBRC guidelines. This process assigns a Basel equivalent rating for an instrument, counterparty, and/or issuer, based on the rating details available for the same, after applying multiple assessment logic.

For more information on the process and sub processes that computes this, see the following:

> *Process: CBRC_CREDIT_RATING_PROCESSING*
>
> *Sub-process:* Credit Rating Data Population

Position Conversion

Position conversion is processed before capital charge calculation under Market Risk. In Position Conversion, different instruments are broken into long and short positions and carried forward for specific and general risk charge calculation. All derivative instruments undergo position conversion, so that the instrument is broken down into simplified positions for further processing. For derivative positions in equities, commodities, gold, currencies, and so on, only one leg is exposed to interest rate and other leg is exposed to the respective asset (equity, FOREX). The following information is required for Position Conversion: Long or Short position, Value of Notional Position, Coupon Rate, and Maturity.

Methodology for Position Conversion

While calculating interest rate risk, each instrument is converted into multiple positions. The notional value of each position is derived based on the following methodology:

- Notional positions in actual debt securities is valued as the nominal amount underlying the contract at the current market price of the debt security.

- Positions in zero-specific-risk securities is valued using one of the following two methods:

  o The present value approach, under which the zero specific-risk security is assigned a value equal to the present value of all the future cash flows that it represents; or

    The alternative approach, under which the zero specific-risk security is assigned a value equal to the market value of the underlying notional equity position in the case of an equity derivative; the notional principal amount in the case of an interest rate or foreign currency swap; or the notional amount in the case of any other financial instrument.

    In case of options, the delta weighted values go into the general risk charge calculation. Delta is computed by the application based on the instrument type, coupon, residual maturity, strike price, spread, option premium value, and so on.

  o For an Interest Rate (IR) Swap, the parent instrument is identified as a Receiver or Payer swap based on whether the bank is receiving fixed or paying fixed, respectively. After Position Conversion, the parent swap is converted to two child positions which is in zero specific risk securities. The exposure amount for each of these positions is computed based on the coupon rate of receiving leg for the long child position and the coupon rate of the paying leg for short child position. Currently, the notional amount for both the child positions is being computed using the current market price column of the parent.

Instrument Coverage

- Interest Rate Derivatives

    o Bond Forward

    o Forward Rate Agreement

    o Bond Future

- o   Future on a Basket/Index of bonds

- o   Interest Rate Futures

- o   Receiver Swap (without deferred start)

- o   Payer Swap (without deferred start)

- o   Basis Swap (without deferred start)

- o   Forward Basis Swap

- o   Forward Receiver Swap

- o   Forward Payer Swap

- o   Dual Currency Bond

- Equity Derivatives

  - o   Equity Forward

  - o   Equity Future

  - o   Equity Swap

- Currency Derivatives

  - o   Currency Forward

  - o   Currency Future

  - o   Currency Swap

- Commodity Derivatives

  - o   Commodity Forward

  - o   Commodity Future

  - o   Commodity Swap

  - o   Gold Forward

- Credit Derivatives

  - o   Credit Default Swap

  - o   Total Rate of Return Swap

  - o   Cash Funded Credit Linked Notes

  - o   First and Second-to-Default Basket Credit Derivatives

- Options / Structured Products

  - Option on Equity

  - Option on Currency

  - Option on Commodity

  - Option on Currency Future

  - Option on Currency Forward

  - Currency Swaption

  - Option on a bond

  - Option on a bond future

  - Option on a Forward Rate Agreement

  - Option on an Interest Rate Future

  - Caps

  - Floors

  - Collars

  - Swaptions

  - Bonds with Embedded Swaptions

  - Callable Bonds

  - Putable Bonds

  - Floating Rate Notes with Caps

  - Floating Rate Notes with Floors

  - Reverse Floaters

  - Leveraged Floaters

Position Conversion Process Flow

The process flow of Market Risk Position Conversion is as follows.

Position Conversion Data Population

The application populates **FCT_MARKET_RISK_EXPOSURES** with the details provided by the bank in **STG_BANK_POSITIONS** and **STG_INSTRUMENT_CONTRACT_MASTER**. FOREX exposures of the bank are populated into **FCT_MARKET_RISK_FOREX**. This exercise is done for all the trading book exposures.

For more information on the process and sub processes that computes this, see the following:

> *Process:* CBRC_MKT_RISK_DATA_POPULATION
>
> *Sub-process:* Market Risk Data Population

Currency Conversion

All the positions in other currencies are converted into the reporting currency of the bank based on the currency conversion rate between the exposure currency and reporting currency.

For more information on the process and sub processes that computes this, see the following:

> *Process:* CBRC_MKT_RISK_DATA_POPULATION
>
> *Sub-process:* Currency Conversion

Shareholding Percent Multiplication

For consolidated runs, exposures of the child entities are multiplied by the entity shareholding percentage to arrive at the consolidated exposure at the parent level.

For more information on the process and sub processes that computes this, see the following:

> *Process:* CBRC_MKT_RISK_DATA_POPULATION
>
> *Sub-process:* Shareholding Percent Multiplication

Position Conversion of Derivatives into Simple Positions

The application takes the contract details from the instrument table and breaks each contract into multiple positions into market risk exposures (**FCT_MARKET_RISK_EXPOSURES**) table. The application splits instruments, which are derivatives in nature, into multiple positions based on the instrument position mapping available in the mapping table. For example: A bank having a plain long position in a derivative instrument is split into one long and one short position. Hence for each position and nature of contract type, the application creates required number of positions in the processing table. The download information used for position conversion is contract details, instrument type, contract position, position mapping, and so on. Certain exotic instruments are split into more than two positions. For example: A long position in a reverse floater is converted into the following positions:

- A long position in two straight bonds (double the notional amount and half the fixed interest rate).

- A short position in a floating rate bond (a position in floating rate bond with notional amount and floating reference rate).

- A long position in a cap (which is further broken down into its underlying positions).

The application reclassifies all bank instruments into standard instrument types based on contract type, contract position, market risk position, and so on. A fixed bond forward with a long position in the contract is reclassified into fixed rate bond for the long leg and zero risk security for the short leg created by position conversion. The reclassifications are then used for notional value calculation.

For more information on the process and sub processes that computes this, see the following:

> *Process*: CBRC_MKT_RISK_POSITION_CONVERSION
> *Sub-process:*

> > o   Position Conversion Exotic Options

> > o   Position Conversion Options

> > o   Position Conversion Basket Futures - Interest Rate

> > o   Position Conversion Swaps

> > o   Position Conversion Forwards and Futures

> > o   Position Conversion Credit Derivatives

Position Conversion Parameter Assignment

After position conversion, that is, breaking each derivative instrument into long and short leg, the application assigns instrument parameters for each position leg created under position conversion logic. For each leg, relevant information like: coupon rate, coupon frequency, maturity, strike price for options, option premium value, and so on, are updated from parent information. This information is used in identifying instruments to be grouped under Maturity Ladder Based Approach on coupon rate (less than or greater than equal to 3%), duration calculation for Duration Ladder Approach, calculation of Greeks for option charge, and so on.

For more information on the process and sub processes that computes this, see the following:

> *Process*: CBRC_MKT_RISK_POSITION_CONVERSION
> *Sub-process:*

- o   Position Conversion Exotic Options

- o   Position Conversion Options

- o   Position Conversion Basket Futures - Interest Rate

- o   Position Conversion Swaps

- o   Position Conversion Forwards and Futures

- o   Position Conversion Credit Derivatives

Notional Value Calculation

Notional value of each leg created by position conversion for each instrument is calculated based on the contract characteristics (market price, number of units). For options it is the delta weighted position which is carried forward for market risk charge calculation.

For more information on the process and sub processes that computes this, see the following:

> *Process*: CBRC_MKT_RISK_POSITION_CONVERSION
> *Sub-process:*

- o   Position Conversion Exotic Options

- o   Position Conversion Options

- o   Position Conversion Basket Futures - Interest Rate

- o   Position Conversion Swaps

- o   Position Conversion Forwards and Futures

- o   Position Conversion Credit Derivatives

Specific Risk Weight Assignment

After Notional Value calculation, the application assigns risk weights to the position converted IR instruments. The risk weights are stored in the specific Risk Mapping table. These risk weights are stored against time band, Basel ratings, and category surrogate keys. The categories are qualifying and sovereign, and the ratings are picked from standard Basel rating table.

For more information on the process and sub processes that computes this, see the following:

   Process: CBRC_MKT_RISK_POSITION_CONVERSION
   Sub-process:

   o   Mkt Risk Specific Risk IR Assignment

   o   Market Risk CD Underlying Specific Risk

There is some dependency on different instrument types, like; the exotic options can further result into a vanilla option after position conversion. Therefore, position conversion should be processed as per the following order of instrument types:

- Exotic Options

- Options.

- Basket Futures

- Swaps

- Forwards Futures

- Credit Derivatives

After position conversion of basket futures instrument types, position offsetting is computed on different positions of the same kind of instrument types and the post offset exposure amount is arrived at.

Example of a Forward Rate Agreement (FRA) Position Conversion

A purchased FRA can be depicted through two notional zero-coupon positions: one short position (liability) up to the maturity of the underlying credit transaction and one long position (claim) up to the settlement of the FRA. Suppose a firm purchases 3 x 6 month FRA, principal: 1000; interest rate: 6%. Then, this position is broken down into two opposite zero coupon bond positions as follows:

- **First Position:**

   Position   : Long

   Value of Notional Position   : PV {1000/ ((1+5%) ^0.25) = 987.87}

   Maturity   : 3 months

   Coupon   : Zero (Coupon of less than 3%)

- **Second Position:**

   Position   : Short

   Value of Notional Position   : PV {1000/ ((1+5%) ^0.5) = 975.90}

   Maturity   : 6 months

   Coupon   : Zero (Coupon of less than 3%)

A sold FRA has positions exactly opposite to the one provided in the preceding example. The long position iscome short and short position becomes long, with the value, maturity, and coupon remaining the same.

It can be noted that the actual discount rates for discounting the notional values of the two legs, as stated in the previous example, are the interest rates pertaining to the respective maturities, that is, 3 months (long leg) and 6 months (short leg). For simplification purposes, an assumed rate of 5% is considered in the preceding example. The procedure followed by the application, taking the preceding example into consideration, is as follows:

1. The FRA as a contract is captured in the contract record details table with banks position in the contract in the position table. The application also captures the position mapping table for the above instrument type which is used for position conversion. Two positions are created: one long position with a maturity of 3 months and a short position for the life of the contract, that is, with a maturity of 6 months.

2. Both the position legs are reclassified into zero specific risk security.

3. The various contract parameters are assigned by the application to both the legs. Example: Coupon Rate, Maturity.

4. The Notional Value of both the legs is calculated as per the logic stated in the example.

Capital Charge for Interest Rate Instruments

The total risk charge for Interest Rate (IR) instruments consists of specific risk charge (specific to the issuer and instrument) and general risk charge (market related risk vested in the instrument).

The process flow for Interest Rate Risk is as follows.

Specific Risk Charge Calculation

Specific risk charge is calculated based on the categories and investment grade. The application initially identifies the categories based on the conditions stated in the regulations. After the category is identified the specific risk charge weight is assigned based on category, Basel equivalent rating, and residual maturity.

The specific risk weight assignment is process under the market risk position conversion process. These specific risk weights are then multiplied by the exposure amount, arrived at after position offset, to eventually compute specific risk charge for interest rate instruments.

For more information on the process and sub processes that computes this, see the following:

> *Process*: CBRC_MKT_RISK_STD_APPROACH
> *Sub-process:* Market Risk Specific Risk Charge Calculation - IR and Equity

General Risk Charge

General risk charge is calculated for each interest rate risk exposure for a reporting bank. General risk charge is calculated based on two methods:

- Maturity Ladder Approach
- Duration Ladder Approach

Under both the methods, the application creates time bands and based on residual maturity or modified duration, places each instrument in the respective time bands for offsetting. The matched and unmatched position across time bands and across three zones attracts general risk charge as per the definition stated in Basel II guidelines for Market Risk.

Residual Maturity Ladder

Under the Maturity Ladder Approach, the general risk charge is calculated for each currency. For multiple currencies the horizontal and vertical disallowance is calculated by creating separate residual maturity ladders for each currency unless the interest rate risk exposures are insignificant for the reporting bank. In the case of insignificant exposures in multiple currencies, exposures are grouped into a single residual maturity ladder for general risk charge calculation.

Under Residual Maturity Method, the application initially creates around 15 residual maturity time bands. The time bands definitions are given in the CBRC guidelines based on coupon being less than 3% or equal to and greater than 3%. All the 15 time bands are grouped to 3 zones for horizontal disallowance as per the zone definition given in Basel II Market Risk guidelines. This is processed under the process 'MR Time Band Reclassification – Maturity Approach'. Based on the time bands, positions are assigned general risk weights. The delta weighted positions of IR options are considered for the slotting into time bands and zones.

The entire end to end processing of general risk charge is calculated in a separate table (**FCT_MARKET_RISK_CAPITAL**) meant specifically for it and can be selected and analyzed in the form of reports. All the processing steps and related data are stored in the table starting from weighted long and short positions, matched and unmatched positions following horizontal and vertical disallowance, and net open position by each currency.

For more information on the process and sub processes that computes this, see the following:

> *Process*: CBRC_MKT_RISK_STD_APPROACH
> *Sub-process:* Time Band Reclassification - Maturity Approach

Duration Ladder

Under the Duration Ladder Approach, the application creates duration ladder based on modified duration calculated for each instrument. Similar to maturity ladder, the general risk charge under duration ladder is also calculated for each currency and insignificant positions across multiple currencies are compiled in a single modified duration ladder for horizontal and vertical disallowance calculation.

The duration ladder time band created in the application is based on the definition given by CBRC guidelines on Market Risk. Like Residual Maturity, for Duration Based Ladder Approach the application creates three time zones for each modified duration time band. This is processed in the process 'MR Time Band Reclassification - Duration Approach'. Based on the time bands, positions are assigned an 'assumed rate'. The delta weighted positions of IR options are considered for the slotting into time bands and zones.

All the processing attributes used under the Duration Ladder Approach are stored in a separate table (**FCT_MARKET_RISK_CAPITAL**) starting from weighted long and short positions, matched and unmatched positions following horizontal and vertical disallowance, and net open position by each currency.

For more information on the process and sub processes that computes this, see the following:

> *Process*: CBRC_MKT_RISK_STD_APPROACH
> *Sub-process:* Time Band Reclassification - Duration Approach

Horizontal/Vertical Disallowance

In the application, vertical and horizontal disallowance for IR instruments, under Maturity and Duration approach is processed by using a Data Transformation function 'Mkt_Risk_GenRsk_IR' under 'Market Risk General Risk Charge Calculation – IR and Equity'. This computes the matching of positions within time bands, zones, across adjacent zones, and across non-adjacent zones to finally arrive at the general risk charge for interest rate instruments.

The capital charge is applied at each state for the matched and unmatched position as per the capital charge stated in the CBRC guidelines for Market Risk. A detailed explanation of how the application handles the horizontal and vertical disallowance is provided in the following section and is common amongst the maturity ladder and duration ladder approaches:

1. The application initially populates weighted long and weighted short position amounts for each time band.

2. The next step is to offset the matched positions and populate them as 'offset matched position within the time band'. The unmatched positions are populated as 'offset unmatched position within the time band'.

Offset unmatched positions arrived at from the previous step are then considered for offsetting within a time zone. All the 'offset unmatched positions within time band' falling under the same zone are offset with each other and 'offset match same zone', and 'offset unmatched same zone are computed'.

Offset unmatched positions within the same zone are then carried forward for calculating 'offset matched between zone' and 'offset unmatched between zones'. This is initially processed for zones 1 and 2, then for zones 2 and 3, and lastly for zones 1 and 3.

All the unmatched positions (within time band, same zone, between zones and net unmatched position) are multiplied by the factors listed in the CBRC guidelines for Maturity and Duration Approach as applicable.

For more information on the process and sub processes that computes this, see the following:

Process: CBRC_MKT_RISK_STD_APPROACH

Sub-process: Market Risk Generic Risk Charge Calculation - IR and Equity

Procedure: Mkt_Risk_GenRsk_IR

Summary Output

For reporting purposes, the application moves data from market risk capital table to market risk reporting table.

Finally, RWA is calculated in market risk summary (**FCT_MARKET_RISK_SUMMARY**) table by multiplying capital charge with 12.5.The interest risk charge is reported from the market risk summary (**FCT_MARKET_RISK_SUMMARY**) table under interest risk charge reporting line. Specific and general risk charge for interest rate is also reported separately from the summary table.

For more information on the process and sub processes that computes this, see the following:

Process: CBRC_MKT_RISK_STD_APPROACH

Sub-process:

- o   Market Risk Capital Risk Charge Calculation

- o   Market Risk IR Reporting Data Population

- o   Market RWA Calculation

Capital Charge for Equities

The application calculates equity capital charge as summation of specific risk charge and general risk charge. The process flow for calculation of equity risk charge is as follows.

Deliberate Arbitrage Strategy Computations

The application identifies the deliberate and future arbitrage strategies for equity positions under this process. Components as per the Basel guidelines for 10 percent slippage, exposure amount calculation under arbitrage, exclusions under deliberate arbitrage, and so on, are computed under this process.

For more information on the process and sub processes that computes this, see the following:

> *Process*: CBRC_MKT_RISK_STD_APPROACH
> *Sub-process:* Market Risk Arbitrage Strategy

Position Offset

Long and short position in the same equity instrument are offset for the matched position and net open position is carried forward as net long or net short position for specific and general risk charge calculation.

For more information on the process and sub processes that computes this, see the following:

> *Process*: CBRC_MKT_RISK_STD_APPROACH
> *Sub-process:* Market Risk Equity Offsetting

Specific Risk Charge

The application assigns specific risk charge as 8% on gross equity positions. For an index equity which is well diversified a 4% specific risk charge is applied. In the case of equity derivative, the application takes into account either any future related arbitrage or deliberate arbitrage strategy created on equity. If equity arbitrage is created out of futures, then the application considers the arbitrage information as a mapping in equity arbitrage mapping (**EQ_ARBITRAGE_STRGY_MAPPING**) table where any opposite future derivative created as hedge for the underlying equity exposures is expected. The application applies a 2% specific charge on lower of opposite index position created or equity underlying.

For more information on the process and sub processes that computes this, see the following:

Process: CBRC_MKT_RISK_STD_APPROACH
Sub-process:

- o Market Risk Specific Risk Equity

- o Market Risk Specific Risk Charge Calculation - IR and Equity

General Risk Charge

The application assigns 8% general risk charge for equity instrument type and then multiplies it with post offset exposure amount to arrive at the general risk charge. Delta-weighted positions of equity options are considered for general risk computations.

For more information on the process and sub processes that computes this, see the following:

Process: CBRC_MKT_RISK_STD_APPROACH
Sub-process:

- o Mkt Risk General Risk Weight Assignment - FOREX and Equity

- o Market Risk Generic Risk Charge Calculation - IR and Equity

Summary Output

The equity risk charge is reported from the market risk summary (**FCT_MARKET_RISK_SUMMARY**) table under equity reporting line. Specific and general risk for equity is also reported separately from the summary table.

For more information on the process and sub processes that computes this, see the following:

Process: CBRC_MKT_RISK_STD_APPROACH
Sub-process:

- o Market Risk Capital Risk Charge Calculation

- o Market RWA Calculation

Capital Charge for Foreign Exchange Transactions

The process flow for Foreign Exchange transaction is as follows.

FOREX Data Population

All foreign exchange exposure data is expected at a net level by each currency in a separate table meant only for FOREX exposures data (**STG_FOREX_EXPOSURES**). Forward currency position, asset, liability, accrued interest, profit and loss, structural position, and so on, in different currencies, are captured separately in the FOREX exposure table. This data is then populated to **FCT_MARKET_RISK_FOREX** which is a dedicated table to compute FOREX capital charge.

For more information on the process and sub processes that computes this, see the following:

> *Process:* CBRC_MKT_RISK_DATA_POPULATION
> *Sub-process:* Market Risk Data Population

Currency Conversion

Currency conversion of FOREX positions to reporting currency is done in the application in the following rules:

- FOREX Position Profit and Loss Attribute Natural CCY Conversion to Reporting CCY

- FOREX Position Attribute Natural CCY Conversion to Reporting CCY

- FOREX Position Other Attribute Natural CCY Conversion to Reporting CCY

This conversion is processed based on the exchange rate between the natural currency of the exposure and the reporting currency.

For more information on the process and sub processes that computes this, see the following:

> *Process*: CBRC_MKT_RISK_STD_APPROACH
> *Sub-process:* Market Risk Options - Capital Charge Calculation - Delta Plus Approach

Calculation of Net Open Position

The net open position is the maximum value of the net long and net short position across all currency exposures plus the value of gold. This is computed under the process 'Market Risk FOREX Risk Position Calculation' in the application.

For more information on the process and sub processes that computes this, see the following:

> *Process*: CBRC_MKT_RISK_STD_APPROACH
> *Sub-process:* Market Risk FOREX Risk Position Calculation

FOREX Capital Charge

The application applies the short hand method for FOREX risk charge calculation by treating all the currencies to be same and applying 8% risk charge on net open position.

This is done by the rule 'Market RW Assignment - General Risk - FOREX and Equity' and the Data Transformation 'Mkt_Risk_Cap_Chrge_FOREX'.

For more information on the process and sub processes that computes this, see the following:

> *Process*: CBRC_MKT_RISK_STD_APPROACH
> *Sub-process:* Market Risk Capital Risk Charge Calculation

Summary Output

The FOREX risk charge gets reported out of market risk summary (**FCT_MARKET_RISK_SUMMARY**) table under FOREX charge reporting line.

For more information on the process and sub processes that computes this, see the following:

> *Process*: CBRC_MKT_RISK_STD_APPROACH
> *Sub-process:* Market RWA Calculation

Capital Charge for Commodities

The process flow for Commodities is as follows.

Commodity Data Population

Commodity data is captured at an exposure level with commodity identifier as information. Commodity identifier is referred from the list of commodities available in the dimension table meant only for commodities.

For more information on the process and sub processes that computes this, see the following:

Process: CBRC_MKT_RISK_DATA_POPULATION
Sub-process: Market Risk Data Population

Simplified Approach

In the Simplified Approach, the application moves data from market risk exposure (**FCT_MARKET_RISK_EXPOSURES**) table to market risk commodity capital (**FCT_MARKET_RISK_COM_CAPITAL**) table. In the Simplified Approach, the application calculates 15% capital charge on the net open long or open short position which includes an additional 3% capital charge on gross position (long plus short) for each commodity group.

This computation is done in the table load '**MKT_RISK_SIM_APP_COMDTY**'.

For more information on the process and sub processes that computes this, see the following:

Process: CBRC_MKT_RISK_STD_APPROACH
Sub-process: Market Risk Capital Charge Calculation - Simple Approach

Maturity Ladder Approach

In the Maturity Ladder Approach, the application creates 7 maturity ladders as per the definition given in CBRC guidelines for Market Risk. The offsetting is processed within each time band and for the matched position 1.5% capital charge is applied. The net open position of each time band is carried forward and a capital charge of .06% is applied to all the carried forward amounts. For the final net open position post offset across the time bands a capital charge of 15% is applied.

The task 'Time Band Reclassification – Commodities – Maturity Approach' assigns time bands while the Data Transformation 'Mkt_Risk_GenRsk_Comdty' computes the capital charge for commodities using maturity approach as per CBRC guidelines.

For more information on the process and sub processes that computes this, see the following:

Process: CBRC_MKT_RISK_STD_APPROACH
Sub-process:

- o   Time Band Reclassification - Commodities - Maturity Approach
- o   Market Risk Generic Risk Charge Calculation - Commodities - Maturity Approach

Summary Output

The commodity risk charge is reported from the market risk summary (**FCT_MARKET_RISK_SUMMARY**) table under commodity charge reporting line.

For more information on the process and sub processes that computes this, see the following:

Process: CBRC_MKT_RISK_STD_APPROACH

Sub-process:

- o Market Risk Capital Charge Calculation

- o Market Risk Commodities Reporting Data Population - Maturity Approach

- o Market RWA Calculation

Capital Charge for Options

The process flow for Capital Charge Options is as follows.
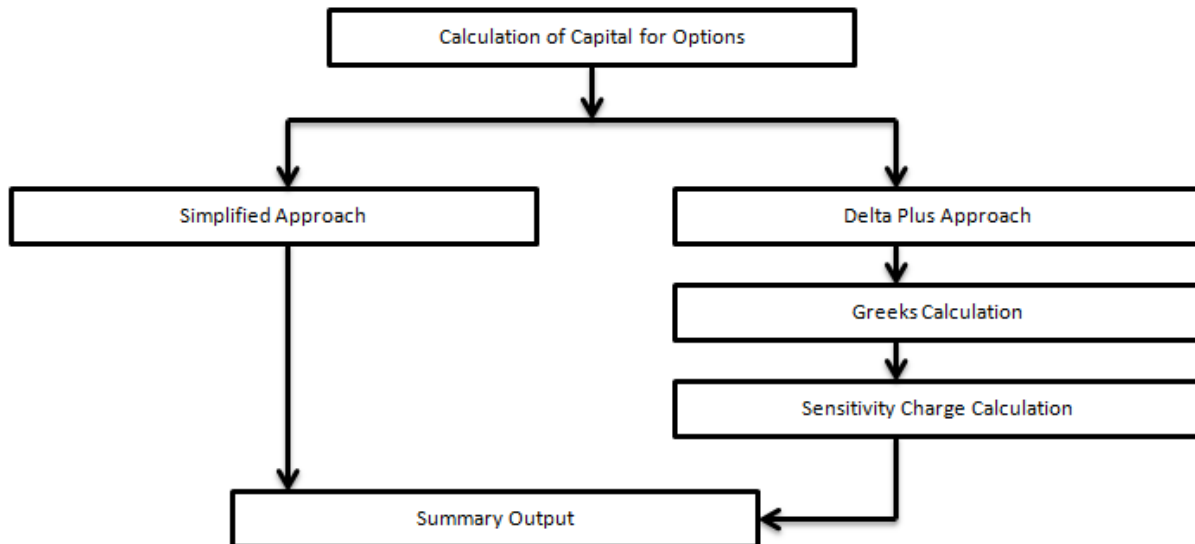
Simplified Approach

In the Simplified Approach, for option type being long cash and long put or short cash and long call, the application calculates 'in the money' values for the option. In the case of 'in the money option' the value is calculated as the number of units multiplied by the difference of underlying forward price and strike price, if the residual maturity of the option is greater than 6 months. In the case of residual maturity of the option contract being less than or equal to 6 months the 'in the money' value is calculated as number of units multiplied by the difference of underlying current market price and strike price.

The capital charge is arrived at as the difference between sum of general risk and specific risk on the underlying value and 'in the money value' of the option. For long put or long call, the application applies the capital charge as least of sum of general risk and specific risk on the underlying and option premium value.

This is computed in the task 'Market Risk Options – Capital Charge Calculation – Simple Approach'

For more information on the process and sub processes that computes this, see the following:

> *Process*: CBRC_MKT_RISK_STD_APPROACH
> *Sub-process:* Market Risk Options - Capital Charge Calculation - Simple Approach

Delta Plus Approach

In delta plus approach the option taken on any underlying contract goes for position conversion. The position conversion is detailed in the position conversion block. The purpose of position conversion is to create multiple positions with delta weighted amounts and send each position for respective capital charge calculation.

Greeks Calculation

The application calculates Greeks for options based on the option contract information. The Greek calculation involves calculating implied volatility, delta, gamma and vega. The information required for calculating Greek is explained under "**Position Conversion Parameter Assignment**"**.** Each of the Greeks calculated then participates in sensitivity charge calculation.

For more information on the process and sub processes that computes this, see the following:

> *Process*: CBRC_MKT_RISK_STD_APPROACH
> *Sub-process:* Market Risk Options - Delta and Gamma Calculations - Delta Plus Approach

Sensitivity Charge Calculation

For options, total charge includes underlying capital charge which includes sensitivity risk charge. Sensitivity risk charge includes delta risk, gamma risk, and vega risk charge. The formula used against each of the sensitivity charge is as per Basel II guidelines on Market Risk.

The computation of Delta weighted positions and Gamma impact for options is processed under the process 'Market Risk Options – Delta and Gamma calculations – Delta Plus Approach'. The delta weighted positions of options participate in the specific and general risk charge computations applicable for the respective underlying.

For more information on the process and sub processes that computes this, see the following:

> *Process*: CBRC_MKT_RISK_STD_APPROACH
> *Sub-process:* Market Risk Options - Capital Charge Calculation - Delta Plus Approach

Summary Output

The capital charge for option is reported from the summary table where reporting line is options where as the underlying risk charge is reported under the respective reporting line.

For more information on the process and sub processes that computes this, see the following:

> *Process*: CBRC_MKT_RISK_STD_APPROACH
> *Sub-process:* Market Risk Generic Risk Charge Calculation - IR and Equity

Treatment of Securitized Exposures in Trading Book

Securitized exposures under trading book are treated based on the Basel guidelines depending on the approach taken for the Securitization process. The specific risk charge assignment to such exposures is processed in the task 'Market Risk Sec Specific Risk Charge Calculation' which assigns the specific risk charge to Securitized exposures based on their ratings and the approach followed (Standardized, RBA, SFA or IRB). The deductions for securitized exposures are computed and treated under the process 'Market Risk Sec Deductions'.

For more information on the process and sub processes that computes this, see the following:

> *Process:* CBRC_MKT_RISK_STD_APPROACH
> *Sub-process:* Market Risk Sec Specific Risk Charge Calculation Market Risk Sec Deductions

Key Data Elements

Key data elements are listed in this section. For a complete list of tables and columns to be populated, see the Download Specification document.

- **Interest Rate Historical Data**: Interest Rate information for IR instrument is stored here.
- **Bank Positions**: Position in the instrument (Long/Short), Price of Instrument and No of Units for OTC instruments are stored here.
- **Market Instrument Contract**: Price of Non-OTC instruments is stored here.
- **Instrument Contract**: Instrument Type, Counter party type, currency code, coupon rate, effective date, maturity date, strike price, coupon rate, coupon frequency are stored here.

- **FOREX Exposures**: Exposure amount, asset amount, asset accrued interest, asset accrued profit are stored here.

7.1.1.3.2 Internal Models Method Approach

As per Internal Models Approach for Value at Risk (VaR) calculation, the bank has to provide capital requirement which is higher than:

- Previous Day VaR

- Average of previous 60 days Vat multiplied by a factor

The bank also needs to calculate stress VaR modeling movement of risk factor due to extreme scenarios. Total Capital requirement is a summation of normal VaR plus stress VaR.

Process Flow for Market Risk – Internal Model Method
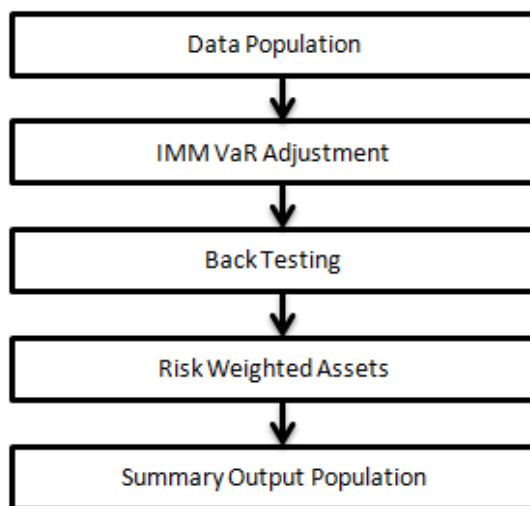
Data Population

The application populates VaR data from stage market risk VaR data (**STG_MR_VAR_DATA**) to fact market risk VaR (**FCT_MR_VAR_DATA**) data. The application expects VaR, stress VaR, Hypothetical, and Actual Profit and Loss data, as input from the bank at a portfolio level.

For more information on the process and sub processes that computes this, see the following:

> *Process:* CBRC_MKT_RISK_IMM_VAR
> *Sub-process:* Market Risk IMM VaR Data Population

IMM VaR Adjustment

The application takes the maximum of previous day VaR and 60 day average VaR which is an input and applies a factor of 3 to arrive at a final VaR number. A similar approach is followed for stress VaR. Further, normal VaR and stress VaR are added up for final capital requirement under Market Risk IMA.

For more information on the process and sub processes that computes this, see the following:

> *Process:* CBRC_MKT_RISK_IMM_VAR
> *Sub-process:*

- o Market Risk IMM Basel Value Calculation
- o Market Risk IMM VaR Summary Population
- o Market Risk IMM SRC Calculation
- o Market Risk Var sVar IRC CRM Avg Calculation
- o Market Risk IMM Capital Charge Calculation

Back Testing

The application does a back testing of VaR number by comparing the total VaR with hypothetical an actual profit and loss. In case the VaR breaches the hypothetical an actual profit and loss application updates each breach as an exception.

For more information on the process and sub processes that computes this, see the following:

> *Process:* CBRC_MKT_RISK_IMM_VAR
> *Sub-process:* Market Risk IMM Back Testing

Risk Weighted Assets

VaR number is modified to RWA by multiplying by 12.5.

For more information on the process and sub processes that computes this, see the following:

> *Process:* CBRC_MKT_RISK_IMM_VAR
> *Sub-process:* Market RWA Calculation

Summary Output Population

The reporting of VaR numbers is processed from the fact market risk summary (**FCT_MARKET_RISK_SUMMARY**) under respective reporting line item.

For more information on the process and sub processes that computes this, see the following:

> *Process:* CBRC_MKT_RISK_IMM_VAR
> *Sub-process:* Market Risk VaR Capital Charge Population.

7.1.1.4 Operational RWA

As per the Basel accord "Operational Risk is the risk of loss resulting from inadequate or failed internal processes, people and systems, or from external events". External losses can occur due to theft of information or hacking of systems. The CBRC accord has prescribed one method for calculating Operational Risk (OR) capital charge, which is Standardized Approach.

NOTE: While executing Solo Run for computing Operational Risk, the parent entity data is processed. However, for a Consolidated Run the parent entity and the subsidiary data is processed.

7.1.1.4.1 Standardized Approach

In this approach, banking activities are divided into eight lines of business. The gross income for each line of business is multiplied by the beta factor which is pre-defined in the CBRC accord. Every year the gross income of the standard line of business is multiplied by respective beta factor. The total capital charge is calculated as the three-year average of the sum of the regulatory capital charges across each lines of business every year. The total capital charge is calculated as follows:

$$K_{TSA} = \left\{ \sum_{\text{years 1-3}} \max\left[\sum (GI_{1-8} \times \beta_{1-8}), 0 \right] \right\} \Big/ 3$$

Where:

K_{TSA} = the Capital Charge under the Standardized Approach

GI_{1-8} = annual gross income in a given year for each of the eight lines of business.

β_{1-8} = a fixed percentage, set by the committee, relating the level of required capital to the level of the gross income for each of the eight lines of business.

Process Flow for Operational RWA

Prerequisite

Before calculating the capital charge for OR, the following should be computed as a prerequisite:

In the process **CBRC_OPS_RISK_STD_APPROACH** the task defined as **OR_Capital_Std_App**, should mention the number of years (in the past) as a parameter for capital calculation.

For example:

If the previous 3 years are considered, then assign 3 as a parameter against the task **OR_Capital_Std_App**. Therefore, in the future, if the previous 4 years have to be considered, then change that particular parameter only.

After defining this parameter, the procedure to compute OR is as follows:
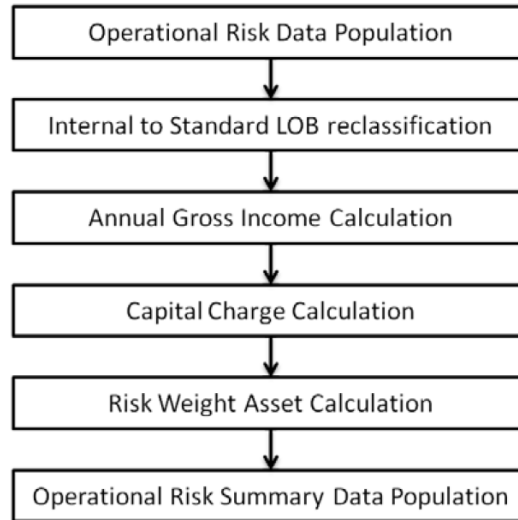
Operational Risk Data Population

The input data for each of the financial year mapped along with the internal line of business are populated in the processing table.

Internal LOB to Standard LOB Reclassification

The internal lines of business are reclassified into standard lines of business.

Annual Gross Income Calculation

For each of the standard line of business for each financial year, the annual gross income is calculated.

Capital Charge Calculation

Capital charge is calculated by multiplying the beta value with the annual income of each year across each standard line of business. Further, the average of 3 years is considered (if the values of all the 3 years are positive). If the values of all the 3 years are not positive, then exclude zero or the negative value from numerator and denominator.

Risk-Weight Asset Calculation

The capital charge value obtained is then converted to equivalent RWA value by multiplying with the factor 12.5.

Operational Risk Summary Data Population

The RWA amount is populated into the OR summary (**FCT_OPS_RISK_SUMMARY**) table along with the entity for which the OR RWA is calculated. The application converts all the elements in the annual gross income and loan and advance amount reported in their respective national currency to the reporting currency. While calculating annual gross income or loan and advance amount for the subsidiary that are part of regulatory consolidation, the amount is limited to the share-holding percentage. Hence, a subsidiary which is part of regulatory consolidation and if the parent holding in the subsidiary is considered as 45%, then the amount limited to 45% is considered for gross calculation. Similarly, if the holding is more than 50%, the entire amount is considered for gross calculation.

7.1.1.4.2 Key Data Elements

Key data elements to be noted for OR computation are listed in this section. To view the complete list of tables used, see the *Download Specification* document.

Entity details which are part of regulatory consolidation and parent entity share holding percent is required. This data is captured in Stage Entity Shareholding Details (**STG_ENTITY_SHR_HLD_PERCENT**) table.

Net Interest Income, Net Provision Amount, Net Non Interest Income, Operating Expenses, Security Sale Gain or Loss from HTM, Insurance Irregular Loss, Security Sale Gain or Loss from AFS, and Insurance Irregular Gain for each line of business and for each financial year is required.

7.1.1.5 Capital Structure

CBRC capital structure calculates the total capital of the bank holding company. The total capital consists of the following components:

- Tier 1 capital consists of core equity capital, retained earnings, and disclosed reserves.
- Tier 2 capital consists of undisclosed reserves, revaluation reserves (discounted by 55%), general provisions, hybrid debt capital, and subordinate term debt.
- Tier 3 capital consists of short term subordinate debt covering market risk instrument.

The total capital amount arrived at for each tier of capital is followed by deduction of goodwill, investment in the subsidiary engaged in BFSI, reciprocal cross holding, and expected loss greater than total provision amount. These line items are deducted at 50% from Tier 1 capital and 50% from Tier 2 capital. Securitization transaction and DTA are deducted from Tier 1 capital.

Tier 2 capital is limited to 100% of Tier1 capital whereas Tier 3 capital is limited to 250% of the bank's Tier1 capital. The total capital ratio must not be lower than 8%.

NOTE: While executing Solo Run the parent entity data is processed. Investment into the subsidiary data undergoes RWA calculation as per the Credit Risk and Market Risk rule. Capital line item pertaining to parent entity is only processed. For consolidation approach, the parent entity and the subsidiary data is considered. All the GL line items are expected at solo level for each entity. The consolidated data is discarded.

7.1.1.5.1 Assumption

The General Ledger codes are expected to be unique across entities in **STG_GL_DATA** and **DIM_CAPITAL_ACCT_HEAD**.

7.1.1.5.2 Process Flow for Capital Structure

Level Selection and Approach Selection Calculation

To process the capital for a bank, a solo or consolidated entity selection should be made, based on which the capital is calculated at organization level. If solo is selected, then only for that particular selected banking organization the capital is calculated. If consolidation is selected, then all the entities that fall under the umbrella of the selected organization are part of capital calculation. This is done in the task – '**Capital Consolidation Level Selection**' in process '**CAPITAL_CONSOLIDATION**'

Based on the share-holding percentage of the parent bank in the subsidiary and the consolidation approach to be followed (consolidation approach and deduction approach) for each of the entity, the Basel approach is selected.

For example: if the share-holding for an entity is 35% and is part of the consolidation process, then the approach selected for this entity is *pro-rata consolidation*. This reclassification is performed in task – '**Cap Consl Basel Approach Type Reclassification for an Entity**' in the process '**CAPITAL_CONSOLIDATION'.**

Gross Capital Calculation for T1, T2, and T3

The total gross capital for each tier of capital, that is, T1, T2, and T3 are calculated as per the definition of T1, T2, and T3, by adding the relevant financial instrument in each tier of capital. The above calculation is done in the sub process – '**Capital Components Calculations**' in the process '**CAP_STRUCT'**.

Internal Transaction and Reciprocal Cross Holding Transaction

All inter-group and reciprocal-cross holding capital investments are marked as internal customer transactions and reciprocal cross holdings, respectively. The marking is done by populating appropriate standard account head surrogate keys for the exposures which qualifies as internal transactions or reciprocal cross holding.

Expected Loss Vs Total Provision Calculation

If the total provision amount is greater than the expected loss, then the difference is added into Tier 2 capital up to a maximum of 0.6% of CR RWA under the IRB approach. The above processing is done in Rule – **CS Total Provision for IRB** in sub process – **Capital Components Calculations** under the process '**CAP_STRUCT'**. If expected loss is greater than the total provision amount, the difference is deducted, where 50% is deducted from Tier 1 capital and remaining 50% is deducted from Tier 2 capital. The above processing is done in the Rules – '**CS General Provisions for IRB**' and '**CS Total Provision for IRB**' in the sub process – '**Capital Components Calculations**' under the process '**CAP_STRUCT**'.

Regulatory Adjustment from Tier 1 and Tier 2

All the regulatory adjustment line items are identified and 50% of the total amount is deducted from Tier 1 capital and 50% from Tier 2 capital. In order to handle this 50-50 deduction, all the regulatory adjustment line items are moved to table **FCT_CALC_ACCT_HEAD** where each of the regulatory adjustment line items are equally split into 2 records. The capital component group of one record is marked as 'T1-50' and the other record is marked as 'T2-50'. The above processing is computed in the sub processes – **Calc Acct Head Population** and **Std Acct Head Population** in the process **CAP_STRUCT**.

Calculation of Net Capital

Net Tier 1 capital is calculated by deducting the Securitization transaction, DTA, and 50% of regulatory adjustment line item. Similarly, Net Tier 2 capital is calculated by deducting 50% of regulatory adjustment line item. If net tier 2 is greater than net tier 1 capital, then the net tier 2 capital is limited to net tier 1 capital.

Total Capital Calculation

The total Net Tier 1 capital, Net Tier 2 capital, and Net Tier 3capital is summed up to obtain the Total Eligible capital.

Risk Weighted Asset (RWA) Amount – Credit Risk, Market Risk and Operational Risk

The RWA amount for Non Securitization, Securitization, Market Risk, Operational Risk and Regulatory Adjustments Phase-In arrangement for Capital Instrument are calculated by summing up the RWA amount and is reported under different headings such as 'Risk Weighted Asset amount for Standardized Portfolios/IRB portfolio' for Non Securitization, "Sec Std RWA" for Securitization portfolio, "Market Risk RWA" for Market Risk, "Operational RWA" for Operational Risk and "Regulatory Adjustments Phase-In RWA" for Phase-In Arrangement. The Phase-In RWA captures the capital instrument investments that goes for deduction from Capital but because of Phase-In arrangement are to be risk-weighted such as – Reciprocal Cross-holding, Treasury Stock, Insignificant Investment amount, Significant Investment amount and Threshold deduction amount.

Capital Ratio Calculation

Tier 1 capital ratio and capital adequacy ratio are calculated using the total RWA amount, net Tier 1 capital, and Total capital amount. The above processing is done in sub process – **Capital Components Calculations** in the process **CAP_STRUCT**.

7.1.1.5.3 Key Data Elements

Key data elements to process the capital structure for the consolidated entity are as follows. For a complete list of tables and columns to be updated, see the *Download Specifications* document:

- Entity details which are part of regulatory consolidation, and parent entity share holding percent is required.

- The capital structure component for each tier of capital for all entities involve in regulatory consolidation is required.

- The General Ledger line items are captured as download in Stage General Ledger Data (**STG_GL_DATA**).

- If a capital line item like 'MR RWA' or 'OR RWA' is available as download, then these non GL line items are expected as download in Stage Standard Accounting Head (**STG_STANDARD_ACCT_HEAD**).

- The standard account head ID of line items like 'Net Tier 1 capital', 'capital ratio', and so on, which are computed by application, are expected to be mapped to Capital Account Identifier – 'OTHERS', as the application populates these line items into Fact Standard Accounting Head (**FCT_STANDARD_ACCT_HEAD**) table with initial value as 0. Later, this value is over written by the application.

- Information stored in Capital Standard Mapping (**FSI_CAPITAL_STANDARD_MAPPING)** table is a mapping of GL capital line items with seeded data in DIM_STD_ACCT_HEAD. For all jurisdictions this mapping should be present. For more information on the mapping of all jurisdictions in **FSI_CAPITAL_STANDARD_MAPPING** table, see Exhibit 5 in *Annexure A: Key Concepts.*

7.2   Basel III

7.2.1   Basel III – Internal Ratings Based Approach

7.2.1.1 CBRC III – High Level Process Flow for Internal Ratings Based Approach

The Basel defined Capital Adequacy ratio is delivered out of box in OFSAAI as a building block approach. The application includes capital computations for Credit Risk (Internal Ratings Based Approach), Market Risk, and Operational Risk along with Capital Structure and Capital Consolidation processes.

For more information on the pre-defined Runs available with the application, see *OFS Basel Regulatory Capital Run Charts*.

7.2.1.1.1 Process Flow for Capital Adequacy Ratio Calculation
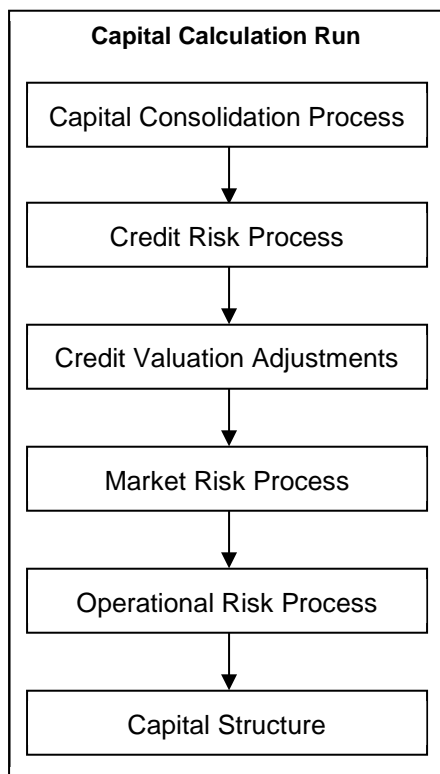
Capital Calculation Run

Capital Consolidation Process

↓

Credit Risk Process

↓

Credit Valuation Adjustments

↓

Market Risk Process

↓

Operational Risk Process

↓

Capital Structure

The Capital Calculation Run, depicted in the preceding process flow, is a single Run joined together with multiple processes. Each process considered as blocks, consists of tasks defined in a sequence to complete the processing of the entire Capital Adequacy Run. The individual blocks like Credit Risk process, Market Risk process, and so on exists as individual runs as well. Capital Consolidation is a process common across each of the individual blocks when executed separately as individual risk runs.

7.2.1.1.2 Capital Consolidation Process

The Capital Consolidation is explained is explained in the following section and is not repeated under the Non Securitization process, Securitization process, Market Risk process, or Operational Risk section of this document.

For example: the standard out of box Market Risk Run has Capital Consolidation and the Market Risk process bundled together as a Single Market Risk Run. This applies for Credit Risk and Operational Risk Runs.

The processing of Capital Consolidation is as follows.

Capital Consolidation Level Selection

The reporting bank can be a part of a financial group that has multiple legal entities like parent or child entities (subsidiaries) under its name. The entity on which you are required to process should be selected by you. Subsequently, level at which a Run is to be executed (solo or consolidated) should also be selected. You can select these options in the Run Management UI. However, if the Run is executed in the Run Rule Framework (RRF), then these options have to be set using the Rule '**Capital Consolidation Level Selection**' in the process '**CAPITAL_CONSOLIDATION**'.

CAPITAL_CONSOLIDATION is the first process to be added in all the Runs defined in the RRF except for the Staging Data Population Run. The Run Management UI selects this process by default.

Run Parameters Assignment

The Basel accord states different approaches for calculating RWA. The Run Management UI in the application allows the reporting bank to define and execute a Run by selecting a combination of different Basel II approaches for RWA computation.

Run Parameter Assignment is also part of **Capital Consolidation** process. The Rule '**Run Definition User Defined Run Param Assignment**' is used to assign the Run parameters if a Run is executed in the RRF. If the Run is executed from the Run Management UI, then the parameters are populated based on the Run defined in the Run Definition window.

Currency Conversion

The Rules pre-defined in the application performs currency conversion of all General Ledger amount attributes to be used for Capital Consolidation from the Natural currency to the Reporting currency, based on the exchange rate provided.

Shareholding Percent Multiplication

For all entities in the Capital Consolidation process, the application updates the shareholding percentage against each entity data in the fact capital accounting head from the fact entity shareholding percent table. The parent data in the processing table of fact capital accounting head is updated with the value 1 and for each child entity the data is based on the parent's holding percentage specified for each child in fact entity share holding percent table.

7.2.1.1.3 Process Flow for Credit RWA

Credit RWA Run is a combination of Non Securitization RWA, Credit Valuation Adjustment RWA, and Securitization RWA computation. A few processes like credit rating, party type reclassification, and mitigant data population are common between Non Securitization and Securitization processes and are executed only once under the Credit RWA Run even though these sub processes are explained separately under Non Securitization and Securitization section of this document.

Certain sub processes under Non Securitization process like Reclassification, are common across all types of exposures for example: banking book, over the counter derivative transactions, and securities financing transactions, and are executed only once in the Run. The details of this sub processes are explained under Reclassification sub process of the Basel III Non Securitization exposures section of this document. Likewise, details of Credit Risk Mitigation for Non Securitization process is detailed under the Basel III Non Securitization section of this document and details of Credit Risk Mitigation for Securitization process is detailed under the Basel III Securitization section of this document.

For more information on the sub processes as detailed in the preceding process flow for the Non Securitization process, CVA processes, and Securitization process, see Credit RWA.

For example: Non Sec Data Population is detailed under data population and currency conversion of Credit RWA (Non Securitization - Standardized approach) section of this document. Likewise, CRM eligibility, haircuts, and so on, is detailed in the Credit RWA (Securitization) section of this document.

7.2.1.1.4 Process Flow for Credit Valuation Adjustments

```
                    ┌─────────────────┐
                    │   CVA Process   │
                    └─────────────────┘
                       │          │
              ┌────────▼──────┐ ┌─▼──────────────────┐
              │ Simple CVA    │ │ Advanced CVA       │
              │ Approach      │ │ Approach           │
              └───────────────┘ └────────────────────┘
```

Basel committee has introduced a new Credit Valuation Adjustment (CVA) capital charge, which is added to default risk capital charge to arrive at the new Counterparty Credit Risk (CCR) capital charge. The mark to market counterparty credit losses or the spread migration risk is captured with CVA, which were not directly capitalized before. CVA is the difference between the risk-free portfolio value and the true portfolio value that takes into account the possibility of the counterparty's default. In other words, CVA is the market value of counterparty credit risk.

This process flow is divided into two sections: Simple Approach and Advanced Approach.

For more information on the sub processes as detailed in the process flow, see Credit Valuation Adjustments.

7.2.1.1.5 Process Flow for Market RWA

Market RWA Run is made up of multiple sub processes specific to Market Risk. However, when Market Risk is bundled under a Consolidated Run and triggered, Capital Consolidation and Rating process is executed only once for Credit Risk and Market Risk. The details of each of the sub process mentioned in the preceding flow chart are present under Market Risk section of this document.

For example: 'Capital Charge for Interest Rate Instruments' sub process is detailed elaborately under 'Capital Charge for Interest Rate Instruments' section of Market Risk. Likewise 'Capital Charge for Equities', 'Capital Charge for Foreign Exchange Transaction' 'Capital Charge for Commodity transaction', and 'Options risk charge calculation' has a detailed explanation present under 'Capital Charge for Equities', 'Capital Charge for Foreign Exchange Transactions' 'Capital Charge for Commodity Transactions', and 'Capital Charge for Options' sub process of the Market Risk section of this document, respectively.

For more information on Market RWA computation, see Market RWA.

7.2.1.1.6 Process Flow for Operational RWA
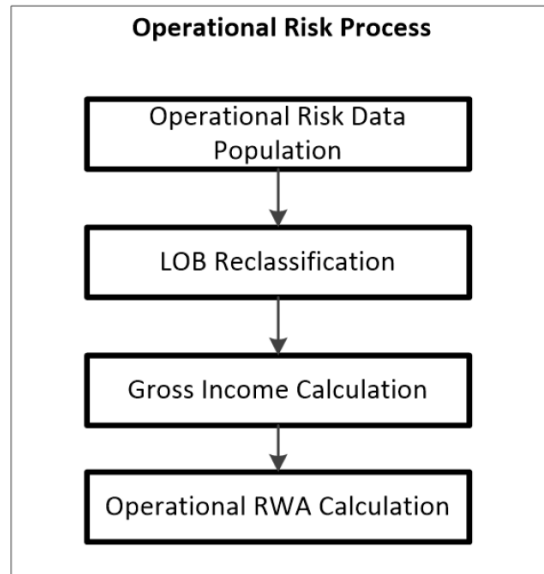
Operational RWA Run is executed with Capital Consolidation process. For more information on Operational RWA computation, see Operational RWA.

7.2.1.1.7 Process Flow for Capital Structure
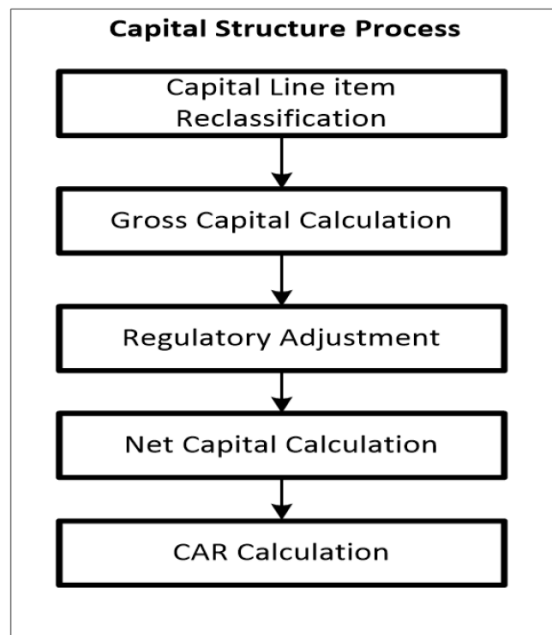
Capital Structure is executed with Capital Consolidation, Credit Risk, Market Risk, and Operational Risk RWA processes. For more information on the sub processes of Capital Structure, see Capital Structure.

For example: 'Gross Capital Calculation' mentioned in the preceding flow chart is explained in detail under 'Gross Capital Calculation for T1, T2 and T3' sub process section of the Basel III Capital Structure in this document. Likewise 'Regulatory Adjustment' and 'Net Capital Calculation' is detailed under 'Regulatory Adjustment to Tier 1 and Tier 2' and 'Calculation of Net Capital' sub process section of the Basel III Capital Structure in this document.

7.2.1.2 Credit RWA

The application supports the computation of Credit RWA as per the guidelines laid out in the Basel accord. Credit RWA computation is broken down into Credit Risk for Non Securitized Exposures and Credit Risk for Securitized Exposures. For Credit Risk for Non Securitized Exposures, the application follows the Standardized Approach, Foundation IRB Approach, and Advanced IRB Approach. Credit RWA computation also consists of computation of Credit Valuation Adjustments which is explained in the later section.

7.2.1.2.1 Non Securitization – Internal Ratings Based Approach

The process begins with rating reclassification. All exposures are rated by different agencies. However, the naming convention of these ratings might not be the same as mentioned in the Basel accord. Hence, the application reclassifies the rating information shared in the bank's data to standard rating, as stated in the Basel accord.

The exposure amount and other amount data columns that are provided as an input (in stage tables) are in the Natural Currency (exposure currency) and this is usually different for exposures across different countries. The application converts them to reporting currency columns so that processing for all exposures happens in one single currency.

The credit risk exposures are identified by their product types, counterparty types, and their corresponding asset classes. A sample list of products types, party types, mitigant types, and credit ratings are pre-defined in the Basel application. However, this list and naming convention differs from one bank to another. Hence, the application reclassifies the bank's data into standard data as per the accord. The application reclassifies the bank's product types and party types to Basel standard product and party types. Further, based on standard Basel product and standard party type, it forms an asset class for each exposure. For equity exposures, the asset class is formed on the basis of equity type and Basel product type.

In the current release, a few additional product types are added in the list and the application is updated to reclassify these products. Some exposures can be hedged against credit risk through various mitigants like guarantors, collaterals, credit derivatives, and so on. These provide mitigation to credit risk and should be considered while computing Credit RWA as per Basel norms. Hence, the application calculates pre-mitigation risk weighted assets amount and post mitigation risk weighted assets amount.

The application calculates the correlation factor using the formula specified for each asset class. The current release considers the updates to correlation factor calculation as per Basel III guidelines. Using Correlation factor, PD, and LGD, the application calculates the pre-mitigation capital charge for each exposure. This value signifies the capital charge the bank has to maintain for each exposure, prior to considering any mitigation effects.

The application calculates pre-mitigation exposure at default amount and risk weight for each exposure. Further, it computes pre-mitigation risk weighted assets (Pre-CRM RWA) by multiplying the EAD by risk weight. The risk weight is arrived at by multiplying pre-mitigation capital charge with 12.5.

Through the Credit Risk Mitigation (CRM) process, the bank considers the effects of mitigation. The application checks mitigant eligibility based on the Basel specifications and assigns a haircut to each mitigant based on their currency, residual maturity, and expected volatility in their market value. FOREX and Maturity haircut considers any currency and maturity mismatches the mitigants have with the exposures that they are covering. Volatility haircut takes into consideration the change in the mitigation effect that arises due to future fluctuations in the mitigant's value. Basel committee has revised CRM guidelines to a large extent. The changes at the higher level are with respect to the recognition of the eligible mitigants, applicable for the Securitized and the Non Securitized exposures. BCBS has also revised the haircuts to be applied for the debt securities issued by a Securitization transaction which act as collateral. The remaining procedures for computation of CRM are the same as in the existing Basel II process. The application allocates mitigants to exposures based on optimizer function and capital charge for each mitigant is calculated by the application.

The application later calculates the post mitigation RWA Unexpected Loss (Post CRM RWA UL) and post mitigation RWA Expected Loss (Post CRM RWA EL). Some credit risk exposures that fall under the category of internal transactions like holding own subsidiaries shares or investment in its capital, reciprocal cross holding, and so on, are treated separately under Capital Structure.

CBRC - Product, Customer, and Asset Reclassification for IRB

To process the data and calculate RWA for each exposure, it is classified into its respective Asset Class. According to the CBRC IRB Approach Basel III guidelines, a set of Asset classes are defined and under which each of the exposures are classified. This way, each exposure undergoes Asset re-classification.

The list of Asset Classes defined are the following:

1. Sovereign Exposures
2. Banking Institutions Exposures
3. Non-banking financial Institutions Exposures
4. Corporate Exposure
5. Corporate SME
6. Project Finance
7. Object Finance
8. HVCRE
9. IPRE
10. Commodities Finance
11. Residential Mortgage Exposures
12. Qualifying Revolving Retail Exposures
13. Other Retail Exposures
14. Equity Exposures
15. Other Asset
16. Purchase Receivables

Process Flow

These asset classes are applicable only for Non-Sec Exposures and Equity Exposures. This Asset class re-classification is based on the standard Product type and standard Party type. In this way, prior to asset reclassification, each exposure also undergoes standard party type reclassification and standard product type reclassification.

To accomplish Standard party type reclassification, standard product type reclassification and Asset Re-classification data that are processed are provided in its respective Product Processor table. The Product Processor table captures the following data related to Loan transaction, Lease Transaction, T-Bills, Cards, Swaps Transaction, Futures transaction, Guarantee, Investments data, Letter of Credit, Money Market transaction, Overdraft, Options Contract, Repo Contracts, Underlying exposures data, and Credit Derivatives.

The application captures the input data in its respective defined product processor table, which is further populated to processing table through a T2T. All the products, except equity are moved to FCT_NON_SEC_EXPOSURES table. Equity related data is populated to FCT_EQUITY_EXPOSURES table. Product, Party, and Asset re-classifications occur in this processing table.

CBRC - Non Sec Exposures – PD, LGD, and Effective Maturity Assignment

PD Assignment

Overview

For F-IRB/AIRB approach, PD of Sovereign Exposure is internal estimates of one year PD. PD for Banking Institutions Exposures, Non-banking financial Institutions Exposures, Corporate Exposure, Corporate SME, Project Finance, Object Finance, HVCRE, IPRE, Commodities Finance, Residential Mortgage Exposures, Qualifying Revolving Retail Exposures, and Other Retail Exposures are bank's internal estimates but PD floor check is 0.03%.

Process Flow

The application expects the PD as an input value for each asset class and only the floor value check is designed based on the asset class. For floor check, a new Rule designed to check the floor limit. This is same as rule for the first modern residential mortgage-backed security.

LGD Assignment

Overview

For F-IRB approach, banks must assign the LGD for non-retail exposure, that is, Sovereign, Banking Institutions Exposures, Non-banking financial Institutions Exposures, Corporate Exposure, Corporate SME, Exposure of 45% to senior claim, and 75% for subordinate flag.

For a bank which following AIRB, the LGD is estimated by the bank itself. For retail asset, LGD is internally estimated and therefore, a download value is there for the retail portfolio.

LGD Assignment Mapping:

Asset Class	Senior Claim Flag	LGD (pre-CRM)
Sovereign	Y	45%
Banking Institutions Exposures	Y	45%
Non-banking financial Institutions Exposures	Y	45%
Corporate Exposure	Y	45%
Corporate SME	Y	45%
Sovereign	N	75%
Banking Institutions Exposures	N	75%
Non-banking financial Institutions Exposures	N	75%
Corporate Exposure	N	75%
Corporate SME	N	75%

Process Flow

To assign the LGD for non-retail portfolio, a new Rule namely, CBRC – CBRC III – LGD assignment for Non-retail exposure, is designed. This Rule is designed as per the mapping provided in the Overview section.

Assignment for Effective Maturity

Overview

For the banks which opt for F-IRB approach, the M for non-retail is 2.5 years and for Repo style it is 0.5 years. For the bank which adopt AIRB, M is greater than 1 year, but capped at 5 years. For Corporate SME asset class, the effective maturity is 2.5 years.

Process Flow

The banks following F-IRB use the same Rule for effective maturity assignment as defined in the BIS-F-IRB process. The name of the Rule used is Non Sec effective Maturity Assignment – F-IRB. The Banks that follow A-IRB use the same rule as defined in BIS A-IRB process.

For assignment of effective maturity to Corporate SME asset class in A-IRB approach, separate Rule is defined to assign 2.5 years with the below mapping:-

Basel Asset Class	Effective maturity (years)
Corporate SME	2.5

CBRC – Correlation Formula and Capital Charge

Overview

CBRC has specified the correlation formula for Sovereign, Corporate, Financial Institutions, Corporate SME, and Retail Exposures. The following are the correlation formulas:

Sovereign and corporate exposures

$$R = 0.12 \times \frac{1 - \frac{1}{e^{(50 \times PD)}}}{1 - \frac{1}{e^{50}}} + 0.24 \times \left[1 - \frac{1 - \frac{1}{e^{(50 \times PD)}}}{1 - \frac{1}{e^{50}}} \right]$$

Financial institutions exposures (bank exposures)

$$R_{FI} = 1.25 \times \left\{ 0.12 \times \frac{1 - \frac{1}{e^{(50 \times PD)}}}{1 - \frac{1}{e^{50}}} + 0.24 \times \left[1 - \frac{1 - \frac{1}{e^{(50 \times PD)}}}{1 - \frac{1}{e^{50}}} \right] \right\}$$

Firm-size adjustment for small- and medium-sized entities (SME)

$$R_{SME} = 0.12 \times \left[\frac{1 - \frac{1}{e^{(50 \times PD)}}}{1 - \frac{1}{e^{50}}} \right] + 0.24 \times \left[1 - \frac{1 - \frac{1}{e^{(50 \times PD)}}}{1 - \frac{1}{e^{50}}} \right] - 0.04 \times \left(1 - \frac{S-3}{27} \right)$$

Residential mortgages: $R_{r1} = 0.15$

Eligible revolving retail exposures: $R_{r2} = 0.04$

Other retail exposure:

$$R_{r3} = 0.03 \times \frac{1 - \frac{1}{e^{(35 \times PD)}}}{1 - \frac{1}{e^{35}}} + 0.16 \times \left[1 - \frac{1 - \frac{1}{e^{(35 \times PD)}}}{1 - \frac{1}{e^{35}}} \right]$$

1.3 Calculation of capital requirement（K）

1.3.1 Non-retail exposures

$$K = \left[LGD \times N \left(\sqrt{\frac{1}{1-R}} \times G(PD) + \sqrt{\frac{R}{1-R}} \times G(0.999) \right) - PD \times LGD \right] \times$$

$$\left\{ \frac{1}{1-1.5 \times b} \times \left[1 + (M - 2.5) \times b \right] \right\}$$

1.3.2 Retail exposures

$$K = LGD \times N \left[\sqrt{\frac{1}{1-R}} \times G(PD) + \sqrt{\frac{R}{1-R}} \times G(0.999) \right] - PD \times LGD$$

Process Flow

All the Rules defined in the Capital Calculation sub-process of CBRC Non Sec IRB process are used with a modification to correlation and Capital calculation for Financial Institutions as asset class.

CBRC - CCF Assignment, EAD Computation, CCY Conversion, and Share Holding Multiplication

CCF Assignment

If the banks follow FIRB approach, then the 75% to loan commitment, NIF, and RUF are calculated for CCF Assignment. For other off-balance sheet line items, it is as defined in the Standardized Approach. For the banks which follow A-IRB approach, the CCF Assignment is internally estimated.

Process Flow

To assign CCF to the off-balance sheet items, a separate process is defined, which specifically caters to CCF Assignment. Also, two new Rules are defined to assign CCF. One rule is designed to assign CCF based on the unconditional cancellable flag. And the other Rule is designed to assign the CCF based on the off-balance sheet items.

The CCF assignment occurs on the processing table for the Non Sec exposures. Therefore, mapping for the CCF assignment is based on unconditional cancellable flag column of the Non Sec processing table.

Mapping of CCF Assignment based on the Basel Product is as follows:

Basel II Product	Drawn CCF Assignment (%)
Transaction-related Contingencies	50%
NIF	75%
RUF	75%
Asset sale with recourse	100%
Trade related short term contingent items	20%
Forward Asset purchase	100%
Forward Time deposit	100%
Partly paid Shares and Securities	100%

Additionally, for unused line of credit of credit cards based on criteria as specified in the Overview detailing section, must either assign a CCF of 20% or 50%.

Product	Basel Customer Type	Current Credit Limit	Auto Cancellable Flag	CCF
Credit Card	Retail	<= RMB 1 million	Y	20%
Credit Card	-	-	-	50%

EAD Computation

Overview

Every Exposure must determine its EAD amount for each of the on-balance sheet exposure, each OTC contract, off-balance sheet commitment, and Equity. On-balance sheet component of equity exposure is value of the exposure that a bank carries. EAD amount computation for on-balance sheet exposure, each OTC contract, and off-balance sheet commitment exposure type are the same as that of BIS IRB approach.

Process Flow

Equity EAD calculation occurs in equity processing table and then populated to non sec processing table.

CCY Conversion

Overview

The exposure amounts are provided in its local currency. These amounts are converted into the corresponding reporting currencies, by the application. Every exposure which is different from its reporting currency undergoes currency conversion.

Process Flow

The CBRC Basel III SA run handles the currency conversion for all the stage data that is populated to processing table for Non Sec and Equity.

Shareholding Multiplication

Overview

Each of the exposure amounts that belong to entities other than the entity for which consolidation process is done are made equal to shareholding percentage which the entity is holding. For example, if a consolidation is happening for a parent entity P which has 40% shareholding in subsidiary entity S. Exposure amount belonging to entity S is consolidation till the portion of holding, that is., 40% of the amount. But if the holding is above 50%, the full amount is consolidated.

Each exposure amount and other relevant amount provided in the stage table undergo shareholding multiplication in the processing table of Non Sec and Equity.

Process Flow

The CBRC Basel III IRB Run is handles the shareholding percentage multiplication for all the stage data that is populated to processing table for Non Sec and Equity.

Specialized Lending

Overview

The category of exposures that falls under the specialized lending are Object Finance, Project Finance, Commodity Finance, and Income Producing Real Estate. The banks using IRB uses PD, LGD K, and RWA. But the banks using supervisory slotting criteria approach classifies the exposure into Strong, Good, Satisfactory, Weak, or Default. The following table displays the category RW assignment:

Residual Maturity	Strong	Good	Satisfactory	Weak	Default
<2.5 years	50%	70%	115%	250%	0%
>= 2.5 years	70%	90%	115%	250%	0%

The EL assignment is as follows:

Residual Maturity	Strong	Good	Satisfactory	Weak	Default
<2.5 years	50%	70%	115%	250%	0%
>= 2.5 years	70%	90%	115%	250%	0%

Process Flow

The sub-process RW Assignment for SL Corporate – Preferential Risk Weight and RW Assignment for SL Corporate - Without Preferential Risk Weight are considered in this. Also note the difference in RW assignment for HVCRE. Since the HVCRE is not applicable in CBRC, remove the HVRCE mapping. The rest of the mapping remain the same in the application.

CRM Treatment to Collateral – Collateral Haircut Approach

Credit Risk can be mitigated through Guarantee, Credit Derivatives, Netting, and Collaterals. It requires recognizing mitigation effect only from eligible mitigant, according to eligibility criteria.

Eligible Collateral

Eligible Collateral includes Financial Collateral, Receivables, Commercial Property, Residential Property, and Others. Asset Re-securitization is not eligible financial Collateral.

Eligible Guarantee

Eligible Guarantee is the guarantee from an eligible guarantor. Eligible Guarantor as defined by CBRC includes Sovereign, Financial Institutions, and Ordinary companies with a lower risk weight than the counter party.

Eligible Credit Derivatives

Only credit default swaps and total return swaps that provide credit protection can be recognized as eligible credit derivatives.

Eligible Netting

The netting is same as in Basel III.

Risk Weight

Bank adopting the foundation IRB Approach deals with the exposures covered by the guarantees or credit derivatives via substitution approach. That is, adopting the risk weight function appropriate to the type of Guarantor.

Reclassification Rule

A new reclassification rule is created for Mitigant type reclassification. New Mitigant type is added in the existing rule. All the following mitigant types are reclassified in standard mitigant type as follows:

Mitigant Type	Standard Mitigant Type
Certificates of Deposit	Debt security
Treasury Bonds	Debt security
T-Bills	Debt security
Bills of exchange	Debt security
Convertible bonds	Debt security
Life insurance	Life insurance
Convertible fund shares	Mutual Fund
Other collateral	Other IRB Collateral

A new reclassification rule is created for Mitigant Issuer type reclassification. The new Mitigant Issuer type is added in the existing rule. All the following party types are reclassified as follows:

Party Type	Standard Party Type
Ministry Of Finance Of china	Domestic Sovereign
People's Bank of China	Domestic Central Bank.
Banks	Banks.
Multilateral Development Banks	Multilateral Development Banks.
International Monetary Fund	Highly Rated Multilateral Development Banks.
Bank of International Settlement	Highly Rated Multilateral Development Banks.
Central Bank in Other Jurisdiction	Central bank

Central Government in Other Jurisdiction	Sovereign
Chinese policy Bank's	Domestic Policy Banks
Chinese Public sector entity	Domestic PSE
Chinese Commercial Banks	Domestic Banks
Asset management Company	Asset management Company
Trust and investment company	financial Entity
Finance company	financial Entity
Financial Leasing company	financial Entity
Auto financing company	financial Entity
Foreign bank branch	financial Entity
Banks	financial Entity

OTC

Overview

According to the CBRC, a banking organization that follows a standardized method for calculation of general risk based capital, should use the Current Exposure Method for the calculation of the RWA of all the OTC Derivative transactions.

Process Flow

The application captures the EAD amount using the add-on percent for OTC and Credit Derivative. It then calculates the EAD amount using the Current Exposure Method. After the EAD is captured, if the bank is using the Standardized Approach, the RWA is calculated based on the RW assigned to Counterparty and if using the IRB based on the PD, LGD, K is calculated and then RWA.

Repo Style Transactions

Overview

The approaches are available as part of BIS Standardized approach and there is no change for the standardized approach. As per the accord, there are the following treatments for repo style transaction for repo style transactions, under standardized approach:
1.   Simple Approach
2.   Collateral Haircut Approach

7.2.1.2.2 Securitization – Internal Ratings Based Approach

The Credit Risk of Securitized exposures in the IRB Approach is calculated similar to the Securitization Exposures under the CBRC Basel II Approach. See Securitization section for more information.

7.2.1.3 Credit Valuation Adjustments

The CVA for IRB Approach is calculated similar to the Standardized Approach except the following changes. See Credit Valuation Adjustments for more information.

Overview

The functional detailing is same as BIS Basel III SA for CVA. The CVA is calculated as per the formula provided:

$$K = 2.33 \cdot \sqrt{h} \cdot \sqrt{\left(\sum_i 0.5 \cdot w_i \cdot \left(M_i \cdot EAD_i^{total} - M_i^{hedge} B_i \right) - \sum_{ind} w_{ind} \cdot M_{ind} \cdot B_{ind} \right)^2 + \sum_i 0.75 \cdot w_i^2 \cdot \left(M_i \cdot EAD_i^{total} - M_i^{hedge} B_i \right)^2}$$

Process Flow

The process Credit value adjustments standard approach is placed between Non Sec processing and Sec processing in the application for the CVA calculation.

See Credit Valuation Adjustments for more information.

7.2.1.4 Market RWA

The Market Risk of Non Securitized and Securitized exposures in the Foundation IRB Approach (FIRB) and Advanced IRB Approach (AIRB) is calculated under the Internal Model Method Approach. See the IMM Approach in the Standardized Approach section for more information.

7.2.1.5 Operational RWA

The CBRC Basel III process calculates Operational Risk capital charges in the Foundation IRB Approach (FIRB) and Advanced IRB Approach (AIRB) as in the CBRC Basel II Operational RWA process.

See Operational RWA for more information.

7.2.1.6 Capital Structure

The CBRC Basel III Capital Structure is calculated similar to the IRB Approach of CBRC Basel II Capital Structure with the following additions. See Capital Structure for more information.

As per the CBRC Basel III, the total capital consist of the sum of the following elements:
- Tier 1 Capital
- Common Equity Tier 1 Capital
- Additional Tier 1 Capital
- Tier 2 Capital

Minimum Capital Requirement

The following are the minimum capital ratios to be maintained by the Bank. The values of the capital are net of regulatory adjustments.

- Common Equity Tier 1 must be at least 5% of Risk-weight asset (RWAs).
- Tier 1 capital must be at least 6.0% of RWAs.
- Total Capital (Summation of Tier 1 and Tier 2 capital) must be at least 8.0% of RWAs.

With respect to BIS Basel III, Common Equity Tier 1 capital comprise of the same component except some new addition to CET1. These are:

- Capital Reserve
- General Reserve

Additional Tier 1 capital and Tier 2 capital contain the same component as defined in Basel III. Therefore, there is no change with the component of AT1.

This has an impact to the Capital Consolidation changes pertaining to the CBRC. The CBRC CET1 definition is a new rule detailing all the changes pertaining to the CBRC Basel III- Advanced Approaches and Standardized Approach. This has an impact on the solo and consolidation runs. While calculating at the solo level, only that particular bank's details are processed and the capital is calculated. In the case of consolidation, the data of all the subsidiary banks which fall into the same regulatory jurisdiction, are processed. This is the same as in BIS.

CBRC – Minority Interest

The Minority treatment, which arises from the issue of Common Shares by a consolidated subsidiary of a commercial bank to third party receive limited recognition in the regulatory capital. The steps to calculate the Minority interest calculation belonging to Third party and Bank is same as defined in Basel III. Minority Interest calculation is applicable for Consolidation run.

The CET1, AT1, T2 capital, and the Minimum Capital ratios of the subsidiary are available to process Minority Interest calculation.

CBRC - Regulatory Deduction/Adjustments/Insignificant/Significant/Threshold Treatment

The regulatory adjustment and deduction which are applicable to its respective CET1, AT1, and T2 are same as defined in BIS Basel III. Similarly the treatment of Insignificant investment and Significant investment remains the same as defined in BIS Basel III. As per CBRC in Threshold treatment, "Significant Investment amount in the Common shares" and "DTA that rely on the future profitability" are used for the treatment.

Regulatory deduction, Adjustment, Insignificant, and Significant Investment treatment is same as defined in the Basel III. The same sub-process to be added to CBRC Capital process. The only change is with respect to Threshold treatment where the population of "DTA that rely on the future profitability" is populated to FSI_THRESHOLD_TREATMENT table.

The T2T "CAPITAL_ACCT_HEAD_THRSHOLD_TREATMENT_DATA_POP" is modified to populate the DTA value. To accomplish this the logic that populate value from FCT_STANDARD_ACCT_HEAD to FSI_THRESHOLD_TREATMENT is changed where only V_STD_ACCT_HEAD_DESC = "DTA that rely on a commercial bank's future profitability to be realized" is populated. The new T2T name is " CBRC_ CAPITAL_ACCT_HEAD_THRSHOLD_TREATMENT_DATA_POP.

CBRC - Product, Customer, and Asset Reclassification

To process the data and calculate RWA for each exposure, it is classified into its respective Asset Class. CBRC Standardized Approach Basel III final guideline has defined a set of Asset class under which each of the exposure is classified. Therefore, each exposure undergoes Asset re-classification.

The list of the Asset Classes as defined are:

- Cash
- Claim on Central Governments and Central Banks
- Claim on Domestically Public Sector Entities (PSEs)
- Claim on Domestically Incorporated Financial Institutions
- Claim on Financial Institutions and PSEs incorporated in Other Jurisdiction
- Claim on Corporate
- Claim on Qualified Micro-and Small Enterprises
- Claim on Retail Customer
- Residential Mortgage Exposures
- Retail Lease Residuals
- Equity Exposures
- Non-own Use Real Estate
- Other Assets

The lists of Asset class as defined above are applicable only for Non-Sec exposures and Equity Exposures. This Asset class re-classification is based on the standard Product type and standard Party type. Therefore, prior to asset reclassification, each exposure also undergoes standard party type reclassification and standard product type reclassification.

To accomplish Standard party type reclassification, standard product type reclassification and Asset Re-classification data that are required to be processed are expected as an input in its respective Product Processor tables.

The Product Processor table captures the data related to Loan transaction, Lease Transaction, T-Bills, Cards, Swaps Transaction, Futures transaction, Guarantee, Investments data, Letter of Credit, Money Market transaction, Overdraft, Options Contract, Repo Contracts, Underlying exposures data, and Credit Derivatives. The application captures the input data in the respective defined product processor tables, which is further populated to processing table through a T2T.

All the product except equity are moved to FCT_NON_SEC_EXPOSURES table. Equity related data is populated to FCT_EQUITY_EXPOSURES table. Product, Party, and Asset re-classification happen in this processing table.

CBRC Non Sec Exposures – Standardized Approach – Risk Weight Assignment

Standardized approach requires assigning risk weight appropriate to the exposure based on the exposure type or counterparty. Risk Weighted Asset is then calculated by multiplying the exposure amount by the risk weight. A total risk-weighted asset for general credit risk is equal to the sum of the risk-weighted asset amounts. The final rule assigns general risk weight based on following asset classes:

- Cash
- Claim on Central Governments and Central Banks
- Claim on Domestically Public Sector Entities (PSEs)
- Claim on Domestically Incorporated Financial Institutions
- Claim on Financial Institutions and PSEs incorporated in Other Jurisdiction
- Claims on multilateral Development Banks, the Bank of International Settlements and the International Monetary fund
- Claim on Corporate
- Claim on Qualified Micro-and Small Enterprises
- Claim on Retail Customer
- Residential Mortgage Exposures
- Retail Lease Residuals
- Equity Exposures
- Non-own Use Real Estate
- Other Assets

CBRC - CCF Assignment, EAD Computation, Past Due Exposure and Failed Transaction, CCY Conversion, and Share Holding Multiplication

As per the CBRC guideline for Standardized Approach following are the CCF assigned to off-balance sheet items:

- Zero percent CCF to Loan commitment that is unconditionally cancelable by the Bank without prior notice.
- Twenty percent CCF to Commitments with an original maturity of one year or less that are not unconditionally cancelable by the Bank.
- Twenty percent CCF to unused credit line of credit cards that has satisfied the following conditions:
  - o Granted to individual
  - o Credit Line granted is no more than RMB 1 million
  - o Bank assesses the cardholder rating at least once a year and monitor credit line quarterly.
  - o If holder credit quality deteriorating, bank can lower or cancel the credit line.
- Twenty percent CCF to trade-related short term contingent items.
- Fifty percent CCF to unused credit line of credit card.
- Fifty percent CCF to Commitments with an original maturity of more than one year that are not unconditionally cancelable by the Bank.
- Fifty percent CCF to Transaction-related contingent items, NIF and RUF.
- Hundred percent CCF to Direct Credit Substitutes, Asset Sale with Recourse, Forward Asset Purchase, Forward Time Deposit, Partly paid Shares and Securities, and Other Off-balance Sheet.

To assign CCF to the Off-Balance Sheet items, a separate process is defined which specifically caters to CCF Assignment. Two new rules are defined to assign CCF. One rule is designed to assign CCF based on Original Maturity and based on the unconditional cancellable flag. Another rule is designed to assign the CCF based on the Off-balance sheet items. The CCF based rule is in the processing table of the Non Sec and therefore, the mapping for the CCF assignment is based on maturity column and unconditional cancellable flag column of the Non Sec processing table as follows:

Basel II Product	Original Maturity	Non Sec Unconditionally Cancellable Facility	CCF Assignment (%)
Loan Commitment	-	Yes	0
Loan Commitment	Less than equal to1 year	No	20
Loan Commitment	More than 1 year	No	50

Mapping of CCF Assignment based on the application is as follows:

Basel II Product	Drawn CCF Assignment (%)
Transaction-related Contingencies	50
NIF	100
RUF	100
Asset sale with recourse	100
Trade related short term contingent items	20%
Forward Asset purchase	100%
Forward Time deposit	100%
Partly paid Shares and Securities	100%

Additionally, for unused line of credit of credit cards needs to either assign a CCF of 20% or 50%.

Product	Basel Customer Type	Current Credit Limit	Auto Cancellable Flag	CCF
Credit Card	Retail	<= RMB 1 million	Y	20%
Credit Card	-	-	-	50%

OTC

According to the US Final Rule, a banking organization, which follows a standardized method for calculation of general risk based capital, should use the Current Exposure Method for the calculation of the RWA of all OTC Derivatives transactions. The following are the changes as per US Final Rule:

- Equity Derivative Treatment
- Removal of 50% Cap for RW of OTC Transactions
- Unsettled Transaction.
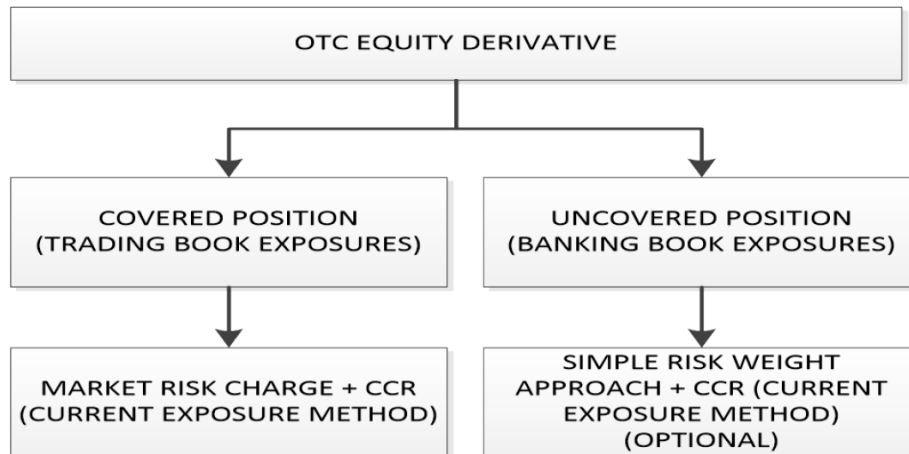
Equity Derivative Treatment

The OTC Equity derivatives have two different treatment based on trade booked under trading or banking book. Banking book OTC equity derivatives goes through Simple Risk Weight Approach as per the equity exposure treatment. Bank has the option to include the banking book exposure for the calculation of CCR Charge. If the bank includes CCR charge for the banking book transactions, all the transactions is included for CCR Charge. Option to include and exclude CCR charge for OTC equity derivative is a run time option. The Trading book OTC equity derivatives are subject to CCR charge based on the Current Exposure Method. The user does not have an option to exclude the same.

Removal of 50% Cap for RW of OTC Transactions

As per US final rule, 50% Cap for Risk Weight is removed for all the OTC transactions.

Unsettled Transaction

The application uses Risk Weight to compute RWA instead of calculating capital and multiplying by 12.5 to arrive at RWA.

Repo Style Transactions

The following two treatments for repo-style transaction are provided in accord for repo-Style transaction under standardized approach:

1. Simple Approach
2. Collateral Haircut Approach

These approaches are available as a part of BIS Standardized approach in the application and there is no change for the standardized approach.

Sold Credit Protection

The Sold Credit Protection in the form of guarantees and credit derivatives are treated under the regulatory framework. The treatment specific to the sold credit protection are as below:

- Guarantees and Credit Derivatives
- Protection Provided to Non-Sec Exposures

In the case of guarantees and credit derivatives provided to the exposures which are not securitized, the protection provided is treated as an exposure to the underlying reference asset.

The flow to the Sold Credit Protection exposures in the application, at a broad level, is as follows:
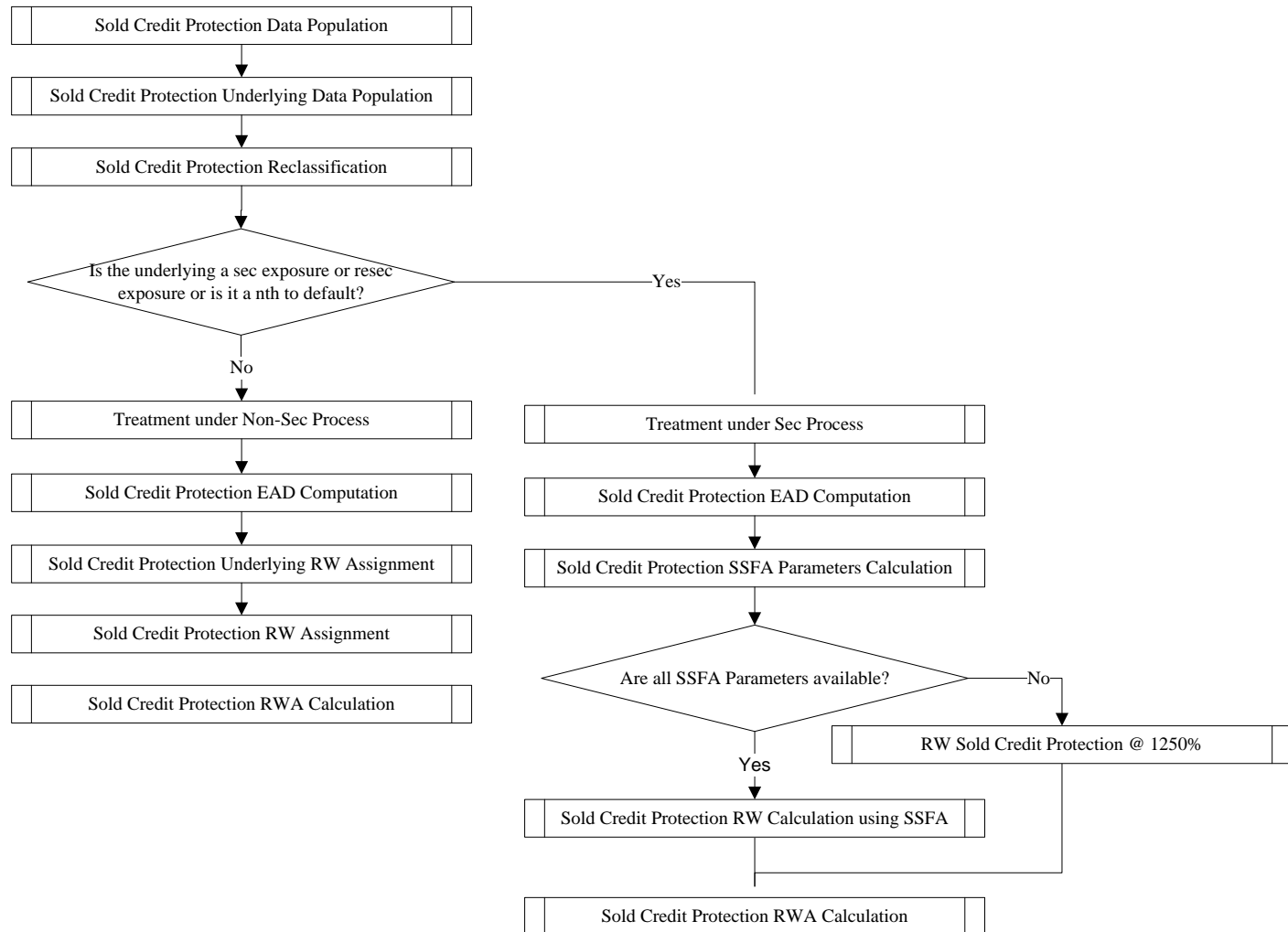
Sold Credit Protection Data Population:

The Sold Credit Protection data is specific to the sold guarantees and sold credit derivatives. These data is available in the product processor tables of STG_GUARANTEES and STG_CREDIT_DERIVATIVES.

These sold credit protection exposures have the following data:

- "F_COVERS_SEC_EXPOSURE_FLAG" or "F_COVERS_RESEC_EXPOSURE_FLAG" has the flag as "Y" in the case of the exposure satisfying the following condition:
    - The sold credit protection is provided on a securitized or resecuritized exposure.
    - In the case of nth to default credit derivative, unless the sold credit protection is provided to a resecuritized exposure, the F_COVERS_SEC_EXPOSURE_FLAG must be "Y".
- If the F_COVERS_SEC_EXPOSURE_FLAG or the F_COVERS_RESEC_EXPOSURE_FLAG have a value of "Y", then these sold credit protection data is processed under securitization framework. Therefore, this is processed to FCT_SEC_EXPOSURES table.

- Else, the sold credit protection data is processed under non-securitization framework. Therefore, this is processed to FCT_NON_SEC_EXPOSURES table.

Sold Credit Protection Data Population

Sold Credit Protection Underlying Data Population

The underlying data is available for all the sold credit protection in the STG_UNDERLYING_EXPOSURES table. These contain the following data:

- The underlying of the sold credit protection has the "V_UNDERLYING_DATA_IDENTIFIER" as "SCP", to recognize this for the Sold credit protection treatment.
- The underlying of the sold credit protection has the "V_PARENT_EXPOSURE_ID" as the "V_EXPOSURE_ID" of the sold credit protection.
- In the case of guarantees and credit derivatives, there is only one underlying for the sold credit protection.
- In the case of nth to default credit derivative, there is more than one underlying for the sold credit protection.
- These underlying for the sold credit protection are processed to the FCT_NON_SEC_EXPOSURES table, wherein all the calculations required are processed. At the end of the processing, this is moved to the FCT_SCP_UNDERLYING table.

NOTE: If the underlying data for the sold credit protection are not provided, this is not treated as sold credit protection. Instead, this is treated as a regular exposure.

Sold Credit Protection Reclassification

The sold credit protection data is reclassified into the standard product type, party type, and asset type for the exposures which are covering the non-sec exposures. The sold credit protection data is reclassified into the standard product type and pool type for the exposures which are covering the sec exposures.

Treatment Specific to Sold Credit Protection

The sold credit protection is treated specifically in the case of the protection covering sec exposures and non-sec exposures.

Sold Credit Protection covering Non-Sec Exposures

The risk weight for the sold credit protection is based on the underlying exposure's asset class. The risk weighting applicable is based on the underlying exposure's asset class.

Process Flow for the Calculations

Treatment specific to Sold Credit Protection Covering Non-Sec Exposures

EAD calculation of the Sold Credit Protection
Underlying Data Asset Type Reclassification
Risk Weight Assignment Based on the Underlying Asset Type
Calculate the RWA
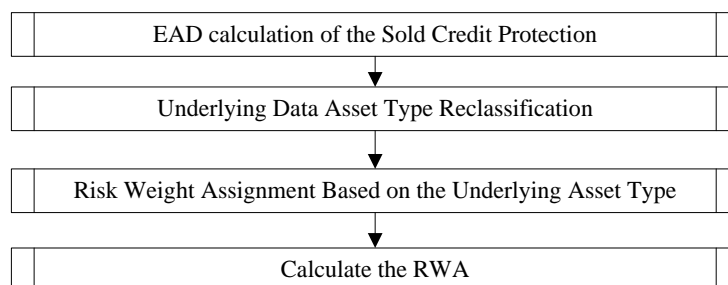
- EAD Calculation of the Sold Credit protection: The EAD for the sold credit protection is equal to the notional amount of the contract.
- Underlying Data Asset Type Reclassification: The Asset type reclassification for the underlying of the sold credit protection is the same as any other non-sec exposure Asset type reclassification.
- Risk Weight Assignment based on the Underlying Asset Type: The risk weight assignment for the sold credit protection is based on the asset type of the underlying exposure, which is the same as any other non-sec exposure. The risk weight for the underlying exposure is calculated and is updated to the sold credit protection exposure.
- Calculate the RWA: The RWA is calculated as the Pre-mitigation EAD multiplied by the Pre-Mitigation Risk Weight. In the case of sold credit protection exposures, the Pre-Mitigation EAD and the Post Mitigation EAD remains the same since there are no mitigants for these exposures.

Sold Credit Protection Covering Sec Exposures

The risk weight for the sold credit protection is calculated using the SSFA Approach. If any of the SSFA parameters are not available for calculation, then the sold credit protection is risk weighted 1250 %. Therefore the hierarchy of approaches for SCP is as follows:
- SSFA Approach
- Risk Weight @ 1250%
- This hierarchy of approaches is different from the securitization exposures.

Process Flow for the Calculations

Treatment specific to Sold Credit Protection
Covering Sec Exposures

```
┌─────────────────────────────────────────────────┐
│  EAD calculation of the Sold Credit Protection  │
└─────────────────────────────────────────────────┘
                       │
                       ▼
┌─────────────────────────────────────────────────┐
│            SSFA Parameters Calculation           │
└─────────────────────────────────────────────────┘
                       │
                       ▼
          ◇ All SSFA Parameters Available? ◇
    Yes ──┘                              └── No
     │                                        │
     ▼                                        ▼
┌───────────────────────────┐    ┌─────────────────────────┐
│ Risk Weight Assignment    │    │ Assign 1250% as Risk    │
│ Based on SSFA Approach    │    │ Weight                  │
└───────────────────────────┘    └─────────────────────────┘
         │                                    │
         └──►┌───────────────────────┐◄───────┘
             │   Calculate the RWA   │
             └───────────────────────┘
```
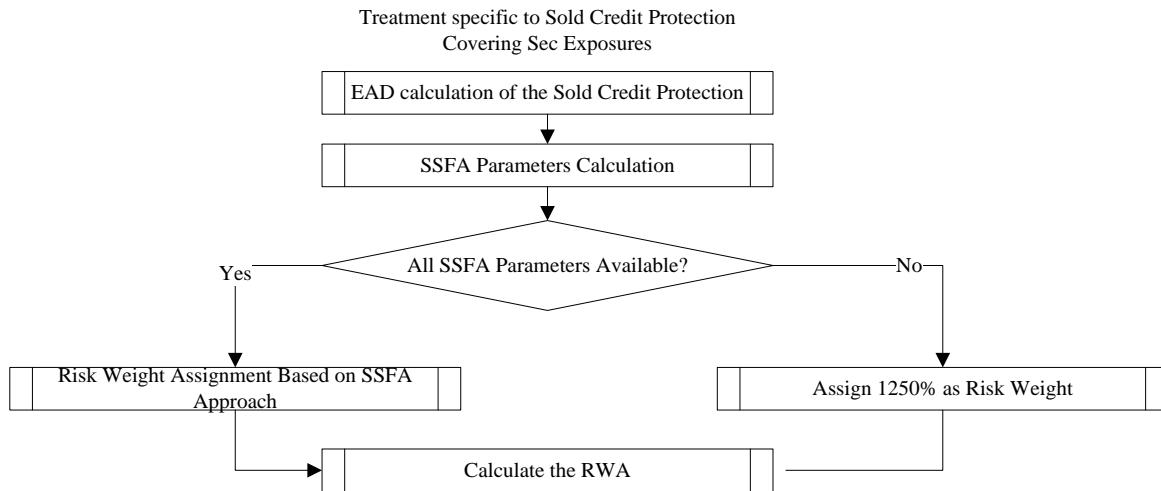
- EAD Calculation of the Sold Credit protection: The EAD for the sold credit protection is the notional amount of the transaction. In the case of nth to default credit derivative, the EAD is the largest notional amount of all underlying exposures.
- SSFA Parameters Calculation
  - Case of Nth to Default Credit Derivative
    - In the case of nth to default credit derivative, the pool parameters of SSFA (Kg, W, and p) are calculated in the same manner as any other securitized exposure.
    - The tranche parameters A and D are calculated differently from the calculation for the securitized exposures. They are calculated as follows:
      - Parameter A:
        - It is calculated as the ratio of the sum of the notional amount of all underlying exposures that are subordinated to the Bank's exposure to the total notional amount of all underlying exposures.
        - The smallest (n-1) exposures are subordinated to the Bank's exposure.
        - This is the same as the existing calculation in the US Basel III Advanced approach SCP treatment under SSFA.
      - Parameter D
        - It is equal to Parameter A + the ratio of the notional amount of the Bank's exposure to the total notional amount of all underlying exposures.
        - This is the same as the existing calculation in the US Basel III Advanced approach SCP treatment under SSFA.

Case of Guarantee and Credit Derivative: In the case of guarantee and credit derivative, the pool parameters of SSFA (Kg, W, and p) and the tranche parameters (A and D) are calculated in the same manner as any other securitized exposure.

7.2.1.6.1 Limitations

The limitations in OFSCAP 8.0.5.0.0 release is as follows:

1. Investment in Own Shares Treatment

    The investment in own shares which goes for capital treatment, has a phase-in treatment, wherein during phase-in a portion of the exposure goes for deduction from capital, and the remaining portion of the exposure goes for 100% RW. This is handled in the processing by the Phase-In treatment table, and this RW gets added into the Regulatory RWA Accounting Head.

    But for reporting, the reporting happens from an account level granularity, and not at a higher granularity of the accounting head. As the current application does not split the exposures into two in the processing table of Fact Non Sec Exposures (FCT_NON_SEC_EXPOSURES), the account level and the Phase-In treatment table values do not reconcile with each other. Currently, this has to be specifically addressed in the reporting layer, and is not part of the OOB product.

2. Reciprocal Cross Holdings Treatment

    The reciprocal cross holding amount which goes for capital treatment, has a phase-in treatment, wherein during phase-in a portion of the exposure goes for deduction from capital, and the remaining portion of the exposure goes for 100% RW. This is handled in the processing by the Phase-In treatment table, and this RW gets added into the Regulatory RWA Accounting Head.

    But for reporting, the reporting happens from an account level granularity, and not at a higher granularity of the accounting head. As the current application does not split the exposures into two in the processing table of Fact Non Sec Exposures (FCT_NON_SEC_EXPOSURES), the account level and the Phase-In treatment table values do not reconcile with each other. Currently, this has to be specifically addressed in the reporting layer, and is not part of the OOB product.

8 Indian (RBI) Jurisdiction

8.1 Basel II

Capital Adequacy related regulations as issued in the RBI-Final Guidelines of April 2007 and Amendments to Final Guidelines issued in March 2008, is incorporated in this OFS Financial Services Basel Regulatory Capital Release 6.1. In this jurisdiction, the following approaches for Risk Weighted Assets (RWA) and Capital Adequacy Ratio are supported:

Basel II

- Credit Risk
    - o Non Securitization – Standardized Approach
    - o Securitization – Standardized Approach
- Market Risk
    - o Market Risk – Standardized Approach
- Operational Risk
    - o Operational Risk – Basic Indicator Approach
- Capital Structure

Basel III

- Credit Risk
    - o Non Securitization – Standardized Approach
    - o Non Securitization – Foundation Internal Rating-Based (IRB) Approach
    - o Non Securitization – Advanced IRB Approach
    - o Securitization – Standardized Approach
    - o Securitization – IRB Approach
- Market Risk
    - o Market Risk – Standardized Approach
- Operational Risk
    - o Operational Risk – Basic Indicator Approach
- Capital Structure

8.1.1 Basel II – Standardized Approach

8.1.1.1 RBI II – High Level Process Flow for Standardized Approach

The Basel defined Capital Adequacy ratio is delivered out of box in OFSAAI as a building block approach. The application includes capital computations for Credit Risk, Market Risk, and Operational Risk along with Capital Structure and Capital Consolidation process.

For more information on the pre-defined Runs available with the application, see *OFS Basel Regulatory Capital Run Charts*.

8.1.1.1.1 Process Flow for Capital Adequacy Ratio Calculation
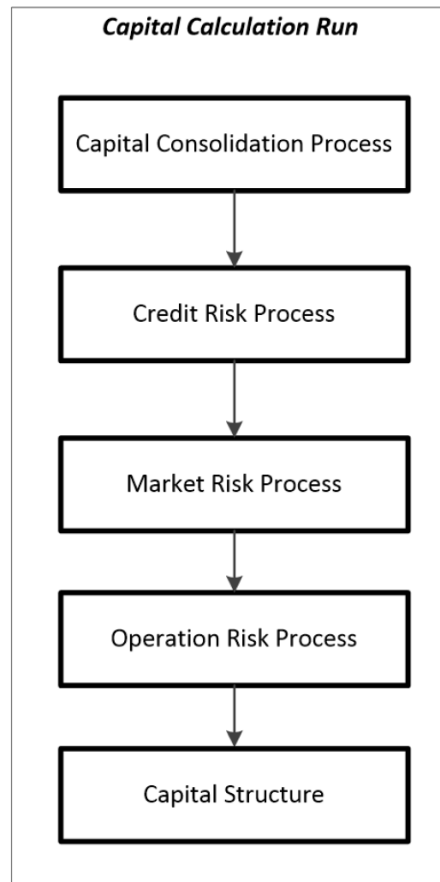
The Capital Calculation Run depicted in the preceding process flow is a single run which is a joined together by multiple processes. Each process is a block, compiled together to form an entire Capital Adequacy run. The individual blocks like the Credit Risk process, Market Risk process, and so on, also exist as individual runs which is described in the following sections.

8.1.1.1.2 Capital Consolidation Process

Capital Consolidation is a process common to each of the individual block when they are triggered separately as an individual run. For example: the standard out-of-box Market Risk run has Capital Consolidation and Market Risk process bundled together as a single Market Risk run. This is applicable for a Credit Risk run and Operational Risk run. The Capital Consolidation is explained in the following section and is not repeated under the Non Securitization process, Securitization process, Market Risk process, or Operational Risk section of this document.

In Capital Consolidation, the application processes the following.

Capital Consolidation Level Selection

The reporting bank can be a part of a financial group that has multiple legal entities like parent or child entities (subsidiaries) under its name. The entity on which you are required to process should be selected by you. Subsequently, level at which a Run is to be executed (solo or consolidated) should also be selected. You can select these options in the Run Management UI. However, if the Run is executed in the Run Rule Framework (RRF), then these options have to be set using the Rule '**Capital Consolidation Level Selection**' in the process '**CAPITAL_CONSOLIDATION**'.

CAPITAL_CONSOLIDATION is the first process to be added in all the Runs defined in the RRF except for the Staging Data Population Run. The Run Management UI selects this process by default.

Run Parameters Assignment

The RBI regulations state different approaches for calculating RWA. The Run Management UI in the application allows the reporting bank to define and execute a Run by selecting a combination of different Basel II approaches for RWA computation.

Run Parameter Assignment is also part of **Capital Consolidation** process. The Rule '**Run Definition User Defined Run Param Assignment**' is used to assign the Run parameters if a Run is executed in the RRF. If the Run is executed from the Run Management UI, then the parameters are populated based on the Run defined in the Run Definition window.

Currency Conversion

The Rules pre-defined in the application performs currency conversion of all General Ledger amount attributes to be used for Capital Consolidation from the Natural currency to the Reporting currency, based on the exchange rate provided.

Shareholding Percent Multiplication

For all entities in the Capital Consolidation process, the application updates the shareholding percentage against each entity data in the Fact Capital Accounting Head from the Fact Entity Shareholding Percent table. The parent data in the processing table of Fact Capital Accounting Head is updated with the value 1 and for each child entity the data is based on the parent's holding percentage specified for each child in fact entity share holding percent table.

8.1.1.1.3 Process Flow for Credit RWA

Credit RWA Run is a combination of Non Securitization RWA process and Securitization RWA process. A few processes like Credit Rating, Party Type Reclassification, and so on, are common between Non Securitization process and Securitization process. Though these sub processes are explained separately under Non Securitization and Securitization section of this document, it is executed only once under the Credit RWA run.

Certain sub processes under Non Securitization process like Reclassification, RW assignment, and so on are common across all types of exposures for example: banking book, over the counter derivative transactions, and securities financing transactions, and are executed only once in the Run. The details of these sub processes are explained under Reclassification and Risk Weight Assignment sub process of the Basel II Non Securitization exposures section of this document. Likewise, details of Credit Risk Mitigation for Non Securitization process is detailed under the Non Securitization section of this document and details of Credit Risk Mitigation for Securitization process is detailed under the Securitization section of this document.

For more information on the sub processes as detailed in the preceding process flow for the Non Securitization process and Securitization process, see Credit RWA.

For example: Non Sec Data Population is detailed under Data Population and Currency Conversion of Credit RWA section of this document.

8.1.1.1.4 Process Flow for Market RWA

Market RWA Run is made up of multiple sub processes specific to Market Risk. However, when Market Risk is bundled under a Consolidated Run and triggered, Capital Consolidation and Rating process is executed only once for Credit Risk and Market Risk. The details of each of the sub process mentioned in the preceding flow chart are present under Market Risk section of this document.

For more information on Market RWA computation, see Market RWA.

For example: 'Capital Charge for Interest Rate Instruments' sub process is detailed elaborately under 'Capital Charge Computation for Interest Rate Instruments' section of Market Risk. Likewise 'Capital Charge for Equities', 'Capital Charge for Foreign Exchange Transaction'   and 'Options risk charge calculation' has a detailed explanation present under 'Capital Charge Calculation for Equities', 'Capital Charge for Foreign Exchange Transactions, and 'Capital Charge for Options' sub process of the Market Risk section of this document, respectively.

8.1.1.1.5 Process Flow for Operational RWA
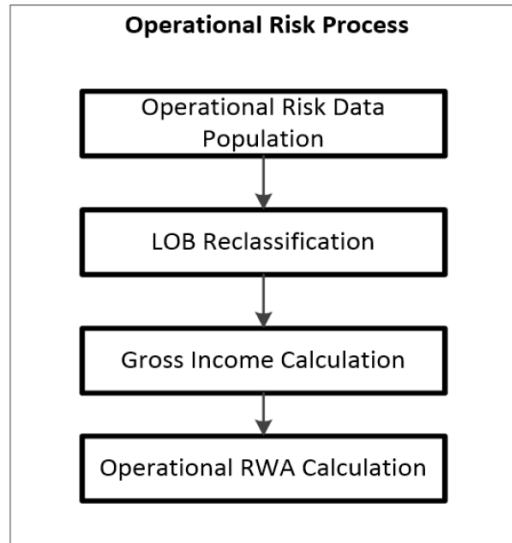
Operational RWA run is executed with the Capital Consolidation process. For more information on the Operational RWA computation, see Operational RWA.

For example: LOB Reclassification and Gross Income Calculation sub process are detailed as separate processes under the Operational RWA section of this document.

8.1.1.1.6 Process Flow for Capital Structure
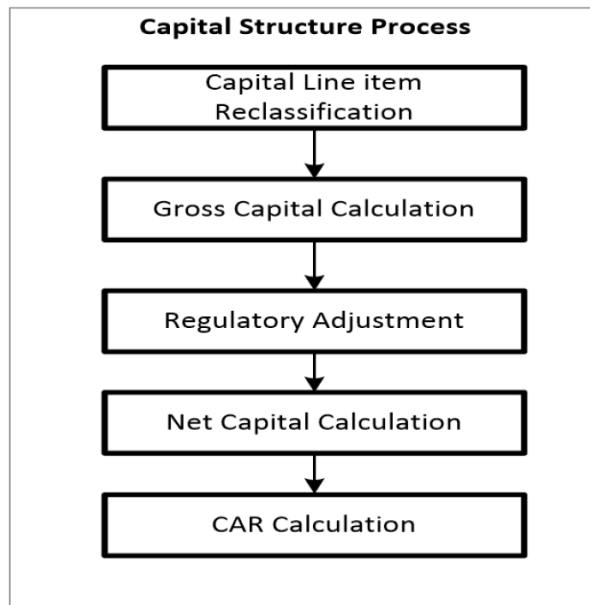
Capital Structure is executed along with Capital Consolidation, Credit Risk, Market Risk, and Operational RWA processes. For more information on the sub processes of Capital Structure, see Capital Structure.

For example: 'Gross Capital Calculation' mentioned in the preceding process flow is explained in detail under 'Gross Capital Calculation for T1, T2 and T3' sub process section of Capital Structure, in this document. Likewise, 'Regulatory Adjustment' and 'Net Capital Calculation' is detailed under 'Regulatory Adjustment to Tier 1 and Tier 2' and 'Calculation of Net Capital' sub process section of the Capital Structure, in this document.

8.1.1.2 Credit RWA

The application supports the computation of Credit RWA for Indian banks under RBI guidelines. Credit RWA computation covers Credit Risk for Non Securitized exposures and Credit Risk for Securitized exposures. For Non Securitized exposures, the application follows the Standardized Approach of RWA calculation.

8.1.1.2.1 Non Securitization – Standardized Approach

Similar to the BIS jurisdiction, all Non Securitized exposures are identified by their product types, counterparty types, and their corresponding asset classes by the application. A sample list of products types, party types, mitigant types, credit ratings are pre-defined in the application, as stated in the RBI guidelines. The application reclassifies the bank's product types and party types to standard product types and standard party types. The standard product type and standard party type are then mapped to form an asset class for each exposure. For equity exposures, the asset class is formed on the basis of standard product type only.

Some exposures can be hedged against Credit Risk through various mitigants like guarantors, collaterals, credit derivatives, and so on. These provide mitigation to credit risk and are considered while computing Credit RWA as per RBI norms. Hence, the application calculates the pre-mitigation RWA amount and post-mitigation RWA amount. Pre-mitigation RWA does not consider the effect of the reduction of RWA due to Credit Risk Mitigation (CRM). Post mitigation RWA considers the effect of CRM on the RWA amount.

Based on the asset class, the application calculates the Pre-CRM EAD and Post CRM EAD for each exposure. Through the CRM process, the bank considers the mitigation effect and calculates the post mitigation exposure at default amount. Pre-CRM EAD computes the total outstanding EAD and does not populate the break-up of the mitigants. Post CRM EAD computes the EAD and populates the break up by respective mitigant mapped to the exposure.

The application also computes the pre-mitigation RWA (Pre CRM RWA) and post mitigation RWA (Post CRM RWA) by multiplying the Pre-CRM EAD and Post CRM EAD by their respective risk weight. The risk weight is arrived at by considering the credit rating of the exposures or mitigants as per the RBI guidelines.

All exposures that fall under the category of internal transactions like holding own subsidiaries shares or investment in its capital, reciprocal cross holding, and so on, are identified in the Non Securitization process and treated separately under the Capital Structure process.

Process Flow for Non Securitization – Standardized Approach

Data Population

Pre-processing Steps

Credit Risk exposures are updated in the application for all the product types through their respective input tables known as Product Processors. Main categories of Credit Risk Non Securitization exposures, along with their respective table names that are used as an input, are as follows:

Product	Source Product Processor
Bills	STG_BILLS_CONTRACTS
Credit Cards	STG_CARDS
Swaps	STG_SWAPS_CONTRACTS
Futures	STG_FUTURES
Guarantees	STG_GUARANTEES
Investments	STG_INVESTMENTS
Lease Contracts	STG_LEASE_CONTRACTS
Letters of Credit	STG_LC_CONTRACTS

Product	Source Product Processor
Line of Credit	STG_CREDIT_LINE_DETAILS
Commitment Contracts	STG_COMMITMENT_CONTRACTS
Loans	STG_LOAN_CONTRACTS
Money market instruments	STG_MM_CONTRACTS
Overdraft	STG_OD_ACCOUNTS
Options	STG_OPTION_CONTRACTS
Re purchase contracts	STG_REPO_CONTRACTS
Equity Exposures	STG_INVESTMENTS
Underlying Exposures for Derivatives, Securitization and Covered Bonds	STG_UNDERLYING_EXPOSURES
Underlying Exposures for Derivatives (if Derivative is either a cleared transaction or an instrument, and the underlying reference asset is an instrument)	STG_UNDERLYING_MASTER/ STG_UNDERLYiNG_DTL
Underlying Exposures for Derivatives (if Derivative is not a cleared transaction or an instrument, or the underlying reference asset is not an instrument)	STG_UNDERLYING_EXPOSURES
Underlying Exposure for Mutual Fund / CIU	STG_FUND_CIS_COMPOSITION
Underlying Exposures for Repo contracts	STG_PLACED_COLLATERAL / STG_MITIGANTS
Credit Derivatives	STG_CREDIT_DERIVATIVES
Fixed Assets	STG_FIXED_ASSETS_DETAILS

Processing Steps

Stage data from the Product Processors or other stage tables is populated in the respective processing tables. Information from all Product Processors data is populated in a common Fact table for all non sec exposures (**FCT_NON_SEC_EXPOSURES**), except equity data which is first populated in the respective equity table (**FCT_EQUITY_EXPOSURES**) and is then (after risk weighing) populated in the common Fact table for all Non Securitized exposures. For more information on the list of columns to be populated within each table, see the *Download Specifications* document.

Shareholding Percent Multiplication

The exposure amount which is a part of the input data (Product Processors) is the exposure amount for a solo entity. However, for a consolidated Run, the parent exposure is considered only by the

shareholding percentage, based on the following calculation:

Exposure Amount   X   Share Holding Percent = Updated Exposure Amount

Where:

Share holding percent is allotted a value by the Rule **Cap Consl Effective Shareholding Percent for an Entity** in the process - **Capital Consolidation.** Shareholding percent multiplication is computed for the following attributes:

- Outstanding Principal
- Current Exposure Amount
- Undrawn Amount
- Exposure Market Value
- Exposure Accrued Interest
- Provision Amount
- Write Off Amount

Capital Consolidation Level Selection

The reporting bank can be a part of a financial group that has multiple legal entities as subsidiaries under its holding. You must select the entity on which capital consolidation must be processed. The execution of the Run can be 'Solo' or 'Consolidated'. Select this option in the **Run Execution** window of the **Run Management** UI. If the Run is executed in the Run Rule Framework (RRF) execution, then these options have to be set up in the Rule '**Capital Consolidation Level Selection**' in the process '**CAPITAL_CONSOLIDATION**'.

Run Parameters Assignment

Run management framework in the application allows the reporting bank to define and execute a Run by selecting a combination of different approaches for RWA computation. The Rule '**Run Definition User Defined Run Param Assignment**' is used to assign the Run parameters for a RRF Run. If a Run is executed in the [Run Management](#) UI, then the parameters are populated based on the Run defined in the **Run Definition** window. For more information on **Run Definition User Defined Run Param Assignment,** see *Run Parameters Setup for Run Creation.*

Mitigant data population happens after Non Sec Data Population process. Post mitigant data population currency conversion is done for all the mitigants.

Rating Information Processing

Pre-processing Steps

Data for credit ratings are to be provided as an input in the following rating specific tables:

- Accounts Rating Table (**STG_ACCOUNT_RATING_DETAILS**)

  Ratings of all Credit Risk Non Securitized Exposures, Securitized Exposures and Securitized Positions are captured in this table.

- Instrument Rating Table (**STG_INSTRUMENT_RATING_DETAILS**)

Ratings for all market risk exposures, investment exposures subject to credit risk (one that are in **STG_INVESTMENTS**), and mitigants, are captured in this table.

- Party Rating Table (**STG_PARTY_RATING_DETAILS**)

  Credit Rating for all customers and issuers are captured in this table.

- Sovereign Rating Table (**STG_SOVEREIGN_RATING_DETAILS**)

  Credit Rating for all countries is captured in this table.

Processing Steps

Banks obtain credit ratings from different sources and these are provided as an input in the application through the four rating tables mentioned in the preceding list. The application re-classifies the rating information to RBI standard ratings.

The rating reclassification lookup table (**FSI_RATING_CLASSIFICATION**) is used to lookup reclassified standard ratings, so that the reclassification rule is not repeated for each of the rating processing tables. Ratings are populated from the stage tables (**STG_PARTY_RATINGS_DETAILS**) to FSI tables (**FSI_PARTY_RATING_DETAILS**) using the lookup table (**FSI_RATING_RECLSSIFICATION**) to obtain reclassified rating.

Note: In the **STG_PARTY_RATINGS_DETAILS** table ensure that the following columns are mandatorily populated with data:

○ Rating source code (**V_RATING_SRC_CODE**)

○ Party Code (**V_PARTY_CD**)

○ Purpose (**V_PURPOSE**): In this field whether the rating is a domestic rating or foreign rating should be indicated. If any other rating is provided, then the exposure is considered as unrated.

○ Rating Code (**V_RATING_CODE**)

After ratings reclassification, the risk weight is updated in risk weight to rating mapping table (**FSI_RW_MAP_MASTER**). The multiple assessments data transformations logic, updates the rating and the risk weights to the exposures. For each exposure, the application checks the risk weight generated by each of its ratings. It then assigns the higher of the two lowest risk weight and the rating corresponding to this risk weight, to the exposure.

For unrated Non Securitized exposures, the application does an issue-issuer assessment to infer a rating of the unrated exposures, based on the rating of a similar instrument (referred as reference issue hereafter) issued by the same issuer. The reference issue is used only when it is of the same currency as the exposure and the exposure is senior or equivalent to the same.

Currency Conversion

The application converts the amount attributes, which are in natural currency, to reporting currency which is used for further calculations. The column names suffixed with '_ncy' are in the natural currency and are multiplied by currency conversion factor to populate values in the reporting currency. The Rule **Reporting Currency Code Assignment** assigns the reporting currency. For more information on Currency Conversion, see Exhibit 4 in *Annexure A: Key Concepts*.

NOTE: Rule Reporting Currency Code Assignment is set to 'USD' as out-of-box. However, you can modify this to any other currency. The reporting currency can be selected in the Run Execution window of the Run Management UI.

Reclassification

The application reclassifies the bank's product types and party types to standard product and party types. Based on standard product and party type, it forms an asset class for each exposure. Equity is reclassified by the application in a separate Rule. Similarly, the application does reclassification for mitigant on the basis of its mitigant types and reclassifies it to standard mitigant types.

Product Type Reclassification

Product types used by reporting bank as input data are reclassified to standard product types as per the RBI guidelines. The product types after reclassification are stored as standard product types. For Example: Housing Loan is reclassified as claims secured by residential property.

Party Type Reclassification

Similar to product type, the customer type and issuer type (which are stored as counterparty type) are also reclassified as standard counterparty type. The application expects all entity type data like customer type, issuer type, and legal entity type in a single table (**STG_PARTY_MASTER**). A single party type reclassification Rule reclassifies for customer types, issuer types, and entity types, as stated in the RBI norms. For Example: Individual is reclassified as Retail.

Asset Class Reclassification

On the basis of standard product type and standard counterparty type, an asset class is formed by the application. For example: If standard counterparty is large corporate, then the asset class is corporate, except when exposure has product types like cash and real estate. For standard product type gold, the asset class is Gold. For standard counterparty type Corporate Non SME and standard product type as Loan, the asset class is Corporate Non SME.

Asset class for all equity products is reclassified on the basis of equity type and product type.

Mitigant Reclassification

For mitigants the application reclassifies the mitigant type to the standard mitigant type like the debt securities, credit derivative, cash, and so on. It also reclassifies the mitigant issuer type to the standard mitigant issuer type like Banks, Corporate, and so on. The reclassification tasks are present in the **Mitigant Reclassification** sub process.

Pre-CRM EAD Computation

Credit Conversion Factor

This is applied to all off-balance sheet exposures. The CCF applied values are 0.2, 0.5, and 1. The various factors on the basis of which the CCF is applied are standard product type, type of facility (whether it is cancellable or not), and the maturity of exposure.

Pre-CRM Exposure at Default (EAD)

EAD is calculated for all asset classes based on the current exposure amount, accrued interest, off-balance sheet drawn CCF percent, drawn CCF percent, and Undrawn Amount. Using the same inputs, drawn EAD amount and undrawn EAD amount is calculated.

In a Standardized Approach, the EAD value of an exposure is calculated using a Rule. It is calculated as:

> **(Current Exposure Amount - Non Sec Investment amount which is above Materiality Level for Commercial Entity) * Off-Balance Sheet Drawn CCF Percent + Undrawn Amount * CCF Percent + Net accrued but unpaid interest and fees**

In the Rule **IND_MAT_CHK_CE_CR_STD** for the processing of the Data Transformation **Fn_Dt_Ind_Mat_Chk_CE_CR_STD,** the sum of T1, T2 and T3 components of capital should be provided as an input. This is a different standard account line item as compared to the current computation of total capital.

Risk Weight Assignment

Non Sec Exposures Risk Weight

Risk Weight is assigned on the basis of asset class and the credit rating. The risk assigned to a particular rating is as per RBI guidelines. The risk weight Rules operate on the basis of risk weight table (**FSI_RW_MAP_MASTER**). Highly rated exposures are allocated low risk weight and poorly rated exposures are allocated high risk weights. If the exposure has more than one rating (rated by more than one agency), then the final rating is assigned on the basis of multiple assessments.

For a scheduled or a non scheduled bank, risk weight is assigned based on capital to Risk-Weighted Assets Ratio (CRAR) of the respective bank. Likewise consumer credit, loans against gold and silver, and so on, is assigned risk weight as per the RBI guidelines.

Pre-CRM RWA Computation

Pre-CRM RWA is calculated for all asset classes by multiplying the Pre-CRM EAD with risk weight. In the standardized approach, RWA for Unexpected Loss is calculated as:

> **Non Sec Pre-Mitigation Pre-Volatility Haircut Exposure at Default * Non Sec Risk Weight for UL before Mitigation**

Mitigant Eligibility

The application handles multiple mitigants for CRM like financial collateral, on-balance sheet netting, guarantees, credit derivatives, and so on. The mitigant is identified as eligible or not based on the eligibility rule for CRM under comprehensive approach mentioned in RBI guidelines.

In the Comprehensive Approach, credit rating of the collateral is considered for all mitigant types issued by all party types while deciding whether mitigant is eligible for a particular exposure or not. The pre-defined Rules in the application perform these checks. Separate eligibility rules are present for mitigants types that are equity, mutual funds, or debt security. For the remaining mitigant types, a mitigant is marked as eligible only if its credit rating is better than the exposure to which it is providing protection and the mitigant is classified as senior in position.

Mitigant eligibility is also checked based on the original and residual maturity of the collateral. Collateral is classified as eligible only if its original maturity is more than 1 year and residual maturity is more than 3 months.

Mitigant Risk Weight

Similar to Non Securitization exposures, collaterals or mitigants are also assigned a risk weight based on their issuer type, credit rating, and original maturity of mitigant. For financial collateral, the RW used is 0.

Capital Consolidation

If the reporting bank has an exposure to one of its own subsidiaries, then that exposure is classified as internal exposure. Each of the internal transaction, that is, the transaction between parent and its subsidiary, is marked as deduction line item. The deduction is processed as part of the RBI capital structure processing and all internal transactions are eliminated from any RWA calculation.

Mitigant Haircut Assignment

Only eligible mitigants are considered for haircut assignment and for further processing. Data of the eligible mitigants flows from the mitigants table to sub exposures table. The application does computations for three kinds of mitigant haircut which are volatility haircut, FOREX haircut, and maturity mismatch haircut. Volatility haircuts are assigned to the collateral to account for any future fluctuations in the market value of the financial collateral. Pre-defined Rules in the application assign haircuts for various type of financial collateral like debt securities, equity, mutual funds, and so on.

In the supervisory haircut method, the application assigns volatility haircut based on issues, issuer's ratings, mitigant's residual maturity, and type of mitigant as per RBI guidelines. If the exposure and collateral are in different currencies, then the application makes an adjustment by applying the FOREX haircut. If the residual maturity of the Credit Risk Mitigant is less than that of the underlying credit exposure, then a maturity mismatch haircut is applied to adjust the value.

Allocation of Mitigants to Exposures

The application has a pre-built optimizer for optimum allocation of mitigants to the exposures for the purpose of CRM. One-to-One, Many-to-One, and Many-to-Many mapping of mitigants are handled in an efficient manner which involves storage of intermediate computations for traceability. For more information on Pooling and Optimizer, see Exhibit 2 and Exhibit 3 in *Annexure A: Key Concepts*.

All mitigants which are eligible and mapped to an exposure are then populated to a new table where each exposure is broken down to the mitigant types. An additional row is included which treats the exposure

as having covered and uncovered portion. The covered factor and uncovered factor is also populated in this table.

The application uses the linear programming method to allocate the mitigants to the exposures. Pooling identifies the exposure and mitigant data from sub exposures (**FCT_SUB_EXPOSURES**) table. Exposure identifier and mitigant identifier are the attributes on which Pooling is performed. It assigns the pool ID for each exposure-mitigant combination. Based on these pool ids, the optimizer allocates a covered factor to the exposures. Optimizer allocates mitigants to exposures.

Post-CRM RWA Computation

Post CRM RWA is calculated by multiplying the post mitigation EAD with the corresponding risk weight. Post mitigation EAD is the sum of covered and uncovered exposure amount for each account.

8.1.1.2.2 Securitization – Standardized Approach

The RBI guidelines differentiate the Credit Risk computation of the Securitized exposures from Non Securitized exposures. As securitized exposures are part of off-balance sheet transactions, it follows a waterfall cash flow mechanism unlike the other exposures. Hence these exposures are treated differently. Due to the economic crisis of 2008, the Basel Rule has categorized securitized exposures into securitized and re-securitized exposures.

Securitized exposures are exposures which are issued out of a pool of underlying exposures for the transfer of risk. Re-securitized exposures are the exposures which are issued out of a pool of underlying exposures which constitutes non-securitized exposures and some portion of securitized exposures. The application is capable of handling both securitized exposures and re-securitized exposures. It also handles the calculation for the originator and the investor bank roles. At a broad level, there are two categories of Investors:

- An Investing Bank who has invested heavily in securitization.
- An Investing Bank who has invested minimal in securitization.

For both the investors, the data is expected in the Stage Underlying Exposures (**STG_UNDERLYING_EXPOSURES**) for the underlying of the pool, Total Pool Level attributes in the Stage Pool table (**STG_SECURITIZATION_POOL**), Tranche Level attributes in the Stage Tranche table (**STG_SECURITIZATION_TRANCHE**), and the Exposure Level Attributes in the respective product processor (PP) tables.

For an originator, the data is expected in the same manner as the Investor, except for the Underlying Exposures. The underlying exposures of the pool are expected in the respective PP tables, depending on the product type of the underlying exposures.

If the exposure is a credit protection in the form of guarantee, it is expected in the Stage Guarantees table (**STG_GUARANTEES**), and if it is a credit derivative, it is expected in the Stage Credit Derivatives table (**STG_CREDIT_DERIVATIVES**). If it is a regular investment in the Tranches by an investing bank, or it is part of the mandate for retention in the pool or tranche for an originating bank, the data is expected in the Stage Investments table (**STG_INVESTMENTS**).

For exposures being a facility like liquidity facility, or servicer cash advance, the exposures are expected

in the Stage Commitment Contracts table (**STG_COMMITMENT_CONTRACTS**).

The application calculates capital for Securitization exposures as per the Standardized Approach stated in the RBI guidelines.

In some procedures, the calculations pertaining to the underlying exposures of the Securitization transaction are required. This change has an impact on the Securitized exposures and the Non Securitized exposures.

Process Flow Credit Risk – Securitization-Standardized Approach

The process flow for standardized approach of Securitization exposures are as follows:

Credit Rating Data Processing

All the rating information of the exposures and the mitigants are populated from the staging tables to the processing tables. The exposure and the tranche rating information are captured in the account rating tables and the mitigants rating information are captured in the instrument rating details.

Data Population

The data pertaining to the pool, tranche, and exposures are populated from the staging tables to the processing tables. The underlying exposures data are captured in the respective Product Processor tables (and for these the process pertaining to the Non Securitization exposures is followed).

Mitigant Data Population

The mitigants data are populated from the staging table to the processing table. The exposures which are mapped to the mitigants are captured and populated from the staging table to the processing table.

Sec Reclassification

The application uses the standardized data for all kinds of calculation (product type like eligible liquidity facility, bank role like originator, pool type like residential revolving mortgages). Before any calculation, the application reclassifies the bank specific data to standard data, similar to the terms used in the RBI guidelines. It reclassifies the bank role to the standard bank role of an originator or investor. Other bank roles like sponsor, credit protection provider, and so on, are reclassified into originator, investor, and so on respectively. The application also reclassifies the pool type to the standard pool. It also reclassifies the product type to the standard product type like Mortgage Backed Securities (MBS), eligible liquidity facility, and so on.

Mitigant Reclassification

For mitigants, the application reclassifies the mitigant types to the standard mitigant types like debt securities, main index equities, cash, and so on. It also reclassifies the mitigant issuer type to the standard mitigant issuer type like sovereign and corporate issuer.

Sec Pre CRM Computations

The application calculates the pre-CRM RWA for the exposures by multiplying the pre-CRM EAD with the risk weight of the exposures. This is handled in the Pre CRM Computations sub process. The exposures which are lower than the investment grade and the unrated exposures are deducted from the capital. Exposures that are ineligible and unrated liquidity facilities are also deducted.

Pre-CRM EAD Computation

The application assigns a CCF percent to all the off-balance sheet items, as per guidelines of RBI. Further, it arrives at the pre CRM EAD amount. The CCF percentages are assigned based on the bank role, the standard product type (like the eligible liquidity facility), the applicable ratings, and original maturity.

Risk Weight Assignment

For Securitization and Re-securitization exposures, the assignment of risk weight is different from the Non Securitization process. The application assigns the risk weight to the exposures based on the bank role and external rating assigned to the exposures. If the exposures have internal ratings assigned, then the application treats the exposures as unrated. Initially, the risk weight assigned to each of the ratings and then the multiple assessments is applied by the application. For multiple ratings assigned to the exposures, the application assigns one final rating to the exposure and the application updates the rating (after multiple assessments) and the corresponding risk weight to the exposures,

The application also handles other Securitization exposures like the eligible liquidity facility. For eligible liquidity facility, the application computes the maximum risk weight of underlying exposures and assigns it to the facility.

Sec CRM Process

Mitigant Eligibility, Mitigant Risk Weight, Haircut Assignment, and Allocation of Mitigants to Exposures are handled in **Sec CRM** sub-process.

Mitigant Eligibility

The application identifies the eligible mitigants based on the criteria as mentioned by the RBI guidelines. The application uses the Comprehensive Approach for the mitigants which are part of the collateral. This is similar to the mitigant eligibility of the Non Securitization process.

The application processes multiple assessments of ratings for the mitigants as well, since some of the mitigant eligibility criteria are based on the ratings and risk weight of the mitigants. The eligibility of the collateral mitigants are based on the party type of the mitigant, mitigant types, the credit rating assigned to the mitigant or the party (as applicable) and whether the collateral is classified as senior or not. For equity, the eligibility is based on the main index equity and the equity trading status. For mutual funds, the eligibility is based on the eligible mutual fund indicator.

Based on the criteria of eligibility mentioned in the RBI guidelines, the application identifies whether the mitigant is eligible or not. It also identifies the eligibility of the mitigants based on the comparison of the risk weight of the exposures and the mitigants. If the mitigants risk weight is lesser than that of the exposures, then the mitigants become eligible or else the application makes it ineligible.

Mitigant Risk Weight

The application calculates the mitigant risk weight similar to the exposure risk weight of Non Securitized exposures. This is based on the issuer type and the credit rating which includes the unrated issuers as well. The application performs multiple assessments for the mitigants, similar to the process followed for Non Securitized exposures, and arrives at a single rating for the mitigant. Further, the application assigns the final risk weight to the mitigant. For a financial collateral, mitigants like cash and gold zero risk weight is assigned.

Haircut Assignment

The application assigns the various haircuts, as applicable to the mitigants. Haircut is assigned to mitigants in the **FCT_SUB_EXPOSURES** table. The application uses supervisory haircuts and scales up, if required, based on the minimum holding period or uses the bank's own estimate of haircuts. The application applies the volatility haircut, FOREX haircut, and the maturity mismatch haircut to the mitigants as appropriate, as stated in the RBI guidelines. Only eligible mitigants are considered for haircut assignment. The eligible mitigants data flows from Mitigants (**FCT_MITIGANTS)** table to Sub Exposures (**FCT_SUB_EXPOSURES)** table. The application populates an uncovered mitigant for each exposure in the **FCT_SEC_EXPOSURES** table. This uncovered mitigant has the same feature as that of the exposure and are created in the **FCT_MITIGANTS** table

Allocation of Mitigants to Exposures

The application computes the mitigant value post all haircuts. Further, it uses the pooling and optimizer logic to allocate the exposures to the mitigants. This allocation is a bit different from the optimizer logic of Non Securitization exposures as the Securitized exposures have priority in the cash flow and gets the maximum protection by the mitigants. The senior most exposure (or tranche) is denoted with seniority 1 and the second senior exposure is denoted with seniority 2 and so on. For securitization exposures, the mitigants are given preference to the senior most exposure and later to the other exposures based on the seniority. The other parameters which are considered in the allocation logic are the risk weight and the mitigant value post haircut.

The application uses the linear programming logic to allocate the mitigants to the exposures. The logic of Pooling is the same as the Pooling logic in Non Securitization exposures. The optimizer logic for Securitization exposures is explained as follows:

Based on the seniority of the exposures, risk weight of the exposures, and the mitigant and the mitigant value, the rank order in which the mitigants are allocated to the exposures is arrived at. The order of allocation can be modified by updating the operation type and the optimizer constraints of the objective function. You can select the allocation rank measure in the **Optimizer Definition** window, while defining the optimizer logic. For more information on defining the optimizer, see Exhibit 2 and Exhibit 3 in *Annexure A: Key Concepts*.
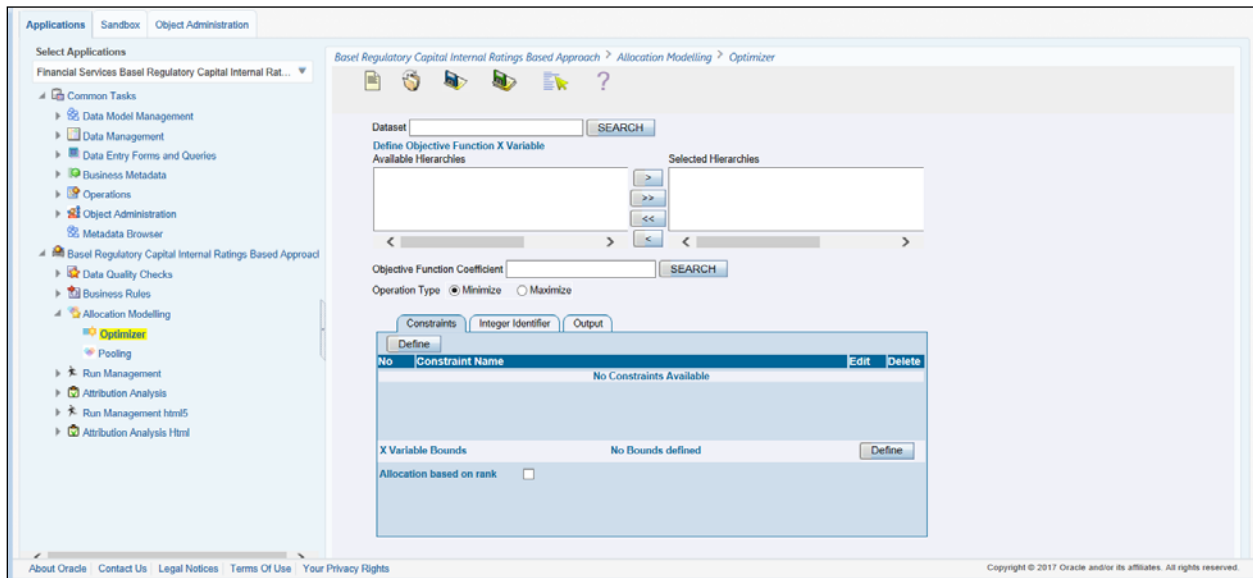
The remaining steps for creating optimizer definitions are the same as in the Non Securitization process. The optimizer functions on the minimization constraint logic.

Single Mitigant Mapped to Single or Multiple Exposures

If there is one or more than one exposure mapped to a single mitigant, the mitigant is allocated to the exposure with the highest seniority. If there is more than one exposure with the same highest seniority, then the mitigant is allocated to the exposure which yields the highest mitigant value post haircut.

Single Exposure Mapped to Single or Multiple Mitigants

If there is one or more than one mitigants mapped to a single exposure, the least risk weighted mitigant is allocated to the exposure. If there is more than one mitigant with the same least risk weight, then the mitigant which has the highest mitigant value post haircut is allocated to the exposure.

Multiple Exposures Mapped to Multiple Mitigants

The treatment for this case is similar to the treatment of single mitigant mapped to single or multiple exposures, for the identification of the mitigant which is assigned to the exposures. The treatment pertaining to single exposure mapped to multiple mitigants is followed to yield the credit risk weighted exposure amount.

Using the above logic, the application calculates the factor of exposure covered by the mitigant and the factor of the exposure uncovered (without any protection).

Sec Post CRM RWA Computation

The application computes the covered amount and the uncovered amount for the exposures. The covered amount is computed by multiplying the covered factor with the exposure amount, and to this covered amount, the application assigns the mitigant risk weight. The product of the covered amount and the mitigant risk weight is the covered RWA. The uncovered amount is computed by multiplying the uncovered factor (which is 1 – sum of all covered factors for that exposure) with the exposure amount. This uncovered amount is multiplied by the exposure risk weight to get the uncovered RWA. The sum of the covered RWA and the uncovered RWA is the Post CRM RWA of the Exposure.

> **Post-CRM RWA = Covered Amount * Risk Weight of the Mitigant**
>
> **+ Uncovered Amount * Risk Weight of the Exposure**

This logic is handled in Sec Post-CRM RWA computation sub process.

8.1.1.2.3 Key Data Elements

Key data elements for Securitization computation is as follows. For a complete list of tables and columns, see the Download Specifications document.

Securitization Exposures (Standardized Approach)

The Key attributes required in the case of an investor or a third party that does not provide the complete pool and tranche details are as follows:

- Credit Enhancement Level
- Pool Exposure Amount
- Sec Second Loss Position of the Tranche
- Seniority of the Tranche
- Sec Trading Book Approach

For an investing bank, the data is expected in the Stage Underlying Exposures (**STG_UNDERLYING_EXPOSURES**) for the underlying of the pool, Total Pool Level attributes in the Stage Pool table (**STG_SECURITIZATION_POOL**), Tranche Level attributes in the Stage Tranche table (**STG_SECURITIZATION_TRANCHE**), and the Exposure Level Attributes in the respective PP tables.

For an originator, the data is expected in the same manner as the Investor, except for the Underlying Exposures. The underlying exposures of the pool are expected in the respective PP tables, depending on the product type of the underlying exposures.

For a credit protection exposure in the form of guarantee, it is expected in the Stage Guarantees table (**STG_GUARANTEES**); and if it is a credit derivative, it is expected in the Stage Credit Derivatives table (**STG_CREDIT_DERIVATIVES**). If it is a regular investment in the Tranches by an investing bank, or it is part of the mandate for retention in the pool or tranche for an originating bank, the data is expected in the Stage Investments table (**STG_INVESTMENTS**).

For a liquidity facility exposure, or servicer cash advance, the exposures are expected in the Stage Commitment Contracts table (**STG_COMMITMENT_CONTRACTS**).

Mitigant Eligibility (Standardized Approach)

Eligible Mutual Fund Indicator, Main Index Equity Indicator, and Equity Traded Indicator.

Miscellaneous

- All tranche information, regardless of the bank having exposure or not, is required for inferring the ratings, credit enhancement level computation, and eligibility of nth to default credit derivative mitigant.
- Mitigant value is to be assigned at an exposure level (not to the tranche).
- Mitigant pool ID in the exposure mitigant mapping table for nth to default mitigants is required for eligibility of nth to default credit derivative mitigant.
- Attachment point of tranches based on original balances is required for eligibility of nth to default credit derivative mitigant.

8.1.1.3 Market RWA

RBI introduced Market Risk Capital Charge calculation in the year 2007. The Market Risk Capital Charge is expected to cater to the following trading book portfolio information of an Indian bank:

- Securities included under the Held for Trading category
- Securities included under the Available for Sale category
- Open gold position limits
- Open foreign exchange position limits
- Trading positions in derivatives
- Derivatives entered into for hedging trading book exposures.

As of 2007, the guidelines are issued for the Standardized Approach only.

8.1.1.3.1 Standardized Approach

In the Standardized Approach (STD Approach), the Market Risk Capital Charge is calculated for the following instrument types:

- Interest Rate related Instruments (IR Instruments)

- Equity Position Risk

- Foreign Exchange Risk

- Options

Prerequisite for Market Risk Processing

Execution of the Run, **Staging Data Population - Market Risk - RBI Standardized Approach** is usually a onetime activity. This should be executed once before actual Market Risk Run is executed. The following tasks are populated when the Run is executed.

- IRC Data

- Market prices of the instruments

- Bank positions

This Run populates the instrument level data that is required by the actual Run for further processing. The instrument level data, such as number of units of the instruments on that particular MIS date is downloaded in bank instrument position (**STG_BANK_POSITIONS)** table. This data flows into the fact table for further processing. The OTC instrument price is expected as a download. For non-OTC instruments the data for instruments' price is captured in Market Instrument Contract (**STG_MKT_INSTRUMENT_CONTRACT)** table. This data flows into the fact table for further processing. For IR instruments, the interest rate required is captured in IRC Rate History (**STG_IRC_RATE_HIST)** table. This data flows into the fact table for further processing. This data is required for term structure that is used in Modified Duration and Greeks parameter calculation for options.

Process Flow for Market RWA

The RWA computation for Market Risk for the Indian jurisdiction is computed under the process IND_RBI_III_MKT_RISK. In this process, RWA is computed for Interest Rate, Equity, FOREX, and Options. The process IND_RBI_III_MKT_RISK is mapped to the following pre-defined Run which computes Market RWA:

Run: Risk Weighted Asset Calculation - Market Risk - RBI Standardized Approach

Capital Consolidation

For a reporting bank the level at which the consolidation is processed is identified by the application. You can select Solo or Consolidation level for each entity in the rule present in the Capital Consolidation process. This particular process handles entity level details. The entity data is captured in Legal Entity Details (**STG_LEGAL_ENTITY_DETAILS**) table. All the child entities underlying a parent are considered for RWA consolidation. When consolidation is the level selected for a reporting bank, each child entity data is consolidated with the parent entity post entity shareholding percent multiplication.

> ***For more information on the process and sub process that computes this task, see the following:***
>
> *Process:* IND_CAPITAL_CONSOLIDATION
>
> *Sub-process:* Capital Consolidation Approach

Rating Process

Rating data is expected for all instruments which bear an interest rate risk. The rating data is reclassified into RBI equivalent standard rating and the standard rating is considered for assigning specific risk charge for interest rate instruments, wherever applicable. If there are multiple ratings for the same issue, then the application does a multiple assessment check as per the multiple assessment logic detailed in the Basel guidelines by the RBI. This process assigns a RBI equivalent rating for an instrument, counterparty and/or issuer, based on the rating details available for the same, after applying multiple assessment logic.

> ***For more information on the process and sub process that computes this task, see the following:***
>
> *Process:* IND_CREDIT_RATING_PROCESSING
>
> *Sub-process:* Credit Rating Data Population

Position Conversion

Position conversion is processed before Capital Charge calculation under Market Risk. In Position Conversion different instruments are broken into long and short positions and carried forward for specific and general risk charge calculation. All derivative instruments undergo position conversion so that the instrument is broken down into simplified positions for further processing. For derivative positions in equities, commodities, gold, currencies, and so on, only one leg is exposed to interest rate and other leg is exposed to the respective asset (equity, FOREX). The following information is required for position conversion: Long/Short position, Value of Notional Position, Coupon Rate, and Maturity.

Methodology for Position Conversion

While calculating interest rate risk, each instrument is converted into multiple positions. The notional value of each position is derived based on the following methodology:

Notional positions in actual debt securities is valued as the nominal amount underlying the contract at the current market price of the debt security.

Positions in zero-specific-risk securities is valued using one of the following two methods:

- The present value approach, under which the zero specific-risk security is assigned a value equal to the present value of all the future cash flows that it represents.

- The alternative approach, under which the zero specific-risk security is assigned a value equal to the market value of the underlying notional equity position in the case of an equity derivative; the notional principal amount in the case of an interest rate or foreign currency swap; or the notional amount in the case of any other financial instrument.

In the case of options, the delta weighted values are processed for general risk charge calculation. Delta is computed by the application based on the instrument type, coupon, residual maturity, strike price, spread, option premium value, and so on.

For an Interest Rate (IR) Swap, the parent instrument is identified as a Receiver or Payer swap based on whether the bank is receiving fixed or paying fixed, respectively. After Position Conversion, the parent swap is converted to two child positions which is in zero specific risk securities. The exposure amount for each of these positions is computed based on the coupon rate of receiving leg for the long child position and the coupon rate of the paying leg for short child position. Currently the notional amount for both the child positions is being computed using the current market price column of the parent.

Instrument Coverage

- Interest Rate Derivatives
    - Bond Forward
    - Forward Rate Agreement
    - Bond Future
    - Future on a Basket/Index of bonds
    - Interest Rate Futures
    - Receiver Swap (without deferred start)
    - Payer Swap (without deferred start)
    - Basis Swap (without deferred start)
    - Forward Basis Swap
    - Forward Receiver Swap
    - Forward Payer Swap
    - Dual Currency Bond
- Equity Derivatives
    - Equity Forward
    - Equity Future
    - Equity Swap
- Currency Derivatives
    - Currency Forward
    - Currency Future
    - Currency Swap
    - Gold Forward
- Options / Structured Products
    - Option on Equity
    - Option on Currency
    - Option on Commodity
    - Option on Currency Future
    - Option on Currency Forward

- o Currency Swaption
- o Option on a bond
- o Option on a bond future
- o Option on a Forward Rate Agreement
- o Option on an Interest Rate Future
- o Swaptions

Position Conversion Process Flow

The process flow of Market Risk Position Conversion is as follows:

Position Conversion Data Population

The application populates **FCT_MARKET_RISK_EXPOSURES** with the details given by the bank in **STG_BANK_POSITIONS** and **STG_INSTRUMENT_CONTRACT_MASTER**. FOREX exposures of the bank are populated into **FCT_MARKET_RISK_FOREX**. This exercise is processed for all the trading book exposures.

> *For more information on the process and sub process that computes this task, see the following:*
>
> *Process:* IND_MKT_RISK_POSITION_CONVERSION
>
> *Sub-process:* Market Risk Data Population

Currency Conversion

All the positions in other currencies are converted into the reporting currency of the bank, based on the currency conversion rate between the exposure currency and reporting currency.

> *For more information on processes and sub processes that compute this, see the following:*
>
> *Process:* IND_MKT_RISK_POSITION_CONVERSION
>
> *Sub-process:* Market Risk Currency Conversion

Shareholding Percent Multiplication

For consolidated runs, exposures of the child entities are multiplied by the entity shareholding percentage to arrive at the consolidated exposure at the parent level.

> ***For more information on the process and sub processes that compute this task, see the following:***
>
> *Process:* IND_MKT_RISK_POSITION_CONVERSION
>
> *Sub-process:* Shareholding Percent Multiplication

Position Conversion of Derivatives into Simple Positions

The application takes the contract details from the instrument table and breaks each contract into multiple positions into market risk exposures (**FCT_MARKET_RISK_EXPOSURES**) table. The application splits instruments which are derivatives in nature into multiple positions based on the instrument position mapping available in the mapping table. For example: A bank having a plain long position in a derivative instrument is split into one long and one short position. Therefore, for each position and nature of contract type, the application creates the required number of positions in the processing table. The download information used for position conversion is contract details, instrument type, contract position, position mapping, and so on.

The application reclassifies all bank instruments into standard instrument types based on contract type, contract position, market risk position, and so on. A fixed bond forward with a long position in the contract is reclassified into fixed rate bond for the long leg and zero risk security for the short leg, created by position conversion. The reclassifications are further used for notional value calculation.

> ***For more information on the process and sub process that computes this task, see the following:***
>
> *Process*: IND_MKT_RISK_POSITION_CONVERSION
> *Sub-processes:* Position Conversion Options, Position Conversion Basket Futures - Interest Rate, Position Conversion Swaps, and Position Conversion Forwards and Futures

Position Conversion Parameter Assignment

After position conversion, that is, breaking each derivative instrument into long and short leg, the application assigns instrument parameters for each position leg created under position conversion logic. For each leg, relevant information like: coupon rate, coupon frequency, maturity, strike price for options, option premium value, and so on, are updated from parent information. This information is used in duration calculation for Duration Ladder Approach, calculation of Greeks for option charge, and so on.

> ***For more information on the process and sub process that computes this task, see the following:***
>
> *Process:* IND_MKT_RISK_POSITION_CONVERSION
> *Sub-processes:* Position Conversion Options, Position Conversion Basket Futures - Interest Rate, Position Conversion Swaps, and Position Conversion Forwards and Futures

Notional Value Calculation

Notional value of each leg created by position conversion for each instrument is calculated based on the contract characteristics (market price, number of units). For options, it is the delta weighted position which is carried forward for Market Risk Charge calculation.

There is some dependency on different instrument types, like; the exotic options can further result into a vanilla option after position conversion, hence the position conversion should be processed in the following order of instrument types:

- Options

- Basket Futures

- Swaps

- Forwards/ Futures

After position conversion of basket futures instrument types, position offsetting on different positions of same kind of instrument types is processed and the post offset exposure amount is arrived at.

> *For more information on the process and sub process that computes this task, see the following:*
>
> *Process:* IND_MKT_RISK_POSITION_CONVERSION
>
> *Sub-processes:* Position Conversion Options, Position Conversion Basket Futures - Interest Rate, Position Conversion Swaps, and Position Conversion Forwards and Futures

Example of a Forward Rate Agreement (FRA) Position Conversion

A purchased FRA can be depicted through two notional zero-coupon positions: one short position (liability) up to the maturity of the underlying credit transaction and one long position (claim) up to the settlement of the FRA. Suppose a firm purchases 3 x 6 month FRA, principal: 1000; interest rate 6%. This position is broken down into two opposite zero coupon bond positions as follows:

First Position:

Position   : Long

Value of Notional Position   : PV {1000/ ((1+5%) ^0.25) = 987.87}

Maturity   : 3 months

Coupon   : Zero (Coupon of less than 3%)

Second Position:

Position   : Short

Value of Notional Position   : PV {1000/ ((1+5%) ^0.5) = 975.90}

Maturity   : 6 months

Coupon   : Zero (Coupon of less than 3%)

A sold FRA has positions exactly opposite to the one given in the preceding example, that is, the long position iscome short and short position iscome long, with the value, maturity, and coupon remaining the same.

The actual discount rates for discounting the notional values of the two legs in the preceding example is the interest rates pertaining to the respective maturities, that is, 3 months (long leg) and 6 months (short leg). For simplification purposes, an assumed rate of 5% is considered in the preceding example. The procedure followed by the application taking the preceding example into consideration, is as follows:

1. The FRA as contract is captured in the contract record details table with banks position in the contract in the position table. The application also captures the position mapping table for the above instrument type which is used for position conversion. For the preceding FRA example, two positions are created, one long position with a maturity of 3 months and a short position for the life of the contract, that is, with a maturity of 6 months.

2. Both the position legs are reclassified into zero specific risk security.

3. The various contract parameters are assigned by the application to both the legs. Example: Coupon Rate, Maturity.

4. The Notional Value of both the legs is calculated as per the logic stated in the example.

Capital Charge Computation for Interest Rate Instruments

The total risk charge for Interest Rate (IR) instruments consists of specific risk charge (specific to the Issuer and Instrument) and general risk charge (market related risk vested in the instrument).

Process Flow Diagram for Interest Rate Risk

Specific Risk Charge

Specific Risk Weight is assigned based on the issuer type and the residual maturity for interest rate related instruments. This is assigned irrespective of the category of investments, whether they are 'Available for sale' (AFS) or 'Held for Trading' (HFT).

> *For more information on the process and sub process that computes this task, see the following:*
>
> *Process:* IND_MKT_RISK
>
> *Sub-process:* Market Risk Specific RW Assignment

Alternative Total Capital Charge

RBI guidelines direct the banks to compute Alternative Total Capital Charge for the exposures in 'Available for Sale' (AFS) category. The application assigns Alternate Total Risk Weight to such exposures based on the issuer type.

> ***For more information on the process and sub process that computes this task, see the following:***

> *Process*: IND_MKT_RISK

> *Sub-process:* Market Risk Alternative Total RW Assignment

General Risk Charge

General risk charge is calculated for each interest rate risk exposure for a reporting bank. General risk charge is calculated by following the Duration Ladder approach. This is processed irrespective of the category of investments, whether they are 'Available for Sale' (AFS) or 'Held for Trading' (HFT).

Duration Ladder

Under this method, the application creates time bands and based on modified duration, places each instrument in the respective time bands for offsetting. The matched and unmatched position across time bands and across three zones attracts general risk charge as per the definition stated in RBI guidelines for Market Risk.

Under Duration Ladder Approach, the application creates duration ladder based on modified duration calculated for each instrument. The general risk charge under duration ladder is calculated for each currency and insignificant positions across multiple currencies are populated into a single modified duration ladder for horizontal and vertical disallowance calculation.

The duration ladder time band created in the application is based on the definition given by RBI guidelines on Market Risk. For Duration Based Ladder Approach, the application creates three time zones for each Modified Duration Time Band. This is computed in the process 'Time Band Assignment'. Based on the time bands, positions are assigned an 'assumed rate'. The delta-weighted positions of IR options are considered for the slotting into time bands and zones.

All the processing attributes used under Duration Ladder Approach are stored in a separate table (**FCT_MARKET_RISK_CAPITAL**) starting from weighted long and short positions, matched and unmatched positions following horizontal and vertical disallowance and net open position by each currency.

> ***For more information on the process and sub process that computes this task, see the following:***

> *Process*: IND_MKT_RISK

> *Sub-processes:* Time Band Assignment, Market Risk Assumed Rate Assignment, and Market Risk Weighted Position Calculation - Duration Approach

Horizontal/Vertical Disallowance

In the application, vertical and horizontal disallowance for IR instruments is processed by using a Data Transformation function 'Mkt_Risk_GenRsk_IR' under 'Market Risk Generic Risk Charge Calculation' which computes the matching of the positions within time bands, zones, across adjacent zones and across non-adjacent zones to finally arrive at the general risk charge for interest rate instruments.

The capital charge is applied at each state for the matched and unmatched position as per the capital charge stated in RBI guidelines for market risk. A detailed explanation of how the application handles the horizontal and vertical disallowance is as follows:

1. The application initially populates weighted long and weighted short position amounts for each time band.

2. The next step is to offset the matched positions and populate them as 'offset matched position within the time band'. The unmatched positions are populated as 'offset unmatched position within the time band'.

3. Offset unmatched positions arrived at from the above step are then taken up for offsetting within a time zone. All the 'offset unmatched positions within time band' falling under the same zone are offset with each other and 'offset match same zone' and 'offset unmatched same zone are computed'.

4. Offset unmatched positions within same zone are then carried forward for calculating 'Offset matched between zone' and 'offset unmatched between zones'. This is first processed for zones 1 and 2, then for zones 2 and 3, and lastly for zones 1 and 3.

5. All the unmatched positions (within time band, same zone, between zones and net unmatched position) are multiplied by the factors listed in the RBI guidelines for duration ladder approach as applicable.

   For more information on the process and sub process that computes this task, see the following:

   Process: IND_MKT_RISK

   Sub-process: Market Risk Generic Risk Charge Calculation

   Procedure: Mkt_Risk_GenRsk_IR

Summary Output

For reporting purposes, the application moves data from market risk capital (**FCT_MARKET_RISK_CAPITAL**) table to market risk reporting (**FCT_MARKET_RISK_REPORTING**) table.

For Interest Rate reporting line, the total capital charge is computed by comparing the values of specific and general risk charge for AFS and HFT categories and the Alternate Capital Charge computed for AFS category. Based on the rules for comparison stated in the RBI guidelines, the population for the capital charge against the Interest Rate reporting line is processed by a Data Transformation 'MR_IR_Tot_Cap_Chrg_Calc' by the application.

Finally, RWA is calculated in the market risk summary (**FCT_MARKET_RISK_SUMMARY**) table by multiplying capital charge with (100/9). The interest risk charge is reported out of market risk summary (**FCT_MARKET_RISK_SUMMARY**) table under Interest Risk charge reporting line.

> ***For more information on the process and sub process that computes this task, see the following:***
>
> *Process*: IND_MKT_RISK
>
> *Sub-processes:* Market Risk Capital Risk Charge Calculation and Market RWA Calculation

Capital Charge Calculation for Equities

The application calculates equity capital charge as summation of specific risk charge and general risk charge. The process flow for calculation of equity risk charge is as follows:

Specific Risk Charge

The application assigns specific risk weight of 9% on gross equity positions. This is processed in the Rule 'IND Market RW Assignment for Equities - Specific Risk'. This specific risk weight is then multiplied by the post offset exposure amount to arrive at the specific risk charge. Delta weighted positions of equity options and is considered for specific risk computations.

> ***For more information on the process and sub process that computes this task, see the following:***
>
> *Process*: IND_MKT_RISK
>
> *Sub-processes:* Market Risk Specific RW Assignment and Market Risk Specific Risk Charge Calculation

General Risk Charge

The application assigns 9% general risk charge for equity instrument type and then multiplies it with post offset exposure amount to arrive at the general risk charge. Delta weighted positions of equity options are considered for general risk computations.

> ***For more information on the process and sub process that computes this task, see the following:***
>
> *Process*: IND_MKT_RISK
>
> *Sub-processes:* Market Risk General RW Assignment and Market Risk Generic Risk Charge Calculation

Summary Output

The equity risk charge is reported from the market risk summary (**FCT_MARKET_RISK_SUMMARY**) table under equity reporting line. Specific and general risk for equity is also reported separately from the summary table.

> ***For more information on the process and sub process that computes this task, see the following:***
>
> *Process*: IND_MKT_RISK
> *Sub-process:* Market Risk Capital Risk Charge Calculation and Market RWA Calculation

Capital Charge for Foreign Exchange Transactions

Process Flow diagram for Foreign Exchange Transactions

FOREX Data Population

All foreign exchange exposure data is expected at a net level by each currency in a separate table meant only for FOREX exposures data (**STG_FOREX_EXPOSURES**). Forward currency position, asset, liability, accrued interest, profit and loss, structural position, and so on, in different currencies are captured separately in the FOREX exposure table. This data is then populated to **FCT_MARKET_RISK_FOREX** which is a dedicated table to compute FOREX capital charge.

> ***For more information on the process and sub process that computes this task, see the following:***
>
> *Process*: IND_MKT_RISK_POSITION_CONVERSION
> *Sub-process:* Market Risk Data Population

Currency Conversion

Currency conversion of FOREX positions to reporting currency is done in the application in the following rules:

- FOREX Position Profit and Loss Attribute Natural CCY Conversion to Reporting CCY
- FOREX Position Attribute Natural CCY Conversion to Reporting CCY
- FOREX Position Other Attribute Natural CCY Conversion to Reporting CCY

This conversion is processed based on the exchange rate between the natural currency of the exposure and the reporting currency.

> ***For more information on the process and sub process that computes this task, see the following:***
>
> *Process: IND_MKT_RISK*
> *Sub-process:* Market Risk Gamma and Vega Capital - Delta Plus Method

Calculation of Net Open Position

The net open position is the maximum value of the net long and net short position across all currency exposures plus the value of gold. This is computed under the process 'Market Risk FOREX Risk Position Calculation' in the application.

> ***For more information on the process and sub process that computes this task, see the following:***
>
> *Process*: IND_MKT_RISK
> *Sub-process:* Market Risk FOREX Risk Position Calculation

FOREX Capital Charge

The application applies the short hand method for FOREX risk charge calculation by treating all the currencies to be same and applying 9% risk charge on net open position.

> This is done by the data transformation 'MR_Cap_Chrge_Frx_Ind'.
>
> ***For more information on the process and sub process that computes this task, see the following:***
>
> *Process*: IND_MKT_RISK
> *Sub-process:* Market Risk Capital Risk Charge Calculation

Summary Output

The FOREX risk charge gets reported out of market risk summary table under FOREX charge reporting line.

> ***For more information on the process and sub process that computes this task, see the following:***
>
> *Process*: IND_MKT_RISK
> *Sub-process:* Market RWA Calculation

Capital Charge for Options

Simplified Approach

In the Simplified Approach, for option type being long cash and long put or short cash and long call, the application calculates 'in the money' values for the option. In case of 'in the money' option, the value is calculated as the number of units multiplied by the difference of underlying forward price and strike price, if the residual maturity of the option is greater than 6 months. In the case of the residual maturity of the option contract being less than or equal to 6 months the 'in the money' value is calculated as number of units multiplied by the difference of underlying current market price and strike price.

The Capital Charge is arrived at as the difference between sum of general risk and specific risk on the underlying value and 'in the money' value of the option. For long put or long call, the application applies the capital charge as the least of the sum of general risk and specific risk on the underlying and option premium value.

This computation is processed in the task 'Market Risk Options – Capital Charge Calculation – Simple Approach'

> *For more information on the process and sub process that computes this task, see the following:*
>
> *Process*: IND_MKT_RISK
>
> *Sub-process:* Market Risk Generic Risk Charge Calculation - Simple Approach and Market Risk Capital Risk Charge Calc - Simple Approach

Delta Plus Approach

In the Delta Plus Approach, the option taken on any underlying contract is processed for position conversion. The purpose of position conversion is to create multiple positions with delta weighted amounts and send each position for respective capital charge calculation.

Greeks Calculation

The application calculates Greeks for options based on the option contract information. The Greek calculation involves calculating implied volatility, delta, gamma and vega. The information required for calculating Greek is explained under "**Position Conversion Parameter Assignment**"**.** Each of the Greeks calculated then participates in sensitivity charge calculation.

> *For more information on the process and sub process that computes this task, see the following:*
>
> *Process*: IND_MKT_RISK
>
> *Sub-process:* Market Risk Gamma Impact - Delta Plus and Market Risk Gamma and Vega
> Capital - Delta Plus Method

Sensitivity Charge Calculation

For options, total charge includes underlying capital; charge plus sensitivity risk charge. Sensitivity risk charge includes delta risk, gamma risk, and vega risk charge. The formula used against each of the sensitivity charge is as per RBI guidelines on Market risk.

The computation of Delta weighted positions and Gamma impact for options is done under the process 'Market Risk Options – Delta and Gamma calculations – Delta Plus Approach'. The delta weighted positions of options participate in the specific and general risk charge computations applicable for the respective underlying.

> *For more information on the process and sub process that computes this task, see the following:*
>
> *Process*: IND_MKT_RISK
>
> *Sub-process:* Market Risk Capital Risk Charge Calculation - Delta Plus

Summary Output

The capital charge for option is reported from summary table where reporting line is options where as the underlying risk charge gets reported under the respective reporting line.

> *For more information on the process and sub process that computes this task, see the following:*
>
> *Process:* IND_MKT_RISK
>
> *Sub-process:* Market RWA Calculation

8.1.1.3.2 Key Data Elements

Key data elements are listed in this section. For a complete list of tables and columns to be populated, see the Download Specification document.

- Interest Rate Historical Data: Interest Rate information for IR instrument is stored here.

- Bank Positions: Position in the instrument (Long/Short), Price of Instrument and No of Units for OTC instruments are stored here.

- Market Instrument Contract: Price of Non-OTC instruments is stored here.

- Instrument contract: Instrument Type, Counter party type, currency code, coupon rate, effective date, maturity date, strike price, coupon rate, coupon frequency are stored here.

- FOREX Exposures: Exposure amount, asset amount, asset accrued interest, asset accrued profit are stored here.

8.1.1.4 Operational RWA

As per the Basel accord, "Operational Risk is the risk of loss resulting from inadequate or failed internal processes, people and systems, or from external events". External losses can occur due to theft of information or hacking of systems. The RBI guidelines have prescribed one method for calculating Operational Risk (OR) Capital Charge which is as follows.

NOTE: While executing Solo Run for computing Operational Risk, the parent entity data is processed. However, for a Consolidated Run the parent entity and the subsidiary data is processed.

8.1.1.4.1 Basic Indicator Approach

To calculate the capital charge under the Basic Indicator Approach, the annual gross income for each of the past three years for a standard line of business is multiplied by a fixed percentage of 15%. The average is considered to calculate the capital charge. If the annual gross income is negative or zero in any of the past three years, then the value from the numerator is excluded thereby reducing the base denominator by the same count.

The capital charge formula is as follows:

$$K_{BIA} = \left[\sum \left(GI_{1..n} \times \alpha \right) \right] \Big/ n$$

Where:

KBIA = the capital charge under the Basic Indicator Approach

GI = annual gross income, where positive, over the previous three years

n = number of the previous three years for which gross income is positive

α = 15 per cent, which is set by the BCBS, relating the industry wide level of required capital to the industry wide level of the indicator.

Process Flow for Operational RWA

Prerequisite

Before calculating the capital charge for OR, the following should be computed as a prerequisite:

In the process **IND_OPS_RISK,** the task defined as **Opr_Risk_Capital_Charge** should mention the number of years (in the past) as a parameter for capital calculation.

For example: if the previous 3 years are considered, then assign 3 as a parameter against the task **Opr_Risk_Capital_Charge**. Therefore, in the future if the previous 4 years have to be considered, then change that particular parameter only.

The process to compute OR under the Basic Indicator Approach are as follows:

Operational Risk Data Population

The input data for each of the financial years mapped, along with the internal line of business are populated in the processing table.

Internal LOB to Standard LOB Reclassification

The internal lines of business are reclassified into standard lines of business.

Annual Gross Income Calculation

For each of the standard lines of business and for each financial year, the annual gross income is calculated.

Capital Charge Calculation

Capital charge is calculated by multiplying the alpha value with the annual income of each year across each standard line of business. Further, the average of 3 years is considered (if the values of all the 3 years are positive). If the values of all the 3 years are not positive, then zero or the negative value from numerator and denominator are excluded.

Risk Weight Asset Calculation

The capital charge value obtained is then converted to the equivalent RWA value by multiplying with the factor 100 divided by 9.

Operational Risk Summary Data Population

The RWA amount is populated into the Operational Risk Summary (**FCT_OPS_RISK_SUMMARY**) table along with the entity for which the OR RWA is calculated. The application converts all the elements in the annual gross income and loan and advance amount reported in their respective national currency, to the reporting currency.

While calculating annual gross income or loan and advance amount for the subsidiary that are part of regulatory consolidation, the amount is limited to the share-holding percentage. Hence, a subsidiary which is part of regulatory consolidation and parent holding in the subsidiary is considered as 45%, and then the amount limited to 45% is considered for gross calculation. Similarly, if the holding is more than 50%, then the entire amount is considered for gross calculation.

8.1.1.4.2 Key Data Elements

Key data elements to be noted are listed in this section. To view the complete list of tables used, see the *Download Specification* document.

Entity details which are part of regulatory consolidation and parent entity share holding percent is required. This data is captured in Stage Entity Shareholding Details (**STG_ENTITY_SHR_HLD_PERCENT**) table.

Net Interest Income, Net Provision Amount, Net Non Interest Income, Operating Expenses, Security Sale Gain or Loss from HTM, Insurance Irregular Loss, Security Sale Gain or Loss from AFS, Insurance Irregular Gain, Net Write-off Amount, Reversed Provision Amount, Reversed Write-off Amount, Disposable Property Income Legal Settlement Income, and Insurance Claim Income for each line of business and for each financial year, is required.

8.1.1.5 Capital Structure

Capital structure of the Indian Jurisdiction calculates the total capital of the bank holding company. The total capital consists of the following components:

- Tier 1 (T1) capital

- Tier 2 (T2) capital

Tier 1 capital consists of the core equity capital, retained earnings, and disclosed reserves. Tier 2 capital consists of undisclosed reserves, revaluation reserves (discounted by 55%), general provisions, hybrid debt capital and subordinate term debt.

The total capital amount arrived at for each tier of capital is followed by deduction of various regulatory adjustments. Some Securitization exposures and investment in the subsidiary engaged in BFSI are deducted as 50% from Tier 1 capital and 50% from Tier 2 capital. Goodwill and other intangibles, Gain on sale related to Securitization transaction, and DTA are deducted from Tier 1 capital.

Tier 2 capital is limited to 100% of Tier1 capital. The total capital ratio must not be lower than 9%.

NOTE: While executing Solo Run the parent entity data is processed. Investment into the subsidiary data undergoes RWA calculation as per the Credit Risk and Market Risk rule. Capital line item pertaining to parent entity is only processed. For consolidation approach, the parent entity and the subsidiary data is considered. All the General Ledger line items are expected at solo level for each entity. The consolidated data is discarded.

8.1.1.5.1 Assumption

The General Ledger codes are expected to be unique across entities in STG_GL_DATA and DIM_CAPITAL_ACCT_HEAD.

8.1.1.5.2 Process Flow for Capital Structure
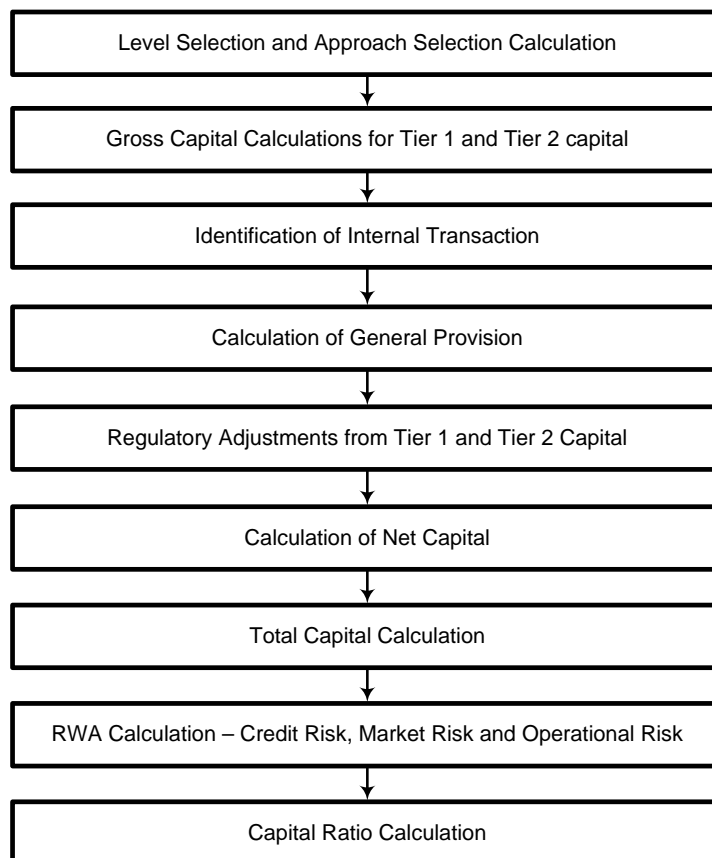
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┌─────────────────────────────────────────────────────────┐
│     Level Selection and Approach Selection Calculation    │
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│      Gross Capital Calculations for Tier 1 and Tier 2 capital │
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┌─────────────────────────────────────────────────────────┐
│            Identification of Internal Transaction          │
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┌─────────────────────────────────────────────────────────┐
│              Calculation of General Provision              │
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│       Regulatory Adjustments from Tier 1 and Tier 2 Capital │
└─────────────────────────────────────────────────────────┘
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│                  Calculation of Net Capital                │
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│                  Total Capital Calculation                 │
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│  RWA Calculation – Credit Risk, Market Risk and Operational Risk │
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│                  Capital Ratio Calculation                 │
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Level Selection and Approach Selection Calculation

To process the capital for a bank, a solo or consolidated entity selection should be made, based on which the capital is calculated at organization level. If solo is selected, then only for that particular selected banking organization the capital is calculated. If consolidation is selected, then all the entities that fall under the umbrella of the selected organization are part of capital calculation. This is done in the task – '**Capital Consolidation Level Selection**' in process '**IND_CAPITAL_CONSOLIDATION**'.

Based on the share-holding percentage of the parent bank in the subsidiary and the consolidation approach to be followed (consolidation approach and deduction approach) for each of the entity, the approach is selected.

For example: if the share-holding for an entity is 35% and is part of the consolidation process, then the approach selected for this entity is pro-rata consolidation. The above reclassification is performed in task – '**Cap Consl Basel Approach Type Reclassification for an Entity**' in the process '**IND_CAPITAL_CONSOLIDATION'.**

Gross Capital Calculation for T1 and T2

The total gross capital for each tier of capital, that is T1 and T2, are calculated as per the definition of T1 and T2, by adding the relevant financial instrument in each tier of capital. The financial instrument included in the each tier of capital is different for Indian banks and for foreign banks in India. This is calculated in the sub process – '**Standard Line Items Calculations**' in the process '**IND_CAP_STRUCT_INDIAN_BANKS**' for Indian banks and in the process '**IND_CAP_STRUCT_FOREIGN_BANKS**' for foreign banks in India.

Identification of Internal Transaction

All intergroup capital investments are marked as internal customer transactions. The marking is done by populating appropriate standard account head surrogate key for the exposures which qualifies as an internal transaction.

Calculation of General Provision

The general provision for the Standardized Approach is added into Tier 2 capital, up to a maximum of 1.25% of CR RWA under the Standardized Approach. The above processing is done in the Rule – **CS General Provisions for Standardized**, in the sub process – **Standard Line Items Calculations** under the process '**IND_CAP_STRUCT_INDIAN_BANKS**' for Indian Banks and in the process '**IND_CAP_STRUCT_FOREIGN_BANKS**' for foreign banks in India.

Regulatory Adjustment from Tier 1 and Tier 2

All the regulatory adjustment line items are identified and 50% of the total amount is deducted from Tier 1 capital and 50% from Tier2 capital. To handle this 50-50 deduction, all the regulatory adjustment line items are moved to the **FCT_CALC_ACCT_HEAD** table where each of the regulatory adjustment line items is equally split into 2 records; with the capital component group of one record marked as 'T1-50' and the other record as 'T2-50'. This is processes in the sub processes – **Calc Acct Head Population** and **Std Acct Head Population** in the process '**IND_CAP_STRUCT_INDIAN_BANKS**' for Indian banks and in the process '**IND_CAP_STRUCT_FOREIGN_BANKS**' for foreign banks in India.

Net Capital Calculation

Net Tier 1 capital is calculated by deducting the Securitization transaction, DTA, and 50% of regulatory adjustment line items. Similarly, the net Tier 2 capital is calculated by deducting 50% of regulatory adjustment line item. If net Tier 2 is greater than net Tier 1 capital, then the net Tier 2 capital is limited to net Tier 1 capital.

Total Capital Calculation

The total Net Tier 1 capital and Net Tier 2 capital is summed up to obtain the total eligible capital.

Risk Weighted Asset (RWA) Amount – Credit Risk, Market Risk and Operational Risk

The RWA amount for Non Securitization, Securitization, Market Risk, and Operational Risk are calculated by summing up the RWA amount as reported under different headings as 'Risk Weighted Asset amount for Standardized Portfolios' for Non Securitization, "Sec Std RWA" for Securitization portfolio, "Market RWA" for Market Risk and "Operational RWA" for Operational Risk.

- **Risk Weight Assignment for Specified Categories**

  All investments in the paid-up equity of non-financial entities (other than subsidiaries) which exceed 10% of the issued common share capital of the issuing entity or where the entity is an unconsolidated affiliate receives a risk weight of 1250%. This functionality is already handled by the Basel application.

Capital Ratio Calculation

Capital Adequacy ratio is calculated using the total net eligible capital and the total RWA amount. The total eligible capital is the sum of net T1 capital and net T2 capital amount. This is processed in the sub process – **Capital Group Components Calculations** in the process '**IND_CAP_STRUCT_INDIAN_BANKS**' for Indian banks and in the process '**IND_CAP_STRUCT_FOREIGN_BANKS**' for foreign banks in India.

8.1.1.5.3 Key Data Elements

Key data elements to be noted are listed in this section. For a complete list of tables and columns to be updated, see the *Download Specifications* document:

- Entity details which are part of regulatory consolidation and parent entity share holding percent. This data is captured in Stage Entity Shareholding Details (**STG_ENTITY_SHR_HLD_PERCENT**) table.

- The capital structure component for each tier of capital for all entities involved in regulatory consolidation.

- The General Ledger line items as captured as download in Stage General Ledger Data (**STG_GL_DATA**).

- If a capital line item like 'MR RWA' or 'OR RWA' is available as download, then these Non GL line items are expected as download in Stage Standard Accounting Head (**STG_STANDARD_ACCT_HEAD**).

- The standard account head ID of line items like 'Net Tier 1 capital', 'capital ratio', and so on, which are computed by application, are expected to be mapped to capital Account Identifier – 'OTHERS'. The application populates these line items in the Fact Standard Accounting Head (**FCT_STANDARD_ACCT_HEAD**) with initial value as 0. Later, this value is over written by the application.

- Information stored in Capital Standard Mapping (**FSI_CAPITAL_STANDARD_MAPPING)** table is a mapping of GL capital line items with seeded data in DIM_STD_ACCT_HEAD. For all jurisdictions this mapping should be present. For more information on the mapping of all jurisdictions in **FSI_CAPITAL_STANDARD_MAPPING** table, see Exhibit 5 in *Annexure A: Key Concepts.*

8.2 Basel III

8.2.1 Basel III – Standardized Approach

8.2.1.1 RBI III - High Level Process Flow for Standardized Approach

8.2.1.1.1 Process Flow for Capital Adequacy Ratio Calculation
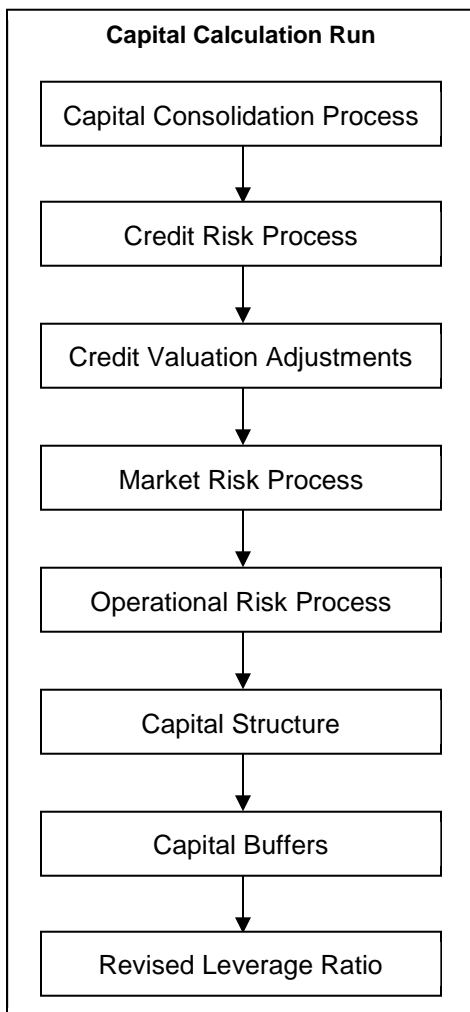
Capital Calculation Run

Capital Consolidation Process

Credit Risk Process

Credit Valuation Adjustments

Market Risk Process

Operational Risk Process

Capital Structure

Capital Buffers

Revised Leverage Ratio

The Capital Calculation Run depicted in the preceding process flow is a single run which is a joined together by multiple processes. Each process is a block, compiled together to form an entire Capital Adequacy run. The individual blocks like the Credit Risk process, Market Risk process, and so on, also exist as individual runs which is described in the following sections.

8.2.1.1.2 Capital Consolidation Process

Capital Consolidation is a process common to each of the individual block when they are triggered separately as an individual run. For example: the standard out-of-box Market Risk run has Capital Consolidation and Market Risk process bundled together as a single Market Risk run. This is applicable for a Credit Risk run and Operational Risk run as well. The Capital Consolidation is explained in the following section and is not repeated under the Non Securitization process, Securitization process, Market Risk process, or Operational Risk section of this document.

In Capital Consolidation, the application processes the following:

Capital Consolidation Level Selection

The reporting bank can be a part of a financial group that has multiple legal entities like parent or child entities (subsidiaries) under its name. The entity on which you are required to process should be selected by you. Subsequently, level at which a Run is to be executed (solo or consolidated) should also be selected. You can select these options in the Run Management UI. However, if the Run is executed in the Run Rule Framework (RRF), then these options have to be set using the Rule '**Capital Consolidation Level Selection**' in the process '**IND_BASELIII_CAPITAL_CONSOLIDATION**'.

'**IND_BASELIII_CAPITAL_CONSOLIDATION**' is the first process to be added in all the Runs defined in the RRF except for the Staging Data Population Run. The Run Management UI selects this process by default.

Run Parameters Assignment

The Basel accord states different approaches for calculating RWA. The Run Management UI in the application allows the reporting bank to define and execute a Run by selecting a combination of different Basel II approaches for RWA computation.

Run Parameter Assignment is also part of **Capital Consolidation** process. The Rule '**Run Definition User Defined Run Param Assignment**' is used to assign the Run parameters if a Run is executed in the RRF. If the Run is executed from the Run Management UI, then the parameters are populated based on the Run defined in the Run Definition window.

Currency Conversion

The Rules pre-defined in the application performs currency conversion of all General Ledger amount attributes to be used for Capital Consolidation from the Natural currency to the Reporting currency, based on the exchange rate provided.

Shareholding Percent Multiplication

For all entities in the Capital Consolidation process, the application updates the shareholding percentage against each entity data in the fact capital accounting head from the fact entity shareholding percent table. The parent data in the processing table of fact capital accounting head is updated with the value 1 and for each child entity the data is based on the parent's holding percentage specified for each child in fact entity share holding percent table.

The exposure amount which is a part of the input data (product processors) is the exposure amount for a solo entity. However, in case of a consolidated Run, the parent exposure is considered only on the basis of shareholding percentage, based on the following calculation:

Exposure amount   X   share holding percent = Updated Exposure Amount

(Where share holding percent is allotted a value by the application during the process - Capital Consolidation in the Rule Cap Consl Effective Shareholding Percent for an Entity)

This assignment is performed by the Rule <Attribute > Shareholding Percent Multiplication. The following attributes undergo shareholding percent multiplication:

- Outstanding Principal
- Current Exposure Amount
- Undrawn Amount
- Exposure Market Value
- Exposure Accrued Interest
- Provision Amount
- Write Off Amount
- Original Book Balance Amount
- For OTC products, Notional Principal and Contract Amount undergo shareholding percent multiplication.

Data Population

Pre-processing Steps

Credit risk exposures' data must be loaded in the application for all the product types through their respective input tables known as product processors. The important categories of Credit Risk (CR) Non Securitization exposures, along with their respective table names, that are used for data input are as follows:

Product	Source Product Processor
Bills	STG_BILLS_CONTRACTS
Credit Cards	STG_CARDS
Swaps	STG_SWAPS_CONTRACTS
Futures	STG_FUTURES
Guarantees	STG_GUARANTEES
Investments	STG_INVESTMENTS
Lease Contracts	STG_LEASE_CONTRACTS
Letters of Credit	STG_LC_CONTRACTS
Line of Credit	STG_CREDIT_LINE_DETAILS

Product	Source Product Processor
Commitment Contracts	STG_COMMITMENT_CONTRACTS
Loans	STG_LOAN_CONTRACTS
Money market instruments	STG_MM_CONTRACTS
Overdraft	STG_OD_ACCOUNTS
Options	STG_OPTION_CONTRACTS
Re purchase contracts	STG_REPO_CONTRACTS
Equity Exposures	STG_INVESTMENTS
Underlying Exposures for Derivatives, Securitization and Covered Bonds	STG_UNDERLYING_EXPOSURES
Underlying Exposures for Derivatives (if Derivative is either a cleared transaction or an instrument, and the underlying reference asset is an instrument)	STG_UNDERLYING_MASTER/ STG_UNDERLYiNG_DTL
Underlying Exposures for Derivatives (if Derivative is not a cleared transaction or an instrument, or the underlying reference asset is not an instrument)	STG_UNDERLYING_EXPOSURES
Underlying Exposure for Mutual Fund / CIU	STG_FUND_CIS_COMPOSITION
Underlying Exposures for Repo contracts	STG_PLACED_COLLATERAL / STG_MITIGANTS
Credit Derivatives	STG_CREDIT_DERIVATIVES
Fixed Assets	STG_FIXED_ASSETS_DETAILS

Processing Steps

Stage data from the product processors or other stage tables is populated in the required tables. All product processor data is populated in a common fact table for all Non Securitization exposures (**FCT_NON_SEC_EXPOSURES**) except equity data.

Equity data related to equity and investment fund are stored in the respective equity exposures (**STG_EQUITY_EXPOSURES)** and fund equity investments table (**STG_FUND_EQUITY_INVESTMENTS).** It is then populated in the respective fact tables for equity exposures. From here, the data is populated in the common fact table (**FCT_NON_SEC_EXPOSURES**) for all Non Securitization exposures. For more information on the list of columns to be populated within each table, see the *Download Specifications* document.

Reclassification Process

The sub processes for Reclassification Process are:

- Product Type Reclassification and
- Party Type Reclassification
- Rating Reclassification

The application reclassifies the bank's product types and party types to Basel standard product and party types. Based on standard Basel product and party type, it forms an asset class for each exposure. Equity is reclassified by the application in a separate Rule.

Product Type Reclassification

Product types used by the reporting bank as input data are reclassified to standard product types as recommended in the RBI Basel III guidelines. The product types after reclassification are stored as Basel product types.

Party Type Reclassification

Similar to the product type, the customer type and issuer type (which are stored as party type) are also reclassified as standard party type. The Basel application is designed to include customer type, issuer type, and legal entity type in a single table (**STG_PARTY_MASTER**). This is applicable for staging and the dimension model. These are reclassified together as well. Party type reclassification Rules handle reclassification for customer types, issuer, and entity types. For Example: Individual is reclassified as Retail.

RBI has different treatment for Domestic and Foreign entities for certain party types. The assignment for nonresident types is done based on country of incorporation. Hence when the country of incorporation of party is not same as the country of reporting entity then the same is reclassified as a Foreign/non-resident party.

Rating Reclassification

Data for credit ratings is uploaded in the application through the following ratings tables:

- Accounts Rating Table (**STG_ACCOUNT_RATING_DETAILS**):

  This table stores ratings of all Credit Risk Non Securitized Exposures, Securitized Exposures, and Securitized Positions.

- Instrument Rating Table (**STG_INSTRUMENT_RATING_DETAILS**):

  This table stores ratings for all Market Risk Exposures, Investment Exposures subject to Credit Risk (one that are in **STG_INVESTMENTS**), and Mitigants.

- Party Rating Table (**STG_PARTY_RATING_DETAILS**):

  This table stores credit rating information of all customers and issuers.

- Sovereign Rating Table (**STG_SOVEREIGN_RATING_DETAILS**):

  This table stores credit rating for all countries.

Processing Steps

Banks obtain credit ratings from different sources which are uploaded to the application through the four rating tables. The application re-classifies the rating information to standard Basel ratings.

Note: In the **STG_PARTY_RATINGS_DETAILS** table ensure that the following columns are mandatorily populated with data:

○ Rating Source Code (**V_RATING_SRC_CODE**)

○ Party Code (**V_PARTY_CD**)

○ Purpose (**V_PURPOSE**): This field indicates whether the rating is a domestic rating or foreign rating. If any other rating is provided, then the exposure is considered as unrated.

○ Rating Code (**V_RATING_CODE**)

The rating reclassification lookup table (**FSI_RATING_CLASSIFICATION**) is used to reclassify all the bank ratings to their Basel ratings. Ratings are populated from the stage tables to FSI tables using the lookup table to fetch reclassified rating.

After the application identifies the reclassified ratings, risk weight Rules update the risk weights in the rating risk weight mapping table. Further, the multiple assessments Data Transformation update the rating and the risk weights to the exposures. For each exposure, the application checks the risk weight yielded by each of its ratings. It then assigns the second greatest risk weight and the rating that yields such risk weight to the exposure.

For unrated Non Securitized exposures, the application does an issuer assessment as per the RBI Basel III guidelines. This is done to infer a rating of the unrated exposures, based on the rating of a similar instrument (referred as reference issue hereafter) issued by the same issuer. The reference issue is used only when it is of the same currency as the exposure and the exposure is senior or equivalent to the same.

RBI has approved following Domestic credit rating agencies – whose ratings can be used by banks for assigning risk weights for credit risk. The lists of agencies are:

    a.   Brickwork Ratings India Pvt. Limited (Brickwork)

    b.   Credit Analysis and Research Limited

    c.   CRISIL Limited

    d.   ICRA Limited

    e.   India Ratings and Research Private Limited (India Ratings)

    f.   SME Rating Agency of India Ltd., (SMERA).

RBI has decided that banks can use the ratings of the following International Credit rating agencies:

    a.   Fitch

    b.   Moody's

    c.   Standard & Poor's.

An example for Long Term rating is shown in the below table:

CARE	CRISIL	India Ratings and Research Private Limited (India Ratings)	ICRA	Brickwork	SME Rating Agency of India Ltd. (SMERA)	RBI Basel Equivalent
CARE AAA	CRISIL AAA	IND AAA	ICRA AAA	Brickwork AAA	SMERA AAA	AAA Equivalent
CARE AA	CRISIL AA	IND AA	ICRA AA	Brickwork AA	SMERA AA	AA Equivalent
CARE A	CRISIL A	IND A	ICRA A	Brickwork A	SMERA A	A Equivalent
CARE BBB	CRISIL BBB	IND BBB	ICRA BBB	Brickwork BBB	SMERA BBB	BBB Equivalent
CARE BB	CRISIL BB	IND BB	ICRA BB	Brickwork BB	SMERA BB	BB Equivalent
CARE B	CRISIL B	IND B	ICRA B	Brickwork B	SMERA B	B Equivalent
CARE C & CARE D	CRISIL C & CRISIL D	IND C & IND D	ICRA C & ICRA D	Brickwork C & Brickwork D	SMERA C & SMERA D	Lower B Equivalent
Unrated	Unrated	Unrated	Unrated	Unrated	Unrated	Unrated

Where "+" or "-" notation is attached to the rating, the corresponding main rating category risk weight is used.

An example for Short Term Rating is shown in the below table:

CARE	CRISIL	India Ratings and Research Private Limited (India Ratings)	ICRA	Brickwork	SME Rating Agency of India Ltd. (SMERA)	RBI Basel Equivalent
CARE A1+	CRISIL A1+	IND A1+	ICRA A1+	Brickwork A1+	SMERA A1+	A1+ Equivalent
CARE A1	CRISIL A1	IND A1	ICRA A1	Brickwork A1	SMERA A1	A-1 Equivalent
CARE A2	CRISIL A2	IND A2	ICRA A2	Brickwork A2	SMERA A2	A-2 Equivalent
CARE A3	CRISIL A3	IND A3	ICRA A3	Brickwork A3	SMERA A3	A-3 Equivalent
CARE A4 & D	CRISIL A4 & D	IND A4 & D	ICRA A4 & D	Brickwork A4 & D	SMERA A4 & D	Lower A-3 Equivalent
Unrated	Unrated	Unrated	Unrated	Unrated	Unrated	Unrated

Where "+" or "-" notation is attached to the rating, the corresponding main rating category risk weight is used.

Mitigant Data Population and Eligibility Process

The sub processes are as follows:

- Mitigant Reclassification
- Mitigant RW Assignment
- Mitigant Eligibility
- Mitigant Volitality Haircut Assignment

Mitigant Reclassification

For mitigants the application reclassifies the mitigant type to the standard mitigant type like the debt securities, credit derivative, cash, and so on. Reclassification mitigant type is used for downstream processing like multi eligibility, multi risk weight assignment and so on.

As per RBI guidelines, since equity as ineligible, equity Mitigant type is mapped to "Others" as standard mitigant type.

Mitigant RW Assignment

To apply risk weight to the covered portion, the risk weight is mapped to the protection provider (Guarantor) based on Standard Party Type and Basel Rating of the guarantor. It is then, taken to mitigant level.

Mitigant RW is assigned based on Credit rating and Standard Party class, for the guarantee provided by following standard parties:

- Foreign Sovereign
- NBFC-Infrastructure Finance Companies
- Non-deposit Taking Systemically Important NBFC
- NBFC-Infrastructure Development Fund
- NBFC-Others
- Corporate Non SME
- Primary Delears
- Domestic PSEs"
- Asset Finance Companies
- Non Resident Corporate
- Foreign PSE
- Multilateral development Bank

A rule "IND BASEL III - Mitigant RW Assignment" is created. For the guarantee provided by the Banks incorporated in India and Foreign Bank branches in India, a rule "IND BASEL III Mitigant RW Assignment - Banks" is created. It assigns RW based on Standard Party Type, Country and CET1 band. Country refers to the Country of operation of the guarantor bank. This is executed after "IND

BASEL III - Mitigant RW Assignment" rule, as there is a difference in treatment for the guarantee provided by the Foreign Banks branches in India.

For the guarantee provided by domestic sovereigns, the rule "IND Mitigant RW Assignment for Domestic Sovereign" is used for claims on domestic sovereign.

Though, there is no risk weight applied to the portion covered by eligible financial collateral, from the solution perspective, a 0% RW is assigned to such portion. This is to ensure that the post haircut collateral amount is deducted from the exposure amount. The BIS rule "Mitigant RW Assignment for Financial Collaterals" and "Basel II Mitigant RW Assignment for Nettable Liabilities" is used for this. It is executed after all other RW assignment rules.

Mitigant RW assignment is dependent on design of exposure RW assignment and mapping of standard party class, rating to the risk weight as mentioned in the exposure RW assignment rules.

The party rating considered for RW assignment should be current and not original. Therefore, if a rating must be considered as eligible rating for RW assignment as on MIS date, then the F_ORIGINAL_CREDIT_RATING_IND in party rating detail should be 'N'.

Mitigant Eligibility

Mitigant type is considered to determine whether the mitigant is eligible for a particular exposure or not. There is separate eligibility Rules for mitigant types that are mutual funds, or debt security. Mitigant eligibility is also checked based on the original and residual maturity of the collateral. Collateral is classified as eligible only if its original maturity is more than 1 year and residual maturity is more than 3 months.

Eligible Collateral

Banks, which take eligible financial collateral, can reduce the exposure amount to counterparty when calculating their capital requirements to take account of the risk mitigating effect of the collateral. The application has Rules that carry out the eligibility checks.

Following are the eligible financial collateral as per RBI Basel III guidelines:

(i) Cash (and certificates of deposit or comparable instruments, including fixed deposit receipts, issued by the lending bank) on deposit with the bank which is incurring the counterparty exposure.

(ii) Gold includes bullion and jewels. However, the value of the collateralized jewellery is arrived at after notionally converting these to 99.99 purity.

(iii) Securities issued by Central and State Governments

(iv) Kisan Vikas Patra and National Savings Certificates provides no lock-in period. It is operational and they can be encashed within the holding period.

(v) Life insurance policies with a declared surrender value of an insurance company which is regulated by an insurance sector regulator.

(vi) Debt securities rated by a chosen Credit Rating Agency in respect of which banks is sufficiently confident about the market liquidity where these are either:

(a) Attracting 100 per cent or lesser risk weight that is, rated at least BBB(-) when issued by public sector entities and other entities (including banks and Primary Dealers); or

(b) Attracting 100 per cent or lesser risk weight that is, rated at least CARE A3/ CRISIL A3/ India Ratings and Research Private Limited (India Ratings) A3/ICRA A3/Brickwork A3/ SMERA A3 for short-term debt instruments.

(vii) Debt Securities not rated by a chosen Credit Rating Agency in respect of which banks is sufficiently confident about the market liquidity where these are:

(a) Issued by a bank

(b) Listed on a recognized exchange

(c) Classified as senior debt

(d) All rated issues of the same seniority by the issuing bank are rated at least BBB(-) or CARE A3/ CRISIL A3/ India Ratings and Research Private Limited (India Ratings) A3/ICRA A3/Brickwork A3/SMERA A3 by a chosen Credit Rating Agency

(e) The bank holding the securities as collateral has no information to suggest that the issue justifies a rating below BBB(-) or CARE A3/ CRISIL A3/ India Ratings and Research Private Limited (India Ratings) A3/ICRA A3/Brickwork A3/SMERA A3 (as applicable)

(f) Banks is sufficiently confident about the market liquidity of the security.

(viii) Units of Mutual Funds regulated by the securities regulator of the jurisdiction of the bank's operation mutual funds where:

(a) A price for the units is publicly quoted daily that is, where the daily NAV is available in public domain.

(b) Mutual fund is limited to investing in the instruments listed in this paragraph.

Re-securitizations, irrespective of any credit ratings, are not eligible financial collateral.

Eligible Guarantor

As per the RBI Basel III guidelines, the following guarantors are considered eligible**:**

1. Sovereigns and sovereign entities. This includes BIS, IMF, European Central Bank and European Community and other eligible MDBs, ECGC, CGTSI, CRGFTLIH, banks and primary dealers with a lower risk weight. The following MDB are treated as an eligible guarantor:

(a) World Bank Group: IBRD and IFC

(b) Asian Development Bank

(c) African Development Bank

(d) European Bank for Reconstruction and Development

(e) Inter-American Development Bank

(f) European Investment Bank

(g) European Investment Fund

(h) Nordic Investment Bank

(i) Caribbean Development Bank

(j) Islamic Development Bank

(k) Council of Europe Development Bank

(l) International Finance facility for Immunization

2. Other entities that are externally rated, including credit protection provided by parent, subsidiary and affiliate companies when they have a lower risk weight than the obligor. The exception to this requirement is when credit protection is provided to a securitization exposure.

3. When credit protection is provided to a securitization exposure, other entities that are currently externally rated BBB- or better AND that were externally rated A- or better at the time the credit protection was provided. This includes credit protection provided by parent, subsidiary, and affiliate companies when they have a lower risk weight than the obligor.

Mitigant eligibility is not present if, exposure guarantor is positively correlated with credit protection as main business indicator (standard party type). Similarly, mitigant eligibility is present if, exposure guarantor is positively not correlated with credit protection as main business indicator (standard party type).

Mitigant eligibility is not present if, exposure guarantor is positively correlated with credit protection as main business indicator (special purpose entity).

Mitigant eligibility is present if, exposure guarantor is positively not correlated with credit protection as main business indicator (insurance entity).

The earlier functionality in the application is the CRM Eligible Guarantor for securitization transaction in India. This is enhanced to comply with RBI 2015 guidelines requirements. With the introduction of this enhancement, in case of Securitization transactions, SPEs cannot be recognized as Eligible Guarantors.

Data Expectation

Security under lock-in period": Value 'can be Y' or 'N'; 'Y' in this column is to identify whether the mitigant is currently under lock-in period and cannot be liquidated.

The requirements regarding Life Insurance are operational in nature and it is expected that the bank fulfills such operational requirement before passing data of Life Insurance as financial Collateral.

Unrated Debt Security Eligibility hierarchy (underlying column F_UNRATED_DEBT_SEC_ELIG_FLAG) - The value in this flag should be Y if all the eligibility condition of unrated debt as financial collateral, as mentioned in para 7.3.5 (vii) (a) to (vii) (f) of RBI Basel III Master Circular are satisfied. That is, including securities issued by the bank.

The value in "Eligible Mutual Fund Indicator" which is based on f_elig_mutual_fund_ind, is expected to be Y if all the eligibility conditions of Mutual Fund as an eligible financial collateral, as mentioned in para 7.3.5 (viii) of RBI Basel III Master circular is satisfied.
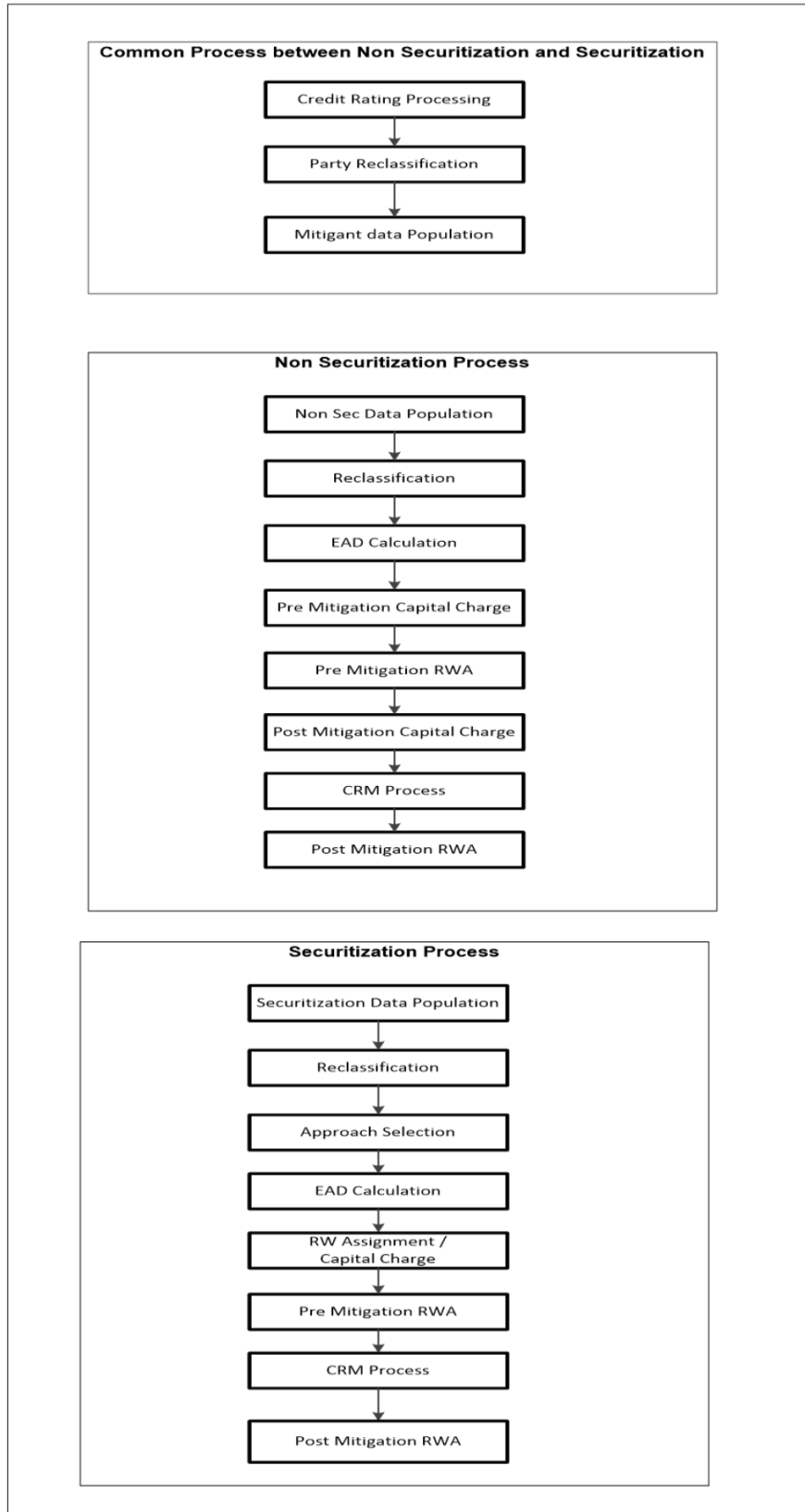
Mitigant Haircut Assignment

The application performs computations for volatility mitigant haircut. Volatility haircuts are calculated and amount of the exposure to the counterparty and the value of collateral or mitigants, is adjusted to account for any future fluctuations in the market value. After the adjustment, the application provides the volatility adjusted amounts for exposures (higher than original exposure amount) and collateral (lower than original amount).

The volatility haircut is assigned based on Supervisory haircut as per RBI Basel III guidelines:

In Supervisory Haircut method, the application assigns volatility haircut based on issuers, issuer's ratings, mitigants residual maturity, and type of mitigant. The assignment is done as per RBI guidelines. The haircut is scaled up based on the minimum holding period for the transaction type where applicable.

8.2.1.1.3 Process Flow for Credit RWA

A Credit RWA Run is a combination of the Non Securitization RWA process and Securitization RWA process. A few processes like Credit Rating, Party Type Reclassification, and Mitigant Data Population are common between Non Securitization and Securitization process. Though these sub processes are explained separately under Non Securitization and Securitization section of this document, it is executed only once under the Credit RWA Run.

Certain sub processes under Non Securitization process like Reclassification and so on are common across all types of exposures for example: banking book, over the counter derivative transactions, and securities financing transactions, and are executed only once in the Run. The details of this sub processes are explained under Reclassification sub process of the Basel II Non Securitization exposures section of this document. Likewise, details of Credit Risk Mitigation for Non Securitization process is detailed under the Basel II Non Securitization section of this document and details of Credit Risk Mitigation for Securitization process is detailed under the Basel II Securitization section of this document.

For more information on the sub processes as detailed in the preceding process flow for the Non Securitization process and Securitization process, see Credit RWA.

For example: Non Sec Data Population is detailed under data population and currency conversion of Credit RWA (Non Securitization - Standardized approach) section of this document.

8.2.1.1.4 Process Flow for Credit Valuation Adjustments

```
┌─────────────────────────────────┐
│          CVA Process            │
│  ┌───────────────────────────┐  │
│  │    Simple CVA Approach    │  │
│  └───────────────────────────┘  │
└─────────────────────────────────┘
```

Basel committee has introduced a new Credit Valuation Adjustment (CVA) capital charge, which is added to default risk capital charge to arrive at the new Counterparty Credit Risk (CCR) capital charge. The mark to market counterparty credit losses or the spread migration risk is captured with CVA, which were not directly capitalized before. CVA is the difference between the risk-free portfolio value and the true portfolio value that takes into account the possibility of the counterparty's default. In other words, CVA is the market value of counterparty credit risk.

In RBI (Indian) Jurisdiction, only Simple CVA approach is followed. For more information on the sub processes as detailed in the process flow, see Credit Valuation Adjustments.

8.2.1.1.5 Process Flow for Market RWA

```
                    ┌───────────┐
                    │   Start   │
                    └───────────┘
                          │
                          ▼
          ┌───────────────────────────────┐
          │     Capital Consolidation      │
          └───────────────────────────────┘
                          │
                          ▼
          ┌───────────────────────────────┐
          │        Rating Process          │
          └───────────────────────────────┘
                          │
                          ▼
          ┌───────────────────────────────┐
          │      Position Conversion       │
          └───────────────────────────────┘
                          │
                          ▼
          ┌───────────────────────────────┐
          │  Capital Charge for Interest   │
          │        Rate Instrument         │
          └───────────────────────────────┘
                          │
                          ▼
          ┌───────────────────────────────┐
          │    Capital Charge for Equity   │
          └───────────────────────────────┘
                          │
                          ▼
          ┌───────────────────────────────┐
          │ Capital Charge for Foreign     │
          │    Exchange Transactions       │
          └───────────────────────────────┘
                          │
                          ▼
          ┌───────────────────────────────┐
          │  Capital Charge for CDS in     │
          │         Trading Book           │
          └───────────────────────────────┘
                          │
                          ▼
          ┌───────────────────────────────┐
          │   Capital Charge for Options   │
          └───────────────────────────────┘
                          │
                          ▼
          ┌───────────────────────────────┐
          │  Treatment for Illiquid position│
          └───────────────────────────────┘
                          │
                          ▼
          ┌───────────────────────────────┐
          │   Summary Data Population       │
          └───────────────────────────────┘
                          │
                          ▼
          ┌───────────────────────────────┐
          │     Market Risk Deductions      │
          └───────────────────────────────┘
```

Market RWA Run is made up of multiple sub processes specific to Market Risk. However, when Market Risk is bundled under a Consolidated Run and triggered, Capital Consolidation and Rating process is executed only once for Credit Risk and Market Risk. The details of each of the sub process mentioned in the preceding flow chart are present under Market Risk section of this document.

For more information on Market RWA computation, see Market RWA.

For example: 'Capital Charge for Interest Rate Instruments' sub process is detailed elaborately under 'Capital Charge for Interest Rate Instruments' section of Market Risk. Likewise 'Capital Charge for Equities', 'Capital Charge for Foreign Exchange Transaction' 'Capital Charge for CDS in Trading Book, and 'Options risk charge calculation' has a detailed explanation present under 'Capital Charge for Equities', 'Capital Charge for Foreign Exchange Transactions' 'Capital Charge for CDS in Trading Book', and 'Capital Charge for Options' sub process of the Market Risk section of this document, respectively.

8.2.1.1.6 Process Flow for Operational RWA
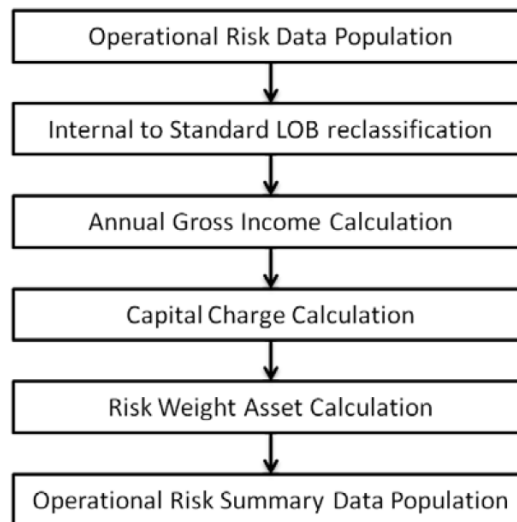
Operational RWA run is executed with the Capital Consolidation process. For more information on the Operational RWA computation, see Operational RWA.

For example: LOB Reclassification and Gross Income Calculation sub process are detailed as separate processes under the Operational RWA section of this document.

8.2.1.1.7 Process Flow for Capital Structure
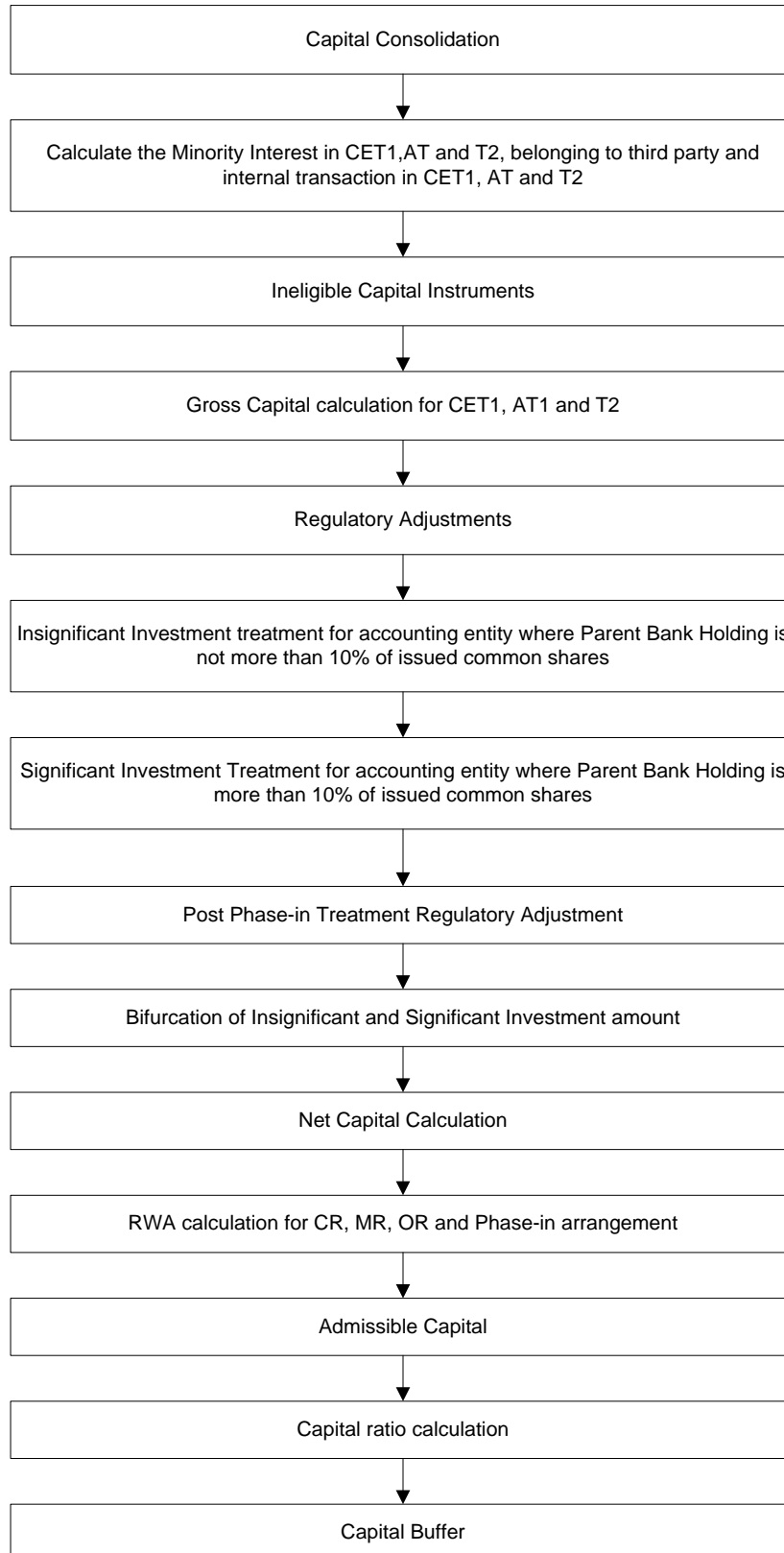
```
┌─────────────────────────────────────────────────────────────────┐
│                      Capital Consolidation                        │
└─────────────────────────────────────────────────────────────────┘
                                │
┌─────────────────────────────────────────────────────────────────┐
│  Calculate the Minority Interest in CET1,AT and T2, belonging     │
│  to third party and internal transaction in CET1, AT and T2       │
└─────────────────────────────────────────────────────────────────┘
                                │
┌─────────────────────────────────────────────────────────────────┐
│                   Ineligible Capital Instruments                  │
└─────────────────────────────────────────────────────────────────┘
                                │
┌─────────────────────────────────────────────────────────────────┐
│              Gross Capital calculation for CET1, AT1 and T2       │
└─────────────────────────────────────────────────────────────────┘
                                │
┌─────────────────────────────────────────────────────────────────┐
│                      Regulatory Adjustments                       │
└─────────────────────────────────────────────────────────────────┘
                                │
┌─────────────────────────────────────────────────────────────────┐
│  Insignificant Investment treatment for accounting entity where   │
│  Parent Bank Holding is not more than 10% of issued common shares │
└─────────────────────────────────────────────────────────────────┘
                                │
┌─────────────────────────────────────────────────────────────────┐
│  Significant Investment Treatment for accounting entity where     │
│  Parent Bank Holding is more than 10% of issued common shares     │
└─────────────────────────────────────────────────────────────────┘
                                │
┌─────────────────────────────────────────────────────────────────┐
│            Post Phase-in Treatment Regulatory Adjustment          │
└─────────────────────────────────────────────────────────────────┘
                                │
┌─────────────────────────────────────────────────────────────────┐
│     Bifurcation of Insignificant and Significant Investment amount│
└─────────────────────────────────────────────────────────────────┘
                                │
┌─────────────────────────────────────────────────────────────────┐
│                     Net Capital Calculation                       │
└─────────────────────────────────────────────────────────────────┘
                                │
┌─────────────────────────────────────────────────────────────────┐
│       RWA calculation for CR, MR, OR and Phase-in arrangement     │
└─────────────────────────────────────────────────────────────────┘
                                │
┌─────────────────────────────────────────────────────────────────┐
│                       Admissible Capital                          │
└─────────────────────────────────────────────────────────────────┘
                                │
┌─────────────────────────────────────────────────────────────────┐
│                     Capital ratio calculation                     │
└─────────────────────────────────────────────────────────────────┘
                                │
┌─────────────────────────────────────────────────────────────────┐
│                         Capital Buffer                            │
└─────────────────────────────────────────────────────────────────┘
```

Capital Structure is executed with Capital Consolidation, Credit Risk, Market Risk, and Operational Risk RWA processes.

For more information on the sub processes of Capital Structure, see Capital Structure.

For example: 'Gross Capital Calculation' mentioned in the preceding flow chart is explained in detail under 'Gross Capital Calculation for T1, T2 and T3' sub process section of the India II Capital Structure in this document. Likewise 'Regulatory Adjustment' and 'Net Capital Calculation' is detailed under 'Regulatory Adjustment to Tier 1 and Tier 2' and 'Calculation of Net Capital' sub process section of the India II Capital Structure in this document.

8.2.1.1.8 Process Flow for Capital Buffers
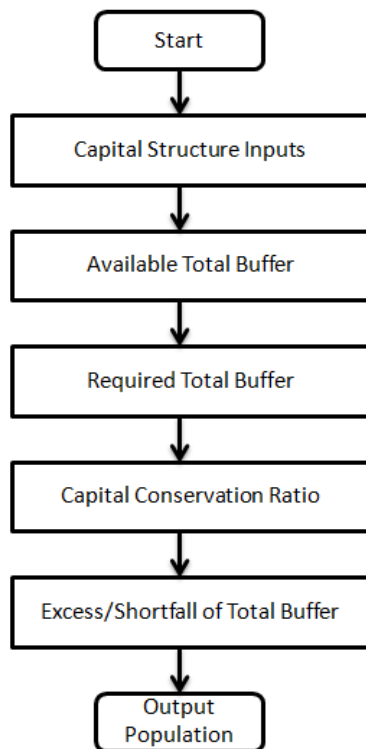
The tasks related to Capital Buffer calculations are present in the process named **INDIA_BASELIII_CAPITAL_BUFFERS**. The processing is detailed in Capital Buffers.

8.2.1.1.9 Process Flow for Revised Leverage Ratio
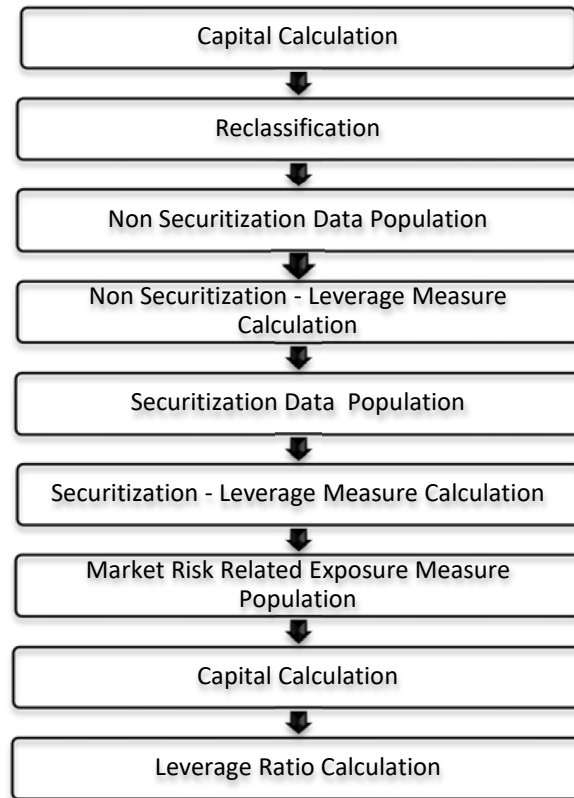
```
Capital Calculation
        ↓
Reclassification
        ↓
Non Securitization Data Population
        ↓
Non Securitization - Leverage Measure
Calculation
        ↓
Securitization Data  Population
        ↓
Securitization - Leverage Measure Calculation
        ↓
Market Risk Related Exposure Measure
Population
        ↓
Capital Calculation
        ↓
Leverage Ratio Calculation
```

Leverage ratio is calculated by executing the Run **IND BASEL III Revised Leverage Ratio Calculation - Indian Banks**.

The processing is detailed in [Revised Leverage Ratio](#).

8.2.1.2 Credit RWA

The application supports the computation of Credit RWA, as per the guidelines laid out by the RBI. Credit RWA computation is divided into Credit Risk for Non Securitized exposures process and Credit Risk for Securitized exposures process.

For Credit Risk of Non Securitized exposures, the application follows the Standardized Approach, Foundation IRB Approach (FIRB), and Advanced IRB Approach (AIRB).

8.2.1.2.1 Non Securitization - Standardized Approach

Process Flow for Non Securitization - Standardized Approach

The sub processes are as follows:
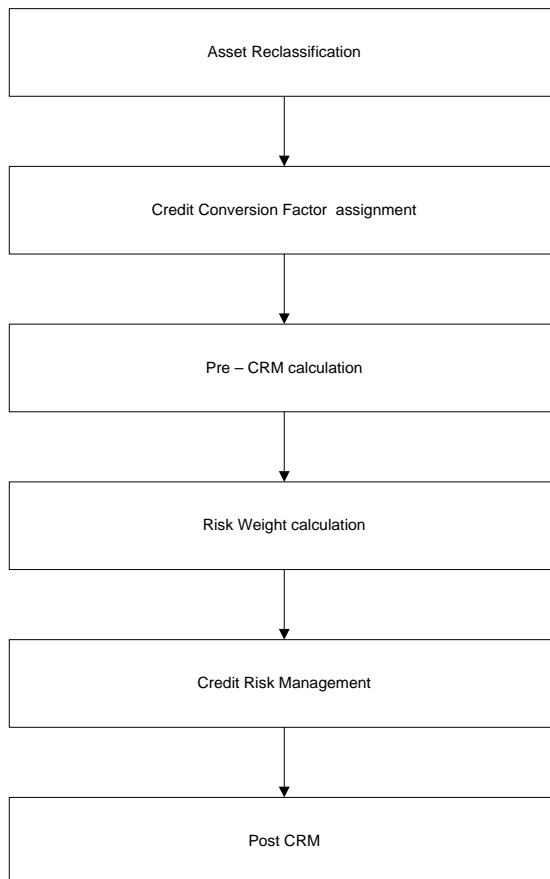
```
┌─────────────────────────────────────┐
│        Asset Reclassification        │
└─────────────────────────────────────┘
                   │
                   ▼
┌─────────────────────────────────────┐
│   Credit Conversion Factor  assignment │
└─────────────────────────────────────┘
                   │
                   ▼
┌─────────────────────────────────────┐
│         Pre – CRM calculation        │
└─────────────────────────────────────┘
                   │
                   ▼
┌─────────────────────────────────────┐
│        Risk Weight calculation       │
└─────────────────────────────────────┘
                   │
                   ▼
┌─────────────────────────────────────┐
│        Credit Risk Management        │
└─────────────────────────────────────┘
                   │
                   ▼
┌─────────────────────────────────────┐
│               Post CRM               │
└─────────────────────────────────────┘
```

Asset Class Reclassification

On the basis of Basel product type and standard counterparty type, an asset class is formed by the application. This asset class is used for data processing. The asset class rule is split as follows:

- Initially the rule assigns asset class based on standard counterparty type alone. This is because, the majority of asset classes are based on party type alone like Sovereign, MDB and so on. Example: IND - Basel III Non Sec Asset Class Reclassification is based on Standard Counterparty Type – STD.

- The rule then assigns asset class based on combination of standard party types and standard product types. Only relevant combinations are selected. This is done to keep the rule size manageable. Example: IND - Basel III Non Sec Asset Class Reclassification – STD.

- A set of rules assigns asset class for specific scenario where any additional information other than standard party type or standard product types is also needed. Example: IND - Basel III Non Sec Asset Class Reclassification - Loans and Advances to Staff, IND Asset Class reclassification - Domestic Sovereign Exposures for CGTMSE, CRGFTLIH and so on.

- The rule assigns the effective asset class as part of CRM for unfunded protections. This rule is similar to the first set, except that exposures guaranteed by State Government and Central Government are classified into separate asset class and not under 'Domestic Sovereign'. Example: IND - Basel III CRM Effective Asset Class Reclassification – STD.

  For example: When standard counterparty is a corporate, the asset class is corporate, except when exposure has specific product types like mortgages where the asset class can be Claims secured by commercial mortgages and so on.

  In addition to the above asset class reclassification process for exposures, to ensure it follows the regulatory retail portfolio definition as specified in the Master Circular the following process:

  MAP_RET_EXP works based on fct_non_sec_exposures table; particularly on columns like Basel Asset Class, Customer/Issuer, Standard Counterparty type, Basel Product Type, and so on.

  This DT checks the Qualifying Crieria requirement of para 5.9.3 of Master Circular – Basel III Capital Regulations in terms of Orientation Criterion, Low value of individual exposures and Granularity Criterion. Product Criterion and customer as Individual is addressed through reclassification. It assigns Regulatory Retail Portfolio asset class for exposure's to bank's own staff not backed by Superannuation adjustment benefits and as defined in para 5.14.2 of Master Circular – Basel III Capital Regulations.

  Post that, it checks the orientation criteria for average turnover of the party against 50 cr and accordingly updates asset class. It, then, checks whether the aggregated exposure to one counterparty exceeds threshold limit of Rs 5 cr then based on customer type it updates asset class to either Corporate, Regulatory Retail or others. Granularity check is performed at the end to check whether total exposure to one counterparty is greater than Granularity threshold (0.2%) of total Regulatory Retail Portfolio. In that case, based on customer type it updates asset class to either Corporate, Regulatory Retail or others. It excludes NPAs from the overall regulatory retail portfolio.

Credit Conversion Factor (CCF)

CCF is applied to all the off balance sheet exposures. The CCF applied values are 0, 0.2, 0.5, and 1. The various factors on the basis of which the CCF is applied are product type, type of facility (whether it is cancellable or not), and the maturity of the exposure.

As per the RBI Basel III guidelines for Standardized Approach, following are the CCF assigned to off-balance sheet items:

Credit Conversion Factors – Non-market related Off-Balance Sheet Items	
Instruments	**Credit Conversion Factor (%)**
Direct credit substitutes	100
Certain transaction-related contingent items	50
Short-term self-liquidating trade letters of credit arising from the movement of goods	20

Credit Conversion Factors – Non-market related Off-Balance Sheet Items	
Instruments	**Credit Conversion Factor (%)**
Sale and repurchase agreement and asset sales with recourse	100
Forward asset purchases	100
Unpaid part of partly paid shares and securities	100
forward deposits	100
Note issuance facilities	50
Revolving / non-revolving underwriting facilities	50
Unconditional take-out finance	100
Conditional take-out finance	50
Lending of banks' securities or posting of securities as collateral by banks	100
Commitments with certain drawdown	100
Commitments unconditionally cancellable	0
Other commitments Maturity up to 1 year	20
Other commitments Maturity more than 1 year	50

Pre CRM EAD

Pre-CRM Exposure at Default (EAD): Exposure at Default is calculated for all asset classes based on:

- Current Exposure Amount
- Off-Balance Sheet Drawn CCF Percent
- Provision Amount
- Undrawn Amount
- CCF Percent
- Exposure Accrued Interest
- Write Off Amount

If the reporting bank has an exposure to one of its own subsidiaries, then that exposure is classified as an internal exposure. Each of the internal transactions, that is, transaction between the parent and its subsidiary, is marked as a deduction line item. The deduction is processed as part of the capital structure processing and all the internal transactions are eliminated from any RWA calculation.

Of the total exposure amount, the exposures may have drawn amount and undrawn amount. The drawn amount is the direct credit exposure and undrawn amount can become a future exposure when that amount is drawn. Therefore, EAD related to undrawn amount is calculated by multiplying the CCF percent with undrawn amount. The application calculates the EAD related to drawn amount using:

- Exposure Accrued Interest

- Off-Balance Sheet Drawn CCF Percent
- Write Off Amount
- Provision Amount
- Current Exposure Amount

Currency Conversion

In this, the application converts data columns (represented as amount) that are in the natural currency, to reporting currency columns which are used for any further calculations. The column names suffixed as '_ncy' are in the natural currency and are multiplied by the Currency Conversion Factor to populate values in the reporting currency. The Rule **IND - Reporting Currency Code Assignment** is used to assign the reporting currency in case of a Run Rule Framework (RRF) execution.

NOTE: The Rule **IND - Reporting Currency Code Assignment** is set to 'INR'. However, you can modify the reporting currency according to your requirements. You can select the reporting currency in the above mentioned rule, if the Run is executed from the Run Execution screen.

Risk Weight

Sovereign

The RBI guidelines, under Claims on Domestic Sovereigns, have listed out the different Risk Weights applicable for different domestic sovereign claims of a Bank.

a. Any claim of the Bank to Central Government gets zero percent risk weight. A bank which invests in State Government or any loan, credit or overdraft exposure to the State Government gets a zero percent Risk Weight.

b. Any Claims on Reserve Bank of India (RBI), Deposit Insurance and Credit Guarantee Corporation (DICGC), Credit Guarantee Fund Trust for Micro and Small Enterprises (CGTMSE), Credit Risk Guarantee Fund Trust for Low Income Housing (CRGFTLIH) are regarded as claims on Central government and gets a zero percent Risk Weight. Any claim on Export Credit Guarantee Corporation of India Ltd. (ECGC) attracts a 20 percent Risk Weight.

c. Any claim on Central Government or State Government has a Risk Weights applicable only if the asset is identified as Standard or Performing, If the Asset is recognized as Non Performing Asset (NPA), they get the Risk Weight as detailed under the section 'Non-Performing Assets' in RBI guidelines.

d. All outstanding amounts covered under any Debt Waiver Schemes announced by government of India, such as Agricultural Debt Waiver Scheme is treated as outstanding debt and gets a zero percent Risk Weight.

e. The Claims guaranteed by State Government gets 20 Percent Risk weight.

f. Central Government guaranteed claims attract a zero risk weight.

Claims on Foreign Sovereigns

The International Rating Agencies S&P, Fitch & Moody's, assigns Risk Weights of the Foreign Sovereign claims. Irrespective of the currency in which these are funded gets Risk Weights as determined by the Rating agencies.

If a claim on a foreign sovereign is funded in the same currency as of the sovereign then it gets zero percent Risk Weight irrespective of its Ratings.

The requirements prescribed by Host Country supervisors are applicable to claims in the books of the foreign branches of the Indian banks for computing capital adequacy.

If the Indian Bank has claims to the Foreign Sovereigns in the books of the foreign branches where the supervisor requires more conservative treatment then they should adopt the requirements prescribed by the Foreign Country Supervisor.

As per the revised guidelines by RBI, claims on foreign central banks is risk weighted in a manner similar to claims on foreign sovereign. Foreign central bank attracts risk weight as per the rating assigned to those central banks claims by the international credit rating agencies as follows:

Claims on Foreign Sovereign/Central banks – Risk Weights						
Standard & Poor's/Fitch Ratings	AAA to AA	A	BBB	BB to B	Below B	Unrated
Moody's Ratings	Aaa to Aa	A	Baa	Ba to B	Below B	Unrated
Risk Weight (%)	0	20	50	100	150	100

With the update by the regulator, currently the application assigns a 0% risk weight for Claims on foreign central banks in their jurisdiction, denominated in the domestic currency of that jurisdiction.

However, in case a Host supervisor requires a more conservative treatment to such claims in the books of foreign branches of the Indian banks, they should adopt the requirement prescribed by the host country supervisors for computing capital adequacy.

The Basel application handles this using the following processes:

1. Reclassify party type to Standard party type.
2. Reclassification based on product –party combination.
3. Assign Risk weight Assignment.

Claims on Corporate and Primary Dealers

Claims on Primary Dealers is reported separately (not under Claims on Corporates) under the RBI RCA3 reporting requirements. Hence these are assigned under the existing asset class 'Primary Dealers'.

   a. Any Claims on Corporate, Asset Finance Corporations (AFC), Non-Banking Finance Companies - Infrastructure Finance Companies is Risk Weighted as per the Rating Agencies which are registered with SEBI. The Ratings are reclassified as per Basel Credit Ratings. The Short Claims and Long Term claims are rated differently.
   b. Any claims on AFCs which attract 150 percent Risk Weight reduces to 100 percent.

c. For entities/counterparties whose obligations are restructured or re-scheduled, the unrated claims on these entities attracts 125 percent Risk Weight.

d. For Claims on corporate which are unrated, the risk weight assigned does not preferential to that assigned to its sovereign of Incorporation.

Unrated claims to Corporate, where the aggregated exposure to a single counterparty is more than the threshold limit of Rs 10 crore is risk weighted at 150%.

Looking at the above it is implied that RBI defined a threshold limit of Rs 10 crore for aggregate exposure on a single counterparty to determine that a RW of 150% applies to Unrated claims.

The RCA3 reporting template requires the Unrated claims above threshold limit and Risk weighted at 150% is reported as a separate row. Hence it is assumed that the threshold limit logic for unrated claims applies under the RBI Basel III requirements as well.

In RCA3 report "Mkt risk Specific-CDS" for RBI, Part A Specific Risk Charge does not reflect the impact of hedging for CDS. Part B Specific Risk Charge which is reported counterparty-wise has hedging benefit reflected in the values.

Assumption

As per the Para 5.8.2 of RBI Basel III guidelines (2013), RBI can warrant a standard risk weight higher than 100% to unrated corporate claims. Further para 5.8.2 of the RBI New Capital Adequacy Framework (2007) mentions that With effect from April 1, 2009, all fresh sanctions or renewals in respect of unrated claims on corporate in excess of Rs. 10 crore threshold (with reference to the aggregate exposure on a single counterparty for the bank as a whole) attracts a risk weight of 150%.

Since the RCA3 reporting template requires the Unrated claims above threshold limit and Risk weighted at 150% to be reported as a separate row, it is assumed that the threshold limit logic as defined under the 2007 RBI Basel II guidelines for unrated claims applies under the RBI Basel III requirements as well.

Risk weights for Claims on Non-Resident Corporates.

Bank

An RBI Basel III guideline requires calculating RWA for claims on banks, that is, exposure in capital instruments of other banks.

Claims on Banks in India and Branches of foreign Banks in India, are treated based on following major criteria:

1. Investments in capital instruments of banks where the investing bank holds not more than 10% of the investee bank.

   Aggregate of these investments, together with investments in capital instruments in insurance and other financial entities do not exceed 10% of common equity of the investing bank.

2. Equity investments in other banks where the investing bank holds more than 10% of the issued common shares of the investee banks.

   Aggregate of these investments, together with investments in capital instruments in insurance and other financial entities do not exceed 10% of common equity of the investing bank.

The applicable treatment is as follows:

Risk Weights (%)						
All Scheduled Banks (Commercial, Regional Rural Banks, Local Area Banks and Co-Operative Banks)				All Non-Scheduled Banks (Commercial, Regional Rural Banks, Local Area Banks and Co-Operative Banks)		
Level of Common Equity Tier 1 capital (CET1) including applicable capital conservation buffer (CCB) (%) of the investee bank (where applicable)	Investments referred to in paragraph (i)	Investments referred to in paragraph (ii)	All other claims	Investments referred to in paragraph (i)	Investments referred to in paragraph (ii)	All Other Claims
1	2	3	4	5	6	7
Applicable Minimum CET1 + Applicable CCB and above	125 % or the risk weight as per the rating of the instrument or counterparty, whichever is higher	250	20	125% or the risk weight as per the rating of the instrument or counterparty, whichever is higher	300	100
Applicable Minimum CET1 + CCB = 75% and <100% of applicable CCB	150	300	50	250	350	150
Applicable Minimum CET1 + CCB = 50% and <75% of applicable CCB	250	350	100	350	450	250
Applicable Minimum CET1 + CCB = 0% and <50% of applicable CCB	350	450	150	625	Full deduction*	350
Minimum CET1 less than applicable minimum	625	Full deduction*	625	Full deduction*	Full deduction*	625

The entire exposure is handled assuming it is less than 10% of Banks own equity. During the Capital structures run, depending upon value of F_SIGNIFICANT_INVESTMENT_IND, the investment above 10% and below 10% gets divided – the below 10% is risk weighted proportionately and above 10% is moved to deductions.

- In case of banks where no capital adequacy norms are prescribed by the RBI, the lending / investing bank calculates the CRAR of the cooperative bank concerned, notionally, by obtaining necessary information from the investee bank, using the capital adequacy norms as applicable to the commercial banks.

- In case, it is not feasible to compute CRAR on such notional basis, the risk weight of 350 or 625 per cent, as per the risk perception of the investing bank, is applied uniformly to the investing bank's entire exposure.

Above mentioned treatment is handled through a set of rules.

RW Assignment mentioned in above table is handled through:

- o IND - Basel III Non Sec Pre-mitigation UL for Claims on Banks Other Than Capital Invst Exp – STD

- o IND - Basel III Non Sec Pre-mitigation RW UL For Capital Investments - Claims On Banks - STD

- o IND - Basel III Non sec Pre-mitigation RW UL for claims on Banks – Cap Invest on Inst Ratings – STD

- o IND-Basel III Non sec Pre-mitigation RW UL for claims on Banks capt invst based on Cust ratings-STD

Treatments based on other conditions are handled through:

- o IND - Basel III Non Sec Pre-mitigation RW UL for Claims on Bank – STD

- o IND - Basel III Non sec Pre-mitigation RW UL for claims on Banks based on risk perception – STD

- o IND - Basel III Non sec Deduction for Claims on Banks Invst within 10percent – STD

Treatment based on Exposures to Export Credit Guarantee Corporation

Export Credit Guarantee Corporation (ECGC) is a central government undertaking body to provide credit guarantee on the default of payments by the buyer. It works as an insurance firm who guarantees export payment, if the buyer defaults in making payment.

ECGC issues Whole-turnover Packing Credit Guarantee (WTPCG) to banks which undertake to obtain cover for packing credit advances granted to all its customers on all-India basis. The guarantee/insurance cover given by ECGC for export credit exposures of the banks ranges between 50% and 75% for pre-shipment credit and 50% to 85% in case of post-shipment credit. However, the ECGC's total liability on account of default by the exporters is capped by an amount specified as Maximum Liability (ML). The banks are required to proportionately distribute the ECGC maximum liability amount to all individual export credits that are covered by the ECGC Policy. For the covered portion of individual export credits, the banks can apply the risk weight applicable to claims on ECGC. For the remaining portion of individual export credit, the banks can apply the risk weight as per the rating of the counter-party.

The Basel application handles this during CRM processing:

- Mitigant Allocation of maximum liability to individual credit exposures.
- Risk weight for uncovered portion. This is handled under the sub process - 'Non Sec STD RW Assignment' for different counter parties.
- Risk weight for covered portion guaranteed by ECGC.

Post risk weight assignment and allocation of mitigant at individual exposure level, the RWA amount is calculated.

The banks are required to proportionately distribute the ECGC maximum liability amount to all individual export credits that are covered by the ECGC Policy. Maximum liability amount is expected as a download from bank in mitigant table where this amount is linked to all the Credit exposures covered. Later, in the CRM process mitigant amount is allocated as per the existing logic.

Claims on Foreign Banks

Claims on Foreign banks are risk weighted based on ratings assigned by international agencies.

The claims on a bank which are denominated in 'domestic' foreign currency met out of the resources in the same currency raised in that jurisdiction is risk weighted at 20 per cent provided the bank complies with the minimum CRAR prescribed by the concerned bank regulator(s).

Rule "IND - Basel III Non Sec Pre-mitigation UL for Claims on Foreign Banks" assigns RW according to rating and based on difference in funded and denominated currency.

Also, in case a Host Supervisor requires a more conservative treatment for such claims in the books of the foreign branches of the Indian banks, they should adopt the requirements prescribed by the Host supervisor for computing capital adequacy. That is, if the applicable host country risk weight is more, then maximum of the host country supervisory risk weight and risk weight calculated by RBI is applied to the exposure.

This is done through rule "IND - Basel III Non Sec Pre Mitigation RW UL - Host Regulator RW Treatment – STD". Depending upon treatment prescribed by host supervisor, this rule is expected to be updated during implementation.

As per the document DBR.BP.BC.No.43/21.06.001/2015-16, the RW assignment for foreign central banks and foreign sovereigns is based on the following table:

Claims on Foreign Sovereigns / Central Banks – Risk Weights						
S&P* / Fitch Ratings	AAA to AA	A	BBB	BB to B	Below B	Unrated
Moody's Ratings	AAA to AA	A	BBB	BB to B	Below B	Unrated
Risk Weight (%)	0	20	50	100	150	100
*Standard & Poor's						

Corporate

Risk weighting of Claims to Primary Dealers and Claims on Corporate, NBFC-IFCs and AFCs based on ratings

The circular issued by RBI in August 2016 for risk weight changes for unrated exposures on corporate, AFC and NBFC-IFCs is complied with in this release. The document used for reference is "Review of Prudential Norms–Risk Weights for Exposures to Corporates, AFCs and NBFC-IFCs" released in August 2016.

Earlier, the risk weight applied to the unrated exposure to Corporate, AFC and NBFC-IFCs is 100% for both Long term and Short term claims. The same is modified as follows:

1. Starting immediately, the RW to be applied to unrated exposures of Corporate, AFC or NBFC-IFCs which have an aggregate exposure of more than INR 100 Crores to the banking system, is 150%. This is applicable if the exposure was previously rated, but has now become unrated.

2. For all unrated exposures to Corporate, AFC and NBFC-IFCs, the RW is 150% starting from 30th June 2017 onwards. This is applicable only if the party has an aggregate exposure of more than INR 200 Crores to the banking system.

3. All the exposures which are unrated and do not fall into the criteria specified in points 1 and 2 above continue to attract a RW of 100% for both long and short term claims.

The exposures to Corporates, AFCs and NBFC-IFCs are treated under the sub-process "Non Sec STD Ceiling RW Assignment for Corporate AFC NBFCIFCs and HFCs".

Risk Weight Capping for Exposures to HFCs

In accordance with the circular issued by RBI in October 2016, Housing Finance Companies (HFCs) are risk weighted similar to Corporate, AFCs or NBFC-IFC's. The document used for reference is "Risk Weights for Exposures to HFCs" published by RBI in October 2016.

HFCs is introduced as a new entry in the DIM_STANDARD_PARTY_TYPE table and banks are expected to reclassify their housing finance companies into HFCs.

All exposures to HFCs is treated similar to the exposures on Corporate, AFCs and NBFC-IFCs. The exposures to HFCs are treated under the sub-process "Non Sec STD Ceiling RW Assignment for Corporate AFC NBFCIFCs and HFCs".

Unrated Exposure to Entities whose Obligations are Restructured/Rescheduling

The unrated claims on Entities whose obligations are restructured/rescheduling is assigned 125% risk weight until satisfactory performance under revised payment schedule is established for one year from the date when the first payment of interest falls due under the revised schedule.

In order to handle this requirement, identify the exposures which are restructured and capture the first payment date under revised schedule. Since obligation subject to restructuring /rescheduling are mostly loans, these attributes are expected only on the Stage Loans Contracts table.

Two hierarchies are created which is used to risk weight unrated restructured exposures to corporate entities:

1. Restructured Obligation Indicator
    a. Restructured Obligation (when restructured indicator is Y)
    b. Non-Restructured Obligation (catch all node)
2. Satisfactory Performance Period
    a. Satisfactory Performance - Less than One year (Past Due Flag is N and difference between First Payment date under Revised Schedule and Mis Date is less than 1 year)
    b. Satisfactory Performance - More than One year (Past Due Flag is N and difference between First Payment date under Revised Schedule and Mis Date is more than 1 year)
    c. OTHERS (catch all node)

Claims on Primary dealers are treated as claims on Corporate.

MDBs

As per the RBI Basel III guidelines, the following guarantors are considered eligible**:**

1. Sovereigns and sovereign entities. This includes BIS, IMF, European Central Bank and European Community and other eligible MDBs, ECGC,CGTSI, CRGFTLIH, banks and primary dealers with a lower risk weight. The following MDB are treated as an eligible guarantor:
    a. World Bank Group: IBRD and IFC
    b. Asian Development Bank
    c. African Development Bank
    d. European Bank for Reconstruction and Development
    e. Inter-American Development Bank
    f. European Investment Bank
    g. European Investment Fund
    h. Nordic Investment Bank
    i. Caribbean Development Bank
    j. Islamic Development Bank
    k. Council of Europe Development Bank
2. Other entities that are externally rated, including credit protection provided by parent, subsidiary and affiliate companies when they have a lower risk weight than the obligor. The exception to this requirement is when credit protection is provided to a securitization exposure.
3. When credit protection is provided to a securitization exposure, other entities that are currently externally rated BBB- or better AND that were externally rated A- or better at the time the credit protection was provided. This includes credit protection provided by parent, subsidiary, and affiliate companies when they have a lower risk weight than the obligor.

These are reclassified as MDB and risk weighted at flat 20%.

Claims on PSEs

All domestic PSEs are handled similar to Claims and Corporate.

- Domestic PSE:

    The claims on domestic PSEs are risk weighted in a manner similar to claims on corporate. See section associated with RW assignment to corporate

- Foreign PSE:

    The Claims on foreign PSEs is risk weighted as per the rating assigned by the international rating agencies.

The risk weights for Foreign PSEs are given as follows.

Claims on Foreign PSEs – Risk Weights S&P/ Fitch ratings	AAA to AA	A	BBB to BB	Below BB	Unrated
Moody's ratings	Aaa to Aa	A	Baa to Ba	Below Ba	Unrated
RW (%)	20	50	100	150	100

The rule "IND – BASEL III Non Sec Pre-Mitigation RW UL – STD" assigns RW accordingly.

Retail and Others

The claims (including fund-based and non-fund based) that meet all the four criteria listed below is considered as retail claims for regulatory capital purposes and included in a regulatory retail portfolio. Claims included in this portfolio are assigned a risk-weight of 75 per cent.

Qualifying Criteria

1. **Orientation Criterion**: The exposure (fund-based and non fund-based) is to an individual person or persons or to a small business; Person under this clause means that any legal person capable of entering into contracts and includes but not restricted to individual, HUF, partnership firm, trust, private limited companies, public limited companies, co-operative societies and so on. Small business is one where the total average annual turnover is less than Rs 50 crore. The turnover criterion is linked to the average of the last three years in the case of existing entities; projected turnover in the case of new entities; and both actual and projected turnover for entities which are yet to complete three years.

    a. **Product Criterion**: The exposure (fund-based and non-fund-based) takes the form of any of the following: revolving credits and lines of credit (including overdrafts), term loans and leases (for example installment loans and leases, student and educational loans) and small business facilities and commitments.

    b. **Granularity Criterion**: Banks must ensure that the regulatory retail portfolio is sufficiently diversified to a degree that reduces the risks in the portfolio, warranting the 75 per cent risk weight. One way of achieving this is that no aggregate exposure to one counterpart should exceed 0.2 per cent of the overall regulatory retail portfolio. 'Aggregate exposure' means gross amount (that is, not taking any benefit for credit risk mitigation into account) of all forms of debt exposures (example: loans or commitments) that individually satisfy the three other criteria. In addition, 'one counterpart' means one or several entities that

can be considered as a single beneficiary (example: in the case of a small business that is affiliated to another small business, the limit applies to the bank's aggregated exposure on both businesses). While banks can appropriately use the group exposure concept for computing aggregate exposures, they evolve adequate systems to ensure strict adherence with this criterion. NPAs under retail loans are to be excluded from the overall regulatory retail portfolio when assessing the granularity criterion for risk-weighting purposes.

c. **Low value of individual exposures**: The maximum aggregated retail exposure to one counterpart should not exceed the absolute threshold limit of 5 crores.

The below claims have to be excluded from the Regulatory Retail Portfolio:

a. Exposures by way of investments in securities (such as bonds and equities), whether listed or not;

b. Mortgage Loans to the extent that they qualify for treatment as claims secured by residential property 39 or claims secured by commercial real estate 40;

c. Loans and Advances to bank's own staff which are fully covered by superannuation benefits and / or mortgage of flat/ house;

d. Consumer Credit, including Personal Loans and credit card receivables;

e. Capital Market Exposures;

f. Venture Capital Funds.

2. Loans and advances to bank's own staff which are fully covered by superannuation benefits and/or mortgage of flat/ house attracts a 20 per cent risk weight.

3. Other loans and advances to bank's own staff are eligible for inclusion under regulatory retail portfolio and therefore attracts a 75 per cent risk weight.

4. The deposits kept by banks with the CCPs, namely Clearing Corporation of India Limited (CCIL), the risk weight is 20 per cent and the deposits kept by banks with other CCPs, risk weight is according to the ratings assigned to these entities.

Audit Trail for Regulatory Retail Portfolio

The RBI guidelines detail the categorization of exposures into regulatory retail portfolio (RRP) based on the qualifying, orientation, product and granularity criteria. For the purpose of satisfying granularity criterion, the aggregate exposure to any counterparty must not exceed 0.2% of the overall regulatory retail portfolio. There is a need for the banks to report the overall regulatory retail portfolio (RRP) which forms a base for this criterion and also the 0.2% of the same. For this purpose, the following suggested solution aims at enhancing the solution to capture this information so that it can be used by the banks, in case of any specific reporting requirements.

The existing solution stores the value for the granularity check as 0.2%. This value of 0.2% is used in the DT to compute the checks and then assign the asset classes for the relevant exposures as RRP. A placeholder in the non-sec processing table to store the value of the exposure is used as a threshold. For all the RRP exposures, the overall RRP exposure value and also the threshold RRP value which is 0.2% of the overall RRP portfolio are marked.

Computation of LTV Ratio for Partially Disbursed Loan

The loan-to-value ratio (LTV ratio) is computed for the loans given by the bank based on the outstanding amount to the property value as per the RBI guidelines. RBI has given approval to some clients to use sanctioned amount instead of the outstanding amount for partially disbursed loans. Since it is not explicitly stated in the accord and there is no written communication from RBI till date about the usage of sanctioned limit for LTV calculations, the solution provides the banks an option to opt for the usage of sanctioned amount for the partially disbursed loans.

For this purpose, the outstanding amount in the LTV ratio calculation is replaced with the sanctioned amount for partially disbursed loans.

Parameter Treatment:

LTV METHOD is set to 'SANCTAMT' if the Computation of LTV Ratio for Partially Disbursed Loan is opted.

BPBL6145	BP - IND Non Sec LTV Ratio Calculation

The parameter for the above BP is set in the following rule.

RLBL6389	IND - Basel III - Non Sec LTV Ratio Calculation For Claims Secured by Residential Property

Data Expectation:

For the partially disbursed loans, the principal drawn amount must contain the amount disbursed for the loan account till date and the current credit limit column must hold the amount of loan finally sanctioned.

Past Due Exposures

Risk Weight Application for Unsecured Portion of NPAs

1. The unsecured portion of NPA (other than a qualifying residential mortgage loan), net of specific provisions (including partial write-offs), is risk-weighted as follows:

    a. 150 per cent risk weight when specific provisions are less than 20 per cent of the outstanding amount of the NPA.

    b. 100 per cent risk weight when specific provisions are at least 20 per cent of the outstanding amount of the NPA.

    c. 50 per cent risk weight when specific provisions are at least 50 per cent of the outstanding amount of the NPA.

2. In addition to the above, where a NPA is fully secured by the following forms of collateral that are not recognized for credit risk mitigation purposes, either independently or along with other eligible collateral a 100 per cent risk weight can apply, net of specific provisions, when provisions reach 15 per cent of the outstanding amount:

    a. Land and building which are valued by an expert valuer and where the valuation is not more than three years old.

  b. Plant and machinery in good working condition at a value not higher than the depreciated value as reflected in the audited balance sheet of the borrower, which is not older than eighteen months.

3. For the purpose of computing the level of specific provisions in NPAs for deciding the risk-weighting, all funded NPA exposures of a single counterparty (without netting the value of the eligible collateral) is reckoned in the denominator.

4. For the purpose of defining the secured portion of the NPA, eligible collateral is the same as recognized for credit risk mitigation purposes. Hence, other forms of collateral like land, buildings, plant, machinery, current assets, and so on is reckoned while computing the secured portion of NPAs for capital adequacy purposes.

Risk Weight Application for Unsecured Portion of NPAs which are Claims Secured by Residential Property

Claims secured by residential property which are NPA are risk weighted as follows:

1. 100 percent risk weight when specific provisions are less than 20 per cent of the outstanding amount of the NPA.

2. 75 percent risk weight when specific provisions are at least 20 per cent of the outstanding amount of the NPA and less than 50 per cent of the outstanding amount of the NPA.

3. 50 percent risk weight when specific provisions are at least 50 per cent of the outstanding amount of the NPA.

8.2.1.2.2 Default Fund Contribution

Default Fund Contribution is the funds contributed or commitments made by a clearing member to a Central Counterparty's (CCP) mutualized loss sharing agreement. The purpose of such default funds is to provide capital as a safeguard against extraordinary losses that might occur in connection with a financial crisis in the market or the simultaneous defaults of several large members. The clearing members contribute to such default funds which are kept with the central counterparty (clearing house) in the proportion of their exposure to the central counterparty. The default fund contributions by the clearing members contribute toward the central counterparty's regulatory capital along with CCP's own contributions to the default fund. These contributions act as collaterals to mutually share in the losses incurred by the clearing members due to counterparty defaults.

The Default Fund Contribution (DFC) feature in the OFS Basel application enables the banks to compute the Risk Weighted Assets for default fund contributions to a central counterparty.

For each clearing member, a contribution is made to the central counterparty's default fund. This contribution acts as a cushion against the defaults by any clearing member of the central counterparty.

If the CCP is not a qualified CCP (Non-QCCP), then the risk weighted asset amount for the banking organization's default fund contribution is the sum of default fund contribution multiplied by 1250%.

If the CCP is a qualified CCP (QCCP), then the RWA amount is computed using the method described below:

The RWA amount for default fund contribution with a QCCP is computed as minimum of (2% of trade exposure amount + 1250% of Funded Default fund contribution by the reporting bank) and (20% of the trade exposure amount). The formula used is as provided:

Min {(2% * TEi + 1250% * DFi); (20% * TEi)}

Where;

TE$_i$ is bank $_i$'s trade exposure to the QCCP; and

DF$_i$ is bank $_i$'s pre-funded contribution to the QCCP's default fund

The Trade Exposure Amount is computed as the sum of net potential exposure amount, Fair value of collateral, and Pre-mitigation but post volatility haircut exposure at default for a QCCP.

Total Risk weighted assets for default fund contribution is the sum of clearing member's RWA for all of its default fund contributions to all CCP's of which bank is a clearing member.

Non-Securitization Related Changes

This enhancement in the Basel application is related to changes in risk weight assignment in the calculation of Risk weighted asset for default fund contribution. According to the RBI regulation update, banks must apply a risk weight of 1250% to their default fund contributions to a non-qualifying and Qualifying CCP instead of 1111%, which is the existing value. The default fund contribution treatment is enhanced to comply with RBI 2015 guidelines requirements related to maximum risk weight assignment.

The Basel application achieves this by modifying the existing rules, where risk weight is assigned as 1111%, to 1250%. You can see the metadata documents available at MOS, to know more about the rules which are undergone changes as per this requirement.

Capital and Provisioning Requirements for Exposures to entities with Unhedged Foreign Currency Exposure

The unhedged foreign currency exposures are affected by the volatility in exchange rate movements. These impacts the capacity of the holders to fulfill their credit obligations toward the banks and hence result in default losses and thereby affects the complete financial system.

To resolve this issue, the application is updated with the changes suggested by the RBI. The changes include provisioning and determining capital requirements due to Unhedged Foreign Currency Exposures (UFCE).

Foreign Currency Exposure (FCE) refers to the gross sum of all items on the balance sheet that have impact on profit and loss account due to the movement in foreign exchange rates. Financial hedges and Natural hedges are recognized for the purpose of calculating unhedged foreign currency exposures. Financial hedge is considered when the exposure is hedged using a derivative contract. Natural hedge occurs between 2 exposures when both of them have opposite cash flows in the same accounting year. Based on these criteria of hedging, the unhedged foreign currency exposure is computed.

The application assess the extent of possible loss that arise in case of volatility in the exchange rate to compute the incremental capital requirements that are maintained by the bank for UFCE. This possible loss is based on the annualized volatility of the USD-INR exchange rate. For the overseas branches/subsidiaries of the bank, the local currency of that jurisdiction is substituted to INR.

This annualized volatility is computed by taking the largest annual volatility as seen in the last 10 years' historical data in adverse direction. This annualized volatility is provided by FEDAI (Foreign Exchange Dealers' Association of India) on instructions from RBI in due course of time on a daily basis and posted on FEDAI's website. The resulting annualized volatility is used to calculate the loss by multiplying with UFCE amount declared by the counterparty entity.

After computing the loss figure, it is compared with the Earnings before Interest and Depreciation (EBID) of the counterparty and expressed in percentage. Higher the percentage, higher the susceptibility of the entity (counterparty) to adverse exchange rate movements. Therefore, all exposures to such entities (whether in foreign currency or in INR), attract incremental capital and provisioning requirements.

UFCE is monitored on a monthly interval and the incremental capital requirements are computed at least quarterly. The frequency of this calculation can increase depending on the volatility of USD-INR exchange rate. For Incremental capital requirements, exposure amount that is used for the credit risk capital requirements is used.

For new entities or projects under implementation where the EBID value is not available, the application calculates the incremental capital requirements based on projected average EBID for the three years from the date of commencement of commercial operations.

The flowchart for UFCE process is provided below:

```
                    ┌─────────────────┐
                    │  Non-Sec Process │
                    └─────────────────┘
                             │
                    ╱─────────────────╲
                   ╱   Staging to       ╲
                  ╱    Fact Tables       ╲
                 ╱     Population          ╲
                 ╲─────────────────────────╱
                             │
                    ┌─────────────────┐
                    │    RW            │
                    │    Assignment    │
                    └─────────────────┘
                             │
                    ┌─────────────────┐
                    │  Likely Loss as  │
                    │  %age of EBID    │
                    └─────────────────┘
                             │
                    ◇─────────────────◇
                    │  Likely Loss as   │──────No──────┐
                    │  % of EBID >      │              │
                    │  75%?             │              │
                    ◇─────────────────◇              │
                             │                          │
                            Yes                         │
                             ▼                          │
                    ◇─────────────────◇    ┌─────────────────┐
                    │   Exposure       │─Yes─│ Default RW as the│
                    │   Defaulted?     │    │ normal process   │
                    ◇─────────────────◇    └─────────────────┘
                             │                          │
                            No                          │
                             │                          │
                    ┌─────────────────┐                │
                    │   Update         │                │
                    │   N_UFCE_SUR     │                │
                    │   CHARGE by      │                │
                    │   0.25 (i.e. 25%)│                │
                    └─────────────────┘                │
                             │                          │
                    ┌─────────────────┐                │
                    │ Update RW = Pre  │                │
                    │ mitigation RW *  │                │
                    │ (1+N_UFCE_SU     │                │
                    │ RCHARGE)         │                │
                    └─────────────────┘                │
                             │                          │
                    ┌─────────────────┐                │
                    │    RWA           │────────────────┘
                    │    Calculation   │
                    └─────────────────┘
```
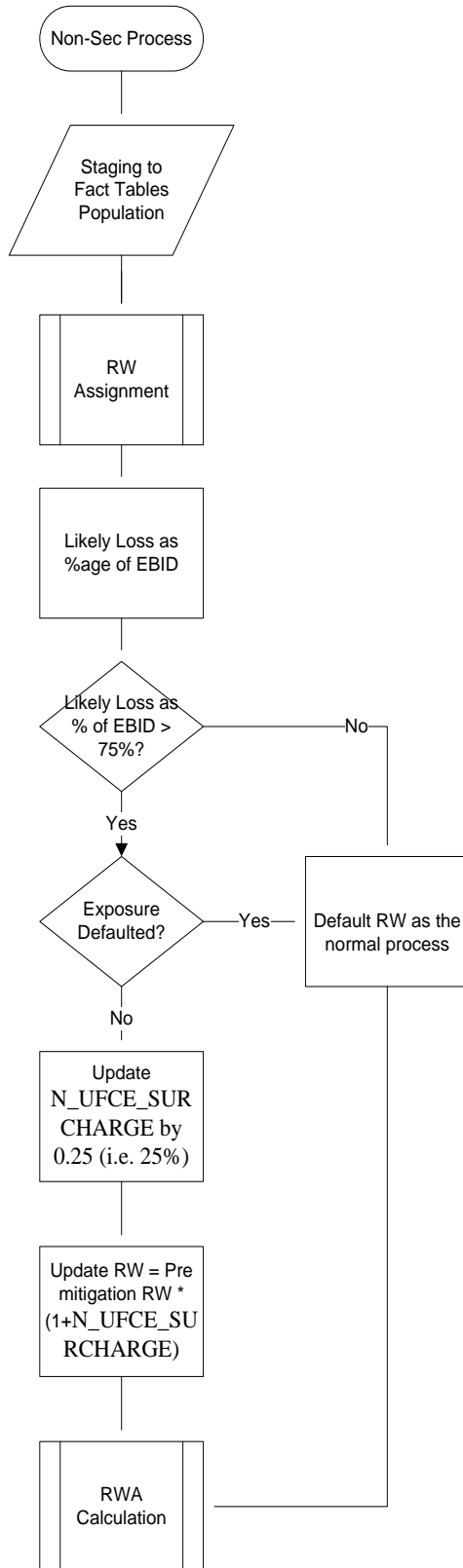
UFCE Treatment

Population of Party-Currency Mapping

Party-Currency mapping is in FSI_SETUP_PARTY_CURRENCY_MAP table and on execution of the BASEL_SETUP_TABLE_POPULATION batch, the data will be moved to the table FSI_PARTY_CURRENCY_MAP by the T2T □ FSI_PARTY_CURRENCY_MAP_POP.

Maximum Annual Volatility Rate

In Non-Sec Data Population process, the party-currency mapping for the run is populated from FSI_PARTY_CURRENCY_MAP into the processing table FSI_PARTY_CURRENCY_CALCULATION using the T2T -> FSI_PARTY_CURRENCY_CALCULATION_POP.

The Maximum Annual Volatility Rate is picked up from FSI_EXCHANGE_RATES based on the Base Currency (BCY) and Non-Base Currency (NBCY) in FSI_PARTY_CURRENCY_CALCULATION.

Likely Loss Amount

The Likely Loss Amount in FSI_PARTY_CURRENCY_CALCULATION table is calculated by a new Rule BP - Party Currency Likely Loss Amount.

The "Likely Loss Calculation for UFCE as Percentage of EBID" in FCT_NON_SEC_EXPOSURES is calculated by the existing "IND - Likely Loss Calculation for UFCE as Percentage of EBID". The new tasks are added to the Non-Sec Data Population for India jurisdiction.

Risk Weight Increase for UFCE Entities

RW increase for UFCE Entities computed in the Rule "IND - RW Increase for UFCE Entities" which refers to FSI_PARTY_CURRENCY_CALCULATION.N_UNHEDGED_AMOUNT.**Data Expectations**:

- Table FSI_SETUP_PARTY_CURRENCY_MAP to be populated by the user.
- N_UNHEDGED_AMOUNT in the above table is provided in reporting currency.

Counterparty Credit Risk – Standardized Approach

The Standardized Approach for Counterparty Credit Risk (SA-CCR) is an alternative for Standardized Method (SM) and Current Exposure Method (CEM) for Counterparty Credit Risk (CCR) in Credit Risk. Banks can use SA-CCR approach while they follow Standardized or IRB approaches for credit risk. The SA-CCR approach is applicable for Over the Counter (OTC) Derivatives, Exchange Traded Derivatives, and Long Settlement Transactions.

Important: The changes detailed in this section is applicable only from 1 April 2018. Therefore, only those Runs with the FIC_MIS_DATE greater than or equal to 1 April 2018, is executed.

According to the guidelines, the banks that do not have approval to apply the IMM approach for the relevant OTC transactions, must use SA-CCR.

Ensure that you have modified the data type length of V_PARENT_EXPOSURE_ID column in STG_UNDERLYING_EXPOSURES table to VARCHAR2(50).

NOTE: This approach does not impact the IMM approach for CCR and any processes for IRB (AIRB or FIRB) runs.

Process Flow

The following flowchart depicts the process flow of SA-CCR.

Replacement Cost

The Replacement Cost (RC) is computed differently for margined and unmargined netting agreements. The Exposure at Default (EAD) for margined netting agreement is capped at the EAD of the same netting agreement calculated on unmargined basis.

NOTE: The RC is capped to zero to ensure that the replacement cost does not become negative value when the bank maintains NICA in excess of TH+MTA.

For unmargined transactions, the RC intends to capture the loss that occurs when a counterparty defaults and closes out its transactions immediately. For margined transactions, the RC intends to capture the loss that occurs if a counterparty defaults at present or on the future, assuming that the closeout and replacement of transactions occur instantaneously. However, there can be a period (the margin period of risk) between the last exchange of collateral before default and replacement of the trades in the market.

The RC can be calculated as follows:

For unmargined transactions:

> **RC= MAX {V-C; 0}**
>
> Where:
>
> V = Value of the derivative contract in netting agreement
>
> C = Haircut value of net collateral held.

For unmargined transactions:

> **RC = MAX {V-C; TH+MTA-NICA; 0}**
>
> Where:
>
> V = Value of the derivative contract in netting agreement
>
> C = Haircut value of net collateral held
>
> TH = Positive threshold before counterparty sends collateral to bank
>
> MTA = Minimum transfer amount applicable to counterparty
>
> NICA = Net Independent Collateral Amount

The formulation for RC for SA-CCR approach depends on the transaction types (margined or unmargined). You must distinguish between the transactions that require only Initial Margin (IM) and no variation margin (VM) as unmargined transactions and the transactions that require IM and VM as margined transactions.

The following tables are referred to as derivative tables in the application. Note that the data for counterparty credit risk related transactions that is for derivatives, are expected in these tables:

- STG_FORWARDS
- STG_FUTURES
- STG_OPTION_CONTRACTS
- STG_SWAPS_CONTRACTS
- STG_CREDIT_DERIVATIVES

The N_MARKET_VALUE column in all the preceding derivative tables is used to store the market value of the derivative contract.

NOTE: Due to uncertainty in the guidelines regarding the treatment of cross-product netting agreements (the nettings agreements that include OTC and SFT), the application calculates the netting agreement level amounts applicable for OTC derivatives by finding out the proportion of OTC in the netting agreement and then allocating the contract amounts accordingly to the same under SA-CCR approach.

IM and VM are expected at netting agreement level. Banks must provide the same either by dividing the IM/VM at counterparty level into netting agreements or by aggregating the IM/VM at transaction level to the netting agreement level. Minimum Transfer Amount and threshold amount should also be provided at netting agreement level in STG_NET_EXPOSURES table.

Banks are also required to identify the transactions as margined or unmargined and provide the values appropriately in the F_MARGINED_TXN_IND column of the STG_FORWARDS, STG_FUTURES, STG_OPTION_CONTRACTS, STG_SWAPS_CONTRACTS, and STG_CREDIT_DERIVATIVES tables. Bilateral transactions, where there is a one-way margining agreement exists in favor of the counterparty (where bank posts but does not receive collaterals) must have the value of the column F_MARGINED_TXN_IND as Y and F_Nettability_Flag as N.

Potential Future Exposure (PFE)

The PFE, Add-ons, and Multiplier are detailed in this section.

The PFE add-ons consists of an aggregate add-on component, which consists of add-ons calculated for each risk category and a multiplier that allows for the recognition of excess collateral or negative mark-to-market value for the transactions.

Add-on Aggregate is the aggregate of add-on components. The multiplier is defined as a function of the following three inputs:

- Value of the derivative contract in netting agreement (V)
- Haircut value of net collateral held (C)
- Add-on Aggregate

If the banks hold collateral which is present in excess than the market value of derivative contracts to reduce the counterparty credit risk, it is called, over-collateralization. If the value of the collateral is lesser than the market value of the derivatives, the contract is called, under-collateralized. To provide the benefit of over-collateralization to banks, BIS has introduced a multiplier on the PFE Add-ons. This decreases as the collateral value increases and is at five percentage of the PFE Add-on.

Therefore, when collateral value is higher than the derivative value, RC becomes zero and the PFE Add-on is multiplied by a multiplier to factor in the effect of over-collateralization. If the contract is under-collateralized, that is if the collateral value is less than the derivative value, the replacement cost remains the same as explained in the Replacement Cost section (for margined and unmargined). In addition, the multiplier becomes equal to, one so that, under collateralization neither benefits nor detriments the bank.

Add-on Aggregate is the sum of the Add-ons for each risk category in a netting agreement.

Note that it is an absolute sum and not a netting effect.

The process for Add-on calculation includes the following steps.

Risk Category

For each exposure, the banks must identify the primary risk driver of the risk factors such as interest rate, foreign exchange, or credit. This is crucial because the Add-on formula for each risk category is different and it depends on the nature of the risk factors. For Add-on calculation it is assumed that all the exposures possess zero current mark-to-market value. That is, all the contracts are at-the-money. The risk categories can be identified by defining the primary risk factors of underlying exposures in the derivative contracts.

Adjustments

There are multiple factors which are a part of the Add-on estimation formulae for each risk category, based on which the transactions are adjusted. These factors are:

- Adjusted Notional Amount: An adjusted notional amount based on actual notional or price is calculated at the trade level. For interest rate and credit derivatives, this adjusted notional amount also incorporates a supervisory measure of duration.

- Delta Adjustment: Supervisory delta adjustment is made to the notional amount depending on the position of the trade (long/short) and the type of trade (option, CDO tranche, or neither).

- Volatility Adjustment: Supervisory adjustment is applied to notional amount to capture volatility.

- Hedging Sets: The trades within each risk category are separated into hedging sets and an aggregation method is applied to aggregate all the trade-level inputs at the hedging set level and finally at the risk-category level. For credit derivatives, this involves the application of a supervisory correlation parameter to capture important basis risks and diversification.

- Maturity Adjustment: A maturity factor depending on type of transactions (MF margined, MF Unmargined) is defined based on the time horizon at trade level. This maturity adjustment factor is applied to the adjusted notional amount. Maturity adjustment for unmargined transactions is the lesser of one year and residual maturity of the contract, floored by 10 business days. For margin transactions, maturity adjustment is calculated after minimum period of risk (MPOR) which depends on cleared transaction indicator.

Period or Date Parameters

Four date parameters are used in SA-CCR approach. These are:

- **M**: This is the latest date on which the contract is active. In such cases where the derivative contract has another underlying contract (for example, Swaption) and where the exercise of one contract can result into the position in the underlying contract, M is the final settlement date of the underlying contract. This input is used in MF adjustment for unmargined transactions.

- **S**: This is the start date for the interest rate derivatives and credit derivatives. If the derivatives refer to another underlying interest rate or credit instrument, then the start date is calculated based on the underlying contract. This value should not be less than 10 days. If the contract has already started, it should be equal to zero.

For example, for Bond futures, S is the start date of the bonds. These inputs are used for the duration adjustment of notional amount for IR and Credit derivatives.

- **E**: This is the contract end date for the interest rate derivatives and credit derivatives. If the derivatives refer to another underlying interest rate or credit instrument, then this end date is calculated based on the underlying contract. This value should not be less than 10 days.

  For example, for Bond futures, it is the end date of the bonds. This input is used for the duration adjustment for notional amount of IR and Credit derivatives. Also, this date determines the maturity bucket category for the IR and Credit Risk Categories.

- **T**: This is the latest contractual exercise date for options in all the Risk Categories. This is used in the computation of Delta adjustment factor for options.

Add-ons

Add-on for IR Derivatives

Following flowchart depicts the IR derivatives:

IR

Adjusted notional
= Notional Amount
* Supervisory
Duration

Assign maturity
buckets based on
residual maturity

Compute Effective
Notional for each
maturity bucket

Bank chooses to offset
across maturity buckets?
Compute effective
notional at hedging set
level

$$EffectiveNotional_j^{(IR)} = \left| D_{j1}^{(IR)} \right| + \left| D_{j2}^{(IR)} \right| + \left| D_{j3}^{(IR)} \right|$$ ◄No ──── Yes►

Add-on at hedging
set level as
product of
Effective notional *
supervisory factor

Cumulative Add-
on for IR Risk
Category

For interest rate derivatives, each currency forms a different hedging set. In each hedging set, the trades are divided into maturity buckets (Less than 1 year, 1 to 5 years, and more than 5 years). Positions are allowed to be completely offset within a time bucket. Add-on for IR derivatives is the sum of add-ons for each hedging set.

Add-on for FOREX Derivatives

Following flowchart depicts the FOREX derivatives:

```
            ( FX )
              |
  +------------------------+
  |  Adjusted notional     |
  |  = Exposure            |
  |  amount converted      |
  |  to reporting          |
  |  currency              |
  +------------------------+
              |
              v
  +------------------------+
  |  Add-on at hedging     |
  |  set level as          |
  |  product of            |
  |  Effective notional *  |
  |  supervisory factor    |
  +------------------------+
              |
              v
  +------------------------+
  |  Cumulative Add-       |
  |  on for FX Risk        |
  |  Category              |
  +------------------------+
```

Add-on for a hedging set for forex derivatives is calculated as per the guidelines.

Add-on for Credit Derivatives

Following flowchart depicts the add-on calculation for credit derivatives:

CD

Adjusted notional
= Notional Amount
* Supervisory
Duration

Compute Effective Notional for each reference entity by full
offsetting if same reference entity is present for 2 trades

Compute Add-on for each reference entity by multiplying
Effective notional by Supervisory Factor. Supervisory factor
depends on the rating of the reference obligation

Compute Aggregate Add-on for Credit derivative
risk category by using below formula:

$$AddOn^{(Credit)} = \left[\left(\sum_k \rho_k^{(Credit)} * AddOn(Entity_k) \right)^2 + \sum_k \left(1 - \left(\rho_k^{(Credit)} \right)^2 \right) * \left(AddOn(Entity_k) \right)^2 \right]^{\frac{1}{2}}$$

where $\rho_k^{(Credit)}$ is the appropriate correlation factor corresponding to the Entity k.

All credit derivatives that reference the same entity (either a single entity or an index) are allowed to offset each other completely to form an entity-level effective notional amount.

For single name entities, SF is determined by the credit rating of the reference name. For index entities, SF is calculated by determining if the index is investment grade or speculative grade. All entity level add-ons are grouped in a single hedging set, except for basis and volatility transactions for which full offsetting is not allowed.

For credit derivatives, add-ons are divided into systematic and idiosyncratic components. Entity Level Add-ons are allowed to be completely offset in systematic component whereas in the idiosyncratic component, there is no offsetting benefit.

Treatment of Multiple Margin Agreements and Multiple Netting Agreements

For RC and PFE, if one of the netting agreement has multiple margin agreements, then this netting agreement should be divided into sub-netting agreements to align with the margin agreements.

If a single margin agreement applies to multiple netting agreements, RC is calculated by taking the maximum of the mark-to-market value of the derivative contract in the netting agreement, then subtracting the value of the collaterals against the margin agreement, and finally flooring this value to 0.

For the calculation of PFE, it is required to adopt the unmargined methodology. This is because, one margin agreement applies to multiple netting agreements and collaterals are based on the netted mark-to-market values of the derivative contracts.

NOTE: CDO Tranches are not included in out-of-the-box product as the guidelines do not clarify whether CDO's should be treated under SA-CCR or Securitization. The existing treatment of CDO tranches under securitization remains unchanged.

Data for Staging Tables

Data for the staging tables (STG_FORWARDS, STG_FUTURES, STG_SWAPS_CONTRACTS, STG_OPTION_CONTRACTS, and STG_CREDIT_DERIVATIVES) are provided with the appropriate underlying types. This ensures that the correct asset class and sub-class are assigned. Otherwise, the banks cannot avail the offsetting benefit for the offsetting of notional amount, as permitted by RBI.

Underlying type values in each of the derivative tables are listed in the previous paragraph are expected from the following codes:

- INTRAT
- EXRATE
- CREDIT
- IGRO
- NIGRO

The following are ensured:

- The correct hedging sets are formed and processed accordingly for margin agreement codes and netting agreement codes. Incorrect data in these columns can lead to inaccurate capital computation.
- For derivatives that have 2 legs in the books, same Deal ID should be provided with appropriate position indicators. This is to ensure that the correct treatment is applied to such positions and offsetting benefit is given to the bank wherever permitted.
- Netting agreement codes should be provided uniformly across the relevant transactions. This is to ensure that the correct calculation of PFE and also to help identify netting agreements in which trades exceed 5000.

Run Management

You can choose between SA-CCR and IMM approach for CCR charge.

RBI has provided an option to choose if the banks want to recognize offset across maturity buckets or not. To enable the offsetting option across maturity buckets for SA CCR approach for IR asset class, a new column namely V_CCR_IR_BUCKET_OFFSET is introduced. If this column is provided with the value Y, then the solution uses the formula according to the guidelines for Offsetting. Otherwise, the formula for effective notional calculation for IR asset class from the guidelines is considered.

As the partial offset within a netting is not detailed in the accord, the same is not included in the scope of the application.

Risk Weighted Asset (RWA) Approach

RWA calculation for the instruments which are subject to CCR risk is similar to RWA calculation for other instruments.

Credit Risk Mitigation (CRM) Approach

CRM calculation for the instruments which are subject to CCR risk is similar to CRM calculation for other instruments.

Credit Risk Securities Financing Transactions (SFT)

Securities Financing Transactions (SFT) includes Repo Style transactions, Margin Lending, Security Financing Borrowing, and so on. The SFT portfolio of a bank is included for capital charge calculations as per standardized, Approach for India. The application takes the notional amount as the EAD amount.

The SFT EAD calculation follows the Collateral Haircut Approach methodology.

- For all SFT contracts which have a mitigant mapped to it, the application computes CRM based on the RWA approach undertaken by the bank. For standardized approach, a risk weight is applied for all eligible mitigants based on mitigant value post haircut adjustment.

Process Flow for Credit Risk Securities Financing Transactions

SFT EAD is computed in the sub process **SFT Exposures RWA - Collateral Haircut Approach**.

A comprehensive explanation of the process flow is as follows.

SFT Underlying Data Population

The two data elements present in the SFT transactions are captured as follows:

Firstly, the parent transaction is captured in the Repo contracts table (**STG_REPO_CONTRACTS**) and secondly the underlying information, on which the parent transaction is built, is captured separately in the mitigant table **(STG_MITIGANTS)** or Placed collateral staging table **(STG_PLACED_COLLATERAL)**, depending on the product type**.**

The underlying data is identified by using the Exposure Mitigant Mapping Staging table **(STG_EXP_MITIGANT_MAPPING)**, wherein this is linked to the data in the repo contracts staging table, for any collateral which is provided to the repo contracts.

And the underlying data for any collateral placed with the counterparty, is identified by using the Account placed collateral Mapping Staging table **(STG_ACCT_PLACED_COLL_MAP)**, wherein this is linked to the data in the repo contracts staging table.

Haircut Assignment for SFT Underlying

This is computed by the following Rules:

- Basel Product Type Level1 for SFT - Comprehensive Method
- Non Sec Basel Methodology Assignment for SFT Comprehensive Method – STD
- FCT_SFT_UNDERLYING_DATA_POPULATION
- Del_NonSec_SFT_Undrly
- FOREX Haircut for SFT Underlying
- Non Sec Pre-Netting EAD Calculation for SFT

Pre-Mitigation Post Volatility Haircut EAD Amount Calculation for Exposures

For SFT transaction, the application calculates EAD for the parent exposure, based on the underlying information. The underlying exposures are processed in **FCT_SFT_UNDERLYING** table and then the EAD computed is moved to parent record in **FCT_NON_SEC_EXPOSURES**. Each underlying exposure is assigned a volatility haircut, if the underlying exposures are financial instruments. FOREX haircut is applied if the underlying and the parent contract are in different currency. Each SFT underlying exposure adjusted for haircut (EAD + haircut value) is added as EAD to the parent contract (Pre mitigation, post volatility haircut EAD).

Nettable Pool Data Population

The application nets SFT contracts based on the same customer, common netting agreement identifier, transaction of Repo, Re-Repo or Margin Lending, Trading or Banking book, and so on. Margin lending transaction being SFT also follows the same EAD calculation methodology; however Repo or Reverse Repo and margin lending are not netted together. The EAD computations as above are taken from FCT_NON_SEC_EXPOSURES to FCT_NETTABLE_POOL after netting them based on the same netting agreement code.

Pre-Mitigation Risk Weighted Assets Calculation for the Pool

Pre-Mitigation Risk Weighted Assets are calculated for the pool as EAD, netted as above, multiplied by the risk weight.

Unsettled Transactions

Calculation of exposure for Delivery versus Payment (DvP) and Non DvP transactions is done by subtracting the mark-to-market value from contract amount (for DvP transactions) and assigning the mark-to-market value (for non-DvP transactions). This is done using the rule: "India - Non Sec Pre-Mitigation EAD Amount for unsettled Transaction".

- **For DvP Transactions**, if the payments have not yet taken place five business days after the settlement date, banks are required to calculate a capital charge by multiplying the positive current exposure of the transaction by the appropriate factor as under:

Number of working days after the agreed settlement date	Corresponding risk multiplier (in per cent)
From 5 to 15	9
From 16 to 30	50
From 31 to 45	75
46 or more	100

- **For non-DvP transactions (free deliveries)**, after the first contractual payment / delivery leg, the bank that has made the payment treats its exposure as a loan if the second leg has not received by the end of the business day. If the dates when two payment legs are made are the same according to the time zones where each payment is made, it is deemed that they are settled on the same day. For example, if a bank in Tokyo transfers Yen on day X (Japan Standard Time)

and receives corresponding US Dollar via CHIPS on day X (US Eastern Standard Time), the settlement is deemed to take place on the same value date. Banks computes the capital requirement using the counterparty risk weights prescribed in these guidelines. However, if five business days after the second contractual payment / delivery date the second leg has not yet effectively taken place, the bank that has made the first payment leg receives a risk weight of 1250% on the full amount of the value transferred plus replacement cost, if any. This treatment applies until the second payment / delivery leg is effectively made.

Treatment of Unutilized Cash Margins

The exposures to Central counterparties are treated in a differential manner than the other exposures as per the RBI guidelines. For this purpose, the placed collaterals, that is, the margins placed with the CCP are considered. There can be cases where an initial cash margin placed with a CCP is not completely utilized. The accord is silent about the treatment of such unutilized cash margin placed with the CCP. Based on the feedback from some clients, it is observed that RBI has given its consent to treat such unutilized cash margins as cash-in-hand and risk weight the same accordingly.

This feature is provided as an option to the customers to decide and treat the unutilized cash margins placed with CCP's as cash-in-hand or leave them as such as per the existing guidelines and treatment in the solution.

Parameter Treatment:

Parameter [TREATMENT] is set to '**Y**' if the Treatment of Unutilized Cash Margin is opted.

BPBL6155	BP - Unutilized Cash Deduction from Non Sec EAD Pre-Mitigation
BPBL6156	BP - Unutilized Cash Deduction from Non Sec Drawn EAD Pre-Mitigation
BPBL6157	BP - Non Sec Unutilized Cash Margin with CCP as EAD Pre-Mitigation
BPBL6158	BP - Non Sec Unutilized Cash Margin with CCP as Undrawn EAD Pre-Mitigation

The parameters for the 4 BPs are set in the following rules.

RLBL6395	IND - Basel III - Non Sec Unutilized Cash Margin with CCP
RLBL6396	IND - Basel III - Non Sec Unutilized Cash Deduction from Placed Collaterals

If the customer opts for the treatment of unutilized cash margins as cash-in-hand, the amount from the unutilized cash margin column is used to create an exposure in the non-sec processing table on the below lines:

1. Party type is "Central Counter Party (CCP)".
2. Basel Product Type is "Cash (CASH)".
3. Asset Class is "Cash (CSH)".
4. Exposure amount is the amount as computed for the unutilized cash margin in the process explained above in this section.
5. Risk-weighting and treatment for these Cash items continue to be as per the existing process as per RBI guidelines.

Data Expectation:

1. Utilized Cash Margin is downloaded in STG_ENTITY_CCP_DETAILS at CCP level.
2. Placed Collateral is an existing downloaded data.
3. Unutilized Cash is computed as Placed Collateral Fair Component Value [Margin Type as Initial Margin (IM) and Product Type as Cash] aggregated at CCP level <minus> Utilized Cash Margin.
4. Unutilized Cash Exposure is at CCP level in FNSE table.
5. Utilized Cash is Placed Collateral Fair Component Value [Margin Type as Initial Margin (IM) and Product Type as Cash] at Placed Collateral Level <minus> Unitized Cash.
6. Risk Weight for Cash is 1 as earlier.

Credit Risk Mitigation

Allocation of Mitigants to Exposures

This process loads the mitigant mapping data from the stage table to its corresponding processing tables. Mitigants are allocated to the respective exposures that they are covering. The application defines how much of the bank's exposure the mitigant is covering. Shareholding percent is applied to the mitigant amounts. The application has a pre-built optimizer for optimum allocation of mitigants to the exposures for credit risk mitigation purposes. One-to-One, Many-to-One, and Many-to-Many mapping of mitigants are handled in an efficient manner, involving storage of intermediate computations for traceability.

All mitigants which are eligible and mapped to an exposure are then populated to a table where each exposure is broken down by mitigant type.

The application uses linear programming logic to allocate the mitigants to the exposures. Pooling identifies the exposure and mitigant data from sub exposures table. Exposure identifier and mitigant identifier are the attributes on which pooling is performed. It assigns the pool ID for each exposure-mitigant combination. Based on these pool ids, optimizer task allocates covered factor to exposures. Optimizer does the optimum allocation of mitigants to exposures.

CRM Treatment to Collateral – Collateral Haircut Approach

Collateral Haircut approach is applicable when the financial collateral is for an eligible margin loan, repo-style transaction, collateralized derivative contract, or single-product netting agreement of such transactions and of any collateral that secures certain repo-style transaction that is included in VaR-based measure. Bank can use either Standard Supervisory haircut or own estimate.

All the conditions and the values related to Collateral Haircut approach (Comprehensive approach) is the same as in India approach, that is:

- Calculation of exposure amount as max $\{0, [(\Sigma E - \Sigma C) + \Sigma(Es \times Hs) + \Sigma(Efx \times Hfx)]\}$

- Apply Standard Supervisory volatility haircuts based on Residual Maturity, (Sovereign / Non Sovereign Issuers Risk Weight)

     o Currency Mismatch Haircut

     o Adjustments to Supervisory Haircut

The following is the method for assigning volatility haircut.Supervisory Haircut.

For supervisory haircut method, the application assigns volatility haircut based on issuers, issuer's ratings, mitigants residual maturity, and type of mitigant, as recommended by the RBI RBI Basel III guidelines. For Own Estimate method, the application considers the Basel transaction type of the exposure. Basel transaction types are stored in the Basel transaction type dimension (**DIM_BASEL_TRANSACTION_TYPE**) table. The various transaction types available are capital market driven, repo style, and secured lending. The volatility haircut is assigned as per the Basel accord. The FOREX haircut is also assigned based on these transaction types as per Basel accord.

Only eligible mitigants are considered for haircut assignment. Haircuts mentioned in the Basel Accord assume a holding period for 10 days. However, if the holding period for mitigants is more than 10 days, then the application scales up the haircut value to reflect the correct value as per the holding period.

Maturity Mismatch

If there is a Maturity Mismatch between mitigant and exposure, then such mitigant is eligible only if its original maturity is greater than or equal to one year and its residual maturity is greater than three months. A maturity mismatch occurs when the residual maturity of a credit derivative or guarantee is less than that of the hedged exposure(s).

Hence, Mitigant Eligibility = 'Y' for the case of maturity mismatch only if, original maturity is more than or equal to a year and residual maturity is greater than 3 Months.

A rule "**Exposure Mitigant Maturity Mismatch identification**" is used to identify if maturity mismatch has occurred between credit derivative or guarantee and the mapped exposure.

A **Maturity Mismatch flag** is used to hold the maturity mismatch indication.

Subsequently, the existing rule "**Mitigants Eligibilty Based on Maturity Mismatch**" is used for eligibility purpose. However, it is executed based upon maturity mismatch.

Hence, Maturity mismatch = 'Y' if, the residual maturity of mitigant is less than or equal to 3 months.

Compliance for Mortgage Guarantee Companies

Based on the request of some clients, the solution is now supporting the treatment for the exposures guaranteed by the Mortgage Guarantee Companies. For this purpose, the reclassification for Mortgage Guarantee Company (MGC) in party type reclassifications is included. The mitigant in this case is a guarantee and issuer type is a MGC. The mitigant is treated in same way as existing treatment of guarantees.

For the exposure side, exposures to MGC is reclassified into Corporate Non SME Non SL asset class and treated accordingly. The same reclassification is done for effective asset class for MGC and where mitigant type is Credit Derivative or Guarantee, that is, into Corporate Non SME Non SL asset class.

Mortgage guarantee companies are included as a party type which is reclassified into the standard party type of Mortgage Guarantee Company.

Key Data Elements

Key data elements are listed in this section. For a complete list of tables and columns to be updated, see the Download Specifications document.

For Mitigants

- Re-securitized exposures Mitigant – The mitigants belonging to re-securitized exposures has "Y" value in this field. The application marks them as ineligible mitigants.

- Securitized exposures Mitigant – The mitigants belonging to securitized exposures has "Y" value in this field. The application assigns different volatility haircuts for these, depending on the current ratings and the residual maturity.

For Ratings

- Current Rating for the Guarantees and Credit derivatives issued to Non-Securitized Exposures.

- Current Rating and Original Rating for the guarantees and credit derivatives issued to Securitized Exposures.

Treatment of Equity Exposures under Strategic Debt Restructuring Scheme

The Strategic Debt Restructuring Scheme (SDRS) introduced by RBI allows banks to convert the outstanding loans into a majority equity stake in a defaulting company, if the company fails to honor its debt commitments agreed under a restructuring plan. These guidelines are applicable for lending under Consortium and Multiple Banking Arrangements (MBA). As per this scheme, all debt restructuring deals in India has a pre-condition that all the loans should be converted into shares. If a borrower fails to honor its debt commitments agreed under a restructuring plan then the Joint Lenders Forum (a committee formed by all the lenders of a borrower) reviews the accounts of the borrower and decide whether to invoke the SDRS, within 30 days after reviewing the account. Such a decision should be approved by the majority of JLF members. Later, the JLF must approve the SDR conversion package within 90 days from the date of deciding to undertake SDR.

Then the SDR conversion package should be completed within 90 days from the date of approval of the SDR package by the JLF. Post the conversion of loan (whole or part of the loan) into equity shares, all the lenders under the JLF must collectively hold 51% or more of the equity shares issued by the company. As per this scheme, by making banks the majority owners and replacing the existing management, banks are required to divest their stake in the company to a new promoter and recover their due by selling the firm to a new promoter. Banks are required to sell their stake within 18 month time-period from the Reference Date (Reference date is the date when Joint Lenders Forum's took decision to undertake Strategic Debt Restructuring).

Full Conversion

In Full Conversion, banks convert the entire consortium/multiple lending into equity shares. These are treated as equity exposures as detailed in the following section:

Treatment of Equity Exposures Acquired under SDRS

Paid-up Equity investment of below 10% or less acquired by banks are risk weighted at 150% or the risk weight as warranted by rating of the counterparty or lack of it, whichever is higher. This risk weight is assigned for a period of 18 months from the Reference Date. On the other hand, after 18 months Paid up equity investment of below 10%, is risk weighted as per extant capital adequacy regulation. This means that, in this case these are risk weighted at 125% or the risk weight as warranted by rating of the counterparty or lack of it, whichever is higher.

Paid-up Equity investment of above 10% acquired by banks are risk weighted at 1250%.

Partial Conversion

In Partial Conversion, instead of converting the entire loan, banks convert partial loan into equity exposures. In such cases, these partial loans converted into equity shares are treated as per equity exposures as explained in the introduction section. The part of the loan which is not converted into equity exposures are treated as per existing guidelines for restructured loans.

In the Basel solution, a fully converted loan that has undergone SDRS is expected only in Stage Equity Exposures table, with an SDRS Undertaking date in SDRS Undertaking Date column. If the equity is not a result of loan's conversion into equity as part of SDRS, this date should be blank. The column Parent Exposure ID in Stage Equity Exposures table should contain the exposure ID of the loan (the value of Account Number column in Stage Loan Contracts table) from which this exposure was derived, that is, the loan that was taken up for SDRS. For a partially converted loan under SDRS, two records are expected. First, for the loan which is yet to be converted into equity in Stage Loan Contracts table and the second, for the converted portion in Stage Equity Exposures table. For both these records, SDRS Undertaking Date column should capture the date on which the SDRS was undertaken. The column Parent Exposure ID in Stage Equity Exposures should contain the exposure ID of the loan from which this exposure was derived, that is the loan that was taken up for SDRS (the value of Account Number column in Stage Loan Contracts table). These exposures are then taken to the non-sec processing table and treated as per the guidelines in the accord.

8.2.1.2.3 Securitization – Standardized Approach

The RBI guidelines differentiates the Credit Risk computation of the Securitized exposures from Non Securitized exposures. As securitized exposures are part of off-balance sheet transactions, it follows a waterfall cash flow mechanism unlike the other exposures. Hence these exposures are treated differently. Due to the economic crisis of 2008, the Basel Rule has categorized securitized exposures into securitized and re-securitized exposures.

Securitized exposures are exposures which are issued out of a pool of underlying exposures for the transfer of risk. Re-securitized exposures are the exposures which are issued out of a pool of underlying exposures which constitutes non-securitized exposures and some portion of securitized exposures. The application is capable of handling both securitized exposures and re-securitized exposures. It also handles the calculation for the originator and the investor bank roles. At a broad level, there are two categories of Investors:

- An Investing Bank who has invested heavily in securitization.
- An Investing Bank who has invested minimal in securitization.

For both the investors, the data is expected in the Stage Underlying Exposures (**STG_UNDERLYING_EXPOSURES**) for the underlying of the pool, Total Pool Level attributes in the Stage Pool table (**STG_SECURITIZATION_POOL**), Tranche Level attributes in the Stage Tranche table (**STG_SECURITIZATION_TRANCHE**), and the Exposure Level Attributes in the respective product processor (PP) tables.

For an originator, the data is expected in the same manner as the Investor, except for the Underlying Exposures. The underlying exposures of the pool are expected in the respective PP tables, depending on the product type of the underlying exposures.

If the exposure is a credit protection in the form of guarantee, it is expected in the Stage Guarantees table (**STG_GUARANTEES**), and if it is a credit derivative, it is expected in the Stage Credit Derivatives table (**STG_CREDIT_DERIVATIVES**). If it is a regular investment in the Tranches by an investing bank, or it is part of the mandate for retention in the pool or tranche for an originating bank, the data is expected in the Stage Investments table (**STG_INVESTMENTS**).

For exposures being a facility like liquidity facility, or servicer cash advance, the exposures are expected in the Stage Commitment Contracts table (**STG_COMMITMENT_CONTRACTS**).

The Basel Accord specifies two broad approaches for the calculation of the capital charge for the Securitization exposures:

- Standardized Approach
- IRB Approach

The standardized approach and IRB approach is handled by the application. For a few procedures, the calculations pertaining to the underlying exposures of the Securitization transaction are required before processing the Securitization exposures. This is computed before processing the Securitization exposures. This is applicable for RBI standardized approach, RBI FIRB approach, and RBI IRB approach.

Process Flow for Securitization – Standardized Approach

The process flow for standardized approach of Securitization exposures are as follows:

Credit Rating Processing

All the rating information of the exposures and the mitigants are populated from the staging tables to the processing tables. The exposure and the tranche rating information are captured in the account rating tables and the mitigants rating information are captured in the instrument rating details. This is handled in the **CREDIT_RATING_PROCESSING** process.

Sec Data Population, Mitigant Data Population, and Mitigant Mapping

The data pertaining to pool, tranche, and exposures are populated from the staging tables to the processing tables. The underlying exposures data are captured in the respective Product Processor tables (and for these, the process pertaining to the non-securitization exposures is followed). The mitigants data are populated from the staging table to the processing table. The exposures which are mapped to the mitigants are captured and populated from the staging table to the processing table. Securitization data population is handled in the process **SEC_DATA_POPULATION**. Mitigant data population is handled in the process **MITIGANT_DATA_POPULATION** and Exposure Mitigant Mapping Population is handled in the process **SEC_EXP_MITIGANT_MAPPING_ POP**.

Sec Reclassification and Mitigant Reclassification

The application uses the standardized data for all kinds of calculations (product type like eligible liquidity facility, bank role like originator, pool type like mortgage backed securities). Before any computations, the application reclassifies the bank specific data to standard data as stated in the Basel accord. It reclassifies the bank role to the standard bank role of an originator or investor. Any other bank roles like sponsor, credit protection provider, and so on, are reclassified into originator, investor, and so on, respectively. The application also reclassifies the pool type to the standard pool type like credit cards receivable pool, auto loans, and so on. It also reclassifies the product type to the standard product type like mortgage backed securities, eligible liquidity facility, and so on.

For mitigants the application reclassifies the mitigant types to the standard mitigant types like the debt securities, credit derivative, cash, and so on. It also reclassifies the mitigant issuer type to the standard mitigant issuer type like Banks, Corporate, and so on. The reclassification tasks are present in the **Sec Reclassification** and **Mitigant Reclassification** sub process. The application assigns the Sec - Standardized Approach in the **Sec Reclassification** Sub Process for approach selection.

Sec Pre-CRM Computations

The application calculates the pre-CRM RWA for the exposures by multiplying the pre-CRM EAD with the risk weight of the exposures. This is handled in the **Sec STD Pre CRM Computations** sub process.

Risk Weight Assignment

The application assigns the risk weight to the exposures based on the external rating assigned to the exposures. If the exposures have internal ratings assigned, then the application treats the exposures as unrated. Initially, the application assigns the risk weight to each of the exposure's ratings. Then, the application using multiple assessment logic as specified by the regulators, assigns the final rating to the exposures. For each exposure, this final rating is the worst of the best two ratings assigned to the exposure.

Further, the application updates the rating after multiple assessments and updates the corresponding risk weight to the exposures. For Securitization and Re-securitization exposures, the risk weights assignment are different from the Non Securitization exposures. The application assigns the risk weights based on the following conditions:

- Bank role
- The exposure is an exposure issued out of a Securitization or Re-securitization pool
- The external ratings assigned to the exposures

For unrated exposures, the application applies the Look through Approach and assigns the weighted average risk weight of the underlying exposures.

The application also handles other securitization exposures like the eligible liquidity facility, exposures in a second loss position and issued to ABCP Program, and so on. If the data to assign a risk weight is not available, then the application marks these exposures for deduction. Risk weights corresponding to the external ratings are assigned to the entity Securitization Risk Weight Map Master (**FSI_SEC_RW_MAP_MASTER**) and the final applicable risk weight is updated in Securitization Exposures table after multiple assessments of the ratings.

Pre-CRM EAD Computation

The application assigns the Credit Conversion Factor (CCF) to the off-balance sheet items as specified in the Basel Accord. The CCF percentages are assigned based on the bank role (this is applicable only for the originator bank role), the product type (like the eligible liquidity facility) and the applicable ratings. The CCF percentages are also assigned to the exposures based the availability of early amortization provision, applicable to the transaction. In such cases, the CCF assignment is based on the early amortization type (controlled or uncontrolled), the pool type, and the ratio of three month average excess spread to the trapping point. Further, the application computes the pre-mitigation EAD. This is computed based on the bank role and the product type. The application calculates the EAD for the investors and the originators separately based on the calculations given in the Basel II Accord.

Sec Deductions Process

The exposures which are lower than the investment grade and the unrated exposures are deducted from the capital. This is handled in the **Sec Deduction** sub process.

Sec CRM Process

Mitigant Eligibility, Mitigant Risk Weight, Haircut Assignment, and Allocation of Mitigants to Exposures are handled in Sec CRM sub-process.

Mitigant Eligibility

The application identifies the eligible mitigants based on the criteria as mentioned in the RBI guidelines. The application identifies the following mitigants in the case of Securitized exposures – collateral, guarantees, and credit derivatives. The application is capable of using comprehensive approach for mitigants which are part of the collateral. This is similar to the mitigant eligibility of the Non Securitization process. The application processes multiple assessments of ratings for mitigants and some of the mitigant eligibility criteria are based on the ratings and risk weight of the mitigants.

The eligibility of the collateral mitigants are based on the party type of the mitigant, mitigant types, the credit rating assigned to the mitigant or the party (as applicable), and the classification of collateral being senior or not. For equity, the eligibility is based on the main index equity and the equity trading status. For mutual funds, the eligibility is based on the eligible mutual fund indicator. The application identifies the eligibility of the guarantees and credit derivatives based on the party type of the mitigant and the credit rating assigned to the issuer of the mitigant. In the case of Nth to default credit derivatives, the application further identifies the eligible credit derivative, based on the number of defaults in the exposures and the defaulted position covered by the mitigant. The application identifies the number of defaults in the tranches based on the attachment point of the tranche to which the exposure belongs to, the initial pool exposure amount, and the cumulative default amount.

Further, the application computes the number of tranches in default and compares it with the defaulted position covered by the mitigant. Based on the criteria of eligibility mentioned in the Basel accord, the application identifies whether the mitigant is eligible or not, and if eligible, the application also makes the least risk weighted exposure as the eligible mapping, for the least eligible nth to default mitigant for the exposure.

This identification of the eligible nth to default credit derivative and the eligible exposure-mitigant mapping is performed with the help of the Data Transformation "CD_Sec_Mitigant_Elig_IRB". The details of the Data Transformation are as follows:

Data Transformation Name	Objective	Processing Logic
CD_Sec_Mitigant_Elig_IRB	The objective of this Data Transformation is to identify an eligible sec exposure mitigant mapping wherein the mitigant is an Nth to default credit derivative, in the case of Securitization IRB Approach.	The eligible nth to default credit derivative mitigant is identified and processed based on the exposures mapped to the same pool id. All the exposures mapped to the same pool ID are identified and the corresponding mitigants mapped to them are also identified. In the sec pool id, the cumulative pool default amount is compared with the tranche attachment point as a number (obtained by multiplying the tranche attachment percentage by the initial pool exposure amount). The number of tranches for which the tranche attachment point is less than the cumulative pool default amount is calculated. This number is compared with the minimum defaulted position of the credit derivative mitigant. For a basket of exposures covered by multiple credit derivatives, eligible mitigant is minimum defaulted position in the basket minus 1. Also other credit derivative in the basket of exposures which are having the defaulted position consecutively iscome eligible. For each eligible mitigant, the exposure mitigant mapping wherein the exposure has the least risk weight or capital charge iscome eligible. All other exposure mitigant mapping for that mitigant is marked ineligible.

The application also identifies the eligibility of the mitigants based on the comparison of the risk weight of the exposures and the mitigants.

The application also identifies the eligibility of the mitigants based on the comparison of the risk weight of the exposures and the mitigants. If the mitigants risk weight is lesser than the risk weight of the exposures, then the mitigants become eligible or else the application makes them ineligible.

Mitigant Risk Weight

The application calculates the mitigant risk weight similar to the exposure risk weight of Non Securitized exposures. This is based on the issuer type and the credit rating, which includes the unrated issuers as well. The application performs multiple assessments for the mitigants, similar to the Non Securitization process, and arrives at a single rating for the mitigant. Further, the application assigns the final risk weight to the mitigant. In the case of financial collateral mitigants like cash and gold, zero risk weight is assigned.

Haircut Assignment

Haircut assignment to the mitigants is processed in the **FCT_SUB_EXPOSURES** table. The application assigns the various haircuts, as applicable to the mitigants. In the case of collateral following simple approach for recognition, there are no haircuts assigned to the mitigant. In the case of collateral following comprehensive approach, the application has the flexibility to use the supervisory haircuts and scale up if required, based on the minimum holding period. Alternatively, it also uses the bank's own estimate of haircuts. The application applies the volatility haircut, FOREX haircut, and the maturity mismatch haircut appropriately to the mitigants, as per the Basel accord. Only eligible mitigants are considered for haircut assignment. The eligible mitigants data flows from mitigants (**FCT_MITIGANTS**) table to sub exposures (**FCT_SUB_EXPOSURES**) table.

The application populates an uncovered mitigant for each exposure in the **FCT_SEC_EXPOSURES** table. This uncovered mitigant has same features as that of the exposure and are created in the **FCT_MITIGANTS** table.

Allocation of Mitigants to Exposures

The application computes the mitigant value after all haircuts. The application uses the pooling and optimizer logic to allocate the exposures to the mitigants. This is a bit different from the optimizer logic of Non Securitization exposures as the Securitized exposures have priority in the cash flow and gets the maximum protection by the mitigants. The senior most exposure (or tranche) is denoted with seniority 1 and the second senior exposure is denoted with seniority 2 and so on.

In the case of securitization exposures, the mitigants are always given preference over the senior most exposure and subsequently to the other exposures based on the seniority. The other parameters which are considered in the allocation logic are the risk weight and the mitigant value post haircut. The application uses the linear programming logic to allocate the mitigants to the exposures. The optimizer logic for the Securitization process is a bit different from the Non Securitization process which is as follows:

> Based on the seniority of the exposures, risk weight of the exposures, the mitigant, and the mitigant value, the ordering of ranking in which the mitigants is allocated to the exposures, is arrived at. The order of allocation can be modified by updating the operation type and the optimizer constraints of the objective function. You have to select the allocation rank measure in the **Optimizer Definition** window, while defining the optimizer logic. For more information on Currency Conversion, see Exhibit 4 *Annexure A: Key Concepts*.

Single Mitigant Mapped to Single or Multiple Exposures

If there is one or more than one exposure mapped to a single mitigant, then the mitigant is allocated to the exposure with the highest seniority. If there is more than one exposure with the same highest seniority, then the mitigant is allocated to the exposure which yields the highest mitigant value post haircut.

Single Exposure Mapped to Single or Multiple Mitigants

If there is one or more than one mitigant mapped to a single exposure, then the least risk weighted mitigant is allocated to the exposure. If there is more than one mitigant with the same least risk weight, then the mitigant which has the highest mitigant value post haircut is allocated to the exposure.

Multiple Exposures Mapped to Multiple Mitigants

The treatment in this case is similar to a single mitigant mapped to single or multiple exposures, for the identification of the mitigant which is assigned to the exposures. Later, the treatment pertaining to single exposure mapped to multiple mitigants is followed to yield the credit Risk weighted exposure amount.

Using the logic mentioned in the preceding list, the application calculates the factor of exposure covered by the mitigant and the factor of the exposure uncovered (without any protection).

Sec Post CRM RWA Computation

The application computes the covered amount and the uncovered amount for the exposures. The covered amount is computed by multiplying the covered factor with the exposure amount. To this covered amount, the application assigns the mitigant risk weight. The product of the covered amount and the mitigant risk weight is the covered RWA. The uncovered amount is computed by multiplying the uncovered factor (which is 1 – sum of all covered factors for that exposure) with the exposure amount. This uncovered amount is multiplied by the exposure risk weight to get the uncovered RWA. The sum of the covered RWA and the uncovered RWA is the Post CRM RWA of the Exposure.

> **Post-CRM RWA = Covered Amount * Risk Weight of the Mitigant**
>
> **+ Uncovered Amount * Risk Weight of the Exposure**

This logic is handled in **Sec Post CRM RWA computation** sub process.

The following sub processes and tasks are computed in the **SEC_IRB** Process:

- Sec Reclassification
- Sec Approach Selection
- Mitigant Reclassification
- Sec Pre-CRM EAD Computation
- Risk Weight Assignment
- Pre-CRM RWA Computation
- Mitigant Eligibility
- Mitigant Risk Weight
- Haircut Assignment
- Allocation of Mitigants to Exposures
- Post CRM RWA Computation

Key Data Elements

Key data elements for Securitization computation is as follows. For a complete list of tables and columns, see the *Download Specifications* document.

8.2.1.3 Large Borrowers – Enhancing Credit Supply

RBI has introduced the guidelines on Enhancing Credit Supply for Large Borrowers through Market Mechanism. This guideline provides a method to identify the exposures to certain large borrowers and shield against any probable losses arising due to such large exposures. The new regulation helps the banks in controlling the exposures to single large borrowers by imposing controls on the banks by suggested limits and prudential measures in case of breach of limits.The following features are introduced as part of this:

- Aggregate Sanctioned Credit Limit (ASCL) is calculated.
- Identifies the specified borrowers to which the bank might have a larger and riskier exposure.
- Stamps the Reference Date.
- Normally Permitted Lending Limit (NPLL) is calculated.
- If there is a breach of the NPLL, then the Prudential Measures prescribed by the regulator are applied.

8.2.1.3.1 Calculating ASCL

ASCL is calculated for each of the party with the maximum of both fund based credit limits sanctioned and the fund based credit limits outstanding, in addition to the unlisted privately placed debt with the banking system. This means that the data with regard to fund based credit limits sanctioned, fund based credit limits outstanding and unlisted privately placed debt with the banking system is at the granularity of the borrower (party) and is not only limited to the credit limits of the bank doing the computations (reporting bank) but to the banking system as a whole as specified by RBI.

Which means,

Aggregate Sanctioned Credit Limit (ASCL) = MAX (fund based credit limits sanctioned, fund based credit limits outstanding) + Unlisted privately placed debt with the banking system

As defined by RBI banking system, which includes all banks in India RRBs and co-operative banks and branches of Indian banks abroad.

If the ASCL for a certain borrower crosses a limit specified by RBI then the borrower is considered to be a Specified Borrower. The specified limits are as follows:

- If the ASCL calculated for a certain party is more than Rs.25,000 crore at any time during finanaical year 2017-18.

- If the ASCL calculated for a certain party is more than Rs.15,000 crore at any time during finanaical year 2018-19.

- If the ASCL calculated for a certain party is more than Rs.10,000 crore at any time from April 1, 2019 onward.

Note: The ASCL calculated as specified above is compared with the limits specified for the respective years to identify the specified borrowers. The NPLL calculation is to be done for the specified borrowers from the next financial year.

The date on which a certain borrower's ASCL crosses the reference limit set for a certain financial year and the borrower becomes a Specified Borrower is called the Reference Date.

Other SCBs, NBFCs registered with RBI, AIFIs (NHB, SIDBI, EXIM Bank and NABARD) and HFCs registered with NHB will be exempted from the calculations. These exempted parties i.e. parties like NHB,SIDBI,NABARD,EXIM must be populated to DIM_PARTY with v_party_type as OTHER.

ASCL is addressed in the following batch:

- BASEL_SETUP_TBL_POP Batch: Basel Setup Table Batch Population. ASCL is calculated and populated to FSI_CP_BANKING_SYSTEM_EXPOSURE.

Specified borrowers is addressed in the following batch:

- India Basel III - Large Borrowers Setup Batch: Requires all the new FSI Setup Table to be populated and reclassification rules be updated with appropriate mapping. This batch identifies the specified borrowers and stamps the reference date for the borrowers.

Note: ECB and Trade Credit raised from overseas branches of Indian banks will count towards ASCL.

8.2.1.3.2 Calculating NPLL

After ASCL is computed, for parties which have had a breach of the prescribed ASCL limit to be identified as specified borrowers, the NPLL is calculated. The reference date always falls in the identification year as it is the date when the borrower became a specified borrower.

NPLL calculation starts from the immediate next financial year of reference date. NPLL is either 50 percent or 60 percent (depending on the conditions) of the incremental funds. Any funds raised by the specified borrower in the given year, by way of equity, is deemed to be part of incremental funds.

In case where a specified borrower has already raised funds by way of market instruments and the amount outstanding in respect of such instruments as on the reference date is 15 percent or more of ASCL on that date, then the NPLL is calculated as 60 percent of the incremental funds raised by the specified borrower over and above its ASCL as on the reference date and 50 percent otherwise.

The following is a special case:

In the FAQs to Enhancing Credit Supply for Large Borrowers through Market Mechanism, RBI has stated that the ASCL limits to be used for identification of a borrower as a specified borrower on or before March 31, 2016 as Rs. 25,000 crore and the reference date for all borrowers identified as specified borrowers prior to FY 2016-17 will to be set as 1st April 2016.

If a borrower is identified to be a Specified Borrower with an ASCL of more than Rs. 25,000 crore, before the financial year 2016-17 then such borrower irrespective of when there ASCL crossed the Rs. 25,000 crore mark will be assigned a reference date of 1st April, 2016. The NPLL calculation and prudential measures for such borrowers are applicable from 1st April, 2017 onward.

The following are the Runs for NPLL:

- IND Basel III Capital Calculation - Standardised Approach - Indian Banks
- IND Basel III Capital Calculation - Standardised Approach - Foreign Banks
- IND Basel III Capital Calculation - Foundation IRB Approach - Foreign Banks
- IND Basel III Capital Calculation - Advanced IRB Approach - Foreign Banks
- IND Basel III Capital Calculation - Foundation IRB Approach – Indian Banks
- IND Basel III Capital Calculation - Advanced IRB Approach - Indian Banks

Note:

- Banks must apply their due-diligence while deciding the NPLL for a single borrower in order that borrowers do not circumvent the cut-off ASCL criteria by borrowing through dummy/fictitious group companies.

- Financial year 2017-18 onwards the banking system shall ordinarily keep its future incremental exposures to the specified borrowers within the NPLL, else they will be subject to the prudential measures as specified.

8.2.1.3.3 Prudential Measures

After the NPLL per borrower is calculated, the banking system's total exposure to a specified borrower are compared against the NPLL on a particular day. In case the bank's total exposure to the specified borrower excluding market instruments subscribed by the banking system in financial year 2017-2018 issued by such specified borrower is greater than the NPLL for that specified borrower then the prudential measures prescribed by RBI are applied.

The prudential measures are methods to shield against any probable losses arising due to default of such large borrowers. This helps in controlling the exposures to single large borrowers by imposing controls on the banks by suggested prudential measures in the form of higher risk weights and provisions in case of breach of limits. Prudential measures also come in the form of systematic divestment of certain investments.

The first of prudential measures comes in the form of additional provisions. This happens to be out of scope of the application. This is because the specific provisions are dealt as a part of accounting and not capital calculations.

The next prudential measure comes in the form of additional risk weights. RBI guidelines state that the banks need to apply an additional risk weight of 75 percentage points over and above the existing applicable risk weight for the exposures to the specified borrowers where there has been a breach of NPLL in order to arrive at the new applicable risk weights.

The following are the Runs for Prudential Measures:

- IND Basel III Capital Calculation - Standardised Approach - Indian Banks
- IND Basel III Capital Calculation - Standardised Approach - Foreign Banks
- IND Basel III Capital Calculation - Foundation IRB Approach - Foreign Banks
- IND Basel III Capital Calculation - Advanced IRB Approach - Foreign Banks
- IND Basel III Capital Calculation - Foundation IRB Approach – Indian Banks
- IND Basel III Capital Calculation - Advanced IRB Approach - Indian Banks

Note:

- All holdings by a bank of market instruments issued by a 'specified borrower' after the 'reference date' shall be held in the AFS/HFT category and marked to market as applicable thereto. However, banks may, at their discretion, value their holdings of market instruments issued by the specified borrowers in 2017-18 at book value.

- RBI will review the entire guidelines including the ASCL limits after a year of the guidelines becoming fully implemented, that is, during FY 2019-20. Refer the RBI guidelines in para 4 of (i) in RBI/2016-17/50 DBR.BP.BC.No.8/21.01.003/2016-17.

- ECB and Trade Credit raised from overseas branches of Indian banks will count towards ASCL.

8.2.1.3.3.1Systematic Divestment

The third prudential measure for breach of NPLL comes in the form of systematic divestment of subscriptions made by the bank in 2017-18 in bonds issued by the specified borrowers over the succeeding three financial years.

The application helps in indicating the divestment schedule. It helps to indicate the minimum amount of bonds that are to be divested in a particular financial year.

The bank is supposed to systematically divest over the succeeding three financial year's, the subscriptions made by it in bonds issued by the specified borrowers in 2017-18. The bank is advised not to invest in any bonds issued by specified borrowers after FY 2017-18. The application displays the minimum volume of the bonds that are to be divested in a particular financial year in accordance with the divestment schedule advised by RBI.

The specified divestment percentage schedule provided by RBI guidelines are as follows:

- Not less than 30 percent by March 31, 2019
- Not less than 60 percent by March 31, 2020
- Not less than 100 percent by March 31, 2021.

Systematic Divestment is addressed in the following batch:

Batch Name	Description
IND_BASEL_III_PARTY_DIVESTMENT_INFO	T2T Batch to be executed for financial year 2017-18. This automatically takes the bond instruments from FNSE as per last run of the financial year 2017-18. A separate batch has to be created with this T2T and can be executed for any date on or after 31st March2018 to display the minimum volume of the bonds that are to be divested in a particular financial year.

Note: Irrespective of when the batch is run, the results populated will be as of 31st March 2018.

8.2.1.4 Credit Valuation Adjustments

Basel committee has introduced a Credit Valuation Adjustment (CVA) capital charge, which is added to default risk capital charge to arrive at the new Counterparty Credit Risk (CCR) capital charge. The mark to market counterparty credit losses or the spread migration risk is captured with CVA, which were not directly capitalized before. CVA is the difference between the risk-free portfolio value and the true portfolio value that takes into account the possibility of the counterparty's default. In other words, CVA is the market value of counterparty credit risk.

The application calculates CVA Charge for OTC derivatives of the bank using standardized approach using RBI guidelines.

1. CVA weight Assignment: As per the existing RBI Basel III guidelines all the unrated exposure was assigned 10% weight whereas per RBI guidelines the unrated counterparties are assigned a weight of 3%.Except when counterparty is scheduled bank, the weights are assigned based on the rating in accordance to the rating below.

Ratings	Wi
AAA	0.7%
AA	0.7%
A	0.8%
BBB	1.0%
BB	2.0%
B and unrated	3.0%
CCC	10.0%

Wi is the weight applicable to counterparty 'i'. Weight is assigned to a counterparty based on its external rating.

Rule is created to assign weight to unrated schedule bank with the above table.

Wi for unrated scheduled commercial banks is derived based on CET1+CCB ratio of the bank.

CET1+CCB of Bank	Ratings	Wi
Applicable Min CET1+CCB>100%	AAA/AA	0.70%
Applicable Min CET1+CCB between 75% and 100%	A	0.80%
Applicable Min CET1+CCB between 50% and 75%	BBB	1%
Applicable Min CET1+CCB between 0% and 50%	BB	2%
CET1 less than applicable minimum	CCC	10%

2. RBI allows banks to adjust the Outstanding EAD which is used to calculate the CVA Charge. Reduction of Outstanding EAD after mitigation is allowed to extent of Incurred CVA Loss by the bank. Example is shown in the below table.

3. DVA amount is expected at GL level or at transaction level. Application expects you to provide data either at transactions level or GL level. If you provide data at GL level, then you must mandatorily select deduction from capital as the option from Run management. Option to deduct or adjust with outstanding EAD is available, only when you provide data at transaction level. Following are the instances:

   - For deduction from capital when you provide data at GL level.

- For deduction from capital when the data is provided at transaction level. The Rule needs to sum the total DVA amount from all the transactions and update against the capital head created.
- For deduction from capital if you provide data at GL Level and transaction level, application by default uses the GL level data, Since GL data is audited data.
- For adjustment to outstanding EAD amount, the following table provides the details regarding the adjustment for the outstanding exposure (Uncovered EAD).
- Adjustment to each uncovered EAD must be done before adjusting the uncovered EAD with Maturity and discount factor adjustment done for exposure related to CVA.

Example of EAD, Incurred CVA, and DVA Adjustment:

Uncovered EAD	Incurred CVA	DVA	DVA at GL Level - EAD after Incurred CVA	DVA at transaction level - EAD after Incurred CVA and DVA
100	30	10	70	80

8.2.1.4.1 Assumptions

CVA hedge should be identified by the clients separately. Only single name CDS and Index Hedge are eligible for CVA. The Basel Regulatory Capital application handles the index position in the following manner:

- Both index position marked to the level of counterparty or not marked to the level of counterparty is handled by the application.
- Effective index hedge amount is considered in the CVA charge calculation at portfolio level without considering whether it is marked to the counterparty or not.
- If the index position is marked to the counterparty, then index hedge amount is considered while allocating total CVA charge to the counterparty CVA Charge, while using Standardized Approach.

8.2.1.4.2 Data Expectation

- Incurred CVA loss is captured in the column for the product processor.
  Column Name: n_incurred_cva_amount.
- DVA Amount is captured in column for all product processor.

8.2.1.4.3 Simple CVA Approach

The application calculates CVA capital charge at portfolio level using the following formula as specified by RBI Basel III guidelines:

$$K_{CVA} = 2.33 \times \sqrt{\left(\sum_i 0.5 \times w_i \times \left(M_i \times EAD_i^{total} - M_i^{hedge} \times B_i \right) - \sum_{ind} w_{ind} \times M_{ind} \times B_{ind} \right)^2 + A}$$

Where:

$$A = \sum_i 0.75 \times w_i^2 \times \left(M_i \times EAD_i^{total} - M_i^{hedge} \times B_i \right)^2$$
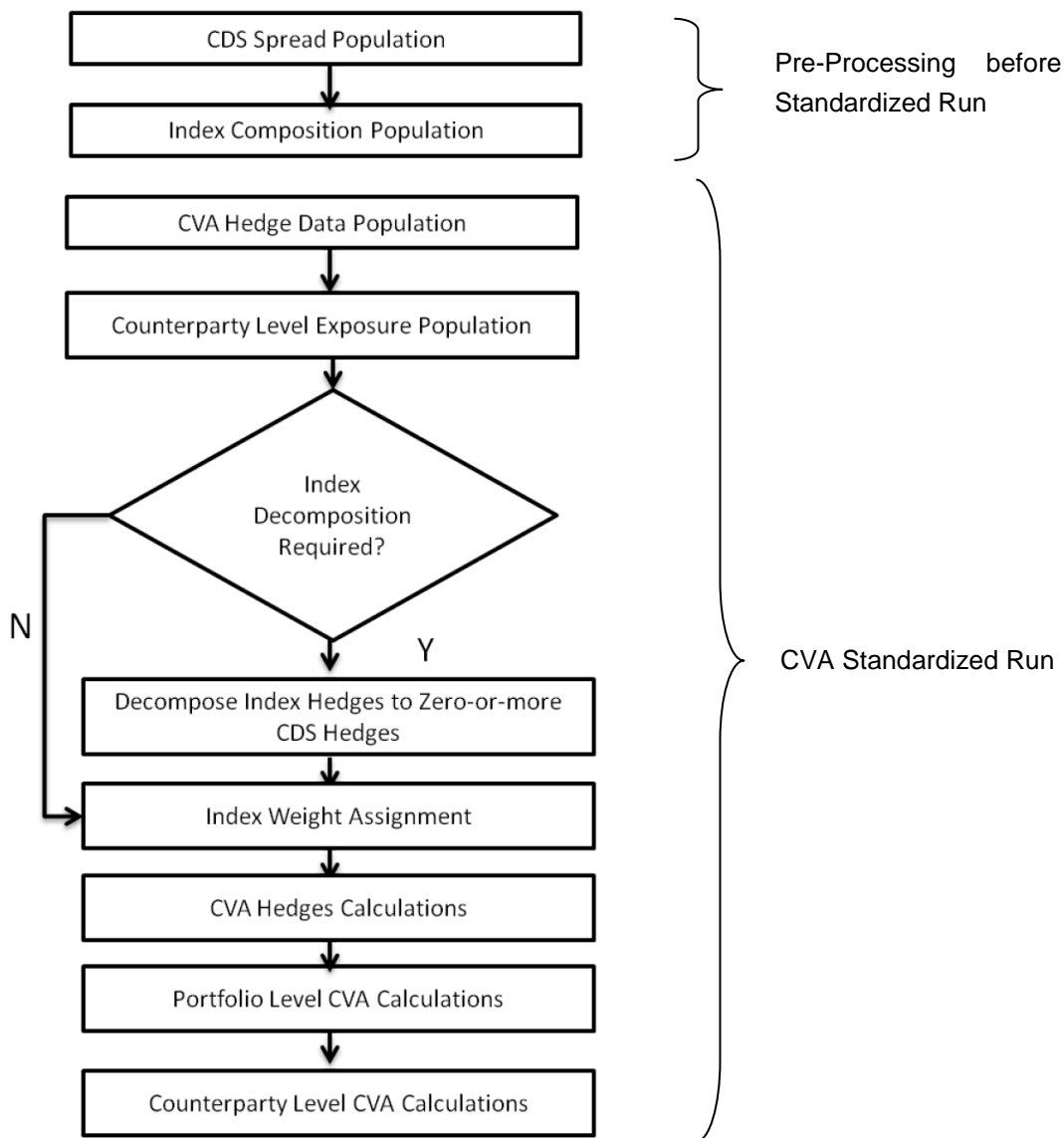
CDS Spread Population and Index Composition Population

Pre-processed data for CVA is required to be populated only once for a particular execution date. The process **CVA DATA POPULATION** in the Run **- Staging Data Population - INDIA Credit Value Adjustment** is responsible for populating pre-processed data for CVA.

CVA Hedge Data Population

Mitigants data marked as CVA hedge is populated as a part of the CVA hedge data population. The application loads all the single name CDS hedge and index hedge data. The hedge data marked as CVA does not flow in the application during the CCR process. Tables are not added for hedge records; however a few columns are added to the existing table to capture CVA specific data. CVA specific data is present in the following tables:

- Fact Mitigants (**F_CVA_HEDGE**): Identifier for CVA hedge records by which the application identifies it as CVA hedge.
- Stage Mitigants (**V_REF_ENTITY_PARTY_ID**): This field captures the counterparty of the hedge transaction.
- **N_CDS_INDEX_AVG_SPREAD**: Average traded CDS Index Spread which is required for assignment of weight to the index.

Counterparty Level Exposure Population

The application expects the uncovered EAD at netting agreement level or at trade level. This is available as an output of Current Exposure Method (CEM). If more than one netting agreement is available, then the exposures are summed at counterparty level. These aggregated data is stored in **FCT_REG_COUNTERPARTY_CVA** table using **COUNTERPARTY_EXPOSURE_POPULATIO** T2T.

Maturity adjustment discount factor is computed at netting agreement level or for each netting agreement using the formula **1- exp (-0.05*M$_i$)/ (0.05*M$_i$).**

Maturity is the notional weighted maturity at netting agreement level. The application sums the data for exposure at counterparty level. If more than one netting agreement is available, the exposures are discounted and then summed at counterparty level. Weight Assignment is done based on the Counterparty PD as specified in the following table. Data is aggregated at counterparty level and stored in separate counterparty table.

Ratings	Wi
AAA	0.7%
AA	0.7%
A	0.8%
BBB	1.0%
BB	2.0%
B and unrated	3.0%
CCC	10.0%

Wi is the weight applicable to counterparty 'i'. Weight is assigned to a counterparty based on its external rating.

Rule is created to assign weight to unrated schedule bank with the above table.

Wi for unrated scheduled commercial banks is derived based on CET1+CCB ratio of the bank.

CET1+CCB of Bank	Ratings	Wi
Applicable Min CET1+CCB>100%	AAA/AA	0.70%
Applicable Min CET1+CCB between 75% and 100%	A	0.80%
Applicable Min CET1+CCB between 50% and 75%	BBB	1%
Applicable Min CET1+CCB between 0% and 50%	BB	2%
CET1 less than applicable minimum	CCC	10%

Index Decomposition Required

You can select index decomposition from the Run Management screen. Index decomposition option, creates single name CDS hedge positions for the counterparties which are part of the CDS Index and also have exposures. Index hedge amount is adjusted by the same amount for which the single name CDS hedge is created, so as to get maximum benefit from hedging. Maturity of the single name CDS hedge is considered same as the maturity of index.

Index Weight Assignment

For index weight assignment, index composition and counterparty probability of default is expected as a download in the application. Weight for the index is the sum of all counterparty weights multiplied by the weight of the counterparty in the index.

NOTE: The risk weight cannot be different for counterparty irrespective of the number of different transaction with the counterparty.

CVA Hedge Calculations

After population of hedge data and creation of single name CDS hedge from index, the application sums the notional to counterparty level and populates in the CVA specific table. Maturity adjustment discount factor is computed by using the formula **(1-exp (-0.05* Mihedge))/ (0.05* Mihedge)**. If more than one CDS Contract is available for the counterparty, then the above amount is summed at counterparty level. Index hedge notional amount is computed after subtracting the notional of all single name CDS hedge created by the decomposition process from index notional. Maturity adjustment discount factor for index position is computed using the formula **(1-exp (-0.05* Mind)) / (0.05* Mind)**. If more than one index hedge is available, then the index hedge amount is summed up. All the above data required for CVA calculation is populated from mitigants data to CVA specific table. The data is summed for each counterparty and stored.

Portfolio Level CVA Calculation

Portfolio Level CVA Charge is calculated as per the following formula:

$$K = 2.33 \cdot \sqrt{h} \cdot \sqrt{\left(\sum_i 0.5 \cdot w_i \cdot \left(M_i \cdot EAD_i^{total} - M_i^{hedge} B_i\right) - \sum_{ind} w_{ind} \cdot M_{ind} \cdot B_{ind}\right)^2 + \sum_i 0.75 \cdot w_i^2 \cdot \left(M_i \cdot EAD_i^{total} - M_i^{hedge} B_i\right)^2}$$

The CVA charge calculated at portfolio level is populated in the **FCT_REG_CVA_SUMMARY** table. Single Name CDS Hedge component for CVA at portfolio level is calculated and the summary table is populated using **CVA_SUMMARY_POPULATION** T2T.

Counterparty Level CVA Calculation

CVA Capital Charge at counterparty level is allocated using the following formula:

> **CVA at Counterparty = Total CVA at Portfolio *W_{CVAi}**
>
> **W_{CVAi} = Absolute [0.5*W_i *(M_i * EAD_{itotal} - M_i^{hedge} * Bi) - $\sum_{indi}(W_{ind} * M_{ind} * B_{ind}$)]/**
>
> **Σ_i^nAbsolute[0.5*W_i * (M_i * EAD_{itotal} - M_i^{hedge} * B_i) - $\sum_{indi}(W_{ind} * M_{ind} * B_{ind}$)]**

8.2.1.4.4 Treatment for Incurred CVA Losses

The Incurred CVA Losses (ICVAL) are adjusted with the valuations for illiquid positions. The computation of Incurred CVA losses is prescribed by RBI based on the expected exposure amount and risk premium or credit spreads. The Incurred CVA loss must be deducted from the EAD when calculating the CVA capital charge. The formula to be used for computation of Incurred CVA loss is as follows:

> **$ICVAL_t$ = Max [0, {(EE_t * RP_t) − (EE_0 * RP_0)}]**
>
> Where;
>
>> **$ICVAL_t$** is the cumulative Incurred CVA loss at time **t**. Here, **t** is the date of valuation.
>>
>> **EE_t** is the value of counterparty exposure projected after 1 year from time **t** (date of valuation) and then discounted back to time **t**. The exposure is computed in line with CEM and discount rate used is the risk free rate of return for 1 year. The counterparty exposure in this case refers to the credit equivalent amount (RC+PFE) computed post CRM.

EE_0 is the counterparty exposure estimated at time **0** (date of transaction) using CEM. The counterparty exposure in this case refers to the credit equivalent amount (RC+PFE) computed post CRM.

RP_t is the credit spread of the counterparty as reflected in CDS or bond prices. If the market-based credit spreads are not available, then the risk premium applicable to the counterparty according to its credit grade as per the internal rating system of the bank can be considered. This is the risk premium as at time **t** (date of valuation).

RP_0 is the credit spread of the counterparty as reflected in CDS or bond prices. If the market-based credit spreads are not available, then the risk premium applicable to the counterparty according to its credit grade as per the internal rating system of the bank can be considered. This is the risk premium as at time **0** (date of transaction).

The CVA calculation parameters Discount Rate, Original Risk Premium and Current Risk Premium are fetched from STG_CPTY_EXPECTED_EXPOSURE and FCT_YIELD_CURVE tables using the below DTs and dependent functions.

Data Transform / Functions	Description
FN_COM_CPTY_CREDIT_SPREAD	Function to fetch credit spread from STG_CPTY_EXPECTED_EXPOSURE table
FN_COM_IRC_YIELD_CURVE	Function to fetch curve data from FCT_YIELD_CURVE table. Discount Rate is fetched from this table with Asset Class as "Sovereign". Risk Premiums are fetched from this table with Asset Class same as the Basel Rating of the Exposures, only when spread is not available in STG_CPTY_EXPECTED_EXPOSURE table. Curve data must be available for all Basel Ratings or Data Transform fails. The Asset Code is Reporting Currency Code of the run in the yield curve table.
FN_DT_INCURRED_CVA_LOSS_ PARAM	Data Transform to update Discount Rate, Original Risk Premium and Current Risk Premium against the exposures, using the above functions.

Data Expectation

1. Expected Exposure at time 0 (EE0) must be provided for contracts which are entered in the system before the incorporation of this functionality. This value must also be computed by the bank as per CEM approach and then provided as download. For the new exposures, the value is computed in the solution and stamped for processing.

2. Bank can choose either MTM Value or the Initial Margin Amount to compute the Expected Exposure at t = 0 for newly originated contracts. This can be achieved by setting the parameter value for [REPLACEMENT COST] in the RLBL0699 (Incurred CVA Original Expected Exposure) as 'IMA' to use Initial Margin Amount.

3. Projected MTM amount must be the amount projected 1 year hence from the valuation date (EEt) and provided as download by the bank.

4. The tenors must be picked up depending on the tenor 0 (for RP0) and tenor corresponding to residual maturity for RPt. For tenor <> 0, the values of credit spread or risk premium is considered as the value of RP at time t.

5. If a run is getting re-executed or a new/duplicate run is executed for same date and legal entity, please remove the records inserted in Setup Table for Expected Exposures (FSI_SETUP_EXPECTED_EXPOSURE) by the previous run. The expected exposures at t=0 inserted by a run can be identified by the Run Surrogate Key (N_RUN_SKEY) column.

6. In absence of credit spreads, FIMMDA spreads can be used by the bank as risk premium. For this purpose, the FIMMDA spreads must be provided as download in the interest rate curve history table with the curve name as follows: FIMMADA CORP, FIMMDA NBFC and FIMMDA PSU OTHERS for party types being Corporate, NBFC and PSU, banks and others respectively.

7. For the discount rates, the risk-free government rates must be provided as download in the interest rate curve history table with the asset class code being as Z.

8. Stage IRC Rates must have curve data for all rating combinations as present in the non sec processing table for risk premium curve.

9. Time vertices must have atleast 0, 1m, 3m, 6m and 1 year as data points.

10. Stage Counterparty Expected Exposure must have atleast 0, 1m, 3m, 6m and 1 year as data points at counterparty level.

11. If spread is available in Stage Counterparty Expected Exposure, then risk premium is not picked from Stage IRC Rates. If this field in Stage Counterparty Expected Exposure is null, then Stage IRC Rates is referred for risk premium.

8.2.1.5 Market RWA

The Market Risk Capital Charge is expected to cater to the following trading book portfolio information of an Indian bank:

- Securities included under the Held for Trading category

- Securities included under the Available for Sale category

- Open gold position limits

- Open foreign exchange position limits

- Trading positions in derivatives

- Derivatives entered into for hedging trading book exposures.

The guidelines are issued for the Standardized approach only.

8.2.1.5.1 Standardized Approach

In the Standardized Approach (STD Approach), the Market Risk Capital Charge is calculated for the following instrument types:

- Interest Rate related Instruments (IR Instruments)

- Equity Position Risk

- Foreign Exchange Risk

- Options
- Credit Default Swap in Trading Book

Prerequisite for Market Risk Processing

Execution of the Run, **Staging Data Population - Market Risk - RBI Standardized Approach** is usually a onetime activity. This should be executed once before actual Market Risk Run is executed. The following tasks are populated when the Run is executed:

- IRC Data
- Market prices of the instruments
- Bank positions

This Run populates the instrument level data that is required by the actual Run for further processing. The instrument level data, such as number of units of the instruments on that particular MIS date is downloaded in bank instrument position (**STG_BANK_POSITIONS)** table. This data flows into the fact table for further processing. The OTC instrument price is expected as a download. For non-OTC instruments the data for instruments' price is captured in Market Instrument Contract (**STG_MKT_INSTRUMENT_CONTRACT)** table. This data flows into the fact table for further processing. For IR instruments, the interest rate required is captured in IRC Rate History (**STG_IRC_RATE_HIST)** table. This data flows into the fact table for further processing. This data is required for term structure that is used in Modified Duration and Greeks parameter calculation for options.

Process Flow for Market RWA

The RWA computation for Market Risk for the Indian jurisdiction is computed under the process IND_MKT_RISK. In this process, RWA is computed for Interest Rate, Equity, FOREX, and Options. The process IND_MKT_RISK is mapped to the following pre-defined Run which computes Market RWA:

Run: Risk Weighted Asset Calculation - Market Risk - RBI Standardized Approach

```
                          ( Start )
                              |
                              v
              +-------------------------------+
              |     Capital Consolidation     |
              +-------------------------------+
                              |
                              v
              +-------------------------------+
              |        Rating Process         |
              +-------------------------------+
                              |
                              v
              +-------------------------------+
              |      Position Conversion      |
              +-------------------------------+
                              |
                              v
              +-------------------------------+
              | Capital Charge for Interest Rate
              |           Instrument          |
              +-------------------------------+
                              |
                              v
              +-------------------------------+
              |    Capital Charge for Equity  |
              +-------------------------------+
                              |
                              v
              +-------------------------------+
              | Capital Charge for Foreign Exchange
              |          Transactions         |
              +-------------------------------+
                              |
                              v
              +-------------------------------+
              | Capital Charge for CDS in Trading
              |             Book              |
              +-------------------------------+
                              |
                              v
              +-------------------------------+
              |    Capital Charge for Options |
              +-------------------------------+
                              |
                              v
              +-------------------------------+
              |  Treatment for Illiquid position
              +-------------------------------+
                              |
                              v
              +-------------------------------+
              |    Summary Data Population     |
              +-------------------------------+
                              |
                              v
              +-------------------------------+
              |     Market Risk Deductions     |
              +-------------------------------+
```

Capital Consolidation

For a reporting bank the level at which the consolidation is processed is identified by the application. You can select Solo or Consolidation level for each entity in the rule present in the Capital Consolidation process. This particular process handles entity level details. The entity data is captured in Legal Entity Details (**STG_LEGAL_ENTITY_DETAILS**) table. All the child entities underlying a parent are considered for RWA consolidation. When consolidation is the level selected for a reporting bank, each child entity data is consolidated with the parent entity post entity shareholding percent multiplication.

>*For more information on the process and sub process that computes this task, see the following:*
>
>*Process*: IND_BASELIII_CAPITAL_CONSOLIDATION
>
>*Sub-process*: Capital Consolidation Approach

Approaches Followed in Capital Consolidation

The three approaches followed by the Capital Consolidation are:

Consolidation Approach (CONSL): Under this approach, all the entities of the bank's organizational structure are considered. This includes all the entities/subsidiaries that belong to the same jurisdiction. All the exposures of the entities in the organizational structure are considered for computing risk weighted exposures, except the intra-group exposures.

Aggregation Approach (AGG): This approach is similar to the Consolidation approach but is used in the cases, where some of the entities that are part of bank's organizational structure belong to a different jurisdiction. The capital requirement of the affiliate is computed as per the jurisdiction that it is subject to and is then aggregated with the rest of the group's capital requirement. Intra-group exposures are not excluded in this approach.

Deduction Approach (DED): This approach is used in the case where some of the subsidiaries/entities that are part of bank's organizational structure are excluded from consolidation. In such a scenario, the regulatory investment in the excluded subsidiary attributable to the rest of the group are deducted from the consolidated capital requirements.

Rating Process

Rating data is expected for all instruments which bear an interest rate risk. The rating data is reclassified into RBI equivalent standard rating and the standard rating is considered for assigning specific risk charge for interest rate instruments, wherever applicable. If there are multiple ratings for the same issue, then the application does a multiple assessment check as per the multiple assessment logic detailed in the RBI Basel III guidelines. This process assigns a RBI equivalent rating for an instrument, counterparty and/or issuer, based on the rating details available for the same, after applying multiple assessment logic.

>*For more information on the process and sub process that computes this task, see the following:*
>
>*Process:* IND_BASELIII_CREDIT_RATING_PROCESSING
>
>*Sub-process:* Credit Rating Data Population

Position Conversion

Position conversion is processed before Capital Charge calculation under Market Risk. In Position Conversion different instruments are broken into long and short positions and carried forward for specific and general risk charge calculation. All derivative instruments undergo position conversion so that the instrument is broken down into simplified positions for further processing. For derivative positions in equities, commodities, gold, currencies, and so on, only one leg is exposed to interest rate and other leg is exposed to the respective asset (equity, FOREX). The following information is required for position conversion: Long/Short position, Value of Notional Position, Coupon Rate, and Maturity.

Methodology for Position Conversion

While calculating interest rate risk, each instrument is converted into multiple positions. The notional value of each position is derived based on the following methodology:

Notional positions in actual debt securities is valued as the nominal amount underlying the contract at the current market price of the debt security

Positions in zero-specific-risk securities is valued using one of the following two methods:

- The present value approach, under which the zero specific-risk security is assigned a value equal to the present value of all the future cash flows that it represents.

- The alternative approach, under which the zero specific-risk security is assigned a value equal to the market value of the underlying notional equity position in the case of an equity derivative; the notional principal amount in the case of an interest rate or foreign currency swap; or the notional amount in the case of any other financial instrument.

In the case of options, the delta weighted values are processed for general risk charge calculation. Delta is computed by the application based on the instrument type, coupon, residual maturity, strike price, spread, option premium value, and so on.

For an Interest Rate (IR) Swap, the parent instrument is identified as a Receiver or Payer swap based on whether the bank is receiving fixed or paying fixed, respectively. After Position Conversion, the parent swap is converted to two child positions which are in zero specific risk securities. The exposure amount for each of these positions is computed based on the coupon rate of receiving leg for the long child position and the coupon rate of the paying leg for short child position. Currently the notional amount for both the child positions is being computed using the current market price column of the parent.

For Credit Derivative Swap, the parent swap is converted to two child positions, of opposite position. So if the Parent CDS is *Long*, its child position is *Short*. One position is zero specific risk security; the other is debt security. The exposure of Zero specific risk security is based on the Present Value of cash flows of Parent CDS. The exposure of Debt security is equal to Notional of Parent CDS. Zero specific risk security has only General Market Risk computed, where-as Debt security has only specific risk computed.

Instrument Coverage

- Interest Rate Derivatives
    - Bond Forward
    - Forward Rate Agreement
    - Bond Future
    - Future on a Basket/Index of bonds
    - Interest Rate Futures
    - Receiver Swap (without deferred start)
    - Payer Swap (without deferred start)
    - Basis Swap (without deferred start)
    - Forward Basis Swap
    - Forward Receiver Swap
    - Forward Payer Swap
    - Dual Currency Bond
- Equity Derivatives
    - Equity Forward
    - Equity Future
    - Equity Swap
- Currency Derivatives
    - Currency Forward
    - Currency Future
    - Currency Swap
    - Gold Forward
- Options / Structured Products
    - Option on Equity
    - Option on Currency
    - Option on Commodity
    - Option on Currency Future
    - Option on Currency Forward
    - Currency Swaption
    - Option on a bond
    - Option on a bond future
    - Option on a Forward Rate Agreement
    - Option on an Interest Rate Future
    - Swaptions

- Credit Derivative
    - o Credit Default Swap
- Hybrid Instruments
    - o Convertible Preference Shares
    - o Hybrid Debt
    - o Hybrid Funds

Position Conversion Process Flow

The process flow of Market Risk Position Conversion is as follows:

Position Conversion Data Population

The application populates **FCT_MARKET_RISK_EXPOSURES** with the details given by the bank in **STG_BANK_POSITIONS** and **STG_INSTRUMENT_CONTRACT_MASTER**. FOREX exposures of the bank are populated into **FCT_MARKET_RISK_FOREX**. This exercise is processed for all the trading book exposures.

> *For more information on the process and sub process that computes this task, see the following:*
>
> *Process*: IND_RBI_III_MKT_RISK_DATA_PROCESSING
>
> *Sub-process:* Market Risk Data Population

Treatment of Hybrid Instrument in Market Risk Standardized Approach

This section is an addition to the existing position conversion process for the extension of the same to treat hybrid instruments.

Currently in the BIS solution, the basket futures are treated. The treatment for the hybrid instruments is similar to the basket futures. The following hybrid instruments are considered:

1. **Convertible Preference Shares**: These have the major risk factor as Equity (EQ).
2. **Hybrid Debt Instruments**: These have the major risk factor as Interest Rate (IR).
3. **Hybrid Funds**: These have the characteristics of debt and equity and can be assigned a major risk factor of either type.

The above instruments are broken down into the component positions. The child positions, spot debt and spot equity, are allocated the contract amount based on the weight of each risk factor (IR or EQ) in the hybrid parent instrument.

The weight of the underlying instruments corresponding to Spot Equity, Fixed Rate Bond, or Floating Rate Bond is used to arrive at the notional amount of each child position. The rest of the key parameters, that is, coupon rate, maturity date, re-pricing date, currency, coupon basis, issuer details, and so on are populated to child positions based on the information provided by the bank in the master table for instrument contract corresponding to the instrument code given for the underlying. The position in child instruments are the same as the position in the parent hybrid instrument.

The resultant child positions are then considered for specific risk and general risk under EQ and IR processes depending on the type of instrument assigned to the position. The specific risk charge computed at the child positions is summed up and reported against parent position.

The components of the hybrid parent contract should be EQSPOTSPT, IRSPOTFIB, or IRSPOTFLB. Each has a unique instrument code captured in underlying table and the master instrument contract table. The underlying table, **Stage Fund CIS Composition**, captures the weights (stock, bond, and cash) and relationship with the parent hybrid contract. The master contract table captures the other details of the instrument like the maturity date, re-pricing date (if applicable), currency, coupon basis (fixed or floating), coupon rate, issuer details, contract rating, and so on. The weights of the components must be provided by the bank as download.

Currency Conversion

All the positions in other currencies are converted into the reporting currency of the bank, based on the currency conversion rate between the exposure currency and reporting currency.

> *For more information on processes and sub processes that compute this, see the following:*
>
> *Process*: IND_RBI_III_MKT_RISK_DATA_PROCESSING
>
> *Sub-process:* Market Risk Currency Conversion

Shareholding Percent Multiplication

For consolidated runs, exposures of the child entities are multiplied by the entity shareholding percentage to arrive at the consolidated exposure at the parent level.

> *For more information on the process and sub processes that compute this task, see the following:*
>
> *Process*: IND_RBI_III_MKT_RISK_DATA_PROCESSING
>
> *Sub-process:* Shareholding Percent Multiplication

Position Conversion of Derivatives into Simple Positions

The application takes the contract details from the instrument table and breaks each contract into multiple positions into market risk exposures (**FCT_MARKET_RISK_EXPOSURES**) table. The application splits instruments which are derivatives in nature into multiple positions based on the instrument position mapping available in the mapping table.

For example: A bank having a plain long position in a derivative instrument is split into one long and one short position.

Therefore, for each position and nature of contract type, the application creates the required number of positions in the processing table. The download information used for position conversion is contract details, instrument type, contract position, position mapping, and so on.

The application reclassifies all bank instruments into standard instrument types based on contract type, contract position, market risk position, and so on. A fixed bond forward with a long position in the contract is reclassified into fixed rate bond for the long leg and zero risk security for the short leg, created by position conversion. The reclassifications are further used for notional value calculation.

> ***For more information on the process and sub process that computes this task, see the following:***

> *Process*: IND_RBI_III_MKT_RISK_POSITION_CONVERSION

> *Sub-processes:* Position Conversion Options, Position Conversion Basket Futures - Interest Rate, Position Conversion Swaps, Position Conversion Forwards and Futures, and IND Position Conversion CDS

Position Conversion Parameter Assignment

After position conversion, that is, breaking each derivative instrument into long and short leg, the application assigns instrument parameters for each position leg created under position conversion logic. For each leg, relevant information like: coupon rate, coupon frequency, maturity, strike price for options, option premium value, and so on, are updated from parent information. This information is used in duration calculation for Duration Ladder Approach, calculation of Greeks for option charge, and so on.

> ***For more information on the process and sub process that computes this task, see the following:***

> *Process:* IND_RBI_III_MKT_RISK_POSITION_CONVERSION

> *Sub-processes:* Position Conversion Options, Position Conversion Basket Futures - Interest Rate, Position Conversion Swaps, Position Conversion Forwards and Futures, and IND Position Conversion CDS

Notional Value Calculation

Notional value of each leg created by position conversion for each instrument is calculated based on the contract characteristics (market price, number of units). For options, it is the delta weighted position which is carried forward for Market Risk Charge calculation.

There is some dependency on different instrument types, like; the exotic options can further result into a vanilla option after position conversion, hence the position conversion should be processed in the following order of instrument types:

- Options
- Basket Futures
- Swaps
- Forwards/ Futures

After position conversion of basket futures instrument types, position offsetting on different positions of same kind of instrument types is processed and the post offset exposure amount is arrived at.

For each leg created from CDS instrument, Notional value is calculated differently. The exposure of Zero specific risk security is based on the Present Value of cash flows of Parent CDS. The exposure of Debt security is equal to Notional of Parent CDS.

For more information on the process and sub process that computes this task, see the following:

Process: IND_RBI_III_MKT_RISK_POSITION_CONVERSION

Sub-processes: Position Conversion Options, Position Conversion Basket Futures - Interest Rate, Position Conversion Swaps, and Position Conversion Forwards and Futures

Example of a Forward Rate Agreement (FRA) Position Conversion

A purchased FRA can be depicted through two notional zero-coupon positions: one short position (liability) up to the maturity of the underlying credit transaction and one long position (claim) up to the settlement of the FRA. Suppose a firm purchases 3 x 6 month FRA, principal: 1000; interest rate 6%. This position is broken down into two opposite zero coupon bond positions as follows:

- **First Position:**

  Position : Long

  Value of Notional Position : PV {1000/ ((1+5%) ^0.25) = 987.87}

  Maturity : 3 months

  Coupon : Zero (Coupon of less than 3%)

- **Second Position:**

  Position : Short

  Value of Notional Position : PV {1000/ ((1+5%) ^0.5) = 975.90}

  Maturity : 6 months

  Coupon : Zero (Coupon of less than 3%)

A sold FRA has positions exactly opposite to the one given in the preceding example, that is, the long position becomes short and short position becomes long, with the value, maturity, and coupon remaining the same.

The actual discount rates for discounting the notional values of the two legs in the preceding example are the interest rates pertaining to the respective maturities, that is, 3 months (long leg) and 6 months (short leg). For simplification purposes, an assumed rate of 5% is considered in the preceding example. The procedure followed by the application taking the preceding example into consideration, is as follows:

1. The FRA as contract is captured in the contract record details table with banks position in the contract in the position table. The application also captures the position mapping table for the above instrument type which is used for position conversion. For the preceding FRA example, two positions are created, one long position with a maturity of 3 months and a short position for the life of the contract, that is, with a maturity of 6 months.

2. Both the position legs are reclassified into zero specific risk security.

3. The various contract parameters are assigned by the application to both the legs. For example: Coupon Rate, Maturity.

4. The Notional Value of both the legs is calculated as per the logic stated in the example.

Capital Charge Computation for Interest Rate Instruments

The total risk charge for Interest Rate (IR) instruments consists of specific risk charge (specific to the Issuer and Instrument) and general risk charge (market related risk vested in the instrument).

Process flow diagram for Interest Rate Risk

Specific Risk Charge

Specific Risk Weight is assigned based on the issuer type rating, CET and CCB information of issuer and residual maturity for interest rate related instruments. This is assigned irrespective of the category of investments, whether they are 'Available for sale' (AFS) or 'Held for Trading' (HFT).

> ***For more information on the process and sub process that computes this task, see the following:***

Process: IND_RBI_III_MKT_RISK

Sub-process: Market Risk Specific RW Assignment

Alternative Total Capital Charge

RBI guidelines direct the banks to compute Alternative Total Capital Charge for the exposures in 'Available for Sale' (AFS) category. The application assigns Alternate Total Risk Weight to such exposures based on the issuer type, rating CET and CCB information of issuer and residual maturity.

> ***For more information on the process and sub process that computes this task, see the following:***

Process: IND_RBI_III_MKT_RISK

Sub-process: Market Risk Alternative Total RW Assignment

General Risk Charge

General risk charge is calculated for each interest rate risk exposure for a reporting bank. General risk charge is calculated by following the Duration Ladder approach. This is processed irrespective of the category of investments, whether they are 'Available for Sale' (AFS) or 'Held for Trading' (HFT).

NOTE: The exposures which are Fully Deducted from CET 1, under Interest Rate Specific Risk Charge calculation, are excluded from General Risk Charge calculation.

Duration Ladder

Under this method, the application creates time bands and based on modified duration, places each instrument in the respective time bands for offsetting. The matched and unmatched position across time bands and across three zones attracts general risk charge as per the definition stated in RBI guidelines for Market Risk.

Under Duration Ladder Approach, the application creates duration ladder based on modified duration calculated for each instrument. The general risk charge under duration ladder is calculated for each currency and insignificant positions across multiple currencies are populated into a single modified duration ladder for horizontal and vertical disallowance calculation.

The duration ladder time band created in the application is based on the definition given by RBI guidelines on Market Risk. For Duration Based Ladder Approach, the application creates three time zones for each Modified Duration Time Band. This is computed in the process 'Time Band Assignment'. Based on the time bands, positions are assigned an 'assumed rate'. The delta-weighted positions of IR options are considered for the slotting into time bands and zones.

All the processing attributes used under Duration Ladder Approach are stored in a separate table (**FCT_MARKET_RISK_CAPITAL**) starting from weighted long and short positions, matched and unmatched positions following horizontal and vertical disallowance and net open position by each currency.

> *For more information on the process and sub process that computes this task, see the following:*
>
> *Process:* IND_RBI_III_MKT_RISK
>
> *Sub-processes:* Time Band Assignment, Market Risk Assumed Rate Assignment, and Market Risk Weighted Position Calculation - Duration Approach

Horizontal/Vertical Disallowance

In the application, vertical and horizontal disallowance for IR instruments is processed by using a Data Transformation function 'MR_IR_Duration_Mat_Ind' under 'Market Risk Generic Risk Charge Calculation' which computes the matching of the positions within time bands, zones, across adjacent zones and across non-adjacent zones to finally arrive at the general risk charge for interest rate instruments.

The capital charge is applied at each state for the matched and unmatched position as per the capital charge stated in RBI guidelines for market risk. A detailed explanation of how the application handles the horizontal and vertical disallowance is as follows:

1. The application initially populates weighted long and weighted short position amounts for each time band.

2. The next step is to offset the matched positions and populate them as 'offset matched position within the time band'. The unmatched positions are populated as 'offset unmatched position within the time band'.

3. Offset unmatched positions arrived at from the above step are then taken up for offsetting within a time zone. All the 'offset unmatched positions within time band' falling under the same zone are offset with each other and 'offset match same zone' and 'offset unmatched same zone are computed'.

4. Offset unmatched positions within same zone are then carried forward for calculating 'Offset matched between zone' and 'offset unmatched between zones'. This is first processed for zones 1 and 2, then for zones 2 and 3, and lastly for zones 1 and 3.

5. All the unmatched positions (within time band, same zone, between zones and net unmatched position) are multiplied by the factors listed in the RBI guidelines for duration ladder approach as applicable.

For more information on the process and sub process that computes this task, see the following:

Process: IND_RBI_III_MKT_RISK

Sub-process: Market Risk Generic Risk Charge Calculation

Procedure: MR_IR_Duration_Mat_Ind

Summary Output

For reporting purposes, the application moves data from market risk capital (**FCT_MARKET_RISK_CAPITAL**) table to market risk reporting (**FCT_MARKET_RISK_REPORTING**) table.

For Interest Rate reporting line, the total capital charge is computed by comparing the values of specific and general risk charge for AFS and HFT categories and the Alternate Capital Charge computed for AFS category. Based on the rules for comparison stated in the RBI guidelines, the population for the capital charge against the Interest Rate reporting line is processed by a Data Transformation 'MR_IR_Tot_Cap_Chrg_Calc' by the application.

Finally, RWA is calculated in the market risk summary (**FCT_MARKET_RISK_SUMMARY**) table by multiplying capital charge with (100/9). The interest risk charge is reported out of market risk summary (**FCT_MARKET_RISK_SUMMARY**) table under Interest Risk charge reporting line.

For more information on the process and sub process that computes this task, see the following:

Process: IND_RBI_III_MKT_RISK

Sub-process: Market Risk Capital Risk Charge Calculation and Market RWA Calculation

Capital Charge Calculation for Equities

Process Flow diagram for Capital Charge Calculation

The application calculates equity capital charge as summation of specific risk charge and general risk charge. The process flow for calculation of equity risk charge is as follows:
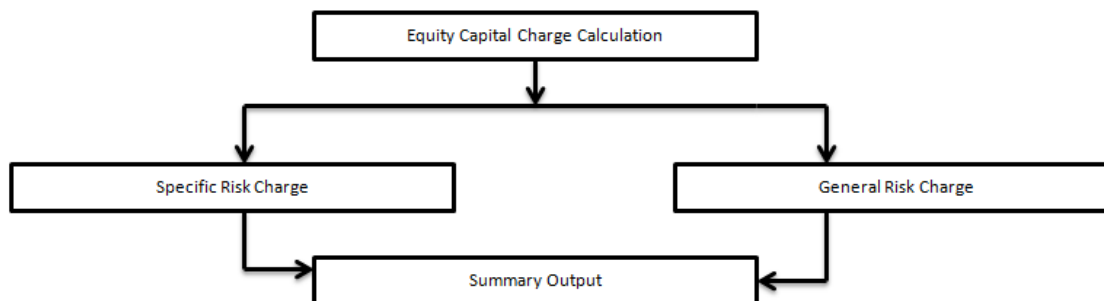
Specific Risk Charge

Specific Risk Weight is assigned based on the issuer type, significant/ insignificant, regulatory capital details for equity related instruments. This specific risk weight is then multiplied by the post offset exposure amount to arrive at the specific risk charge. Delta weighted positions of equity options and is considered for specific risk computations.

> *For more information on the process and sub process that computes this task, see the following:*
>
> *Process:* IND_RBI_III_MKT_RISK
>
> *Sub-process:* Market Risk Specific RW Assignment Equity

The Specific Risk charge for Security Receipts is 13.50%.

> *For more information on the process and sub process that computes this task, see the following:*
>
> *Process:* IND_RBI_III_MKT_RISK
>
> *Sub-processes:* Market Risk Specific RW Assignment Equity and Market Risk Specific Risk Charge Calculation

General Risk Charge

The application assigns 9% general risk charge for equity instrument type and then multiplies it with post offset exposure amount to arrive at the general risk charge. Delta weighted positions of equity options are considered for general risk computations.

> *For more information on the process and sub process that computes this task, see the following:*
>
> *Process:* IND_RBI_III_MKT_RISK
>
> *Sub-processes:* Market Risk General RW Assignment and Market Risk Generic Risk Charge Calculation

NOTE: The exposures which are Fully Deducted from CET 1, under Equity Specific Risk Charge calculation are excluded from General Risk Charge calculation.

Summary Output

The equity risk charge is reported from the market risk summary (**FCT_MARKET_RISK_SUMMARY**) table under equity reporting line. Specific and general risk for equity is also reported separately from the summary table.

> ***For more information on the process and sub process that computes this task, see the following:***

Process: IND_RBI_III_MKT_RISK
Sub-processes: Market Risk Capital Risk Charge Calculation and Market RWA Calculation

Capital Charge for Foreign Exchange Transactions

Process Flow diagram for Foreign Exchange Transactions

FOREX Data Population

All foreign exchange exposure data is expected at a net level by each currency in a separate table meant only for FOREX exposures data (**STG_FOREX_EXPOSURES**). Forward currency position, asset, liability, accrued interest, profit and loss, structural position, and so on, in different currencies are captured separately in the FOREX exposure table. This data is then populated to **FCT_MARKET_RISK_FOREX** which is a dedicated table to compute FOREX capital charge.

> ***For more information on the process and sub process that computes this task, see the following:***
> *Process:* IND_RBI_III_RISK_DATA_PROCESSING
> *Sub-process:* Market Risk Data Population

Currency Conversion

Currency conversion of FOREX positions to reporting currency is done in the application in the following rules:

- FOREX Position Profit and Loss Attribute Natural CCY Conversion to Reporting CCY
- FOREX Position Attribute Natural CCY Conversion to Reporting CCY
- FOREX Position Other Attribute Natural CCY Conversion to Reporting CCY

This conversion is processed based on the exchange rate between the natural currency of the exposure and the reporting currency.

> ***For more information on the process and sub process that computes this task, see the following:***

> *Process:* IND_RBI_III_MKT_RISK
> *Sub-process:* Market Risk Gamma and Vega Capital - Delta Plus Method

Calculation of Net Open Position

The net open position is the maximum value of the net long and net short position across all currency exposures plus the value of gold. This is computed under the process 'Market Risk FOREX Risk Position Calculation' in the application.

> ***For more information on the process and sub process that computes this task, see the following:***

> *Process:* IND_RBI_III_MKT_RISK

> *Sub-process:* Market Risk FOREX Risk Position Calculation

FOREX Capital Charge

The application applies the short hand method for FOREX risk charge calculation by treating all the currencies to be same and applying 9% risk charge on net open position.

This is done by the data transformation 'MR_Cap_Chrge_Frx_Ind'.

> ***For more information on the process and sub process that computes this task, see the following:***

> *Process:* IND_RBI_III_MKT_RISK

> *Sub-process:* Market Risk Capital Risk Charge Calculation

Summary Output

The FOREX risk charge gets reported out of market risk summary table under FOREX charge reporting line.

> ***For more information on the process and sub process that computes this task, see the following:***

> *Process:* IND_RBI_III_MKT_RISK
> *Sub-process:* Market RWA Calculation

Capital Charge for CDS in Trading Book

Credit Default Swap (CDS) is a financial instrument, used to hedge counterparty credit risk. The total risk charge for CDS instruments consists of specific risk charge (specific to the Issuer and Instrument) and general risk charge (market related risk vested in the instrument).

CDS Parent instrument is converted into two Child position, each position is specific to Specific Risk and General Risk charge computation. Details of Position conversion is mentioned in Section - Position Conversion.

Process Flow diagram for Capital Charge for CDS in Trading Book
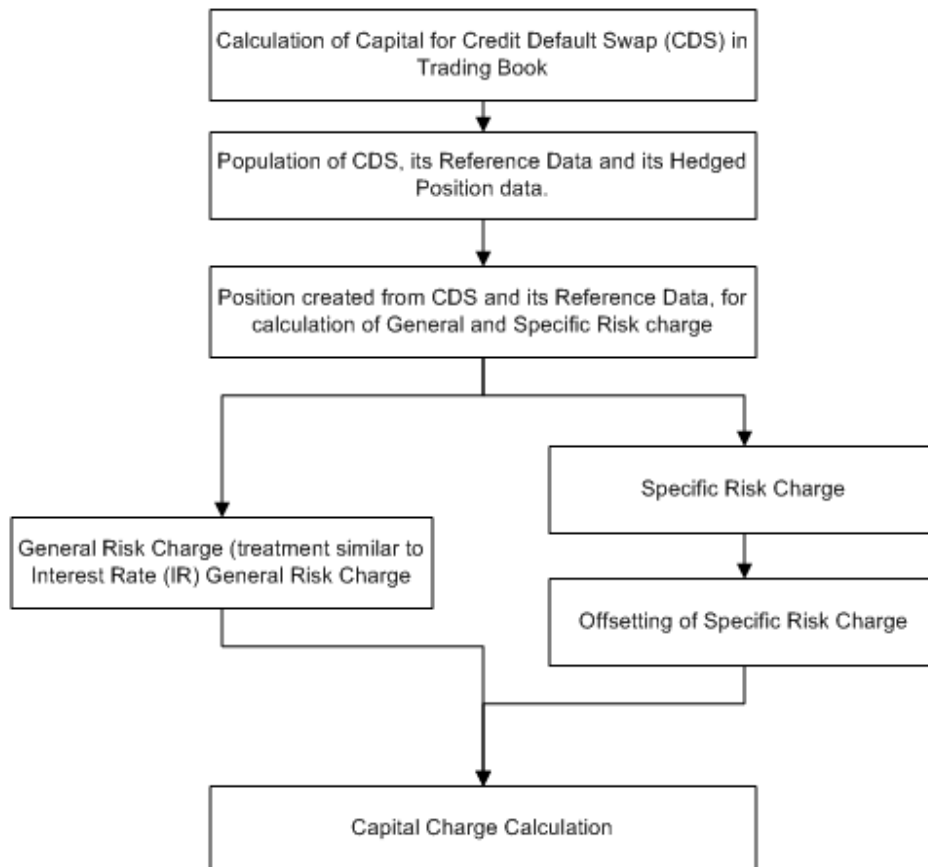
Specific Risk Charge

Specific Risk is calculated for Child Debt security position created from Parent CDS.

Specific Risk Weight is assigned based on the issuer type, rating, residual maturity of the reference asset/obligation and residual maturity of the parent CDS. This specific risk weight is then multiplied by the post offset exposure amount to arrive at the specific risk charge. Post offset amount is derived from Parent CDS Notional amount.

Specific Risk charge is different if the reference asset/ obligation issuer type is NBFC-ND-SI (Non-deposit Taking Systemically Important Non-Banking Financial Companies) or Commercial Real Estate Companies.

Wherever the issuer type is NBFC-ND-SI or CRE, data must be provided in table stg_party_master column v_type.

After Specific Risk charge is applied, if the Parent CDS is used for Hedging, there is offset to the Specific Risk charge.

If the Parent CDS is not used for Hedging, there is no offset done to Specific Risk charge.

> ***For more information on the process and sub process that computes this task, see the following:***

Process: IND_RBI_III_MKT_RISK

Sub-process: Market Risk Specific RW Assignment CDS

General Risk Charge

General risk charge is calculated for Zero Specific Risk Child position created from Parent CDS. General risk charge is calculated by following the Duration Ladder approach, similar in line with General Risk of IR instrument. Duration Ladder approach is already detailed in Section- Duration Ladder under Section-Capital Charge Computation for Interest Rate Instruments.

> ***For more information on the process and sub process that computes this task, see the following:***

Process: IND_RBI_III_MKT_RISK

Sub-processes: Market Risk Weighted Position Calculation - Duration Approach and Market Risk Generic Risk Charge Calculation

Summary Output

For reporting purposes, the application moves data from market risk capital (FCT_MARKET_RISK_CAPITAL) table to market risk reporting (FCT_MARKET_RISK_REPORTING) table.

The output is populated in CDS Reporting Line. There is separate output for General Risk and Specific Risk.

Finally, RWA is calculated in the market risk summary (FCT_MARKET_RISK_SUMMARY) table by multiplying capital charge with (100/9). The interest risk charge is reported out of market risk summary (FCT_MARKET_RISK_SUMMARY) table under Interest Risk charge reporting line.

> ***For more information on the process and sub process that computes this task, see the following:***

Process: IND_RBI_III_MKT_RISK

Sub-processes: Market Risk Capital Risk Charge Calculation and Market RWA Calculation

Capital Charge for Options

Simplified Approach

In the Simplified Approach, for option type being long cash and long put or short cash and long call, the application calculates 'in the money' values for the option. In case of 'in the money' option, the value is calculated as the number of units multiplied by the difference of underlying forward price and strike price, if the residual maturity of the option is greater than 6 months. In the case of the residual maturity of the option contract being less than or equal to 6 months the 'in the money' value is calculated as number of units multiplied by the difference of underlying current market price and strike price.

The Capital Charge is arrived at as the difference between sum of general risk and specific risk on the underlying value and 'in the money' value of the option. For long put or long call, the application applies the capital charge as the least of the sum of general risk and specific risk on the underlying and option premium value.

This computation is processed in the task 'Market Risk Options – Capital Charge Calculation – Simple Approach'

> ***For more information on the process and sub process that computes this task, see the following:***

> *Process:* IND_RBI_III_MKT_RISK
> *Sub-processes:* Market Risk Generic Risk Charge Calculation - Simple Approach and Market
> Risk Capital Risk Charge Calc - Simple Approach

Delta Plus Approach

In the Delta Plus Approach, the option taken on any underlying contract is processed for position conversion. The purpose of position conversion is to create multiple positions with delta weighted amounts and send each position for respective capital charge calculation.

Greeks Calculation

The application calculates Greeks for options based on the option contract information. The Greek calculation involves calculating implied volatility, delta, gamma and vega**.** Each of the Greeks calculated then participates in sensitivity charge calculation.

> ***For more information on the process and sub process that computes this task, see the following:***
>
> *Process:* IND_RBI_III_MKT_RISK
>
> *Sub-processes:* Market Risk Gamma Impact - Delta Plus and Market Risk Gamma and Vega Capital - Delta Plus Method

Sensitivity Charge Calculation

For options, total charge includes underlying capital; charge plus sensitivity risk charge. Sensitivity risk charge includes delta risk, gamma risk, and vega risk charge. The formula used against each of the sensitivity charge is as per RBI guidelines on Market risk.

The computation of Delta weighted positions and Gamma impact for options is done under the process 'Market Risk Options – Delta and Gamma calculations – Delta Plus Approach'. The delta weighted positions of options participate in the specific and general risk charge computations applicable for the respective underlying.

> ***For more information on the process and sub process that computes this task, see the following:***
>
> *Process:* IND_RBI_III_MKT_RISK
>
> *Sub-process:* Market Risk Capital Risk Charge Calculation - Delta Plus

Summary Output

The capital charge for option is reported from summary table where reporting line is options where as the underlying risk charge gets reported under the respective reporting line.

> ***For more information on the process and sub process that computes this task, see the following:***
>
> *Process:* IND_RBI_III_MKT_RISK
>
> *Sub-process:* Market Risk RWA Calculation

The capital charge for market risk is computed as **12.5 * RWA** in order to comply with July 2015 master circular of RBI issued in this regard.

Treatment for Illiquid Positions

RBI guidelines for treatment for Illiquid Positions have the following consideration:

1. Valuation Adjustments for Less Liquid Derivatives Positions
2. Valuation Adjustment for Less Liquid or Illiquid Positions

Valuation Adjustments for Derivatives Portfolio

Valuation adjustment is done for Derivative products. Its value is market to market or, which is hold in trading book. These are applicable for Market Risk calculation.

The valuations required to be adjusted or deducted are-

1. Incurred CVA Losses

2. Closeout Costs

3. Operational Costs

4. Early Termination, Investing, and Funding Costs

5. Future Administrative Costs

6. Model Risk, if appropriate

All valuation details are expected as download at the contract level. Incurred CVA Losses, Adjustment to MTM (which include adjustment due to Closeout costs, Operation Costs, Early termination, investing, funding cost, Future administrative costs, model risk), and Other valuation adjustment, if any. All this adjustment mentioned is deducted from CET1.

Valuation Adjustment for Less Liquid or Illiquid Positions

Valuation adjustment done for Illiquid positions (or contracts), are deducted from CET1, instead of debiting it to Profit and Loss Account.

Valuation adjustment done for Derivative products, has the following considerations:

1. Identification of Illiquid contracts

2. Identification of Derivative contracts

3. Capturing of Incurred CVA Losses

4. Capturing of Other MTM adjustment

5. Capturing of any other Adjustment

6. Deduction of Incurred CVA Losses, Other MTM adjustment, and any other adjustment from CET1

Adjustment MTM, other adjustment values and Incurred CVA losses, are populated separately for Illiquid positions. MTM value populated for illiquid position is net of these values (Adjustment MTM, Other adjustment values and Incurred CVA losses).

> *For more information on the process and sub process that computes this task, see the following:*
> *Process:* IND_RBI_III_MKT_RISK
> *Sub-process:* Market Risk Deduction From CET1

Market Risk Deductions from CET1

Deduction items captured in IR, Equity Specific Risk and Illiquid Position, is deducted from CET1.

> *For more information on the process and sub process that computes this task, see the following:*
> *Process:* IND_RBI_III_MKT_RISK
> *Sub-process:* Market Risk Deduction from CET1

The sub-process takes the CET1 value, stored in FCT table and deducts the new formed capital heads with values from CET1, and updates CET1 with deducted amount.

8.2.1.5.2 Key Data Elements

Key data elements are listed in this section. For a complete list of tables and columns to be populated, see the Download Specification document.

- Interest Rate Historical Data: Interest Rate information for IR instrument is stored here.
- Bank Positions: Position in the instrument (Long/Short), Price of Instrument and No of Units for OTC instruments are stored here.
- Market Instrument Contract: Price of Non-OTC instruments is stored here.
- Instrument contract: Instrument Type, Counter party type, currency code, coupon rate, effective date, maturity date, strike price, coupon rate, coupon frequency are stored here.
- FOREX Exposures: Exposure amount, asset amount, asset accrued interest, asset accrued profit are stored here.

8.2.1.6 Operational RWA

As per the Basel accord, "Operational Risk is the risk of loss resulting from inadequate or failed internal processes, people and systems, or from external events". External losses can occur due to theft of information or hacking of systems. The RBI guidelines have prescribed one method for calculating Operational Risk (OR) Capital Charge which is as follows:

- Basic Indicator Approach

NOTE: While executing Solo Run for computing Operational Risk, the parent entity data is processed. However, for a Consolidated Run the parent entity and the subsidiary data is processed.

8.2.1.6.1   Basic Indicator Approach

To calculate the capital charge under the Basic Indicator Approach, the annual gross income for each of the past three years for a standard line of business is multiplied by a fixed percentage of 15%. The average is considered to calculate the capital charge. If the annual gross income is negative or zero in any of the past three years, then the value from the numerator is excluded thereby reducing the base denominator by the same count.

The capital charge formula is as follows:

$$K_{BIA} = \left[\sum \left(GI_{1..n} \times \alpha\right)\right] / n$$

Where:

K_{BIA} = the capital charge under the Basic Indicator Approach

GI = annual gross income, where positive, over the previous three years

n = number of the previous three years for which gross income is positive

α = 15 per cent, which is set by the BCBS, relating the industry wide level of required capital to the industry wide level of the indicator.

Process Flow for Operational RWA

The process to compute OR under the Basic Indicator Approach are as follows:
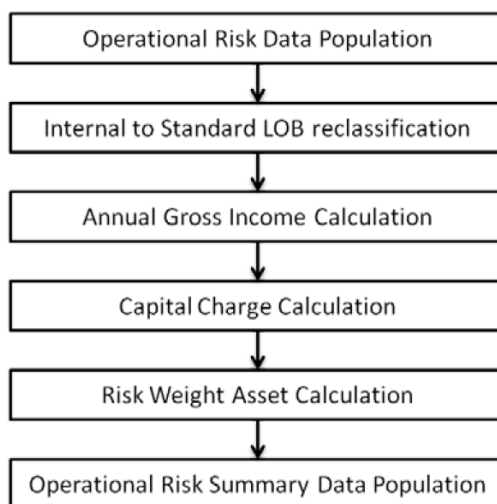
Prerequisite

Before calculating the capital charge for OR, the following should be computed as a prerequisite:

In the process **IND_OPS_RISK,** the task defined as **Opr_Risk_Capital_Charge** should mention the number of years (in the past) as a parameter for capital calculation.

For example: if the previous 3 years are considered, then assign 3 as a parameter against the task Opr_Risk_Capital_Charge. Therefore, in the future if the previous 4 years have to be considered, then change that particular parameter only.

Operational Risk Data Population

The input data for each of the financial years mapped, along with the internal line of business are populated in the processing table.

Internal LOB to Standard LOB Reclassification

The internal lines of business are reclassified into standard lines of business.

Annual Gross Income Calculation

For each of the standard lines of business and for each financial year, the annual gross income is calculated.

Capital Charge Calculation

Capital charge is calculated by multiplying the alpha value with the annual income of each year across each standard line of business. Further, the average of 3 years is considered (if the values of all the 3 years are positive). If the values of all the 3 years are not positive, then zero or the negative value from numerator and denominator are excluded.

<u>**Risk Weight Asset Calculation**</u>

The capital charge value obtained is then converted to the equivalent RWA value by multiplying with the factor 100 divided by 9.

<u>**Operational Risk Summary Data Population**</u>

The RWA amount is populated into the Operational Risk Summary (**FCT_OPS_RISK_SUMMARY**) table along with the entity for which the OR RWA is calculated. The application converts all the elements in the annual gross income and loan and advance amount reported in their respective national currency, to the reporting currency. While calculating annual gross income or loan and advance amount for the subsidiary that are part of regulatory consolidation, the amount is limited to the share-holding percentage. Hence, a subsidiary which is part of regulatory consolidation and parent holding in the subsidiary is considered as 45%, then the amount limited to 45% is considered for gross calculation. Similarly, if the holding is more than 50%, then the entire amount is considered for gross calculation.

8.2.1.6.2 Key Data Elements

Key data elements to be noted are listed in this section. To view the complete list of tables used, see the *Download Specification* document.

Entity details which are part of regulatory consolidation and parent entity share holding percent is required. This data is captured in Stage Entity Shareholding Details (**STG_ENTITY_SHR_HLD_PERCENT**) table.

Net Interest Income, Net Provision Amount, Net Non Interest Income, Operating Expenses, Security Sale Gain or Loss from HTM, Insurance Irregular Loss, Security Sale Gain or Loss from AFS, Insurance Irregular Gain, Net Write-off Amount, Reversed Provision Amount, Reversed Write-off Amount, Disposable Property Income Legal Settlement Income, and Insurance Claim Income for each line of business and for each financial year, is required.

8.2.1.7 Capital Structure

During the economic crisis, the global banking system had an insufficient level of high level quality capital. During the crisis, it was identified that there was inconsistency in the definition of capital across jurisdictions and lack of disclosure. To address this issue of inconsistency, the Basel committee had prescribed a new definition of capital to strengthen the global capital framework under Basel III. RBI came up with Basel III to calculate the total capital for the Indian banks and the Foreign banks branches in India.

As per the new definition in the RBI III accord, total capital consists of sum of the following elements:

1. Tier1 Capital

    o   Common Equity Tier 1 Capital for Indian Banks

    o   Common Equity Tier 1 Capital for branches of Foreign Banks in India

    o   Additional Tier 1 Capital for Indian Banks

    o   Additional Tier 1 Capital for branches of Foreign Banks in India

2. Tier 2 Capital

   o Tier 2 Capital for Indian Banks
   o Tier 2 Capital for branches of Foreign Banks in India

Each component of capital is subject to restrictions where CET1 must be at least 5.5% of total risk-weighted asset. Tier 1 capital must be at least 7.0% of total risk-weighted asset. Total capital must be 9.0% of total risk-weighted asset. Each component of capital undergoes minority interest and regulatory adjustments. The minority interest is applicable for a bank only. Most of the regulatory adjustment line items are to be deducted from CET1.

For a bank, the accounting entity that are not part of regulatory consolidation, the investment amount is partly deducted from its respective component of capital and is partly risk weighted as per banking or trading book rules.

Securitization transaction and non-DvP and non-PvP transaction items, which were formerly as per Basel II, deducted 50% from Tier 1 and 50% from Tier 2 are instead risk weighted at 1250%. All the regulatory adjustment line items follow a phase-in arrangement from the beginning of 2014 till 2017.

In particular, the regulatory adjustments begins at 20% of the required adjustments to Common Equity Tier 1 on 31st March 2014, 40% on 31st March 2015, 60% on 31st March 2016, 80% on 31st March 2017, and reaches 100% on 31st March 2018.The same transition approach applies for all deductions from additional Tier 1 and Tier 2 capital.

Capital Structure process takes inputs from Fact Non Sec Exposures (**FCT_NON_SEC_EXPOSURES**) and Market Risk Exposures (**FCT_MARKET_RISK_EXPOSURES**). Capital Structure process is positioned between Market Risk data processing (**BASELIII_MKT_RISK_DATA_PROCESSING**) and Market Risk position conversion (**BASELIII_MKT_RISK_POSITION_CONVERSION**) due to the following reasons:

The significant and insignificant investment deductions involve splitting of certain exposures into multiple exposures (2 new exposures and deletion of the parent exposure). These split exposures should be position converted and RWA is calculated on these position converted exposures.

After processing of Market Risk, the calculated RWA is populated to Market Risk Summary (**FCT_MARKET_RISK_SUMMARY**) which contains the aggregated record for each instrument type. If Market Risk is processed before Capital Structure processing, then the RWA is adjusted for the split exposures for the Market Risk record and this task is repeated for each record.

If the RWA for the split exposures is adjusted, then it is approximate in case the RWA is pro-rated between instrument types. The same tasks are repeated (falling into cycles) if RWA is computed in this table again.

NOTE: All the GL line items are expected at Solo level for each entity. The consolidated data is discarded.

While executing Solo Run the parent entity data is processed. Investment into the subsidiary data is processed as per Credit Risk and Market Risk rule. Capital line item pertaining to parent entity is only processed.

While executing Consolidation Run, the parent entity and the subsidiary data is considered. Regulatory Investment data to financial institutions which are part of regulatory consolidation is

treated as an internal transaction. Those subsidiaries which are outside the scope of consolidation are treated as per insignificant and significant rule.

The sub processes and rules within Market Risk Data Processing process **IND_RBI_III_MKT_RISK_DATA_PROCESSING** perform the following tasks**:**

- The Rules within the sub process **Market Risk Currency Conversion** converts the amount attributes, which are in natural currency to reporting currency, which is used for further processing. Attributes like the exposure amount, margin amount, MR notional amount, and so on are processing for currency conversion from natural currency to reporting currency.

- The Rule **Mkt Risk Instrument type to Capital Comp Group Reclassification** in the sub process **Market Risk Reclassification** within **IND_RBI_III_MKT_RISK_DATA_PROCESSING** re-classifies Market Risk instrument data into the various Capital Component Groups such as CET1, AT1.

- The re-classified instruments are further processed for identification of Regulatory Entity Internal Transaction, Reciprocal Cross-Holding, Own Shares - Treasury Stock, and Significant Investment in Non Reg Consl Entity transaction. The following Rules in the **Market Risk Capital Consolidation Calculations** sub process identify these transactions:
    - Cap Consl - MR Deduction of Regulatory Entity Internal Transaction
    - Cap Consl - MR Basel III Deduction of Reciprocal Cross-Holding
    - Cap Consl - MR Deduction of Own Shares - Treasury Stock
    - Cap Consl - Mkt Risk Deduction of Significant Investment in Non Reg Consl Entity

8.2.1.7.1 Process Flow for Capital Structure

Capital Structure is executed along with Capital Consolidation and Credit RWA process. For arriving at the capital structure, the minority interest is found out, ineligible capital instruments are identified, gross capital is calculated, adjustments for regulatory purposes are made, insignificant adjustments are also made, phase in treatments are brought in, and finally the net capital is calculated. Following block diagram illustrates the process and subsequent section details each of the blocks depicted in the block diagram.

```
┌─────────────────────────────────────────────────────────┐
│                 Capital Consolidation                   │
└─────────────────────────────────────────────────────────┘
                            │
                            ▼
┌─────────────────────────────────────────────────────────┐
│  Calculate the Minority Interest in CET1,AT and T2,      │
│  belonging to third party and internal transaction in    │
│  CET1, AT and T2                                         │
└─────────────────────────────────────────────────────────┘
                            │
                            ▼
┌─────────────────────────────────────────────────────────┐
│              Ineligible Capital Instruments              │
└─────────────────────────────────────────────────────────┘
                            │
                            ▼
┌─────────────────────────────────────────────────────────┐
│          Gross Capital calculation for CET1, AT1 and T2  │
└─────────────────────────────────────────────────────────┘
                            │
                            ▼
┌─────────────────────────────────────────────────────────┐
│                 Regulatory Adjustments                  │
└─────────────────────────────────────────────────────────┘
                            │
                            ▼
┌─────────────────────────────────────────────────────────┐
│  Insignificant Investment treatment for accounting       │
│  entity where Parent Bank Holding is not more than 10%   │
│  of issued common shares                                │
└─────────────────────────────────────────────────────────┘
                            │
                            ▼
┌─────────────────────────────────────────────────────────┐
│  Significant Investment Treatment for accounting entity  │
│  where Parent Bank Holding is more than 10% of issued    │
│  common shares                                          │
└─────────────────────────────────────────────────────────┘
                            │
                            ▼
┌─────────────────────────────────────────────────────────┐
│        Post Phase-in Treatment Regulatory Adjustment     │
└─────────────────────────────────────────────────────────┘
                            │
                            ▼
┌─────────────────────────────────────────────────────────┐
│  Bifurcation of Insignificant and Significant Investment │
│  amount                                                 │
└─────────────────────────────────────────────────────────┘
                            │
                            ▼
┌─────────────────────────────────────────────────────────┐
│                 Net Capital Calculation                 │
└─────────────────────────────────────────────────────────┘
                            │
                            ▼
┌─────────────────────────────────────────────────────────┐
│  RWA calculation for CR, MR, OR and Phase-in arrangement │
└─────────────────────────────────────────────────────────┘
                            │
                            ▼
┌─────────────────────────────────────────────────────────┐
│                   Admissible Capital                    │
└─────────────────────────────────────────────────────────┘
                            │
                            ▼
┌─────────────────────────────────────────────────────────┐
│                 Capital ratio calculation               │
└─────────────────────────────────────────────────────────┘
                            │
                            ▼
┌─────────────────────────────────────────────────────────┐
│                    Capital Buffer                       │
└─────────────────────────────────────────────────────────┘
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Capital Consolidation

The Capital Consolidation is done as explained in the capital adequacy flow. See Capital Consolidation Process.

Surplus of Minority Interest

Minority Interest as per the RBI Basel III guidelines are calculated and the surplus amount in each tier of capital, which is attributed to third parties, are deducted from the gross capital of each tier of capital.

Minority interest is calculated as the third party's interest (share holding percent) in the surplus capital (available capital – minimum required capital).

All the values required for processing are populated into Minority Interest Capital (**FSI_MINORITY_INTEREST**) table which is the processing table for minority interest calculations.

The sub process – **Minority Interest Calculations** in **BASELIII_CAPITAL_STRUCTURE** process covers the above processing. The RBI specific data is captured in the table, FSI_SETUP_CAPITAL_HEAD.

The deduction also includes internal transactions in each tier of capital among the various entities which are part of the regulatory consolidation. Hence, minority interest attributed to third party and the internal transactions in each tier of capital is deducted from the gross capital of each tier of capital.

RBI says the minimum required CET-1, Tier -1 capital, Total capital ratios, that is (8.0%, 9.5% and 11.5%) used as the basis for computing the surplus capital for minority interest are not phased-in, while for other jurisdiction these minimum required capital percent receives phase-in treatment.

Internal Transactions

The deduction also includes internal transactions in each tier of capital among the various entities which are part of the regulatory consolidation. The internal transactions are identified in the Non Securitization process. The internal transactions are identified as any capital related transactions within the organization structure group, which is part of the regulatory consolidation. These deducted items are not processed further under any other process.

Limits on a Bank's Investments in Capital of Banking, Financial and Insurance Entities

The limit to be applied on various cases of bank's investments in banking, financial and insurance entities is detailed in this section. The limit breaches are highlighted and reported via a report under Basel Dashboard in addition to allocating them to CAP IDs in the solution.

The following entity types are considered as financial entities:

1. Asset Management Companies (mutual funds/ venture capital funds/ private equity fund, and so on)
2. Non-Banking Finance Companies
3. Housing Finance Companies
4. Primary Dealers
5. Merchant Banking Companies

6. Entities engaged in activities that are ancillary to banking business

7. Central Counterparties

Hence, in this section, wherever the word 'Financial Entity' or 'Financial Institution' is used, the above party types are considered.

The limits, to which a bank's investments in the capital instruments issued by banking, financial or insurance entities, is subject to are detailed as follows:

1. If the bank has invested in any banking, financial or insurance entity, then the aggregate of such investment must not exceed 10% of the total capital computed post all regulatory adjustments other than the significant/ insignificant investments. This implies that the amount which falls within this 10% limit is taken up for further processing and for computing the significant and insignificant computations. The excess amount, that is, the amount above 10% is stored in a CAP ID.

2. Reporting bank must not further invest in another bank's equity capital if this new investment makes reporting bank's holding more than 5% of the investee bank's equity capital. The investee bank's equity capital is captured at the party level. This fresh stake can be identified by the start date, that is, the date on which contract was effective. It is assumed that fresh stakes are categorized as those investments which are taken up during the fiscal year, that is, between start date of fiscal year and the execution date.

3. Reporting bank's stake in any company, be it a financial or a non-financial company, cannot exceed 30% of the paid-up share capital of the investee company or 30% of the reporting bank's paid-up share capital and reserves, whichever is lesser. In this scenario, it is required to first aggregate all the investments to a company. Secondly, compare the paid-up capital of the investee company with paid-up capital and reserves of the reporting bank. Thirdly, check the amount computed as part of step 1 which is within the limits of 30% of the amount arrived at in step 2. The amount exceeding the limit is then stored in a CAP ID.

4. Equity Investment by the bank in its subsidiary or financial services company, financial institution, stock or other exchanges must not exceed 10% of reporting bank's paid-up share capital. For this purpose, only equity investments in all the above company types is captured and then compared with the paid-up share capital of the reporting bank.

5. Equity investment by the reporting bank in companies engaged in non-financial services must not exceed 10% of the investee company's paid-up share capital or 10% of bank's paid-up share capital and reserves, whichever is lesser. In this scenario, it is required to first aggregate all the investments to a company engaged in non-financial activities. Secondly, compare the paid-up capital of the investee company with paid-up capital and reserves of the reporting bank. Thirdly, check the amount computed as part of step 1 which is within the limits of 10% of the amount arrived at in step 2. The amount exceeding the limit is then stored in a CAP ID.

6. Equity Investment in a company engaged in non-financial services and part of organization structure of the reporting bank (can be an affiliate, subsidiary, joint ventures, and so on) must not exceed 20% of the investee company's paid-up share capital. Hence, first aggregate all investments to an entity which is a part of organization structure and is non-financial. Then compare it with the paid-up share capital of the investee entity. The amount exceeding 10% of paid-up share capital of investee entity is stored in a CAP ID.

7. Equity investments in subsidiaries and non-subsidiaries engaged in financial services activities and in entities engaged in non-financial services activities (non-subsidiaries) must not exceed 20% of reporting bank's paid-up share capital and reserves. This 20% limit does not apply to HFT instruments. For this purpose, firstly, the equity investments is aggregated (except the HFT marked items) for all financial services entities and non-financial services entities and then compare it with reporting bank's paid-up share capital and reserves. The amount exceeding 20% of bank's paid-up share capital and reserves is stored in a CAP ID.

8. If a solo run is executed for a subsidiary, and if the subsidiary has invested in the regulatory capital of the parent entity, then this amount is deducted from the subsidiary's capital.

Data Expectation

1. Currently, in DIM_EXPOSURE, the columns D_ACCT_START_DATE and D_ACCT_CLOSED_DATE are not marked as mandatory. Therefore, these columns can have NULL value for some exposures. However, for Equity Exposures, these columns in STG_EXPOSURE_MASTER are populated and the SCD batch is executed. The Start and End Date in FNSE is populated when equity exposures are moved from FEE to FNSE.

2. In DIM_DATES, the columns D_FISCAL_YEAR_START_DATE and D_FISCAL_YEAR_END_DATE are used to check if it's a freshly acquired investment within the Fiscal Year. Ensure that these columns are populated in DIM_DATES.

NOTE: Financial Year Start Date and End Date can vary based on the Jurisdiction.

Treatment of Revaluation Reserves

The revaluation reserves arising out of change in the carrying value of bank's property can be discounted at 55% and included as part of Common Equity Tier 1 Capital. Earlier, this item was considered under Tier 2 Capital. The value to be considered in CET1 is 0.45 * Value stored under CAP048 ("Latent revaluation reserves from securities").

The inclusion of revaluation reserves in CET1 is subject to following operational criteria:

- Bank is able to sell the property readily at its own will and there is no legal impediment in selling the property.

- The revaluation reserves are shown under Schedule 2: Reserves and Surplus in the Balance Sheet of the bank.

- Revaluations are realistic, in accordance with Indian Accounting Standards.

- Valuations are obtained, from two independent valuers, at least once in every 3 years; where the value of the property is substantially impaired by any event. These values are to immediately revalued and appropriately factored into capital adequacy computations.

- The external auditors of the bank have not expressed a qualified opinion on the revaluation of the property.

- The instructions on valuation of properties and other specific requirements as mentioned in the circular on 'Valuation of Properties - Empanelment of Valuers' published by RBI, are strictly adhered to.

Treatment of Foreign Currency Translation Reserve (FCTR)

Foreign currency translation reserves can arise due to translation of financial statements of the reporting bank's foreign operations. This is in accordance with the accounting standards. This foreign currency translation reserve is provided by the bank and can be considered a part of CET1 capital. The value to be considered as part of CET1 capital is 75% of the value provided as the foreign currency translation reserves.

The inclusion of foreign currency translation reserves in CET1 is subject to following operational criteria:

- The FCTR are shown under Schedule 2: Reserves and Surplus in the Balance Sheet of the bank.
- The external auditors of the bank have not expressed a qualified opinion on the FCTR.

Treatment of Deferred Tax Assets (DTAs)

RBI has provided the following guidelines with respect to the treatment of DTA's in line with Basel Accord. The following guidelines are applicable for DTA:

1. Deferred Tax Assets (DTA's) associated with accumulated loss is deducted in full from CET1 capital.

2. DTA's related to temporary (timing) differences must not be fully deducted, but can be recognized as part of CET1 capital up to 10% of the CET1 capital computed post all regulatory adjustments and post the significant investments in unconsolidated financial entity which is not in common stock. For example, if the DTA due to temporary differences is 50 and CET1 post deductions is 100, then only 10 from DTA due to temporary differences can be considered in CET1. The rest of the amount, that is, 40 is taken for deduction from CET1 capital.

3. The amount of DTA due to temporary differences, in addition to the individual threshold of 10% of CET1, is also subject to an aggregate threshold of 15%. This aggregate threshold is computed along with the amount computed as significant investment in common shares of unconsolidated financial entity. The amount computed in point 2 above along with the amount for significant investment in common shares of unconsolidated entity must not be more than 15% of the CET1 capital computed post all the regulatory adjustments (including significant investment adjustments).

   Continuing the same example as in point 2 above, if significant investment amount is 15, and DTA due to temporary differences is 10 (from point 2), then (10+15 = 25) which is more than the 15% threshold (CET1 post deductions is 100). Hence, in such a case, total of 15 is considered. Out of this, based on the pro-rata basis, DTA is considered till the extent of (15*10/25 = 6). The remaining amount of DTA, that is, (10-6 =4) is taken up for deduction from CET1.

   Cumulative amount of DTA to go for deduction (considering point 2 as well) is (40+4) = 44.

4. DTAs that are being deducted from CET1 can also be netted with the Deferred Tax Liabilities (DTLs) provided that:

   a. the DTAs and DTLs relate to taxes levied by the same taxation authority and offsetting is permitted by the relevant taxation authority;

      the DTLs permitted to be netted against DTAs must exclude amounts that are netted against the deduction of goodwill, intangibles and defined benefit pension assets; and

the DTLs is allocated on a pro-rata basis between DTAs subject to deduction from CET1 capital.

b. It is assumed that these criteria are fulfilled by the bank when providing the value of Deferred Tax Liabilities.

5. The amount of DTA arising out of temporary differences which is not deducted from CET1 is risk-weighted at 250%, same as in case of significant investment treatment.

Continuing the same example from points 2 and 3 above, DTA due to temporary difference which is not deducted has a value of 6. This amount is assigned a risk-weight of 250%, that is, the RWA for this is 2.5*6 = 15.

Treatment of 15% Aggregate Threshold

The following items receive limited recognition when calculating CET1, with recognition capped at 10% of bank's common equity (CET1 – Post Deduction Amount of CET1 in Significant Investment of BFSI):

- Investment in common share of unconsolidated financial institutions.
- DTA arising from temporary differences.

Bank must also deduct the amount by which the aggregate of the above two items exceeds 15% of its common equity component of Tier 1(calculated post all regulatory adjustment).

During transition period, the 15% of the CET1 Amount is calculated on the CET1 Amount post all regulatory deductions till the Significant Investments. After the transition period, the 17.65% of the CET1 Amount is calculated on the CET1 Amount post all regulatory deductions including the Significant Investments less the items undergoing threshold deduction in full.

Amount of the above line items that are not deducted are risk weighted at 250%.

Treatment for Eligibility of Quarterly Profit for Inclusion in CET1 Capital

The RBI guidelines recommend the inclusion of eligible quarterly profit into CET1 Capital. The criteria for the inclusion of this profit is that the quarterly incremental specific provision for the NPAs for the previous financial year should not have varied more than 25% from the average specific provision for the NPAs throughout the previous financial year. For this purpose, the incremental provisions made for non-performing assets are considered as at the end of all the 4 quarters of the previous financial year. These incremental provisions should then be compared with the average of such provisions over the 4 quarters of the previous financial year. The deviation in such a case should not be more than 25%. Only if these conditions are satisfied, the eligible profit can be considered based on the following formula:

$EP_t = (NP_t – 0.25*D*t)$

Where,

EP_t is the Eligible profit up to the quarter 't' of the current financial year; **t** varies from **1** to **4**.

NP_t is the net profit up to the quarter 't' of the current financial year.

D is the average annual dividend paid during last three years.

t is the number of the quarters for which computation is being done, that is, **1** for **Q1**, **2** for **Q2**, **3** for **Q3**, and **4** for **Q4**.

The treatment for Eligibility of Quarterly Profit for inclusion in CET1 Capital is carried out in the Capital Structure processes under a new sub-process "**Profit Eligibility and Calculation**", which is added to compute Eligible Quarter profit and then added to the Gross CET1 Capital in "**Provisions and Gross Capital Calculations**" sub-process.

The following CAP IDs are introduced in the **DIM_STANDARD_ACCT_HEAD** table.

CAP ID	STANDARD ACCT HEAD DESCRIPTION
CAP1124	Specific Provision for NPAs in Quarter 4 of Second Previous Financial Year
CAP1125	Specific Provision for NPAs in Quarter 1 of Previous Financial Year
CAP1126	Specific Provision for NPAs in Quarter 2 of Previous Financial Year
CAP1127	Specific Provision for NPAs in Quarter 3 of Previous Financial Year
CAP1128	Specific Provision for NPAs in Quarter 4 of Previous Financial Year
CAP1129	Specific Provision for NPAs in Current Reporting Period
CAP1130	Highest Incremental Provision in Consecutive Quarters of Previous Financial Year

Data Expectation for Specific Provision for NPA:

a. In Fact Standard Account Head for CAP1129 for the runs in Q1-Q4 of previous Financial Year and Q4 of second previous Financial Year.

b. If data is not available in #1, then expected in Fact Non Sec Exposures for the runs in Q1-Q4 of previous Financial Year and Q4 of second previous Financial Year.

c. If data is not available in #2, then customer/bank has to provide data for CAP1124, CAP1125, CAP1126, CAP1127, CAP1128 as download in Stage Standard Account Head for the current run. Bank has to add the mapping for these CAP IDs in Capital to Standard reclassification rule.

NOTE: Data is expected for quarterly runs, so MIS Date for the previous quarterly runs should be last date of the quarter (that is, 30-Jun-xxxx, 30-Sep-xxxx, 31-Dec-xxxx, 31-Mar-xxxx)

The existing solution expects eligible profit for a quarter as a download. This feature aims at revamping the computation of eligible profit and determining the eligibility of the profit for inclusion in common equity tier 1 capital (CET1).

Capping of General Provisions Amount Included on T2 Capital Under Standardized Approach

General Provisions on Standard Assets, Floating Provisions, Provisions held for Country Exposures, Investment Reserve Account, excess provisions which arise on account of sale of NPAs and countercyclical provisioning buffer qualifies for inclusion in Tier 2 capital. However, these items together are admitted as Tier 2 capital up to a maximum of 1.25% of the total credit risk-weighted assets under the standardized approach.

Eligible provisions amount is computed as part of the rule 'CS - Basel III General Provision for Standardized' and is stored under the existing Capital head 'General provision for Standardized Approach'.

Shortfall of Stock of Provision to Expected Loss

Any shortfall of Stock of Provision (General Provision) to Expected Loss under the IRB approach is deducted from the CET1 capital. Where, the total expected loss amount is less than total eligible provisions, banks are permitted to recognize the difference under Tier 2 capital up to a maximum of 0.6% of credit-risk weighted assets calculated under the IRB approach.

Regulatory Adjustment

The regulatory adjustments and deductions are applied to the following capital at Solo and at Consolidated levels.

Goodwill and other intangibles, DTAs, cash flow hedge reserve, gain on sale of securitization transaction, cumulative gain and losses due to change in own credit risk, defined pension fund asset are direct downloads (in **STG_GL_DATA** table). The General Provision is obtained as a download in the **Stage General Ledger Data** (**STG_GL_DATA)** table. All the DTLs related to phase line items are expected as download in the STG_GL_DATA table. The application calculates the values net of DTL and then processes it for the Regulatory Adjustments. This amount is prorated between the standardized approach and the IRB approach. This is processed using the **Provisions and Gross Capital Calculations** sub process. As per RBI, "Defined Benefit Pension Fund Assets and Liabilities" includes other defined employees' funds also. Bank needs to provide the data for this line item as inclusive of other defined employees' funds.

Goodwill and Other Intangible Assets

Goodwill and all Others Intangible assets is deducted from Common Equity Tier1 (CET1) capital including any goodwill, that is included in the valuation of significant investment in the BFSI entities which are outside the scope of regulatory consolidation. The full amount that is deducted from CET1 is Goodwill and Intangible Asset net of Deferred Tax Liability.

Operating losses in the current period and those brought forward are also deducted from CET1 Capital.

The data in the below Capital heads are provided as direct download:

- Goodwill
- Deferred Tax Liability related to Goodwill
- Other Intangible Assets
- Deferred Tax Liability related to Other Intangible Asset
- Losses brought forward and losses in the current period

Deferred Tax Assets (DTA)

The DTAs computed are deducted from Common Equity Tier 1 capital and includes:

- (a) DTA associated with accumulated losses
- (b) The DTA (excluding DTA associated with accumulated losses), net of DTL, where the DTL is in excess of the DTA (excluding DTA associated with accumulated losses). The excess is neither adjusted against item (a) nor added to Common Equity Tier 1 capital.

DTAs are captured under the below break-up amounts:

- DTA associated with accumulated losses
- Other DTA (excluding DTA associated with accumulated losses)

DTL is permitted to be netted off only against the 'Other DTA' amount. Any Excess DTL is not permitted to be offset against 'DTA associated with accumulated losses' nor to be added to the CET1 capital.

NOTE: If the DTA (net of DTL) has a negative value then, the line item does not follow the phase-in treatment. Only positive value goes for transitional arrangement.

Data Expectation

Download is expected for **STG_STANDARD_ACCT_HEAD** and reclassified in the rule **RLBL6040** (**IND - Basel III Capital - Standard Acct Head Reclassification**) to the CAP ID (**CAP867 Deferred Tax Asset related to Temporary Differences**).

Cash Flow Hedge Reserve

The amount of the net cash flow hedge reserve which relates to the hedging of items that are not fair valued on the balance sheet (including projected cash flows) is de-recognized in the calculation of Common Equity Tier 1. This means that positive amounts are deducted and negative amounts are added.

Data in the below Capital heads are provided as direct download:

- Cash Flow Hedge not fair valued (Asset)
- Cash Flow Hedge not fair valued (Liability)

The Final amount which is derecognized from Capital is computed by the rule 'CS - Net Cash Flow Hedge Reserve Calculation'.

NOTE: If the Net cash Flow Hedge Reserve has a negative value then, the line item does not follow phase-in treatment. Only positive value goes for transitional arrangement.

Cumulative Gain and Losses due to Change in Own Credit Risk on Faired Valued Financial Liabilities

Banks derecognize all unrealized gains and losses that result from changes in the fair value of liabilities that are due to changes in the bank's own credit risk from the CET1. This means that positive amounts are deducted and negative amounts are added.

In addition, with regard to derivative liabilities, derecognize all accounting valuation adjustments arising from the bank's own credit risk. The offsetting between valuation adjustments arising from the bank's own credit risk and those arising from its counterparties' credit risk is not allowed.

If a bank values its derivatives and securities financing transactions (SFTs) liabilities taking into account its own creditworthiness in the form of debit valuation adjustments (DVAs), then the bank deducts all DVAs from its Common Equity Tier 1 capital, irrespective of whether the DVAs arises due to changes in its own credit risk or other market factors. Thus, such deduction also includes the deduction of initial DVA at inception of a new trade. In other words, though a bank has to recognize a loss reflecting the credit risk of the counterparty (that is, credit valuation adjustments-CVA), the bank is not allowed to recognize the corresponding gain due to its own credit risk.

NOTE: If the line item has a negative value then, the line item does not follow phase-in treatment. Only positive value goes for transitional arrangement.

The Investment in own shares are calculated as the sum of the pre-mitigation EAD (**EAD Pre-mitigation Measure Value (N_EAD_PRE_MITIGATION)** in **Fact Non Sec Exposures** (**FCT_NON_SEC_EXPOSURES**) table) of the exposures which have the flag of treasury stock indicator (**F_TREASURY_STOCK_INDICATOR**) as "Y".

The Investment in reciprocal cross holdings Are calculated as the sum of the pre-mitigation EAD (**EAD Pre-mitigation Measure Value (N_EAD_PRE_MITIGATION)** in **Fact Non Sec Exposures** (**FCT_NON_SEC_EXPOSURES**) table) of the exposures which have the flag of reciprocal cross holding indicator (**F_RECIPROCAL_CROSS_HLDG_IND**) as "Y".

All the regulatory adjustment line items are deducted from its respective tier of capital post minority and internal transaction deduction.

Reciprocal Cross Holdings

The Investment in reciprocal cross holdings are calculated as the sum of the pre-mitigation EAD (**EAD Pre-mitigation Measure Value** (**N_EAD_PRE_MITIGATION**) in **Fact Non Sec Exposures** (**FCT_NON_SEC_EXPOSURES**) table) of the exposures which have the flag of reciprocal cross holding indicator (**F_RECIPROCAL_CROSS_HLDG_IND**) as "**Y**".

For this processing, the reciprocal amount is expected as a download in the Stage Capital Investments Position Table **(STG_CAP_INVESTMENTS_POSITIONS)** at an instrument level. The instrument code provided in this table is the instrument in which the reporting bank has invested, and for which there is a reciprocal cross holding by the reporting bank. The reciprocal cross holding amount is also captured in this table. The solution expects the staging data of the exposures to have the reciprocal cross holding indicator (**F_RECIPROCAL_CROSS_HLDG_IND**) as 'Y'.

The solution, as part of the sub process **Non Sec Reciprocal Cross Holdings Data Population** in the processes **IND_BASELIII_CAPITAL_STRUCTURE_INDIAN_BANKS** and **IND_BASELIII_CAPITAL_STRUCTURE_FOREIGN_BANKS** splits the exposure into two, based on the reciprocal cross holding amount. The exposure which meets the reciprocal cross holding amount is stamped with the reciprocal cross holding indicator (**F_RECIPROCAL_CROSS_HLDG_IND**) as 'Y', and this will go for the reciprocal cross holding treatment for the capital instruments.

The portion of the exposure, which is above the reciprocal cross holding amount is treated as a regular exposure, and is risk weighted as per the Basel asset class for that instrument.

Treatment of Grandfathered Instruments

As per the RBI guidelines, for the issued instruments which are grandfathered, the base amount to be used for phase-in calculations is considered as the amount outstanding as on 1st Jan 2013. This amount is used to compute the amortization amount (in last 5 years of maturity) and the phase-out amount. The phase-out for the grandfathered instruments is done at 10% every year while the amortization for the same is done at 20% every year in the last 5 years from the maturity date. Though the accord does not explicitly mention about the recognition of the amount of instruments to be taken as the minimum of the amortization or phase-out amount, based on the feedback received from some clients, it is decided that the amount to be considered for instruments subject to phase-out is the minimum of the amortization amount or the phase-out amount. This approach has the consent of RBI and the client.

Data Expectation

For the grandfathered instruments, the base amount is provided as the outstanding notional amount as on 1st January 2013. This amount is provided only for the issued instruments which are grandfathered. The data is provided in **Issue Current Outstanding Amount** with the FIC_MIS_DATE as 1st January 2013.

Phase-in Treatment for Regulatory Adjustments

The regulatory adjustment line items that include Goodwill net of DTL, Other Intangibles net of DTL, DTA net of DTL, Net Cash Flow Hedge Reserves, Gain on Sale related to Securitization transaction, Defined Pension Fund Asset net of DTL and losses due to changes in own credit risk, Investment in Treasury Stock, and Reciprocal Cross Holding follows phase-in arrangement. The phase-in deduction percent for each year is available in a setup table - **Setup Capital Heads** (**FSI_SETUP_CAPITAL_HEAD**) table.

Treatment Specific to Insignificant Investments

Investment in all financial entities, which are outside the scope of regulatory consolidation, is identified for significant and insignificant investments. The shareholding percent for these parties are expected as download in STG_PARTY_SHR_HLD_PERCENT. The parties are identified as significant when the shareholding percentage is greater than or equal to 10%. And the others are identified as insignificant investment. The parties are identified as significant when the shareholding percentage is greater than or equal to 10%. And the others are identified as insignificant investment.

The total investment amount in insignificant entities is computed by summing up the Pre Mitigation EAD (EAD Pre-mitigation Measure Value (**N_EAD_PRE_MITIGATION**)) from the Fact Non Sec Exposures (**FCT_NON_SEC_EXPOSURES**) table. And also the tier wise computation of investment amount happens. The total amount is compared with the 10% of the CET1 amount of the parent bank amount post regulatory adjustments. The amount above 10% limit is processed for deduction. This summing up includes the direct, indirect and synthetic investments. The Indirect investments are investments in Investment funds and those which have invested in capital instruments. The synthetic investments are the investments in synthetic transactions on capital instruments. For all these exposures, the net long position amount, updated in the N_EAD_PRE_MITIGATION is considered.

The total deduction amount is pro-rated among each tier of capital based on the percentage of investment in each tier of capital. The amount arrived is deducted from each tier of Capital.

The investment amount below the 10% limit is treated as per banking book rule for the instrument.

The application computes as follows:

- Parties are marked as insignificant investment parties by updating the flag: **F_SIGNIFICANT_INVESTMENT_IND** in Fact Party Shareholding Percent (**FCT_PARTY_SHR_HLD_PCT**) with value N.

- The exposure amount of banking book and trading book exposures to these entities are summed by grouping their component of capital and compared against 10% of parent bank's CET1 capital. The portion of amount which exceeds the 10% limit is deducted.

- This is computed by calculating tier wise deduction percentage and multiplying this percentage with the exposure amount to arrive at the amount to be deducted from each tier of capital.

- The total investment values are populated into **Non Regulatory Consolidation Entity Investment** (**FSI_NON_REG_CONSL_ENTITY_INVST**) table which is the processing table for insignificant and significant investment deductions.

- After the application of this treatment, the Insignificant Investments line item also follows phase-in arrangement which is similar to the phase-in arrangement for Regulatory Adjustments.

Treatment Specific to Significant Investments

The total investment amount is checked against the set limit of 10% of CET1 amount of the parent bank, post insignificant investment amount adjustment. The CET1 amount above 10% is deducted from the CET1 post insignificant investment amount deduction. The CET1 amount below 10% follows threshold deduction. The investment amount in AT1 and T2 is fully deducted from its respective AT1 and T2 tier of capital. The application computes as follows:

- Entities are marked as significant investment entities by updating the flag – **Significant Entity Indicator** (**F_SIGNIFICANT_INVESTMENT_IND**) in **Fact Entity Information** (**FCT_ENTITY_INFO**) with value 'Y'.

- The exposure amount of banking book and trading book exposures to these entities are summed by grouping their component of capital and compared against 10% of parent bank's CET1 capital. The portion of amount which exceeds the 10% limit is deducted from CET1. The exposures of AT1 and T2 are fully deducted from respective tier of capital.

  This is done by calculating deduction percentage for CET1 and by multiplying this percentage with the CET1 exposure's exposure amount to arrive at the amount to be deducted from CET1 capital.

- After the application of this treatment, the Significant Investments line item also follows phase-in arrangement which is similar to the phase-in arrangement for Regulatory Adjustments.

Treatment of Indirect Investments

In the case of Indirect Investments, the solution applies the Insignificant Investment treatment. The solution captures the fund investment percentage in the various products in the in the Stage Fund Underlying Composition table (Stg_Fund_Underlyng_Composition). The solution processes these investments as per the treatment for exposures pertaining to Insignificant and Significant Investment. The deduction, as applicable per phase-in, is from CET1.

Threshold Deduction

The two line items, (Significant Investment in the Common Shares of Accounting entities from the **FSI_NON_REG_CONSL_ENTITY_INVST**and DTAs that arises from temporary differences that comes from the **FCT_CAPITAL_ACCT_HEAD**) are populated in the **FSI_THRESHOLD_TREATMENT** table and the threshold calculations are processed in this table.

Threshold Treatment

These three line items are individually compared with the 10% of CET1 calculated post Regulatory Adjustments, Insignificant Investments and Indirect Investments. The amounts which are above 10% CET1 limit are deducted from CET1 following the phase-in arrangements. During the transition period, any amount of these three line items, which is not deducted as per the 10% mentioned earlier, goes for risk weighting at 100%.

Post Phase-in Treatment for Insignificant Investments, Significant Investments, and Threshold Deductions

In this step, the balance phase-in deduction amount for Insignificant, Significant, and Threshold deductions are calculated and they are assigned the applicable risk weight. The RWA of these amounts are also computed.

Bifurcation of Insignificant and Significant Investment Amount

All the investment transactions in Insignificant Entity and Significant Entity go for bifurcation. Insignificant investment amount below 10% are stamped as 'INSIG_RWA' and any amount above 10% are stamped as 'INSIG_DED'. The same logic is applied to Significant Investment amount in CET1. The CET1 amount in Significant Investment entity that is below 10% is stamped as 'SIG_RWA' and amount above 15% limit is stamped as 'SIG_DED'. The original transactions are deleted and new transactions are created with stamping as described above. The new transaction thus created can be traced by looking into the parent exposure ID.

The exposure to be deducted is marked with standard account head surrogate key based on whether the deduction is Insignificant or Significant investment and based on capital component group.

This splitting of exposures is done in Fact Non Sec Exposures (**FCT_NON_SEC_EXPOSURES**) and Fact Sec Exposures (**FCT_SEC_EXPOSURES**). This splitting logic is carried to **Equity Exposures** (**FCT_EQUITY_EXPOSURES)** and Fact **Sub Exposures** (**FCT_SUB_EXPOSURES)** as well.

Treatment of Intra-Group Transactions

Intra-group exposures beyond the permissible limits are deducted from Common Equity Tier 1 capital of the bank. Banks are required to comply with these limits at solo and consolidated levels. The guidelines are meant for banks' transactions and exposures to the entities belonging to the bank's own group (group entities).

Intra-group exposures are applicable to all scheduled commercial banks, including foreign banks operating in India, belonging to a financial group. A 'group' is defined as an arrangement involving two or more entities related to each other through any of the following relationships and a 'group entity' as any entity involved in this arrangement:

- Subsidiary – Parent

- Associate

- Joint Venture

- Related Party

- Direct or indirect ownership of 20% or more interest in the voting power of the enterprise

- Common brand name

- Promoters of bank

- Non-Operative Financial Holding Company (NOFHC) of bank

- An entity which has any of the first six relations, as above, with the promoters/NOFHC and their step-down entities.

The relationship between entity and parties are captured in staging table for party-party relationship, while the relationship types must be captured in the staging master table of party relationship type. This staging master table populates dimensional table for party relationship type through SCD process. The rule "IND - Basel III - Party Relationship Type Reclassification" must be modified based on the values entered by the bank to ensure correct reclassification into standard party relationship type values. The seeded table for the standard values is Regulatory Party Relationship Type Dimension.

Data Expectation

Bank must provide an exhaustive list of Party-Party relationship in the table Stage Party To Party Relationship (STG_PARTY_PARTY_RELATIONSHIP). The relationship list must include direct and indirect relationships between the parties. The solution does not derive any relationship between two parties based on any common related party.

Entities Exempted from the Definition of Group Entities

The following entities are exempted from being part of Group Entities:

- Ownership Public Sector Banks (PSBs) lies with the Government of India.

- Entities that are promoted by financial sector intermediaries including banks to undertake financial market infrastructure activities are not treated as group entities like depositories, exchanges, clearing and settlement agencies, and so on.

Exposures include credit exposure (funded and non-funded credit limits) and investment exposure (including underwriting and similar commitments). Exposure on account of equity and other regulatory capital instruments should be excluded while computing exposure to group entities.

Banks should adhere to the following intra-group exposure limits:

- Single Group Entity Exposure:

  o 5% of Paid-up Capital and Reserves for non-financial companies and unregulated financial services companies.

  o 10% of Paid-up Capital and Reserves for regulated financial services companies.

- Aggregate Group Exposure:

    o 10% of Paid-up Capital and Reserves for all non-financial companies and unregulated financial services companies taken together.

    o 20% of Paid-up Capital and Reserves for the group. That is all group entities (financial and non-financial) taken together.

Intra-Group Exposures Exempted from the Prudential Limits

Banks' exposures to other banks/financial institutions in the group in the form of equity and other capital instruments are exempted from the limits. These include, inter-bank exposures among banks in the group operating in India and Letters of Comfort issued by parent bank in favor of overseas group entities to meet regulatory requirements.

The treatment of Intra-group exposures is carried out in the Capital Structure processes for Indian and Foreign Banks under a new sub-process "**Intra Group Treatment Calculations**" before the "**Provisions and Gross Capital Calculations**" sub-process.

The following CAP IDs are introduced in the DIM_STANDARD_ACCT_HEAD table.

CAP ID	STANDARD ACCT HEAD DESCRIPTION
CAP1119	Deduction Amount from CET1 Capital for Intra-Group Transactions
CAP1120	Single Group Exposure Limit for Non-Financial Companies and Unregulated Financial Services Companies
CAP1121	Single Group Exposure Limit for Regulated Financial Services Companies
CAP1122	Aggregated Group Exposure Limit for Non-Financial Companies and Unregulated Financial Services Companies
CAP1123	Aggregated Group Exposure Limit for Regulated Financial Services Companies
CAP1131	Intra Group Exposure Exceeding Single Group Exposure Limit
CAP1132	Intra Group Exposure Exceeding Aggregate Group Exposure Limit
CAP1133	Intra Group Exposure Beyond Permissible Limit - Deduction from CET1 Capital

The new table **IND_BASEL_III_INTRA_GROUP_EXPOSURE_DATA_POP** populates the exposures from Fact Exposure tables at Single and Aggregate group level for each Entity - Related Party combination in the processing table **FSI_INTRA_GROUP_EXPOSURES**.

The CAP IDs for Single and Aggregate Groups are assigned to the respective columns in the processing table using the following rules:

- **IND - Basel III -** Single **Group Limit Standard Acct Head Identification**

- **IND - Basel III -** Aggregate **Group Limit Standard Acct Head Identification**

The exposure limit percentage for the Single and Aggregate Group are assigned from the **FSI_SETUP_CAPITAL_HEAD** using the folowing rules:

- **RLBL6377: IND -** Basel **III - Single Group Exposure Limit Percent**

- **RLBL6378: IND - Basel III - Aggregate Group Exposure Limit Percent**

The exposure limit amounts for the Single and Aggregate Group are computed by multiplying the limit percentages with the sum of using the rule **IND - Basel III - Intra Group Exposure Limit Amount**.

The excess Intra-Group exposure amount beyond permissible limit for CET1 deduction is computed by considering the greatest of the 2 excess exposure using the rule **IND CS - Intra Group Exposure Exceeding Permissible Limit**.

The excess Intra-Group amount to be deducted from CET1 Capital is classified into DEDCET1 capital component group using the rule **IND CS - Basel III Standard Account Head to Capital Component Group reclassification**.

The CET1 deduction of Intra-Group exposures from Net CET1 Capital is carried out using the rule **IND CS - Net CET1 Capital post Deduction of Intra Group Exposures Exceeding Permissible Limit**.

Non-Qualifying Capital Instruments

Capital instruments which no longer qualify as non-common equity Tier 1 capital or Tier 2 capital (for example, IPDI and Tier 2 debt instruments with step-ups) are considered as Ineligible Capital Instruments and are phased out beginning January 1, 2013. After fixing the base at the nominal amount of such instruments outstanding on January 1, 2013, their recognition is capped at 90% from January 1, 2013, with the cap reducing by 10 percentage points in each subsequent year. This cap is applied to Additional Tier 1 and Tier 2 capital instruments separately and refers to the total amount of instruments outstanding which no longer meet the relevant entry criteria. To the extent an instrument is redeemed, or its recognition in capital is amortized, after January 1, 2013, the nominal amount serving as the base is not reduced.

Previously eligible capital items subject to phasing is captured at instrument level and the appropriate amount eligible to be included in the relevant capital tier during the transition period is computed at the instrument level itself. The total eligible item are aggregated and populated on Standard Account Head Fact table for the below Capital heads:

- Total Non-qualifying capital instruments subject to phase-out from Additional tier 1 capital
- Total Non-qualifying capital instruments subject to phase-out from Tier 2 capital

After the data is populated on the Standard Account Head Fact table, the same is classified into the appropriate capital component.

Following are the steps in the process:

1. Details of all ineligible capital instruments, which are eligible under the current Basel II regulations such as IPDI and Tier 2 debt instruments with step-ups are captured under the below tables:

    - Stage Issued Instrument Positions (STG_ISSUED_INSTR_POSITIONS)
    - Stage Instrument Contract Master (STG_INSTRUMENT_CONTRACT_MASTER)

2. The Data captured is moved to the respective Fact and Dimension table below:

    - Fact Issued instrument Positions (FCT_ISSUED_INSTR_POSITIONS)
    - Instruments Contracts Dimension (DIM_INSTRUMENT_CONTRACT)

3. The eligible amount included as part of Basel III capital structure is computed and stored in the Fact Issued Instrument Positions table under attribute 'Amount Recognized in Regulatory Capital'.

4. The eligible capital computed amount is aggregated and added on Fact Standard Account Head table under the below Capital heads:

- Total Non-qualifying capital instruments subject to phase-out from Additional tier 1 capital
- Total Non-qualifying capital instruments subject to phase-out from Tier 2 capital

Gross Capital Calculation for CET1, AT1, and T2

For Gross Capital calculation all the components are classified into their respective tiers (CET1, AT1, and T2) based on their purpose. The total gross capital for each tier of capital (CET1, AT1, and T2) is calculated as per the definition of CET1, AT1, and T2 by adding the relevant financial instrument in each tier of capital.

Net Capital Calculation

The Net CET1, Net AT1, and Net T2 capital amount are calculated post all regulatory adjustments, including the insignificant, significant, and threshold treatment. Any shortfall in T2 capital amount is adjusted against Net AT1 amount and any shortfall of AT1 capital amount is adjusted against Net CET1 amount.

RWA Calculation for Credit Risk, Market Risk, Operational Risk and Phase–in arrangement.

The Regulatory Adjustment RWA is the sum of RWA calculated for all the exposures which undergo the processing of Regulatory Deductions, Insignificant Investments, Significant Investments, and the Threshold deduction line items which are risk weighted.

The Total RWA amount is the summation of Non Securitization, Securitization, Market Risk, Operational Risk, and Regulatory Adjustment RWA.

The DTAs arising due to the temporary difference is at a risk weight of 100% and after the RWA is calculated as a part of Credit RWA.

Capital Ratio Calculation

CET1 ratio, T1 ratio, T2 ratio, and Capital Adequacy ratio are calculated using the Total RWA amount and Net CET1 Capital, Net T1 Capital, Net T2 capital and Total Capital (sum of Net T1 Capital amount and Net T2 capital amount) amount.

Transitional arrangement for capital ratios has begun as on April, 2013. Capital ratios and deductions from Common Equity is fully phased-in and implemented as on March 31, 2019, instead of March 31, 2018. The phase-in arrangements for banks operating in India is indicated in the following table:

Minimum Capital Ratios	April 1, 2013	March 31, 2014	March 31, 2015	March 31, 2016	March 31, 2017	March 31, 2018	March 31, 2019
Minimum Common Equity Tier (CET1)	4.5	5	5.5	5.5	5.5	5.5	5.5
Capital Conservation Buffer (CCB)	-	-	-	0.625	1.25	1.875	2.5
Minimum CET1+CCB	4.5	5	5.5	6.125	6.75	7.375	8

Minimum Capital Ratios	April 1, 2013	March 31, 2014	March 31, 2015	March 31, 2016	March 31, 2017	March 31, 2018	March 31, 2019
Minimum Tier 1 Capital	6	6.5	7	7	7	7	7
Minimum Total Capital	9	9	9	9	9	9	9
Minimum Total Capital + CCB	9	9	9	9.625	10.25	10.875	11.5
Phase-in of all deductions from CET1 (in %) #	20	40	60	80	100	100	100

Shortfall Treatment for Unconsolidated Financial Institutions

The Basel accord mentions treatment of the shortfall in the unconsolidated financial institutions. This is due to deduction of the regulatory capital instruments, which are part of the significant and insignificant treatment. The solution handles this by taking the input of the following CAP IDs in the standard accounting head staging table:

- CAP723 (Shortfall in Equity Capital of Unconsolidated Majority Owned Financial Entities)
- CAP727 (Shortfall in AT1 Capital of Unconsolidated Majority Owned Financial Entities)

This is deducted from the Net CET1 capital which is remaining after deduction of shortfall in AT1 capital.

Treatment of Investment in Capital of Unconsolidated Non-financial Subsidiaries

The Basel accord mentions about the treatment for equity investments in non-financial subsidiaries from the consolidated/solo bank capital. The solution handles this by taking the input of the following CAP ID in the standard accounting head staging table:

- CAP722 (Investments in Equity Capital of Unconsolidated Non-financial Subsidiaries)

   This is deducted from the Net CET1 capital which is remaining after deduction of shortfall in AT1 capital.

Treatment of Equity Investment in Non-financial and Insurance Subsidiaries

Equity Investments in Insurance Subsidiaries

The regulatory adjustment applies to capital of the entities that are within the organization structure of the Parent for which consolidation is being calculated and are outside the scope of regulatory consolidation and where bank hold more than 10% of the issued common shares capital of the entity.

Equity investments in insurance subsidiaries that are outside the scope of regulatory consolidation are fully deducted from banks' Common Equity. Also, the total investment of the bank in insurance entity is summed up, where holding of bank is more than 10 % of Bank's CET1.

If the sum of total of all holding is more than 10% of bank's common equity (CET1-post minority and all regulatory adjustment) then the amount is fully deducted from banks CET Capital.

If the sum of total of all holding is less than 10% of bank's common equity (CET1-post minority and all

regulatory adjustment) then the treatment remains same as [Treatment Specific to Insignificant Investments](#) and [Treatment Specific to Significant Investments](#).

Equity Investments in Non-Financial Subsidiaries

All investments in the paid-up equity of non-financial entities (other than subsidiaries) which exceed 10% of the issued common share capital of the issuing entity or where the entity is an unconsolidated affiliate receive a risk weight of 1250%. Equity investments equal to or below 10% paid-up equity of such investee companies is assigned a 125% risk weight or the risk weight as warranted by rating or lack of it, whichever higher.

Significant /Insignificant treatment for financial and non-financial entities is handled based on standard party type.

8.2.1.7.2 Assumptions

The regulatory adjustment that follows a phase-in arrangement and not deducted from CET1, needs to follow national treatment as per RBI III accord. Hence, the assumption is that the regulatory adjustment line item follows Basel II accord. Items which were formerly deducted from 50%-50% from Tier 1-Tier 2 capital are deducted from AT1 and capital investment instrument not deducted from CET1 is risk-weighted at 100%.

Since investments in accounting entities (which are outside the scope of regulatory consolidation) by parent bank are long-term investments and mostly equity related instruments, these investments are not processed for Credit Risk Mitigation.

The GL codes are expected to be unique across entities in Stage General Ledger Data (**STG_GL_DATA**) and Capital Accounting Head Dimension (**DIM_CAPITAL_ACCT_HEAD**).

As per the Phase In treatment flow and details available in the RBI Basel III Master Circular for instruments issued before 12th Sep 2010, treatment of exposure depends on the Call exercise date. It is assumed that the Call referred in the circular is the first call available post instrument issue.

8.2.1.7.3 Key Data Elements

The key data elements are listed in this section. For more information on the tables and columns to be updated, see the *Download Specifications* document.

- The data for third party investment, with the investment percentage in each tier of capital along with the total amount available in each tier of capital is expected as a download value, for the surplus of Minority Interest computation.

- The entity level Market Risk RWA is expected as a download value in the Standard Account (**DIM_STANDARD_ACCT_HEAD**) table. This is required for calculating the Total RWA.

- The Market Risk data for significant and insignificant investment exposures is expected as download value in the Stage Investments (**STG_INVESTMENTS**) table (for equity and non-equity trading book exposures except the mutual fund trading book exposures) along with the other investment data.

The data for indirect capital instruments are expected in the Fund Underlying Composition table (**STG_Fund_Underlyng_Composition**). All the amounts are converted into the same currency for ease of processing and reporting.

- The application expects the GL IDs and the description to be unique across an entity and the data is expected at a solo level. The application ignores consolidated data and calculates the data for consolidation.

Minority Interest Calculations' Data Expectation

The application expects the capital ratios, tier wise capital amount, third party investment percentage, and the total RWA of the subsidiary as download for the Minority Interest calculation.

The entities which have to be processed for Minority interest computation have to be provided with the F_THIRDPARTY_MINORITY_HOLD_IND flag in the **STG_ENTITY_SHR_HLD_PERCENT** table as "Y".

The application expects only the preferred shares data for the REIT subsidiary. Hence for the Minority Interest computation to happen correctly, the REIT subsidiaries should enter the CET1, AT1, T2 and Total RWA amount. The stage data expectation for minority interest calculation in REIT is the third party holding percentage must be 0% for the CET1, and must have the applicable percentage only for the portion of preferred shares data in the REIT subsidiary.

The application processes the REIT subsidiaries available as part of the DIM_ORG_STRUCTURE table, wherein the operating entity flag is "Y", regardless of the third party minority holding indicator flag as "Y" or "N". The REIT subsidiaries should have the regulatory entity indicator flag as "Y" in the DIM_ORG_STRUCTURE table.

Regulatory Adjustments' Data Expectation

The application expects the goodwill value to be provided, which is net of the goodwill for the entity and any goodwill used in the valuation of the significant investments.

The application expects the deferred tax liabilities value associated with the various regulatory adjustments to be populated wherever the entity expects the value to be netted, satisfying the criteria for netting

The application expects the 'Other Intangible Assets' as a single line item, which includes all the intangible assets other than goodwill.

The defined pension fund net asset is not required to be deducted for insured depository institution. Since the insured depository institutions are not part of regulatory consolidation, this data is not expected for those institutions in the STG_GL_DATA table. It is instead expected to be provided in the Product processor tables, and the capital charge must be calculated as per the applicable rules.

The defined pension fund asset reported must be the defined pension fund asset net of the unrestricted access and unfettered access to the assets in the fund, based on supervisory approval. The applicable amount which corresponds to the unrestricted and unfettered access to the assets in the fund is expected as download in the Product Processor tables. Hence the capital charge is calculated on this.

Internal Transactions Data Expectation

The Customer Reference code of the exposures should be of any entity's party id, which is part of the Organization Structure Dimension (**DIM_ORG_STRUCTURE)**, to be identified as internal transactions.

Investment in Own Shares Data Expectation

The Customer Reference code of the exposures should be of the parent entity's own party ID, which is to be identified as investment in own shares

Reciprocal Cross Holdings Data Expectation

The reciprocal cross holdings flag should be 'Y'.

Threshold Treatment Data Expectation

The Deferred Tax Assets (DTA) related to temporary differences which are processed for the threshold treatment is expected as the download value net of deferred tax liabilities associated with that.

8.2.1.7.4 Limitations

The limitations in OFSCAP 8.0.5.0.0 release is as follows:

1. Investment in Own Shares Treatment

   The investment in own shares which goes for capital treatment, has a phase-in treatment, wherein during phase-in a portion of the exposure goes for deduction from capital, and the remaining portion of the exposure goes for 100% RW. This is handled in the processing by the Phase-In treatment table, and this RW gets added into the Regulatory RWA Accounting Head.

   But for reporting, the reporting happens from an account level granularity, and not at a higher granularity of the accounting head. As the current application does not split the exposures into two in the processing table of Fact Non Sec Exposures (FCT_NON_SEC_EXPOSURES), the account level and the Phase-In treatment table values do not reconcile with each other. Currently, this has to be specifically addressed in the reporting layer, and is not part of the OOB product.

2. Reciprocal Cross Holdings Treatment

   The reciprocal cross holding amount which goes for capital treatment, has a phase-in treatment, wherein during phase-in a portion of the exposure goes for deduction from capital, and the remaining portion of the exposure goes for 100% RW. This is handled in the processing by the Phase-In treatment table, and this RW gets added into the Regulatory RWA Accounting Head.

   But for reporting, the reporting happens from an account level granularity, and not at a higher granularity of the accounting head. As the current application does not split the exposures into two in the processing table of Fact Non Sec Exposures (FCT_NON_SEC_EXPOSURES), the account level and the Phase-In treatment table values do not reconcile with each other. Currently, this has to be specifically addressed in the reporting layer, and is not part of the OOB product.

   Also, reciprocal cross holdings treatment is not available for market risk exposures. This is scoped in the upcoming releases.

8.2.1.8 Capital Buffers

There are two types of Capital Buffers prescribed in the RBI Master Circular for Basel III which are as follows:

- ◆ Capital Conservation Buffer (CCB)
- ◆ Countercyclical Capital Buffer (CCCB)

A detailed description of each of these buffers is provided in the following sections.

8.2.1.8.1 Process Flow for Capital Buffers

The tasks related to Capital Buffer calculations are present in the process named **INDIA_BASELIII_CAPITAL_BUFFERS**. The processing is as follows.

Capital Structure Inputs

The Capital Structure Rules are executed before the calculation of buffers. These Rules calculate the available capital ratios and required capital ratios of the three capital components which are Common Equity Tier 1 Capital Ratio, Tier 1 Capital Ratio, and Capital Ratio.

These line items are populated in the **Fact Standard Accounting Head (FCT_STANDARD_ACCT_HEAD)** table.

Available Total Buffer

Calculation of Available Buffer from CET1 Capital is performed using inputs taken from the previous step.

Required Total Buffer

Required Total Buffer is the sum of the two required buffers: Calculation of Required Capital Conservation Buffer (CAP823) and Calculation of Required Weighted Average Countercyclical Capital Buffer (CAP819).

Capital Conservation Buffer

The RBI Master Circular for Basel III requires banks to maintain Capital Conservation Buffer (CCB) out of Common Equity Tier 1 Capital (CET1). This requirement is as per the transitional arrangement as stated in the RBI guidelines.

Capital distribution constraints are imposed on a bank when the capital level falls within the Capital Conservation Buffer range. As a result of change in Transition period from 2017 to 2018, there is a change in the capital level or CET1 range required to be maintained by the bank during the transition period. The following table lists the minimum ratio that must be maintained by the banks.

Minimum Capital Conversion Standards for Individual Banks			
Common Equity tier 1 ratio after including the current periods retained earnings			**Minimum Capital Conservation Ratios**
As on March 31, 2016	As on March 31, 2017	As on March 31, 2018	
5.5% to 5.65625%	5.5% to 5.8125%	5.5% to 5.96875%	100%
>5.65625% to 5.8125%-	5.8125% to 6.125%	>5.96875% to 6.4375%	80%
>5.8125% to 5.96875%	>6.125% to 6.4375%	>6.4375% to 6.90625%	60%
>5.96875% to 6.125%	>6.4375% to 6.75%	>6.90625% to 7.375%	40%
>6.125%	>6.75%	>7.375%	0%

Countercyclical Capital Buffer

The Countercyclical Capital Buffer (CCCB) is determined by RBI, based on the various market variables like credit to GDP gap, incremental C-D ratio over a moving period of 3 years, GNPA growth, industry outlook assessment index, and interest coverage ratio. Credit to GDP gap is defined as the difference between the credit to GDP ratio and the long term trend value of credit-to-GDP ratio at any point of time.

The countercyclical capital buffer has a lower threshold value and a higher threshold value to be maintained, and this is determined based on the credit-to-GDP gap.

The credit-to-GDP gap is decided by the RBI, based on the following conditions:

- The lower threshold when this CCCB will be activated is 3%, provided GNPA remains constant. This indicates that at 3%, RBI requires the CCCB to be maintained at any percentage more than 0%.
- The upper threshold when this CCCB will be maximum (2.5%) is 15%, provided GNPA remains constant. This indicates that at 15%, RBI requires the CCCB to be maintained at 2.5%.
- This indicates that at less than 3% credit-to-GDP gap, RBI does not have any mandatory requirement for CCCB.

For India, the CCCB are maintained by banks at solo level and consolidated level.

Calculation of Required Countercyclical Capital Buffer

Required Countercyclical Capital Buffer Ratio (**FSI_REQUIRED_CNTR_CYC_BUFFER**) table is updated with values using a T2T. The values are taken from **Benchmark Counter Cyclical Buffer Ratio** table. The **Regulator Code** column in Benchmark Counter Cyclical Buffer Ratio table is compared to jurisdiction code column in Run Dimension. This T2T aggregates the country wise exposure amount for each country. When no Countercyclical Capital Buffer is available, the required weighted average is **0** as the benchmark is assumed to be **0**. (If there is no countercyclical requirement, we expect the regulator to provide 0 as the benchmark.)

After the T2T loading, based on each country's requirement for Countercyclical Capital Buffer, the weighted average Countercyclical Capital Buffer is calculated.

This is applicable for both Indian banks and foreign banks. For Indian banks having international presence, the banks' CCCB is the weighted average countercyclical capital buffer requirement across various jurisdictions, as applicable.

Calculation of Required Buffer from CET1 Capital, Tier1 and Capital Adequacy Ratio

For the calculation of the required buffers, based on **Updated Capital Component Group Skey** (which corresponds to BFCET1 - Buffers from CET1 for Required Buffer from CET1 Capital, BFT1 - Buffers from T1 for Required Buffer from T1 Capital, and BFCAR - Buffers from CAR for Required Capital Adequacy Ratio), the standard account head amount is summed up and populated against the corresponding CAP ID in **Fact Standard Accounting Head (FCT_STANDARD_ACCT_HEAD)** table.

Calculation of Capital Conservation Buffer / Available Buffer from CET1 Capital

The value that the application calculates for available buffer from CET1 capital meets the buffer requirements for the two buffers: Capital Conservation Buffer (CCB) and Countercyclical Capital Buffer (CCCB). No priority is given to any buffer over another. Hence, the shortfall or excess, if any, is calculated and reported at an aggregate level. The required total buffer is calculated as the sum of the required values of two individual buffers.

The application also computes CET1 and Buffer Lookup Ratio, which is further required for calculating Minimum Capital Conservation Ratio. To calculate the available buffer, remainder of following is taken:

Excess of CET1 Capital Ratio over the benchmark (4.5%), after catering to the shortfall (if any), in the Additional Tier 1 and Tier 2 capital to their respective benchmark levels (1.5% and 2% respectively).

Hence, CCB excludes any additional CET1 needed to maintain 6% of Tier 1 Capital Ratio and 8% of Total Capital Ratio.

Capital Conservation Ratio

The required buffer from CET1 capital (sum of two required buffers) is compared with the Available Buffer from CET1 capital. If the banks are unable to meet their total buffer requirements for the two buffers, then they are subject to constraints on the discretionary payments of earnings. In this case, the Capital Conservation Ratio is calculated and represents the percentage of net earnings after tax (positive) not distributed by the bank and held back as retained earnings. Capital Conservation Ratio of the current year is applied after 12 months from the time of calculation.

For banks not meeting the buffer requirements, there are restrictions on discretionary distributions. Assuming a concurrent requirement of Capital Conservation Buffer of 2.5%, and Countercyclical Capital Buffer of 2.5%, the required capital conservation ratio is as follows.

CET1 Ratio Bands	Minimum Capital Conservation Ratio (expressed as a % of earnings)
> 5.5% to 6.75%	100%
> 6.75% to 8.0%	80%
> 8.0% to 9.25%	60%
> 9.25% to 10.50%	40%
> 10.50%	0%

Capital Conservation Ratio is calculated based on required CET1, buffers and the setup or semi-static tables as per the year when the Run is executed.

Capital Conservation ratio is updated in Fact Capital Conservation Ratio. The values are populated through a T2T. The application assigns minimum Capital Conservation Ratio range for a given CET1 and Buffer Lookup Ratio in a table (**FCT_CAPITAL_CONSERVATION_RATIO**). This table is dynamic and formula driven and is constructed by the application using the values of the required buffers as per the RBI guidelines. The application constructs the range of CET1 and Buffer Look-up ratio (Lower Limit and Upper Limit) for the required Capital Conservation Ratio in four quartiles.

Lower Limit = 0.000001 + Upper Limit of (n-1)th quartile

Lower Limit of first quartile =- 0.045

Upper Limit = 0.045 + (Total Required Buffer from CET1 Capital * 0.25 * n)

Where **n** is the quartile number

8.2.1.8.2 Assumptions

Countercyclical Capital Buffer requirement for each country should be provided by the client or the bank as the final percentage applicable for each country and this is dependent on the home regulator.

For Required Weighted Average Countercyclical Capital Buffer calculation, the exposures used in the bank are all accounts exposed to credit risk (Securitized and Non Securitized) and those exposed to Market Risk. However, the application can be restructured to consider only those exposed to Credit Risk as per bank's requirement.

In Capital Conservation Ratio, for the computation of the quartiles that are used to arrive at Minimum Capital Conservation Ratio, the application is dependent on the required CCB ratio. From 2013 till 2016, CCB requirements keep changing every year as per the transitional arrangement. For the purpose of calculating the quartiles range, the application considers it as per the transitional arrangement. At the same time, the application has the flexibility to have the required CCB constant at 2.5% throughout. Also, the minimum required CET1 Ratio considered for the purpose of building these quartiles is 4.5%

Excess/Shortfall of Total Buffer

The calculated values (only positive values are considered) are stored against the corresponding CAP IDs –Excess of Total Buffer (CAP839) and Shortfall of Total Buffer (CAP840)– as two separate line items of which one is **0**.

8.2.1.8.3 Key Data Elements

Key data elements are elaborated in this section. For a complete list of tables to be updated, see the Download Specifications document.

- Countercyclical Capital Buffer requirement for each country should be provided by the client or the bank, as the percentage applicable for each country is dependent on the home regulator's jurisdiction. The home regulator's jurisdiction can prescribe Countercyclical Capital Buffer percentage that is higher than the percentage prescribed by the regulator of exposure country. Hence, the required Countercyclical Capital Buffer percentage for each exposure country provided as input should be the one that the home regulator agrees to.

- In the **FSI_REQUIRED_CNTR_CYC_BUFFER** table, the post mitigation exposure amount is updated against each country code. This is applicable for Credit Risk (for Non Securitization and Securitization exposures) and Market Risk.

- As the required Capital Conservation Buffer (CCB) must be met as per the transitional arrangement, the required buffer value must be setup in Setup Capital Heads (**FSI_SETUP_CAPITAL_HEAD)** table for different periods against the standard account head CAP ID (CAP823). Different CCB requirements specified by the different regulators can be setup by specifying the regulator codes against the same standard account head ID. This regulator code must be the same as the jurisdiction code assigned by the Rule **Jurisdiction Code Assignment**.

- The required benchmark of Countercyclical Capital Buffer for different countries as set by different regulators is expected as download in Stage Benchmark Countercyclical Capital Buffer (**STG_BENCHMARK_CNTR_CYC_BUFFER**). This data is populated to Benchmark Countercyclical Capital Buffer Ratio (**FSI_BENCHMARK_CNTR_CYC_BUFFER**) using a Slowly Changing Dimension (SCD) process. Buffer requirement given on a date is valid till the next buffer is specified. For a solo Run, the regulator of subsidiary specified buffer requirements are considered and for consolidation Run, the consolidating entity's regulator specified buffer requirements are considered.

- The minimum Capital Conservation Ratios requirement for different quartiles (1, 0.8, 0.6, 0.4, 0) is expected as a download in Stage Benchmark Capital Conservation Ratio table (**STG_BENCHMARK_CAP_CONS_RATIO**). This data is populated to the semi-static table **Benchmark Capital Conservation Ratio** (**FSI_BENCHMARK_CAP_CONS_RATIO**) using a SCD process. Conservation ratios specified once are valid till the next revision.

- If the bank is not using the OFSAA Capital Adequacy Pack for any one of the risk types, (Credit/Market), then the bank must provide the RWA amount corresponding to the respective risk types in table Stage Countrywise Risk Summary (Stg_Countrywise_Risk_Summary) for each country to which the bank has an exposure. The values are picked from here in cases where such data is missing from the application processing. For example, if the bank is using only Credit Risk framework from Basel processing and some other engine for market risk computations, then this table should contain the RWA amount as input with a risk type ID as MR for the countries where the bank has market risk exposure. These values are considered for the Countercyclical Buffers calculation. In the absence of such inputs, the solution computes Countercyclical Buffers based only on the information which is an output of the solution's processing area.

8.2.1.9 Revised Leverage Ratio

During the financial crisis, banking institutions built-up excessive on-balance sheet and off-balance sheet leverage which forced the banking sector to reduce its leverage. To prevent building of excessive leverage on the institutions' balance sheet, the EBA has introduced a non-risk based leverage ratio which is a new regulatory tool supplementing risk-based capital requirement. The leverage ratio guidelines were revised and published on 10[th] October 2014. The guidelines are mostly in sync with the revised leverage ratio guidelines issued in 2014 by BIS.

The solution supports this revised approach in the calculation. The application calculates the leverage ratio for a reporting bank. The minimum required leverage ratio is 3%.

The leverage ratio is calculated by dividing an institution's Tier 1 capital measure by the total leverage exposure measure.

$$\text{Leverage Ratio} = \frac{\text{Tier 1 Capital}}{\text{Leverage Exposure Measure}}$$

The Run **IND BASEL III Revised Leverage Ratio Calculation - Indian Banks** is used for computing the leverage ratio, as per the revised guidelines.

Net Tier 1 capital is the summation of Net CET1 and Net AT1 capital amount post regulatory adjustment. Exposure measure is the summation of on-balance sheet items, off-balance sheet items, Derivative Exposures and Structured Financial Transactions (SFT). The on-balance sheet items include the Non-Securitization exposures' amount and the Securitization exposures' amount. The off-balance sheet items include the Non-Securitization exposures' amount and the Securitization exposures' amount. Mitigation is not considered when calculating exposure amount.

NOTE:	The leverage calculation happens at the consolidated parent entity level. The market risk data are not captured for the EU Jurisdiction, and hence that is expected as a download. This is expected in Stage Standard Account Head (**STG_STANDARD_ACCT_HEAD**) for the CAP843 (Leverage Ratio).

The leverage ratio calculations are a separate run, and not part of the regular capital calculation run. This is because of the changes in the Credit conversion factor assigned to the exposures, and also exemption of few exposures from the calculation which are part of the capital charge calculations. Also, the mitigation is not required for these exposures, and the exposure measure calculations are different from the regular EAD calculations.

8.2.1.9.1 Assumptions

The accord is not explicit on the inclusion of Securitization and market related transactions in the exposure measure calculations. However, the application has considered Securitization and the market related transactions in the calculation of total leverage exposure measure.

As the application does not support market related capital calculations pertaining to the EU jurisdiction, the application expects the MR related Exposure measure as a download.

8.2.1.9.2 Process Flow for Revised Leverage Ratio
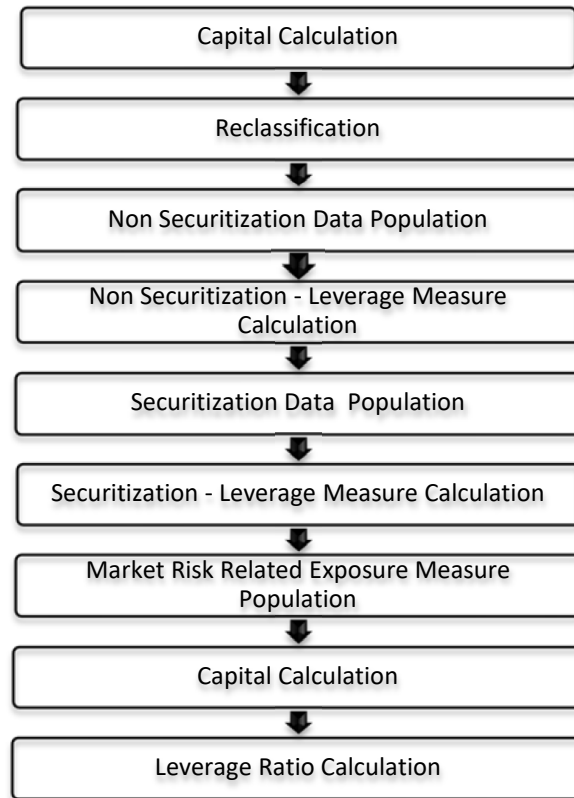
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┌─────────────────────────────────────────┐
│           Capital Calculation            │
└─────────────────────────────────────────┘
                    ↓
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│             Reclassification             │
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│     Non Securitization Data Population    │
└─────────────────────────────────────────┘
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┌─────────────────────────────────────────┐
│      Non Securitization - Leverage Measure │
│                Calculation               │
└─────────────────────────────────────────┘
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┌─────────────────────────────────────────┐
│       Securitization Data  Population     │
└─────────────────────────────────────────┘
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┌─────────────────────────────────────────┐
│   Securitization - Leverage Measure Calculation │
└─────────────────────────────────────────┘
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┌─────────────────────────────────────────┐
│    Market Risk Related Exposure Measure   │
│                Population                 │
└─────────────────────────────────────────┘
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┌─────────────────────────────────────────┐
│           Capital Calculation            │
└─────────────────────────────────────────┘
                    ↓
┌─────────────────────────────────────────┐
│        Leverage Ratio Calculation        │
└─────────────────────────────────────────┘
```

Leverage ratio is calculated by executing the Run **IND BASEL III Revised Leverage Ratio Calculation - Indian Banks**.

The details of the process flow for leverage ratio is as follows.

Capital Consolidation process

The capital consolidation process remains the same as is existing in the capital calculation run.

Reclassification

The reclassification process remains the same as is existing in the capital calculation run.

Non Securitization Data Population

Data from the Product Processors are populated to **FCT_NON_SEC_EXPOSURES** table in the process **IND_BASELIII_NON_SEC_DATA_POPULATION**. This data population also remains the same as existing in the capital calculation run.

Non Securitization Leverage Measure Calculation

After data is populated in non sec processing table, the exposure measure is calculated in the process **BASELIII_LEV_RATIO_EXPOSURE_MEASURE_CALCULATION**.

The Exposure measure is the sum of the Pre Mitigation EAD amount of the following exposure types:

- On-Balance Sheet Exposures
- Off-Balance Sheet Exposures
- SFT Exposures
- Derivative Exposures

Details on the calculation of these exposure measures are mentioned in the following sections. All the exposure measures are computed and populated into the Leverage Exposure amount (**N_LEVERAGE_EXPOSURE_AMOUNT**) column. And any exempted exposures are identified by the solution in the Regulatory Capital Exemption Criteria in the Non Sec Exposures processing table. These exempted criteria are part of the dimension table of Regulatory Capital Exemption Criteria Dimension (**DIM_REG_CAP_EXEMPTION_CRITERIA**).

On-Balance Sheet Exposures

The accounting value of the on-balance sheet exposures net of specific provisions and valuation adjustments are considered for the exposure measure. The valuation adjustments are captured at an instrument level, in the FSI setup table for Instrument Valuation Details (**FSI_SETUP_INSTR_VALUATION_DTLS**).

The exposure measure considered is the Pre-Mitigation amount, and does not consider the benefit of the mitigation.

Some of the exempted exposures are detailed as follows.

Fiduciary Assets

If the bank considers the assets of the fiduciary assets, as the bank's own assets, then, these assets are exempted from the calculation. The fiduciary assets are identified based on the exposures having the Parent Fiduciary Account Number (V_PARENT_FIDUCIARY_ACCT_NUMBER) in the product processor (PP) staging tables.

The bank has to select the run management option to select whether the exposures are derecognized in the balance sheet or not. If the run management option of Y is selected, all the fiduciary assets with the parent fiduciary account is exempted from the Leverage Exposure Measure calculations. If the run management option of N is selected, specific fiduciary assets can be exempted from the Leverage Exposure Measure calculations. These specific fiduciary assets are expected to be provided in the FSI Fiduciary Assets setup table (**FSI_SETUP_DEREC_FIDUCIARY_ASST**).

This is handled in the **Fiduciary Assets Exemption** subprocess of the **BASELIII_LEV_RATIO_EXPOSURE_MEASURE_CALCULATION** process.

Off-Balance Sheet Exposures

The exposure amount for off-balance sheet exposures is the undrawn amount of the exposure multiplied by the CCF. The CCF of the exposures remain the same as in the Capital Calculation Run, except that the CCF is floored at 10%. The flooring of the CCF to 10% is handled by the rule **Non Sec Off Balance Sheet Exposures CCF Percent Flooring** in the **Non Sec CCF Assignment** sub process.

This exposure measure does not consider the mitigation effect.

SFT Exposures

The exposure amount of the SFT Exposures to be considered for the leverage measure is post the effect of the collateral. The SFT Exposures data provided in the staging must not consider the accounting netting.

The data capture for the SFT exposures remain the same as in the Capital calculation run. The bank role in the SFT transaction is also captured in the staging table.

The Gross amount and the Add-on amount, as expected in the accord are computed by the application. The Gross amount is the actual transaction amount of the SFT exposures, as provided in the Repo contracts staging table. And the Add-on amount is the difference between the fair value of the repo exposures and the fair value of the collateral placed or received.

The fair value of the exposures, including the placed collateral are captured at an instrument level, in the FSI setup table for Exposure Fair Value Details (**FSI_SETUP_INSTR_VALUATION_DTLS**), and the fair value of the mitigants are captured in the FSI setup table for Mitigant Fair Value (**FSI_SETUP_MTGNT_VALUATION_DTLS**).

The mitigants which are used to offset the fair value of the repo exposures, are stamped accounting heads, to ensure that they can be tracked.

The exposure amount calculations are different for the bank acting as a principal in the SFT transactions, and an agent in the SFT transactions. The solution supports both the treatments.

For bank acting as an agent, the solution handles all the treatment mentioned in the accord. The data expectation for them are as follows:

- *Case 1: Bank is an agent, and does not get involved in any other role with the SFT Exposure*

  In this case, the data is not expected in the Repo contracts staging table.

- *Case 2: Bank is an agent, and provides a guarantee equal to the difference between the SFT Exposure and the collateral amount*

  In this case, the data is expected in the Repo contracts staging table, with the bank role as an agent, and the indemnity indicator **(F_INDEMNITY_IND)** as 'Y'.

  The application computes only the Add-on amount for this SFT transaction, inline with the guidelines. And this Add-on amount is populated into the Add-on column of the processing table.

  This Add-on amount is caluclated in the data transformation **Lev_Ratio_SFT_Addon_amt.**

  This is handled in the sub process (**Leverage Ratio Computations**) of the process (**BASELIII_LEV_RATIO_EXPOSURE_MEASURE_CALCULATION**).

- **Case 3: Bank is an agent, and provides a guarantee more than the difference between the SFT Exposure and the collateral amount**

  In this case, the data is expected in the Repo contracts staging table, with the bank role as an agent, and the indemnity indicator **(F_INDEMNITY_IND)** as Y. And a separate guarantee transaction is expected to be recorded in the guarantee staging table. This guarantee transaction is also provided as a mitigant with the mitigant table also storing the guarantee contract ID (**V_GUARANTEE_CONTRACT_ID**). And the exposure and the mitigant must be mapped to each other in the exposure mitigant mapping table **(STG_EXP_MITIGANT_MAPPING)**.

  This guarantee is not for a mitigant treatment, and hence, this is expected with the mitigant eligibility flag as 'N'. This identified guarantee is populated in FNSE.n_repo_contract_skey.

  The application computes both the gross exposure amount and the addon amount for this SFT transaction, inline with the guidelines.

  This Add-on amount is caluclated in the data transformation **Lev_Ratio_SFT_Addon_amt.**

  This is handled in the sub process (**Leverage Ratio Computations**) of the process (**BASELIII_LEV_RATIO_EXPOSURE_MEASURE_CALCULATION**).

Derivative Exposures

Derivative transactions (OTC Derivatives) exposure measure are calculated using the Mark to Market Method. The add-on assignment is same as what is mentioned in the Capital Calculation Run. The exposure measure is the sum of market value, and the notional amount multiplied by the add-on percent.

The derivative exposure measure has few specific treatment, in terms of the Leverage Exposure Measure calculations. They are as detailed as follows.

Collateral of Derivative

The collateral received with reference to the derivatives, cannot be used in netting, and reducing the exposure amount of the derivatives. Based on whether the operative accounting framework allows for netting of the collateral or not, the solution updates the exposure measure. The solution expects a run management selection to identify whether the bank considers netting of the collateral outside the application, and provides the netted amount as input to the product processor staging tables.

The collateral of derivative is given in the mitigant table. There is a run management option to capture whether the operative accounting framework allows for netting of the collateral as per the master netting agreement or not.

If 'Yes' is selected, assuming that the bank has provided the MTM value based on already considering the collateral amount, the collateral amount is added to the MTM of the exposure. And if 'No' is selected, there is no change to the MTM value.

Data Expectations

- Collateral for the derivatives, which is already considered in the MTM calculation, are provided in the **STG_MITIGANTS** table with the eligibility flag as 'N' and the corresponding entry is added into the **STG_EXP_MITIGANT_MAPPINGS** table.

- The MTM provided for the derivatives' instruments, must be after following the corresponding operational accounting framework.

Cash Variation Margin

As per the guideline, the Replacement cost of the derivatives can be reduced by cash variation margin if certain conditions are satisified. This is handled in the solution by using the above run management option, wherein it mentions whether the exposure is being offset with the collateral or not.

In the run management, if the option of 'No' is selected, the cash variation margin is used to offset the exposure measure. If all the conditions are satisfied, the flag to indicate that the Variation Margin has satisfied the conditions is updated. And if this flag is 'Y', then, the cash variation margin is used to reduce the replacement cost of the derivative.

This is handled in the sub process (**Cash Variation Margin Exemptions**) of the process (**BASELIII_LEV_RATIO_EXPOSURE_MEASURE_CALCULATION**).

Clearing Member of a QCCP

For clearing member of a QCCP, the exposures where Bank acts as a clearing member, and the trade exposures, wherein the bank is not obligated to reimburse the losses suffered by the client, for CCP default are exempted, from the leverage ratio calculation.

This is handled in the sub process (**QCCP Related Exemptions**) of the process (**BASELIII_LEV_RATIO_EXPOSURE_MEASURE_CALCULATION**).

Written Credit Derivatives or Sold Credit Derivatives

The effective notional amount of the credit derivative transactions are reduced by any change in the fair value of derivative liabilities. The fair value of the exposures are captured in the FSI setup table for Fair Value (**FSI_SETUP_INSTR_VALUATION_DTLS**), at an instrument level. And the difference between the Fair value and the MTM value of these exposures result in the unrealized gain and loss of the derivative exposures.

This is subtracted from the notional principal of these derivatives to arrive at the effect notional principal before offsetting.

The sold credit protection is offset against the bought credit protection based on the conditions mentioned in the guidelines. This offset happens in the data transformation (**SCP_BCP_Offset_Mapping**) which is in the sub process (**Written Credit Derivatives SCP BCP Offset Mapping**).

All the other written credit derivative treatment is handled in the sub process (**Written Credit Derivative Related Exemptions**) of the process
(**BASELIII_LEV_RATIO_EXPOSURE_MEASURE_CALCULATION**).

Securitization Data Population

Securitization exposure data is populated to securitization processing table in the process **SEC_DATA_POPULATION**. The population remains the same as in the capital calculation run.

Securitization Exposure – Leverage Measure Calculation

After securitization exposure data is populated, exposure measure is calculated in the process **SEC_EXP_MITIGANT_MAPPING_POP**.

The exposure measure calculation remains the same as in the capital calculation run, except that the CCF for the off balance sheet exposures are floored at 10%. And the mitigation is not considered for the leverage measure calculations.

Market Risk – Leverage Measure Calculation

Leverage Measure for Market Risk is directly expected as a download in the Stage Standard Accounting Head (**STG_STANDARD_ACCOUNT_HEAD**) with the CAP1809 (On Balance and Off Balance Total Leverage Exposure Measure for Securitized Exposures). This is expected as a download, as the EU jurisdiction does not support the MR calculations.

Capital Calculation

Capital measure is calculated in EU_CAPITAL_STRUCTURE process. Capital Measure used in the leverage ratio is equal to Net Tier 1 which is post all regulatory adjustments. The capital structure is the same as the capital calculation run.

Leverage Ratio Calculation

The leverage ratio is calculated as follows.

> **Leverage Ratio = Tier 1 Capital / Total Leverage Exposure Measure**

This is computed in the process - **IND_BASELIII_LEV_RATIO_LEVERAGE_RATIO_CALCULATION**.

8.2.1.9.3 Key Data Elements

Key data elements are elaborated in this section. For a complete list of tables and columns to be populated, see the *Download Specifications* document.

To calculate the leverage ratio, exposure amount for all product types and the total capital are required.

The key data elements for exposure measure calculation of the various product types are as follows:

- ♦ On-Balance Sheet Exposures: For on-balance sheet items, End of Period (EOP) balance amount, write-off, and accrued interest amount is required.
- ♦ SFT Exposures: For repo products, exposure amount, and instrument rating are required.
- ♦ Derivative Exposures: For derivative products, exposure mark to market value, notional principal amount, and underlying instrument types are required.
- ♦ Off-Balance Sheet Exposures: For off-balance sheet items, undrawn amount is required.
- ♦ Securitization Transaction: For securitization transactions, exposure amount is required.
- ♦ Capital Calculation: See the Capital Structure for more details.
- ♦ Cash Variation Margin: The collateral segregated flag, exchange traded flag, and netting agreement code are required.
- ♦ Netting Agreement: The margin threshold and the minimum transfer amount are required, which are captured in the Stage Net Exposures table (**STG_NET_EXPOSURES**).

8.2.2 Basel III – Internal Ratings Based Approach

8.2.2.1 RBI III - High Level Process Flow for Internal Ratings Based Approach

8.2.2.1.1 Process Flow for Capital Adequacy Ratio Calculation
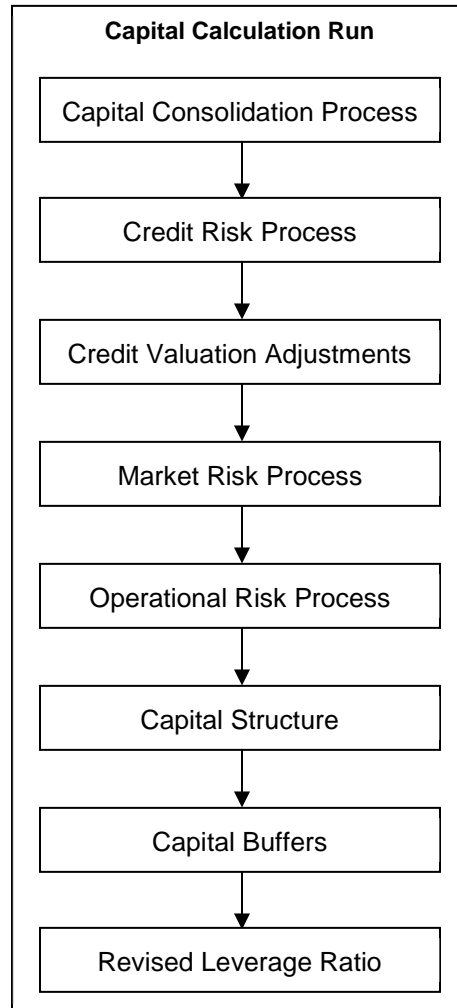
```
┌─────────────────────────────────────────────┐
│            Capital Calculation Run           │
│                                              │
│   ┌──────────────────────────────────────┐   │
│   │      Capital Consolidation Process   │   │
│   └──────────────────────────────────────┘   │
│                     │                        │
│                     ▼                        │
│   ┌──────────────────────────────────────┐   │
│   │          Credit Risk Process         │   │
│   └──────────────────────────────────────┘   │
│                     │                        │
│                     ▼                        │
│   ┌──────────────────────────────────────┐   │
│   │      Credit Valuation Adjustments    │   │
│   └──────────────────────────────────────┘   │
│                     │                        │
│                     ▼                        │
│   ┌──────────────────────────────────────┐   │
│   │          Market Risk Process         │   │
│   └──────────────────────────────────────┘   │
│                     │                        │
│                     ▼                        │
│   ┌──────────────────────────────────────┐   │
│   │        Operational Risk Process      │   │
│   └──────────────────────────────────────┘   │
│                     │                        │
│                     ▼                        │
│   ┌──────────────────────────────────────┐   │
│   │           Capital Structure          │   │
│   └──────────────────────────────────────┘   │
│                     │                        │
│                     ▼                        │
│   ┌──────────────────────────────────────┐   │
│   │            Capital Buffers           │   │
│   └──────────────────────────────────────┘   │
│                     │                        │
│                     ▼                        │
│   ┌──────────────────────────────────────┐   │
│   │        Revised Leverage Ratio        │   │
│   └──────────────────────────────────────┘   │
└─────────────────────────────────────────────┘
```

The Capital Adequacy Ration Calculation is performed as in the Standardized approach. See Capital Adequacy Ratio Calculation.

8.2.2.1.2 Process Flow for Credit RWA
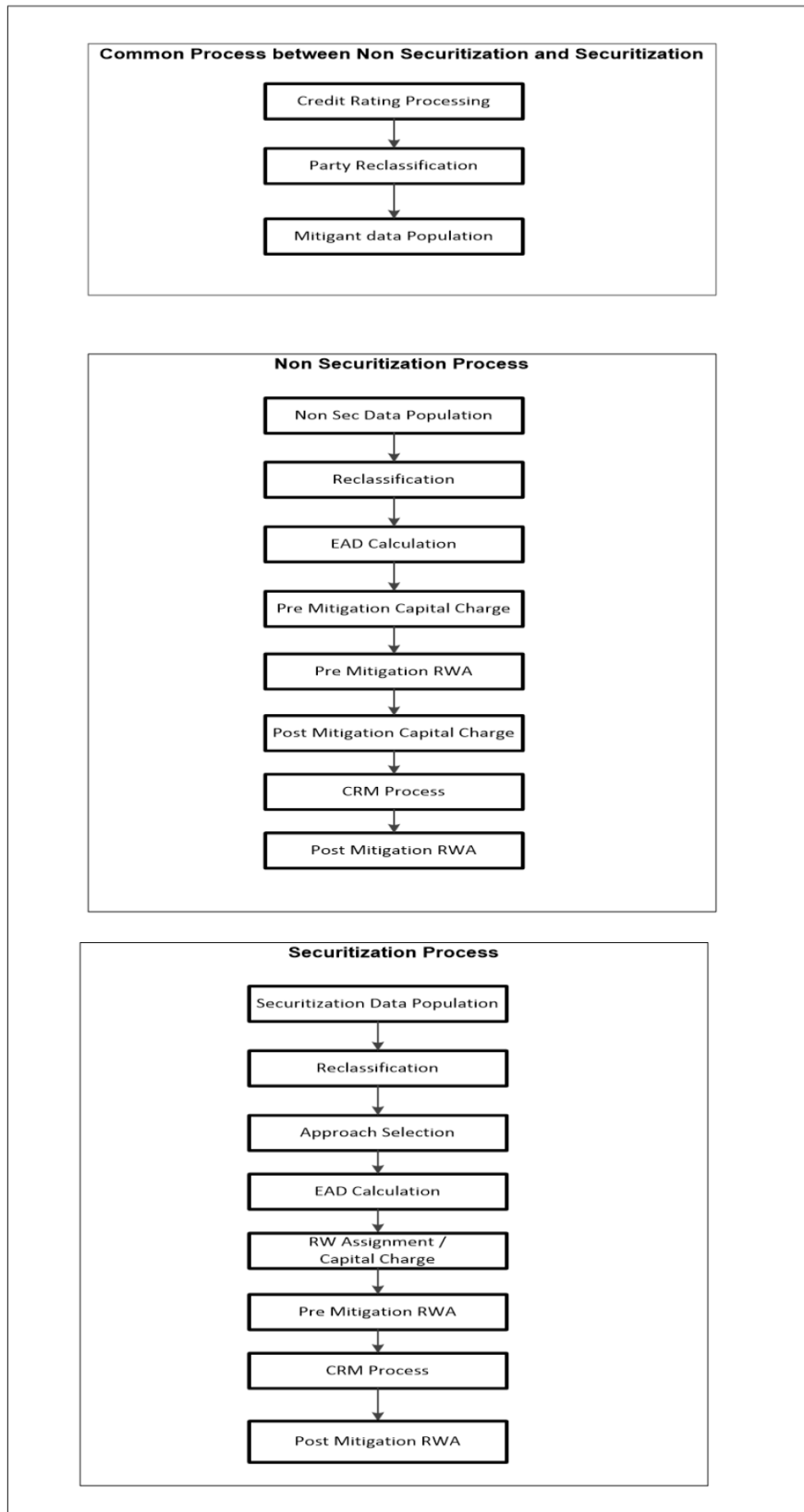
The Credit Risk Calculation is performed as in the Standardized approach. For more information on the sub processes as detailed in the preceding process flow for the Non Securitization process and Securitization process, see Credit RWA.

8.2.2.1.3 Process Flow for Credit Valuation Adjustments

```
┌─────────────────────────────────────┐
│           CVA Process               │
│   ┌─────────────────────────────┐   │
│   │    Simple CVA Approach      │   │
│   └─────────────────────────────┘   │
└─────────────────────────────────────┘
```

Basel committee has introduced a new Credit Valuation Adjustment (CVA) capital charge, which is added to default risk capital charge to arrive at the new Counterparty Credit Risk (CCR) capital charge. The mark to market counterparty credit losses or the spread migration risk is captured with CVA, which were not directly capitalized before. CVA is the difference between the risk-free portfolio value and the true portfolio value that takes into account the possibility of the counterparty's default. In other words, CVA is the market value of counterparty credit risk.

In RBI (Indian) Jurisdiction, only Simple CVA approach is followed. For more information on the sub processes as detailed in the process flow, see Credit Valuation Adjustments.

8.2.2.1.4 Process Flow for Market RWA

```
                          ┌──────────┐
                          │  Start   │
                          └────┬─────┘
                               ▼
                  ┌────────────────────────────┐
                  │   Capital Consolidation    │
                  └────────────┬───────────────┘
                               ▼
                  ┌────────────────────────────┐
                  │      Rating Process        │
                  └────────────┬───────────────┘
                               ▼
                  ┌────────────────────────────┐
                  │    Position Conversion     │
                  └────────────┬───────────────┘
                               ▼
                  ┌────────────────────────────┐
                  │ Capital Charge for Interest│
                  │      Rate Instrument       │
                  └────────────┬───────────────┘
                               ▼
                  ┌────────────────────────────┐
                  │  Capital Charge for Equity │
                  └────────────┬───────────────┘
                               ▼
                  ┌────────────────────────────┐
                  │ Capital Charge for Foreign │
                  │   Exchange Transactions    │
                  └────────────┬───────────────┘
                               ▼
                  ┌────────────────────────────┐
                  │ Capital Charge for CDS in  │
                  │       Trading Book         │
                  └────────────┬───────────────┘
                               ▼
                  ┌────────────────────────────┐
                  │ Capital Charge for Options │
                  └────────────┬───────────────┘
                               ▼
                  ┌────────────────────────────┐
                  │Treatment for Illiquid position│
                  └────────────┬───────────────┘
                               ▼
                  ┌────────────────────────────┐
                  │  Summary Data Population    │
                  └────────────┬───────────────┘
                               ▼
                  ┌────────────────────────────┐
                  │   Market Risk Deductions   │
                  └────────────────────────────┘
```
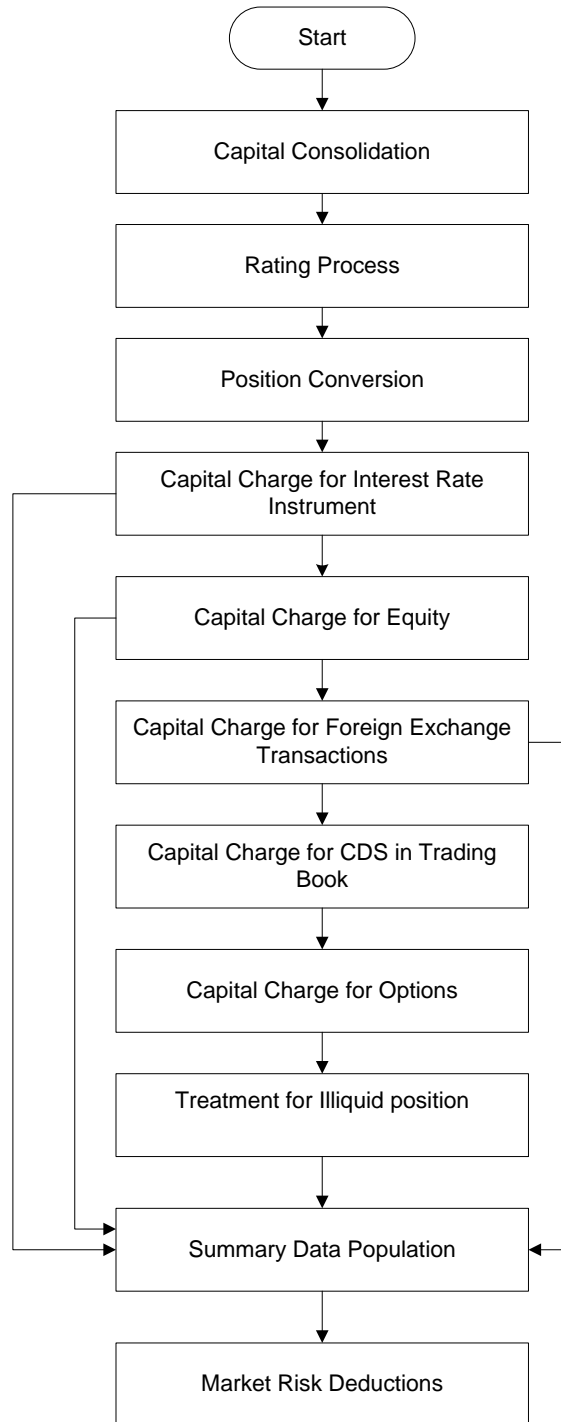
The Market Risk Calculation is performed as in the Standardized approach. For more information on Market RWA computation, see Market RWA.

8.2.2.1.5 Process Flow for Operational RWA
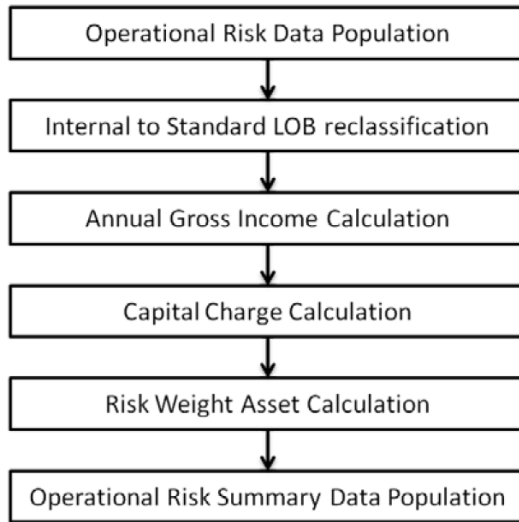
The Operational Risk Calculation is performed as in the Standardized approach. For more information on the Operational RWA computation, see Operational RWA.

8.2.2.1.6 Process Flow for Capital Structure

```
┌─────────────────────────────────────────────────────────────┐
│                    Capital Consolidation                      │
└─────────────────────────────────────────────────────────────┘
                              │
                              ▼
┌─────────────────────────────────────────────────────────────┐
│  Calculate the Minority Interest in CET1,AT and T2, belonging │
│    to third party and internal transaction in CET1, AT and T2 │
└─────────────────────────────────────────────────────────────┘
                              │
                              ▼
┌─────────────────────────────────────────────────────────────┐
│                 Ineligible Capital Instruments                │
└─────────────────────────────────────────────────────────────┘
                              │
                              ▼
┌─────────────────────────────────────────────────────────────┐
│            Gross Capital calculation for CET1, AT1 and T2     │
└─────────────────────────────────────────────────────────────┘
                              │
                              ▼
┌─────────────────────────────────────────────────────────────┐
│                    Regulatory Adjustments                     │
└─────────────────────────────────────────────────────────────┘
                              │
                              ▼
┌─────────────────────────────────────────────────────────────┐
│  Insignificant Investment treatment for accounting entity     │
│  where Parent Bank Holding is not more than 10% of issued     │
│  common shares                                                │
└─────────────────────────────────────────────────────────────┘
                              │
                              ▼
┌─────────────────────────────────────────────────────────────┐
│  Significant Investment Treatment for accounting entity where │
│  Parent Bank Holding is more than 10% of issued common shares │
└─────────────────────────────────────────────────────────────┘
                              │
                              ▼
┌─────────────────────────────────────────────────────────────┐
│          Post Phase-in Treatment Regulatory Adjustment        │
└─────────────────────────────────────────────────────────────┘
                              │
                              ▼
┌─────────────────────────────────────────────────────────────┐
│  Bifurcation of Insignificant and Significant Investment amount│
└─────────────────────────────────────────────────────────────┘
                              │
                              ▼
┌─────────────────────────────────────────────────────────────┐
│                    Net Capital Calculation                    │
└─────────────────────────────────────────────────────────────┘
                              │
                              ▼
┌─────────────────────────────────────────────────────────────┐
│      RWA calculation for CR, MR, OR and Phase-in arrangement  │
└─────────────────────────────────────────────────────────────┘
                              │
                              ▼
┌─────────────────────────────────────────────────────────────┐
│                      Admissible Capital                       │
└─────────────────────────────────────────────────────────────┘
                              │
                              ▼
┌─────────────────────────────────────────────────────────────┐
│                    Capital ratio calculation                  │
└─────────────────────────────────────────────────────────────┘
                              │
                              ▼
┌─────────────────────────────────────────────────────────────┐
│                        Capital Buffer                         │
└─────────────────────────────────────────────────────────────┘
```

The Capital Structure is executed with Capital Consolidation, Credit Risk, Market Risk, and Operational Risk RWA processes.

For more information on the sub processes of Capital Structure, see Capital Structure.

8.2.2.1.7 Process Flow for Capital Buffers
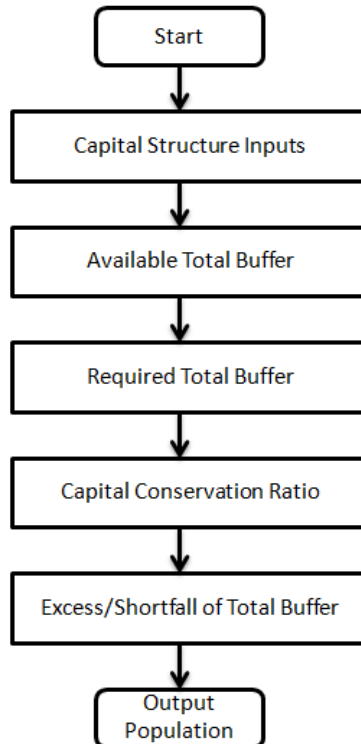
The tasks related to Capital Buffer calculations are present in the process named **INDIA_BASELIII_CAPITAL_BUFFERS**. The processing is detailed in Capital Buffers.

8.2.2.1.8 Process Flow for Revised Leverage Ratio
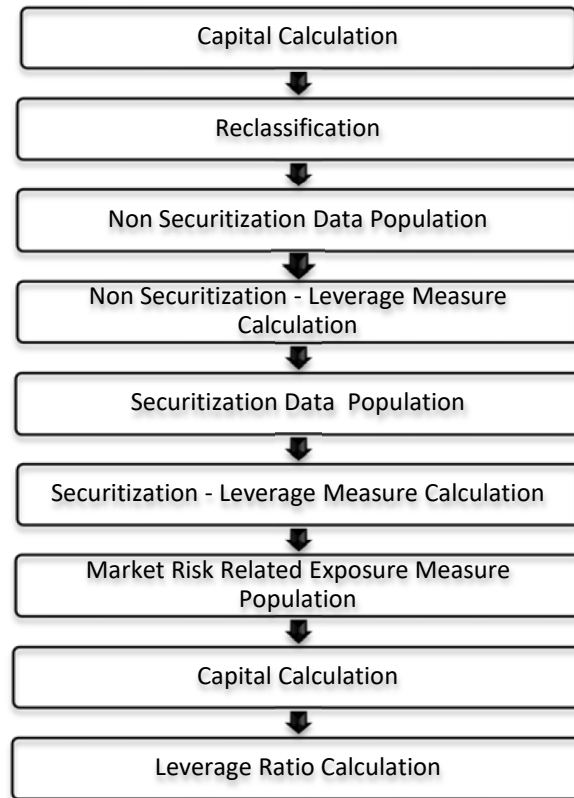
Leverage ratio is calculated by executing the Run **IND BASEL III Revised Leverage Ratio Calculation - Indian Banks**.

The processing is detailed in Revised Leverage Ratio.

8.2.2.2 Credit RWA

The application supports the computation of Credit RWA, as per the guidelines laid out by the RBI. Credit RWA computation is divided into Credit Risk for Non Securitized exposures process and Credit Risk for Securitized exposures process.

For Credit Risk of Non Securitized exposures, the application follows the Foundation IRB Approach (FIRB) and Advanced IRB Approach (AIRB).

8.2.2.2.1 Non Securitization - Foundation IRB / Advanced IRB Approach

The Foundation IRB/Advanced IRB Approach consists of the following:

- Banking Book Products
- Over the Counter Derivative Products: See Over the Counter Derivatives in Standardized Approach section.
- Securities Financing Transactions: See Securities Financing Transactions in Standardized Approach section.
- Credit Risk Mitigation

Banking Book Products

Rating reclassification is the initial step in the process. All exposures are rated by different agencies. However, naming convention of these ratings might not be the same as mentioned in the Basel Accord. Hence, the application re-classifies the rating information shared in the bank's data to standard rating as recommended in the Basel Accord.

The exposure amount and other amount attributes that are provided as input (in the stage tables) should be in the natural currency (currency of the exposure) and this is usually different for exposures across different countries. The application converts them to reporting currency, so that processing occurs in a single currency.

The Credit Risk exposures are identified by their product types, counterparty types, and their corresponding asset classes by the application. A sample list of products types, party types, mitigant types, and credit ratings are pre-defined in the application. However, this list and naming convention differs from one bank to another. The application reclassifies the bank's product types and party types to Basel standard product and party types. Based on standard Basel product and standard party type, it forms an asset class for each exposure. For equity exposures, the asset class is formed on the basis of equity type and Basel product type. Some exposures can be hedged against Credit Risk through various mitigants like guarantors, collaterals, credit derivatives, and so on. These provide mitigation to credit risk and are considered while computing Credit RWA as per the RBI 2012 Accord for IRB. Hence, the application calculates pre-mitigation RWA amount and post-mitigation RWA amount.

The application calculates the correlation factor using the formula specified for each asset class. Using this Correlation Factor, Probability of Default (PD), and Loss Given Default (LGD), the application calculates the pre-mitigation capital charge for each exposure. This value signifies the capital charge that the bank needs to maintain for each exposure, before considering any mitigation effects.

The application calculates pre-mitigation EAD amount and RWA for each exposure and then computes pre-mitigation risk weighted assets (Pre-CRM RWA) by multiplying the EAD by the risk weight. The risk weight is arrived at by multiplying pre-mitigation capital charge with 12.5.

With the Credit Risk Mitigation (CRM) process, the bank considers the mitigation effect. The application checks on the eligibility of the mitigants, based on RBI specifications. It assigns a haircut to each mitigant based on their currency, residual maturity, and expected volatility in their market value. FOREX and maturity haircuts consider any currency and maturity mismatches that the mitigants have with the exposures it covers. Volatility haircut considers the change in the mitigation effect that arises due to future fluctuations in the value of the mitigant. The application allocates mitigants to exposures based on optimizer function and subsequently the capital charge is calculated for each mitigant.

The application then calculates the post mitigation RWA Unexpected Loss (Post CRM RWA UL) and post mitigation RWA Expected Loss (Post CRM RWA EL). Some credit risk exposures that fall under the category of internal transactions like holding own subsidiaries shares or investment in its capital, are treated separately under Capital Structure.

Process Flow for Banking Book Products

Rating Information Processing

Pre Processing Steps

Data on ratings are captured in the following rating specific tables:

⬧ **Accounts Rating Table (STG_ACCOUNT_RATING_DETAILS)**

Ratings of all Credit Risk Non Securitized Exposures, Securitized Exposures, and Securitized Positions are captured in this table.

⬧ **Instrument Rating Table (STG_INSTRUMENT_RATING_DETAILS)**

Ratings for all market risk exposures, investment exposures subject to credit risk (one that are in **STG_INVESTMENTS**), and mitigants are captured in this table.

⬧ **Party Rating Table (STG_PARTY_RATING_DETAILS)**

Credit rating for all customers and issuers are captured in this table.

⬧ **Sovereign Rating Table (STG_SOVEREIGN_RATING_DETAILS)**

Credit rating for all countries is captured in this table.

Processing Steps

Banks obtain credit ratings from different sources and these are provided as an input in the four rating tables mentioned in the preceding list. The application reclassifies the rating information to Basel standard ratings.

The rating reclassification lookup table (**FSI_RATING_CLASSIFICATION**) is used to lookup reclassified Basel ratings. Ratings are populated from the stage tables (**STG_PARTY_RATINGS_DETAILS**) to FSI (**FSI_PARTY_RATING_DETAILS**) tables using the lookup table (**FSI_RATING_RECLSSIFICATION**) to obtain the reclassified rating.

Note: In the **STG_PARTY_RATINGS_DETAILS** table ensure that the following columns are mandatorily populated with data:

○ Rating source code (**V_RATING_SRC_CODE**)

○ Party Code (**V_PARTY_CD**)

○ Purpose (**V_PURPOSE**): In this field whether the rating is a domestic rating or foreign rating should be indicated. If any other rating is provided, then the exposure is considered as unrated.

○ Rating Code (**V_RATING_CODE**)

Out of the multiple Basel ratings assigned to an exposure, the worst rating is picked up and assigned against the exposures. Basel rating for all asset classes and sovereign rating is computed separately.

Data Population

Pre Processing Steps

Credit Risk exposure data should be uploaded in the application for all the product types through their respective input tables known as Product Processors. The important categories of Credit Risk Non Securitization exposures, along with their respective table names that are used as an input are as follows:

Product	Source Product Processor
Bills	STG_BILLS_CONTRACTS
Credit Cards	STG_CARDS
Swaps	STG_SWAPS_CONTRACTS
Futures	STG_FUTURES
Guarantees	STG_GUARANTEES
Investments	STG_INVESTMENTS
Lease Contracts	STG_LEASE_CONTRACTS
Letters of Credit	STG_LC_CONTRACTS
Line of Credit	STG_CREDIT_LINE_DETAILS
Commitment Contracts	STG_COMMITMENT_CONTRACTS
Loans	STG_LOAN_CONTRACTS
Money market instruments	STG_MM_CONTRACTS
Overdraft	STG_OD_ACCOUNTS
Options	STG_OPTION_CONTRACTS
Re purchase Contracts	STG_REPO_CONTRACTS
Equity Exposures	STG_INVESTMENTS
Underlying Exposures for Derivatives and Securitization	STG_UNDERLYING_EXPOSURES
Underlying Exposures for Repo Contracts	STG_PLACED_COLLATERAL / STG_MITIGANTS
Credit Derivatives	STG_CREDIT_DERIVATIVES
Fixed Assets	STG_FIXED_ASSETS_DETAILS

Processing Steps

Staging data from the Product Processors or other stage tables is populated in the required processing tables. The entire data in the Product Processor is populated in a common fact table for all Non Securitized exposures (**FCT_NON_SEC_EXPOSURES**), except equity data, which is first populated in the respective equity table (**FCT_EQUITY_EXPOSURES**) and is then populated in the common fact table for all Non Securitized exposures. For more information on the list of columns to be populated within each table, see the *Download Specifications* document.

Shareholding Percent Multiplication

The exposure amount that is a part of the input data (Product Processors) is the exposure amount for a solo entity. However, for a consolidated Run, the parent exposure is considered only on the shareholding percentage, based on the below calculation:

Exposure Amount   X   Share Holding Percent = Updated Exposure Amount

Where:

Share holding percent is allotted a value by the Rule **Cap Consl Effective Shareholding Percent for an Entity** in the process- **Capital Consolidation**.

This assignment which uses the Rule **<Attribute > Shareholding Percent Multiplication** relates to paragraph 28 of the Basel II Accord. The following attributes undergo shareholding percent multiplication:

+ Outstanding Principal
+ Current Exposure Amount
+ Undrawn Amount
+ Exposure Market Value
+ Exposure Accrued Interest
+ Provision Amount
+ Write Off Amount
+ Notional Principal and Contract Amount for OTC products

Currency Conversion

The application converts the amount attributes, which are in natural currency, to reporting currency which is used for further calculations. The column names suffixed with '_ncy' are in the natural currency and are multiplied by currency conversion factor to populate values in the reporting currency. The Rule **Reporting Currency Code Assignment** assigns the reporting currency. For more information on Currency Conversion, see Exhibit 4 in *Annexure A: Key Concepts.*

NOTE: The data populated in the Product Processor is expected in natural currency of the exposure.

Reclassification

The application reclassifies the bank's product types and party types to the Basel standard product and party types. Based on the standard Basel product and party type, it forms an asset class for each exposure. A separate Rule in the application reclassifies equity. Similarly, mitigant is reclassified on the basis of its mitigant types and is reclassified to standard mitigant types.

Product Type Reclassification

Product types used by reporting bank as input data are reclassified to standard product types as recommended in the RBI guidelines. The product types after reclassification are stored as Basel product types.

For Example: Unsecured bonds are reclassified as debt securities.

A separate Rule in the application reclassifies lease residual and equity products.

Party Type Reclassification

Similar to the product type, the customer type and issuer type (which are stored as counterparty type) are also reclassified to standard counterparty type. The application is designed to include customer type, issuer type, and mitigant types in a single table (**STG_PARTY_MASTER**) and these are also reclassified together. Party type reclassification Rules handle reclassification for customer types and issuer types.

For Example: Individual is reclassified as Retail.

A separate Rule in the application reclassifies for issuer of equity. This Rule is defined in the lookup table so that the same reclassification can be used across exposures, equity, and the mitigant tables.

Asset Class Reclassification

On the basis of Basel product type and standard counterparty type, an asset class is formed by the application. This asset class is used for data processing.

For example: Standard counterparty is large corporate, the asset class is large corporate, except for exposures that have product types like cash and real estate. For Basel product type gold, the asset class is Gold, except for standard counterparty type which is Central Counter Party; the asset class is Central Counter Party. For standard counterparty type Insurance Entity and Basel product type as Line of Credit, the asset class is Corporate Non SME Non SL.

Asset class of all equity products are is done on the basis of equity type and Basel product type. Asset class for all mitigants is reclassified based on their standard mitigant types and standard issuer type.

RBI Guidelines does not consider specialized lending asset guidelines. RBI does not have a special class called high-volatility commercial real estate (HVCRE) under corporate asset class unlike BIS. Other Specialized lending asset classes such as, project finance (PF), commodities finance (CF), object finance (OF) and income-producing real estate (IPRE) are part of the solution.

Under exemption in determining effective maturity for smaller domestic corporate borrowers, RBI can exempt facilities to certain domestic corporate borrowers from the explicit maturity adjustment if the reported exposure to the consolidated group based in India is less than Rs. 100 crore subject to the condition that the total exposure of the borrower is less than or equal to Rs. 5 crore from the banking system. This range/criteria of group exposure is used for the reclassification of a corporate into an SME.

These reclassifications are handled in the sub-process "**Bank to Basel Reclassification**" in both FIRB and AIRB processes for India, that is, "**IND_BASELIII_NON_SEC_FIRB**" and "**IND_BASELIII_NON_SEC_AIRB**".

Mitigant Reclassification

For mitigants the application reclassifies the mitigant type to the standard mitigant type like the debt securities, credit derivative, cash, and so on. It also reclassifies the mitigant issuer type to the standard mitigant issuer type like Banks, Corporate, and so on. The reclassification tasks are present in the **Mitigant Bank to Basel Reclassification** sub process.

Risk Parameters Assignment

The application assigns risk weight parameters of PD, LGD, and maturity to all exposures. For Foundation Internal Rating Based (FIRB) approach, the application assigns the PD and LGD on its own. In Advanced Internal Ratings Based (AIRB) approach, these values are directly taken as downloaded values from the reporting bank.

For senior claim exposures, LGD assigned is 0.65 and for non senior claim exposures LGD assigned is 0.75. For exposures belonging to retail asset class, irrespective of the seniority of the exposure, the LGD has a floor value of 0.1. FIRB approach assigns pre-mitigation LGD to all purchase receivables through a separate rule. PD has a floor value of 0.0003 for all asset classes, except for defaulted exposures, where the value is 1.

For corporate and bank exposures, PD is greater of the one year PD associated with the internal borrower grade to which that exposure is assigned or 0.03%. For sovereign exposures, the PD is the one year PD associated with the internal borrower grade to which that exposure is assigned. For both FIRB and AIRB, banks should be estimating PDs of the exposures. The PD of the borrowers assigned to a default grade, consistent with default criteria is 100%.

LGD is usually shown as the percentage of EAD that the bank can lose if the borrower defaults. It depends, among others, on the type and amount of collateral and the type of borrower and the expected proceeds from the worth (for example, sales proceeds from sales of collaterals/securities) of the assets. Also, LGD is exposure specific, that is, different exposures to the same borrower can have different LGDs.

1. Under FIRB approach, if corporate, sovereign and banks asset classes are not secured by recognized collateral, the following are the minimum LGD for the exposures which are subject to RBI review:

    - Senior claims is assigned a 65% LGD in RBI, whereas BIS has 45% LGD.

    - All subordinated claims is assigned 75% LGD in RBI, same as in BIS.

2. The LGD for secured claims is 50% in RBI, whereas in BIS it is 35% (for CRE/RRE and eligible financial receivables only).

3. When the exposure is covered by eligible financial receivables, eligible CRE/RRE and other physical collateral (eligible IRB collaterals). For partial collateralization, the covered portion of the exposure is assigned the percentages as mentioned under C** below, while the uncovered portion is assigned 65% LGD. This is in the case where the collateral is completely used, but the exposure is still partially covered.

    A snapshot of the LGD values applicable for FIRB in India is as follows:

LGD for unsecured and non-recognised collateralised exposures			
Type of exposure	**Minimum LGD (%)**		
Senior Unsecured claim	65		
Subordinated claim	75		
LGD for collateralised exposures – under eligible collaterals			
Type of collateral	**Minimum LGD (%)**	**Threshold level of collateralisation required for partial recognition of collateral for the exposure (C*)**	**Required level of (over) collateralisation for full recognition of collateral for the exposure(C**)**
Eligible financial collateral[@]	-	-	-
Eligible financial receivables	50	0	125
Eligible Commercial Real Estate (CRE)/Residential Real Estate(RRE)	50	30	140
Other physical collateral [£]	60	30	140

@ treatment has been dealt with in detail in para 56 and 57 of the guidance and Appendix 3
£may include industrial properties, land, etc.

If the exemption in determining effective maturity for smaller domestic corporate borrowers is applied, all exposures to qualifying smaller domestic firms as mentioned above is assumed to have an average maturity of 2.5 years on a consistent basis, similar to foundation IRB.

Tasks for PD-LGD assignments for Purchased Receivables can be found under sub-process **PD-LGD Assignment - Top Down Approach,** while for others it is done under sub-process **PD-LGD Assignment**.

Minimum and Over-collateralization levels assignment and amount adjustments are done under sub-process **CRM Mitigant Collateralization Level**. The mitigants which fall below the minimum collateralization level or more than over-collateralization level, are marked as ineligible in the **optimizer_cre** and the amount allocated to such mitigants is updated against uncovered row. The LGD assignment for uncovered exposures based on seniority of the exposures is done in the task **IND - Uncovered Exposures LGD Assignment**. As per the RBI guidelines, the LGD assignment based on collateralization levels is done only for the FIRB approach, hence the mentioned tasks can be found under process **IND_BASELIII_NON_SEC_FIRB**.

Pre-Mitigation Capital Calculation

Pre-mitigation capital is calculated for all asset classes using the Correlation factor, PD, and LGD where correlation factor is calculated for each asset class on the basis of PD. Capital for defaulted exposures and failed trades is calculated through separate Rules. For exposures that have defaulted, the application uses two inputs - LGD and Best Estimated Expected Loss of a Bank. For failed trade transactions, the capital requirement is assigned by the application on the basis of the number of failed business days.

The risk multipliers for RBI are different from the risk multipliers for BIS. The treatment of failed trade is replicated from India Standardized Approach rather than BIS. The same is carried to both FIRB and AIRB for India. The following table illustrates the risk multipliers applicable for India under both Standardized and IRB approaches.

Number of Working Days After the Agreed Settlement Date	Corresponding Risk Multiplier (in per cent)
From 5 to 15	9
From 16 to 30	50
From 31 to 45	75
46 or more	100

Failed trade is treated under the sub-process **Non Sec Failed Trade Processing**.

In the case of sold credit protection exposures, the exposures are assigned the risk weight pertaining to the securitization exposures. For assigning these risk weights, the application applies multiple assessments. These multiple assessment of ratings is performed in the Data Transformation "Mult_Assessment_SCP". The details of the Data Transformation are as follows:

Data Transformation Name	Objective	Processing Logic
Mult_Assessment_SCP	The objective of this Data Transformation is to perform multiple assessment of the ratings and assign a normalized rating and risk weight to the sold credit protection exposures.	For each exposure, the various standard ratings associated with that exposure and the respective risk weights are identified. If the number of ratings are 1, then the same rating gets assigned as the standard rating for the exposure and the risk weight associated with that standard rating gets assigned as the Pre-mitigation risk weight. If the number of ratings are greater than or equal to 2, then the exposure is assigned a risk weight which is the worst of the best two risk weight. And the corresponding rating is assigned to the exposure.

For more information on setting up this Rule, see *Run Parameters Setup for Run Creation.*

Sold Credit protection is treated under the sub-process **Sold Credit Exp Data Pop**.

Credit Conversion Factor (CCF)

This is applied to all the off-balance sheet exposures. The CCF applied values are the same as in the standardized approach for RBI. The CCF values range as 0%, 20%, 50%, 75%, 100%. The various factors on the basis of which CCF is applied are product type, type of facility (whether it is cancellable or not), and the maturity of exposure. Sub-process **CCF Assignment** assigns the CCF percentages as per the RBI guidelines.

Pre CRM Exposure at Default (EAD)

Exposure at default is calculated for all asset classes based on:

- Current Exposure Amount
- Off-Balance Sheet Drawn CCF Percent
- Provision Amount
- Undrawn Amount
- CCF Percent
- Exposure Accrued Interest
- Write Off Amount

CCF percent for FIRB approach is assigned by the application and is taken as a value provided by the client for AIRB Approach.

If the reporting bank has exposure to one of its own subsidiaries, then that exposure is classified as internal exposure. Each of the internal transaction, that is, transaction between parent and its subsidiary is marked as deduction line item. The deduction is processed as part of the RBI II Capital Structure in the capital structure processing and all the internal transactions are eliminated from any RWA calculation.

Of the total exposure amount, the exposures can have drawn amount and undrawn amount. Drawn amount is the direct credit exposure and undrawn amount can become a potential exposure when that amount is drawn. Therefore, EAD related to undrawn amount is calculated by multiplying the CCF percent with undrawn amount. The application calculates the EAD related to drawn amount using the following attributes:

- Exposure Accrued Interest
- Off-Balance Sheet Drawn CCF Percent
- Write Off Amount
- Provision Amount
- Current Exposure Amount

For market related off-balance sheet items that are specifically highlighted in RBI Basel III Regulatory issued in 2012, exposure is calculated as committed but undrawn amount multiplied by a credit conversion factor (CCF). The credit equivalent amount in relation to a non-market based off-balance sheet items like direct credit derivatives, trade and performance related contingent items, and other drawndown commitments are determined by multiplying the contracted amount of that particular transaction by the relevant CCF.

In calculating the off-balance sheet credit exposures arising from market related off-balance sheet items that expose bank to counterparty credit risk, the bank includes all its market related transactions held in the banking and trading book which give rise to off-balance sheet credit risk.

1. Market related off-balance sheet items include:
    a) Interest rate contracts;
    b) Foreign exchange contracts, contracts involving gold, cross currency swaps (including cross currency interest rate swaps), forward foreign exchange contracts, currency futures, currency options; and

    c) Any other market related contracts specifically allowed by the Reserve Bank which give rise to credit risk.

2. Exemption from capital requirements is permitted for:

    a) Foreign exchange (except gold) contracts which have an original maturity of 14 calendar days or less; and

    b) Instruments traded on futures and options exchanges which are subject to daily mark-to-market and margin payments.

The exemptions listed above under point 2 are excluded from the capital computations from the relevant table populations and tasks. Sub-process **EAD Calculation** computes the pre-mitigation EAD.

Equity Exposures – SRWA/ PD LGD Approach Non Investment Fund Treatment

Equity Exposures are treated in the Equity Exposures (**FCT_EQUITY_EXPOSURES**) table where EAD is calculated using the post off-set amount. This is further reduced by the exposure excess investment amount. The excess investment amount is to be provided as an input. For more information, see the *Download Specifications* document.

Equity Exposure can be treated using the Simple Risk Weight Assignment (SRWA) method, PD/LGD approach or Internal Model Method. You can define the approach to be used to calculate the RWA for equity approach. If PD/LGD approach is selected Correlation, Capital charge and RWA is calculated.

If SRWA is the selected RW is calculated based on equity being Public Traded or Private traded. If IMM is selected, then the Capital Charge Derived from VaR Model is taken as input and RW is assigned.

Equity Exposures RWA

Equity Exposure RWA is calculated by multiplying the risk weight with the Equity EAD. Equity data is processed in Equity Exposures (**FCT_EQUITY_EXPOSURES**) table. From Equity Exposures (**FCT_EQUITY_EXPOSURES**), data is populated to Fact Non Sec Exposures (**FCT_NON_SEC_EXPOSURES)** table.

For calculating risk weighted assets for equity exposures held in banking book, two approaches are used:

1. Market-based approach

   Under the market-based approach, banks are permitted to calculate the minimum capital requirements for credit risk for their banking book equity holdings using either or both of two following methods:

       a. Simple Risk Weight Assignment Method

       Banks in India are not allowed to take a Short position in Equity or derivatives. For this purpose, the offsetting of Long and Short positions of the bank is not permitted.

       b. Internal Models Method:

       This approach is same as in BIS (Section 5.1.2.8.2). There are no functional changes to the same.

2. PD/LGD approach

   The minimum requirements and methodology for the PD/LGD approach for equity exposures are the same as those for the IRB foundation approach for corporate exposures. The maximum risk weight applicable for equity exposures for India is 1250%.

Sub-processes **Equity PD - LGD Approach**, **Equity Simple Risk Weight Method** and **Equity Internal Model Method** deal with the treatment of equity exposures under SRWA, PD/LGD and IMM approach respectively.

Framework for Exposures in Default under Corporate, Sovereign, Bank and Retail Exposures

The capital requirement for restructured exposures considers the 'hardship' clauses specified in RBI Master Circular on Relief Measures by Banks in Areas affected by Natural Calamities dated July 1, 2011 or with the prior approval from RBI.

- Capital requirement (K) for a defaulted exposure is equal to the greater of zero and the difference between its LGD and the bank's best estimate of expected loss.

- The risk weighted asset amount for the defaulted exposure is calculated simlar to the non defaulted exposure, that is, product of K, 12.50% and EAD.

- Restructured exposures under corporate, sovereign and bank asset classes calculate risk weight as applicable to exposures in default, except for hardship clauses.

- Hardship clauses can be extended to borrowers, as per the RBI Master Circular on Relief Measures by Banks in Areas affected by Natural Calamities dated July 1, 2011 or with the prior approval from RBI.

- However, such restructured accounts are eligible for upgrade to the non defaulted category after observation of 'satisfactory performance' during the period of one year from the date when the first payment of interest or installment of principal falls due under the terms of restructuring package.

NOTE: This treatment of restructured assets classified as standard assets is from the perspective of capital adequacy and is not considered as a contradiction of asset classification norms which have implications for provisioning.

The above definition of defaulted and restructured assets are expected as an input from the bank, where the reporting bank classifies the exposures as NPA or restructured.

If the exposure is restructured and the period of satisfactory performance is more than 1 year, then the exposure is treated as standard. If the period of satisfactory performance is less than 1 year, then the exposure is treated as defaulted.

The process flow is as follows.
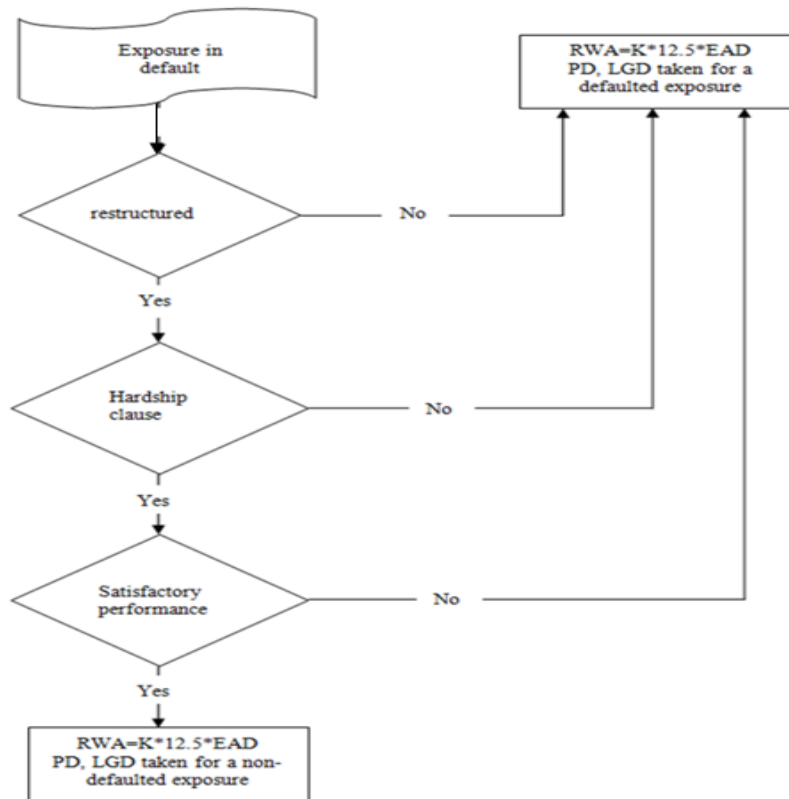
Task **IND - Non Sec PD Assignment for Defaulted Exposures IRB** considers the above flow and assigns the PD to the defaulted exposures based on the RBI guidelines. The other tasks for RWA and Capital charge calculations pick up this PD and treat these exposures as per the guidelines given by RBI in this regard.

Retail Exposures

The retail exposure rules cover risk components, qualifying criteria, further classification of retail assets, EAD calculations, on balance sheet netting and risk weight functions of retail assets.

The following claims, both fund based and non-fund based, shall be excluded from the regulatory retail portfolio:

a. Exposures by way of investments in securities (such as bonds and equities), whether listed or not;

b. Loans and advances to banks' own staffs which are fully covered by superannuation benefits and / or mortgage of flat / house;

c. Capital market exposures;

d. Venture capital funds.

NOTE: Capital calculation for the exposures mentioned in (b) and (d) are treated as per RBI directives of standardized approach of India Basel III.

The above exclusions and qualifying criteria follow the same criteria as per the RBI Standardized approach reclassifications for Retail exposures. The threshold of INR 50 Crore is checked in accordance with the standard approach for India. The reclassification into RRP is done in the task **Map_Ret_Exp**.

Pre-CRM RWA Computation

Pre-CRM RWA is calculated for all asset classes by multiplying the Pre-CRM EAD with the risk weight.

Credit Risk Mitigation

The application handles multiple mitigants for credit risk mitigants like financial collateral, on-balance sheet netting, guarantees, credit derivatives, and so on. In CRM reclassification, collateral and issuer is reclassified to standard collateral and issuer type. The mitigant is identified as eligible or not based on the eligibility rules for CRM.

Process Flow for Credit Risk Mitigation

```
┌─────────────────────────────────┐
│      Mitigant Eligibility       │
└─────────────────────────────────┘
                │
                ▼
┌─────────────────────────────────┐
│         PD/LGD for CRM          │
└─────────────────────────────────┘
                │
                ▼
┌─────────────────────────────────┐
│   Mitigant Haircut Assignment   │
└─────────────────────────────────┘
                │
                ▼
┌─────────────────────────────────┐
│  CRM Capital Charge Calculation │
└─────────────────────────────────┘
                │
                ▼
┌─────────────────────────────────┐
│ Allocation of Mitigants to Exposures │
└─────────────────────────────────┘
                │
                ▼
┌─────────────────────────────────┐
│    Post CRM RWA Computation     │
└─────────────────────────────────┘
```

Mitigant Eligibility

In the Comprehensive approach, credit rating of the mitigant of the collateral is considered for all mitigant types issued by all party types, while deciding whether the mitigant is eligible for a particular exposure or not. The application has pre-defined Rules that perform these eligibility checks. Separate eligibility Rules for mitigants types that are equity, mutual funds, or debt security exist in the application. For the remaining mitigant types, a mitigant is marked as eligible if it satisfies the following conditions:

- The credit rating is better than the exposure to which it is providing protection
- The exposure is classified as senior in position.

Mitigant eligibility is also checked based on the original and residual maturity of the collateral. Collateral is classified as eligible only if its original maturity is more than a year and residual maturity is more than 3 months.

PD/LGD for CRM

The application assigns the PD and LGD to the mitigants as follows:

In the FIRB approach for financial collateral, PD used is that of the exposure that the collateral is covering and the LGD used is 0. For other mitigants like guarantees or credit derivative, the PD used is that of the mitigant (expected to be an input from the bank) and LGD used is that of the exposure that the mitigant is covering.

For LGD assignment, the application considers the minimum collateralization effect as stated in the Basel II guidelines. Additionally, if there is any over collateralization amount, the application does the mitigant value adjustment based on the over collateralization percentages as stated in RBI guidelines.

For AIRB Approach, the institutions must provide the PD or LGD data at a mitigant level. However, if the reporting bank is able to model the PD or LGD of the exposure considering the mitigation effects, then the application offers the flexibility to the reporting bank to include the mitigation effects at exposure level. In such cases, the reporting bank need not provide mitigant data separately, as they have already factored in its effects at the exposure level PD and LGD.

Mitigant Haircut Assignment

The application does computations for three kinds of mitigant haircut as follows:

- Volatility haircut
- FOREX haircut
- Maturity mismatch haircut

Volatility haircuts are calculated and amount of the exposure to the counterparty and the value of collateral or mitigant is adjusted to account for any future fluctuations in the market value. After this adjustment, the application updates the volatility adjusted amounts for the exposure (higher than original exposure amount) and the collateral (lower than original amount).

When the exposure and collateral are in different currencies, the application performs adjustments by applying the FOREX haircut. If the residual maturity of the CRM is less than that of the underlying credit exposure, then a maturity mismatch is applied. If there is a maturity mismatch and the CRM has an original maturity of more than one year, maturity mismatch haircut is applied to adjust the value.

There are two methods for assigning volatility haircut:

- Supervisory Haircut
- Own Estimate

For supervisory haircut method, the application assigns volatility haircut based on issuers, issuer's ratings, mitigants residual maturity, and type of mitigant, as recommended by the Basel accord. For Own Estimate method, the application considers the Basel transaction type of the exposure. Basel transaction types are stored in the Basel transaction type dimension (**DIM_BASEL_TRANSACTION_TYPE**) table. The various transaction types available are capital market driven, repo style, and secured lending.

The volatility haircut is assigned as per the RBI guidelines. The FOREX haircut is also assigned based on these transaction types as per RBI guidelines.

Only eligible mitigants are considered for haircut assignment. The eligible mitigants are moved from the mitigants (**FCT_MITIGANTS**) table to sub exposures (**FCT_SUB_EXPOSURES**) table. Haircuts mentioned in the Basel Accord assume a holding period for 10 days. However, if the holding period for mitigants is more than 10 days, then the application scales up the haircut value to reflect the correct value as per the holding period.

CRM Capital Charge Calculation

Mitigant Correlation Factor

Similar to Non Securitization exposures, correlation factor for collaterals or mitigants are also calculated for mitigants belonging to all asset classes. This is based on their PD as mentioned in the RBI guidelines.

Capital Charge Calculation

Capital charge is calculated for all mitigants using their effective maturity, correlation factor, probability of default, loss given default, and maturity adjustment value.

Allocation of Mitigants to Exposures

This process loads the mitigant mapping data from stage table to the corresponding processing table. Mitigants are allocated to the respective exposures it covers and the application defines the amount of the bank's exposure the mitigant is covering. Shareholding percent is also applied to the mitigant amounts. The application has a pre-built optimizer for optimum allocation of mitigants to the exposures for CRM purposes. One-to-One, Many-to-One, and Many-to-Many mapping of mitigants are handled in an efficient manner involving storage of intermediate computations for traceability.

All mitigants which are eligible and mapped to an exposure are then populated to a new table where each exposure is broken down into mitigant types. It includes an additional row which treats the exposure as having covered and uncovered portion. The covered factor and uncovered factor is also populated in this table.

The application uses the linear programming logic to alloc`ate the mitigants to the exposures. Pooling identifies the exposure and mitigant data from sub exposures (**FCT_SUB_EXPOSURES)** table. Exposure identifier and mitigant identifier are the attributes on which pooling is performed. It assigns a pool ID for each exposure to mitigant combination. Based on these pool Ids, the optimizer allocates a covered factor to exposures. Optimizer allocates mitigants to exposures to attain the most favorable EAD output

For more information on pooling and optimizer, see Exhibit 1 and Exhibit 3 in *Annexure A: Key Concepts*.

NOTE: A tag <ALTER_STATEMENTS> is present in Optimizer_Config.xml. This statement is used to enable the parallel Data Manipulation Language (DML) for optimizer. This is disabled by default due to which a warning appears as follows, which is printed in the optimizer log:

"Error: **Could not find node ALTER_STATEMENTS in the xml**"

The administrator can uncomment this tag to enable parallel DML for the optimizer.

Post-CRM RWA Computation

Pre mitigation EAD is divided into Post Mitigation EAD for the covered portion and Post Mitigation EAD for uncovered portion. Covered portion is the portion of the exposure covered by the mitigant and uncovered portion is portion of the exposure not covered by the mitigant. For multiple mitigants covering one exposure, there is more than one record for the covered portion of that exposure. Post mitigation RWA UL (Post CRM RWA UL) is calculated by multiplying post mitigation EAD and its Capital Required UL with 12.5. Post mitigation RWA Expected Loss is calculated by multiplying the PD, LGD, and post mitigation EAD amount with 12.5.

Post CRM

Pre-mitigation EAD is split into post mitigation EAD for covered portion (mitigant's EAD - portion of exposure that is covered by mitigant) and uncovered portion (portion of the exposure that is not covered by mitigant). For multiple mitigants covering one exposure, there is more than one record for covered portion of that exposure. Thus, each exposure is divided into sub-exposures. Post mitigation RWA Unexpected Loss (post CRM RWA UL) is calculated as the product of sub exposure amount and applicable Risk Weight. For covered portion, RW applicable is as per mitigant assigned, for example, RW applicable to eligible guarantor. For uncovered portion, RW of exposures continue to be applied. Sub-exposure amount are, then, aggregated to exposure level.

Counterparty Credit Risk

The Standardized Approach for Counterparty Credit Risk (SA-CCR) is an alternative for Standardized Method (SM) and Current Exposure Method (CEM) for Counterparty Credit Risk (CCR) in Credit Risk. Banks can use SA-CCR approach while they follow Standardized or IRB approaches for credit risk.

8.2.2.2.2   Securitization – Internal Ratings Based Approach

The RBI guidelines differentiate the Credit Risk computation of the Securitized exposures from Non Securitized exposures. As securitized exposures are part of off-balance sheet transactions, it follows a waterfall cash flow mechanism unlike the other exposures. Hence these exposures are treated differently. Due to the economic crisis of 2008, the Basel Rule has categorized securitized exposures into securitized and re-securitized exposures.

Securitized exposures are exposures which are issued out of a pool of underlying exposures for the transfer of risk. Re-securitized exposures are the exposures which are issued out of a pool of underlying exposures which constitutes non-securitized exposures and some portion of securitized exposures. The application is capable of handling both securitized exposures and re-securitized exposures. It also handles the calculation for the originator and the investor bank roles. At a broad level, there are two categories of Investors:

- An Investing Bank who has invested heavily in securitization.
- An Investing Bank who has invested minimal in securitization.

For both the investors, the data is expected in the Stage Underlying Exposures (**STG_UNDERLYING_EXPOSURES**) for the underlying of the pool, Total Pool Level attributes in the Stage Pool table (**STG_SECURITIZATION_POOL**), Tranche Level attributes in the Stage Tranche table (**STG_SECURITIZATION_TRANCHE**), and the Exposure Level Attributes in the respective product processor (PP) tables.

For an originator, the data is expected in the same manner as the Investor, except for the Underlying Exposures. The underlying exposures of the pool are expected in the respective PP tables, depending on the product type of the underlying exposures.

If the exposure is a credit protection in the form of guarantee, it is expected in the Stage Guarantees table (**STG_GUARANTEES**), and if it is a credit derivative, it is expected in the Stage Credit Derivatives table (**STG_CREDIT_DERIVATIVES**). If it is a regular investment in the Tranches by an investing bank, or it is part of the mandate for retention in the pool or tranche for an originating bank, the data is expected in the Stage Investments table (**STG_INVESTMENTS**).

For exposures being a facility like liquidity facility, or servicer cash advance, the exposures are expected in the Stage Commitment Contracts table (**STG_COMMITMENT_CONTRACTS**).

BIS differentiates securitization exposures into two types:

1. Traditional exposures: A traditional securitization is a structure where the cash flow from an underlying pool of exposures is used to service at least two different stratified risk positions or tranches reflecting different degrees of credit risk.

2. Synthetic exposures: A synthetic securitization is a structure with at least two different stratified risk positions or tranches that reflect different degrees of credit risk where credit risk of an underlying pool of exposures is transferred, in whole or in part, through the use of funded or unfunded credit derivatives or guarantees that serve to hedge the credit risk of the portfolio.

RBI follows only traditional exposure type in framing the risk weight assets and follows the rules for dealing with such exposure. Also, re-securitization exposures are not applicable in RBI.

The advanced approaches and the treatment of securitization exposures under these approaches is detailed in the sections that follow. The process to be referred for securitization exposures is **IND_BASELIII_SEC_IRB**.

Process Flow for Securitization – IRB Approach

The application handles the IRB Approach of the Securitization Exposures as follows:

Credit Rating Processing

All the rating information of the exposures and the mitigants are populated from the staging tables to the processing tables. The exposure and the tranche rating information are captured in the account rating (**STG_ACCOUNT_RATING_DETAILS**) tables and the mitigants rating information are captured in the instrument rating details (**STG_INSTRUMENT_RATING_DETAILS**).

This is handled in the **CREDIT_RATING_PROCESSING** process.

Sec Data Population, Mitigant Data Population, and Mitigant Mapping

The data pertaining to the pool, tranche, and exposures are populated from the staging tables to the processing tables. The underlying exposures data is captured in the respective Product Processor tables (for which the process pertaining to the Non Securitization exposures are followed). The mitigants data are populated from the staging table to the processing table. The exposures which are mapped to the mitigants are captured and populated from the staging table to the processing table.

Sec Reclassification

The application uses the standardized data for all kinds of calculations (product type like eligible liquidity facility, bank role like originator, pool type like mortgage backed securities). Before any computation, the application reclassifies the bank specific data to standard data, similar to the Basel accord terms. The application reclassifies the Bank role to the standard Bank Role of an Originator or Investor. Any other bank roles like Sponsor, Credit Protection Provider and so on are reclassified into Originator, Investor respectively.

The application also reclassifies the pool type to the standard pool type like Credit Cards Receivable Pool, Auto Loans, and so on. It also reclassifies the product type to the standard product type like Mortgage Backed Securities, Eligible Liquidity Facility, and so on. For mitigants, the application reclassifies the mitigant types to the standard mitigant types like the Debt Securities, Credit Derivative, Cash, and so on. It also reclassifies the mitigant issuer type to the standard mitigant issuer type like banks, corporate, and so on.

The reclassification tasks are present in Sec reclassification and Mitigant reclassification sub process.

Sec Approach Selection

The application assigns the appropriate approach to the exposures, based on the criteria specified in the Basel Accord. The application assigns any of the three approaches under IRB process:

- Sec-Ratings based Approach
- Sec-Supervisory Formula Approach (SFA)
- Sec-IRB 1250% Risk Weight Approach

If the exposure is qualified for the SFA approach (SFA Qualified flag is 'Y') and there is one or no external ratings assigned for that exposure, then the application assigns the SFA to the originator exposures. It assigns the sec-ratings based approach, if there is at least one rating assigned to the exposures. If exposures are qualified for SFA approach (SFA Qualified flag is 'Y') and has more than one rating, the application assigns the sec-ratings based approach to that exposure. In the case of exposures not qualifying for any of these approaches, the application assigns the Sec-IRB 1250% Risk Weight Approach.

This approach selection is handled in the Sec Approach selection sub-process.

Pre-CRM RWA Computation

The application calculates the pre-CRM RWA for the exposures by multiplying the pre-CRM EAD with the risk weight of the exposures. This is handled in the pre-CRM computations sub-process.

Pre-CRM EAD Computation

The application assigns the Credit Conversion Factor (CCF) to the off-balance sheet items as specified by the RBI guidelines. The CCF percentages are assigned based on the bank role (this is applicable only for the originator bank role), the product type (like the Eligible Liquidity Facility), and the applicable ratings. The CCF percentages are also assigned to the exposures based on the early amortization provision applicable to the transaction. In such cases, the CCF assignment is based on the early amortization type (controlled or uncontrolled), the pool type, and the ratio of three month average excess spread to the trapping point. Further, the application computes the pre-mitigation EAD based on the bank role and the product type. It calculates the EAD for the investors and the originators separately based on the calculations given in the RBI guidelines. This is handled in the **Pre-CRM Computations** sub-process.

Risk Weight Assignment

Ratings Based Approach

For exposures that follow the ratings based approach, the risk weight assignment is similar to the standardized approach, except for the difference on the criteria used for risk weighting. The application uses the granularity of the pool, seniority position of the exposure, and the credit rating of the exposure for the risk weighting the exposures which follow the ratings based approach.

In the case of exposures which are unrated, the application checks the criteria required for inferring the rating. This is based on the presence of the subordinate tranche information (based on seniority) for the same pool, regardless of whether the bank has an exposure in that tranche or not, residual maturity of the subordinate tranche being more than the unrated tranche's residual maturity, the credit enhancement level of the unrated tranche being equal to or more than the subordinate tranche's credit enhancement level. The ratings of the tranches also undergo multiple assessments and the application assigns a single rating for all the rated tranches. This multiple assessment of ratings occur in the Data Transformation "Mult_Assessment_Tranche". The details of the Data Transformation are as follows:

Data Transformation Name	Objective	Processing Logic
Mult_Assessment_Tranche	The objective of this Data Transformation is to perform multiple assessments of the ratings and assign a normalized rating and risk weight to the securitization tranche. This is required for processing the inferred ratings treatment.	For each securitization tranche the various standard ratings associated with that exposure and the respective risk weights are identified. If the number of ratings are 1, then the same rating gets assigned as the standard rating for the tranche. If the number of ratings are greater than or equal to 2, then the tranche is assigned a standard rating which corresponds to the worst of the best two risk weights associated with the various tranche ratings.

Based on all this criteria, the rating for the unrated exposure is considered to be equal to the identified subordinate tranche. Due to the seniority of the exposure in the cash flow and in the securitization structure, a subordinate tranche does not have ratings more than that of the immediate senior tranche. Hence, if more than one subordinate exposure exists, then the application assigns the rating of the immediate subordinate tranche.

This is handled in the **Pre-CRM Computations** sub-process.

Supervisory Formula Approach

For exposures which follow the supervisory formula approach, the application calculates the underlying capital of the securitization pool (K_{IRB}), using the Non Securitization process. Further, the application calculates the SFA parameters based on the pool and tranche details. The application calculates these, using the calculation logic specified by the RBI guidelines. It also checks the exposure to identify whether the exposure should be straddled or not. This check is based on the credit enhancement level of the tranche to which the exposure belongs to, the thickness of the tranche to which the exposure belongs to, and the underlying capital of the securitization pool.

The exposures for which the sum of the credit enhancement level and the tranche thickness are less than that of the K_{IRB}, the exposures are deducted from the capital. The exposures for which the credit enhancement level is more than that of the K_{IRB}, the exposures have the SFA Parameters computed. The exposures for which the credit enhancement level is less than that of the K_{IRB} but the sum of the credit enhancement level and the tranche thickness are more than the K_{IRB}, the exposures are straddled, that is, the tranche to which the exposure belongs is split into a position below K_{IRB} and a position above K_{IRB}. All the exposures mapped to the straddled tranche are also split by the application in the same proportion as the split tranche.

The application populates straddled tranche information into Securitization Straddled Tranche (**FSI_SEC_STRADDLED_TRANCHE)** table. The application splits each of the exposures of the identified straddled tranche, into two. The account skey of the parent exposure, which is undergoing the split, is added as the parent account skey for the new exposures formed. The straddled tranche deduction amount (the K_{IRB} amount less the tranche amount) is calculated and populated from the **FSI_SEC_STRADDLED_TRANCHE** in a pro-rated manner to all the exposures of the straddled tranche which are identified for deductions. The remaining amount (which is the tranche amount above the K_{IRB}) is the exposure amount of the senior exposure belonging to the category of split exposures. After the original exposures are split into two and their amounts are populated, the original exposure is deleted from the Exposure table.

The splitting of the identified straddled exposures are done with the help of the Data Transformation "Sec_Straddling_Sfa" for securitized exposures and with the help of the Data Transformation "Resec_Straddling_Sfa" for resecuritized exposures.

The Details of the Data Transformation are as follows:

Data Transformation Name	Objective	Processing Logic
Sec_Straddling_Sfa	The objective of this Data Transformation is to split the sec position (excluding resec position) belonging to straddling qualifying tranche into two positions (senior and junior) and treat them as per regulator guidelines.	Cases where L < KIRB < (L+T), the position is split into two position, where junior position is calculated as pool capital in amount terms minus the sum of amount of all tranches junior to the one to which bank has exposure to. The remaining amount is assigned to senior position, which gets assigned risk weight calculated as per Supervisory Formula. The junior position is assigned 1250% risk weight.
Resec_Straddling_Sfa	The objective of this Data Transformation is to split the re-sec position belonging to straddling qualifying tranche into two positions (senior and junior) and treat them as per regulator guidelines.	Cases where L < KIRB < (L+T), the position is split into two position, where junior position is calculated as pool capital in amount terms minus the sum of amount of all tranches junior to the one to which bank has exposure to. The remaining amount is assigned to senior position, which gets assigned risk weight calculated as per Supervisory Formula. The junior position is assigned 1250% risk weight. The Data Transformation inserts record corresponding to the straddled tranche into DIM_EXPOSURE and FCT_SEC_EXPOSURES. The Data Transformation updates N_SEC_EXP_RW_UL & N_PRE_CRM_SEC_EXP_CAPITAL_UL. of FCT_SEC_EXPOSURES.

After all the SFA Parameters are computed, the capital charge is calculated using the SFA Parameters. This capital charge is subsequently converted into the risk weight.

This is handled in the **Pre-CRM Computations** sub-process.

Sec 1250% Risk Weight Approach

The exposures which are unrated and do not qualify for any of the approaches, are assigned 1250% risk weight. Also, the exposures under RBA which are below investment grade are also assigned 1250% risk weight. The exposures which follow the SFA Approach and which are lower than the KIRB, also get assigned 1250% risk weight.

Sec CRM Process

Mitigant Eligibility, Mitigant Risk Weight, Haircut Assignment, and Allocation of Mitigants to Exposures are handled in Sec CRM sub-process.

Mitigant Eligibility

The application identifies the eligible mitigants based on the criteria as mentioned in the RBI guidelines. The application identifies the following mitigants in the case of Securitized exposures – collateral, guarantees, and credit derivatives. The application is capable of using comprehensive approach for mitigants which are part of the collateral. This is similar to the mitigant eligibility of the Non Securitization process. The application processes multiple assessments of ratings for mitigants and some of the mitigant eligibility criteria are based on the ratings and risk weight of the mitigants.

The eligibility of the collateral mitigants are based on the party type of the mitigant, mitigant types, the credit rating assigned to the mitigant or the party (as applicable), and the classification of collateral being senior or not. For equity, the eligibility is based on the main index equity and the equity trading status. For mutual funds, the eligibility is based on the eligible mutual fund indicator. The application identifies the eligibility of the guarantees and credit derivatives based on the party type of the mitigant and the credit rating assigned to the issuer of the mitigant. In the case of Nth to default credit derivatives, the application further identifies the eligible credit derivative, based on the number of defaults in the exposures and the defaulted position covered by the mitigant. The application identifies the number of defaults in the tranches based on the attachment point of the tranche to which the exposure belongs to, the initial pool exposure amount, and the cumulative default amount.

Further, the application computes the number of tranches in default and compares it with the defaulted position covered by the mitigant. Based on the criteria of eligibility mentioned in the Basel accord, the application identifies whether the mitigant is eligible or not, and if eligible, the application also makes the least risk weighted exposure as the eligible mapping, for the least eligible nth to default mitigant for the exposure.

This identification of the eligible nth to default credit derivative and the eligible exposure-mitigant mapping is performed with the help of the Data Transformation "CD_Sec_Mitigant_Elig_IRB". The details of the Data Transformation are as follows:

Data Transformation Name	Objective	Processing Logic
CD_Sec_Mitigant_Elig_IRB	The objective of this Data Transformation is to identify an eligible sec exposure mitigant mapping wherein the mitigant is an Nth to default credit derivative, in the case of Securitization IRB Approach.	The eligible nth to default credit derivative mitigant is identified and processed based on the exposures mapped to the same pool id. All the exposures mapped to the same pool ID are identified and the corresponding mitigants mapped to them are also identified. In the sec pool id, the cumulative pool default amount is compared with the tranche attachment point as a number (obtained by multiplying the tranche attachment percentage by the initial pool exposure amount). The number of tranches for which the tranche attachment point is less than the cumulative pool default amount is calculated. This number is compared with the minimum defaulted position of the credit derivative mitigant. For a basket of exposures covered by multiple credit derivatives, eligible mitigant is minimum defaulted position in the basket minus 1. Also other credit derivative in the basket of exposures which are having the defaulted position consecutively iscome eligible. For each eligible mitigant, the exposure mitigant mapping wherein the exposure has the least risk weight or capital charge iscome eligible. All other exposure mitigant mapping for that mitigant is marked ineligible.

The application also identifies the eligibility of the mitigants based on the comparison of the risk weight of the exposures and the mitigants.

The application also identifies the eligibility of the mitigants based on the comparison of the risk weight of the exposures and the mitigants. If the mitigants risk weight is lesser than the risk weight of the exposures, then the mitigants become eligible or else the application makes them ineligible.

Mitigant Risk Weight

The application calculates the mitigant risk weight similar to the exposure risk weight of Non Securitized exposures. This is based on the issuer type and the credit rating, which includes the unrated issuers as well. The application performs multiple assessments for the mitigants, similar to the Non Securitization process, and arrives at a single rating for the mitigant. Further, the application assigns the final risk weight to the mitigant. In the case of financial collateral mitigants like cash and gold, zero risk weight is assigned.

Haircut Assignment

Haircut assignment to the mitigants is processed in the **FCT_SUB_EXPOSURES** table. The application assigns the various haircuts, as applicable to the mitigants. In the case of collateral following simple approach for recognition, there are no haircuts assigned to the mitigant. In the case of collateral following comprehensive approach, the application has the flexibility to use the supervisory haircuts and scale up if required, based on the minimum holding period. Alternatively, it also uses the bank's own estimate of haircuts. The application applies the volatility haircut, FOREX haircut, and the maturity mismatch haircut appropriately to the mitigants, as per the Basel accord. Only eligible mitigants are considered for haircut assignment. The eligible mitigants data flows from mitigants (**FCT_MITIGANTS**) table to sub exposures (**FCT_SUB_EXPOSURES**) table.

The application populates an uncovered mitigant for each exposure in the **FCT_SEC_EXPOSURES** table. This uncovered mitigant has same features as that of the exposure and are created in the **FCT_MITIGANTS** table.

Allocation of Mitigants to Exposures

The application computes the mitigant value after all haircuts. The application uses the pooling and optimizer logic to allocate the exposures to the mitigants. This is a bit different from the optimizer logic of Non Securitization exposures as the Securitized exposures have priority in the cash flow and gets the maximum protection by the mitigants. The senior most exposure (or tranche) is denoted with seniority 1 and the second senior exposure is denoted with seniority 2 and so on.

In the case of securitization exposures, the mitigants are always given preference over the senior most exposure and subsequently to the other exposures based on the seniority. The other parameters which are considered in the allocation logic are the risk weight and the mitigant value post haircut. The application uses the linear programming logic to allocate the mitigants to the exposures. The optimizer logic for the Securitization process is a bit different from the Non Securitization process which is as follows:

> Based on the seniority of the exposures, risk weight of the exposures, the mitigant, and the mitigant value, the ordering of ranking in which the mitigants is allocated to the exposures, is arrived at. The order of allocation can be modified by updating the operation type and the optimizer constraints of the objective function. You have to select the allocation rank measure in the **Optimizer Definition** window, while defining the optimizer logic. For more information on Currency Conversion, see Exhibit 4 *Annexure A: Key Concepts.*

Single Mitigant Mapped to Single or Multiple Exposures

If there is one or more than one exposure mapped to a single mitigant, then the mitigant is allocated to the exposure with the highest seniority. If there is more than one exposure with the same highest seniority, then the mitigant is allocated to the exposure which yields the highest mitigant value post haircut.

Single Exposure Mapped to Single or Multiple Mitigants

If there is one or more than one mitigant mapped to a single exposure, then the least risk weighted mitigant is allocated to the exposure. If there is more than one mitigant with the same least risk weight, then the mitigant which has the highest mitigant value post haircut is allocated to the exposure.

Multiple Exposures Mapped to Multiple Mitigants

The treatment in this case is similar to a single mitigant mapped to single or multiple exposures, for the identification of the mitigant which is assigned to the exposures. Later, the treatment pertaining to single exposure mapped to multiple mitigants is followed to yield the credit Risk weighted exposure amount.

Using the logic mentioned in the preceding list, the application calculates the factor of exposure covered by the mitigant and the factor of the exposure uncovered (without any protection).

Sec Post CRM RWA Computation

The application computes the covered amount and the uncovered amount for the exposures. The covered amount is computed by multiplying the covered factor with the exposure amount. To this covered amount, the application assigns the mitigant risk weight. The product of the covered amount and the mitigant risk weight is the covered RWA. The uncovered amount is computed by multiplying the uncovered factor (which is 1 – sum of all covered factors for that exposure) with the exposure amount. This uncovered amount is multiplied by the exposure risk weight to get the uncovered RWA. The sum of the covered RWA and the uncovered RWA is the Post CRM RWA of the Exposure.

> **Post-CRM RWA = Covered Amount * Risk Weight of the Mitigant**
>
> **+ Uncovered Amount * Risk Weight of the Exposure**

This logic is handled in **Sec Post CRM RWA computation** sub process.

The following sub processes and tasks are computed in the **SEC_IRB** Process:

- Sec Reclassification
- Sec Approach Selection
- Mitigant Reclassification
- Sec Pre-CRM EAD Computation
- Risk Weight Assignment
- Pre-CRM RWA Computation
- Mitigant Eligibility
- Mitigant Risk Weight
- Haircut Assignment
- Allocation of Mitigants to Exposures
- Post CRM RWA Computation

8.2.2.3 Large Borrowers – Enhancing Credit Supply

RBI has introduced the guidelines on Enhancing Credit Supply for Large Borrowers through Market Mechanism. This guideline provides a method to identify the exposures to certain large borrowers and shield against any probable losses arising due to such large exposures. The new regulation helps the banks in controlling the exposures to single large borrowers by imposing controls on the banks by suggested limits and prudential measures in case of breach of limits.The following features are introduced as part of this:

- Aggregate Sanctioned Credit Limit (ASCL) is calculated.
- Identifies the specified borrowers to which the bank might have a larger and riskier exposure.
- Stamps the Reference Date.
- Normally Permitted Lending Limit (NPLL) is calculated.
- If there is a breach of the NPLL, then the Prudential Measures prescribed by the regulator are applied.

8.2.2.3.1 Calculating ASCL

ASCL is calculated for each of the party with the maximum of both fund based credit limits sanctioned and the fund based credit limits outstanding, in addition to the unlisted privately placed debt with the banking system. This means that the data with regard to fund based credit limits sanctioned, fund based credit limits outstanding and unlisted privately placed debt with the banking system is at the granularity of

the borrower (party) and is not only limited to the credit limits of the bank doing the computations (reporting bank) but to the banking system as a whole as specified by RBI.

Which means,

Aggregate Sanctioned Credit Limit (ASCL) = MAX (fund based credit limits sanctioned, fund based credit limits outstanding) + Unlisted privately placed debt with the banking system

As defined by RBI banking system, which includes all banks in India RRBs and co-operative banks and branches of Indian banks abroad.

If the ASCL for a certain borrower crosses a limit specified by RBI then the borrower is considered to be a Specified Borrower. The specified limits are as follows:

- If the ASCL calculated for a certain party is more than Rs.25,000 crore at any time during finanaical year 2017-18.

- If the ASCL calculated for a certain party is more than Rs.15,000 crore at any time during finanaical year 2018-19.

- If the ASCL calculated for a certain party is more than Rs.10,000 crore at any time from April 1, 2019 onward.

Note: The ASCL calculated as specified above is compared with the limits specified for the respective years to identify the specified borrowers. The NPLL calculation is to be done for the specified borrowers from the next financial year.

The date on which a certain borrower's ASCL crosses the reference limit set for a certain financial year and the borrower becomes a Specified Borrower is called the Reference Date.

Other SCBs, NBFCs registered with RBI, AIFIs (NHB, SIDBI, EXIM Bank and NABARD) and HFCs registered with NHB will be exempted from the calculations. These exempted parties i.e. parties like NHB,SIDBI,NABARD,EXIM must be populated to DIM_PARTY with v_party_type as OTHER.

ASCL is addressed in the following batch:

- BASEL_SETUP_TBL_POP Batch: Basel Setup Table Batch Population. ASCL is calculated and populated to FSI_CP_BANKING_SYSTEM_EXPOSURE.

Specified borrowers is addressed in the following batch:

- India Basel III - Large Borrowers Setup Batch: Requires all the new FSI Setup Table to be populated and reclassification rules be updated with appropriate mapping. This batch identifies the specified borrowers and stamps the reference date for the borrowers.

Note: ECB and Trade Credit raised from overseas branches of Indian banks will count towards ASCL.

8.2.2.3.2 Calculating NPLL

After ASCL is computed, for parties which have had a breach of the prescribed ASCL limit to be identified as specified borrowers, the NPLL is calculated. The reference date always falls in the identification year as it is the date when the borrower became a specified borrower.

NPLL calculation starts from the immediate next financial year of reference date. NPLL is either 50 percent or 60 percent (depending on the conditions) of the incremental funds. Any funds raised by the specified borrower in the given year, by way of equity, is deemed to be part of incremental funds.

In case where a specified borrower has already raised funds by way of market instruments and the amount outstanding in respect of such instruments as on the reference date is 15 percent or more of ASCL on that date, then the NPLL is calculated as 60 percent of the incremental funds raised by the specified borrower over and above its ASCL as on the reference date and 50 percent otherwise.

The following is a special case:

In the FAQs to Enhancing Credit Supply for Large Borrowers through Market Mechanism, RBI has stated that the ASCL limits to be used for identification of a borrower as a specified borrower on or before March 31, 2016 as Rs. 25,000 crore and the reference date for all borrowers identified as specified borrowers prior to FY 2016-17 will to be set as 1st April 2016.

If a borrower is identified to be a Specified Borrower with an ASCL of more than Rs. 25,000 crore, before the financial year 2016-17 then such borrower irrespective of when there ASCL crossed the Rs. 25,000 crore mark will be assigned a reference date of 1st April, 2016. The NPLL calculation and prudential measures for such borrowers are applicable from 1st April, 2017 onward.

The following are the Runs for NPLL:

- IND Basel III Capital Calculation - Standardised Approach - Indian Banks
- IND Basel III Capital Calculation - Standardised Approach - Foreign Banks
- IND Basel III Capital Calculation - Foundation IRB Approach - Foreign Banks
- IND Basel III Capital Calculation - Advanced IRB Approach - Foreign Banks
- IND Basel III Capital Calculation - Foundation IRB Approach – Indian Banks
- IND Basel III Capital Calculation - Advanced IRB Approach - Indian Banks

Note:

- Banks must apply their due-diligence while deciding the NPLL for a single borrower in order that borrowers do not circumvent the cut-off ASCL criteria by borrowing through dummy/fictitious group companies.
- Financial year 2017-18 onwards the banking system shall ordinarily keep its future incremental exposures to the specified borrowers within the NPLL, else they will be subject to the prudential measures as specified.

8.2.2.3.3 Prudential Measures

After the NPLL per borrower is calculated, the banking system's total exposure to a specified borrower are compared against the NPLL on a particular day. In case the bank's total exposure to the specified borrower excluding market instruments subscribed by the banking system in financial year 2017-2018 issued by such specified borrower is greater than the NPLL for that specified borrower then the prudential measures prescribed by RBI are applied.

The prudential measures are methods to shield against any probable losses arising due to default of such large borrowers. This helps in controlling the exposures to single large borrowers by imposing controls on

the banks by suggested prudential measures in the form of higher risk weights and provisions in case of breach of limits. Prudential measures also come in the form of systematic divestment of certain investments.

The first of prudential measures comes in the form of additional provisions. This happens to be out of scope of the application. This is because the specific provisions are dealt as a part of accounting and not capital calculations.

The next prudential measure comes in the form of additional risk weights. RBI guidelines state that the banks need to apply an additional risk weight of 75 percentage points over and above the existing applicable risk weight for the exposures to the specified borrowers where there has been a breach of NPLL in order to arrive at the new applicable risk weights.

The following are the Runs for Prudential Measures:

- IND Basel III Capital Calculation - Standardised Approach - Indian Banks
- IND Basel III Capital Calculation - Standardised Approach - Foreign Banks
- IND Basel III Capital Calculation - Foundation IRB Approach - Foreign Banks
- IND Basel III Capital Calculation - Advanced IRB Approach - Foreign Banks
- IND Basel III Capital Calculation - Foundation IRB Approach – Indian Banks
- IND Basel III Capital Calculation - Advanced IRB Approach - Indian Banks

Note:

- All holdings by a bank of market instruments issued by a 'specified borrower' after the 'reference date' shall be held in the AFS/HFT category and marked to market as applicable thereto. However, banks may, at their discretion, value their holdings of market instruments issued by the specified borrowers in 2017-18 at book value.
- RBI will review the entire guidelines including the ASCL limits after a year of the guidelines becoming fully implemented, that is, during FY 2019-20. Refer the RBI guidelines in para 4 of (i) in RBI/2016-17/50 DBR.BP.BC.No.8/21.01.003/2016-17.
- ECB and Trade Credit raised from overseas branches of Indian banks will count towards ASCL.

8.2.2.3.3.1 *Systematic Divestment*

The third prudential measure for breach of NPLL comes in the form of systematic divestment of subscriptions made by the bank in 2017-18 in bonds issued by the specified borrowers over the succeeding three financial years.

 The application helps in indicating the divestment schedule. It helps to indicate the minimum amount of bonds that are to be divested in a particular financial year.

The bank is supposed to systematically divest over the succeeding three financial year's, the subscriptions made by it in bonds issued by the specified borrowers in 2017-18. The bank is advised not to invest in any bonds issued by specified borrowers after FY 2017-18. The application displays the

minimum volume of the bonds that are to be divested in a particular financial year in accordance with the divestment schedule advised by RBI.

The specified divestment percentage schedule provided by RBI guidelines are as follows:

- Not less than 30 percent by March 31, 2019

- Not less than 60 percent by March 31, 2020

- Not less than 100 percent by March 31, 2021.

Systematic Divestment is addressed in the following batch:

Batch Name	Description
IND_BASEL_III_PARTY_DIVESTMENT_INFO	T2T Batch to be executed for financial year 2017-18. This automatically takes the bond instruments from FNSE as per last run of the financial year 2017-18. A separate batch has to be created with this T2T and can be executed for any date on or after 31st March2018 to display the minimum volume of the bonds that are to be divested in a particular financial year.

Note: Irrespective of when the batch is run, the results populated will be as of 31st March 2018.

8.2.2.4 Credit Valuation Adjustments

The CVA for IRB Approach is calculated similar to the Standardized Approach. See Credit Valuation Adjustments for more information.

8.2.2.5 Market RWA

The Market Risk of Non Securitized and Securitized exposures in the Foundation IRB Approach (FIRB) and Advanced IRB Approach (AIRB) is calculated as in the Standardized Approach. See Standardized Approach for more information.

8.2.2.6 Operational RWA

The Basel accord has prescribed three methods for calculating Operational Risk capital charges in the Foundation IRB Approach (FIRB) and Advanced IRB Approach (AIRB). Banks can use any of these methods to calculate capital charge same as in the Standardized Approach.

- Basic Indicator Approach

- Standardized Approach

- Alternative Standardized Approach

See Operational RWA for more information.

8.2.2.7 Capital Structure

Basel III Capital Structure is calculated for the Foundation IRB Approach (FIRB) and Advanced IRB Approach (AIRB) similar to the Standardized Approach.

See Capital Structure for more information.

8.2.2.8 Capital Buffers

Basel III Capital Buffers is calculated for the Foundation IRB Approach (FIRB) and Advanced IRB Approach (AIRB) similar to the Standardized Approach.

See Capital Buffers for more information.

8.2.2.9 Revised Leverage Ratio

Basel III Revised Leverage Ratio is calculated for the Foundation IRB Approach (FIRB) and Advanced IRB Approach (AIRB) similar to the Standardized Approach.

See Revised Leverage Ratio for more information.

9 European Union (EU) Jurisdiction

The European Banking Association (EBA) in conjunction with the European Council and the European Parliament has issued the CRD IV and CRR IV rule which encompasses the entire Regulations to be followed by the Banks. These regulations are by and large compliant with the Basel III changes issued by the Basel Committee (BIS).

The OFS Financial Services Basel Regulatory Capital application incorporates the Capital Requirements Regulation IV (CRR IV) issued by the European Union on 26th June 2013. The application is compliant with the Standardized approach and the Internal Ratings Based Approach for European Jurisdiction:

- Non-Securitization Exposures – Standardized Approach / Internal Ratings Based Approach
- Counterparty Credit Risk Exposures – Original Exposure Method, Mark to Market Method, and Internal Modeling Method
- Settlement Risk Exposures
- Securitization Exposures – Standardized Approach / Internal Ratings Based Approach
- Credit Valuation Adjustment – Standardized Approach, Alternative Approach and Advanced Approach
- Default Fund Contribution – Qualified Central Counterparty and Non-Qualified Central Counterparty
- Large Exposure Treatment for Banking Book
- Capital Structure – Capital Ratios and Buffers
- Leverage Ratio Calculations

NOTE: The Leverage Ratio calculations are a different run, from the other calculations, due to changes in the computations required, and also the exemptions.

The application also supports the mixed approach wherein some of the asset classes follow Standardized Approach and the remaining asset classes follow Internal Ratings Based Approach.

9.1 CRR IV

9.1.1 EU-CRR IV – Standardized Approach

9.1.1.1 EU-CRR IV High Level Process Flow – Standardized Approach

The Capital Adequacy Ratio, which is defined by EBA is delivered out-of-box in OFSAAI as a building block approach.

For more information on the pre-defined Runs available with the application, see *OFS Basel Regulatory Capital Run Charts* available in MOS.

9.1.1.1.1 Process Flow for Capital Adequacy Ratio Calculation

The Capital Adequacy Ratio is computed for all banks and their financial subsidiaries, which are part of the same banking regulation. The banks have to be compliant with the regulations and the required ratios at individual level (solo) and consolidated entity level (regulatory consolidation). The application supports both the approaches.

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│          Capital Calculation Run         │
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│  ┌────────────────────────────────────┐  │
│  │   Capital Consolidation Process    │  │
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│  │         Credit Risk Process        │  │
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│  │     Credit Valuation Adjustments   │  │
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│  │      Operational Risk Process      │  │
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│  │          Capital Structure         │  │
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│  │           Capital Buffers          │  │
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│  │       Revised Leverage Ratio       │  │
│  └────────────────────────────────────┘  │
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Capital Calculation Run

The Capital Calculation Run, which is depicted in the preceding process flow diagram, is a single run which is a joined together by multiple processes. Each process is a block, compiled together to form an entire Capital Adequacy Run.

9.1.1.1.2 Capital Consolidation Process

Capital Consolidation is a process common to each of the individual block when they are triggered separately as an individual run. In Capital Consolidation, the application processes the following.

Capital Consolidation Level Selection

The reporting bank can be a part of a financial group that has multiple legal entities like parent or child entities (subsidiaries) under its name. The entity on which you are required to process should be selected. Subsequently, level at which a Run is to be executed (solo or consolidated) should also be selected. Select these options in the Run Management UI. However, if the Run is executed in the Run Rule Framework (RRF), then these options have to be set using the Rule **EU-Capital Consolidation Level Selection** (RLBL8147) in the sub-process '**Capital Consolidation Approach**'.

EU_CAPITAL_CONSOLIDATION is the first process to be added in all the Runs and the Run Management UI selects this process by default.

Run Parameters Assignment

The accord states different approaches for calculating RWA. The Run Management UI in the application allows the reporting bank to define and execute a Run by selecting a combination of different approaches for RWA computation.

Run Parameter Assignment is also part of **EU_CAPITAL_CONSOLIDATION** process. The Rule **EU - Run Definition User Defined Run Param Assignment** is used to assign the Run parameters if a Run is executed in the RRF. If the Run is executed from the Run Management UI, then the parameters are populated based on the Run defined in the Run Definition window.

Currency Conversion

The Rules pre-defined in the application performs currency conversion of all General Ledger amount attributes to be used for Capital Consolidation from the Natural currency to the Reporting currency, based on the exchange rate provided.

Shareholding Percent Multiplication

For all entities in the Capital Consolidation process, the application updates the shareholding percentage against each entity data in the fact capital accounting head from the fact entity shareholding percent table. The parent data in the processing table of fact capital accounting head is updated with the value 1 and for each child entity the data is based on the parent's holding percentage specified for each child in fact entity share holding percent table.

9.1.1.1.3 Process Flow for Credit RWA
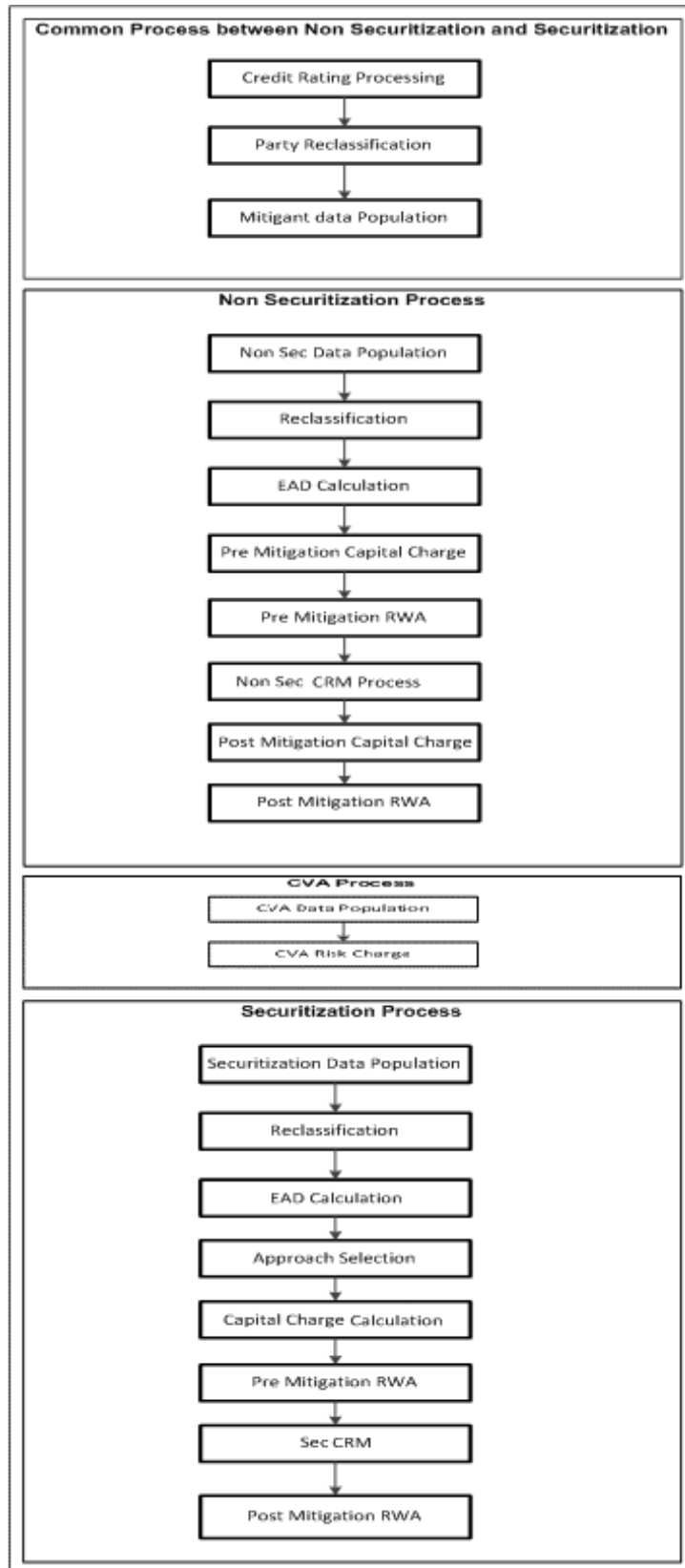
Credit RWA Run is a combination of Non securitization RWA, Credit Valuation Adjustment (CVA) RWA, and Securitization RWA. For Credit Risk of Non Securitized exposures and Securitization positions, the application follows the Standardized Approach.

CVA calculation has two approaches, Standardized Approach and Alternative Standardized Approach, which is detailed separately under Credit Valuation Adjustment section of Credit RWA.

A few processes such as Credit Rating, Party Type Reclassification, and Mitigant Data Population are common between Non-Securitization and Securitization processes. Though these sub processes are explained separately under Non-Securitization and Securitization sections of this document, it is executed only once under the Credit RWA Run.

Certain sub processes under Non-Securitization process such as Reclassification, RW assignment, and so on are common across all types of exposures. For example, reclassification of products across banking book like over the counter derivative transactions, and securities financing transactions are executed only once in the Run. The details of these sub processes are explained under Reclassification and Risk Weight Assignment sub process of the Non-Securitization exposures section of this document. Similarly, details of Credit Risk Mitigation for Non-Securitization process is detailed under the Non-Securitization section of this document and details of Credit Risk Mitigation for Securitization process is detailed under the Securitization section of this document.

The Non Securitization process also includes calculations pertaining to the counterparty credit risk. The EAD of the counterparty credit risk are calculated using one of the Run Management option.

This also includes the settlement risk calculation pertaining to the unsettled transactions depending on the number of days they are unsettled.

For more information on the sub processes as detailed in the preceding process flow for the Non-Securitization process, CVA process and Securitization process, see Credit RWA section.

For example, Non-Sec Data Population is detailed under data population and currency conversion of Credit RWA (Non-Securitization - Standardized approach) section of this document.

9.1.1.1.4 Process Flow for Credit Valuation Adjustments
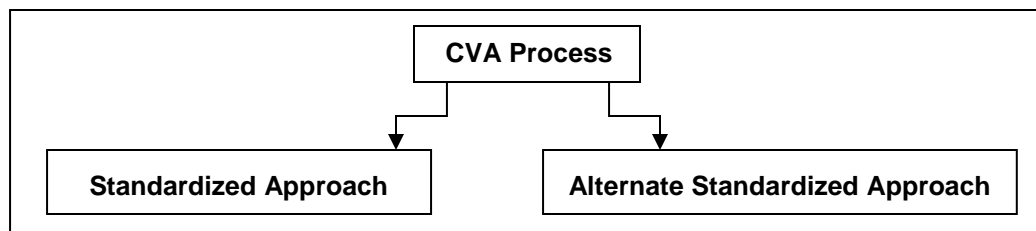
```
                    ┌──────────────────┐
                    │   CVA Process    │
                    └──────────────────┘
                       │            │
            ┌──────────▼───┐   ┌────▼──────────────────────┐
            │ Standardized │   │ Alternate Standardized    │
            │  Approach    │   │       Approach            │
            └──────────────┘   └───────────────────────────┘
```

The application calculates CVA Charge for OTC portfolio of a bank using standardized approach or alternative standardized approach. This is part of a run management option. Advanced approach is not supported as part of this release.

For more information on the sub processes as detailed in the process flow, see Credit Valuation Adjustments.

9.1.1.1.5 Process Flow for Operational RWA
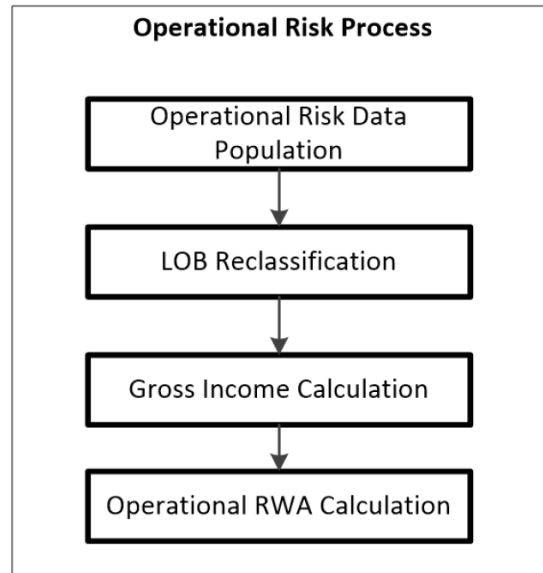
Operational RWA run is executed with the Capital Consolidation process. For more information on the Operational RWA computation, see Operational Risk section.

For example: LOB Reclassification and Gross Income Calculation sub process are detailed as separate processes under the Operational RWA section of this document.

9.1.1.1.6 Process Flow for Capital Structure

Capital Structure is executed with Capital Consolidation, Credit Risk, and Operational Risk RWA

processes.

For more information on the sub processes of Capital Structure, see Capital Structure section.

For example: 'Gross Capital Calculation' mentioned in the preceding process flow, is explained in detail under 'Gross Capital Calculation for CET1, AT1, and T2' sub process section of the Capital Structure section in this document. Likewise, 'Regulatory Adjustment' and 'Net Capital Calculation' is detailed under 'Regulatory Adjustment to Common Equity Tier 1, Additional Tier 1, and Tier 2' section along with 'Treatment of Insignificant and Significant Investment Data Treatment' and 'Calculation of Net Capital' sub process section of Capital Structure in this document.

9.1.1.1.7 Process Flow for Capital Buffers
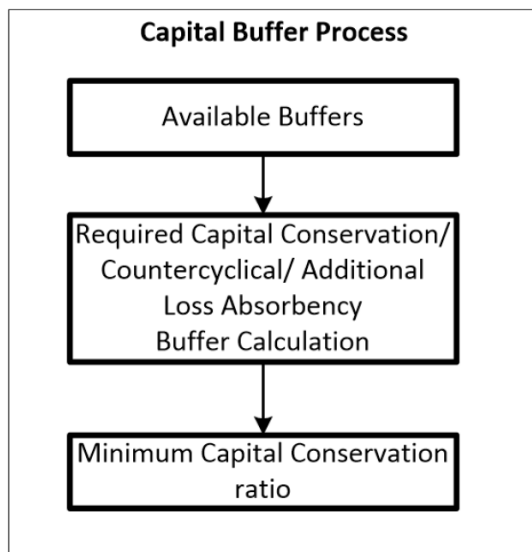
Capital Buffer is calculated after the calculation of Capital Ratios, as they go as an input to Buffer calculation. Each sub-process is explained in detail under Capital Buffer section of the user guide.

For more information on Capital Buffers, see Capital Buffers section.

For example, Required Capital Conservation Buffer and Required Countercyclical Buffer calculation are detailed in the 'Required Total Buffer' sub-section of the Capital Buffer section in this document. Similarly, Minimum Capital Conservation ratio is detailed in the 'Capital Conservation Ratio' sub section of Capital Buffer section in this document.

9.1.1.1.8 Process Flow for Revised Leverage Ratio
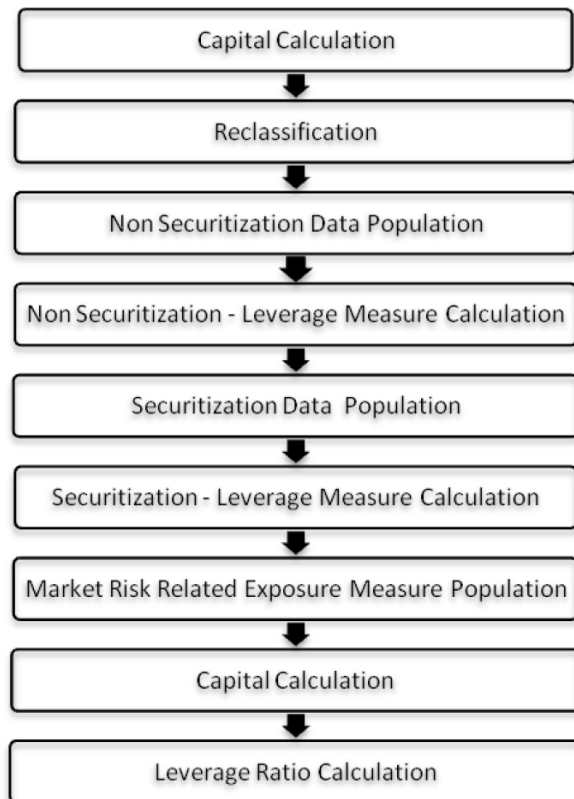
The leverage ratio calculations are a separate run, and not part of the regular capital calculation run. This is because of the changes in the Credit conversion factor assigned to the exposures, and also exemption of few exposures from the calculation which are part of the capital charge calculations. Also, the mitigation is not required for these exposures, and the exposure measure calculations are different from the regular EAD calculations.

For more information on Leverage Ratio, see Leverage Ratio section.

9.1.1.2 Credit RWA

The application supports computation of Credit RWA, as per the guidelines laid out in the CRR IV Accord, issued by EBA. Credit RWA computation is divided into Credit Risk for Non-Securitized exposures process and Credit Risk for Securitized exposures process.

For Credit Risk of Non-Securitized exposures, the application follows Standardized Approach. For Counterparty Credit Risk of exposures, the application follows the Original Exposure Method (OEM), Mark to Market Method (MTM), and Internal Model Method (IMM).

9.1.1.2.1 Non-Securitization – Standardized Approach

Standardized Approach consists of the processing of the following broad functional areas:

- ♦ Credit Risk for Banking Book Products
- ♦ Counterparty Credit Risk for Banking and Trading book exposures
    - o Over-the-Counter Derivative Products
    - o Securities Financing Transactions
- ♦ Credit Risk Mitigation for the Credit Risk

Banking Book Products

All the credit risk exposures are identified by the application, through their product type, counterparty type, and the corresponding derived asset classes. A sample list of products types, party types, mitigant types, and credit ratings are pre-defined in the application. However, this list and naming convention differs from one bank to another. Hence, the application re-classifies the bank's information on product type, party type, credit ratings, and so on, into standard data as per the accord, such as standard product type, standard party type, and so on. Based on standard product and party types, the standard asset classes are assigned to each exposures.

Some exposures can be hedged against credit risk through various mitigants such as guarantees, collaterals, credit derivatives, and so on. These provide mitigation to credit risk and should be considered while computing Credit RWA, as per the Accord. Hence, the application calculates pre-mitigation exposure amount and post-mitigation exposure amount.

Based on the asset class, the application calculates the Pre-Credit Risk Mitigation (CRM) Exposure at Default (EAD) for each exposure. This value signifies the maximum loss that the bank can suffer, in case of default on this exposure, prior to considering any mitigation effects. Through the CRM process, the bank takes into account the effect of the mitigation and calculates the post mitigation exposure at default amount. This signifies the maximum loss that the bank can suffer in case of default on this exposure, after considering the effects of the mitigation.

The application also computes pre-mitigation risk weighted assets (Pre CRM RWA) and post mitigation risk weighted assets (Post CRM RWA) by multiplying the respective EAD by risk weight. The risk weight is arrived at, by considering the credit rating of the exposures and mitigants as per the guidelines. Some credit risk exposures that belong to the category of internal transactions, like holding subsidiaries shares or investment in its capital, reciprocal cross holding, and so on, are treated separately under Capital Structure.

Process Flow for Banking Book Products

A comprehensive explanation of the process flow is as follows:

Rating Information Processing

Pre-processing Steps

Data on ratings is captured in the following rating specific tables:

- Accounts Rating Table (**STG_ACCOUNT_RATING_DETAILS**)

  Ratings of all Credit Risk Non Securitized Exposures, Securitized Exposures and Securitized Positions are captured in this table.

- Instrument Rating Table (**STG_INSTRUMENT_RATING_DETAILS**)

  Ratings for investment exposures subject to credit risk (one that are in **STG_INVESTMENTS**), and mitigants are captured in this table.

- Party Rating Table (**STG_PARTY_RATING_DETAILS**)

  Credit Rating for all customers and issuers are captured in this table.

- Sovereign Rating Table (**STG_SOVEREIGN_RATING_DETAILS**)

  Credit Rating for all countries is captured in this table.

- External Underlying Exposures Rating Table (**STG_EXT_ULY_ACCT_RATING_DTL)**

  Credit Rating for all external underlying exposures is captured in this table. In the case of underlying exposures of CIU transactions, which are treated as mitigants, it is expected that the value of Exposure ID is that of the instrument ID to which the underlying exposures belong to. For example: If the Underlying Exposure ID EXP001, which belongs to the instrument INSTR001, and which has the parent ID as PARENT001; in this case, the data expected in this table is of the instrument INSTR001, with the Exposure ID as INSTR001.

Processing Steps

Banks obtain credit ratings from different sources and these are provided as an input in the application through the rating tables mentioned in the preceding list. The application re-classifies the rating information to CRR Specific standard ratings. The CRR IV specific standard ratings are the Credit Quality steps 1 to 6. The out-of-box solution supports the Fitch / Moodys / S&P and DBRS credit rating reclassification for Long Term and Short Term ratings.

The rating reclassification lookup table (**FSI_RATING_CLASSIFICATION**) is used to lookup reclassified standard ratings, so that the reclassification rule is not repeated for each of the rating processing tables. Ratings are populated from the stage tables (for example, **STG_PARTY_RATINGS_DETAILS**) to FSI tables (for example, **FSI_PARTY_RATING_DETAILS**) using the lookup table (**FSI_RATING_RECLSSIFICATION**) to obtain reclassified rating.

NOTE:	Ensure that the following columns are mandatorily populated with data In the **STG_PARTY_RATINGS_DETAILS** table: Rating source code (V_RATING_SRC_CODE) Party Code (V_PARTY_CD) Purpose (V_PURPOSE): In this field whether the rating is a domestic rating or foreign rating should be indicated. If any other rating is provided, then the exposure is considered as unrated. Rating Code (V_RATING_CODE)

Similarly, the other rating tables are populated.

After ratings reclassification, the risk weight is updated in risk weight to rating mapping table (**FSI_RW_MAP_MASTER**). The multiple assessments data transformation logic, updates the rating and the risk weights to the exposures. For each exposure, the application checks the risk weight generated by each of its ratings. It then assigns the higher of the two lowest risk weight and the rating corresponding to this risk weight, to the exposure.

For unrated Non-Securitized exposures, the application does an issue-issuer assessment to infer a rating of the unrated exposures, based on the rating of a similar instrument (referred as reference issue hereafter) issued by the same issuer. The reference issue is used only when it is of the same currency as the exposure and the exposure is senior or equivalent to the same. For unavailable reference issue, the party rating is used. In the case of party also being unrated, the exposure remains unrated. Also, the application populates whether the exposure is LT rated or ST rated, based on the rating assigned to the exposure.

Data Population

Pre-processing Steps

Credit Risk exposures are updated in the application for all the product types through their respective input tables known as Product Processors. Main categories of Credit Risk Non-Securitization exposures, along with their respective table names that are used as an input, are as follows:

Product	Source Product Processor
Bills	STG_BILLS_CONTRACTS
Credit Cards	STG_CARDS
Swaps	STG_SWAPS_CONTRACTS
Futures	STG_FUTURES
Guarantees	STG_GUARANTEES
Investments	STG_INVESTMENTS
Lease Contracts	STG_LEASE_CONTRACTS
Letters of Credit	STG_LC_CONTRACTS
Line of Credit	STG_CREDIT_LINE_DETAILS
Commitment Contracts	STG_COMMITMENT_CONTRACTS
Loans	STG_LOAN_CONTRACTS
Money market instruments	STG_MM_CONTRACTS
Overdraft	STG_OD_ACCOUNTS
Options	STG_OPTION_CONTRACTS
Re purchase contracts	STG_REPO_CONTRACTS
Equity Exposures	STG_INVESTMENTS
Underlying Exposures for Derivatives, Securitization and Covered Bonds	STG_UNDERLYING_EXPOSURES
Underlying Exposures for Derivatives (if Derivative is either a cleared transaction or an instrument, and the underlying reference asset is an instrument)	STG_UNDERLYING_MASTER/ STG_UNDERLYiNG_DTL
Underlying Exposures for Derivatives (if Derivative is not a cleared transaction or an instrument, or the underlying reference asset is not an instrument)	STG_UNDERLYING_EXPOSURES

Product	Source Product Processor
Underlying Exposure for Mutual Fund / CIU	STG_FUND_CIS_COMPOSITION
Underlying Exposures for Repo contracts	STG_PLACED_COLLATERAL / STG_MITIGANTS
Credit Derivatives	STG_CREDIT_DERIVATIVES
Fixed Assets	STG_FIXED_ASSETS_DETAILS

There is data population pertaining to the placed collateral and central counterparty details, which are required for the cleared transaction and default fund contribution treatment.

Product	Source Product Processor
Placed Collateral	STG_PLACED_COLLATERAL
Default Fund Contribution	STG_CCP_DETAILS

There is data population pertaining to the mitigants, which cater to all the types of mitigants like collateral, guarantee, and credit derivatives. There is one data population pertaining to the counter guarantee for the guarantor.

Product	Source Product Processor
Mitigants – Collateral, Guarantee, Credit Derivatives	STG_MITIGANTS
Counter Guarantee	STG_MITIGANT_COUNTER_GUARANTEE

There is data population pertaining to the mapping between the exposures and the mitigants. And one data population pertaining to the mapping between the exposures and the placed collateral. There is also data population pertaining to the mapping between the guarantee and the counter-guarantee.

Product	Source Table
Mapping for Exposures and Mitigants	STG_ACCOUNT_MITIGANT_MAP
Mapping for Exposures and Placed Collateral	STG_ACCT_PLACED_COLL_MAP
Mapping for Guarantee and Counter Guarantee	STG_MITIGANT_CNTR_GUAR_MAPPING

Processing Steps

Stage data from the Product Processors or other stage tables is populated in the respective processing tables. Information from all Product Processors data is populated in a common Fact table for all non-sec exposures (**FCT_NON_SEC_EXPOSURES**), except equity data which is first populated in the respective equity table (**FCT_EQUITY_EXPOSURES**) and is then (after risk weighing) populated in the common Fact table for all Non-Securitized exposures. For more information on the list of columns to be populated within each table, see *Download Specifications* document in MOS.

Shareholding Percent Multiplication

The exposure amount which is a part of the input data (Product Processors) is the exposure amount for a solo entity. However, for a Consolidated Run, the parent exposure is considered only by the shareholding percentage, based on the following calculation:

Exposure Amount x Share Holding Percent = Updated Exposure Amount

Where:

Share holding percent is allotted a value by the Rule **Cap Consl Effective Shareholding Percent for an Entity** in the process – Europe **Capital Consolidation**.

This assignment uses the Rule **<Attribute > Shareholding Percent Multiplication** Shareholding percent multiplication is computed for the following attributes:

- Outstanding Principal
- Current Exposure Amount
- Undrawn Amount
- Exposure Market Value
- Exposure Accrued Interest
- Provision Amount
- Write Off Amount
- Notional Principal and Contract Amount for OTC products
- Any other amounts

Currency Conversion

The application converts the amount attributes, which are in natural currency, to reporting currency which is used for further calculations. The column names suffixed with '_ncy' are in the natural currency and are multiplied by currency conversion factor to populate values in the reporting currency. The Rule **Reporting Currency Code Assignment** assigns the reporting currency. For more information on Currency Conversion, see Exhibit 4 in *Annexure A: Key Concepts.*

NOTE: The data populated in the Product Processor is expected in natural currency of the exposure.

Reclassification

The application reclassifies the bank's product types and party types to standard product and party types. Based on standard product and party type, it forms an asset class for each exposure. Similarly, the application does reclassification for mitigant on the basis of its mitigant types and reclassifies it to standard mitigant types.

NOTE: Ensure that all products and party type and mitigants which are bank specific are reclassified, as part of the setup activity. If they are not reclassified, the treatment might not happen as expected by the regulator

Product Type Reclassification

Product types used by the reporting bank as input data are reclassified to standard product types as recommended in the Accord. The product types after reclassification are stored as Basel product types. For Example: Housing Loan is reclassified as Residential Mortgage Exposure as per the CRR IV guidelines.

This is handled in the **EU_PRODUCT_TYPE_RECLASSIFICATION** process, and also any specific product type reclassification, based on other attributes are handled in the sub process **Product Type Reclassification,** and **Fixed Assets Type Reclassification** in the **EU_NON_SEC_STD** process.

Party Type Reclassification

Similar to the product type, the customer type and issuer type (which are stored as counterparty type) are also reclassified as standard counterparty type. The Basel application is designed to include customer type, issuer type, and legal entity type in a single table (**STG_PARTY_MASTER**). This is applicable for staging and the dimension model. These are reclassified together as well. Party type reclassification Rules handle reclassification for customer, issuer, and entity types. For Example: Individual is reclassified as Retail.

This is handled in the **EU_PARTY_RECLASSIFICATION** process, and also any specific party type reclassification, based on other attributes are handled in the sub process **Party Type Reclassification of SME** in the **EU_NON_SEC_STD** process.

Asset Class Reclassification

On the basis of Basel product type and standard counterparty type, an asset class is formed by the application. This asset class is used for data processing. The asset class is the same as specified in the accord.

For example: Standard counterparty is Corporate non-SME and Corporate SME, the asset class is corporate. For Basel product type gold, the asset class is Gold.

Asset class reclassification of all equity products is done on the basis of Equity type and Basel product type. Asset class for all mitigants is reclassified based on their standard mitigant types and standard issuer type.

This is handled in the **Non Sec Asset Reclassification** sub process in the **EU_NON_SEC_STD** process.

Mitigant Reclassification

For mitigants the application reclassifies the mitigant type to the standard mitigant type like the debt securities, credit derivative, cash, and so on. It also reclassifies the mitigant issuer type to the standard mitigant issuer type like Banks, Corporate, and so on. The reclassification tasks are present in the **EU_MITIGANT_DATA_POPULATION** process.

In the case of the underlying exposures of CIU which are mitigants, the underlying exposure product types are reclassified into standard mitigant types. This is part of the **Mitigant Reclasification** sub process.

Pre-CRM EAD computation

Credit Conversion Factor

This is applied to all off-balance sheet exposures. Off-balance sheet exposures can be identified at the first level in the Basel Product Types Dimension (**DIM_BASEL_PRODUCT_TYPE**) table. The CCF values applied are 0, 0.2, 0.5, and 1. The factors on the basis of which the CCF is applied are Basel product type (as per CRR IV Accord), type of facility (whether it is cancellable or not), and the maturity of the exposure. There are few exposures for which the CCF is assigned to the exposure only on the undrawn portion. And for few exposures, the CCF is assigned to the contract amount of the exposure (which is recorded as the drawn portion of the exposure). The solution assigns the supervisory provided CCF to the exposures based on the Basel product type dimension. This is available in the N_CCF_PERCENT (for undrawn portion CCF), and the N_CCF_PERCENT_DRAWN (for the drawn portion CCF).

This is handled part of the sub process **Non Sec CCF Assignment**.

Pre CRM Exposure at Default (EAD)

Exposure at Default (EAD) is calculated for all asset classes based on the Current Exposure Amount, and Undrawn Amount. Using the same inputs, drawn EAD amount and undrawn EAD amount is calculated. The provision amount is prorated for the drawn and undrawn portion of the exposure.

In a standardized approach, the EAD value of an exposure is calculated as follows:

((Current Outstanding Exposure Amount – Specific Provision related to drawn portion of exposure – Valuation Adjustments) + (Undrawn Amount – Specific Provision related to undrawn portion of the exposure)

The CCF is not assigned to the exposures in the pre mitigation EAD calculation, as the accord specifically mentions the mitigation to happen on the exposures without CCF assignment.

The valuation adjustments are expected to be provided at an instrument level, and the same are being used to reduce the EAD of the exposure. The valuation adjustments are expected as a download in the FSI table of Instrument Valuation Details (**FSI_INSTR_VALUATION_DETAILS**). This is prorated to the account level, based on the instrument amount and the corresponding account's amount.

This EAD calculation is handled in the sub process **Non Sec Pre CRM EAD Computation**.

Risk Weight Assignment

Non-Sec Exposures Risk Weight

Risk Weight is assigned on basis of asset class and the credit rating as per the CRR IV guidelines. The risk weight rules operate on the risk weight table (**FSI_RW_MAP_MASTER**). Highly rated exposures are allocated low risk weight and poorly rated exposures are allocated high risk weights. If an exposure has more than one rating (rated by more than one agency), then the final rating is assigned on the basis of multiple assessments. The application updates the risk weights against the exposures directly, when ratings are not considered. Options for risk weighting process are selected during Run definition if the Run Management UI is used. If the Run Rule Framework (RRF) of OFSAAI is used, a setup code from **USR_DEFINED_RUN_PARAMETERS** is set in the Rule **EU - Run Definition User Defined Run Param Assignment**.

The multiple assessment of ratings are performed in the Data Transformation "Mult_Assessment_SCP" for the sold credit protection exposures, since their risk weight is based on the securitization framework. And the multiple assessment of ratings for all other non securitzed exposures are performed in the Data Transformation "Mult_Assessment_NonSec".

The mutliple assessment for the Non Sec exposure happens in the sub process **Multiple Assessment**.

The multiple assessment for the Sold Credit protection exposure happens in the sub process **Sold Credit Protection Exposure Data Population.**

The details of the Data Transformation are as follows:

Data Transformation Name	Objective	Processing Logic
Mult_Assessment_NonSec	The objective of this Data Transformation is to perform multiple assessment of the ratings and assign a normalized rating and risk weight to the non-securitized exposures and the underlying exposures.	For each exposure, the various standard ratings associated with that exposure and the respective risk weights are identified. If the number of ratings are 1, then the same rating gets assigned as the standard rating for the exposure and the risk weight associated with that standard rating gets assigned as the Pre-mitigation risk weight. If the number of ratings are greater than or equal to 2, then the exposure is assigned a risk weight which is the worst of the best two risk weights. And the corresponding rating is assigned to the exposure. This also assigns the rating to the parties and the sovereigns, based on the multiple assessments.
Mult_Assessment_SCP	The objective of this Data Transformation is to perform multiple assessment of the ratings and assign a normalized rating and risk weight to the sold credit protection exposures.	For each exposure, the various standard ratings associated with that exposure and the respective risk weights are identified. If the number of ratings are 1, then the same rating gets assigned as the standard rating for the exposure and the risk weight associated with that standard rating gets assigned as the Pre-mitigation risk weight. If the number of ratings are greater than or equal to 2, then the exposure is assigned a risk weight which is the worst of the best two risk weight. And the corresponding rating is assigned to the exposure.

For more information on setting up this Rule, see section.

```
┌─────────────────────────────────────────────────────────────┐
│                  Risk Weight Process START                    │
└─────────────────────────────────────────────────────────────┘
                              │
                              ▼
┌─────────────────────────────────────────────────────────────┐
│  Assign Risk Weights using exposure rating, party rating or   │
│                       sovereign rating                        │
└─────────────────────────────────────────────────────────────┘
                              │
                              ▼
┌─────────────────────────────────────────────────────────────┐
│      Assign Risk Weights and Ratings after multiple           │
│                         assessment                            │
└─────────────────────────────────────────────────────────────┘
                              │
                              ▼
┌─────────────────────────────────────────────────────────────┐
│   Update Risk Weights and Ratings after issue vs issuer       │
│                         agreement                             │
└─────────────────────────────────────────────────────────────┘
                              │
                              ▼
┌─────────────────────────────────────────────────────────────┐
│ Assign Risk Weights directly to exposures without ratings for │
│  Cash CRE, and so on. And also assign risk weights to unrated │
│                          exposures                            │
└─────────────────────────────────────────────────────────────┘
```

For exposures that are related to high risk, the solution relcassifies the assets or the products specified in the accord, and assigns them 150% Risk Weight. The solution reclassifies all the Basel products mentioned in the accord for the high risk treatment, with the High Risk Exposure Flag **(F_EXP_TREATED_AS_HIGH_RISK)** as Y, in the Non Sec processing table.

The Accord also mentions cases where a bank can have its own customized high risk category of exposures. To cater to this requirement, the bank has to create a custom rule for identifying those high risk exposures and populate this with the high risk exposure flag as **Yes** in **Fact Non Sec Exposures** table. This must be placed before the rule which is pertaining to the high risk exposure risk weight assignment based on discretion of the bank. These exposures are assigned 150% RW based on the rule **EU - High Risk Exposure Risk Weight Assignment Based on Discretion of Bank**.

For exposures that are based on a third country, and given the treatment on par with European Union, it is expected that the bank provides the country as EU approved third country jurisdiction in the country dimension (DIM_COUNTRY).

The Loan to value calculation for the Commercial Real Estate (CRE) and Residential Real Estate (RRE) product types and mitigant types are based on the bank opting for calculation using either mortgage lending value or market value. This is based on the bank's option, which is selected using the run management option, This is handled in the **Loan To Value Ratio Calculation** sub process.

The sub process **Non Sec Risk Weight Assignment Processing**, Risk Weight Assignment based on Asset Class handle this requirement for Risk weight assignment.

Pre-CRM RWA Computation

Pre-CRM RWA is calculated for all asset classes by multiplying the Pre-CRM EAD with the risk weight. RWA for Unexpected Loss is calculated as follows:

> **Non-Sec Pre-Mitigation Pre-Volatility Haircut Exposure at Default * Non-Sec Risk Weight for UL before Mitigation.**

If reporting bank has an exposure to one of its own subsidiaries, then that exposure is classified as an internal transaction. A subsidiary is identified by the values present in V_PARENT_CODE in the DIM_ORG_STRUCTURE table.

Each of the internal transaction, that is, transaction between parent and its subsidiary is marked as a deduction line item, from the corresponding tiers of capital. For the internal transactions which are not regulatory capital calculations, the solution supports the risk weight of 0% to these exposures based on the supervisory approval. This is handled as part of the run management option.

NOTE: All the internal transactions which are not part of the regulatory capital calculations are risk weighted at 0%, based on the supervisory approval. This option must be selected in the run management option.

The deduction is processed as part of capital structure in the capital structure processing and all the internal transactions are eliminated from any RWA calculation.

The covered bond and the CIU are processing specific to EU. The solution has undergone changes to cater to these functionalities.

Covered Bond Processing

The covered bonds are bonds which are backed by cash flows from an underlying asset. The covered bonds, as per the accord, undergoes preferential treatment of risk weighting if they satisfy few criteria. The solution validates the various criteria.

A high level process for the covered bond is as below:

Data Population to Account Level Processing Table

↓

Asset Reclassification

↓

Identification of the Qualification for Preferential Treatment

↓

Asset reclassification based on the Qualification for Preferential Treatment

↓

Risk Weight Assignment
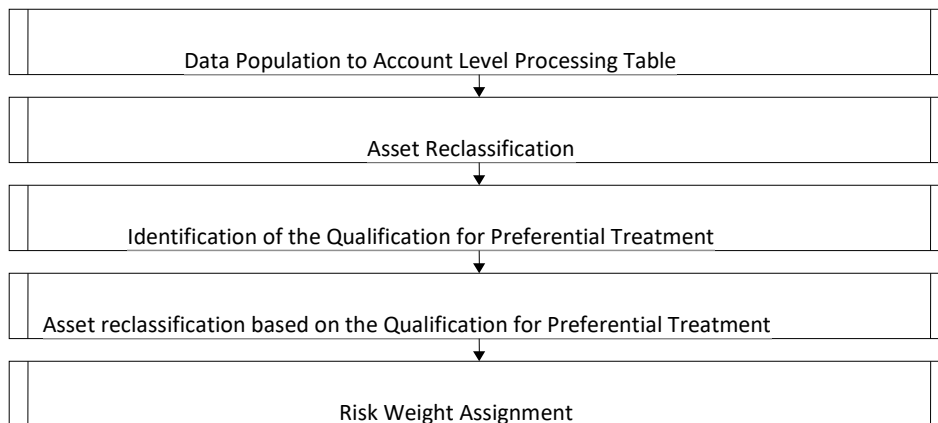
The exposures to the covered bond are expected in the Stage Investments table (**STG_INVESTMENTS**), and the instrument code is expected to be populated for these exposures.

The static information related to the instruments are expected in the Instrument contract dimension table (**DIM_INSTRUMENT_CONTRACT**), and the information pertaining to the instruments which changes periodically like the current outstanding issue amount is expected in the Stage Insrument Contract Detail table (**STG_INSTRUMENT_CONTRACT_DTL**).

The underlying exposures pertaining to these covered bonds are expected in the Underlying Exposure Staging table (**STG_UNDERLYING_EXPOSURES**), with the **Instrument ID** that of the Instrument, and the Underlying Data Type Identifier as **"CB"**.

NOTE: The covered bond underlying information are required only once for the instrument, regardless of the number of exposures to the instrument.

There are few critical information which are required for the processing of these covered bond instruments, which are captured in the instrument contract dimension table:

- Periodic Portfolio Information Received Flag

There are few critical information which are required for the processing of these covered bonds in the Stage Instrument Contract Detail table.

- Issued Current Outstanding Amount of the Instrument
- Issued Total Outstanding Amount of the Instrument

There are few critical information which are required for the processing of these covered bonds in the Stage Underlying Exposures table, if applicable.

- Senior Units of an Eligible Securitization
- Underlying Exposures' Loan To Income Ratio
- Underlying Exposures' Loan To Value Ratio

The underlying exposures are moved to the Non Sec Exposures processing table, and the instrument gets validated for the preferential treatment criteria. If the issue date is before 31-Dec-2007, the instrument and the related exposures are marked as eligible for preferential treatment.

If the issue date is after 31-Dec-2007, the solution checks the underlying exposures on the critieria mentioned in the accord, and marks them as eligible or ineligible.

If all the underlying exposures meet the criteria, then, the exposure to the covered bond is marked as eligible for preferential treatment. Else, the exposure to the covered bond is treated as a normal exposure.

If the issue date is after 2007, and the underlying exposures are not provided, then, the covered bond gets treated as a normal exposure. The underlying of the covered bond gets moved out of the Non Sec processing table to another table FSI Underlying Audit Details (**FSI_UNDERLYING_AUDIT_DETAILS**).

NOTE: Unless all information required for the covered bond preferential treatment eligibility check are populated into the application, the solution treats it as a normal exposure, which belongs to the asset class based on the issuer type.

The exposures to the covered bond, which meets the preferential treatment eligibility criteria, are reclassified into the Covered Bond asset class, and assigned the risk weight as per the preferential treatment. Else, it goes for normal risk weighting based on the standard party type related asset class.

The covered bond processing is handled in the sub process **Risk Weight Assignment for Covered Bond.**

Collective Investment Units (CIU) Processing

The CIU are funds which have invested in various exposures. The accord has specified various criteria for risk weighting the CIU Exposures. The solutions supports all the approaches. In the case of CIU, the solution follows a hierarchy of approaches – High Risk Treatment, Treated of Rated CIU exposures, Treatment of Unrated CIU – Full Look Through Exposures, Treatment of Unrated CIU – Partial Look Through Exposures and Treatment of Unrated CIU – Other exposures

Data Population to Equity Exposure Processing Table
↓
Asset Reclassification
↓
Risk Weight Based on Supervisory Approval for High Risk Treatment
↓
Risk Weigtht for Rated CIUs
↓
Risk Weight for Unrated CIUs

The exposures to the CIU are expected in the Stage Investments table (**STG_INVESTEMENTS**), and the instrument code is expected to be populated for these exposures. The static information related to the instruments are expected in the Instrument contract dimension table (**DIM_INSTRUMENT_CONTRACT**), and the information pertaining to the instruments which changes periodically like the current outstanding issue amount is expected in the Stage Insrument Contract Detail table (**STG_INSTRUMENT_CONTRACT_DTL**).

The underlying exposures pertaining to these CIU are expected in the Underlying Exposure Staging table (**STG_UNDERLYING_EXPOSURES**), with the **Instrument ID** that of the Insrument, and the Underlying Data Type Identifier as **"CIU"**. The underlying composition of the CIU are expected in the Stage Fund Underlying Composition table (**STG_FUND_UNDERLYNG_COMPOSITION**). This has the underlying composition details of the fund, across various products, and the maximum permissible limit of investment in each of the product types, with the fund code as the Instrument ID.

NOTE: The fund underlying composition and/or the underlying exposures are required for processing, only in the case of unrated CIUs. When the derivatives products are the underlying for a CIU, then the Notional amount of the derivative is expected to be given as the exposure amount in Stage Underlying Exposures (**STG_UNDERLYING_EXPOSURES**).

The exposures are first assigned a risk weight of 150%, if the CIU is classified as a high risk, and the supervisor has provided approval to treat it under high risk. This supervisory approval is captured in the Supervisory Approval Table (**FSI_SETUP_ASSETS_SUP_APPR_INFO**). The CIUs are assigned the high risk category based on the risk return profile grade flag, which is captured in the instrument contract dimesnion table. The risk return profile grade is reclassified into the risk categories of low, medium and high. This is done using the reclassification rule "EU - Risk indicator assignment for CIU Instruments",, which can be updated based on the country specific risk criteria.

NOTE: Unless the supervisory approval is populated, and the risk return profile grade is reclassified as high risk, the CIU is not treated as high risk item.

In the case of CIU having a rating, then, the CIU is risk weighted as per the CIU's rating. In the case of unrated CIUs, the solution follows look through apporach, provided the operational criteria are satisfied. The regulated party flag in the party table, and the periodic portfolio information received in the insturment contract table are required for this operational criteria check.

NOTE: Unless operational criteria are met, the look through approaches are not applicable.

If the operational criteria are met, and the CIU invests in a depository institution, the risk weight can be provided as a input. This is handled in the rule "**EU - CIU Risk Weight Assignment based on Third Party Issued Risk Weight**"

If the operational criteria are met, and the underlying exposure data are available the CIU is treated under Full Look through approach, and the weighted average risk weight of the underlying exposures are assigned to the CIU exposure.

If the operational criteria are met, and the underlying exposure are not available the CIU is treated under Partial Look through approach. In this, the underlying exposures are created based on the maximum permissible limit, and the investment in financial instruments percentage of the fund underkying composition table. These exposures go for risk weight treatment under issuer asset class, based on the product type. The Exposure Amount of the underlying exposures are recomputed, based on the maximum underlying exposure percentage and the descending order of risk weights. The weighted average risk weight of the underlying exposures are assigned to the CIU exposure.

Any other unrated exposures are also assigned a risk weight of100%

In the case of Partial Look through, the rule "**EU - Non Sec Pre-Mitigation RW for UL - PLT Approach**" helps in overriding the risk weight calculated for the underlying exposures, based on the underlying asset class and the credit rating.

The entire processing of CIU happens in the sub process "**CIU Risk weight Assignment**".

The CRD Accord expects few exposures to be treated as high risk category, and be assigned a differential RW of 150%. All these high risk categories are identified by the solution and it populates the exposure treated as high risk indicator flag as **Yes** in the **Fact Non Sec Exposures** and **Fact Equity Exposures** tables. And the solution risk weights all the exposures with high risk indicator flag as **Yes** to 150%.

The Accord also mentions cases where a bank can have its own customized high risk category of exposures. To cater to this requirement, the bank has to create a custom rule for identifying those high risk exposures and populate this with the high risk indicator flag as **Yes** in **Fact Non Sec Exposures** table. This must be placed before the rule which is pertaining to the high risk exposure risk weight assignment based on discretion of the bank. These exposures are assigned 150% RW based on the rule **EU - High Risk Exposure Risk Weight Assignment Based on Discretion of Bank**.

Over-the-Counter Derivative Products

The accord recommends calculation of Counterparty Credit Risk (CCR), wherein the counterparty can default before the final settlement of a transaction. Unlike the firm's exposure to credit risk arising from a loan, CCR creates a bilateral risk of loss. Market value of the transaction can be positive or negative for either parties in the transaction at different points in time, till the maturity or closure of the transaction. This market value is dependent on the movement of the underlying risk factor. The EBA has proposed Rules to calculate the EAD or exposure amount for the instrument with CCR.

NOTE: All OTC Derivatives and Repo products are part of the CCR computation.

The application's treatment for the instrument with CCR is divided into three categories:

1. Exposure at Default (EAD)
2. Risk Weighted Asset (RWA)
3. Credit Risk Mitigation (CRM)

Process Flow for Over-the-Counter Derivatives – EAD Approach

Exposure at Default (EAD)

A comprehensive explanation of the process flow is as follows:

The Basel Application enables the banks to calculate Counterparty Credit Risk (CCR) using Mark to Market method, Original Exposure method, or IMM method. Banks can use any of these approaches for calculating exposure value for all its derivative contracts. The selection of the exposure calculation method is dependent on bank's derivative portfolio and trading portfolio. Derivative portfolio and trading portfolio exposure conditions are operational in nature and is satisfied by the bank.

NOTE: The selection of the approach is based on run management option. In the case of Add-on estimation for MTM, there are 2 options, which is part of run management option.

If Bank's derivative portfolio includes only interest rate and exchange rate contracts, then bank can opt for any one of the approaches. If Bank's portfolio includes all types of derivative contacts including Interest rate and exchange rate contracts, then bank can only opt for Mark to Market method. Based on the run management option selected, the EAD is computed.

NOTE: Banks can opt for any of the approaches for the transactions at a portfolio level. For example, bank can opt for MTM for OTC Derivatives and OEM for Long settlement transactions.

In run management, the following counterparty credit risk calculation approaches are provided as option under OTC:

1. MTM
2. IMM
3. OEM

Under MTM, two Add-On approaches are provided:

1. Option 1 – If selected, Table 1 is used to assign add on.
2. Option 2 – If selected, Table 2 is used to assign add on. If you select this option, then the application identifies whether the entity satisfies the all the three criteria for extended maturity ladder approach or not.

Under OEM, the interest rate swaps have the option of choosing one of the following maturity for assigning the add-on:

1. Residual Maturity
2. Original Maturity

NOTE: The solution computes the add-on and EAD using the run management option selected EAD approach. It does not validate whether all the portfolios are covered or not. It is expected that Bank selects the appropriate portfolio for the EAD approach.

Mark to Market Method (MTM)

The application calculates the EAD for two different sets of the records with a different methodology - Netting Agreement Records and Non Netting Agreement Records.

Non Netted Exposure

To compute EAD for non-netting records the application requires the following inputs:

♦ Total replacement cost which is the greater of Mark to Market value of the contract or zero for all the contracts.

♦ An amount for potential future credit exposure is calculated based on the notional amount and multiplied by the add-on factor based on the underlying type in the contracts. The assignment of Add-on for different products is represented in the following table:

Residual Maturity	Interest Rates	FX and Gold	Equities	Precious Metals Except Gold	Other Commodities
One year or less	0.00%	1.00%	6.00%	7.00%	10.00%
Over one year to five years	0.50%	5.00%	8.00%	7.00%	12.00%
Over five years	1.50%	7.50%	10.00%	8.00%	15.00%

Netted Exposure

To compute EAD for netting agreement records, the application requires the following inputs:

♦ Total replacement cost which is positive Mark to Market value for all the contracts.

♦ An amount for potential future credit exposure is calculated based on the notional and multiplied by the add-on factor based on the following formula:

$$A_{net} = 0.4 * A_{Gross} + 0.6 * NGR * A_{Gross}$$

♦ The application creates new records for netting agreement and then populates into the OTC Exposure processing table. It selects all the records with the following attributes which are similar to computing the netting agreement exposure:

  o Trades with Entity

  o Customer

  o Product Level – All OTC trades

  o Netting Agreement

  o Book Code: Trading or Banking

  o Long Settlement transaction Flag

  o GAAP Code

Perfectly Matched Contract in Netting Set

The perfectly matched contracts are a set of contracts which have the same value date, same currency code, within the same netting agreement set, same product types, and with opposite risk positions (long and short). In the case of cross currency forex contracts, the currency code of one contract must equal the other currency code of the second contract and the other currency code must equal the currency code of the second contract. The application caclulates the settlement amount of the perfectly matched contracts in the netting agreement as follows:

Settlement Amount = Sum (notional principal of all buy (long position) contracts) - Sum (notional principal of all sell (short position) contracts)

NOTE: For the calculation of perfectly matched netting set, the parameters of value date and currency code have to be provided. Else, it is treated as non-perfectly matched netting set contracts.

Such calculated amount is distributed among the contracts in the perfectly matching set. For this the notional principal of these contracts are pro rated as follows:

Notional Principal of Contract= (Settlement Amount)*(notional principal of contract / sum (notional principal in the perfectly matching contract Set))

After prorating of notional principal is done for the contract the EAD is calculated as:

EAD = Notional Principal * Add-on.

The Add-on percentages are different for the contracts part of the perfectly matched netting set, and the contracts which are not part of the perfectly matched netting set.

The Setup rule, **EU-Extended Maturity Ladder Approach Operational Criteria** (RLBL8131), is used to setup the operational criteria for extended maturity ladder approach. These operational criteria is set at entity level. You have to select the entities in the source hierarchy (Organization Structure) and then for each hierarchy, it is required to select the check box for the following three target measures. Each of these corresponds to one operational criteria for using extended maturity ladder approach:

1. EU-Diversified Commodity Portfolio Flag - This flag indicates if the entity undertakes significant commodities business.
2. EU-Internal Model Calculation Flag - This flag indicates if the entity has a diversified commodities portfolio.
3. EU-Significant Commodity Business Flag - This flag indicates if the entity is in a position to calculate internal model for the purpose of commodities risk.

NOTE: Unless the rule EU-Extended Maturity Ladder Approach Operational Criteria has updated the values for the entities, the option 2 of the add—on cannot be used

If the entity is using the Extended Ladder Maturity Approach, then first two flags should be selected. The first two flags indicate **Yes** and the third flag indicates **No**.

If all these conditions are satisfied, the following table is used. This is a run management option, which the bank can decide to use, if the bank satisfies the preceding criteria.

Residual maturity	Precious Metals Except Gold	Base Metals	Agricultural Products (Softs)	Other, Including Energy Products
One year or less	2%	2.5%	3%	4%
Over one year to five years	5%	4%	5%	6%
Over Five years	7.5%	8%	9%	10%

If the preceding conditions are not satisfied by an entity, then the following table is used:

Residual maturity	Interest Rates	FX and Gold	Equities	Precious Metals Except Gold	Other Commodities
One year or less	0.00%	1.00%	6.00%	7.00%	10.00%
Over one year to five years	0.50%	5.00%	8.00%	7.00%	12.00%
Over Five years	1.50%	7.50%	10.00%	8.00%	15.00%

Internal Model Method (IMM)

If you select IMM Method for OTC portfolio, the SFT-OTC cross product netting calculations are done outside the system, and provided as input to the solution. The Exposure amount provided is taken as the EAD and multiplied by the Alpha value.

*Exposure at Default = α * Effective Exposure Amount, where α = 1.4*

NOTE: Effective Exposure Amount is provided as an input in the case of IMM Method.

Original Exposure Method (OEM)

If you select OEM Method for OTC portfolio and has exposures other than Interest Rate, Foreign exchange, and Gold are ignored since no treatment is specified in the accord.

NOTE: Any exposure in the portfolio, which does not comply with the OEM set of requirement, will not be risk weighted, and the EAD will not be computed for those exposures And these exposures will not be part of the RWA calculations as well, as EAD will be null. It is expected that the bank considers this, while creating the portfolio, and also selects the method appropriately.

The application calculates Exposure at default (EAD) using the following formula:

*EAD = Notional Amount *Add on*

Where, Add-on factor is derived based on the underlying, maturity of the contract,perfectly matched contract and Nettability flag. This formula remains the same for Netting and Non Netting calculations.

Perfectly Matched Contract in Netting Set

The perfectly matched contracts are a set of contracts which have the same value date, same currency code, within the same netting agreement set, same product types, and with opposite risk positions (long and short). In the case of cross currency forex contracts, the currency code of one contract must equal the other currency code of the second contract and the other currency code must equal the currency code of the second contract. The application caclulates the settlement amount of the perfectly matched contracts in the netting agreement as follows:

> *Settlement Amount = Sum (notional principal of all buy (long position) contracts) - Sum (notional principal of all sell (short position) contracts)*

NOTE: For the calculation of perfectly matched netting set, the parameters of value date and currency code have to be provided.

Such calculated amount is distributed among the contracts in the perfectly matching set. For this the notional principal of these contracts are pro rated as follows:

> *Notional Principal of Contract= (Settlement Amount)*(notional principal of contract / sum (notional principal in the perfectly matching contract Set))*

After prorating of notional principal is done for the contract the EAD is calculated as:

> *EAD = Notional Principal * Add-on.*

The Add-on percentages are different for the contracts part of the perfectly matched netting set, and the contracts which are not part of the perfectly matched netting set.

NOTE: For the purpose of Add-on assignment, the user can select either residual maturity or original maturity for the Interest rate swaps, based on the run management option.

Add-on for perfectly matched netting set contracts.

Original Maturity	Interest Rate Contracts	Foreign Exchange Contracts
One Year or Less	0.35%	1.50%
More than one year but not more than two years	0.75%	3.75%
Additional Allowance for each additional year	**0.75%**	**2.25%**

Add-on for non perfectly matched netting set contracts.

Original Maturity	Interest Rate Contracts	Foreign Exchange Contracts
One Year or Less	**0.5%**	**2%**
More than one year but not more than two years	**1%**	**5%**
Additional Allowance for each additional year	**1%**	**3%**

Operational Requirement for OEM

OEM cannot be opted by banks which have the small trading book business. This is expected to be validated by the user, before selecting the run management option of OEM, as an operational requirement, as the trading book exposures are not captured in the solution.

The criteria to identify banks having small trading book business are as follows:

- The on-balance sheet and off-balance sheet trading book assets are less than 5% of the total assets of the entity and also EUR 15 million. That is, Total On-balance sheet and Off-balance sheet trading book assets < min (5% of the total assets of the entity, 15 million)

- These assets never exceed 6% of the total assets and EUR 20 million.

Allocation of RWA at Exposures

CCR RWA calculated at the netting set level is allocated to the exposures of the nettable pool using the following formula:

RWA at Exposure Level = Total CCR RWA at netting set level * Pre Mitigation EAD for Exposure / Sum of Pre-Mitigation EAD for all Exposures part of CCR RWA at netting set level

Credit Risk Securities Financing Transactions (SFT)

Securities Financing Transactions (SFT) includes Repo Style transactions, Margin Lending, Security Financing Borrowing, and so on. The SFT portfolio of a bank is included for capital charge calculations as per standardized, foundation IRB, and advanced IRB approach. The SFT EAD calculation follows two methodologies:

- Comprehensive Approach
- IMM Approach

Currently, the Basel Regulatory Capital application supports Comprehensive approach only.

For all SFT contracts which have a mitigant mapped to it, the application computes CRM based on the RWA approach undertaken by the bank. For standardized approach, a risk weight is applied for all eligible mitigants based on mitigant value post haircut adjustment.

Process Flow for Credit Risk Securities Financing Transactions

SFT EAD is computed in the sub process **SFT Exposures RWA - Comprehensive Approach**.

A comprehensive explanation of the process flow is as follows.

SFT Underlying Data Population

The two data elements present in the SFT transactions are captured as follows:

Firstly, the parent transaction is captured in the Repo contracts table (**STG_REPO_CONTRACTS**) and secondly the underlying information, on which the parent transaction is built, is captured separately in the mitigant table **(STG_MITIGANTS)** or Placed collateral staging table **(STG_PLACED_COLLATERAL)**, depending on the product type**.**

The underlying data is identified by using the Exposure Mitigant Mapping Staging table **(STG_EXP_MITIGANT_MAPPING)**, wherein this is linked to the data in the repo contracts staging table, for any collateral which is provided to the repo contracts.

And the underlying data for any collateral placed with the counterparty, is identified by using the Account placed collateral Mapping Staging table **(STG_ACCT_PLACED_COLL_MAP)**, wherein this is linked to the data in the repo contracts staging table.

Volatility Haircut Assignment for SFT Underlying

The mitigant eligibility is calculated for the mitigants provided by the other banks for the SFT transactions, and based on the eligible mitigants, the haircut is assigned. In the case of ineligible mitigants, the haircut is assigned as 0.25, assuming the treatment of non-main index equities, which are traded on the exchange.

Pre-Mitigation Post Volatility Haircut EAD Amount Calculation for Exposures

For SFT transaction, the application calculates EAD for the parent exposure, based on the underlying information. The underlying exposures (which are the mitigants received and the collateral placed) are moved to **FCT_SFT_UNDERLYING** table from **FCT_MITIGANTS**. FOREX haircut is applied if the underlying and the parent contract are in different currency. Each SFT underlying exposure adjusted for haircut (EAD + haircut value) is added as EAD to the parent contract.

Nettable Pool Data Population

The application nets SFT contracts based on the same customer, common netting agreement identifier, transaction of Repo, Re-Repo or Margin Lending, Trading or Banking book, and so on. Margin lending transaction being SFT also follows the same EAD calculation methodology, however Repo or Reverse Repo and margin lending are not netted together.

In the case of Repo transactions, it is expected that the Risk weight is based on the account rating, and hence, only ratings of the repo transactions are required. This does not require the party rating.

Pre-Mitigation Risk Weighted Assets Unexpected Loss Calculation for the Pool

Pre-Mitigation Risk Weighted Assets Unexpected Loss is calculated for the pool as EAD multiplied by the risk weight.

RWA Allocation at Exposure Level

The RWA calculated at the netting set level, is allocated back to the exposures, which are part of the SFT netting set. This also uses the same formula as specified in the OTC section.

Treatment for Settlement Risk

There are unsettled transactions or failed trades in the security trading system. From the time, the failed trade happens till four business days after the settlement date, this is treated as a regular exposure. And post that, this is treated under the failed trade transaction related capital calculations. The EAD for these exposures is the difference between the Exposure Amount and the market value, which is computed by the solution.

Whenever there is a Delivery vs payment, and the trade remains unsettled even after the settlement date, then, it has the following capital charge assigned to the exposure, and on this basis, the RWA for the exposure is calculated.

NOTE: Failed Trade transactions have settlement risk calculated under DvP or PvP and Non-DvP / Non-PvP.

If there is a failed trade, and it is not a DvP or a PvP, then, it is treated as a free delivery. It wil be treated as a normal exposure till 4 business days. From 5 business days and later, this is risk weighted at 1250% if there is a material transaction, and for an immaterial transaction apply a risk weight of 100%. The bank has an option to deduct the failed trade transactions related to free deliveries, based on the run management option. If the run management option of deduction is selected, then, this is deducted from CET1 capital.

NOTE: There is a run management option for the bank to select whether they want to deduct the failed trade transactions from the CET1 capital, or want to risk weight at 1250%.

In the case of system wide failure of settlement systems, the settlement risk is not considered for these failed trade transactions, based on supervisory approval. This is a run management option, and when this option is selected, none of the exposures are risk weighted as per the settlement risk calculations.

NOTE: There is a run management option for the bank to select whether they have a supervisory approval to treat failed trade transactions as not a failed trade, if it is based on system wide failure of settlement system. The run management selection is done for the entire failed trade exposures, and not for few of the exposures.

Specific Wrong Way Risk

Wrong-way risk is defined as the risk that occurs when "exposure to counterparty is adversely correlated with the credit quality of that counterparty". It arises when default risk and credit exposure increases together.

Specific wrong-way risk means wrong-way risk that arises when either:

♦   The counterparty and issuer of the collateral supporting the transaction, or

♦   The counterparty and the reference asset of the transaction are affiliates or are the same entity.

Data Flow for SWWR
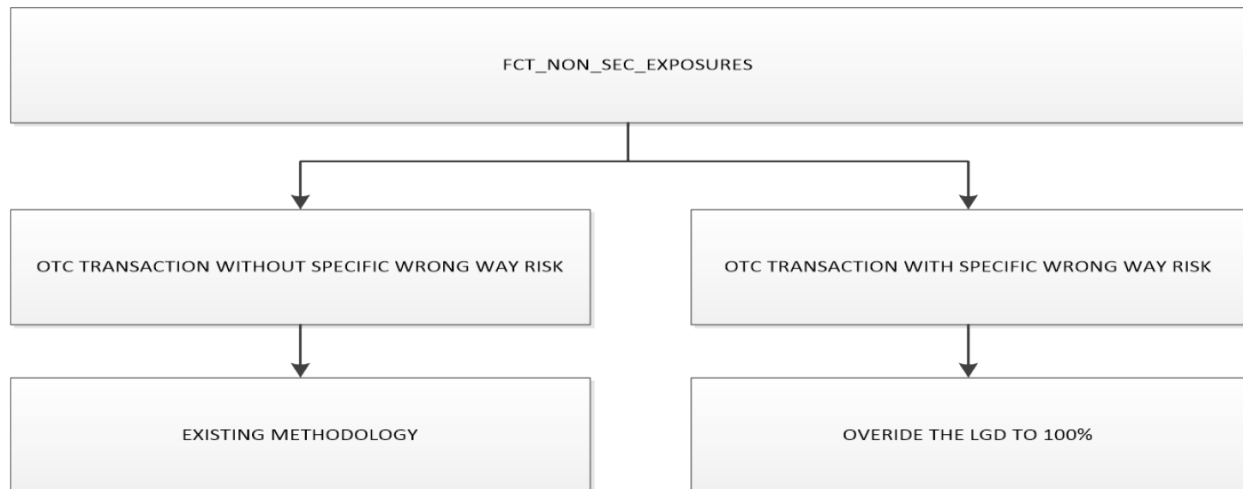
Specific Wrong way risk (SWWR) is identified by the clients and is captured in the product processor. Any exposure identified as SWWR is coming as netting agreement of its own is the data expectation.

Exposure at Default is expected as client input wherever the transaction is identified as SWWR. For all the transactions which are identified as SWWR, the risk weight, in the case of standardized approach, is based on the counterparty standard party type of the derivative.

Bought Credit Protection transactions which are currently flowing in Mitigants table are not part of SWWR treatment.

Key Data Elements

Key data elements to be noted are listed in this section. To view the complete list of tables, see *Download Specification* document in MOS.

For instruments participating in netting agreement, the nettability flag should be set as '**Y**'.

Instruments with the same agreement code are netted in the same netting agreement. The application handles cross product and product netting for netting agreements.

For specific wrong way risk, the exposures are expected to be part of the same netting agreement.

Cleared Transactions

The G20 Leaders, at their Pittsburgh summit in September 2009, agreed to a number of measures to improve the over-the-counter (OTC) derivatives markets, including creating incentives for banks to increase their use of Central Counterparties (CCP). Central clearing decreases the possibility of systemic risk by reducing the possibility of transferring financial contagion risk problems from one institution to another institution. This movement of a transaction to a CCP and the eventual failure of CCP can be catastrophic to the entire financial system. The CRR IV, in line with Basel committee guidelines, has introduced capital requirement for a bank's exposure arising from OTC, exchange traded derivatives, and repo style transactions which are cleared through CCP. The application calculates the risk charge for the transaction involving CCP's as per the guidelines laid out in CRR IV.

This concept is applicable for all the OTC and exchange traded derivatives and SFT products cleared through Qualified Central Counterparty (QCCP). For more information on terms such as Central Counterparty, Qualifying Central Counterparty, Clearing Member, Clearing Member Client, and Bankruptcy Remote, see *Glossary*.

Assumption

Fair value of collateral is at counterparty and collateral type level.

Process Flow
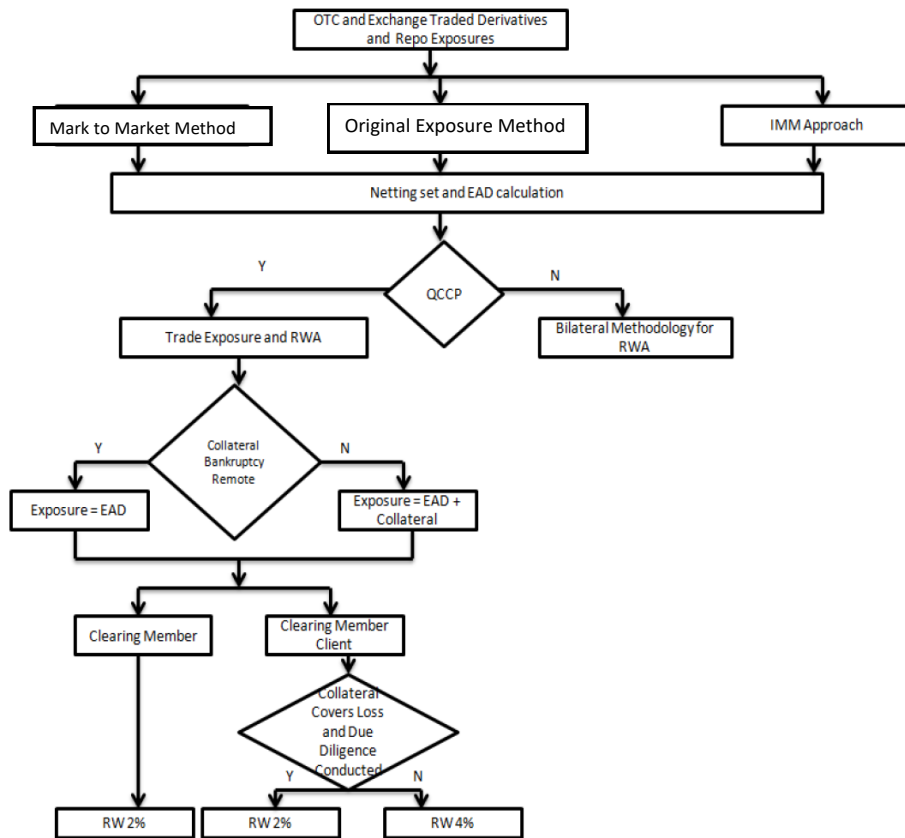
EAD Calculation

EAD calculation is computed as per the CCR approach selected, and based on the CRR IV guidelines.

The sub process **Treatment for Cleared Transaction** handles the EAD and the risk weight calculations.

Under the CRR IV, a clearing member banking organization treats its counterparty credit risk exposure to clients as an OTC derivative contract, irrespective of whether the clearing member banking organization guarantees the transaction or acts as an intermediary between the client and the QCCP. Consistent with the BCBS CCP interim framework, to recognize the shorter close-out period for cleared transactions, a clearing member banking organization can calculate its exposure amount to a client by multiplying the exposure amount, calculated using the MTM or OEM, by a scaling factor.

NOTE: The holding days are expected as an input, and on the same basis, the scaling factor is computed.

Holding Period (days)	Scaling Factor
5	0.71
6	0.77
7	0.84
7	0.89
9	0.95
10	1.00

Treatment of Exposure with Qualified CCP when Reporting Bank act as Clearing Member

The application expects you to identify all the transactions which fall under the group of cleared transactions.

The application calculates risk charge separately for exposures and collaterals posted with the QCCP. All the exposures with the QCCP are assigned a risk weight of 2%. If the collateral posted with the QCCP is not bankruptcy remote, then a risk weight of 2% is assigned. Otherwise a 0% risk weight is assigned.

Treatment of Exposure with Qualified CCP when Reporting Bank act as Clearing Member Client

The application expects you to identify all the transactions which fall under the group of cleared transaction. Risk weight assignment for the exposure with QCCP is based on the validation of the collateral posted by the reporting bank with the clearing member or QCCP. A risk weight of 2% is assigned if the following conditions are met:

- If the collateral posted covers all the losses arising for the clearing member or QCCP
- Due diligence is conducted on the collateral wherein there is no restrictions on the clearing member or QCCP for using posted collateral, in case of any legal proceeding at 2%

NOTE: These two conditions (that is, collateral covers the loss and due diligence conducted) are expected to be provided as an input.

If the preceding two conditions are not met, then a risk weight of 4% is assigned. These conditions are collateral specific and the application expects it for the collateral posted with QCCP. It automatically assigns the same to all the exposures of reporting bank with the QCCP. Collateral posted with the QCCP is also assigned the same risk weight which gets assigned to the exposure.

Treatment of Exposure with Non-qualifying CCP when Reporting Bank acts as Clearing Member or Clearing Member Client

The application expects you to identify all the transactions which fall under the group of the cleared transaction. Risk weight assignment for exposure and collateral posted with the non-qualifying CCP is assigned the same risk weight as that of a bilateral trade.

The CCP is considered as belonging to thecorporate asset class for the treatment.

Key Data Elements

Some key data expectations are as follows:

- For the exposure, the application expects the counterparty for the trades which are stamped as cleared transaction, to be CCP.

- The application also has captured the clearing member code if the role of the bank for the transaction is a clearing member client.

- For the collateral posted with clearing member, the application expects the counterparty to be clearing member and in addition the application also captures the QCCP for which collateral is posted.

- When the collateral is posted with CCP, transactions similar to exposures are expected. Collateral is also expected at counterparty and collateral type level.

- All the collateral records are assigned the risk weight separately.

The following data elements are expected as an input from the client:

- Central Counterparty is Qualifying or Non Qualifying.

- Collateral covering losses and due diligence conducted by CMC for the collateral contract.

- Bankruptcy Remote status for the collateral posted with CCP.

- Fair value of collateral at counterparty and collateral type.

- Bank's role in the transaction with the Central Counterparty

Default Fund Contribution

A default fund contribution refers to the funds contributed or commitments made by a clearing member to a Central Counterparty's (CCP) equalized loss sharing agreement. The purpose of such default funds is to provide capital, in addition to the collateral posted by participants and in addition to capital provided by the clearinghouse, as a safeguard against extraordinary losses that might occur in connection with.

For example a financial crisis in the market or the simultaneous defaults of several large members. The clearing members contribute to such default funds kept with the central counterparty (clearing house) in the proportion of their exposure to the central counterparty.

The default fund contributions by the clearing members contribute toward the central counterparty's regulatory capital along with CCP's own contributions to the default fund. These contributions act as collaterals to mutually share in the losses incurred by the clearing members due to counterparty defaults.

For each clearing member, a contribution is made to the central counterparty's default fund.

This contribution acts as a relief's against the defaults by any clearing member of the central counterparty.

CRR IV explains the methods that the banking organization playing the part of a clearing member of the CCP, must adopt and compute risk weighted assets (RWA) for a non-qualifying and a qualifying CCP.

NOTE: The solution handles the treatment of exposures to a QCCP and a Non-QCCP. This qualified CCP flag is expected to be provided as a download in the Party Master (**STG_PARTY_MASTER**) table.

If the CCP is not a qualified CCP (Non-QCCP), then the risk weighted asset amount for the banking organization's default fund contribution is calculated using the Own funds requirements for pre-funded contributions to the default fund of a non-qualifying CCP approach, as suggested in the accord.

If the CCP is a qualified CCP (QCCP), then the RWA amount is computed using one of the following two approaches stated below. Both are handled in the same Sub process - RWA For Default Fund Contribution With QCCP. This is based on the run management option selected.

- Own funds requirements for pre-funded contributions to the default fund of a QCCP.

- Alternative calculation of own funds requirement for exposures to a QCCP.

NOTE: The approach to use of either the own fund requirements for QCCP or the alternative approach of the own fund requirements for QCCP is based on the run management option.

Approach 1

For the purpose of computing the clearing member's capital requirement, which is the reporting bank's capital requirement for the contributions made to the CCP's default fund, the hypothetical capital requirement of the central counterparty for the default fund must be known. This must be computed by the central counterparty based on the exposures of all the clearing members to the default fund. After this figure is calculated by the CCP, it is shared with all the clearing members to enable them and to compute their respective capital requirements against the default fund.

When the reporting bank gets the hypothetical capital requirement from the QCCP, next step is to compute the capital requirement of the reporting bank by finding out the proportion of the reporting bank's contribution in the total default fund contribution.

The parameters considered for this purpose include the following QCCPs:

- Net potential exposure to the two largest clearing members,

- The total net potential exposure to all the clearing members,

- Total default fund contribution by all the clearing members,

- QCCP's own contribution to the default fund, and

- The total number of clearing members for the default fund.

The last step is to compute the risk weighted assets of the reporting bank corresponding to the default fund contribution to the QCCP by using the capital computed in the previous step.

These steps and the calculation involved are the following:

- **Step 1:**

  It requires the QCCP to calculate its hypothetical capital requirement (K_{CCP}) for the default fund. This is done by the QCCP and is published to the clearing members for them to use for their respective capital calculations.

- **Step 2:**

  Compare K_{CCP} with the funded portion of the default fund of a QCCP and calculate the capital requirement of the bank (K_{CM}) by using the total of all the clearing members' capital requirements (K^*_{CM}). This capital requirement is considered on the contribution that the clearing members make to the default fund of the QCCP.

Approach 2

Capital Charge for the default fund contribution is calculated as follows:

Capital charge (Ki) = 8% * minimum (2% of Trade exposures to the QCCP + 1250% * default fund contribution to the QCCP, 20% * Trade Exposure Amount to the QCCP).

The solution also supports the treatment of a CCP stopping to calculate its own fund requirement to the CCP. The flag to indicate that the CCP has stopped calculating the own fund requirement is captured in the party table (STG_PARTY_MASTER). And based on the supervisory approval provided, in the run management option, the capital wil be calculated using the Alternative approach. Else, it is treated as a normal Credit Risk Exposure, part of the Corporate Asset class.

NOTE: The flag to indicate that the CCP has stopped calculating the capital requirement is expected as part of the Party Master Table (STG_PARTY_MASTER). In the case of this flag being null, it is expected that the CCP is calculating the Total Capital and normal processing of QCCP or Non-QCCP happens.

Key Data Elements

Key data elements to be noted are listed in this section. To view the complete list of tables used, see the *Download Specification* document in [MOS](#).

Default fund contributions and related data are expected at Default fund – Central Counterparty level in the entity Stage Central Counterparty Details (STG_CCP_DETAILS).

Hypothetical Capital Requirement of CCP, Maximum Net Potential Exposure of clearing member of CCP, 2nd Maximum Net Potential Exposure of clearing member of CCP, Total Net Potential Exposure of clearing member of CCP, Number of Clearing Members to the CCP, Total funded Default Fund Contribution of all clearing members to the CCP, Total unfunded Default Fund Contribution of all clearing members to the CCP and Default fund contribution of CCP from its own funds for each central counterparty level required.

Application supports only the capital requirement of the bank (K_{CM}) based on Funded/Unfunded default contributions from all clearing members not by Initial Margin. But data model supports place holders to capture Total Initial Margin by all clearing members to CCP and Bank's initial margin posted to CCP.

Credit Risk Mitigation

The application handles multiple mitigants for Credit Risk Mitigation (CRM) like financial collateral, on-balance sheet netting, guarantees, credit derivatives, and so on. CRM reclassification is computed by reclassifying collateral and issuer to standard collateral and issuer type. The mitigant is identified as eligible or not based on the eligibility rule for CRM.

The CRM for non-sec exposures is validated for the following:

- ♦ The credit risk mitigation cannot allocate a risk weight higher than that of the exposure risk weight. This is validated by the solution. This is same as in existing solution.

- ♦ In case of exposures wherein the exposure already considers a case of credit risk mitigant, the data is not provided separately in the mitigant table. And the pre mitigation and post mitigation values are one and the same for these exposures.

- ♦ It is expected that the mitigants provided satisfy the operational criteria of mitigant eligibility, of them being sufficiently liquid and stable at all times.

- ♦ In the case of CIUs investing in instruments which are not part of eligible collateral, it is expected that the data provided in the mitigant table is the prorate share of the CIUs, which is pertaining to the eligible collateral instruments invested.

For Credit Risk Mitigation, the mitigants are divided into two broad categories:

1. Funded Credit Protection
2. Unfunded Credit Protection

Mitigant eligibility, mitigant risk weight, haircut assignment, and allocation of mitigants to exposures are handled in CRM sub-process.

Process Flow for Credit Risk Mitigation
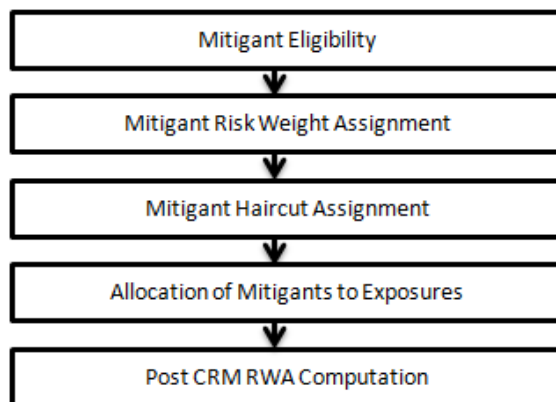
Mitigant Eligibility

The mitigant is identified as eligible or not based on the eligibility rules for CRM as mentioned in the CRR IV accord. Credit rating of the collateral is considered for all mitigant types issued by all party types, while deciding whether a mitigant is eligible for a particular exposure or not. Separate eligibility Rules exist for mitigants types like equity, mutual funds, or debt security, to perform these checks.

For the remaining, a mitigant is marked as eligible only if its risk weight is better than the exposure to which it is providing protection. This is handled in the sub process - **EU CRM Mitigant Eligibility Simple and Comprehensive Approach**.

Mitigant eligibility is also checked based on the original and residual maturity of the collateral. Collateral is classified as eligible only if its original maturity is more than a year and residual maturity is more than 3 months.

If CIU is a mitigant, the underlying of CIU are captured in the underlying exposures table. The underlying also undergoes the mitigant eligibility treatment, and based on which the CIU's elgibile mitigant amount computed.

In the case of unrated debt securities, the reference issue, and the corresponding rating is expected. It is also expected that the reference issue has data whether it has a positive outlook (**F_RATING_OUTLOOK_WATCH** = 'P') or a negative outlook **F_RATING_OUTLOOK_WATCH** = 'N'), or the same outlook of rating (**F_RATING_OUTLOOK_WATCH** = 'S'), as that ensures whether the reference issue is eligible or not.

The guarantees which are covered by a counter guarantor have the corresponding mapping updated in the counter guarantor mapping table. Based on the counter guarantor's eligibility as specified in the accord, the mitigant is made eligible.

Mitigant Risk Weight

Similar to Non-Securitization exposures, collaterals and mitigants are also assigned a risk weight based on their issuer type, credit rating, and original maturity of the mitigant. For financial collateral, under the Financial Collateral comprehensive method (FCCM), the RW assigned is 0. Also, nettable liabilities are also considered with 0% RW.

Mitigant Haircut Assignment

The application assigns three kinds of mitigant haircut, which are volatility haircut, FOREX haircut, and maturity mismatch haircut. Volatility haircuts are assigned to the collateral to account for any future fluctuations in the market value of the financial collateral. Separate Rules exist in the application for various types of financial collaterals like debt securities, equity, mutual funds, and so on. When the exposure and collateral are in different currencies, the application makes an adjustment by applying FOREX haircut. If the residual maturity of CRM is less than the underlying credit exposure, then a maturity mismatch is applied. If there is a maturity mismatch and CRM has an original maturity of more than a year, the maturity mismatch haircut is applied to adjust the value. The application assigns a volatility haircut using Supervisory Haircut method.

In case of Supervisory Haircut method, the application assigns volatility haircut based on issues, issuer's ratings, mitigant's residual maturity, and standard type of mitigant. The FOREX haircut is also assigned based on these transaction types as per the accord. Only eligible mitigants are considered for haircut assignment.

If CIU is a mitigant, the underlying of CIU undergo the mitigant haircut assignment, and the weighted average haircut is assigned to the mitigant. There is no haircut assigned for the ineligible mitigants.

The eligible mitigants data flows from Mitigants (**FCT_MITIGANTS)** table to Sub Exposures (**FCT_SUB_EXPOSURES)** table.

Allocation of Mitigants to Exposures

The application has a pre-built optimizer for optimum allocation of mitigants to the exposures for CRM purposes. One-to-One, Many-to-One, and Many-to-Many mapping of mitigants are handled in an efficient manner. This involves storage of intermediate computations for traceability.

All mitigants which are eligible and mapped to an exposure are then populated to a new table where each exposure is broken down to the mitigant types. An additional row is included which treats the exposure as having covered and uncovered portion. The covered factor and uncovered factor is also populated in this table.

The application uses the linear programming method to allocate the mitigants to the exposures. Pooling identifies the exposure and mitigant data from sub exposures (**FCT_SUB_EXPOSURES**) table.

Exposure identifier and mitigant identifier are the attributes on which Pooling is performed. It assigns the pool ID for each exposure-mitigant combination. Based on these pool ids, the optimizer allocates a covered factor to the exposures. Optimizer allocates mitigants to exposures to attain the most favorable EAD output.

The various steps related to the optimizer processing are part of the **Exposure Mitigant Optimizer** sub process.

The drawn portion of the Exposure is given a priority over the undrawn portion of the Exposure. And in the case of off-balance sheet transactions, the CCF is applied to the Exposure only post mitigation, inline with the CRR IV guidelines.

For more information on pooling and optimizer, see Exhibit 2 and Exhibit 3 in *Annexure A: Key Concepts*.

NOTE: A tag <ALTER_STATEMENTS> is present in Optimizer_Config.xml. This statement is used to enable the parallel Data Manipulation Language (DML) for the optimizer. This is disabled by default, due to which the following warning appears printed in the Optimizer log:

"Error: **Could not find node ALTER_STATEMENTS in the xml**"

The administrator can uncomment this tag to enable parallel DML for the optimizer.

Post CRM RWA Computation

Pre mitigation EAD is divided into Post Mitigation EAD for the covered portion and Post Mitigation EAD for uncovered portion. Covered portion is the portion of the exposure covered by the mitigant and uncovered portion is portion of the exposure not covered by the mitigant. For multiple mitigants covering one exposure, there is more than one record for the covered portion of that exposure. Post mitigation RWA UL (Post CRM RWA UL) is calculated by multiplying post mitigation EAD and its Risk Weight UL.

9.1.1.2.2 Securitization – Standardized Approach

The CRR IV accord differentiates the Credit Risk computation of the Securitized exposures from Non-Securitized exposures, in line with the CRR IV Accord. The securitized exposures are part of off-balance sheet transactions (when they are securitzed), and it follows a waterfall cash flow mechanism unlike the other exposures. Hence these exposures are treated differently. Due to the economic crisis of 2008, the Basel Rule has categorized securitized exposures into securitized and re-securitized exposures. And the CRR IV guidelines is in sync with the BIS guidelines.

Securitized exposures are exposures which are issued out of a pool of underlying exposures for the transfer of risk. Re-securitized exposures are the exposures which are issued out of a pool of underlying exposures which constitutes non-securitized exposures and some portion of securitized exposures. The application is capable of handling both securitized exposures and re-securitized exposures. It also handles the calculation for the originator and the investor bank roles. At a broad level, there are two categories of Investors:

♦ An Investing Bank who has invested heavily in securitization.

♦ An Investing Bank who has invested minimal in securitization.

For both the investors, the data is expected in the Stage Underlying Exposures (**STG_UNDERLYING_EXPOSURES**) for the underlying of the pool, Total Pool Level attributes in the Stage Pool table (**STG_SECURITIZATION_POOL**), Tranche Level attributes in the Stage Tranche table (**STG_SECURITIZATION_TRANCHE**), and the Exposure Level Attributes in the respective product processor (PP) tables.

If the exposure is a credit protection in the form of guarantee, it is expected in the Stage Guarantees table (**STG_GUARANTEES**), and if it is a credit derivative, it is expected in the Stage Credit Derivatives table (**STG_CREDIT_DERIVATIVES**). If it is a regular investment in the Tranches by an investing bank, or it is part of the mandate for retention in the pool or tranche for an originating bank, the data is expected in the Stage Investments table (**STG_INVESTMENTS**).

For exposures being a facility like liquidity facility, or servicer cash advance, the exposures are expected in the Stage Commitment Contracts table (**STG_COMMITMENT_CONTRACTS**), along with any respective entry in Stage Credit Line Details table (**STG_CREDIT_LINE_DETAILS**), if there is a credit line involved.

The Accord specifies two broad approaches for the calculation of the capital charge for the Securitization exposures:

1. Standardized Approach
2. IRB Approach

The standardized approach is handled by the application. For a few procedures, the calculations pertaining to the underlying exposures of the Securitization transaction are required before processing the Securitization exposures. This is computed before processing the Securitization exposures, using the Non Securitization exposures processing.

Process Flow for Securitization – Standardized Approach

The process flow for standardized approach of Securitization exposures are as follows:

Credit Rating Processing

All the rating information of the exposures and the mitigants are populated from the staging tables to the processing tables. The exposure and the tranche rating information are captured in the account rating tables and the mitigants rating information are captured in the instrument rating details. This is handled in the **CREDIT_RATING_PROCESSING** process.

Sec Data Population, Mitigant Data Population, and Mitigant Mapping

The data pertaining to pool, tranche, and exposures are populated from the staging tables to the processing tables. The underlying exposures data are captured in the underlying exposures staging table (and for these, the process pertaining to the non-securitization exposures is followed). The mitigants data are populated from the staging table to the processing table. The exposures which are mapped to the mitigants are captured and populated from the staging table to the processing table. Securitization data population is handled in the process **SEC_DATA_POPULATION**. Mitigant data population is handled in the process **MITIGANT_DATA_POPULATION** and Exposure Mitigant Mapping Population is handled in the process **SEC_EXP_MITIGANT_MAPPING_ POP**.

Sec Reclassification and Mitigant Reclassification

The application uses the standardized data for all kinds of calculations (product type like eligible liquidity facility, bank role like originator, pool type like mortgage backed securities). Before any computations, the application reclassifies the bank specific data to standard data as stated in the accord. It reclassifies the bank role to the standard bank role of an originator or investor. Any other bank roles like sponsor, credit protection provider, and so on, are reclassified into originator, investor, and so on, respectively. The application also reclassifies the pool type to the standard pool type like credit cards receivable pool, auto loans, and so on. It also reclassifies the product type to the standard product type like mortgage backed securities, eligible liquidity facility, and so on. These reclassifications are part of the **Sec Reclassification** sub process.

For mitigants the application reclassifies the mitigant types to the standard mitigant types like the debt securities, credit derivative, cash, and so on. It also reclassifies the mitigant issuer type to the standard mitigant issuer type like Institutions, Corporate, and so on. The application assigns the Sec - Standardized Approach in the **Sec Reclassification** Sub Process for approach selection.

Originator to Exclude Exposures from Capital Treatment

The originator can exclude the securitization exposures, which are retained by the originator, if it follows certain conditions, as mentioned in the CRR IV guideline. This is handled in the sub process **Treatment of originator to exclude sec exposures**.

Implicit Treatment

The originator, if they provide an implicit support to the securitization transaction, the bank cannot treat it as securitized transaction, and the exposure amount will be updated that of the sum of the underlying exposure amount, related to that pool. And the risk weight will be the weighted average risk weight of the underlying exposures. This is handled in the sub process **Implicit Support Treatment**.

Sec Pre-CRM Computations

The application calculates the pre-CRM RWA for the exposures by multiplying the pre-CRM EAD with the risk weight of the exposures. This is handled in the **Sec STD Pre-CRM Computations** sub process.

In the case of an originator, the securitized exposures in which the originator has invested in, and for which there is a significant credit risk transfer can be exempted from the calculation of the RWA.

This is identified by the solution, by taking the inputs required for the calculation as specified in the accord.

The mezzanine positions and the subordinated positions are identifed by the solution, based on the ratings of the tranches. The exemption criteria is checked using a combination of the pool attributes, tranche attributes and the exposure attributes.

And post calculations, if the exemption criteria is met, then, the pool, and all the exposures to the pool are marked as exempted under the significant credit risk transfer criteria. The RWA is not calculated for these exposures.

CCF Assignment

The application assigns the Credit Conversion Factor (CCF) to the off-balance sheet items as specified in the Accord. The CCF percentages are assigned based on the bank role, the product type (like the eligible liquidity facility) and the applicable ratings. The CCF percentages are also assigned to the exposures based the availability of early amortization provision, applicable to the transaction.

EAD Calculation

Using all the required input, the application computes the pre-mitigation EAD. The application calculates the EAD for the investors and the originators separately based on the calculations given in the Accord.

Risk Weight Assignment

The application assigns the risk weight to the exposures based on the external rating assigned to the exposures. If the exposures have internal ratings assigned, then the application treats the exposures as unrated. Initially, the application assigns the risk weight to each of the exposure's ratings. Then, the application using multiple assessment logic as specified by the regulators, assigns the final rating to the exposures. For each exposure, this final rating is the worst of the best two ratings assigned to the exposure.

Further, the application updates the rating after multiple assessments and updates the corresponding risk weight to the exposures. For Securitization and Re-securitization exposures, the risk weights assignment are different from the Non-Securitization exposures. The application assigns the risk weights based on the following conditions:

+ Bank role
+ The exposure is an exposure issued out of a Securitization or Re-securitization pool
+ The external ratings assigned to the exposures
+ Long Term or Short Term Ratings

In the case of an originator or sponsor, the risk weight of the securitized exposure cannot be more than that of the underlying exposures. The securitized exposures for which the underlying are defaulted exposures and/or associated with high risk are risk weighted at 150%.

For unrated exposures, the application applies the Look through Approach and assigns the weighted average risk weight of the underlying exposures multiplied by the concentration ratio of the tranche.

The application also handles other securitization exposures like the eligible liquidity facility, exposures in a second loss position and issued to ABCP Program, and so on. The risk weight for the unrated ABCP is not lower than a risk weight applied to the senior rated tranches of the same pool.

If the data to assign a risk weight is not available, then the application marks these exposures for 1250% risk weight.

Risk weights corresponding to the external ratings are assigned to the entity Securitization Risk Weight Map Master (**FSI_SEC_RW_MAP_MASTER**) and the final applicable risk weight is updated in Securitization Exposures table after multiple assessments of the ratings.

Treatment of Early Amortization

The revolving exposures with early amortization treatment have a different CCF assigned to them, based on whether they are controlled or non-controlled. The early amortization remains the same as in BIS, and the trapping percentage remains at 4.5.

If bank has provided Early Amortization provision, that is, at pool level (here, pool type is Revolving) and Early Amortization type is:

- Controlled committed Early Amortization Provision
- Controlled uncommitted Early Amortization Provision
- Uncontrolled committed Early Amortization Provision
- Uncontrolled uncommitted Early Amortization Provision

Early amortization type is expected as a download value at pool level.

Reduction in Risk Weighted Exposure Amount

The application provides a Run Management option to deduct the securitized or resecuritized exposures, which are risk weighted at 1250%, from capital. If the option to deduct these exposures is selected, all the exposures which are risk weighted 1250%, is assigned the CAP ID CAP593 (Securitization Exposures to be deducted instead of risk weighting at 1250%) and deducted from the capital in the capital calculations.

Sec CRM Process

Mitigant Eligibility, Mitigant Risk Weight, Haircut Assignment, and Allocation of Mitigants to Exposures are handled in Sec CRM sub-process.

Mitigant Eligibility

The application identifies the eligible mitigants based on the criteria as mentioned by the Accord. It identifies the following mitigants in the case of securitized exposures – Collateral, Guarantees, and Credit Derivatives. The application is capable of using the simple approach and the comprehensive approach for the mitigants which are part of the collateral. This is similar to the mitigant eligibility of the Non-Securitization process.

The application processes the multiple assessments of ratings for the mitigants also. This is required since some of the mitigant eligibility criteria are based on the ratings and risk weight of the mitigants.

…

The application identifies the eligibility of the financial collateral separately for the simple approach and the comprehensive approach. The eligibility of the collateral mitigants are based on the party type of the mitigant, mitigant types, the credit rating assigned to the mitigant or the party (as applicable).

For equity, the eligibility is based on the main index equity and the equity trading status. For mutual funds, the eligibility is based on the mutual fund calculations as specified in the non-sec process.

The application identifies the eligibility of the guarantees and credit derivatives based on the party type of the mitigant and the credit rating assigned to the issuer of the mitigant. For Nth to default credit derivatives, the application further identifies the eligible credit derivative, based on the number of defaults in the exposures and the defaulted position covered by the mitigant. The application identifies the number of defaults in the tranches based on the attachment point of the tranche to which the exposure belongs, the initial pool exposure amount, and the cumulative default amount. Further, it computes the number of tranches in default and compares it with the defaulted position covered by the mitigant.

Based on the criteria of eligibility mentioned in the accord, the application identifies whether the mitigant is eligible or not. If eligible, the application considers the least risk weighted exposure as the eligible mapping for the least eligible nth to default mitigant for the exposure.

This identification of the eligible nth to default credit derivative and the eligible exposure-mitigant mapping is performed with the help of the Data Transformation CD_SEC_MITIGANT_ELIG_STD. The details of the Data Transformation are as follows:

Data Transformation Name	Objective	Processing Logic
CD_Sec_Mitigant_ Elig_STD	The objective of this Data Transformation is to identify an eligible sec exposure mitigant mapping wherein the mitigant is an Nth to default credit derivative, in the case of IRB Approach.	The eligible nth to default credit derivative mitigant is identified and processed based on the exposures mapped to the same pool ID. All the exposures mapped to the same pool ID are identified and the corresponding mitigants mapped to them are also identified. In the sec pool ID, the cumulative pool default amount is compared with the tranche attachment point as a number (obtained by multiplying the tranche attachment percentage by the initial pool exposure amount). The number of tranches for which the tranche attachment point is less than the cumulative pool default amount is calculated. This number is compared with the minimum defaulted position of the credit derivative mitigant. For a basket of exposures covered by multiple credit derivatives, eligible mitigant is minimum defaulted position in the basket minus 1. Also other credit derivative in the basket of exposures which are having the defaulted position consecutively becomes eligible.

Data Transformation Name	Objective	Processing Logic
		For each eligible mitigant, the exposure mitigant mapping wherein the exposure has the least risk weight or capital charge becomes eligible. All other exposure mitigant mapping for that mitigant is marked ineligible.

The application also identifies the eligibility of the mitigants based on the comparison of the risk weight of the exposures and the mitigants. If the mitigants risk weight is lesser than that of the exposures, then the mitigants become eligible or else the application makes them ineligible.

Mitigant Risk Weight

The application calculates the mitigant risk weight similar to the exposure risk weight of non-securitized exposures. This is based on the issuer type and the credit rating which includes the unrated issuers as well. The application performs multiple assessments for the mitigants, similar to the Non-Securitization exposures process and arrives at a single rating for the mitigant. Further, the application assigns the final risk weight to the mitigant. In case of financial collateral mitigants like cash, and gold zero risk weight is assigned.

Haircut Assignment

The application assigns the various haircuts, as applicable to the Mitigants. For collateral following simple approach, there are no haircuts assigned to the mitigant. For collateral following comprehensive approach, the application has the flexibility to use the supervisory haircut and scale up, if required, based on the minimum holding period. Alternatively, it can also use the bank's own estimate of haircuts. The application applies the volatility haircut, FOREX haircut, and the maturity mismatch haircut to the mitigants as appropriate. This is as per the Accord regulations. Only eligible mitigants are considered for haircut assignment. The eligible mitigants data flows from the mitigants (**FCT_MITIGANTS**) table to sub exposures (**FCT_SUB_EXPOSURES**) table.

Allocation of Mitigants to Exposures

The application computes the mitigant value post all haircuts. Further, it uses the pooling and optimizer logic to allocate the exposures to the mitigants. This allocation is a bit different from the optimizer logic of Non-Securitization exposures as the Securitized exposures have priority in the cash flow and gets the maximum protection by the mitigants. The senior most exposure (or tranche) is denoted with seniority 1 and the second senior exposure is denoted with seniority 2 and so on. For securitization exposures, the mitigants are given preference to the senior most exposure and later to the other exposures based on the seniority. The other parameters which are considered in the allocation logic are the risk weight and the mitigant value post haircut.

The application uses the linear programming logic to allocate the mitigants to the exposures. The optimizer logic for Securitization exposures is a bit different from Non-Securitization exposures, which is explained as follows:

Based on the seniority of the exposures, risk weight of the exposures, and the mitigant and the mitigant value, the rank order in which the mitigants are allocated to the exposures is arrived at. The order of allocation can be modified by updating the operation type and the optimizer constraints of the objective function. You can select the allocation rank measure in the **Optimizer Definition** window, while defining the optimizer logic. For more information on defining the optimizer, see Exhibit 2 and Exhibit 3 in *Annexure A: Key Concepts.*

Single Mitigant Mapped to Single or Multiple Exposures

If there is one or more than one exposure mapped to a single mitigant, the mitigant is allocated to the exposure with the highest seniority. If there is more than one exposure with the same highest seniority, then the mitigant is allocated to the exposure which yields the highest mitigant value post haircut.

Single Exposure Mapped to Single or Multiple Mitigants

If there is one or more than one mitigants mapped to a single exposure, the least risk weighted mitigant is allocated to the exposure. If there is more than one mitigant with the same least risk weight, then the mitigant which has the highest mitigant value post haircut is allocated to the exposure.

Multiple Exposures Mapped to Multiple Mitigants

The treatment for this case is similar to the treatment of single mitigant mapped to single or multiple exposures, for the identification of the mitigant which is assigned to the exposures. The treatment pertaining to single exposure mapped to multiple mitigants is followed to yield the credit risk weighted exposure amount.

Using the preceeding logic, the application calculates the factor of exposure covered by the mitigant and the factor of the exposure uncovered (without any protection).

Sec Post CRM RWA Computation

The application computes the covered amount and the uncovered amount for the exposures. The covered amount is computed by multiplying the covered factor with the exposure amount, and to this covered amount, the application assigns the mitigant risk weight. The product of the covered amount and the mitigant risk weight is the covered RWA. The uncovered amount is computed by multiplying the uncovered factor (which is 1 – sum of all covered factors for that exposure) with the exposure amount. This uncovered amount is multiplied by the exposure risk weight to get the uncovered RWA. The sum of the covered RWA and the uncovered RWA is the Post CRM RWA of the Exposure.

> **Post-CRM RWA = Covered Amount * Risk Weight of the Mitigant**
>
> **+ Uncovered Amount * Risk Weight of the Exposure**

This logic is handled in **Sec Post-CRM RWA Computation** sub process.

Key Data Elements

A few key data elements are elaborated in this section. For a complete list of tables and columns to be populated, see the *Download Specifications* document.

For an investing bank, the data is expected in the Stage Underlying Exposures (**STG_UNDERLYING_EXPOSURES**) for the underlying of the pool, Total Pool Level attributes in the Stage Pool table (**STG_SECURITIZATION_POOL**), Tranche Level attributes in the Stage Tranche table (**STG_SECURITIZATION_TRANCHE**), and the Exposure Level Attributes in the respective PP tables.

For an originator, the data is expected in the same manner as the Investor, except for the Underlying Exposures. The underlying exposures of the pool, which are available in the asset sold staging table, are also expected in the Stage Underlying Exposures (**STG_UNDERLYING_EXPOSURES**).

For a credit protection exposure in the form of guarantee, it is expected in the Stage Guarantees table (**STG_GUARANTEES**); and if it is a credit derivative, it is expected in the Stage Credit Derivatives table (**STG_CREDIT_DERIVATIVES**). If it is a regular investment in the Tranches by an investing bank, or it is part of the mandate for retention in the pool or tranche for an originating bank, the data is expected in the Stage Investments table (**STG_INVESTMENTS**).

For a liquidity facility exposure, or servicer cash advance, the exposures are expected in the Stage Commitment Contracts table (**STG_COMMITMENT_CONTRACTS**), along with Stage Credit Line Details (**STG_CREDIT_LINE_DETAILS**), if it is issued as part of a credit line agreement.

9.1.1.3 Credit Valuation Adjustments

Credit Valuation Adjustment (CVA) capital charge is added to default risk capital charge to arrive at the new Counterparty Credit Risk (CCR) capital charge. The mark to market counterparty credit losses or the spread migration risk is captured with CVA, which were not directly capitalized before. CVA is the difference between the risk-free portfolio value and the true portfolio value that takes into account the possibility of the counterparty's default. In other words, CVA is the market value of counterparty credit risk.

The application calculates CVA Charge for OTC portfolio of a bank using standardized approach or alternative standardized approach. This is part of a run management option. Advanced approach is applicable only wherein the bank follows IRB approach for their portfolio.

NOTE: The CVA approach selection is based on the run management option. If banks follow OEM approach for the CCR calculation, the supervisory approval for Alternative approach is captured based on the run management option.

When using the standardized approach, CVA charge is calculated at portfolio level. Counterparty level calculations consider all trades in different OTC products with the counterparty for calculation of CVA Charge. Charge is calculated for all counterparties with which banks have counterparty credit risk exposures. The CVA charge for all the counterparties is summed up to ascertain the Portfolio Level Charge.

All the OTC Derivatives products are part of CVA calculations. SFTs are included if you select the option from Run Management Window, as that is based on the supervisory approval Internal transactions are also included, based on the run management option selection, as that is also based on the supervisory approval. Also, trades with Central Counterparty (CCP), and transactions with a non-financial counterparty are excluded from CVA Charge calculations.

Assumptions

CVA hedge should be identified by the clients separately. Only single name CDS and Index Hedge are eligible for CVA. The Accord does not clearly mention whether index hedge position should be marked to the counterparty or not.

NOTE: The solution checks the eligibility and marks the nth to default CDS and credit linked note as ineligible hedges, as per the requirement.

The Basel Regulatory Capital application handles the index position in the following manner:

1. Both index position marked to the level of counterparty or not marked to the level of counterparty is handled by the application.

2. Effective index hedge amount is considered in the CVA charge calculation at portfolio level without considering whether it is marked to the counterparty or not.

3. If the index position is marked to the counterparty, then index hedge amount is considered while allocating total CVA charge to the counterparty CVA Charge, while using Standardized Approach.

The calculation of the CVA happens in the
EU_CREDIT_VALUE_ADJUSTMENTS_STD_AND_ALTERNATIVE_APPROACH process.

9.1.1.3.1 Standardized Approach

The application calculates CVA capital charge at portfolio level using the following formulae as specified by the accord:

$$K = 2.33 \cdot \sqrt{h} \cdot \sqrt{\left(\sum_i 0.5 \cdot w_i \cdot \left(M_i \cdot EAD_i^{total} - M_i^{hedge} B_i \right) - \sum_{ind} w_{ind} \cdot M_{ind} \cdot B_{ind} \right)^2 + \sum_i 0.75 \cdot w_i^2 \cdot \left(M_i \cdot EAD_i^{total} - M_i^{hedge} B_i \right)^2}$$
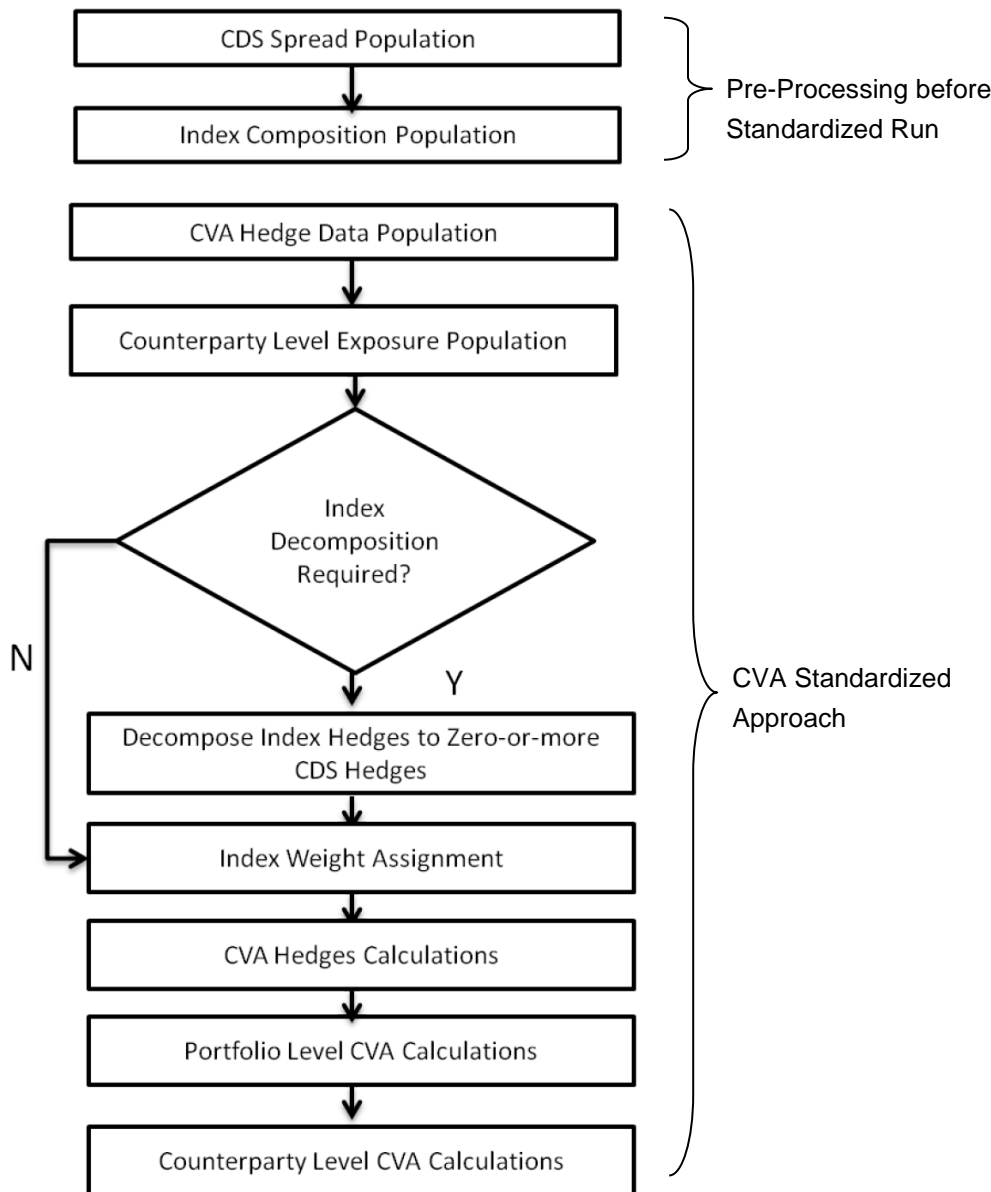
CDS Spread Population and Index Composition Population

Pre-processed data for CVA is required to be populated only once for a particular execution date. The process **EU_CVA_DATA_POPULATION** in the Run **Staging Data Population - EU Credit Value Adjustment** is responsible for populating pre-processed data for CVA.

CVA Hedge Data Population

Mitigants data marked as CVA Hedge is populated as a part of the CVA Hedge Data Population. The application loads all the single name CDS hedge and index hedge data. The hedge data marked as CVA does not flow in the application during the credit risk process.

CVA specific data is captured using the following attributes:

1. **F_CVA_HEDGE**

   Identifier for CVA Hedge records by which the application identifies it as CVA Hedge.

2. **N_CDS_INDEX_AVG_SPREAD**

   Average traded CDS Index Spread which is required for assignment of weight to the index.

3. **V_REF_ENTITY_PARTY_ID**

   This field captures the counterparty of the hedge transaction.

This is handled in the sub process **CVA DATA POPULATION**.

Counterparty Level Exposure Population

The application expects the uncovered EAD at netting agreement level or at trade level. This is available as an output of Counterparty credit risk process. If more than one netting agreement is available, then the exposures are summed at counterparty level. These aggregated data is stored in **FCT_REG_COUNTERPARTY_CVA** table using **COUNTERPARTY_EXPOSURE_POPULATION** T2T.

Maturity adjustment discount factor is computed at netting agreement level or for each netting agreement using the formula **1- exp(-0.05*M_i)/ (0.05*M_i).**

Maturity is the notional weighted maturity at netting agreement level. The application sums the data for exposure at counterparty level. If more than one netting agreement is available, the exposures are discounted and then summed at counterparty level. Weight assignment is done based on the counterparty rating as specified in the following table. Data is aggregated at counterparty level and stored in separate counterparty table.

Credit Quality Step	Weight
1	0.7%
2	0.8%
3	1.0%
4	2.0%
5	3.0%
6	10.0%

This happens in the sub process **CVA COUNTERPARTY EAD CALCULATION**.

Index Decomposition Required

You can select index decomposition which is executed in the **Run Management** window. Index decomposition option, creates single name CDS hedge positions for the counterparties which are part of the CDS Index and also have exposures. Index hedge amount is adjusted by the same amount for which single name CDS hedge is created, so as to get maximum benefit from hedging. Maturity of the single name CDS hedge is considered same as the maturity of index.

The sub process **INDEX DECOMPOSITION** handles this processing.

Index Weight Assignment

The application derives the weight for each index by assigning rating. Rating is assigned by comparing the historical average spread of index with spread corresponding to the tenor, which is equal to the maturity of index. After acquiring the rating, assign the weights to the index as per the reference table (weights table). Average index spread and credit spread data for different ratings are the inputs. Index spread is populated as a part of mitigants data. Credit spread data for respective ratings and tenors are required as inputs.

This is handled in the sub process **CVA INDEX WEIGHT ASSIGNMENT**.

CVA Hedge Calculations

After population of hedge data and creation of single name CDS hedge from the index, the application sums the notional to counterparty level and populates in CVA Specific table. Maturity Adjustment discount factor is computed using the formula **(1-exp (-0.05 * M_{ihedge}))/ (0.05 * M_{ihedge})**. If more than one CDS Contract is available for the counterparty, the computed amount is summed at counterparty level. The Index Hedge amount is calculated separately. Maturity Adjustment discount factor for index position is computed using the formula **(1-exp (-0.05 * M_{ind})) / (0.05 * M_{ind})**. If more than one index hedge is available then index hedge amount is summed. All the data required for CVA calculation is populated from Mitigants data to CVA specific table. The data is summed for every counterparty and stored.

This happens in the sub process **SINGLE NAME CDS CALCULATION**.

Portfolio Level CVA Calculation

Portfolio Level CVA Charge is calculated as per the following formula:

$$K = 2.33 \cdot \sqrt{h} \cdot \sqrt{\left(\sum_i 0.5 \cdot w_i \cdot \left(M_i \cdot EAD_i^{total} - M_i^{hedge} B_i \right) - \sum_{ind} w_{ind} \cdot M_{ind} \cdot B_{ind} \right)^2 + \sum_i 0.75 \cdot w_i^2 \cdot \left(M_i \cdot EAD_i^{total} - M_i^{hedge} B_i \right)^2}$$

The CVA charge calculated at portfolio level is populated in the **FCT_REG_CVA_SUMMARY** table. Single Name CDS Hedge component for CVA at portfolio level is calculated and the summary table is populated using **CVA_SUMMARY_POPULATION** T2T.

NOTE: The CVA calculation happens at the portfolio level, and is allocated back to the counterparty and the exposures.

This happens in the sub process **PORTFOLIO LEVEL CVA CALCULATION**.

Counterparty Level CVA Calculation

CVA Capital Charge at counterparty level is allocated using the following formula:

CVA at Counterparty = Total CVA at Portfolio *W_{CVAi}

W_{CVAi} = Absolute[0.5*W_i * (M_i * EAD_i^{total} - M_i^{hedge} * B_i) - Σ_{indi}(W_{ind} * M_{ind} * B_{ind})]/

$\Sigma niAbsolute[0.5$*Wi * (Mi * EADitotal - Mi hedge * Bi) - Σ_{ind1}(W_{1nd} * M_{1nd} * B_{1nd})]/

This is handled in the sub process **COUNTERPARTY LEVEL CVA CALCULATION**.

Exposure Level CVA Capital Charge and RWA

CVA Capital Charge calculated at the counterparty level is allocated to the exposures of the nettable pool using the following formula:

CVA RWA at Exposure Level = Total CVA RWA * Pre Mitigation Non CVA RWA for Exposure / Sum of Pre-Mitigation Non CVA RWA for all Exposures part of CVA RWA

This is handled in the sub process **CVA RWA And CVA Charge Allocation To Exposures**.

9.1.1.3.2 Alternative Approach

The application calculates CVA capital charge using the alternative approach. This is selected based on the run management option. In the case of bank following OEM for its OTC derivatives, it can opt for Alternative Approach, only based on the supervisory approval. This is captured using the run management option.

NOTE: This is applicable based on the run management option, and only in the case of OEM, it requires a supervisory approval as well for using it. This is also captured in the run management option.

In the case of Alternative approach, the CVA capital charge is calculated by multiplying a factor of 10, to the CCR RWA, and the same is summed up at the counterparty level and the portfolio level. The rules **EU - CVA RWA and Charge at Portfolio Calculation - Alternative Approach** and **EU - CVA RWA and Charge at Counterparty Calculation - Alternative Approach** handles this particular requirement at both portfolio level and counterparty level respectively. The RWA calculated is prorated and assigned back to the individual exposures, using the sub process **CVA RWA And CVA Charge Allocation To Exposures.**

Key Data Elements

Key data elements are provided in this section for computation for Credit Valuation Adjustment. For a complete list of tables and columns to be updated, see the Download Specifications document.

- ♦ CDS Index Composition data requirement.
- ♦ CDS Spread data for Rating and Tenor.
- ♦ Average Index Spread for all the Index Hedge Position.

9.1.1.4 Operational Risk

As per the Basel accord, "Operational Risk is the risk of loss resulting from inadequate or failed internal processes, people and systems, or from external events". External losses can occur due to theft of information or hacking of systems.

Operational losses, that is, the financial impact associated with an operational event that is recorded in the institution's financial statements consistent with Accounting Principle or Framework. Financial impact includes all out-of pocket expenses associated with an operational event but does not include opportunity costs, foregone revenue, or costs related to investment programs implemented to prevent subsequent operational risk losses.

As per the CRR IV regulation, the calculation of capital charge for operational risk is done by using any of the below approaches, based on the bank fulfilling the required conditions:

1. Basic Indicator Approach
2. Standardized Approach
3. Alternative Standardized Approach

NOTE: When executing Solo Run for computing Operational Risk, the parent entity data is processed. However, for a Consolidated Run the parent entity and the subsidiary data are processed.

The bank can choose the approaches based on run management option. As the approach option of Standardized Approach and Alternative Standardized Approach is based on supervisory approval, it is expected that the bank chooses the appropriate run management option based on the supervisory approval obtained.

NOTE: It is expected that the bank is aware of which process it has an approval to, and selects the approach accordingly in the run management option.

9.1.1.4.1 Operational Risk Prerequisites

The banking activities are divided into eight lines of business for operational risk as defined in the following table. This is the basis on which the bank is expected to reclassify their lines of business into the Basel application specific lines of business.

Business line	List of activities
Corporate finance	♦ Underwriting of financial instruments or placing of financial instruments on a firm commitment basis ♦ Services related to underwriting Investment advice ♦ Advice to undertakings on capital structure, industrial strategy and related matters and advice and services relating to the mergers and the purchase of undertakings ♦ Investment research and financial analysis and other forms of general recommendation relating to transactions in financial instruments

Business line	List of activities
Trading and sales	♦ Dealing on own account ♦ Money broking ♦ Reception and transmission of orders in relation to one or more financial instruments ♦ Execution of orders on behalf of clients ♦ Placing of financial instruments without a firm commitment basis ♦ Operation of Multilateral Trading Facilities
Retail brokerage	♦ Reception and transmission of orders in relation to one or more financial instruments ♦ Execution of orders on behalf of clients ♦ Placing of financial instruments without a firm commitment basis
Commercial banking	♦ Acceptance of deposits and other repayable funds ♦ Lending ♦ Financial leasing ♦ Guarantees and commitments
Retail banking	♦ Acceptance of deposits and other repayable funds ♦ Lending ♦ Financial leasing ♦ Guarantees and commitments
Payment and settlement	♦ Money transmission services ♦ Issuing and administering means of payment
Agency services	Safekeeping and administration of financial instruments for the account of clients, including custodianship and related services such as cash/collateral management
Asset management	♦ Portfolio management ♦ Managing of UCITS ♦ Other forms of asset management

This is handled in the sub process **Reclassification of LoB**.

9.1.1.4.2 Basic Indicator Approach Requirements

To calculate the capital charge under the basic indicator approach, the annual gross income for each of the past three years for a standard line of business is multiplied by a fixed percentage of 15%. The average is considered to calculate the capital charge.

The capital charge formula is as follows:

$$K_{BIA} = \left[\sum \left(GI_{1..n} \times \alpha \right) \right] / n$$

Where:

$K_{BIA} =$ the Capital Charge under the Basic Indicator Approach.

$GI_{1-n} =$ the annual gross income in a given year for each line of business.

$\alpha =$ a fixed percentage, set by the committee, relating the level of required capital to the level of the gross income for the line of business.

This is handled in the sub process **Risk Factor Calculations** of the process **OPS_RISK_BASIC_IND_APPROACH**.

9.1.1.4.3 Standardized Approach Requirements

In this approach, banking activities are divided into eight lines of business. The gross income for each line of business is multiplied by the beta factor which is pre-defined in the CRR IV accord. Every year the gross income of the standard line of business is multiplied by respective beta factor. The total capital charge is calculated as the three-year average of the sum of the regulatory capital charges across each lines of business every year. The total capital charge is calculated as follows:

$$K_{TSA} = \left\{ \sum\nolimits_{years\ 1-3} \max\left[\sum (GI_{1-8} \times \beta_{1-8}), 0 \right] \right\} / 3$$

Where:

$K_{TSA} =$ the Capital Charge under the Standardized Approach.

$GI_{1-8} =$ the annual gross income in a given year (as defined in the Basic Indicator Approach) for each of the eight lines of business.

$\beta_{1-8} =$ a fixed percentage, set by the committee, relating the level of required capital to the level of the gross income for each of the eight lines of business.

NOTE: The Basic Indicator Approach's gross income calculation can be reused for this, unless the bank has a different gross income calculation for the various lines of business.

This is handled in the sub process **Risk Factor Calculations** of the process **OPS_RISK_STD_APPROACH**.

9.1.1.4.4 Alternative Standardized Approach Requirements

This approach is an extension of the standardized approach. A bank can use Alternative Standardized Approach, based on the supervisory approval. The supervisory approval is provided based on the reporting bank meeting all of the following criteria:

- The retail or commercial banking activities account for at least 90 % of its income.
- A significant proportion of the retail or commercial banking activities comprise loans associated with a high PD.

The Alternative Standardized Approach provides an appropriate basis for calculating its own funds requirement for operational risk.

In this approach for two lines of business: Retail Banking and Commercial Banking, the loan and advance amount is used (rather than annual gross income) which is multiplied by the fixed factor "m" and the beta factor. The beta factor as in the standardized approach remains the same for retail and commercial banking. The constant factor "m" is equal to 0.035. The capital charge for retail and commercial banking uses the loan and advance amount and for the remaining, the calculation of capital charge is the same as in the standardized approach. The total capital charge is calculated as the three-year average of the sum of the regulatory capital charges across each lines of business every year.

This is handled in the sub process **Risk Factor Calculations** of the process **OPS_RISK_ALTERNATE_STD_APPROACH**

Process Flow for Operational Risk

The procedure to compute Operational Risk is as follows.
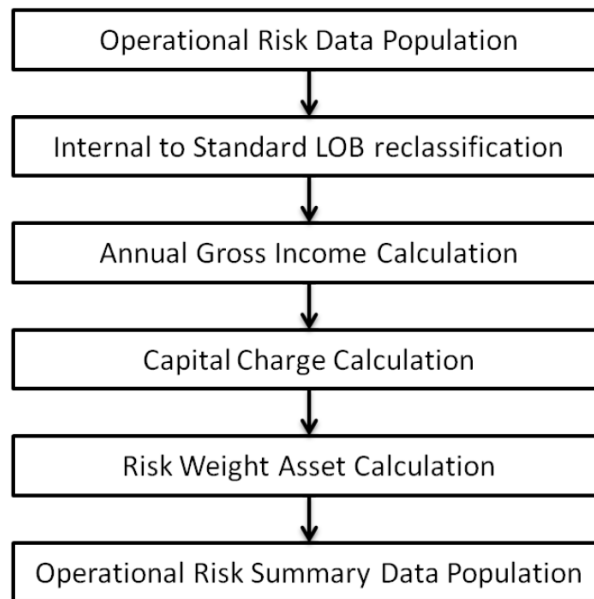
Capital Consolidation Calculation

The capital consolidation calculations remains the same as mentioned in the Credit RWA section.

Operational Risk Approach Selection

The approach selection for Operational Risk is a run management option, as seen in other jurisdictions. Based on the run management option, the corresponding approach is selected, and RWA is computed as per the approach. The approaches available are as follows:

- Basic Indicator Approach
- Standardized Approach
- Alternative Standardized Approach

The bank can choose the approaches based on run management option. As the approach option of Standardized Approach and Alternative Standardized Approach is based on supervisory approval, it is expected that the bank chooses the appropriate run management option based on the supervisory approval obtained.

Operational Risk Data Population

The input data for each of the financial years mapped along with the internal lines of business are populated in the processing table.

This is handled in the sub process **Data Population**.

The application converts all the elements in the annual gross income and loan and advance amount reported in their respective national currency to the reporting currency.

This is handled in the sub process **Currency Conversion.**

While calculating annual gross income or loan and advance amount for the subsidiary that are part of regulatory consolidation, the amount is limited to the share-holding percentage. Hence, a subsidiary which is part of regulatory consolidation and if the parent holding in the subsidiary is considered as 45%, then the amount limited to 45% is considered for gross calculation. Similarly, if the holding is more than 50%, the entire amount is considered for gross calculation.

This is handled in the sub process **Shareholding Percent Multiplication**

Internal LOB to Standard LOB Reclassification

The internal lines of business are reclassified into Basel standard lines of business.

This is handled in the sub process **Reclassification of LoB**.

Annual Gross Income Calculation

For each of the standard lines of business and for each financial year, the annual gross income is calculated.

This is handled in the sub process **Risk Factor Calculations**.

Beta Factor Calculation

For each of the standard lines of business and for each financial year, the beta factor is calculated as per the accord mentioned guidelines.

This is handled in the sub process **Risk Factor Calculations**.

Capital Charge Calculation

Capital charge is calculated by multiplying the alpha value or the beta value (for basic indicator approach or standardized approach) with the annual income of each year across each standard line of business. The average of 3 years is considered, if the values of all the 3 years are positive. If the values of all the 3 years are not positive, then zero or the negative value from both numerator and denominator is excluded.

This is handled in the sub process **Capital and RWA Calculations**.

Risk-Weight Asset Calculation

The capital charge value obtained is converted to the equivalent RWA value by multiplying with the factor 12.5.

This is handled in the sub process **Capital and RWA Calculations**.

Operational Risk Summary Data Population

The RWA amount is populated into the OR summary (**FCT_OPS_RISK_SUMMARY**) table along with the entity for which the OR RWA is calculated.

This is handled in the sub process **Summary Data Population**.

Key Data Elements

Key data elements that must be noted while calculating the capital charge for OR for the consolidated entity. To view the complete list of tables used for CCR computation, see the *Download Specification* document.

- Entity details which are part of regulatory consolidation and parent entity share holding percent is required. These details are captured in the Stage Entity Shareholding Details (**STG_ENTITY_SHR_HLD_PERCENT**) table.

- Net Interest Income, Net Provision Amount, Net Non Interest Income, Operating Expenses, Security Sale Gain or Loss from HTM, Insurance Irregular Loss, Security Sale Gain or Loss from AFS, and Insurance Irregular Gain for each line of business and for each financial year is required.

9.1.1.5 Capital Structure

The European Banking Association (EBA) in conjunction with the European Council and the European Parliament has issued the CRR IV regulations and the CRD IV directive which encompasses the entire Regulations to be followed by the Banks. The capital structure of this rule is by and large compliant with the Basel III changes issued by the Basel Committee.

Under the CRR IV, compliant with the Basel III Regulations, the Tier 1 capital has become the main constituent of the Capital Structure. The entire capital structure of the European Union as was existent due to CRR II and CRR III has undergone changes to be compliant with the BIS Basel III Regulations.

The total capital requirement of 8% remains the same as in CRD II and CRD III. But total capital will increase after addition of the capital conservation buffer, countercyclical buffer, and systemic buffers.

There are two tiers of capital:

- Tier1 Capital
  - Common Equity Tier 1 Capital (CET1)
  - Additional Tier 1 Capital (AT1)
- Tier 2 Capital

9.1.1.5.1 Assumptions

Credit Risk Mitigation for Capital Instruments

Investments in capital instruments are generally long-term investments. These investments are not processed for Credit Risk Mitigation, as generally capital instruments are not mitigated by eligible mitigants.

Treatment of the Transition Percentages

As per Accord:

> All the transitions are mentioned as a range of percentage, for example, 20% to 100%, and this has to be updated for the national specific transition percentage.

Interpretation in the application:

> Since the solution cannot use an entire range to calculate, the solution has used the lower limit of the percentage, as the default value. The same can be updated based on the national specific transition percentage, in the Setup table.

Treatment of Special Purpose Entity Subsidiary in Minority Interest Calculation

As per Accord:

> Additional Tier 1 and Tier 2 instruments issued by special purpose entity, and the related share premium accounts are included in qualifying Additional Tier 1, Tier 1 or Tier 2 capital or qualifying own funds. In these cases, the special purpose entity issuing those instruments is included fully in the consolidation.

Interpretation in the application:

> The Special Purpose Entity (SPE) is treated as any other Banking subsidiary and hence the value of the CET1, AT1 and T2 capital, Capital Ratio for each tier of capital, total RWA and the percentage of shareholding in each of the component of capital is required.

Calculation of Qualifying Holding Deduction

As per Accord:

- A qualifying holding, the amount of which exceeds 15 % of the eligible capital of the institution, in an undertaking is subject to various computations.
- 'eligible capital' means the sum of the following:
    - o Tier 1 capital as determined in Article 23.
    - o Tier 2 capital as determined in Article 68 that is equal to or less than one third of Tier 1 capital.

Interpretation in the application:

- The qualifying holding depends on the eligible capital, which is the sum of Net tier 1 capital and Net tier 2 capital. And the net common equity tier 1 is inclusive of the deduction of the qualifying holdings. This will result in circular reference.

- Hence it is proposed to use the same treatment specified by the CRR IV Accord for the threshold treatment, wherein the entire amount applicable for the threshold items is deducted in full, and then the 15% is applied on the remaining 85%, which is 15% divided by 85% = 17.65%

- Hence in the solution, the qualifying holdings amount is deducted in full from the Net CET1 after all the regulatory adjustments and the Significant and Insignificant Investments.

- And this Net CET1, after deducting qualifying holdings in full, is used for the calculation of the eligible capital, used in the comparison.

- And the 15% will instead be 15% divided by (100% - 15%) = 15% divided by 85% = 17.65%

- And the 60% will instead be 60% divided by (100% - 60%) = 60% divided by 40% = 150%

Treatment of Grandfathered Capital Instruments

As per Accord:

The grandfathered capital instruments' treatment is based on the first call date.

Interpretation in the application:

It is expected that the call date captured in the application is the first call date.

9.1.1.5.2 Process Flow for Capital Structure

Capital Consolidation

↓

Surplus of Minority Interest Calculation

↓

Internal Transactions Identification

↓

Gross Capital Calculation

↓

Regulatory Adjustments

↓

Phase-in treatment for Regulatory Adjustments

↓

Treatment specific to Insignificant Investments

↓

Treatment specific to Significant Investments

↓

Threshold Deductions

↓

Post Phase-in treatment for Insignificant investments, Significant Investments and Threshold deductions

↓

Bifurcation of Investment in own shares, Reciprocal Cross Holding, Insignificant and Significant Investment Amount

↓

Treatment for qualifying holdings

↓

Net Capital Calculation

↓

RWA Calculation for CR, MR, OR and Phase-in treatment

↓

Capital Ratio Calculation

The Capital Structure Run, which is depicted in the preceding process flow diagram, is a single run which is joined together by multiple processes. Each process is a block, compiled together to form an entire Capital Adequacy Run.

Capital Consolidation Requirements

The level of consolidation determines the activities with which the banks must be compliant. A bank must be compliant with the regulations and ratios at an individual level (solo), and also at a regulatory consolidated entity level (consolidation). The consolidation occurs at the parent entity level.

All the calculations except the below mentioned ones have to be complied with, at the solo level and the consolidated level. The calculations pertaining to the qualifying holdings outside the financial sector and the leverage ratio calculations are complied with, by the banks at only the consolidated level. The application supports this calculation.

Capital Consolidation Process

Capital Consolidation is a process common to each of the individual block when they are triggered separately as an individual run. In Capital Consolidation, the application processes the following.

Capital Consolidation Level Selection

The reporting bank can be a part of a financial group that has multiple legal entities like parent or child entities (subsidiaries) under its name. The entity on which you are required to process should be selected. Subsequently, level at which a Run is to be executed (solo or consolidated) should also be selected. Select these options in the Run Management UI. However, if the Run is executed in the Run Rule Framework (RRF), then these options have to be set using the Rule **EU-Capital Consolidation Level Selection** (RLBL8147) in the sub-process '**Capital Consolidation Approach**'.

EU_CAPITAL_CONSOLIDATION is the first process to be added in all the Runs and the Run Management UI selects this process by default.

The three approaches followed by the Capital Consolidation are:

1. **Consolidation Approach(CONSL)**: Under this approach, all the entities of the bank's organizational structure are considered. This includes all the entities/subsidiaries that belong to the same jurisdiction. All the exposures of the entities in the organizational structure are considered for computing risk weighted exposures, except the intra-group exposures. The exposure amount computations considers the shareholding percent as 100% for these entities (as their shareholding percent will be more than 50%).

2. **Aggregation Approach(AGG)**: This approach is similar to the Consolidation approach but is used in the cases, where some of the entities that are part of bank's organizational structure belong to a different jurisdiction. The capital requirement of the affiliate is computed as per the jurisdiction that it is subject to and is then aggregated with the rest of the group's capital requirement. Intra-group exposures are not excluded in this approach. The exposure amount computations considers the shareholding percent as the same as provided by the bank for these entities (as their shareholding percent will be more than 20% but less than 50%).

3. **Deduction Approach(DED)**: This approach is used in the case where some of the subsidiaries/entities that are part of bank's organizational structure are excluded from consolidation. In such a scenario, the regulatory investment in the excluded subsidiary attributable to the rest of the group are deducted from the consolidated capital requirements.

The exposure amount computations considers the shareholding percent as 0% for these entities (as their shareholding percent will be less than 20%).

Run Parameters Assignment

The CRR IV accord states different approaches for calculating RWA. The Run Management UI in the application allows the reporting bank to define and execute a Run by selecting a combination of different approaches for RWA computation.

Run Parameter Assignment is also part of **EU_CAPITAL_CONSOLIDATION** process. The Rule **EU - Run Definition User Defined Run Param Assignment** is used to assign the Run parameters, if a Run is executed in the RRF. If the Run is executed from the Run Management UI, then the parameters are populated based on the Run defined in the Run Definition window.

Currency Conversion

The Rules pre-defined in the application performs currency conversion of all General Ledger amount attributes to be used for Capital Consolidation from the Natural currency to the Reporting currency, based on the exchange rate provided.

Shareholding Percent Multiplication

For all entities in the Capital Consolidation process, the application updates the shareholding percentage against each entity data in the fact capital accounting head from the fact entity shareholding percent table. The parent data in the processing table of fact capital accounting head is updated with the value 1 and for each child entity the data is based on the parent's holding percentage specified for each child in fact entity share holding percent table.

Surplus of Minority Interest Calculation

Minority Interest (also known as non-controlling interest) refers to the portion of a subsidiary corporation's stock that is not owned by the parent corporation. The minority interest arising from the intermediate financial holding companies are also eligible for the calculation. If the subsidiary is a special purpose entity which is included in the consolidation of the bank, then the AT1 and T2 instruments issued are eligible for the minority interest calculation.

The minority interest calculation and the surplus of the minority interest is calculated by the solution, based on the minority interest indicator.

NOTE: For solo run, there is no minority interest calculation processed.
For consolidated run, the parent bank and all its subsidiaries details are processed for minority interest calculations.
The subsidiaries, for which the minority interest is calculated, have to run the solo run first and compute the various tiers of capital and the total RWA. Then these are used as the input for the consolidated run for those entities. All the entities for which the Minority Interest calculations are eligible must be provided with the value of minority interest indicator as 'Y'.

The minority interest calculation is based on the minimum of the amount in the respective tier, the subsidiary must hold and the Total RWA multiplied by the respective minimum tier percentage. Surplus of Minority Interest is calculated and the surplus amount in each tier of capital which is attributed to third parties is deducted from the gross capital of each tier of capital.

Minority interest is calculated as the third party's interest (share holding percent) in the surplus capital (available capital – Minimum required capital). This is calculated tier-wise. The available capital is expected from the client tier-wise (CET1, AT1 and T2). This is computed by the solo run. The minimum required capital of the CET1, T1 and Total Capital is calculated by multiplying the total RWA by minimum required tier-wise capital as a percentage (Total RWA * Minimum Required CET1%, Total RWA * Minimum Required T1%, Total RWA * Minimum Required Total Capital %). The minimum required CET1% includes the Minimum required CET1 and the minimum required buffers to be maintained out of the CET1.

The surplus of the CET1, T1 and Total Capital is calculated as the difference between the available CET1, T1 and Total Capital and the minimum required CET1, T1 and Total Capital. The surplus of the AT1 capital is calculated as the difference between the Surplus T1 Capital and Surplus CET1 Capital. The surplus of T2 Capital is calculated as the difference between the surplus Total Capital and the Surplus T1 Capital. The surplus in each tier attributable to the third party is calculated by multiplying the surplus in each tier by the third party minority holding percentage in each tier.

All the values required for processing are populated into Minority Interest Capital (**FSI_MINORITY_INTEREST**) table which is the processing table for minority interest calculations.

The is handled in sub process - **Minority Interest Calculations** in **EU_CAPITAL_STRUCTURE**.

Treatment for Grandfathered Capital Instruments

Capital instruments which no longer qualify as non-common equity Tier 1 Capital or Tier 2 Capital are considered as ineligible capital instruments. They are subject to grandfathering requirement, wherein they have limited recognition as capital instruments for a specific period of time. The phase-in is based on the balance of the instruments as of December 31, 2012. Their recognition is capped at 80% from January 1, 2014, with the cap reducing by 10 percentage points in each subsequent year. This cap is applied to each of the tier separately.

The data for all the grandfathered capital instruments are expected in the Stage Issued Instrument Positions **(STG_ISSUED_INSTR_POSITIONS)** and the Stage Instrument Contract Master **(STG_INSTRUMENT_CONTRACT_MASTER)**. Based on the processing, it moves to the respective fact and dimension tables – Fact Issued Instrument Positions **(FCT_ISSUED_INSTR_POSITIONS)** and Instrument Contracts Dimension **(DIM_INSTRUMENT_CONTRACT)**. The Phase-in Base amount is captured, and stored in the table.

The instruments are reclassified from the bank specific instrument type to basel instrument type. This instrument type is being reclassified into the various tiers of capital. All these instruments are being summed up and populated into the Phase-In treatment table **(FSI_PHASE_IN_TREATMENT)**. Over there, the amount gets split into two – Phase-in Amount and Balance Phase-in Amount.

The split happens based on the specified transition percentage present in the Setup Capital Head table (**FSI_SETUP_CAPITAL_HEAD**).

The split CAP IDs with different Capital component group are again moved back to the Fact Standard Accounting Head table (**FCT_STANDARD_ACCT_HEAD**).

The various CAP IDs related to the grandfathered instruments, and populated by the solution are as follows:

CAP ID	Description
CAP1576	Grandfathered Instruments - CET1
CAP1586	Grandfathered instruments under state aid - CET1
CAP1589	Grandfathered instruments under state aid for economic adjustment programme - CET1
CAP1575	Excess on the limit of CET1 Grandfathered instruments
CAP1577	Grandfathered instruments with call option after report date and eligible capital instrument - AT1
CAP1579	Grandfathered instruments with call option after report date and ineligible capital instrument - AT1
CAP1581	Grandfathered instruments with call option before cut-off date and ineligible capital instrument - AT1
CAP1583	Grandfathered Instruments without call option - AT1
CAP1585	Grandfathered instruments under state aid - AT1
CAP1588	Grandfathered instruments under state aid for economic adjustment programme - AT1
CAP1591	Excess on the limit of AT1 Grandfathered instruments
CAP1578	Grandfathered instruments with call option after report date and eligible capital instrument - T2
CAP1580	Grandfathered instruments with call option after report date and ineligible capital instrument - T2
CAP1582	Grandfathered instruments with call option before cut-off date and ineligible capital instrument - T2
CAP1584	Grandfathered Instruments without incentive to redeem - T2
CAP1587	Grandfathered instruments under state aid - T2
CAP1590	Grandfathered instruments under state aid for economic adjustment programme - T2

The sub process – **Limited Recognition of Previously Eligible Capital Instruments** in **EU_CAPITAL_STRUCTURE** process covers the above processing.

Internal Transaction Identification

All transactions by the bank with any of the entities which belongs to the same organization structure, as can be seen from the organization structure table, is identified for internal transactions by the solution. These transactions are marked with the internal transaction flag and the sum of these transactions is deducted from the capital, from the respective tiers of capital. These transactions are not processed further.

NOTE: For solo run, there is no internal transaction calculation processed. For consolidated run, the parent bank and all its subsidiaries' investments within the regulatory consolidation group are identified as internal transactions. Any internal transactions in the regulatory capital instruments are deducted from the capital. Any internal transactions in non-capital instruments are eligible for either a 0% RW treatment, or a regular RW treatment, based on the national supervisory approval. This is based on run management option, and is detailed in the RW section.

Gross Capital Calculation for CET1, AT1, and T2

The gross capital is computed by the solution, as per the CRR IV accord specific guidelines. The bank's capital instruments are reclassified into CET1, AT1 and T2, depending on them belonging to various standard accounting head line items.

The total gross capital for each tier of capital (CET1, AT1, and T2) is calculated as per the definition of CET1, AT1, and T2 by adding the relevant instrument in each tier of capital.

NOTE: In the case of Gross CET1, the reserves are captured in the solution at individual category of GL. And they are summed up to calculate the total reserves.

Regulatory Adjustment

Under the CRR IV, most of the deductions are required to be applied to Common Equity. The regulatory adjustments / deductions are applied to regulatory capital at solo and consolidated level. All the values mentioned below are expected in the Stage General Ledger **(STG_GL_DATA)** at a solo level.

Goodwill as an intangile asset, Goodwill included in the valuation of the significant investments, DTL associated with goodwill, other intangibles, DTL associated with other intangibles, DTA, DTL associated with DTA, cash flow hedge not fair valued (asset), cash flow hedge reserve not fair valued (liability), gain on sale of securitization transaction, cumulative gain and losses due to change in own credit risk, defined pension fund asset, DTL associated with defined pension fund asset, defined pension fund asset to which the bank has unrestricted ability to use and defined pension fund liabilities, are expected to be direct download values in Stage General Ledger Data **(STG_GL_DATA)** table. The application computes the regulatory adjustment line items which are net of DTL, that is, goodwill net of DTL, other intangibles net of DTL, DTA net of DTL, defined pension fund asset net of DTL, and net cash flow hedge reserve. These computed values are used for the regulatory adjustment deductions.

All the regulatory adjustment line items are deducted from its respective tier of capital post minority and internal transaction deduction.

The sub process – **Provisions and Gross Capital Calculations** in **EU_CAPITAL_STRUCTURE** process covers the above processing.

Investment in Own Shares

The investment in own shares are calculated as the sum of the pre-mitigation EAD (**EAD Pre-mitigation Measure Value** (**N_EAD_PRE_MITIGATION**) in **Fact Non Sec Exposures (FCT_NON_SEC_EXPOSURES**) table) of the exposures which have the flag of treasury stock indicator (**F_TREASURY_STOCK_INDICATOR**) as '**Y**'.

In this case, there is difference in the treatment between the direct, indirect, synthetic and actual or contingent obligations. The solution identifies the exposure types based on the Basel product type. This happens in the sub process **Exposure Holding Type Classification** in the **EU_CAPITAL_STRUCTURE** process. And the treatment corresponding to the exposure type is handled by the solution.

Investment in Reciprocal Cross Holdings

The Investment in reciprocal cross holdings are calculated as the sum of the pre-mitigation EAD (**EAD Pre-mitigation Measure Value** (**N_EAD_PRE_MITIGATION**) in **Fact Non Sec Exposures (FCT_NON_SEC_EXPOSURES**) table) of the exposures which have the flag of reciprocal cross holding indicator (**F_RECIPROCAL_CROSS_HLDG_IND**) as "**Y**".

For this processing, the reciprocal amount is expected as a download in the Stage Capital Investments Position Table **(STG_CAP_INVESTMENTS_POSITIONS)** at an instrument level. The instrument code provided in this table is the instrument in which the reporting bank has invested, and for which there is a reciprocal cross holding by the reporting bank. The reciprocal cross holding amount is also captured in this table. The solution expects the staging data of the exposures to have the reciprocal cross holding indicator (**F_RECIPROCAL_CROSS_HLDG_IND**) as 'Y'.

The solution, as part of the sub process **Non Sec Reciprocal Cross Holdings Data Population** in the process **EU_CAPITAL_STRUCTURE** splits the exposure into two, based on the reciprocal cross holding amount. The exposure which meets the reciprocal cross holding amount is stamped with the reciprocal cross holding indicator (**F_RECIPROCAL_CROSS_HLDG_IND**) as 'Y', and this will go for the reciprocal cross holding treatment for the capital instruments.

The portion of the exposure, which is above the reciprocal cross holding amount is treated as a regular exposure, and is risk weighted as per the Basel asset class for that instrument.

In this case, there is difference in the treatment between the direct, indirect and synthetic exposures. The solution identifies the exposure types based on the Basel product type. This happens in the sub process **Exposure Holding Type Classification** in the **EU_CAPITAL_STRUCTURE** process. And the treatment corresponding to the exposure type is handled by the solution.

Exposures to be Deducted from Capital instead of RW

There are few exposures, for which the bank has an option to choose deduction from CET1 capital, instead of risk weighting them at 1250%. This is handled in the solution, based on the run management option.

NOTE: In the run management screen, option is given at a portfolio to select the 1250% RW treatment or the deduction from capital. Based on the option selected, the run is configured to use the 1250% RW or the deduction from capital.

If the option for deduction from capital is selected, the solution stamps the exposures with 1250% with the CAP ID, and sums up the amount from the Fact processing table of the exposures, and populates the Fact Standard Accounting Head. The following are the CAP IDs which are relevant for this option.

CAP ID	Description
CAP593	Securitization Exposures to be deducted instead of risk weighting at 1250%
CAP1570	Deduction Amount of CET1 due to Investment in qualifying holdings outside the financial sector exceeding Thresholds
CAP1571	Sold Credit Exposures to be deducted instead of risk weighting at 1250%
CAP1572	Equity Exposures to be deducted instead of risk weighting at 1250%
CAP157	De:Non DvP Items

Phase-in Treatment for Regulatory Adjustments

Under the CRR IV, the regulatory adjustment line items that include goodwill, DTA, cash flow hedge reserves, gain on sale related to sec transaction, defined pension fund, cumulative gain and losses due to changes in own credit risk, treasury stock, and reciprocal cross-holdings, follows phase-in arrangement as per the timelines defined. Similarly, insignificant investment, significant investment, and threshold deduction amount line items will also follow phase-in arrangement, after insignificant, significant, and threshold treatment calculation. The phase-in deduction percent for each year is available in a setup table - **FSI_SETUP_CAPITAL_HEAD**.

The processing related to the regulatory adjustments and deductions are part of the sub process **Phase In Deduction Data Processing**.The entire processing is done in sub process **Post Phase In Treatment calculations** in process – **EU_CAPITAL_STRUCTURE**, for the Significant investments, insignificant investments and threshold treatment.

Process Flow for Non-Significant (Insignificant) and Significant Investments
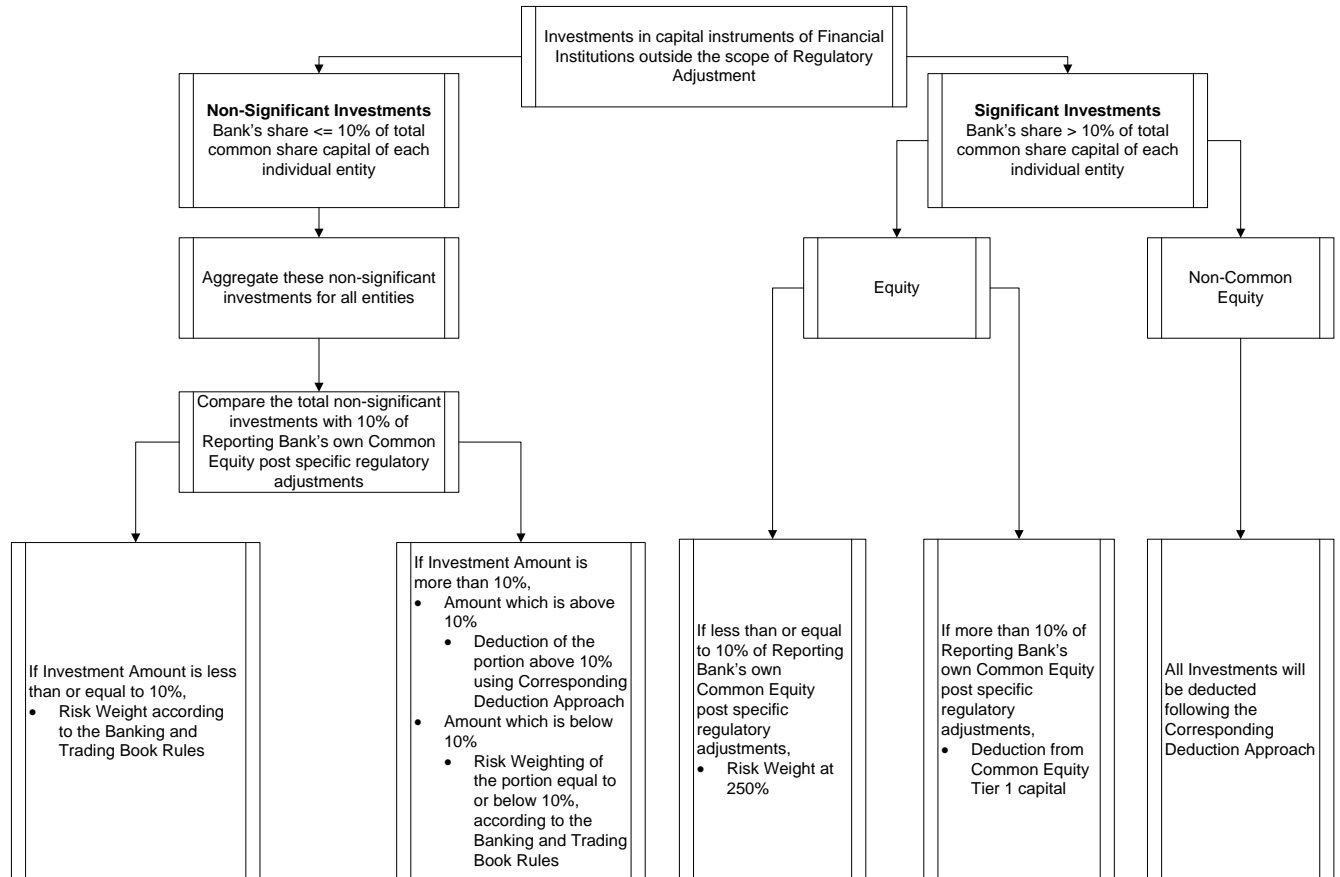
Treatment Specific to Insignificant Investments

Investment in all financial entities, which are outside the scope of regulatory consolidation, is identified for significant and insignificant investments.

The shareholding percent for these parties are expected as download in Stage Party Shareholding Percent table (**STG_PARTY_SHR_HLD_PERCENT)**. Any party which is part of the Org Structure, but is not part of the regulatory consolidation, can also qualify for this treatment, if it is financial entity. If the entity is part of the Org structure, the share holding percent is expected in the Stage Entity Shareholding percent table **(STG_ENTITY_SHR_HLD_PERCENT)**.

The parties are identified as significant when the shareholding percentage is greater than or equal to 10%. And the others are identified as insignificant investment. This processing happens in the **EU_PARTY_SHAREHOLDING_PERCENT** process.

The total investment amount in insignificant entities is computed by summing up the Pre Mitigation EAD **(EAD Pre-mitigation Measure Value (N_EAD_PRE_MITIGATION**)) from the **Fact Non Sec Exposures (FCT_NON_SEC_EXPOSURES**) table. And also the tier wise computation of investment amount happens. The total amount is compared with the 10% of the CET1 amount of the parent bank amount post regulatory adjustments. The amount above 10% limit is processed for deduction.

This summing up includes the direct, indirect and synthetic investments. The Indirect investments are investments in Investment funds, and which are invested in capital instruments. The synthetic investments are the investments in synthetic transactions on capital instruments. For all these exposures, the net long position amount, updated in **N_EAD_PRE_MITIGATION** is considered.

The net long position is the gross long position net of any qualified short position in the same exposure. You must provide value ("Y" or "N") against the flag "F_CAPITAL_NETTING_QUALIFICATION_FLAG" whether the gross long position is allowed to be deducted from the net of short positions in the same underlying instrument. This is done only if the short positions involve no counterparty risk and both long and short position have same maturity. And the short position amount is also expected to be provided at the same exposure level.

NOTE: This is expected for all capital positions, and not for specific capital position.

In this case, there is difference in the treatment between the direct, indirect and synthetic exposures. The solution identifies the exposure types based on the Basel product type. This happens in the sub process **Exposure Holding Type Classification** in the **EU_CAPITAL_STRUCTURE** process. And the treatment corresponding to the exposure type is handled by the solution.

The total deduction amount is pro-rated among each tier of capital based on the percentage of investment in each tier of capital. The amount arrived is deducted from each tier of Capital.

The investment amount below the 10% limit is treated as per banking book rule for the instrument.

The application computes as follows:

- Parties are marked as insignificant investment parties by updating the flag: Significant Entity Indicator (**F_SIGNIFICANT_INVESTMENT_IND**) in Fact Party Shareholding Percent (**FCT_PARTY_SHR_HLD_PCT**) with value N, and **F_SIGNIFICANT_INVESTMENT_IND** in Fact Entity Info (**FCT_ENTITY_INFO**) with value N.

- The exposure amount of banking book and trading book exposures (any counterparty credit risk exposures) to these entities are summed by grouping their component of capital and compared against 10% of parent bank's CET1 capital. The portion of amount which exceeds the 10% limit is deducted.

This is computed by calculating tier wise deduction percentage and multiplying this percentage with the exposure amount to arrive at the amount to be deducted from each tier of capital.

The total investment values are populated into **Non Regulatory Consolidation Entity Investment** (**FSI_NON_REG_CONSL_ENTITY_INVST) table** which is the processing table for insignificant and significant investment deductions.

The sub process – **Insignificant Investment in Entities Outside Regulatory Consolidation Processing** in **EU_CAPITAL_STRUCTURE** process covers the above processing.

After the application of this treatment, the Insignificant Investments line item also follow phase–in arrangement which is similar to the phase-in arrangement for Regulatory Adjustments.

Treatment Specific to Significant Investments

The total investment amount is checked against the set limit of 10% of CET1 amount of the parent bank, post insignificant investment amount adjustment. The CET1 amount above 10% is deducted from the CET1 post insignificant investment amount deduction. The CET1 amount below 10% follows threshold deduction. The investment amount in AT1 and T2 is fully deducted from its respective AT1 and T2 tier of capital. The application computes as follows:

- Entities are marked as significant investment entities by updating the flag – Significant Entity Indicator (**F_SIGNIFICANT_INVESTMENT_IND**) in Fact Party Shareholding Percent (**FCT_PARTY_SHR_HLD_PCT**) with value Y and Significant Entity Indicator (**F_SIGNIFICANT_INVESTMENT_IND**) in Fact Entity Information (**FCT_ENTITY_INFO**) with value 'Y'.

- The exposure amount of banking book and trading book exposures (any counterparty credit risk exposures) to these entities are summed by grouping their component of capital and compared against 10% of parent bank's CET1 capital. The portion of amount which exceeds the 10% limit is deducted from CET1. The exposures of AT1 and T2 are fully deducted from respective tier of capital. This is done by calculating deduction percentage for CET1 and by multiplying this percentage with the CET1 exposure's exposure amount to arrive at the amount to be deducted from CET1 capital.

The sub process – **Significant Investment in Entities Outside Regulatory Consolidation Processing** in **EU_CAPITAL_STRUCTURE** process covers the above processing.

After the application of this treatment, the Significant Investments line item also follow phase–in arrangement which is similar to the phase-in arrangement for Regulatory Adjustments.

Threshold Deduction

The line items, (Significant Investment in the Common Shares of Accounting entities from the **FSI_NON_REG_CONSL_ENTITY_INVST** from the **FCT_STANDARD_ACCT_HEAD** table, and DTAs that arises from temporary differences that comes from the **FCT_CAPITAL_ACCT_HEAD**) are populated in the **FSI_THRESHOLD_TREATMENT** table and the threshold calculations are processed in this table.

Threshold Treatment

The two line items are individually compared with the 10% of CET1 calculated post Regulatory Adjustments and Insignificant. The amounts which are above 10% CET1 limit are deducted from CET1 following the phase-in arrangements. During the transition period, any amount of these line items, which is not deducted as per the 10% mentioned earlier, goes for risk weighting at 100%.. During the transition period, the check of 15% is against the CET1 post all regulatory adjustments and adjustments to insignificant investments and significant investments. In the post transition period, instead of 15%, the aggregate check is 17.65% of CET1, post all regulatory adjustments and adjustments to insignificant investments, less 100% of the sum of the line items which goes for threshold deduction. The amount which is not deducted due to this 10% and 15% check is risk weighted 100% during the transition period and is risk weighted 250% post the transition period.

The same phase-in treatment is followed by the aggregate 15% limit for Significant Investment in the Common Shares of Accounting entities, and DTAs that arises from temporary differences.

The sub process – **Threshold Treatment Calculations** in **EU_CAPITAL_STRUCTURE** process covers the above processing.

Qualifying Holdings Outside the Financial Sector

Any significant capital investment in a non-financial party will qualify for this treatment. The qualifying holdings are the holdings which are outside the financial sector and wherein the bank has more than 10% holdings. The application identifies these based on the significant party identification, and the party attribute of whether they are a financial entity or not.

The sub process – **Treatment of Qualifying Holdings Outside the Financial Sector** in **EU_CAPITAL_STRUCTURE** process covers the above processing.

Threshold Check for the Qualifying Holdings

The Investment Amount (**N_EAD_PRE_MITIGATION**) is summed up for all the entities which have the **F_SIGNIFICANT_INVESTMENT_IND = Y,** and the financial entity indicator flag **(F_FINANCIAL_ENTITY_IND)** is **N.** This is populated into the table **FSI_HOLDING_OUTSIDE_FIN_SECTOR**.

These holdings are individually checked at party level with 15% of the eligible capital. And they are checked using aggregate value at the total level with 60% of the eligible capital. The greater of these two amounts will go for deduction from capital, or Risk weighting at 1250%, based on the run management option selected.

If the bank opts for deduction from capital, this is deducted from CET1 capital, and the Net CET1 Capital is calculated.

Post Phase-in Treatment for Insignificant Investments, Significant Investments, and Threshold Deductions

In this step, the balance phase-in deduction amount for Insignificant, Significant, and Threshold deductions are calculated and they are assigned the applicable risk weight. The RWA of these amounts are also computed. The sub process – **Post Phase In Treatment Calculations** in **EU_CAPITAL_STRUCTURE** process covers the above processing.

Bifurcation of Capital Investment Amount

All the investment transactions in Investment in own shares, Reciprocal cross holdings, Insignificant Entity and Significant Entity go for bifurcation. Even the qualifying holdings go for bifurcation.

Insignificant investment amount below 10% are stamped as 'INSIG_RWA' and any amount above 10% are stamped as 'INSIG_DED'.

The same logic is applied to Significant Investment amount in CET1. The CET1 amount in Significant Investment entity that is below 10% and 15% limit is stamped as 'SIG_RWA' and amount above 15% limit is stamped as 'SIG_DED'.

Investment in own shares which are part of the phase-in and is deducted from capital during phase-in are stamped as 'OWN_DED' and any amount which is risk weighted during phase-in are stamped as 'OWN_RWA'.

Reciprocal cross holding which are part of the phase-in and is deducted from capital during phase-in are stamped as 'RECI_DED' and any amount which is risk weighted during phase-in are stamped as 'RECI_RWA'.

Investment in qualifying holdings outside financial sector which are deducted from capital are stamped as 'QUAL_DED' and any amount which is risk weighted are stamped as 'QUAL_RWA'. The exposures which are risk weighted at 1250% are stamped as 'QUAL_1250RW'.

The original transactions are deleted and new transactions are created with stamping as described above. The new transaction thus created can be traced by looking into the parent exposure ID.

The exposure to be deducted is marked with standard account head surrogate key based on whether the deduction is Investment in own shares, reciprocal cross holdings, Insignificant or Significant investment and based on capital component group.

This splitting of exposures is done in Fact Non Sec Exposures (**FCT_NON_SEC_EXPOSURES**) and Fact Sec Exposures (**FCT_SEC_EXPOSURES**). This splitting logic is carried to **Equity Exposures** (**FCT_EQUITY_EXPOSURES)** and Fact **Sub Exposures** (**FCT_SUB_EXPOSURES)**.

The entire processing is done in the sub processes of the process **EU_CAPITAL_STRUCTURE**:
  ♦ **Non Sec Insignificant Investment Exposure Processing**
  ♦ **Non Sec Significant Investment Exposure Processing**
  ♦ **Non Sec Investment in Own Share Exposure Processing**
  ♦ **Non Sec Reciprocal Cross Holding Processing**
  ♦ **Non Regulatory Investment Sub Exposures Population**
  ♦ **Equity Non Regulatory Investment Processing**
  ♦ **Reference Capital Exposures Data Population**

Net Capital Calculation

The Net CET1, Net AT1, and Net T2 capital amount are calculated post all regulatory adjustments, including the insignificant, significant, and threshold treatment. Any shortfall in T2 capital amount is adjusted against Net AT1 amount and any shortfall of AT1 capital amount is adjusted against Net CET1 amount.

This is done in sub process – **Net Capital Calculations** in process **EU_CAPITAL_STRUCTURE**.

RWA Calculation for Credit Risk, Market Risk, Operational Risk and Phase–in Arrangement

The following data is collated and RWA is computed:

- Non-securitized exposures data and the associated mitigants data to compute as Risk Weighted Asset amount.
- CVA Exposures Data to compute CVA RWA.
- Securitized exposures data and the associated mitigants data to compute Sec RWA.
- Operational RWA

The **Market Risk RWA** for Market Risk is expected as a download. The Regulatory Adjustment RWA is the sum of RWA calculated for all the exposures which undergo the processing of Regulatory Deductions, Insignificant Investments, Significant Investments, and the Threshold deduction line items which are risk weighted.

The Total RWA amount is the summation of Non Securitization, Securitization, Market Risk, Operational Risk, and Regulatory Adjustment RWA.

As this is standardized approach RWA, the Total RWA is also populated into the Total Standardized Approach RWA.

The above processing is done in sub process – **RWA Populations** in process – **EU_CAPITAL_STRUCTURE_CAPITAL_RATIO**.

Capital Ratio Calculation

CET1 ratio, T1 ratio, T2 ratio, and Capital Adequacy ratio are calculated using the Total RWA amount and Net CET1 Capital, Net T1 Capital, Net T2 capital and Total Capital (sum of Net T1 Capital amount and Net T2 capital amount) amount.

This is done in sub process – **Capital Ratio Calculations** in process in **EU_CAPITAL_STRUCTURE_CAPITAL_RATIO**.

In case of any shortfall in CET1, the AT1 Instruments can be converted into CET1 Instruments. This shortfall amount is computed using the rule **EU - Amount to be Written Down to Convert AT1 into CET1 Instruments**.

9.1.1.5.3 Key Data Elements

The key data elements are listed in this section. For more information on the tables and columns to be updated, see the *Download Specifications* document.

- The data for third party investment, with the investment percentage in each tier of capital along with the total amount available in each tier of capital is expected as a download value, for the surplus of Minority Interest computation.

- The entity level Market Risk RWA is expected as a download value in the Standard Account (**DIM_STANDARD_ACCT_HEAD**) table. This is required for calculating the Total RWA.

- The Market Risk data for significant and insignificant investment exposures is expected as download value in the Stage Investments (**STG_INVESTMENTS**) table (for equity and non-equity trading book exposures except the mutual fund trading book exposures) along with the other investment data.

- The synthetic capital instruments are expected in the Credit derivatives (**STG_CREDIT_DERIVATIIVES**), guarantee **(STG_GUARANTEES)**, Option Contracts **(STG_OPTION_CONTRACTS)**, Futures **(STG_FUTURES)** and Swap Contracts **(STG_SWAP_CONTRACTS)**. The underlying information for these exposures is expected in the Underlying Exposures **(STG_UNDERLYING_EXPOSURES)** table.

- The synthetic capital investment pertaining to the securitization framework is expected in the Stage Investments (**STG_INVESTMENTS**) table and the underlying of the exposures available in the Stage Underlying Exposures (**STG_UNDERLYING_EXPOSURES**) table.

- The short position amount to be netted against a long position is expected as a download.

- The flag to identify whether the netting is applicable is expected as 'Y' to calculate the net long position amount.

- All the amounts are converted into the same currency for ease of processing and reporting.

- The application expects the GL IDs and the description to be unique across an entity and the data is expected at a solo level. The application ignores consolidated data and calculates the data for consolidation.

- Minority Interest Calculations Data Expectation

  The application expects the capital ratios, tier wise capital amount, third party investment percentage, and the total RWA of the subsidiary as download for the Minority Interest calculation.

  The entities which are processed for Minority interest computation are provided with the F_THIRDPARTY_MINORITY_HOLD_IND flag in the **STG_ENTITY_SHR_HLD_PERCENT** table as 'Y'.

- Regulatory Adjustments Data Expectation

  The application expects the goodwill value to be provided without considering the goodwill used I the valuation of the significant investments, and any goodwill used in the valuation of the significant investments as different line items.

The application expects the deferred tax liabilities value associated with the various regulatory adjustments to be populated wherever the entity expects the value to be netted, satisfying the criteria for netting

The application expects the 'Other Intangible Assets' as a single line item, which includes all the intangible assets other than goodwill.

The defined pension fund asset reported is the defined pension fund asset net of the unrestricted access and unfettered access to the assets in the fund, based on supervisory approval. The applicable amount which corresponds to the unrestricted and unfettered access to the assets in the fund, is expected as download in the Product Processor tables. Hence the capital charge is calculated on this.

- Internal Transactions Data Expectation

  The Customer Reference code of the exposures should be of any entity's party id, which is part of the Organization Structure Dimension (**DIM_ORG_STRUCTURE)**, to be identified as internal transactions.

- Investment in Own Shares Data Expectation

  The Customer Reference code of the exposures should be of the parent entity's own party id, which is to be identified as investment in own shares

- Reciprocal Cross Holdings Data Expectation

  The reciprocal cross holdings flag should be 'Y'. And the reciprocal cross holding amount along with the instrument code for which this amount is considered is provided as a download. Please see the Reciprocal cross holding section for further data requirements.

- Threshold Treatment Data Expectation

  The Deferred Tax Assets (DTA) related to temporary differences which are processed for the threshold treatment is expected as the download value net of deferred tax liabilities associated with that.

- Grandfathered instruments

  The grandfathered instruments are expected as a download in the STG_ISSUED_INSTR_POSITIONS, and the corresponding instrument attribute in the DIM_INSTRUMENT_CONTRACT table.

9.1.1.6 Capital Buffers

There are three types of Capital Buffers prescribed in the CRR IV Rules, which are as follows:

1. Capital Conservation Buffer
2. Countercyclical Buffer
3. Systemic Risk Buffer / Systematic Risk Buffer

A detailed description of each of these buffers is provided in the following sections.

Capital Conservation Buffer

The CRR IV requires banks to maintain Capital Conservation Buffer (CCB) out of Common Equity Tier 1 Capital (CET1). This requirement is as per the transitional arrangement as mentioned in the CRR IV final guidelines.

Countercyclical Buffer

The CRR IV Rules requires banks to maintain Countercyclical that is prescribed by the respective jurisdiction's regulator through an extension of CCB. Banks determine their countercyclical capital buffer amount by calculating the weighted average of the countercyclical capital buffer amounts established for the national jurisdictions. After calculating the weighted average, the application then computes a single value for Countercyclical Buffer benchmark which is applicable on all exposures of all jurisdictions.

Systemic Risk Buffer / Systematic Risk Buffer

As part of the CRR IV guidelines, the banks can be required to hold additional buffer to meet the systemic risk. Banks are required to maintain a specific buffer, and the solution handles this in the total required CET1 capital requirement.

Calculation of Capital Conservation Buffer / Available Buffer from CET1 Capital

The value that the application calculates for available buffer from CET1 capital meets the buffer requirements for all three buffers - Capital Conservation Buffer (CCB), Countercyclical Buffer, and Systemic risk Buffer. No priority is given to any buffer over another. Hence, the shortfall or excess, if any, is calculated and reported at an aggregate level. The required total buffer is calculated as the sum of the required values of three individual buffers.

The application also computes CET1 and Buffer Lookup Ratio, which is further required for calculating Minimum Capital Conservation Ratio. To calculate the available buffer, remainder of following is taken:

- Excess of CET1 Capital Ratio over the benchmark (4.5%), after catering to the shortfall (if any), in the Additional Tier 1 and Tier 2 capital to their respective benchmark levels (1.5% and 2% respectively).

Hence, CCB excludes any additional CET1 needed to maintain 6% of Tier 1 Capital Ratio and 8% of Total Capital Ratio.

Maximum Payout Ratio

The required buffer from CET1 capital (sum of three required buffers) is compared with the Available Buffer from CET1 capital. If the banks are unable to meet their total buffer requirements for all the three buffers, then they are subject to constraints on the discretionary payments of earnings. In this case, the Maximum Payout Ratio is calculated and represents the percentage of net earnings after tax (positive) not distributed by the bank and held back as retained earnings. Maximum Payout Ratio of the current year is applied after 12 months from the time of calculation.

NOTE: The application calculates Capital Buffers at consolidated level for the reporting bank. However, at the discretion of national supervisors, this can be applied at solo level as well. In such cases, the calculation of solo level for the respective jurisdictions is included in the application.

Process Flow for Capital Buffers

The tasks related to capital buffer calculations are present in the process named **EU_CAPITAL_BUFFER**. The processing is as follows.

Capital Structure Inputs

The Capital Structure Rules are executed before the calculation of buffers. These Rules calculate the available capital ratios and required capital ratios of the three capital components which are Common Equity Tier 1 Capital Ratio, Tier 1 Capital Ratio, and Capital Ratio. These line items are populated in the **Fact Standard Accounting Head (FCT_STANDARD_ACCT_HEAD)** table.

Available Total Buffer

Calculation of Available Buffer from CET1 Capital is performed with inputs taken from the preceding step.

Required Total Buffer

Calculation of Required Total Buffer is the sum of three required buffers.

- Required Countercyclical Buffer: Required Countercyclical Buffer Ratio (**FSI_REQUIRED_CNTR_CYC_BUFFER**) table is updated with values. The values are taken from **Benchmark Counter Cyclical Buffer Ratio (FSI_BENCHMARK_CNTR_CYC_BUFFER)** table. The **Regulator Code (V_CAPITAL_ADEQUACY_REGULATOR)** column in Benchmark Counter Cyclical Buffer Ratio is compared to jurisdiction code column in Run Dimension. If no Countercyclical Buffer is available, the required weighted average is 0 as the benchmarks are assumed to be 0. (If there is no countercyclical requirement, the regulator must provide 0 as the benchmark.)

  After the T2T loading, based on each country's requirement for countercyclical buffer, the weighted average Countercyclical Buffer is calculated.

- Calculation of Required Buffer from CET1 Capital, Tier1, and Capital Adequacy Ratio: For the calculation of these required buffers, based on **Updated Capital Component Group Skey** (**N_UPD_CAP_COMP_GROUP_SKEY,** which corresponds to BFCET1 - Buffers from CET1 for Required Buffer from CET1 Capital, BFT1 - Buffers from T1 for Required Buffer from T1 Capital and BFCAR - Buffers from CAR for Required Capital Adequacy Ratio), the standard

account head amount is summed up and populated against the corresponding Cap ID in **Fact Standard Accounting Head** (**FCT_STANDARD_ACCT_HEAD**) table.

Maximum Payout Ratio

Maximum Payout Ratio is calculated based on required CET1, buffers and the setup or semi-static tables as per the year when the Run is executed.

The application assigns Maximum Payout Ratio range for a given CET1 and Buffer Lookup Ratio in table (**FCT_CAPITAL_CONSERVATION_RATIO**). This table is dynamic and formula driven and is constructed by the application using the values of the three required buffers as per the Basel guidelines. The application constructs the range of CET1 and Buffer Look-up ratio (Lower Limit and Upper Limit) for the Maximum Payout Ratio in four quartiles.

> **Lower Limit = 0.000001 + Upper Limit of (n-1)th quartile**
>
> **Lower Limit of first quartile = 0.045**
>
> **Upper Limit = 0.045 + (Total Required Buffer from CET1 capital * 0.25 * n)**
>
> Where **n** is the quartile number.

Excess/Shortfall of Total Buffer

The calculated values (only positive values are considered) are stored against the corresponding Cap IDs as two separate line items of which one is 0.

Key Data Elements

A few key data elements is elaborated in this section. For a complete list of tables to be updated, see the Download Specifications document.

Countercyclical Buffer requirement for each country should be provided by the client or the bank as the percentage applicable for each country and this is dependent on the home regulator's jurisdiction as it can prescribe Countercyclical Buffer percentage that is higher than the percentage prescribed by the regulator of the exposure country. Hence, the required Countercyclical Buffer percentage for each exposure country provided as an input should be the one that the home regulator agrees to.

As the required Capital Conservation Buffer (CCB) must be met as per the transitional arrangement, set up the required buffer value in Setup Capital Heads (**FSI_SETUP_CAPITAL_HEAD)** for different periods against the standard account head ID CAP823. Different CCB requirements specified by the different regulators can be setup by specifying the regulator codes against the same standard account head ID. This regulator code must be the same as the jurisdiction code assigned by the Rule **Jurisdiction Code Assignment**.

The required benchmark of Countercyclical Buffer for different countries as set by different regulators is expected as download in **Stage Benchmark Counter Cyclical Buffer** (**STG_BENCHMARK_CNTR_CYC_BUFFER**). This data is populated to **Benchmark Counter Cyclical Buffer Ratio** (**FSI_BENCHMARK_CNTR_CYC_BUFFER**) using a Slowly Changing Dimension (SCD) process. Buffer requirement given on a date is valid till the next buffer is specified. For a solo Run, the regulator of subsidiary specified buffer requirements are considered and for consolidation Run, the consolidating entity's regulator specified buffer requirements are considered.

The minimum Payout Ratio requirement for different quartiles specified by different regulators is expected as a download in **Stage Benchmark Capital Conservation Ratio** (**STG_BENCHMARK_CAP_CONS_RATIO**). This data is populated to the semi-static table **Benchmark Capital Conservation Ratio** (**FSI_BENCHMARK_CAP_CONS_RATIO**) using a SCD process. Payout ratios specified once are valid till the next revision.

In the **Required Counter Cyclical Buffer Ratio** (**FSI_REQUIRED_CNTR_CYC_BUFFER)** table the Risk Weight Amount column is updated against each country code. This is applicable for Credit Risk (for Non Securitization and Securitization exposures).

9.1.1.7 Large Exposures

The CRR IV guidelines mandate the financial institutions to monitor and control their large exposures. This is to control the concentration risk of the institution to a single client or a group of inter connected clients. The identification of the large exposures and the threshold limits for the large exposure are based on the exposure value net of mitigation. The solution is compliant with the requirements.

9.1.1.7.1 Process Flow for Large Exposures

| Non Securitization Exposures Calculation |
| Counterparty Credit Risk Calculation |
| Securitization Exposures Calculation |
| Capital Calculation |
| Counterparty Exposure Process |
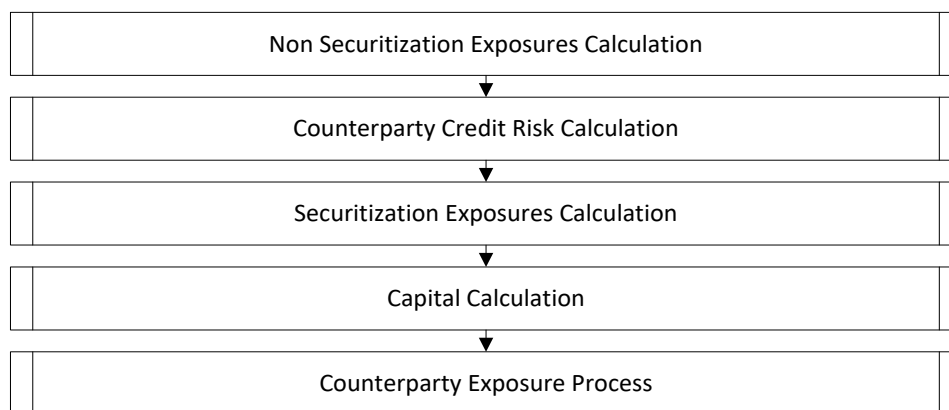
The entire processing of large exposure happens in the EU Large Exposure Process.

The soltution sums up the exposure amount pre mitigation and post mitigation across the various counterparties and the mitigant amount issued by the counterparties, and populates the counterparty exposure processing table. As per the accord, there are few exposures, which are exempted from the exposure calculation The solution goes ahead and marks the exposures for exemption, and the exemption percentage as 100%, and the exemption source as CRD.

There are few exposures which can be exempted based on the supervisory approval. This is currently handled for few cases, where the exemption percentage is 0%, and the exemption source is SUPR. The rule "**EU - Large Exposure Supervisory Exemption Approval for Covered Bonds**" and "**EU - Large Exposure Supervisory Exemption Approval for Member States**" handle the supervisory approval criteria. And the remaining cases are to be handled based on jurisdiction specific approvals.

NOTE: The exemption criteria pertaining to the supervisory approval must be dealt with on a case-to-case basis, depending on the approval provided by that particular supervisor.

The sub process "**Exposure Exemption and Exemption Percentage**" handles this exemption criteria.

The solution supports the calculation of the threshold amount for the Institutions and non-institutions. The large exposure and the threshold limit breach is identified by the solution.

The solution sums up the exposures for all the counterparties belonging to the same parent, along with the parent, and populates the Fact Party Group Exposure table (**FCT_PARTY_GROUP_LARGE_EXPOSURE**). The expectation is that all the parties which are related to each other, have the Parent ID of the Party table as the same. On the party group, the threshold limit check is applied, and the large exposure is also found.

The solution populates all the exposures pertaining to each of the counterparties without considering their relationship with other counterparties into Counterparty Exposure processing table (**FCT_COUNTERPARTY_EXPOSURES)**. The exposure amount pre mitigation, as well as post mitigation, and the exempted amount are considered in this data population.

The data population considers even the indirect exposures, wherein the bank has issued a mitigant. In this case, the mitigant total amount is considered as an indirect exposure, and not just the portion which is used for mitigation.

The data population also considers the logic for additional exposures, wherein the bank is a counterparty (customer or issuer, depending on the product code), for the underlying exposures of Securitization or CIU. Depending on the data, either a separate client is identified for the underlying, or it gets added to the identified counterparty, as mentioned in the CRR IV guideline.

The related parties are expected to be provided in the Stage Party Party Relationship table (**STG_PARTY_PARTY_RELATIONSHIP)**, with the relationship type. This gets reclassified into the Regulatory Party Relationship type as part of the rule **EU - Party Relationship Type Reclassification** in the process **EU_PARTY_RECLASSIFICATION**.

NOTE: It is expected that the party ID is the one for which it is considered as a related party. For example, if Bank A is related to party B, and party B is related to party C, it is expected that the data is provided for Bank A to party B, and Bank A to party C, to ensure that every mapping is being considered.

The solution sums up the exposures for all the counterparties belonging to the same parent, along with the parent, and populates the Fact Party Group Exposure Table (**FCT_PARTY_GROUP_LARGE_EXPOSURE**). The expectation is that all the parties which are related to each other, have the Parent ID of the Party table as the same, or are part of the related party. Based on these related parties identified, and the parent id in the DIM_PARTY, the related parties are identified, and these are also considered as belonging to the same group, during the Fact Party Group Exposure data population.

On the party group, the threshold limit check is applied, and the large exposures are identified.

9.1.1.8 Revised Leverage Ratio

During the financial crisis, banking institutions built-up excessive on-balance sheet and off-balance sheet leverage which forced the banking sector to reduce its leverage. To prevent building of excessive leverage on the institutions' balance sheet, the EBA has introduced a non-risk based leverage ratio which is a new regulatory tool supplementing risk-based capital requirement. The leverage ratio guidelines were revised and published on 10th October 2014. The guidelines are mostly in sync with the revised leverage ratio guidelines issued in 2014 by BIS.

The solution supports this revised approach in the calculation. The application calculates the leverage ratio for a reporting bank. The minimum required leverage ratio is 3%.

The leverage ratio is calculated by dividing an institution's Tier 1 capital measure by the total leverage exposure measure.

$$\textbf{Leverage Ratio} = \frac{\textbf{Tier 1 Capital}}{\textbf{Leverage Exposure Measure}}$$

The Run **CRD IV Revised Leverage Ratio Calculation** is used for computing the leverage ratio, as per the revised guidelines.

Net Tier 1 capital is the summation of Net CET1 and Net AT1 capital amount post regulatory adjustment. Exposure measure is the summation of on-balance sheet items, off-balance sheet items, Derivative Exposures and Structured Financial Transactions (SFT). The on-balance sheet items include the Non-Securitization exposures' amount and the Securitization exposures' amount. The off-balance sheet items include the Non-Securitization exposures' amount and the Securitization exposures' amount. Mitigation is not considered when calculating exposure amount.

NOTE: The leverage calculation happens at the consolidated parent entity level. The market risk data are not captured for the EU Jurisdiction, and hence that is expected as a download. This is expected in Stage Standard Account Head (**STG_STANDARD_ACCT_HEAD**) for the **CAP843** (Leverage Ratio).

The leverage ratio calculations are a separate run, and not part of the regular capital calculation run. This is because of the changes in the Credit conversion factor assigned to the exposures, and also exemption of few exposures from the calculation which are part of the capital charge calculations. Also, the mitigation is not required for these exposures, and the exposure measure calculations are different from the regular EAD calculations.

9.1.1.8.1 Assumptions

The accord is not explicit on the inclusion of Securitization and market related transactions in the exposure measure calculations. However, the application has considered Securitization and the market related transactions in the calculation of total leverage exposure measure.

As the application does not support market related capital calculations pertaining to the EU jurisdiction, the application expects the MR related Exposure measure as a download.

9.1.1.8.2 Process Flow for Revised Leverage Ratio

```
┌─────────────────────────────────────────┐
│           Capital Calculation            │
└─────────────────────────────────────────┘
                    ⬇
┌─────────────────────────────────────────┐
│             Reclassification             │
└─────────────────────────────────────────┘
                    ⬇
┌─────────────────────────────────────────┐
│     Non Securitization Data Population    │
└─────────────────────────────────────────┘
                    ⬇
┌─────────────────────────────────────────┐
│     Non Securitization - Leverage Measure│
│                Calculation               │
└─────────────────────────────────────────┘
                    ⬇
┌─────────────────────────────────────────┐
│       Securitization Data  Population     │
└─────────────────────────────────────────┘
                    ⬇
┌─────────────────────────────────────────┐
│  Securitization - Leverage Measure Calculation │
└─────────────────────────────────────────┘
                    ⬇
┌─────────────────────────────────────────┐
│     Market Risk Related Exposure Measure │
│                Population                 │
└─────────────────────────────────────────┘
                    ⬇
┌─────────────────────────────────────────┐
│           Capital Calculation            │
└─────────────────────────────────────────┘
                    ⬇
┌─────────────────────────────────────────┐
│        Leverage Ratio Calculation         │
└─────────────────────────────────────────┘
```
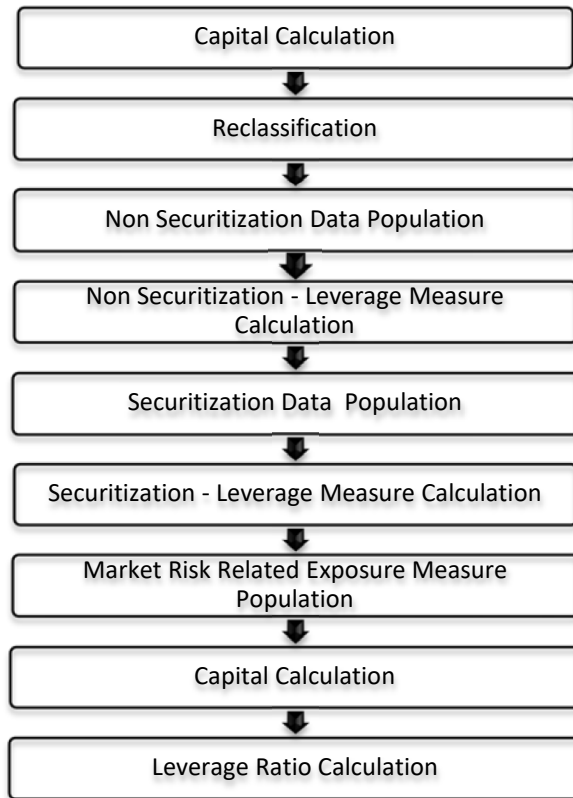
Leverage ratio is calculated by executing the Run **CRD IV Revised Leverage Ratio Calculation**.

The details of the process flow for leverage ratio is as follows.

Capital Consolidation process

The capital consolidation process remains the same as is existing in the capital calculation run.

Reclassification

The reclassification process remains the same as is existing in the capital calculation run.

Non Securitization Exposure Data Population

Data from the Product Processors are populated to Fact Non Securitization Exposures (**FCT_NON_SEC_EXPOSURES**) table in the process **EU_NON_SEC_DATA_POPULATION**. This data population also remains the same as existing in the capital calculation run.

Non Securitization Exposure Measure Calculation

After data is populated in non sec processing table, the exposure measure is calculated in the process **EU_LEV_RATIO_EXPOSURE_MEASURE_CALCULATION**.

The Exposure measure is the sum of the Pre Mitigation EAD amount of the following exposure types:

- On-Balance Sheet Exposures

- Off-Balance Sheet Exposures

- SFT Exposures

- Derivative Exposures

Details on the calculation of these exposure measures are mentioned in the following sections. All the exposure measures are computed and populated into the Leverage Exposure amount (**N_LEVERAGE_EXPOSURE_AMOUNT**) column. And any exempted exposures are identified by the solution in the Regulatory Capital Exemption Criteria in the Non Sec Exposures processing table. These exempted criteria are part of the dimension table of Regulatory Capital Exemption Criteria Dimension (**DIM_REG_CAP_EXEMPTION_CRITERIA**).

The mitigants are not considered in the exposure measure calculation for On balance sheet and Off balance sheet exposures. In the case of SFT and Derivatives, the collateral is considered, based on the run management options.

On-Balance Sheet Exposures

The accounting value of the on-balance sheet exposures net of specific provisions and valuation adjustments are considered for the exposure measure. The valuation adjustments are captured at an instrument level, in the FSI setup table for Instrument Valuation Details (**FSI_SETUP_INSTR_VALUATION_DTLS**).

The exposure measure considered is the Pre-Mitigation amount, and does not consider the benefit of the mitigation.

Some of the exempted exposures are detailed as follows.

Fiduciary Assets

If the bank considers the assets of the fiduciary assets, as the bank's own assets, then, these assets are exempted from the calculation. The fiduciary assets are identified based on the exposures having the Parent Fiduciary Account Number (**V_PARENT_FIDUCIARY_ACCT_NUMBER**) in the product processor (PP) staging tables.

The bank has to select the run management option to select whether the exposures are derecognized in the balance sheet or not. If the run management option of Y is selected, all the fiduciary assets with the parent fiduciary account is exempted from the Leverage Exposure Measure calculations. If the run management option of N is selected, specific fiduciary assets can be exempted from the Leverage Exposure Measure calculations. These specific fiduciary assets are expected to be provided in the FSI Fiduciary Assets setup table (**FSI_SETUP_DEREC_FIDUCIARY_ASST**).

This exemption is handled in the **Fiduciary Assets Exemption** subprocess of the **EU_LEV_RATIO_EXPOSURE_MEASURE_CALCULATION** process.

Internal Transactions

The internal transactions which are risk weighted at 0%, are exempted from the exposure measure. The bank has to select the run management option of whether the bank has supervisory approval to risk weight the internal transactions at 0%. Based on the run management option selected for risk weighting, these exposures are exempted.

This exemption is handled in the **EU - Leverage Ratio - Exemption of 0 Percent RW Internal Transactions** rule of the **EU_LEV_RATIO_EXPOSURE_MEASURE_CALCULATION** process.

General Fund Investments

The general fund investments in PSE which are treated as sovereign, are exempted from the exposure measure. The bank has to select the run management option of whether the bank has supervisory approval to exempt these exposures. Based on the run management option selected, and the basel product type being General Fund Investments, and the standard party type being PSE Treated as sovereign, these exposures are exempted.

This is handled in the **EU - Leverage Ratio - Exemption Of Assets that are used for Funding General Interest Investments** rule of the **EU_LEV_RATIO_EXPOSURE_MEASURE_CALCULATION** process.

Off-Balance Sheet Exposures

The exposure amount for off-balance sheet exposures is the undrawn amount of the exposure multiplied by the CCF. The CCF of the exposures remain the same as in the Capital Calculation Run, except that the CCF is floored at 10%. The flooring of the CCF to 10% is handled by the rule **Non Sec Off Balance Sheet Exposures CCF Percent Flooring** in the **Non Sec CCF Assignment** sub process.

SFT Exposures

The exposure amount of the SFT Exposures to be considered for the leverage measure is post the effect of the collateral. The SFT Exposures data provided in the staging must not consider the accounting netting.

The data capture for the SFT exposures remain the same as in the Capital calculation run. The bank role in the SFT transaction is also captured in the staging table.

The Gross amount and the Add-on amount, as expected in the accord are computed by the application. The Gross amount is the actual transaction amount of the SFT exposures, as provided in the Repo contracts staging table. And the Add-on amount is the difference between the fair value of the repo exposures and the fair value of the collateral placed or received.

The fair value of the exposures, including the placed collateral are captured at an instrument level, in the FSI setup table for Exposure Fair Value Details (**FSI_SETUP_INSTR_VALUATION_DTLS**), and the fair value of the mitigants are captured in the FSI setup table for Mitigant Fair Value (**FSI_SETUP_MTGNT_VALUATION_DTLS**).

The mitigants which are used to offset the fair value of the repo exposures, are stamped accounting heads, to ensure that they can be tracked.

The exposure amount calculations are different for the bank acting as a principal in the SFT transactions, and an agent in the SFT transactions. The solution supports both the treatments.

For bank acting as an agent, the solution handles all the treatment mentioned in the accord. The data expectation for them are as follows:

- *Case 1: Bank is an agent, and does not get involved in any other role with the SFT Exposure*

   In this case, the data is not expected in the Repo contracts staging table.

- *Case 2: Bank is an agent, and provides a guarantee equal to the difference between the SFT Exposure and the collateral amount*

   In this case, the data is expected in the Repo contracts staging table, with the bank role as an agent, and the indemnity indicator **(F_INDEMNITY_IND)** as 'Y'. There is no requirement for a guarantee contract to be separately reported, as the guarantee amount is the difference between the SFT transaction, and the related collateral amount.

   The application computes only the Add-on amount for this SFT transaction, inline with the guidelines. And this Add-on amount is populated into the Add-on column of the processing table. This Add-on amount is caluclated in the data transformation **Lev_Ratio_SFT_Addon_amt.**

   This is handled in the sub process (**Leverage Ratio Computations**) of the process (**EU_LEV_RATIO_EXPOSURE_MEASURE_CALCULATION**).

- *Case 3: Bank is an agent, and provides a guarantee more than the difference between the SFT Exposure and the collateral amount*

   In this case, the data is expected in the Repo contracts staging table, with the bank role as an agent, and the indemnity indicator **(F_INDEMNITY_IND)** as Y. And a separate guarantee transaction is expected to be recorded in the guarantee staging table. This guarantee transaction is also provided as a mitigant with the mitigant table also storing the guarantee contract ID (**V_GUARANTEE_ACCOUNT_ID**). And the exposure and the mitigant must be mapped to each other in the account mitigant mapping table **(STG_ACCOUNT_MITIGANT_MAP)**.

   This guarantee is not for a mitigant treatment, and hence, this is expected with the mitigant eligibility flag as 'N'. This identified guarantee is populated in the Non Securitized Exposures processing table in the column related to the Repo Contract surrogate key (**N_REPO_CONTRACT_SKEY**).

   The application computes both the gross exposure amount and the addon amount for this SFT transaction, inline with the guidelines. This Add-on amount is caluclated in the data transformation **Lev_Ratio_SFT_Addon_amt.**

   This is handled in the sub process (**Leverage Ratio Computations**) of the process (**EU_LEV_RATIO_EXPOSURE_MEASURE_CALCULATION**).

Derivative Exposures

Derivative transactions (OTC Derivatives) exposure measure are calculated using the Mark to Market Method. The add-on assignment is same as what is mentioned in the Capital Calculation Run. The exposure measure is the sum of market value, and the notional amount multiplied by the add-on percent.

The derivative exposure measure has few specific treatment, in terms of the Leverage Exposure Measure calculations. They are as detailed as follows.

Collateral of Derivative

The collateral received with reference to the derivatives, cannot be used in netting, and reducing the exposure amount of the derivatives. Based on whether the operative accounting framework allows for netting of the collateral or not, the solution updates the exposure measure. The solution expects a run management selection to identify whether the bank considers netting of the collateral outside the application, and provides the netted amount as input to the product processor staging tables.

The collateral of derivative is given in the mitigant table. There is a run management option to capture whether the operative accounting framework allows for netting of the collateral as per the master netting agreement or not.

If 'Yes' is selected, assuming that the bank has provided the MTM value based on already considering the collateral amount, the collateral amount is added to the MTM of the exposure. And if 'No' is selected, there is no change to the MTM value.

Data Expectations

- Collateral for the derivatives, which is already considered in the MTM calculation, are provided in the Stage Mitigants (**STG_MITIGANTS)** table with the eligibility flag as 'N' and the corresponding entry is added into the Exposure Mitigant Mapping staging table (**STG_ACCOUNT_MITIGANT_MAP)**.

- Collateral for the derivatives, which is not considered in the MTM calculation, are provided in the Stage Mitigants table (**STG_MITIGANTS)** with the eligibility flag as 'Y' and the corresponding entry is added into the Exposure Mitigant Mapping staging table (**STG_ACCOUNT_MITIGANT_MAP**). But this will not undergo any treatment in the Leverage Ratio run, and will be part of only the regular Capital calculation run CRM process.

- The MTM provided for the derivatives' instruments, must be after following the corresponding operational accounting framework.

Cash Variation Margin

As per the guideline, the Replacement cost of the derivatives can be reduced by cash variation margin if certain conditions are satisified. This is handled in the solution by using the above run management option, wherein it mentions whether the exposure is being offset with the collateral or not.

In the run management, if the option of 'No' is selected, the cash variation margin is used to offset the exposure measure. If all the conditions are satisfied, the flag to indicate that the Variation Margin has satisfied the conditions is updated. And if this flag is 'Y', then, the cash variation margin is used to reduce the replacement cost of the derivative.

This is handled in the sub process (**Cash Variation Margin Exemptions**) of the process (**EU_LEV_RATIO_EXPOSURE_MEASURE_CALCULATION**).

Clearing Member of a QCCP

For clearing member of a QCCP, the exposures where Bank acts as a clearing member, and the trade exposures, wherein the bank is not obligated to reimburse the losses suffered by the client, for CCP default are exempted, from the leverage ratio calculation.

This is handled in the sub process (**QCCP Related Exemptions**) of the process (**EU_LEV_RATIO_EXPOSURE_MEASURE_CALCULATION**).

Written Credit Derivatives or Sold Credit Derivatives

The effective notional amount of the credit derivative transactions are reduced by any change in the fair value of derivative liabilities. The fair value of the exposures are captured in the FSI setup table for Fair Value (**FSI_SETUP_INSTR_VALUATION_DTLS**), at an instrument level. And the difference between the Fair value and the MTM value of these exposures result in the unrealized gain and loss of the derivative exposures.

This is subtracted from the notional principal of these derivatives to arrive at the effect notional principal before offsetting.

The sold credit protection is offset against the bought credit protection based on the conditions mentioned in the guidelines. This offset happens in the data transformation (**SCP_BCP_Offset_Mapping**) which is in the sub process (**Written Credit Derivatives SCP BCP Offset Mapping**).

All the other written credit derivative treatment is handled in the sub process (**Written Credit Derivative Related Exemptions**) of the process (**EU_LEV_RATIO_EXPOSURE_MEASURE_CALCULATION**).

Securitization Data Population

Securitization exposure data is populated to securitization processing table in the process **SEC_DATA_POPULATION**. The population remains the same as in the capital calculation run.

Securitization Exposure – Leverage Measure Calculation

After securitization exposure data is populated, exposure measure is calculated in the process **SEC_EXP_MITIGANT_MAPPING_POP**.

The exposure measure calculation remains the same as in the capital calculation run, except that the CCF for the off balance sheet exposures are floored at 10%. And the mitigation is not considered for the leverage measure calculations.

Market Risk – Leverage Measure Calculation

Leverage Measure for Market Risk is directly expected as a download in the Stage Standard Accounting Head (**STG_STANDARD_ACCOUNT_HEAD**) with the **CAP1809** (On Balance and Off Balance Total Leverage Exposure Measure for Securitized Exposures). This is expected as a download, as the EU jurisdiction does not support the MR calculations.

Capital Calculation

Capital measure is calculated in EU_CAPITAL_STRUCTURE process. Capital Measure used in the leverage ratio is equal to Net Tier 1 which is post all regulatory adjustments. The capital structure is the same as the capital calculation run.

Leverage Ratio Calculation

The leverage ratio is calculated as follows.

Leverage Ratio = Tier 1 Capital / Total Leverage Exposure Measure

This is computed in the process - **EU_LEV_RATIO_LEVERAGE_RATIO_CALCULATION**.

9.1.1.8.3 Key Data Elements

Key data elements are elaborated in this section. For a complete list of tables and columns to be populated, see the *Download Specifications* document.

To calculate the leverage ratio, exposure amount for all product types and the total capital are required.

The key data elements for exposure measure calculation of the various product types are as follows:

- ♦ On-Balance Sheet Exposures: For on-balance sheet items, End of Period (EOP) balance amount, write-off, and accrued interest amount is required.
- ♦ SFT Exposures: For repo products, exposure amount, and instrument rating are required.
- ♦ Derivative Exposures: For derivative products, exposure mark to market value, notional principal amount, and underlying instrument types are required.
- ♦ Off-Balance Sheet Exposures: For off-balance sheet items, undrawn amount is required.
- ♦ Securitization Transaction: For securitization transactions, exposure amount is required.
- ♦ Capital Calculation: See the Capital Structure for more details.
- ♦ Cash Variation Margin: The collateral segregated flag, exchange traded flag, and netting agreement code are required.
- ♦ Netting Agreement: The margin threshold and the minimum transfer amount are required, which are captured in the Stage Net Exposures table (**STG_NET_EXPOSURES**).

9.1.2 EU-CRR IV – Internal Ratings Based Approach

9.1.2.1 EU-CRR IV High Level Process Flow – Internal Ratings Based Approach

The Capital Adequacy Ratio, which is defined by EBA is delivered out-of-box in OFSAAI as a building block approach. The application computes capital for Credit Risk (Internal Ratings Based Approach), Operational Risk along with Capital Structure and Capital Consolidation processes. The application supports the Foundation IRB Approach for Credit Risk and Advanced IRB Approach for Credit Risk.

For more information on the pre-defined Runs available with the application, see *OFS Basel Regulatory Capital Run Charts* available in [MOS](#).

9.1.2.1.1 Process Flow for Capital Adequacy Ratio Calculation

The Capital Adequacy Ratio is computed for all banks and their financial subsidiaries, which are part of the same banking regulation. The banks have to be compliant with the regulations and the required ratios at individual level (solo) and consolidated entity level (regulatory consolidation). The application supports both the approaches.

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┌─────────────────────────────────────┐
│        Capital Calculation Run       │
│                                      │
│   ┌──────────────────────────────┐   │
│   │ Capital Consolidation Process│   │
│   └──────────────────────────────┘   │
│                  │                    │
│                  ▼                    │
│   ┌──────────────────────────────┐   │
│   │     Credit Risk Process       │   │
│   └──────────────────────────────┘   │
│                  │                    │
│                  ▼                    │
│   ┌──────────────────────────────┐   │
│   │  Credit Valuation Adjustments │   │
│   └──────────────────────────────┘   │
│                  │                    │
│                  ▼                    │
│   ┌──────────────────────────────┐   │
│   │   Operational Risk Process    │   │
│   └──────────────────────────────┘   │
│                  │                    │
│                  ▼                    │
│   ┌──────────────────────────────┐   │
│   │       Capital Structure       │   │
│   └──────────────────────────────┘   │
│                  │                    │
│                  ▼                    │
│   ┌──────────────────────────────┐   │
│   │        Capital Buffers        │   │
│   └──────────────────────────────┘   │
│                  │                    │
│                  ▼                    │
│   ┌──────────────────────────────┐   │
│   │     Revised Leverage Ratio    │   │
│   └──────────────────────────────┘   │
└─────────────────────────────────────┘
```

Capital Calculation Run

The Capital Calculation Run, which is depicted in the preceding process flow diagram, is a single run which is a joined together by multiple processes. Each process considered as blocks, consists of tasks defined in a sequence to complete the processing of the entire Capital Adequacy Run.

9.1.2.1.2 Capital Consolidation Process

Capital Consolidation is a process common to each of the individual block when they are triggered separately as an individual run. In Capital Consolidation, the application processes the following.

Capital Consolidation Level Selection

The reporting bank can be a part of a financial group that has multiple legal entities like parent or child entities (subsidiaries) under its name. The entity on which you are required to process should be selected. Subsequently, level at which a Run is to be executed (solo or consolidated) should also be selected. Select these options in the [Run Management UI](#). However, if the Run is executed in the Run Rule Framework (RRF), then these options have to be set using the Rule **EU-Capital Consolidation Level Selection** (RLBL8147) in the sub-process '**Capital Consolidation Approach**'.

EU_CAPITAL_CONSOLIDATION is the first process to be added in all the Runs and the Run Management UI selects this process by default.

Run Parameters Assignment

The accord states different approaches for calculating RWA. The Run Management UI in the application allows the reporting bank to define and execute a Run by selecting a combination of different approaches for RWA computation.

[Run Parameter Assignment](#) is also part of **EU_CAPITAL_CONSOLIDATION** process. The Rule **EU - Run Definition User Defined Run Param Assignment** is used to assign the Run parameters if a Run is executed in the RRF. If the Run is executed from the Run Management UI, then the parameters are populated based on the Run defined in the [Run Definition](#) window.

Currency Conversion

The Rules pre-defined in the application performs currency conversion of all General Ledger amount attributes to be used for Capital Consolidation from the Natural currency to the Reporting currency, based on the exchange rate provided.

Shareholding Percent Multiplication

For all entities in the Capital Consolidation process, the application updates the shareholding percentage against each entity data in the fact capital accounting head from the fact entity shareholding percent table. The parent data in the processing table of fact capital accounting head is updated with the value 1 and for each child entity the data is based on the parent's holding percentage specified for each child in FACT ENTITY SHAREHOLDING PERCENT table.

9.1.2.1.3 Process Flow for Credit RWA

Credit RWA Run is a combination of Non Securitization RWA, Credit Valuation Adjustment RWA, and Securitization RWA computation. A few processes like credit rating, party type reclassification, and mitigant data population are common between Non Securitization and Securitization processes and are executed only once under the Credit RWA Run even though these sub processes are explained separately under Non Securitization and Securitization section of this document.

Certain sub processes under Non Securitization process like Reclassification, are common across all types of exposures. For example: banking book, over the counter derivative transactions, and securities financing transactions, and are executed only once in the Run. The details of these sub processes are explained under Reclassification sub process of the CRR IV Non Securitization exposures section of this document. Similarly, details of Credit Risk Mitigation for Non Securitization process is detailed under the CRR IV Non Securitization section of this document and details of Credit Risk Mitigation for Securitization process is detailed under the CRR IV Securitization section of this document.

For more information on the sub processes as detailed in the preceding process flow for the Non Securitization process, CVA process, and Securitization process, see Credit RWA.

For example: Non Sec Data Population is detailed under data population and currency conversion of Credit RWA (Non Securitization - Standardized approach) section of this document. The currency conversion is handled in the sub process "Currency Conversion" of the process "SEC_DATA_POPULATION".

Similarly, CRM eligibility, haircuts, and so on, is detailed in the Credit RWA (Securitization) section of this document.

9.1.2.1.4 Process Flow for Credit Valuation Adjustments
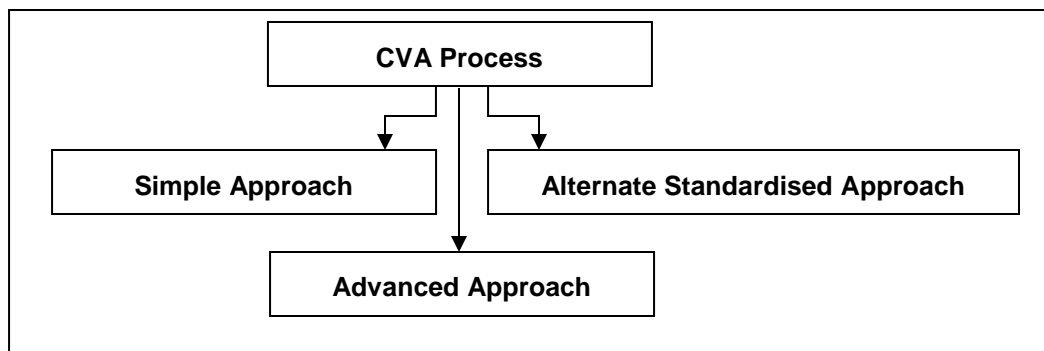
The CRR IV committee has introduced a new Credit Valuation Adjustment (CVA) capital charge, which is added to default risk capital charge to arrive at the new Counterparty Credit Risk (CCR) capital charge. The mark to market counterparty credit losses or the spread migration risk is captured with CVA, which were not directly capitalized before. The application calculates CVA Charge for OTC portfolio of a bank. This is part of a run management option.

This process flow is divided into three sections: Simple Approach, Alternate Standardised Approach and Advanced Approach.

For more information on the sub processes as detailed in the process flow, see Credit Valuation Adjustments.

9.1.2.1.5 Process Flow for Operational RWA
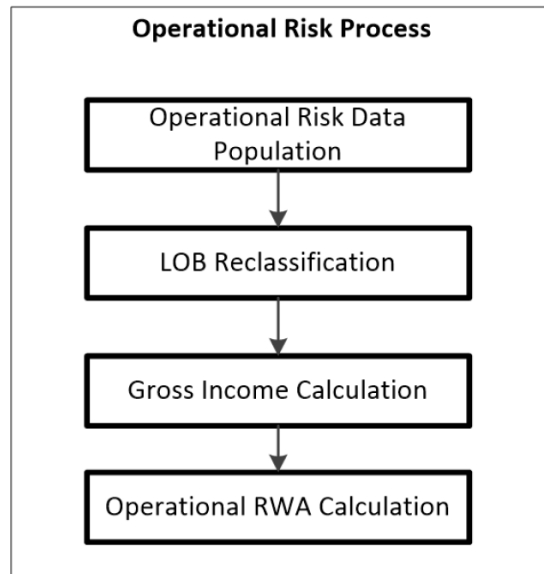
Operational RWA run is executed with the Capital Consolidation process. For more information on the Operational RWA computation, see Operational Risk section.

For example: LOB Reclassification and Gross Income Calculation sub process are detailed as separate processes under the Operational RWA section of this document.

9.1.2.1.6 Process Flow for Capital Structure

Capital Structure is executed with Capital Consolidation, Credit Risk, and Operational Risk RWA processes. For more information on the sub processes of Capital Structure, see Capital Structure section.

For example: 'Gross Capital Calculation' mentioned in the preceding process flow, is explained in detail under 'Gross Capital Calculation for CET1, AT1, and T2' sub process section of the Capital Structure section in this document. Likewise, 'Regulatory Adjustment' and 'Net Capital Calculation' is detailed under 'Regulatory Adjustment to Common Equity Tier 1, Additional Tier 1, and Tier 2' section along with 'Treatment of Insignificant and Significant Investment Data Treatment' and 'Calculation of Net Capital' sub process section of Capital Structure in this document.

9.1.2.1.7 Process Flow for Capital Buffers
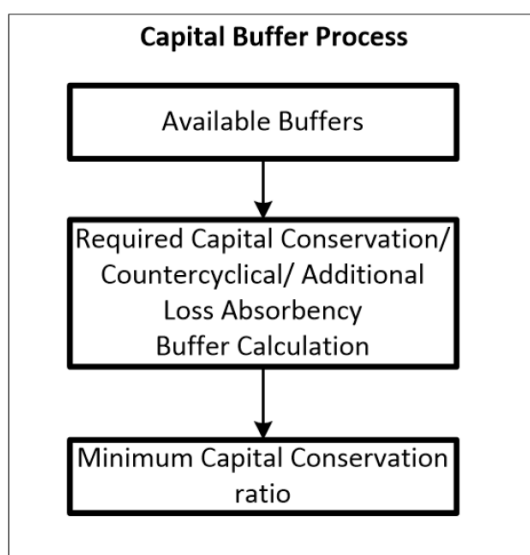
Capital Buffer is calculated after the calculation of Capital Ratios, as they go as an input to Buffer calculation. Each sub-process is explained in detail under Capital Buffer section of the user guide.

For more information on Capital Buffers, see Capital Buffers section.

For example, Required Capital Conservation Buffer and Required Countercyclical Buffer calculation are detailed in the 'Required Total Buffer' sub-section of the Capital Buffer section in this document. Similarly, Minimum Capital Conservation ratio is detailed in the 'Capital Conservation Ratio' sub section of Capital Buffer section in this document.

9.1.2.2 Credit RWA

The application supports the computation of Credit RWA as per the guidelines laid out in the CRR IV. Credit RWA computation is broken down into Credit Risk for Non Securitized Exposures and Credit Risk for Securitized Exposures. For Credit Risk for Non Securitized Exposures, the application follows the Standardized Approach, Foundation IRB Approach, and Advanced IRB Approach. Credit RWA computation also consists of computation of Credit Valuation Adjustments which is explained in the later section.

9.1.2.2.1 Non-Securitization – Internal Ratings Based Approach

The process begins with rating reclassification. All exposures are rated by different agencies. However, the naming convention of these ratings might not be the same as mentioned in the CRR IV. Hence, the application reclassifies the rating information shared in the bank's data to standard rating, as stated in the CRR IV. In the case of IRB, the internal ratings are the one which is required for some of the exposure asset classes like specialized lending. And for mitigants, the external ratings are required. As there are no other relevance of usage of ratings in the Non Securitization process, there is no multiple assessment for the Non Securitization exposures, and only Mitigants and Sold credit protection exposures have multiple assessment process.

The exposure amount and other amount data columns that are provided as an input (in stage tables) are in the Natural Currency (exposure currency) and this is usually different for exposures across different countries. The application converts them to reporting currency columns so that processing for all exposures happens in one single currency.

The credit risk exposures are identified by their product types, counterparty types, and their corresponding asset classes. A sample list of products types, party types, mitigant types, and credit ratings are pre-defined in the Basel application. However, this list and naming convention differs from one bank to another. Hence, the application reclassifies the bank's data into standard data as per the accord. The application reclassifies the bank's product types and party types to Basel standard product and party types. Further, based on standard Basel product and standard party type, it forms an asset class for each exposure.

Some exposures can be hedged against credit risk through various mitigants like guarantors, collaterals, credit derivatives, and so on. These provide mitigation to credit risk and should be considered while computing Credit RWA as per CRR IV norms. Hence, the application calculates pre-mitigation risk weighted assets amount and post mitigation risk weighted assets amount.

The application calculates the correlation factor using the formula specified by CRR IV guidelines for each asset class. The correlation factor is computed using the formulae specified by the guidelines, for each of the asset classes. The correlation factor also considers the Asset value correlation multiplier as applicable for few of the exposures, based on them satisfying the required conditions. The PD of the exposures are expected as a download from the bank in the FSI Setup Account Modeling Information (**FSI_SETUP_ACCT_MODELING_INFO**) at an account granularity. This will be based on the bank's PD modeling mechanism which assigns the PD at either the party level or at the instrument level. The LGD are assigned by the solution, based on the regulator provided values, in the case of the bank following Foundation IRB Approach, and assigned based on the bank's estimate of LGD based on their LGD modeling, in the case of bank following Advanced IRB approach. All the modeling parameters which are computed by the bank using custom models are expected as a download in the FSI Setup Account Modeling Information table, at an account granularity.

Using Correlation factor, PD, and LGD, the application calculates the pre-mitigation capital charge for each exposure. This value signifies the capital charge the bank has to maintain for each exposure, prior to considering any mitigation effects.

The application calculates pre-mitigation exposure at default amount and risk weight for each exposure. Further, it computes pre-mitigation risk weighted assets (Pre-CRM RWA) by multiplying the EAD by risk

weight. The risk weight is arrived at by multiplying pre-mitigation capital charge with 12.5 and 1.06, inline with the CRR IV guidelines.

Through the Credit Risk Mitigation (CRM) process, the bank considers the effects of mitigation. The application checks mitigant eligibility based on the CRR IV specifications and assigns a haircut to each mitigant based on their currency, residual maturity, and expected volatility in their market value. Volatility haircut takes into consideration the change in the mitigation effect that arises due to future fluctuations in the mitigant's value. FOREX and Maturity haircut considers any currency and maturity mismatches the mitigants have with the exposures that they are covering. The application allocates mitigants to exposures based on optimizer function and capital charge for each mitigant is calculated by the application.

The application later calculates the post mitigation RWA Unexpected Loss (Post CRM RWA UL) and post mitigation RWA Expected Loss (Post CRM RWA EL). Some credit risk exposures that fall under the category of internal transactions like holding own subsidiaries shares or investment in its capital, reciprocal cross holding, and so on, are identified in the Non Securitization process and treated separately under Capital Structure process.

Process Flow for Non Securitization – Internal Ratings Based Approach

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│        Rating Information Processing      │
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┌─────────────────────────────────────────┐
│              Data Population              │
└─────────────────────────────────────────┘
                    ↓
┌─────────────────────────────────────────┐
│            Currency Conversion            │
└─────────────────────────────────────────┘
                    ↓
┌─────────────────────────────────────────┐
│              Reclassification             │
└─────────────────────────────────────────┘
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┌─────────────────────────────────────────┐
│          Risk Parameters Assignment       │
└─────────────────────────────────────────┘
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┌─────────────────────────────────────────┐
│     Non Sec Asset Value Correlation Factor│
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┌─────────────────────────────────────────┐
│     Pre-Mitigation Capital Charge Calculation│
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┌─────────────────────────────────────────┐
│       Pre-CRM Exposure at Deafult (EAD)   │
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┌─────────────────────────────────────────┐
│    Pre-CRM Risk Weights Assets Calculation│
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┌─────────────────────────────────────────┐
│             Mitigant Eligibility          │
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│              PD / LGD for CRM             │
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│          Mitigant Haircut Assignment      │
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┌─────────────────────────────────────────┐
│         Mitigant Correlation Factor       │
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│         CRM Capital Charge Calculation    │
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│      Allocation of Mitigant to Exposures  │
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┌─────────────────────────────────────────┐
│           Post-CRM RWA Computation        │
└─────────────────────────────────────────┘
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For Credit Risk of Non Securitized and Securitized exposures, the Foundation IRB Approach (FIRB) and Advanced IRB Approach (AIRB) are applicable for the banks. Foundation IRB approach uses the bank's own estimate of PD, and the supervisory provided values for LGD and Effective Maturity (M). In the case of Advanced IRB approach, the bank uses own estimates of PD, LGD and Effective Maturity (M).

Foundation IRB/Advanced IRB Approach consists of the following:

- ♦ Banking Book Products
- ♦ Over the Counter Derivative Products

- ♦ Securities Financing Transactions
- ♦ Credit Risk Mitigation

Banking Book Products

Rating reclassification is the initial step in the process. All exposures are rated by different agencies. The rating expectation as per CRR IV guidelines are the credit quality steps, which are not the same as what are provided as the rating by the rating agencies. Hence, the application re-classifies the rating information shared in the bank's data to standard rating as recommended in the CRR IV.

The exposure amount and other amount attributes that are provided as input (in the stage tables) should be in the natural currency (currency of the exposure) and this is usually different for exposures across different countries. The application converts them to reporting currency, so that processing occurs in a single currency.

The Credit Risk exposures are identified by their product types, counterparty types, and their corresponding asset classes by the application. A sample list of products types, party types, mitigant types, and credit ratings are pre-defined in the application. However, this list and naming convention differs from one bank to another. The application reclassifies the bank's product types and party types to Basel standard product and party types. Based on standard Basel product and standard party type, it forms an asset class for each exposure. Some exposures can be hedged against Credit Risk through various mitigants like guarantors, collaterals, credit derivatives, and so on.

These provide mitigation to credit risk and are considered while computing Credit RWA as per the Accord. Hence, the application calculates pre-mitigation RWA amount and post-mitigation RWA amount.

The application calculates the correlation factor using the formula specified for each asset class. Using this Correlation Factor, Probability of Default (PD), and Loss Give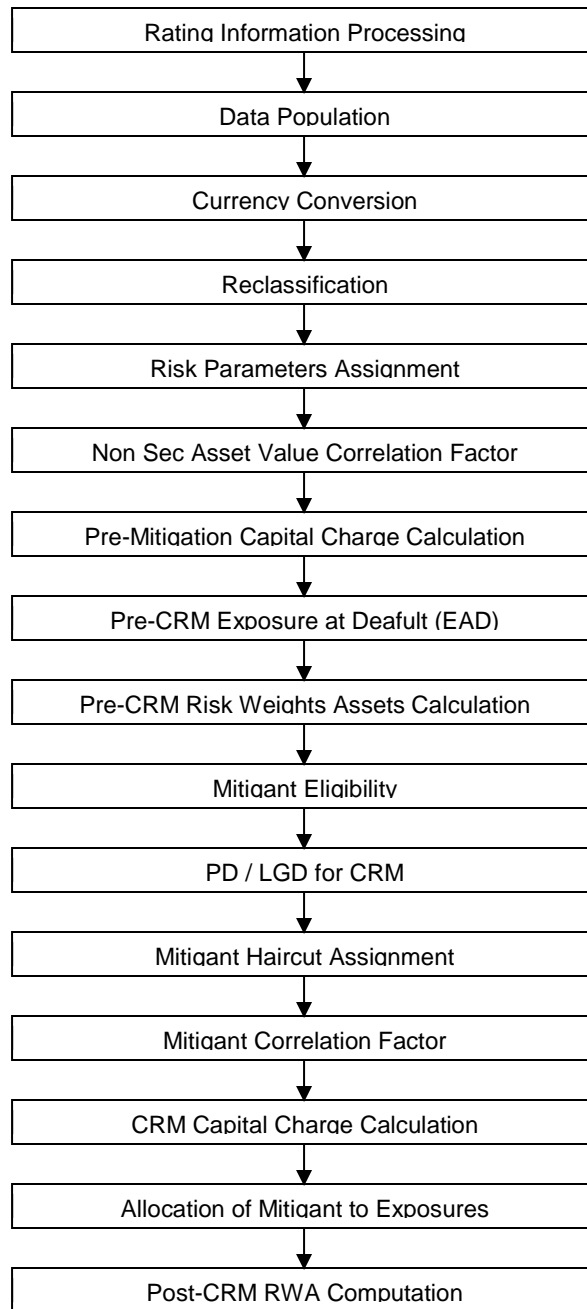n Default (LGD), the application calculates the pre-mitigation capital charge for each exposure. This value signifies the capital charge that the bank must maintain for each exposure, before considering any mitigation effects.

The application calculates pre-mitigation EAD amount and RWA for each exposure and then computes pre-mitigation risk weighted assets (Pre-CRM RWA) by multiplying the EAD by the risk weight. The risk weight is arrived at by multiplying pre-mitigation capital charge with 12.5 and 1.06, as mentioned by the CRR IV guidelines.

With the Credit Risk Mitigation (CRM) process, the bank considers the mitigation effect. The application checks on the eligibility of the mitigants, based on CRR IV specifications. It assigns a haircut to each mitigant based on their currency, residual maturity, and expected volatility in their market value. Volatility haircut considers the change in the mitigation effect that arises due to future fluctuations in the value of the mitigant. FOREX and maturity haircuts consider any currency and maturity mismatches that the mitigants have with the exposures it covers. The application allocates mitigants to exposures based on optimizer function and subsequently the capital charge is calculated for each mitigant.

The application then calculates the post mitigation RWA Unexpected Loss (Post CRM RWA UL) and post mitigation RWA Expected Loss (Post CRM RWA EL). Some credit risk exposures that fall under the category of internal transactions like holding own subsidiaries shares or investment in its capital, are treated separately under Capital Structure.

Process Flow for Banking Book Products

Rating Information Processing

Pre Processing Steps

Data on ratings are captured in the following rating specific tables:

- Accounts Rating Table (**STG_ACCOUNT_RATING_DETAILS**)
- Instrument Rating Table (**STG_INSTRUMENT_RATING_DETAILS**)
- Party Rating Table (**STG_PARTY_RATING_DETAILS**)
- Sovereign Rating Table (**STG_SOVEREIGN_RATING_DETAILS**)
- External Underlying Exposures Rating Table (**STG_EXT_ULY_ACCT_RATING_DTL**)

NOTE: For the purpose of IRB, the ratings expectation are the internal ratings, which is a single rating for each account. These are the ratings to be reclassified into the credit quality steps of 1 to 6. For the purpose of Sold Credit Protection, the ratings expectation are external ratings, and they will be reclassified into the credit quality steps of 1 to 12, as per the Securitization rating expectations.

The multiple assessment is applicable only for External ratings, which are applicable for Sold credit protection exposures, and mitigants. In the case of other Non Securitized exposures, we do not have any requirement for external ratings, and hence require only internal ratings. The internal ratings are reclassified into the credit quality steps 1 to 6. And internal ratings will be a single rating, and hence there is no requirement for multiple assessment.

See the Rating Information section for more details on this.

Data Population

Pre Processing Steps

Credit Risk exposure data should be uploaded in the application for all the product types through their respective input tables known as Product Processors.

See the Data Population section for more details on this.

Currency Conversion

The application converts the amount attributes, which are in natural currency, to reporting currency which is used for further calculations.

NOTE: The data populated in the Product Processor is expected in natural currency of the exposure.

See the Currency Conversion section for more details on this.

Reclassification

The application reclassifies the bank's product types and party types to standard product and party types. Based on standard product and party type, it forms an asset class for each exposure. Similarly, the application does reclassification for mitigant on the basis of its mitigant types and reclassifies it to standard mitigant types.

NOTE: Ensure that all products and party type and mitigants which are bank specific are reclassified, as part of the setup activity. All the exposures in the credit line table are reclassified into Line of Credit Basel product type.

NOTE: In the case of product reclassification pertaining to QRRE exposures, which are qualified retail revolving exposures, the data expectation is only the consolidated exposure. As this is a consolidated exposure, the criteria pertaining to the counterparty level total exposure being less than 100,000 EUR must be handled by the bank, during the reclassification.

See the Reclassification section for more details on this.

Risk Parameters Assignment

The application assigns risk weight parameters of PD, LGD, and maturity to all exposures. The PD of the exposure is either obtained from the customer / issuer's party level PD estimate, or the instrument's PD estimate, depending on the account type. The LGD and maturity are based on supervisory estimates in the case of Foundation IRB Approach, and based on bank's estimates in the case of Advanced IRB Approach.

The Loan to value calculation for the Commercial Real Estate (CRE) and Residential Real Estate (RRE) product types and mitigant types are based on the bank opting for calculation using either mortgage lending value or market value. This is based on the bank's option, which is selected using the run management option, This is handled in the **Loan To Value Ratio Calculation** sub process.

For Foundation Internal Rating Based (FIRB) approach, the application assigns the PD based on bank's estimate. The LGD and Effective Maturity are based on the supervisory estimate as applicable for the asset classes. In the case of Retail asset class, the LGD is based on the bank's own estimate. The Expected Loss is computed as per the formulae specified by the CRR IV guidelines for the various asset classes. The expected loss is computed before the PD Flooring, as the PD floor considers the LGD and the EL. The expected loss is computed again after the PD Flooring, as that is the final Expected loss which is applicable for the bank using the final PD for the exposures, and the LGD for the exposures.

The covered bonds which are eligible for preferential treatment, have a different LGD assignment compared to their asset class LGD. Also, the purchase receivables have a different LGD assignment.

For defaulted exposures, PD is assigned 100%, and this requires the input of both LGD and Best estimate of expected loss.

In Advanced Internal Ratings Based (AIRB) approach, the PD, LGD, Best Estimate of Expected Loss and Effective Maturity values are directly taken as downloaded values from the reporting bank. All other computations remain same as in FIRB.

The sub process "**PD LGD Assignment**" details the assignment of the risk parameters.

In the case of Corporate SME, the correlation calculation requires the Total Assets or Total Annual Sales, depending on the type of operations the corporate is involved, and whether assets or sales is a meaningful indicator of the same. The calculation requires the value to be substitution in million, and it has an upper limit of 50 million. This limit is handled in the Reveleus parameter master table. This value is provided as EU_ASSET_CAP_AMT and EU_SALES_CAP_AMT respectively. As the limit is specified to be 50 million as per the guideline, the application has considered the value of 50. This can be modified by the user, if the regulator modifies the limit.

Risk Parameters Assignment for Dilution Risk

The PD for dilution risk is same as the PD of the Instrument or Party as applicable, and which is used in the Capital charge computation of the exposures.

For Foundation IRB (FIRB) approach, the LGD for dilution risk is based on the supervisory estimate, as applicable for the calculations. In the case of Advanced IRB (AIRB), the LGD is based on either the bank's own estimate or the supervisory provided LGD value. This is based on the run management option selected by the bank.

The sub process "**Capital Calculation for Dilution Risk**" details the assignment of the risk parameters for dilution risk.

The bank can get exemption from the national supervisor, for the calculation of the dilution risk, if the exposures are immaterial. This is again based on the run management option, and also the bank providing an update on which Basel product type is being exempted from this calculation.

The Purchased Receivables are eligible for retail treatment if both the parties are unrelated and have no internal transactions between them, as per the guidelines. The application validates this condition, and assigns the asset class accordingly for these exposures. This is handled in the "**Dilution Risk Eligibility**" sub process.

NOTE: There should not be any columns filled in FSI Party Party Relationship table (**FSI_PARTY_PARTY_RELATIONSHIP**) for that party ID and entry for internal transactions (**F_INTERNAL_CUST_IND**) in Fact Non Securitization Exposures (**FCT_NON_SEC_EXPOSURES**) table should be "**No**".

In the case of bank having purchased receivables which has full recourse to the seller for both dilution risk and default risk, it is expected that the bank will provide the purchased receivable in the applicable product processor staging table. And as there is full recourse to the seller, this recourse amount, will be provided as a guarantee in the mitigants table. As the regulatory requirement is to treat this as a collateralized transaction, this is the expected data flow.

The Purchased Receivables will be pooled together using the Retail Pooling ID, as there are specific calculations, which require the processing to happen at pool level. The application will perform the summation of the pool records, and then further processing of pre CRM RWA calculations will happen. And post that, the pool record value is prorated to the individual accounts, to ensure that CRM happens on the individual account level values. This is handled in the sub process "**Capital Calculation**".

Asset Value Correlation Multiplier

In the CRR IV, Asset Value Correlation (AVC) factor of 1.25 is applicable to exposures of regulated financial firms with total assets of at least €70 billion and to all exposures of unregulated financial firms (regardless of size). The identification for the AVC calculation are handled in the "**AVC Related Calculations**" sub process.

Pre-mitigation Capital Charge Calculation

Pre-mitigation capital is calculated for all asset classes using the Correlation factor, PD, and LGD where correlation factor is calculated for each asset class on the basis of PD. Capital for defaulted exposures and failed trades is calculated through separate Rules. For exposures that have defaulted, the application uses two inputs - LGD and Best Estimated Expected Loss of a Bank. For failed trade transactions, the additional capital requirement is assigned by the application on the basis of the number of failed business days.

This is handled in the sub process "**Capital Calculation**" and "**Non Sec Failed Trade Processing**"

The failed trade transactions due to system wide settlement failure, can be exempted from the failed trade transaction based on the supervisory approval. This is handled in the run management option.

The sub process "**Non Sec Failed Trade Waiver**" handles this requirement.

The specialized lending exposures can opt for risk weighting instead of the IRB specific PD, LGD calculations. This is again handled by the run management option. And if the risk weighting option is selected, the solution applies the risk weight for these exposures. This is handled in the sub process "**Specialized Lending Treatment**".

The other non credit obligation exposures, for which CRR IV guidelines specify the risk weight treatment, instead of the PD, LGD approach, are handled in the sub process "**Non Credit Obligation Exposure Treatment**" and "**Risk Weight Assignment for Lease Residual**".

In the case of sold credit protection exposures, the exposures are assigned the risk weight pertaining to the securitization exposures, for rated exposures. For assigning these risk weights, the application applies multiple assessments. The multiple assessment has to be performed using the Securitization specific rating reclassification. As the securitization risk weights are assigned using the securitization specific credit quality step reclasssification, the sold credit protection exposures will be assigned reclassified credit quality steps using the securitization specific logic.

These multiple assessment of ratings is performed in the Data Transformation "Mult_Assessment_SCP". The details of the Data Transformation are as follows:

Data Transformation Name	Objective	Processing Logic
Mult_Assessment_SCP	The objective of this Data Transformation is to perform multiple assessment of the ratings and assign a normalized rating and risk weight to the sold credit protection exposures.	For each exposure, the various standard ratings associated with that exposure and the respective risk weights are identified. If the number of ratings are 1, then the same rating gets assigned as the standard rating for the exposure and the risk weight associated with that standard rating gets assigned as the Pre-mitigation risk weight. If the number of ratings are greater than or equal to 2, then the exposure is assigned a risk weight which is the worst of the best two risk weight. And the corresponding rating is assigned to the exposure. This uses the securitization related rating reclassification and the securitization related risk weights.

The sold credit protection processing is handled in the "**Sold Credit Protection Exposure Data Population**" sub process.

For more information on setting up this Rule, see *Run Parameters Setup for Run Creation.*

Credit Conversion Factor (CCF)

This is applied to all off-balance sheet exposures. Off-balance sheet exposures can be identified at the first level in the Basel Product Types Dimension (**DIM_BASEL_PRODUCT_TYPE**) table. The CCF values applied are 0, 0.2, 0.5, 0.75, and 1. The factors on the basis of which the CCF is applied are Basel

product type (as per CRR IV Accord), type of facility (whether it is cancellable or not), and the maturity of the exposure. There are few exposures for which the CCF is assigned to the exposure only on the undrawn portion, namely commitments. And for few exposures, the CCF is assigned to contract amount viz. products like guarantee, note issuance facilities. The solution assigns the supervisory provided CCF to the exposures based on the Basel product type dimension. This is available in the CCF Percent (**N_CCF_PERCENT** - for undrawn portion CCF), and the CCF Percent Drawn (**N_CCF_PERCENT_DRAWN** - for the drawn portion CCF).

The CCF applied for the Pre mitigation EAD is 100%, and the applicable CCF is applied to the exposures only post mitigation.

This CCF assignment is handled in the sub process "**Non Sec CCF Assignment**".

Pre CRM Exposure at Default (EAD)

Exposure at default is calculated for all asset classes based on:

 ♦ Current Exposure Amount
 ♦ Off-Balance Sheet Drawn CCF Percent (for Post CRM EAD)
 ♦ Provision Amount
 ♦ Undrawn Amount
 ♦ CCF Percent (for post CRM EAD)

CCF percent for FIRB approach is assigned by the application based on the supervisory provided CCF values, and in the case of AIRB approach, the CCF is considered based on the bank's estimate.

Of the total exposure amount, the exposures can have drawn amount and undrawn amount. Drawn amount is the direct credit exposure, or the outstanding balance of the exposure and undrawn amount can become a potential exposure when that amount is drawn. In case of certain products like guarantee, it is the contract amount, which is considered as the drawn portion of the exposure. Therefore, EAD related to undrawn amount is calculated by multiplying the CCF percent with undrawn amount and subtracting the proportion of the provision related to the undrawn portion.

The EAD calculation differs for different products, based on the CRR IV guidelines. This is handled in the sub process "**Non Sec Pre CRM EAD Computation**" and "**EAD Calculation Purchase Receivable for Dilution Risk**".

If the reporting bank has exposure to one of its own subsidiaries, then that exposure is classified as internal exposure. Each of the internal transaction, that is, transaction between parent and its subsidiary is marked as deduction line item. The deduction is processed as part of the Capital Structure processing and all the internal transactions are eliminated from any RWA calculation.

For the internal transactions which are not regulatory capital calculations, the solution supports the risk weight of 0% to these exposures based on the supervisory approval. This is handled as part of the run management option.

NOTE: All the internal transactions which are not part of the regulatory capital calculations will be risk weighted at 0%, based on the supervisory approval. This option has to be selected in the run management option.

This is handled in the sub process "**Zero Risk Weight Assignment to Non Sec Internal Transactions**".

Equity Exposures Treatment

Equity Exposures are treated in the Equity Exposures (**FCT_EQUITY_EXPOSURES**) table where EAD is calculated using the post off-set amount. The offset amount is arrived based on the risk position mapping long position of equity exposures with applicable short position of equity exposures. For more information, see the *Download Specifications* document.

The equity exposures are reclassified into the Equity Exposure asset class. Also, any subordinated exposures will also be reclassified into Equity Asset class, based on the CRR IV guideline requirements.

Equity Exposure can be treated using the Simple Risk Weight Assignment (SRWA) method, PD/LGD approach or Internal Model Method. You can define the approach to be used to calculate the RWA for equity approach, in the run management option.

If PD/LGD approach is selected, the risk parameters of PD, LGD and Effective maturity are provided based on whether the bank is following FIRB or AIRB. Using these risk parameters, the capital charge parameters of Correlation, Capital Charge and RWA are calculated.

If SRWA is selected, the RW is calculated based on equity being Exchange Traded or Private Traded.

If IMM is selected, the Capital Charge Derived from VaR Model is taken as input and RW is assigned. The PD/LGD approach RWA is used for the flooring purpose for the IMM approach, and hence, the applications computes both the method for these exposures.

Equity Exposures RWA

Equity Exposure RWA is calculated by multiplying the risk weight with the Equity EAD. Equity data is processed in Equity Exposures (**FCT_EQUITY_EXPOSURES**) table. From Equity Exposures (**FCT_EQUITY_EXPOSURES**), data is populated to Fact Non Sec Exposures (**FCT_NON_SEC_EXPOSURES)** table.

Pre-CRM RWA Computation

Pre-CRM RWA is calculated for all asset classes by multiplying the Pre-CRM EAD with the risk weight.

Collective Investment Units (CIU) Processing

The exposures to the CIU are expected in the Stage Investments table (**STG_INVESTEMENTS**), and the instrument code is expected to be populated for these exposures. The static information related to the instruments are expected in the Instrument contract dimension table (**DIM_INSTRUMENT_CONTRACT**), and the information pertaining to the instruments which changes periodically like the current outstanding issue amount is expected in the Stage Instrument Contract Detail table (**STG_INSTRUMENT_CONTRACT_DTL**).

The underlying exposures pertaining to these CIU are expected in the Underlying Exposure Staging table (**STG_UNDERLYING_EXPOSURES**), with the **Instrument ID** that of the Instrument, and the Underlying Data Type Identifier as **"CIU"**. The underlying composition of the CIU are expected in the Stage Fund Underlying Composition table (**STG_FUND_UNDERLYNG_COMPOSITION**). This has the underlying composition details of the fund, across various products, and the maximum permissible limit of investment

in each of the product types, with the fund code as the Instrument ID.

| **NOTE:** | The fund underlying composition and/or the underlying exposures are required for processing, only in the case of unrated CIUs. |
| | When the derivatives products are the underlying for a CIU, then the Notional amount of the derivative is expected to be given as the exposure amount in Stage Underlying Exposures (**STG_UNDERLYING_EXPOSURES**). |

If the operational criteria are met, and the CIU invests in a depository institution, the risk weight can be provided as an input. This is handled in the rule "**EU - CIU - RW Assignment based on Third Party Assessment**".

If the operational criteria are met and the underlying exposure data are available, the CIU is treated under Full Look through approach.

♦ If the bank follows IRB approach for all the underlying exposure asset classes, the weighted average risk weight of the underlying exposures computed using the respective asset class method for capital computation, weighted by the EAD of the underlying exposures are assigned to the CIU exposure.

♦ If the bank does not follow IRB approach for all the underlying exposure asset classes, the SRWA approach will be followed for Equity underlying exposures, and Standardized approach will be followed for other underlying exposures, based on the CRR IV guidelines. The weighted average risk weight of the underlying exposures, weighted by the EAD of the underlying exposures are assigned to the CIU exposure. This will be applicable only in the case of mixed approach of having both standardized approach and IRB approach.

If the operational criteria are not met or the underlying exposure are not available, the CIU is treated as per the SRWA Approach of Equity Exposures.

The CIU calculations are handled in the sub process "**Equity Simple Risk Weight Approach**".

Over-the-Counter Derivative Products

The accord recommends calculation of Counterparty Credit Risk (CCR), wherein the counterparty can default before the final settlement of a transaction. Unlike the firm's exposure to credit risk arising from a loan, CCR creates a bilateral risk of loss. Market value of the transaction can be positive or negative for either parties in the transaction at different points in time, till the maturity or closure of the transaction. This market value is dependent on the movement of the underlying risk factor. The EBA has proposed Rules to calculate the EAD or exposure amount for the instrument with CCR.

| **NOTE:** | All OTC Derivatives and Repo products are part of the CCR computation. |

See the Over the Counter Derivative products section for more details on this.

Credit Risk Securities Financing Transactions (SFT)

Securities Financing Transactions (SFT) includes Repo Style transactions, Margin Lending, Security Financing Borrowing, and so on. The SFT portfolio of a bank is included for capital charge calculations as per standardized, foundation IRB, and advanced IRB approach. The SFT EAD calculation follows two methodologies:

- Comprehensive Approach
- IMM Approach

See the Securities Financing Transaction section for more details on this.

Specific Wrong Way Risk

Wrong-way risk is defined as the risk that occurs when "exposure to counterparty is adversely correlated with the credit quality of that counterparty". It arises when default risk and credit exposure increases together.

See the Specific Wrong Way Risk section for more details on this.

The LGD for the Specific wrong way risk exposures are considered 100%, in the processing of the IRB capital charge.

Cleared Transactions

The G20 Leaders, at their Pittsburgh summit in September 2009, agreed to a number of measures to improve the over-the-counter (OTC) derivatives markets, including creating incentives for banks to increase their use of Central Counterparties (CCP). Central clearing decreases the possibility of systemic risk by reducing the possibility of transferring financial contagion risk problems from one institution to another institution. This movement of a transaction to a CCP and the eventual failure of CCP can be catastrophic to the entire financial system. The CRR IV, in line with Basel committee guidelines, has introduced a new capital requirement for a bank's exposure arising from OTC, exchange traded derivatives, and repo style transactions which are cleared through CCP. The application calculates the risk charge for the transaction involving CCP's as per the guidelines laid out in CRR IV.

See the Cleared Transactions section for more details on this.

Treatment for Settlement Risk

There are unsettled transactions or failed trades in the security trading system. From the time, the failed trade happens till four business days after the settlement date, this will be treated as a regular exposure. And post that, this will be treated under the failed trade transaction related capital calculations. The EAD for these exposures will be the difference between the Exposure Amount and the market value, which is computed by the solution.

See the Treatment for Settlement Risk section for more details on this.

Treatment for Double Default

In the CRR IV guideline, there is a different Capital charge formulae, compared to other exposures when there is a double default. The eligibility criteria for the exposures, as per the CRR IV guidelines are validated, the exposure gets identified for the double default treatment. This is handled in the sub process **Double Default Exposures Identification**.

The protection providers of the unfunded credit protection are also identified for the double default treatment, based on the CRR IV guidelines. This is handled in the sub process **Mitigant Eligibility for Double default Treatment**.

The exposures and the corresponding mitigant, for which the eligiblity for the double default treatment are met, are updated based on the guidelines. This is handled in the sub process **Double Default Exposures Identification Based on Mitigant Type**.

After the Double Default Flag value is defined, the maturity adjustment, risk weight, and risk weighted asset amount are calculated. The EL is also assigned as 0% as per the accord. This is handled in the sub process **Post CRM Risk Weight Calculations**.

9.1.2.2.2 Default Fund Contribution

A default fund contribution refers to the funds contributed or commitments made by a clearing member to a Central Counterparty's (CCP) equalized loss sharing agreement. The purpose of such default funds is to provide capital, in addition to the collateral posted by participants and in addition to capital provided by the clearinghouse, as a safeguard against extraordinary losses that might occur in connection with.

CRR IV explains the methods that the banking organization playing the part of a clearing member of the CCP, need to adopt and compute risk weighted assets (RWA) for a non-qualifying and a qualifying CCP.

NOTE: The solution handles the treatment of exposures to a QCCP and a Non-QCCP. This qualified CCP flag is expected to be provided as a download in the Party Master (**STG_PARTY_MASTER**) table.

If the CCP is not a qualified CCP (Non-QCCP), then the risk weighted asset amount for the banking organization's default fund contribution is calculated using the Own funds requirements for pre-funded contributions to the default fund of a non-qualifying CCP approach, as suggested in the accord.

If the CCP is a qualified CCP (QCCP), then the RWA amount is computed using one of the following two approaches stated below. Own funds requirements for pre-funded contributions to the default fund of a QCCP.

Alternative calculation of own funds requirement for exposures to a QCCP.

NOTE: The approach to use of either the own fund requirements for QCCP or the alternative approach of the own fund requirements for QCCP is based on the run management option.

See the Default Fund Contribution section for more details on this.

Credit Risk Mitigation

The application handles multiple mitigants for credit risk mitigants like financial collateral, on-balance sheet netting, guarantees, credit derivatives, and so on. In CRM reclassification, collateral and issuer is reclassified to standard collateral and issuer type. The mitigant is identified as eligible or not based on the eligibility rules for CRM.

Process Flow for Credit Risk Mitigation

Mitigant Eligibility

The mitigant is identified as eligible or not based on the eligibility rules for CRM as mentioned in the CRR IV accord.

See the Mitigant Eligibility section for more details on this.

Mitigant Haircut Assignment

The application assigns three kinds of mitigant haircut, which are volatility haircut, FOREX haircut, and maturity mismatch haircut.

See the Mitigant Haircut Assignment section for more details on this.

In the case of bank applying the own estimate of haircut, instead of the supervisory estimate of haircuts, based on the run management option, this will be provided by the bank by using their modeling parameters. This is handled in the sub process "**Volatility Haircut Assignment for Mitigants Banks Estimate**".

The bank can also opt for Forex haircut assignment based on the bank's own estimate, by using their modeling parameters. This is handled in the sub process **Forex Haircut Assignment for Mitigants Banks Estimate**

CRM Capital Charge Calculation

Capital charge is calculated for all mitigants using their effective maturity, correlation factor, probability of default, loss given default, and maturity adjustment value.

PD/LGD for CRM

The application assigns the PD and LGD to the mitigants as follows:

In the FIRB approach for financial collateral, PD used is that of the exposure that the collateral is covering and the LGD used is the LGD*, computed as per the CRR IV guidelines. For other mitigants like guarantees or credit derivative, the PD used is that of the mitigant and LGD used is that of the exposure that the mitigant is covering.

For LGD assignment, the application considers the minimum collateralization effect as stated in the CRR IV guidelines. Additionally, if there is any over collateralization amount, the application does the mitigant value adjustment based on the over collateralization percentages as stated in CRR IV guidelines.

For AIRB Approach, the institutions must provide the PD or LGD data at a mitigant level. However, if the reporting bank is able to model the PD or LGD of the exposure considering the mitigation effects, then the application offers the flexibility to the reporting bank to include the mitigation effects at exposure level. In such cases, the reporting bank need not provide mitigant data separately, as they have already factored in its effects at the exposure level PD and LGD.

The PD and LGD assignment for the mitigants are handled in the sub process **CRM PD LGD Assignment**.

Minimum Collateralization & Overcollateralization check

For LGD assignment, the application considers the minimum collateralization effect as stated in the CRR IV guidelines. Additionally, if there is any over collateralization amount, the application performs the mitigant value adjustment based on the over collateralization percentages as stated in the CRD IV guidelines.

After the collateralization level is checked, the LGD for exposure and the risk weight for mitigants are assigned as applicable.

This is handled in the **CRM Mitigant collateralization level** sub process.

Inline with the supervisory approval, the banks can opt for CRE/RRE to be risk weighted instead of using LGD. This is based on the run management option.

This is handled in the sub process **CRM RW Assignment.**

Mitigant Correlation Factor

Similar to Non Securitization exposures, correlation factor for collaterals or mitigants are also calculated for mitigants belonging to all asset classes. This is based on the protection provider's PD or the instrument's PD, and the LGD as per the CRR IV guidelines. The correlation factor calculation is handled in the sub process **CRM Correlation Factor Calculation**.

The effective asset class reclasification is performed for the guarantees and credit derivative. This is required for computing the capital charge, as per the formulae specified in the accord. The effective asset reclassification is handled in the sub process **Effective Asset Reclassification**.

Minimum LGD for secured parts of exposures				
	LGD* for senior exposure	LGD* for subordinated exposures	Required minimum collateralisation level of the exposure (C*)	Required minimum collateralisation level of the exposure (C**)
Receivables	35 %	65 %	0 %	125 %
Residential real estate/ commercial real estate	35 %	65 %	30 %	140 %
Other collateral	40 %	70 %	30 %	140 %

Allocation of Mitigants to Exposures

The application has a pre-built optimizer for optimum allocation of mitigants to the exposures for CRM purposes. One-to-One, Many-to-One, and Many-to-Many mapping of mitigants are handled in an efficient manner. This involves storage of intermediate computations for traceability.

All mitigants which are eligible and mapped to an exposure are then populated to a new table where each exposure is broken down to the mitigant types.

An additional row is included which treats the exposure as having covered and uncovered portion. The covered factor and uncovered factor is also populated in this table.

See the Allocation of Mitigants section for more details on this.

Post-CRM RWA Computation

Pre-mitigation EAD is divided into Post-mitigation EAD for the covered portion and Post-mitigation EAD for uncovered portion. Covered portion is the portion of the exposure covered by the mitigant and uncovered portion is portion of the exposure not covered by the mitigant. For multiple mitigants covering one exposure, there is more than one record for the covered portion of that exposure. Post-mitigation RWA UL (Post CRM RWA UL) is calculated by multiplying post-mitigation EAD and its Capital Required UL with 12.5. Post-mitigation RWA Expected Loss is calculated by multiplying the PD, LGD, and post-mitigation EAD amount with 12.5.

This is handled in the sub process **Non Sec Post CRM Process**.

9.1.2.2.3 Securitization – Internal Ratings Based Approach

The CRR IV differentiates the Credit Risk computation of the Securitized exposures from Non Securitized exposures. As securitized exposures are part of off-balance sheet transactions, it follows a waterfall cash flow mechanism unlike the other exposures. Hence these exposures are treated differently. Due to the economic crisis of 2008, the Basel Rule has categorized securitized exposures into securitized and re-securitized exposures.

Securitized exposures are exposures which are issued out of a pool of underlying exposures for the transfer of risk. Re-securitized exposures are the exposures which are issued out of a pool of underlying exposures which constitutes non-securitized exposures and some portion of securitized exposures. The application is capable of handling both securitized exposures and re-securitized exposures. It also handles the calculation for the originator and the investor bank roles. At a broad level, there are two categories of Investors:

- An Investing Bank who has invested heavily in securitization.
- An Investing Bank who has invested minimal in securitization.

For both the investors and the originator, the data is expected in the Stage Underlying Exposures (**STG_UNDERLYING_EXPOSURES**) for the underlying of the pool, Total Pool Level attributes in the Stage Pool table (**STG_SECURITIZATION_POOL**), Tranche Level attributes in the Stage Tranche table (**STG_SECURITIZATION_TRANCHE**), and the Exposure Level Attributes in the respective product processor (PP) tables.

If the exposure is a credit protection in the form of guarantee, it is expected in the Stage Guarantees table (**STG_GUARANTEES**), and if it is a credit derivative, it is expected in the Stage Credit Derivatives table (**STG_CREDIT_DERIVATIVES**). If it is a regular investment in the Tranches by an investing bank, or it is part of the mandate for retention in the pool or tranche for an originating bank, the data is expected in the Stage Investments table (**STG_INVESTMENTS**).

For exposures being a facility like liquidity facility, or servicer cash advance, the exposures are expected in the Stage Commitment Contracts table (**STG_COMMITMENT_CONTRACTS**) along with any respective entry in Stage Credit Line Details table (**STG_CREDIT_LINE_DETAILS**), if there is a credit line involved.

The CRR IV specifies IRB Approach for the calculation of the capital charge for the Securitization exposures:

- IRB Approach
  - Ratings Based Approach
  - Internal Assessment Approach
  - Supervisory Formula Approach

For some of the computations, the calculations pertaining to the underlying exposures of the Securitization transaction are required before processing the Securitization exposures. This is computed before processing the Securitization exposures. This is computed using the IRB Approach of the Non Securitization exposures process.

Process Flow for Securitization - IRB Approach

The application handles the IRB Approach of the Securitization Exposures as follows:

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┌─────────────────────────────┐
│   Credit Rating Processing   │
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              ▼
┌─────────────────────────────┐
│      Data Population          │
└─────────────────────────────┘
              │
              ▼
┌─────────────────────────────┐
│   Mitigant Data Population    │
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┌─────────────────────────────┐
│      Mitigant Mapping         │
└─────────────────────────────┘
              │
              ▼
┌─────────────────────────────┐
│     Sec Reclassification      │
└─────────────────────────────┘
              │
              ▼
┌─────────────────────────────┐
│    Sec Approach Selection     │
└─────────────────────────────┘
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┌─────────────────────────────┐
│   Mitigant Reclassification   │
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              ▼
┌─────────────────────────────┐
│   Sec Pre- CRM Computations   │
└─────────────────────────────┘
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┌─────────────────────────────┐
│       Sec Deductions          │
└─────────────────────────────┘
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┌─────────────────────────────┐
│       Sec CRM Process         │
└─────────────────────────────┘
              │
              ▼
┌─────────────────────────────┐
│  Sec Post CRM RWA Computation │
└─────────────────────────────┘
```

Credit Rating Processing

All the rating information of the exposures and the mitigants are populated from the staging tables to the processing tables. The exposure and the tranche rating information are captured in the account rating (**STG_ACCOUNT_RATING_DETAILS**) tables and the mitigants rating information are captured in the instrument rating details (**STG_INSTRUMENT_RATING_DETAILS**).

This is handled in the **CREDIT_RATING_PROCESSING** process.

Sec Data Population, Mitigant Data Population, and Mitigant Mapping

The data pertaining to the pool, tranche, and exposures are populated from the staging tables to the processing tables. The underlying exposures data is captured in the underlying exposures staging table (**STG_UNDERLYING_EXPOSURES**). The mitigants data are populated from the staging table to the processing table. The exposures which are mapped to the mitigants are captured and populated from the staging table to the processing table.

Sec Reclassification

The application uses the standardized data for all kinds of calculations (product type like eligible liquidity facility, bank role like originator, pool type like mortgage backed securities). Before any computation, the application reclassifies the bank specific data to standard data, similar to the accord terms. The application reclassifies the Bank role to the standard Bank Role of an Originator or Investor. Any other bank roles like Sponsor, Credit Protection Provider and so on are reclassified into Originator, Investor respectively.

The application also reclassifies the pool type to the standard pool type like Credit Cards Receivable Pool, Auto Loans, and so on. It also reclassifies the product type to the standard product type like Mortgage Backed Securities, Eligible Liquidity Facility, and so on. For mitigants, the application reclassifies the mitigant types to the standard mitigant types like the Debt Securities, Credit Derivative, Cash, and so on. It also reclassifies the mitigant issuer type to the standard mitigant issuer type like banks, corporate, and so on.

The reclassification tasks are present in Sec reclassification and Mitigant reclassification sub process.

Sec Approach Selection

The application assigns the appropriate approach to the exposures, based on the criteria specified in the CRR IV. The application assigns any of the three approaches under IRB process:

- Sec-ratings based approach
- Sec-internal assessment approach
- Sec-Supervisory Formula Approach (SFA)

The hierarchy of the approaches are dependent on whether the exposures have external rating, or not. If the exposures have external rating, the Ratings Based Approach is being followed for the Securitization exposures and the Resecuritization exposures. If the exposure is an ABCP, and they have internal ratings, and have approval to use this for their risk weighting purpose, the exposures will follow the Interal Assessment Approach for risk weighting the exposures.

The supervisory approval is based on the run management option.

If the exposure is unrated, then the SFA approach is followed for the exposures, unless the bank does not meet the requirements to calculate the parameters required for this approach. If they don't meet the requirement, the exposures will be risk weighted at 1250%.

This approach selection is handled in the **Sec Approach Selection** sub-process.

Pre-CRM RWA Computation

The application calculates the Pre-CRM RWA for the exposures by multiplying the Pre-CRM EAD with the risk weight of the exposures. This is handled in the **Sec Pre-CRM Computations** sub-process.

Pre-CRM EAD Computation

The application assigns the Credit Conversion Factor (CCF) to the off-balance sheet items as specified by the accord. The CCF percentages are assigned based on the bank role (this is applicable only for the originator bank role), the product type (like the Eligible Liquidity Facility), and the applicable ratings. The CCF percentages are also assigned to the exposures based on the early amortization provision applicable to the transaction. In such cases, the CCF assignment is based on the early amortization type (controlled or uncontrolled), the pool type, and the ratio of three month average excess spread to the trapping point. Further, the application computes the pre-mitigation EAD based on the bank role and the product type. It calculates the EAD for the investors and the originators separately based on the calculations given in the CRR IV. This is handled in the **EAD Calculations** sub-process.

Risk Weight Assignment

Ratings Based Approach

For exposures that follow the ratings based approach, the risk weight assignment is similar to the standardized approach, except for the difference on the criteria used for risk weighting. The application uses the granularity of the pool, seniority position of the exposure, and the credit rating of the exposure for the risk weighting the exposures which follow the ratings based approach.

In the case of exposures which are unrated, the application checks the criteria required for inferring the rating. This is based on the presence of the subordinate tranche information (based on seniority) for the same pool, regardless of whether the bank has an exposure in that tranche or not, residual maturity of the subordinate tranche being more than the unrated tranche's residual maturity, the credit enhancement level of the unrated tranche being equal to or more than the subordinate tranche's credit enhancement level. The ratings of the tranches also undergo multiple assessments and the application assigns a single rating for all the rated tranches. This multiple assessment of ratings occur in the Data Transformation "Mult_Assessment_Tranche". The details of the Data Transformation are as follows:

Data Transformation Name	Objective	Processing Logic
Mult_Assessment_Tranche	The objective of this Data Transformation is to perform multiple assessments of the ratings and assign a normalized rating and risk weight to the securitization tranche. This is required for processing the inferred ratings treatment.	For each securitization tranche the various standard ratings associated with that exposure and the respective risk weights are identified. If the number of ratings are 1, then the same rating gets assigned as the standard rating for the tranche. If the number of ratings are greater than or equal to 2, then the tranche is assigned a standard rating which corresponds to the worst of the best two risk weights associated with the various tranche ratings.

Based on all this criteria, the rating for the unrated exposure is considered to be equal to the identified subordinate tranche. Due to the seniority of the exposure in the cash flow and in the securitization structure, a subordinate tranche does not have ratings more than that of the immediate senior tranche. Hence, if more than one subordinate exposure exists, then the application assigns the rating of the immediate subordinate tranche.

This is handled in the **Pre-CRM Computations** sub-process.
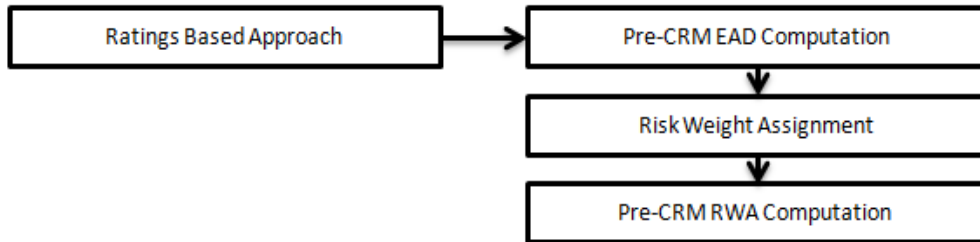

Internal Assessment Approach

For exposures that follow the internal assessment approach, the risk weight assignment is similar to the standardized approach, except for the difference on the criteria used for risk weighting. The application uses the granularity of the pool, seniority position of the exposure, and the credit rating of the exposure for the risk weighting the exposures that follow the internal assessment approach. The internal rating of the exposures is reclassified by the application into standard ratings, for applying the internal assessment approach consistent with the CRR IV.

This is handled in the **Pre-CRM Computations** sub-process.
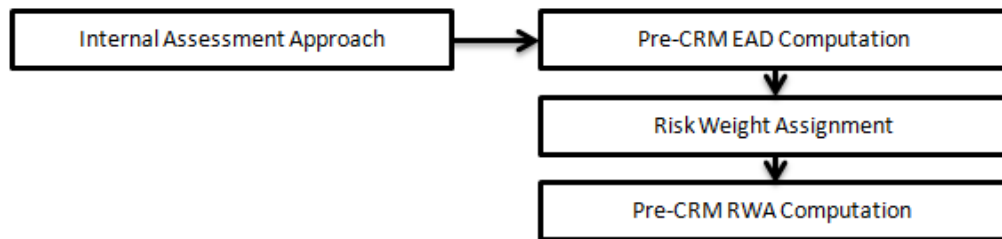
Supervisory Formula Approach

For exposures which follow the supervisory formula approach, the application calculates the underlying capital of the securitization pool (K_{IRB}), using the Non Securitization process. Further, the application calculates the SFA parameters based on the pool and tranche details. The application calculates these, using the calculation logic specified by the CRR IV. It also checks the exposure to identify whether the exposure should be straddled or not. This check is based on the credit enhancement level of the tranche to which the exposure belongs to, the thickness of the tranche to which the exposure belongs to, and the underlying capital of the securitization pool.

The exposures for which the sum of the credit enhancement level and the tranche thickness are less than that of the K_{IRB}, the exposures are deducted from the capital. The exposures for which the credit enhancement level is more than that of the K_{IRB}, the exposures have the SFA Parameters computed. The exposures for which the credit enhancement level is less than that of the K_{IRB} but the sum of the credit enhancement level and the tranche thickness are more than the K_{IRB}, the exposures are straddled, that is, the tranche to which the exposure belongs is split into a position below K_{IRB} and a position above K_{IRB}. All the exposures mapped to the straddled tranche are also split by the application in the same proportion as the split tranche.

The application populates straddled tranche information into Securitization Straddled Tranche (**FSI_SEC_STRADDLED_TRANCHE)** table. The application splits each of the exposures of the identified straddled tranche, into two. The account Skey of the parent exposure, which is undergoing the split, is added as the parent account Skey for the new exposures formed. The straddled tranche deduction amount (the K_{IRB} amount less the tranche amount) is calculated and populated from the **FSI_SEC_STRADDLED_TRANCHE** in a pro-rated manner to all the exposures of the straddled tranche which are identified for deductions. The remaining amount (which is the tranche amount above the K_{IRB}) is the exposure amount of the senior exposure belonging to the category of split exposures. After the original exposures are split into two and their amounts are populated, the original exposure is deleted from the Exposure table. The splitting of the identified straddled exposures are done with the help of the Data Transformation "Sec_Straddling_Sfa" for securitized exposures and with the help of the Data Transformation "Resec_Straddling_Sfa" for re-securitized exposures. The Details of the Data Transformation are as follows:

Data Transformation Name	Objective	Processing Logic
Sec_Straddling_Sfa	The objective of this Data Transformation is to split the sec position (excluding resec position) belonging to straddling qualifying tranche into two positions (senior and junior) and treat them as per regulator guidelines.	Cases where L < KIRB < (L+T), the position is split into two position, where junior position is calculated as pool capital in amount terms minus the sum of amount of all tranches junior to the one to which bank has exposure to. The remaining amount is assigned to senior position, which gets assigned risk weight calculated as per Supervisory Formula. The junior position is assigned 1250% risk weight.
		The Data Transformation inserts record corresponding to the straddled tranche into DIM_EXPOSURE and FCT_SEC_EXPOSURES. The Data Transformation updates N_SEC_EXP_RW_UL & N_PRE_CRM_SEC_EXP_CAPITAL_UL of FCT_SEC_EXPOSURES
Resec_Straddling_Sfa	The objective of this Data Transformation is to split the re-sec position belonging to	Cases where L < KIRB < (L+T), the position is split into two position, where junior position is calculated as pool capital in amount terms minus the sum of amount of all

Data Transformation Name	Objective	Processing Logic
	straddling qualifying tranche into two positions (senior and junior) and treat them as per regulator guidelines.	tranches junior to the one to which bank has exposure to. The remaining amount is assigned to senior position, which gets assigned risk weight calculated as per Supervisory Formula. The junior position is assigned 1250% risk weight. The Data Transformation inserts record corresponding to the straddled tranche into DIM_EXPOSURE and FCT_SEC_EXPOSURES. The Data Transformation updates N_SEC_EXP_RW_UL & N_PRE_CRM_SEC_EXP_CAPITAL_UL of FCT_SEC_EXPOSURES.

After all the SFA Parameters are computed, the capital charge is calculated using the SFA Parameters. This capital charge is subsequently converted into the risk weight.

This is handled in the **Pre-CRM Computations** sub-process.

Originator to Exclude Exposures from Capital Treatment

The originator can exclude the securitization exposures, which are retained by the originator, if it follows certain conditions, as mentioned in the CRR IV guideline. This is handled in the sub process **Treatment of originator to exclude sec exposures**.

Implicit Treatment

The originator, if they provide an implicit support to the securitization transaction, the bank cannot treat it as securitized transaction, and the exposure amount will be updated that of the sum of the underlying exposure amount, related to that pool. And the risk weight will be the weighted average risk weight of the underlying exposures. This is handled in the sub process **Implicit Support Treatment**.

Treatment of Early Amortization

The revolving exposures with early amortization treatment have a different CCF assigned to them, based on whether they are controlled or non-controlled. The early amortization remains the same as in BIS, and the trapping percentage remains at 4.5.

If bank has provided Early Amortization provision, that is, at pool level (here, pool type is Revolving) and Early Amortization type is:

- Controlled committed Early Amortization Provision
- Controlled uncommitted Early Amortization Provision
- Uncontrolled committed Early Amortization Provision
- Uncontrolled uncommitted Early Amortization Provision

Early amortization type is expected as a download value at pool level.

Reduction in Risk Weighted Exposure Amount

The application provides a Run Management option to deduct the securitized or resecuritized exposures, which are risk weighted at 1250%, from capital. If the option to deduct these exposures is selected, all the exposures which are risk weighted 1250%, is assigned the CAP ID **CAP593** (Securitization Exposures to be deducted instead of risk weighting at 1250%) and deducted from the capital in the capital calculations.

Sec CRM Process

Mitigant Eligibility, Mitigant Risk Weight, Haircut Assignment, and Allocation of Mitigants to Exposures are handled in Sec CRM sub-process.

Mitigant Eligibility

The application identifies the eligible mitigants based on the criteria as mentioned in the CRR IV. The application identifies the following mitigants in the case of Securitized exposures – collateral, guarantees, and credit derivatives. The application is capable of using comprehensive approach for mitigants which are part of the collateral. This is similar to the mitigant eligibility of the Non Securitization process. The application processes multiple assessments of ratings for mitigants and some of the mitigant eligibility criteria are based on the ratings and risk weight of the mitigants.

The eligibility of the collateral mitigants are based on the party type of the mitigant, mitigant types, the credit rating assigned to the mitigant or the party (as applicable), and the classification of collateral being senior or not. For equity, the eligibility is based on the main index equity and the equity trading status. For mutual funds, the eligibility is based on the eligible mutual fund indicator. The application identifies the eligibility of the guarantees and credit derivatives based on the party type of the mitigant and the credit rating assigned to the issuer of the mitigant. The sub process **Securitization Mitigant Eligibility** handle this mitigant eligiblity.

In the case of Nth to default credit derivatives, the application further identifies the eligible credit derivative, based on the number of defaults in the exposures and the defaulted position covered by the mitigant. The application identifies the number of defaults in the tranches based on the attachment point of the tranche to which the exposure belongs to, the initial pool exposure amount, and the cumulative

default amount. Further, the application computes the number of tranches in default and compares it with the defaulted position covered by the mitigant. Based on the criteria of eligibility mentioned in the CRR IV, the application identifies whether the mitigant is eligible or not, and if eligible, the application also makes the least risk weighted exposure as the eligible mapping, for the least eligible nth to default mitigant for the exposure.

This identification of the eligible nth to default credit derivative and the eligible exposure-mitigant mapping is performed with the help of the Data Transformation "CD_Sec_Mitigant_Elig_IRB". The details of the Data Transformation are as follows:

Data Transformation Name	Objective	Processing Logic
CD_Sec_Mitigant_Elig_IRB	The objective of this Data Transformation is to identify an eligible sec exposure mitigant mapping wherein the mitigant is an Nth to default credit derivative, in the case of Securitization IRB Approach.	The eligible nth to default credit derivative mitigant is identified and processed based on the exposures mapped to the same pool id. All the exposures mapped to the same pool ID are identified and the corresponding mitigants mapped to them are also identified. In the sec pool ID, the cumulative pool default amount is compared with the tranche attachment point as a number (obtained by multiplying the tranche attachment percentage by the initial pool exposure amount). The number of tranches for which the tranche attachment point is less than the cumulative pool default amount is calculated. This number is compared with the minimum defaulted position of the credit derivative mitigant. For a basket of exposures covered by multiple credit derivatives, eligible mitigant is minimum defaulted position in the basket minus 1. Also other credit derivative in the basket of exposures which are having the defaulted position consecutively become eligible. For each eligible mitigant, the exposure mitigant mapping wherein the exposure has the least risk weight or capital charge is become eligible. All other exposure mitigant mapping for that mitigant is marked ineligible.

The application also identifies the eligibility of the mitigants based on the comparison of the risk weight of the exposures and the mitigants.

The application also identifies the eligibility of the mitigants based on the comparison of the risk weight of the exposures and the mitigants. If the mitigants risk weight is lesser than the risk weight of the exposures, then the mitigants become eligible or else the application makes them ineligible.

Mitigant Risk Weight

The application calculates the mitigant risk weight similar to the exposure risk weight of Non Securitized exposures, using the PD of the protection provider, and the LGD as specified in the IRB section of the CRR IV guidelines. In the case of financial collateral mitigants like cash and gold, zero risk weight is assigned.

Haircut Assignment

Haircut assignment to the mitigants is processed in the **FCT_SUB_EXPOSURES** table.

See the Haircut Assignment section for more details on this.

Allocation of Mitigants to Exposures

The application computes the mitigant value after all haircuts. The application uses the pooling and optimizer logic to allocate the exposures to the mitigants. This is a bit different from the optimizer logic of Non Securitization exposures as the Securitized exposures have priority in the cash flow and gets the maximum protection by the mitigants. The senior most exposure (or tranche) is denoted with seniority 1 and the second senior exposure is denoted with seniority 2 and so on.

In the case of securitization exposures, the mitigants are always given preference over the senior most exposure and subsequently to the other exposures based on the seniority.

See the Allocation of Mitigants to Exposures section for more details on this.

Sec Post CRM RWA Computation

The application computes the covered amount and the uncovered amount for the exposures. The covered amount is computed by multiplying the covered factor with the exposure amount. To this covered amount, the application assigns the mitigant risk weight. The product of the covered amount and the mitigant risk weight is the covered RWA. The uncovered amount is computed by multiplying the uncovered factor (which is 1 – sum of all covered factors for that exposure) with the exposure amount. This uncovered amount is multiplied by the exposure risk weight to get the uncovered RWA. The sum of the covered RWA and the uncovered RWA is the Post CRM RWA of the Exposure.

> **Post-CRM RWA = Covered Amount * Risk Weight of the Mitigant**
>
> **+ Uncovered Amount * Risk Weight of the Exposure**

This logic is handled in **Sec Post CRM RWA computation** sub process.

9.1.2.3 Credit Valuation Adjustment

Credit Valuation Adjustment (CVA) capital charge is added to default risk capital charge to arrive at the new Counterparty Credit Risk (CCR) capital charge. The mark to market counterparty credit losses or the spread migration risk is captured with CVA, which were not directly capitalized before. CVA is the difference between the risk-free portfolio value and the true portfolio value that takes into account the possibility of the counterparty's default. In other words, CVA is the market value of counterparty credit risk.

See the Credit Valuation Adjustment section for more details on this.

9.1.2.3.1 Standardized Approach

The application calculates CVA capital charge at portfolio level, as per the CRR IV guidelines.

See the Standardized Approach section for more details on this.

9.1.2.3.2 Alternative Approach

The application calculates CVA capital charge using the alternative approach. This is selected based on the run management option. In the case of bank following OEM for its OTC derivatives, it can opt for Alternative Approach, only based on the supervisory approval. This is captured using the run management option.

NOTE: This is applicable based on the run management option, and only in the case of OEM, it requires a supervisory approval as well for using it. This is also captured in the run management option

In the case of Alternative approach, the CVA capital charge is calculated by multiplying a factor of 10, to the CCR RWA, and the same is summed up at both the counterparty level and the portfolio level.

9.1.2.3.3 Advanced Approach

Expected Exposure Data Population

The data requirement which is required as input for calculation of CVA Charge using Advance Approach is as follows:

$$CVA = (LGD_{MKT}) \cdot \sum_{i=1}^{T} Max\left(0; exp\left(-\frac{s_{i-1} \cdot t_{i-1}}{LGD_{MKT}}\right) - exp\left(-\frac{s_i \cdot t_i}{LGD_{MKT}}\right)\right) \cdot \left(\frac{EE_{i-1} \cdot D_{i-1} + EE_i \cdot D_i}{2}\right)$$

> **LGDMKT**: This is the LGD of the counterparty based on the spread of a market instrument of the counterparty. It should be based on market assessment and not an internal estimate. LGD Market should be an input for every counterparty.

> **Si**: This is the credit spread of the counterparty at each tenor Ti, which is used to calculate CVA of the counterparty. Spread data is an input for each counterparty and tenor level.

Ti: This is the tenor at which the Expected Exposure (EE) and spread are provided. Tenor is an input for each EE and spread.

EEi: This is the expected exposure (EE) of the counterparty at revaluation time ti where exposures of different netting agreements of counterparties is added. Expected exposure is an input at each counterparty and tenor level.

Di: This is the default risk free discount factor for each revaluation time bucket. Default risk free rate is an input for each counterparty and tenor Ti.

Counterparty Level CVA Calculation

CVA RWA calculation at counterparty level is computed by the following formula:

CVA_{RWA} = 12.5*K

Where K= CVA capital charge calculated as per formula specified in Standardized or Advanced method for each counterparty.

The application calculates the CVA Charge at counterparty level using the below formula for two different scenarios:

♦ Expected Exposure calculated with Current Market Data.

♦ Expected Exposure calculated with Stressed Market Data.

K = 3* ($CVA_{Unstressed\ VAR}$ + $CVA_{Stressed\ VAR}$)

The application calculates the CVA Charge at counterparty level using this formula, for every counterparty, and sums the CVA charge for all counterparties to compute portfolio level capital charge.

The CVA charge calculated at portfolio level is populated in the Fact Regulatory CVA Summary (**FCT_REG_CVA_SUMMARY**) table.

These aggregated data is stored in **FCT_REG_COUNTERPARTY_CVA** table using **COUNTERPARTY_EXPOSURE_POPULATION** T2T.

Portfolio Level CVA Calculation

CVA RWA calculation at portfolio level is computed using the following formula:

CVA_{RWA} = 12.5*K

Where K= CVA capital charge calculated as per formula specified in standardized or advanced method at portfolio level.

NOTE: CVA RWA is added to Credit RWA and is not multiplied by the factor 1.06.

9.1.2.3.4 Key Data Elements

Key data elements are provided in this section for computation for Credit Valuation Adjustment. For a complete list of tables and columns to be updated, see the Download Specifications document.

♦ CDS Index Composition data requirement.

♦ CDS Spread data for Rating and Tenor.

♦ Average Index Spread for all the Index Hedge Position.

9.1.2.4 Operational RWA

The CRR IV has prescribed three methods for calculating Operational Risk capital charges in the IRB Approach. Banks can use any of these methods to calculate capital charge same as in the Standardized Approach.

- ♦ Basic Indicator Approach
- ♦ Standardized Approach
- ♦ Alternative Standardized Approach
- ♦ Advanced Measurement Approach

See Operational RWA for more information.

In the case of AMA, the RWA is provided as a download, for the Capital calculation.

9.1.2.5 Capital Structure

The CRR IV Capital Structure is calculated for the IRB Approach similar to the Standardized Approach.

See Capital Structure for more information.

In the case of IRB, there is a requirement to floor the RWA using Standardized Approach, or Basel 1 Approach, or there is no floor requirement depending on the supervisory approval provided to the bank. This is handled by the run management option.

The Basel 1 Approach RWA is expected as a download in the Stage Standard Accounting Head table (**STG_STANDARD_ACCT_HEAD**) for the CAP ID **CAP1606** (Total Risk Weighted Assets using Basel 1 Approach)

The Standardized Approach RWA is expected as a download in the Stage Standard Accounting Head table (**STG_STANDARD_ACCT_HEAD**) for the CAP ID **CAP1605** (Total Risk Weighted Assets using Standardized Approach). This is expected to be populated by executing the standardized approach, and then providing that as the input for the IRB approach.

The IRB Approach RWA is computed by the solution, and populated for the CAP ID **CAP1607** (Total Risk Weighted Assets using IRB Approach).

The Total RWA is computed using the floor, in the rule **EU - CS - Total RWA Flooring – IRB**. The shortfall in the RWA to meet the floor requirement, if any, is computed using the rule **EU - Shortfall Amount in Total RWA to Meet the Floor Requirement – IRB**.

9.1.2.6 Capital Buffers

The CRR IV Capital Buffers is calculated for the IRB Approach similar to the Standardized Approach.

See Capital Buffers for more information.

9.1.3 EU-CRR IV – Mixed Approach

The mixed approach is based on the approach asset class is assigned to. The mixed approach is an out of box run which supports the CRR IV guidelines, which mentions that a bank which has approval for IRB approach, can follow standardized approach for some of the asset classes. This standardized approach can be to accommodate either an approach wherein the bank opts for standardized approach permanently for some of the exposures, or wherein the bank is opting for sequential implementation of IRB.

This will support a single portfolio of the bank, wherein the bank can opt for certain asset classes an IRB approach and for other asset classes Standardized approach. As this is applicable only wherein the bank is following an IRB approach, the run and the computations are mostly same as in IRB.

The bank is expected to provide the approach selection as a download for each of the IRB asset class in the FSI Setup Table for Asset Class Approach (**FSI_SETUP_ASSET_CLASS_APPROACH**). In this table, for the IRB Asset classes, the bank has to select one of the three approaches (**V_APPROACH**) as below:

 ♦ Standardized Approach (with the code as **STDASSET**)
 ♦ Foundation IRB Approach (with the code as **FIRBASSET**)
 ♦ Advanced IRB Approach (with the code as **AIRBASSET**)

The bank must also specify for the assets marked for standardized approach, whether they are part of standardized approach due to the permanent partial exemption supervisory approval, or due to the sequential IRB implementation approval. This is used for reporting. If the standardized approach asset class does not have any detail of this, this will reported under the regular standardized approach RWA.

The processing table for this setup table is **FSI_ASSET_CLASS_APPROACH**, and this is part of the T2T **FSI_ASSET_CLASS_APPROACH_DATA_POP**. This T2T is executed as part of the ICC batch, **BASEL_SETUP_TBL_POP**.

This process includes all tasks from Standardized approach, FIRB Approach and AIRB Approach. And based on the approach selection for the respective asset class, the corresponding calculation happens, as this mixed approach run considers all the rules of Standardized approach, FIRB run and AIRB run.

Treatment for CIU

The CIU exposures which follow the full look through approach, will go for the mixed approach specifically mentioned in the CRR IV guideline, wherein the bank follows SRWA for Equity Exposures, and Standardized Approach for Non Securitization Exposures. The underlying exposures for CIU gets risk weighted as per only these guidelines, irrespective of whether all the underlying exposures qualified for STD or IRB.

Treatment for Securitization

The Securitization exposures wherein all the underlying exposures follow standardized approach, will follow the standardized approach of risk weighting. In the case of exposures wherein all the underlying exposures follow IRB approach, the IRB approach of risk weighting is followed for the exposure. In the case of exposures, wherein the underlying exposures follow a mix of standardized approach and IRB approach, the securitization exposure goes for the standardized approach.

Treatment for Capital

The capital treatment will be same as in standardized approach. There will be no RWA flooring applicable, as there will be a mix of standardized approach and IRB approach assets.

10 Thai (BOT) Jurisdiction

The Bank of Thailand (BOT) has issued multiple guidelines to be followed by the banks for compliance with the Capital Adequacy guidelines. These guidelines are by and large compliant with the Basel III changes issued by the Basel committee (BIS).

The OFS Financial Services Basel Regulatory Capital application incorporates the guideline. The application is compliant with the Standardized approach and Internal Ratings Based Approach for Thailand Jurisdiction. The following are the functionalities that are handled:

- Non-Securitization Exposures – Standardized Approach / Internal Ratings Based Approach
- Counterparty Credit Risk Exposures – Current Exposure Method
- Settlement Risk Exposures
- Capital Structure – Capital Ratios and Buffers

NOTE: The seeded table **FSI_PARTY_STD_PARTY_MAP** should be updated with **V_PARTY_ID** as in **STG_PARTY_DETAILS** for MDB parties or standard parties.

10.1 Basel III – Internal Ratings Based Approach

10.1.1.1 BOT III – High Level Process Flow for Internal Ratings Based Approach

The Capital Adequacy Ratio, which is defined by BOT, is delivered out-of-box in OFSAAI as a building block approach. The application computes the capital for Credit Risk.

For more information on the pre-defined Runs available with the application, see *OFS Basel Regulatory Capital Run Charts* available in MOS.

10.1.1.1.1   Process Flow for Capital Adequacy Ratio Calculation

The Capital Adequacy Ratio is computed for all banks and their financial subsidiaries, which are part of the same banking regulation. The banks have to be compliant with the regulations and the required ratios at individual level (solo) and consolidated entity level (regulatory consolidation). The application supports both the Standardized Approach / Internal Ratings Based approaches.
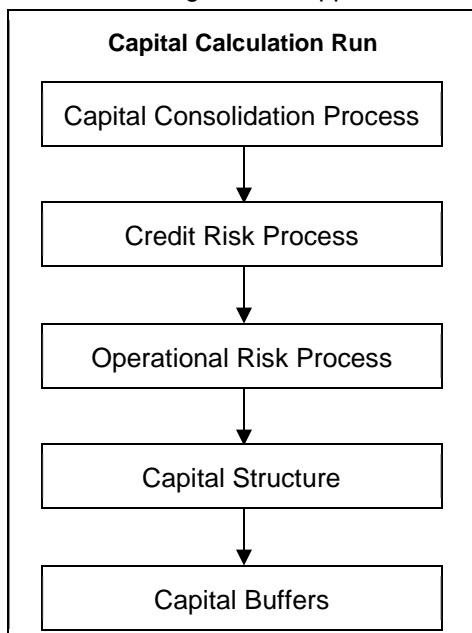
```
┌─────────────────────────────────────┐
│        Capital Calculation Run        │
│  ┌─────────────────────────────────┐ │
│  │  Capital Consolidation Process  │ │
│  └─────────────────────────────────┘ │
│                  │                    │
│  ┌─────────────────────────────────┐ │
│  │       Credit Risk Process       │ │
│  └─────────────────────────────────┘ │
│                  │                    │
│  ┌─────────────────────────────────┐ │
│  │     Operational Risk Process    │ │
│  └─────────────────────────────────┘ │
│                  │                    │
│  ┌─────────────────────────────────┐ │
│  │        Capital Structure        │ │
│  └─────────────────────────────────┘ │
│                  │                    │
│  ┌─────────────────────────────────┐ │
│  │         Capital Buffers         │ │
│  └─────────────────────────────────┘ │
└─────────────────────────────────────┘
```

Capital Calculation Run

The Capital Calculation Run, which is depicted in the preceding process flow diagram, is a single run which is a joined together by multiple processes. Each process is a block, compiled together to form an entire Capital Adequacy Run.

10.1.1.1.2   Capital Consolidation Process

Capital Consolidation is a process common to each of the individual blocks when they are triggered separately as an individual run. In Capital Consolidation, the application processes the following:

Capital Consolidation Level Selection

The reporting bank can be a part of a financial group that has multiple legal entities like parent or child entities (subsidiaries) under its name. The entity that you are required to process should be selected. Subsequently, the level at which a Run is to be executed (solo or consolidated) should also be selected. Select these options in the Run Management UI.

However, if the Run is executed in the Run Rule Framework (RRF), then these options have to be set by using the Rule which is present in **CAPITAL_CALCULATION_PARAM_SETTINGS** process.

CAPITAL_CALCULATION_PARAM_SETTINGS is the first process to be added in all the Runs and the Run Management UI selects this process by default.

Run Parameters Assignment

The accord states different approaches for calculating RWA. The Run Management UI in the application allows the reporting bank to define and execute a Run by selecting a combination of different approaches for RWA computation.

The Run Parameter Assignment is also a part of the **CAPITAL_CALCULATION_PARAM_SETTINGS** process. The Rule is used to assign the Run parameters if a Run is executed in the RRF. If the Run is executed from the Run Management UI, then the parameters are populated based on the Run defined in the Run Definition window.

Currency Conversion

The Rules pre-defined in the application performs the currency conversion of all the General Ledger amount attributes to be used for Capital Consolidation from the Natural currency to the Reporting currency, based on the exchange rate provided.

Shareholding Percent Multiplication

For all entities in the Capital Consolidation process, the application updates the shareholding percentage against each entity data in the fact capital accounting head from the fact entity shareholding percent table. The parent data in the processing table of fact capital accounting head is updated with the value 1 and for each child entity the data is based on the parent's holding percentage specified for each child in fact entity share holding percent table.

5.2.1.8.7 Process Flow for Credit RWA

```
┌─────────────────────────────────────────────────┐
│          Non − Securitization Process Flow         │
│                                                   │
│            ┌─────────────────────────┐            │
│            │  Credit Rating Processing │            │
│            └─────────────────────────┘            │
│                        │                          │
│                        ▼                          │
│            ┌─────────────────────────┐            │
│            │    Party Reclassification │            │
│            └─────────────────────────┘            │
│                        │                          │
│                        ▼                          │
│            ┌─────────────────────────┐            │
│            │   Mitigant Data Population │           │
│            └─────────────────────────┘            │
│                        │                          │
│                        ▼                          │
│            ┌─────────────────────────┐            │
│            │  Non − Sec Data Population │           │
│            └─────────────────────────┘            │
│                        │                          │
│                        ▼                          │
│            ┌─────────────────────────┐            │
│            │      Reclassification     │            │
│            └─────────────────────────┘            │
│                        │                          │
│                        ▼                          │
│            ┌─────────────────────────┐            │
│            │       EAD Calculation     │            │
│            └─────────────────────────┘            │
│                        │                          │
│                        ▼                          │
│            ┌─────────────────────────┐            │
│            │ Pre Mitigation Capital Charge │        │
│            └─────────────────────────┘            │
│                        │                          │
│                        ▼                          │
│            ┌─────────────────────────┐            │
│            │     Pre Mitigation RWA    │            │
│            └─────────────────────────┘            │
│                        │                          │
│                        ▼                          │
│            ┌─────────────────────────┐            │
│            │ Post Mitigation Capital Charge │       │
│            └─────────────────────────┘            │
│                        │                          │
│                        ▼                          │
│            ┌─────────────────────────┐            │
│            │        CRM Process        │            │
│            └─────────────────────────┘            │
│                        │                          │
│                        ▼                          │
│            ┌─────────────────────────┐            │
│            │     Post Mitigation RWA   │            │
│            └─────────────────────────┘            │
│                                                   │
└─────────────────────────────────────────────────┘
```
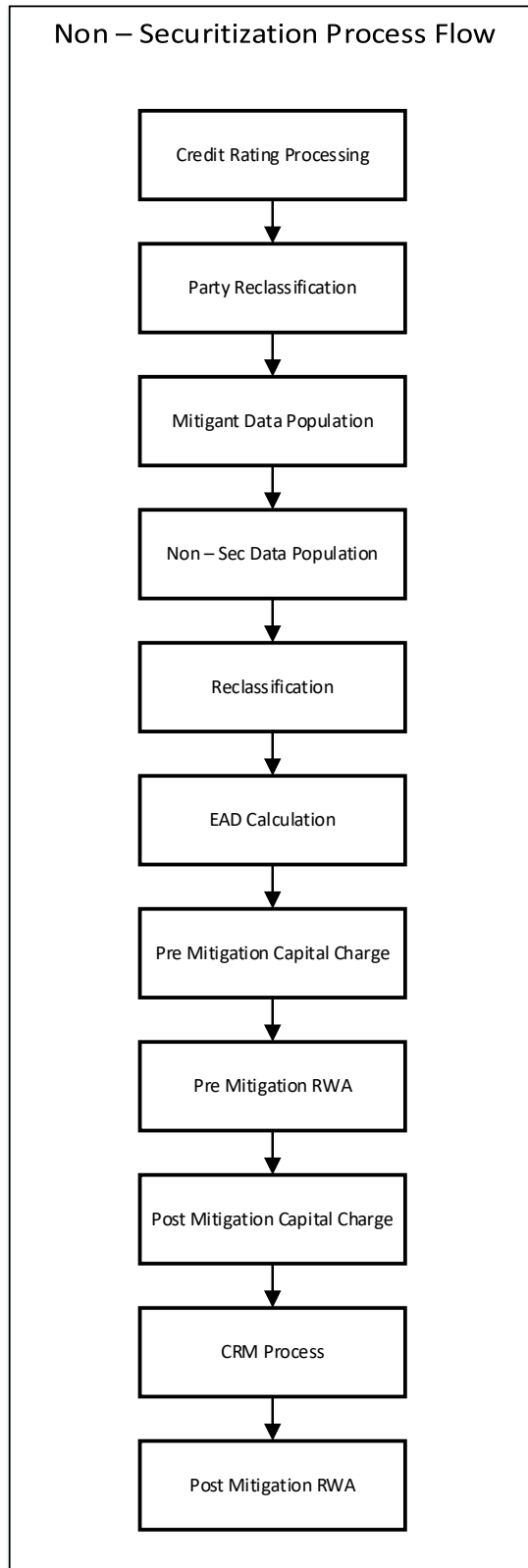
Credit RWA Run is the Non securitization RWA. For Credit Risk, the application follows the Standardized Approach.

A few processes such as Credit Rating, Party Type Reclassification, and Mitigant Data Population are common across computations for Non-Securitization exposures.

Certain sub processes under Non-Securitization process such as Reclassification, RW assignment, and so on are common across all types of exposures. For example, banking book, over the counter derivative transactions, and securities financing transactions are executed only once in the Run. The details of these sub processes are explained under the Reclassification and Risk Weight Assignment sub process of the Non-Securitization exposures section of this document. Similarly, details of the Credit Risk Mitigation for Non-Securitization process is detailed under the Non-Securitization section of this document.

The Non Securitization process also includes calculations pertaining to the counterparty credit risk. The EAD of the counterparty credit risk are calculated using one of the Run Management option.

This also includes the settlement risk calculation pertaining to the unsettled transactions depending on the number of days they are unsettled.

For more information on the sub processes as detailed in the preceding process flow for the Non-Securitization process, see Credit RWA section.

For example, Non-Sec Data Population is detailed under data population and currency conversion of Credit RWA (Non-Securitization - Standardized approach) section of this document.
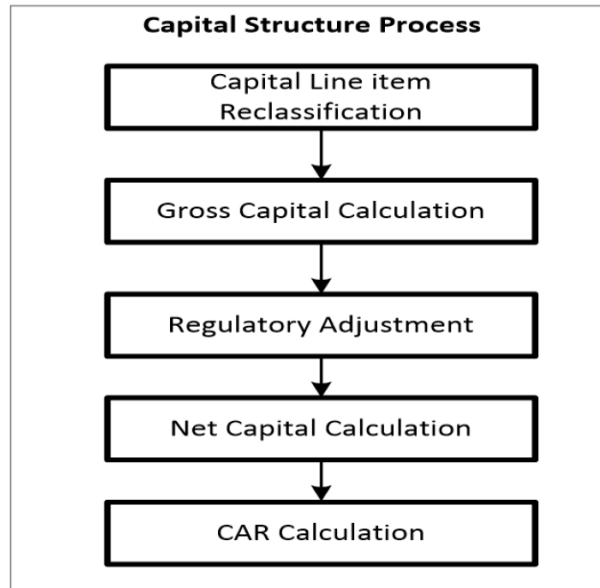
10.1.1.1.3 Process Flow for Operational RWA
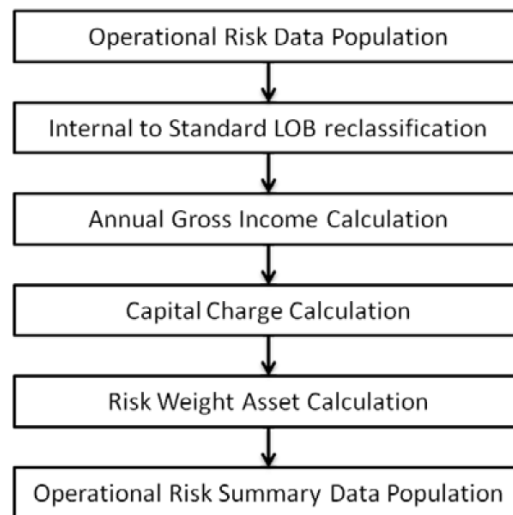
Operational RWA run is executed with the Capital Consolidation process. For more information on the Operational RWA computation, see **Error! Reference source not found.**.

For example: LOB Reclassification and Gross Income Calculation sub process are detailed as separate processes under the Operational RWA section of this document.

## 10.1.1.1.4 Process Flow for Capital Structure

Capital Structure is executed with Capital Consolidation, Credit Risk, and Operational Risk RWA processes.

For more information on the sub processes of Capital Structure, see Capital Structure.

For example: 'Gross Capital Calculation' mentioned in the preceding process flow, is explained in detail under 'Gross Capital Calculation for CET1, AT1, and T2' sub process section of the Capital Structure section in this document. Likewise, 'Regulatory Adjustment' and 'Net Capital Calculation' is detailed under 'Regulatory Adjustment to Common Equity Tier 1, Additional Tier 1, and Tier 2' section along with 'Treatment of Insignificant and Significant Investment Data Treatment' and 'Calculation of Net Capital' sub process section of Capital Structure in this document.

10.1.1.1.5 Process Flow for Capital Buffers
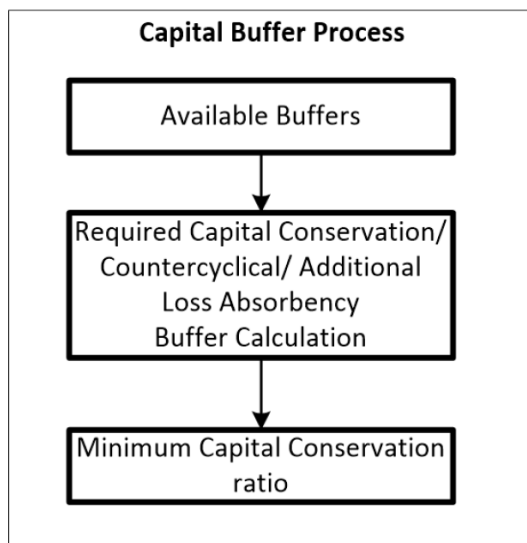
Capital Buffer is calculated after the calculation of Capital Ratios, as they go as an input to Buffer calculation. Each sub-process is explained in detail under Capital Buffer section of the user guide.

For more information on Capital Buffers, see Capital Buffers section.

For example, Required Capital Conservation Buffer and Required Countercyclical Buffer calculation are detailed in the 'Required Total Buffer' sub-section of the Capital Buffer section in this document. Similarly, Minimum Capital Conservation ratio is detailed in the 'Capital Conservation Ratio' sub section of Capital Buffer section in this document.

10.1.1.2 Credit RWA

The application supports the computation of Credit RWA as per the guidelines laid out in the BOT accord..

For Credit Risk for Non Securitized Exposures, the application follows the Standardized Approach, Foundation IRB Approach, and Advanced IRB Approach.

10.1.1.2.1 Non-Securitization – Internal Ratings Based Approach

Foundation IRB/Advanced IRB Approach consists of the following:

- ♦ Banking Book Products
- ♦ Over-the-Counter Derivative Products
- ♦ Securities Financing Transactions
- ♦ Credit Risk Mitigation

Banking Book Products

Rating reclassification is the initial step in the process. All exposures are rated by different agencies. The rating expectation as per BOT guidelines are the rating grades, which are not the same as what are provided as the rating by the rating agencies. Hence, the application re-classifies the rating information

shared in the bank's data to standard rating as recommended in the BOT. Rating are required futher for determining mitigant eligibility.

For the specialized lending exposures solution reclassifies the internal ratings of the bank into external ratings and further reclassifies the external rating into categories metioned in the BOT guidelines.This is happening in the sub process "Rating Reclassification Data Population", "Regulatory Reclassification" and "Basel Rating Assignment".

The exposure amount and other amount attributes that are provided as input (in the stage tables) should be in the natural currency (currency of the exposure) and this is usually different for exposures across different countries. The application converts them to reporting currency, so that processing occurs in a single currency.

The Credit Risk exposures are identified by their product types, counterparty types, and their corresponding asset classes by the application. A sample list of products types, party types, mitigant types, and credit ratings are pre-defined in the application. However, this list and naming convention differs from one bank to another. The application reclassifies the bank's product types and party types to Basel standard product and party types. Based on standard Basel product and standard party type, it forms an asset class for each exposure. Some exposures can be hedged against Credit Risk through various mitigants like guarantors, collaterals, credit derivatives, and so on.

These provide mitigation to credit risk and are considered while computing Credit RWA as per the Accord. Hence, the application calculates pre-mitigation RWA amount and post-mitigation RWA amount.

The application calculates the correlation factor using the formula specified for each asset class. Using this Correlation Factor, Probability of Default (PD), and Loss Given Default (LGD), the application calculates the pre-mitigation capital charge for each exposure. This value signifies the capital charge that the bank must maintain for each exposure, before considering any mitigation effects.

The application calculates pre-mitigation EAD amount and RWA for each exposure and then computes pre-mitigation risk weighted assets (Pre-CRM RWA) by multiplying the EAD by the risk weight. The risk weight is arrived at by multiplying pre-mitigation capital charge with 12.5 and 1.06, as mentioned by the BOT guidelines.

With the Credit Risk Mitigation (CRM) process, the bank considers the mitigation effect. The application checks on the eligibility of the mitigants, based on BOT specifications. It assigns a haircut to each mitigant based on their currency, residual maturity, and expected volatility in their market value. Volatility haircut considers the change in the mitigation effect that arises due to future fluctuations in the value of the mitigant. FOREX and maturity haircuts consider any currency and maturity mismatches that the mitigants have with the exposures it covers. The application allocates mitigants to exposures based on optimizer function and subsequently the capital charge is calculated for each mitigant.

The application then calculates the post mitigation RWA Unexpected Loss (Post CRM RWA UL) and post mitigation RWA Expected Loss (Post CRM RWA EL). Some credit risk exposures that fall under the category of internal transactions like holding own subsidiaries shares or investment in its capital, are treated separately under Capital Structure.

Process Flow for Banking Book Products

The following is a comprehensive explanation of the process flow:
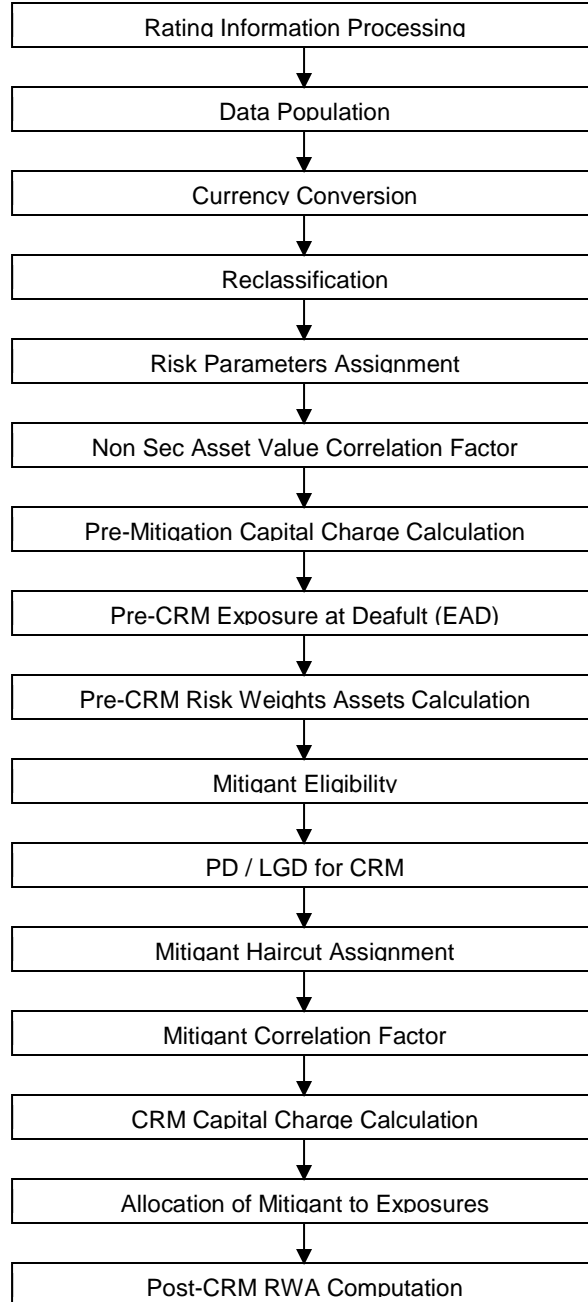
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│       Rating Information Processing       │
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│              Data Population              │
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│            Currency Conversion            │
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│              Reclassification             │
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│          Risk Parameters Assignment       │
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│     Non Sec Asset Value Correlation Factor│
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│   Pre-Mitigation Capital Charge Calculation│
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│      Pre-CRM Exposure at Deafult (EAD)    │
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│    Pre-CRM Risk Weights Assets Calculation│
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│             Mitigant Eligibility          │
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│              PD / LGD for CRM             │
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│         Mitigant Haircut Assignment       │
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│         Mitigant Correlation Factor       │
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│        CRM Capital Charge Calculation     │
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│       Allocation of Mitigant to Exposures │
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┌─────────────────────────────────────────┐
│           Post-CRM RWA Computation        │
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Rating Information Processing

Pre Processing Steps

Data on ratings is captured in the following rating specific tables:

- Accounts Rating Table (**STG_ACCOUNT_RATING_DETAILS**)

  Ratings of all the Credit Risk Non Securitized Exposures are captured in this table.

- Instrument Rating Table (**STG_INSTRUMENT_RATING_DETAILS**)

  Ratings for investment exposures subject to credit risk (one that are in **STG_INVESTMENTS**), and mitigants are captured in this table.

- Party Rating Table (**STG_PARTY_RATING_DETAILS**)

  Credit Rating for all customers and issuers are captured in this table.

- Sovereign Rating Table (**STG_SOVEREIGN_RATING_DETAILS**)

  Credit Rating for all countries is captured in this table.

- External Underlying Exposures Rating Table (**STG_EXT_ULY_ACCT_RATING_DTL)**

  The Credit Rating for all external underlying exposures are captured in this table. In the case of underlying exposures, it is expected that the value of the Exposure ID is that of the instrument ID to which the underlying exposures belong to. For example: The Underlying Exposure ID EXP001, which belongs to the instrument INSTR001, contains the parent ID as PARENT001; in this case, the data expected in this table is of the instrument INSTR001, with the Exposure ID as INSTR001.

NOTE: For the purpose of IRB, the ratings expectation are the internal ratings, which is a single rating for each account. These are the ratings to be reclassified into the credit quality steps of 1 to 6. For the purpose of Mitigant eligibility , the ratings expectation are external ratings, and they will be reclassified into rating grade 1 to 6.

The multiple assessment is applicable only for External ratings, which are applicable for Sold credit protection exposures, and mitigants. In the case of other Non Securitized exposures, we do not have any requirement for external ratings, and hence require only internal ratings. The internal ratings are reclassified into 5 categories for specialized lending exposures . And internal ratings will be a single rating, and hence there is no requirement for multiple assessment.

Processing Steps

Banks obtain credit ratings from different sources and these are provided as an input in the application through the four rating tables mentioned in the preceding list. The application re-classifies the rating information to BOT specific ratings pertaining to the Rating Grades of 1 to 6 standard ratings.

The rating reclassification lookup table (**FSI_RATING_CLASSIFICATION**) is used to lookup reclassified Basel ratings, so that the reclassification rule is not repeated for each of the rating processing tables. Ratings are then populated from the stage tables (**STG_PARTY_RATINGS_DETAILS**) to FSI tables (**FSI_PARTY_RATING_DETAILS**) by using the lookup table (**FSI_RATING_RECLSSIFICATION**) to obtain the reclassified rating.

NOTE: In the **STG_PARTY_RATINGS_DETAILS** table ensure that the following columns are mandatorily populated with data:
Rating source code (**V_RATING_SRC_CODE**)
Party Code (**V_PARTY_CD**)
Purpose (**V_PURPOSE**): In this field, whether the rating is a domestic rating or foreign rating

should be indicated. If any other rating is provided, then the exposure is considered as unrated.
Rating Code (**V_RATING_CODE**)

Data Population

Pre Processing Steps

Credit Risk exposures are updated in the application for all the product types through their respective input tables known as Product Processors. The following are the main categories of Credit Risk Non-Securitization exposures, along with their respective table names that are used as an input:

Product	Product Processor
Bills	STG_BILLS_CONTRACTS
Credit Cards	STG_CARDS
Swaps	STG_SWAPS_CONTRACTS
Futures	STG_FUTURES
Guarantees	STG_GUARANTEES
Investments	STG_INVESTMENTS
Lease Contracts	STG_LEASE_CONTRACTS
Letters of Credit	STG_LC_CONTRACTS
Line of Credit	STG_CREDIT_LINE_DETAILS
Commitment Contracts	STG_COMMITMENT_CONTRACTS
Loans	STG_LOAN_CONTRACTS
Money market instruments	STG_MM_CONTRACTS
Overdraft	STG_OD_ACCOUNTS
Options	STG_OPTION_CONTRACTS
Re purchase contracts	STG_REPO_CONTRACTS
Equity Exposures	STG_INVESTMENTS
Underlying Exposures for Derivatives and Securitization	STG_UNDERLYING_EXPOSURES
Underlying Exposures for Repo contracts	STG_PLACED_COLLATERAL / STG_MITIGANTS
Credit Derivatives	STG_CREDIT_DERIVATIVES
Fixed Assets	STG_FIXED_ASSETS_DETAILS
Stage Correspondent Accounts	STG_CORRESPONDENT_ACCOUNT

There is data population pertaining to the placed collateral, which are required for the collatera placed with third party, for the sake of derivatives.

Product	Source Product Processor
Placed Collateral	STG_PLACED_COLLATERAL

There is data population pertaining to the mitigants, which cater to all the types of mitigants like collateral, guarantee, and credit derivatives. There is one data population pertaining to the counter guarantee for the guarantor. There is also mapping data population of Exposure to Mitigant Data and the Guarantor to Counter guarantee data population.

Product	Source Product Processor
Mitigants – Collateral, Guarantee, Credit Derivatives	STG_MITIGANTS
Counter Guarantee	STG_MITIGANT_COUNTER_GUARANTEE

There is data population pertaining to the mapping between the exposures and the mitigants. And one data population pertaining to the mapping between the exposures and the placed collateral. There is also data population pertaining to the mapping between the guarantee and the counter-guarantee.

Product	Source Table
Mapping for Exposures and Mitigants	STG_ACCOUNT_MITIGANT_MAP
Mapping for Exposures and Placed Collateral	STG_ACCT_PLACED_COLL_MAP
Mapping for Guarantee and Counter Guarantee	STG_MITIGANT_CNTR_GUAR_MAPPING

Processing Steps

Staging data from the Product Processors or other staging tables are populated in the respective processing tables. Information from all the Product Processors data is populated in a common Fact table for all non sec exposures (**FCT_NON_SEC_EXPOSURES**), except for equity data that is first populated in the respective equity table (**FCT_EQUITY_EXPOSURES**) and is then populated in the common Fact table for all Non Securitized exposures.

Currency Conversion

The application converts the amount attributes, which are in the natural currency, to the reporting currency that is used for further calculations. The column names suffixed with '_ncy' are in the natural currency and are then multiplied by the currency conversion factor to populate values in the reporting currency. The Rule **Reporting Currency Code Assignment** assigns the reporting currency. For more information on Currency Conversion, see Exhibit 4 in *Annexure A: Key Concepts.*

NOTE: The data populated in the Product Processor is expected in natural currency of the exposure.

Reclassification

The application reclassifies the bank's product types and party types to the Basel standard product and party types. Based on the standard Basel product and party type, it forms an asset class for each exposure. Similarly, the application reclassifies mitigants on the basis of its mitigant types, and then reclassifies it to standard mitigant types.

NOTE: Ensure that all products and party type and mitigants which are bank specific are reclassified, as part of the setup activity.

NOTE: In the case of product reclassification pertaining to QRRE exposures, which are qualified retail revolving exposures, the data expectation is only the consolidated exposure. As this is a consolidated exposure, the criteria pertaining to the counterparty level total exposure being less than 100,000 Bhat must be handled by the bank, during the reclassification.

Risk Parameters Assignment

The application assigns risk weight parameters of PD, LGD, and maturity to all exposures. The PD of the exposure is either obtained from the customer / issuer's party level PD estimate, or the instrument's PD estimate, depending on the account type. The LGD and maturity are based on supervisory estimates in the case of Foundation IRB Approach, and based on bank's estimates in the case of Advanced IRB Approach.

For Foundation Internal Rating Based (FIRB) approach, the application assigns the PD based on bank's estimate. The LGD and Effective Maturity are based on the supervisory estimate as applicable for the asset classes. In the case of Retail asset class, the LGD is based on the bank's own estimate. The Expected Loss is computed as per the formulae specified by the BOT guidelines for the various asset classes. The expected loss is computed before the PD Flooring, as the PD floor considers the LGD and the EL. The expected loss is computed again after the PD Flooring, as that is the final Expected loss which is applicable for the bank using the final PD for the exposures, and the LGD for the exposures.

LGD for housing loans shall not be lower than 10% except the loan is secured by government guarantee. Also, the purchase receivables have a different LGD assignment.

For defaulted exposures, PD is assigned 100%, and this requires the input of both LGD and Best estimate of expected loss.

In Advanced Internal Ratings Based (AIRB) approach, the PD, LGD, Best Estimate of Expected Loss and Effective Maturity values are directly taken as downloaded values from the reporting bank. All other computations remain same as in FIRB.

The sub process "**PD LGD Assignment**" details the assignment of the risk parameters.

For the failed trade exposures application takes the PD, LGD as per the IRB guidelines in FIRB and assigns 45% LGD for the NON DVP transactions non material failed trade exposures when bank uses AIRB approach. This happens in LGD CALCULATION - AIRB process.

For the purchase corporate receivables calculating Default risk as per the guidelines Commercial banks can follow bottom approach and top down approach based on the level of estimates of risk components i.e, either individual basis or pool basis. The estimates of risk componets are based on banks option.The PD,LGD assignments for default risk is calculated in process "PURCHASE RECEIVABLES LGD-PD ASSIGNMENT".

Corporate exposures meeting the following condition must be treated as Small and Medium Enterprises. The total sales volume of the business group is less than 1000 million baht per annum. This happens in Asset Reclassifications process.

Risk Parameters Assignment for Dilution Risk

The PD for dilution risk is same as the PD of the Instrument or Party as applicable, and which is used in the Capital charge computation of the exposures.

For Foundation IRB (FIRB) approach, the LGD for dilution risk is based on the supervisory estimate, as applicable for the calculations. In the case of Advanced IRB (AIRB), the LGD is based on either the bank's own estimate or the supervisory provided LGD value. This is based on the run management option selected by the bank.

The sub process "**DILUTION RISK PD-LGD ASSIGNMENT"** details the assignment of the risk parameters for dilution risk.

The bank can get exemption from the national supervisor, for the calculation of the dilution risk, if the exposures are immaterial. This is again based on the run management option.

The Purchased Receivables are eligible for retail treatment. This is handled in the "**Dilution Risk Eligibility**" sub process.

The Purchased Receivables will be pooled together using the Retail Pooling ID, as there are specific calculations, which require the processing to happen at pool level. The application will perform the summation of the pool records, and then further processing of pre CRM RWA calculations will happen. And post that, the pool record value is prorated to the individual accounts, to ensure that CRM happens on the individual account level values. This is handled in the sub process "**PURCHASE RECEIVABLES LGD-PD ASSIGNMENT & CAPITAL CALCULATION"**.

Asset Value Correlation Multiplier

In the Basel III accord, BCBS has introduced a multiplier of 1.25 to the Asset Value Correlation (AVC) of exposures. These exposures relate to regulated financial firms with assets of at least 100 billion USD and to exposures of unregulated financial firms (regardless of size). The revised correlation formula for financial entities is as follows:

> **Correlation (R_FI) = 1.25 x [0.12 x (1 - EXP (-50 x PD))**

AVC Rule is applicable for Non Securitization accounts and for issuers of credit risk mitigation.

NOTE: The computation of AVC does not change for any entity executing a Solo or Consolidation Basel Run. As per the guidelines the USD is converted into BHAT.

Pre-mitigation Capital Charge Calculation

Pre-mitigation capital is calculated for all asset classes using the Correlation factor, PD, and LGD where correlation factor is calculated for each asset class on the basis of PD. Capital for defaulted exposures is calculated through separate Rules. For exposures that have defaulted, the application uses two inputs - LGD and Best Estimated Expected Loss of a Bank.

The specialized lending exposures can opt for risk weighting instead of the IRB specific PD, LGD calculations. This is again handled by the run management option. And if the risk weighting option is selected, the solution applies the risk weight for these exposures. This is handled in the sub process "**Specialized Lending Treatment**".

The other assets, for which BOT guidelines specify the risk weight treatment, instead of the PD, LGD approach, are handled in the sub process "**OTHER_ASSETS_GL_RISK_WEIGHT_ASSIGNMENT**" and "**OTHER_ASSETS_NON_SEC_RISK_WEIGHT_ASSIGNMENT_IRB**".

Other Assets Non – Sec Flow

Fixed assets, cash etc. are identified as "Other Assets" and are further treated based on other attributes such as the party type etc. A default RW of 100% is applied to all the items which are classified to Other Assets, an array of overriding rules update the risk weight accordingly. Some of the RW rules are based on the below items.

1. Cash and balances with banks such as in Nostro accounts.
2. The derivatives with positive Mtm, the mtm value gets risk weighted separately.
3. Cash items that are in process of collection.
4. Fixed Assets and so on.

Credit Conversion Factor

This is applied to all off-balance sheet exposures. Off-balance sheet exposures can be identified at the first level in the Basel Product Types Dimension (**DIM_BASEL_PRODUCT_TYPE**) table. A CCF of 100% is applied over all the off-balance sheet exposures.

For all types of unused commited credit lines, commercial banks shall apply CCF of 75 percent regardless of maturity.

CCF percent for FIRB approach is assigned by the application based on the supervisory provided CCF values, and in the case of AIRB approach, the CCF is considered based on the bank's estimate.

Commercial banks shall use their own estimate CCF across different types of off-balance sheet item, with exception to off-balance sheet item that is subject to CCF of 100.

Pre CRM Exposure at Default (EAD)

Exposure at default is calculated for all asset classes based on:

♦ Current Exposure Amount
♦ Write off amount
♦ Undrawn Amount
♦ CCF Percent
♦ CCF PERCENT DRAWN

The EAD calculation differs for different products, based on the BOT guidelines. This is handled in the sub process "**NON_SEC_EAD_PRE_MITIGATION - IRB**" where the rule calculates drawn EAD by adding write off amount and multipying with CCF percent drawn and undrawn EAD by multipying undrawn amount by CCF percent undrawn.The final EAD is arrived by summing up drawn and undrawn EAD.

The EAD for purchase receivables is calculated in different rule post calculating dilution risk capital charge.

Sold Credit Protection Covering Non-Sec Exposures

• The risk weight for the sold credit protection is based on the underlying exposure's asset class.
• The risk weighting applicable based on the underlying exposure's asset class.

Process Flow for the Calculations

Treatment specific to Sold Credit Protection Covering Non-Sec Exposures

EAD calculation of the Sold Credit Protection

↓

Underlying Data Asset Type Reclassification

↓

Risk Weight Assignment Based on the Underlying Asset Type

↓

Calculate the RWA

EAD Calculation of the Sold Credit Protection

The EAD for the sold credit protection is equal to the notional amount of the contract.

Underlying Data Asset Type Reclassification

The asset type reclassification for the underlying of the sold credit protection is same as any other non-sec exposure Asset type reclassification. This is handled in the Non-Sec Exposures asset type reclassification.

Risk Weight Assignment based on the Underlying Asset Type

- The risk weight assignment for the sold credit protection is based on the asset type of the underlying exposure, which is the same as any other non-sec exposure.

- The risk weight for the underlying exposure is calculated and this is updated to the sold credit protection exposure.

Calculate the Risk Weight Assessment

- The RWA is calculated as the Pre-mitigation EAD multiplied by the Pre-Mitigation Risk Weight.

- In the case of sold credit protection exposures, the Pre-Mitigation EAD and the Post Mitigation EAD are the same since there are no mitigants for these exposures.

Pre-CRM RWA Computation

The Pre-CRM RWA is calculated for all asset classes by multiplying the Pre-CRM EAD with the risk weight. RWA for Unexpected Loss is calculated as follows:

Non Sec Pre-Mitigation Exposure at Default * Non Sec Risk Weight for UL before Mitigation

Equity Exposures Treatment

Equity Exposures are treated in the Equity Exposures (**FCT_EQUITY_EXPOSURES**) table where EAD is calculated using the post off-set amount. The offset amount is arrived based on the risk position mapping long position of equity exposures with applicable short position of equity exposures. For more information, see the *Download Specifications* document.

The equity exposures are reclassified into the Equity Exposure asset class. Also, any subordinated exposures will also be reclassified into Equity Asset class, based on the BOT guideline requirements.

Equity Exposure can be treated using the Simple Risk Weight Assignment (SRWA) method, PD/LGD approach or Internal Model Method. You can define the approach to be used to calculate the RWA for equity approach, in the run management option.

If PD/LGD approach is selected, the risk parameters of PD, LGD and Effective maturity are provided based on whether the bank is following FIRB or AIRB. Using these risk parameters, the capital charge parameters of Correlation, Capital Charge and RWA are calculated.

If SRWA is selected, the RW is calculated based on equity being Exchange Traded or Private Traded.

If IMM is selected, the Capital Charge Derived from VaR Model is taken as input and RW is assigned. The PD/LGD approach RWA is used for the flooring purpose for the IMM approach, and hence, the applications computes both the method for these exposures.

As per the BOT guidelines the equity exposures which satifies certain conditions should follow Standardized approach instead of IRB Approach. The application stamps the exposures with exemption criteria in FCT_EQUITY_EXPOSURES table. This assignmnet is happening in sub process" Equity Exemption Criteria".

Equity Investments in Funds – (Collective Investment Units (CIU) Processing)

As per the BOT guidelines the commercial banks hold investment units which invest in both debt securities and equity securities, there are three approaches for determining credit risk weighted assets.The application supports two approaches,

- Look through approach
- Mandate based approach

In case of Investment in funds solution follow hierarchy of approches based on the complete underlying information.

The exposures to the CIU are expected in the Stage Investments table (STG_INVESTMENTS), and the instrument code is expected to be populated for these exposures. The static information related to the instruments are expected in the Instrument contract dimension table (DIM_INSTRUMENT_CONTRACT), and the information pertaining to the instruments which changes periodically like the current outstanding issue amount is expected in the Stage Instrument Contract Detail table (STG_INSTRUMENT_CONTRACT_DTL).

The underlying exposures of the CIU are expected in STG_FUND_CIS_COMPOSITION with the fund code (instrument_code) populated also into V_PARENT_INSTRUMENT_CODE. The underlying composition of the CIU are expected in the Stage Fund Underlying Composition table (STG_FUND_UNDERLYNG_COMPOSITION). This has the underlying composition details of the fund,

across various products, and the maximum permissible limit of investment in each of the product types, with the fund code as the Instrument ID.

NOTE: The fund underlying composition and/or the underlying exposures are required for processing, only when the underlying of the fund is not available and when there is manadate information avaialble for the fund.. When the derivatives products are the underlying for a CIU, then the MTM value of the derivative is expected to be given as N_ASSET_MTM_VALUE in STG_FUND_CIS_COMPOSITION. MTM value of the derivative must also be populated to N_COMPOSITION_VALUE to check for the complete underlying exposure availability of the CIU underlyings. The instrument code of the CIU funds are also expected to be given STG_EXPOSURE_MASTER for the correct processing.

NOTE: Unless operational criteria are met, the look through approach is not applicable.

Look Through Approach

The first approach in the hierarchy that application assigns based on the operational criteria given in the accord. For the purpose of validating the operational criteria or conditions given, data is expected as input. Along with the suggested conditions application also checks for the availability of the underlying information. If all the sufficient information is available the application assigns the Look Through Approach (LTA) and computation will be followed as given in the accord. If operational criteria are not met, the application checks for the immediate next approach.

To check the information provided is verified by the third party or not a column (STG_INSTRUMENT_CONTRACT_DTL .F_INFO_VERIFIED_BY_THIRD_PARTY) is introduced where value 'Y or N" is given as input by the bank.

Under this approach for IRB, accord suggests few logics to calculate or use risk weights. The case where accord suggests to use risk weights same as standardized approach when banks cannot calculate risk weights using IRB will not be handled by the application as there is a mention of "partial use of provision" which relates to the mixed pool, the rest of the cases will be taken care by the application.

Mandate Based Approach

This approach is applied when the information of the underlying and the third party risk weights that can be used under the look through approach are not available. To continue with this approach banks need to have the mandate information required. Once the application checks for the information and assigns the approach, computations for MBA under Standardized approach are in line with the Basel Accord.

Over-the-Counter Derivative Products

The accord recommends the calculation of Counterparty Credit Risk (CCR), wherein the counterparty can default before the final settlement of a transaction. Unlike the firm's exposure to credit risk arising from a loan, CCR creates a bilateral risk of loss. Market value of the transaction can be positive or negative for either parties in the transaction at different points in time, till the maturity or closure of the transaction. This market value is dependent on the movement of the underlying risk factor. The BOT has proposed Rules to calculate the EAD or exposure amount for the instrument with CCR.

Note: All OTC Derivatives and Repo products are part of the CCR computation.

The application's treatment for the instrument with CCR is divided into three categories:

1. Exposure at Default (EAD)
2. Risk Weighted Asset (RWA)
3. Credit Risk Mitigation (CRM)

Process Flow for Over-the-Counter Derivatives – EAD Approach

Exposure at Default (EAD)

A comprehensive explanation of the process flow is as follows:
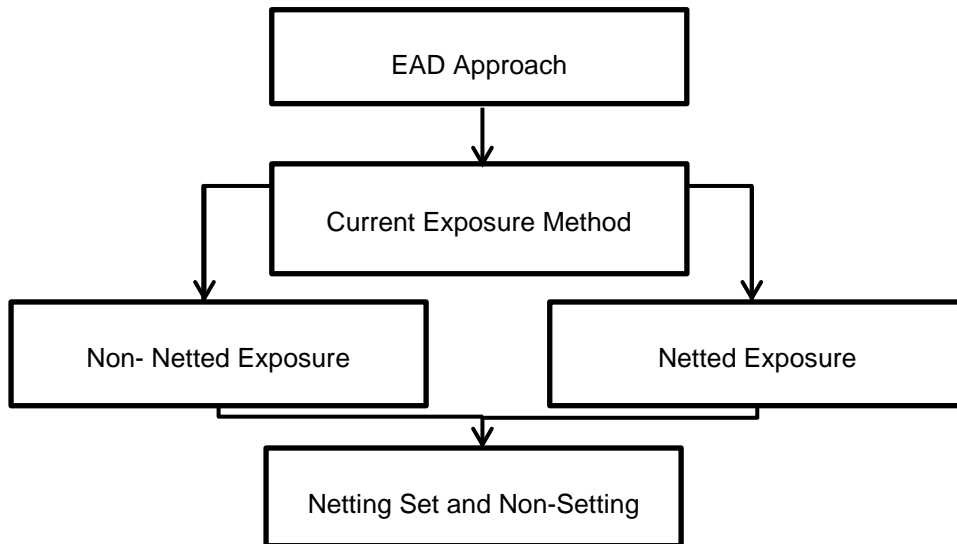
The Application enables the banks to calculate Counterparty Credit Risk (CCR) by using the Current Exposure Method.. Banks can use any of these approaches for calculating the exposure value for all its derivative contracts. The selection of the exposure calculation method is dependent on the bank's derivative portfolio and trading portfolio. Derivative portfolio and trading portfolio exposure conditions are operational in nature and are satisfied by the bank.

Current Exposure Method (CEM)

The application calculates the EAD for two different sets of the records with a different methodology - Netting Agreement Records and Non Netting Agreement Records. The process **BOT_NON_SEC_CURRENT_EXPOSURE_METHOD** handles this computation.

Maturity[1]	Derivatives (except credit derivatives)[2]							
	Foreign exchange and gold	Interest rate	Equity	Commodity and precious metal	Other commodities	Bond		
						Government	Eligible	Not eligible
Less than 14 days	0	0	6	7	10	0	5	10
Less than 1 year	1	0	6	7	10	0	5	10
More than 1 year – 5 years	5	0.5	8	7	12	0.5	5	10
Over 5 years	7.5	1.5	10	8	15	1.5	5	10

Non Netted Exposure

To compute an EAD for non-netting records, the application requires the following inputs:

- Total replacement cost which is the greater than the Mark to Market value of the contract or zero for all the contracts.
- An amount for potential future credit exposure is calculated based on the notional amount and multiplied by the add-on factor based on the underlying type in the contracts. The assignment of the add-on for different products gets assigned based on the underlying type code.

Netted Exposure

To compute the EAD for netting the agreement records, the application requires the following inputs:

- Total replacement cost, which is positive Mark to Market value for all the contracts.
- An amount for potential future credit exposure is calculated based on the notional and multiplied by the add-on factor based on the following formula:

$A_{net} = 0.4 * A_{Gross} + 0.6 * NGR * A_{Gross}$

- The application creates new records for netting the agreement and then populates it into the OTC Exposure processing table. It selects all the records with the following attributes which are similar to computing the netting agreement exposure:

    o Trades with Entity

    o Customer

    o Product Level – All OTC trades

    o Netting Agreement

    o Book Code: Trading or Banking

    o Long Settlement transaction Flag

    o GAAP Code

Under the CEM approach wherever the exposures belong to a netting agreement, two NGR calculation methods have been provided:

1. Option 1 – Individual approach.
2. Option 2 – Aggregate approach.

Data Expectation

- For derivatives where notional amounts are exchanged several times, such as a commodity swap, the actual notional amount is equal to the notional amount multiplied by the remaining times for such notional amounts to be exchanged.

- Potential future exposures of options sold that commercial banks have not received the whole amount of premium is equal to unpaid premium not yet received from buyers.

- The underlying type appllicable for the derivatives for BOT Add on assignment are as below:

    o Foreign Exchange and Gold – EXRATE & GOLD

    o Interest Rate – INTRATE

    o Equity – EQTY

    o Commodity and Precious Metal – OTHPM

    o Other Commodities – OTHCOM

    o Bonds - DEBIST

Allocation of RWA at Exposures

CCR RWA calculated at the netting set level is allocated to the exposures of the nettable pool using the following formula:

RWA at Exposure Level = Total CCR RWA at netting set level * Pre Mitigation EAD for Exposure / Sum of Pre-Mitigation EAD for all Exposures part of CCR RWA at netting set level

Securities Financing Transactions

Process Flow for Credit Risk Securities Financing Transactions

The SFT EAD is computed in the sub process **SFT Exposures RWA - Comprehensive Approach**.

A comprehensive explanation of the process flow is as follows:

SFT Underlying Data Population

The two data elements present in the SFT transactions are captured as follows:

Firstly, the parent transaction is captured in the Repo contracts table (**STG_REPO_CONTRACTS**) and secondly the underlying information, on which the parent transaction is built, is captured separately in the mitigant table **(STG_MITIGANTS)** or Placed collateral staging table **(STG_PLACED_COLLATERAL)**, depending on the product type**.**

The underlying data is identified by using the Exposure Mitigant Mapping Staging table **(STG_ACCOUNT_MITIGANT_MAPPING)**, wherein this is linked to the data in the repo contracts staging table, for any collateral which is provided to the repo contracts.

And the underlying data for any collateral placed with the counterparty, is identified by using the Account placed collateral Mapping Staging table **(STG_ACCT_PLACED_COLL_MAP)**, wherein this is linked to the data in the repo contracts staging table.

For example, a commercial bank undertakes a repo transaction (denoted 1) with counter party 'A', i.e. the commercial bank borrows from counter party 'A', and then pledges security 'a' as collateral. The bank then undertakes reverse repo (denoted 2) transactions with counter party B, i.e. the commercial bank lends to counter party B and receives security "b" as collateral. The commercial bank must maintain capital funds for both transactions. For instrument (1), the commercial bank's risk is when the value of the pledged security 'a' is higher than the cash received from the counter party. For instrument (2), the commercial bank's risk is similar to normal secured credits where the value of collateral "b" can deteriorate.

Volatility Haircut Assignment for SFT Underlying

This is computed by the following Rules:

- Exposure Volatility Haircut Assignment for Supervisory Haircut

- CRM Exposure Volatility Haircut for Equity and Mutual Fund

- Exposure Volatility Haircut Assignment - Scaling Up for "Capital Market Driven" or "Repo Style" transaction types

- Exposure Volatility Haircut Assignment - Own Estimate

- FOREX Haircut

Treatment for Double Default

In the BOT guideline, there is a different Capital charge formulae, compared to other exposures when there is a double default. The eligibility criteria for the exposures, as per the BOT guidelines are validated, the exposure gets identified for the double default treatment through a flag. This is handled in the sub process **Double Default Exposures Identification**.

The protection providers of the unfunded credit protection are also identified for the double default treatment, based on the BOT guidelines. This is handled in the sub process **Mitigant Eligibility for Double default Treatment**.

The exposures and the corresponding mitigant, for which the eligiblity for the double default treatment are met, are updated based on the guidelines. This is handled in the sub process **Double Default Exposures Identification Based on Mitigant Type**.

After the Double Default Flag value is defined, the maturity adjustment, risk weight, and risk weighted asset amount are calculated. The EL is also assigned as 0% as per the accord. This is handled in the sub process **Post CRM Risk Weight Calculations**.

Credit Risk Mitigation

The application handles multiple mitigants for credit risk mitigants like financial collateral, on-balance sheet netting, guarantees, credit derivatives, and so on. In CRM reclassification, collateral and issuer is reclassified to standard collateral and issuer type. The mitigant is identified as eligible or not based on the eligibility rules for CRM.

Process Flow for Credit Risk Mitigation

Mitigant Eligibility

In the Comprehensive approach, credit rating of the mitigant of the collateral is considered for all mitigant types issued by all party types, while deciding whether the mitigant is eligible for a particular exposure or not. The application has pre-defined Rules that perform these eligibility checks. Separate eligibility Rules for mitigants types that are equity, mutual funds, or debt security exist in the application. For the remaining mitigant types, a mitigant is marked as eligible if it satisfies the following conditions:

- The credit rating is better than the exposure to which it is providing protection
- The exposure is classified as senior in position.

Mitigant eligibility is also checked based on the original and residual maturity of the collateral. Collateral is classified as eligible only if its original maturity is more than a year and residual maturity is more than 3 months.

Types of collateral recognized by the Bank of Thailand as credit risk mitigation for commercial banks that adopt the FIRB are as follows:

All the eligible financial collaterals which are under standardized approach are eligible under IRB approach.

Commercial real estate and residential real estate can be recognized as the collaterals if they meet the following conditions

The debtor's ability to repay doesn't significantly depend on the performance of the underlying asset.

The value of collateral pledged must not significantly depend on operating performance of debtor

Mitigant Haircut Assignment

The application assigns three kinds of mitigant haircut, which are volatility haircut, FOREX haircut, and maturity mismatch haircut.

See the Mitigant Haircut Assignment section for more details on this.

In the case of bank applying the own estimate of haircut, instead of the supervisory estimate of haircuts, based on the run management option, this will be provided by the bank by using their modeling parameters. This is handled in the sub process "**Volatility Haircut Assignment for Mitigants Banks Estimate**".

The bank can also opt for Forex haircut assignment based on the bank's own estimate, by using their modeling parameters. This is handled in the sub process **Forex Haircut Assignment for Mitigants Banks Estimate**

CRM Capital Charge Calculation

Capital charge is calculated for all the exposures using mitigants effective maturity, correlation factor, probability of default, loss given default, and maturity adjustment value.

PD/LGD for CRM

The application assigns the PD and LGD to the mitigants as follows:

In the FIRB approach for financial collateral, PD used is that of the exposure that the collateral is covering and the LGD used is the LGD*, computed as per the BOT guidelines. For other mitigants like guarantees or credit derivative, the PD used is that of the mitigant and LGD used is that of the exposure that the mitigant is covering.

For LGD assignment, the application considers the minimum collateralization effect as stated in the BOT guidelines. Additionally, if there is any over collateralization amount, the application does the mitigant value adjustment based on the over collateralization percentages as stated in BOT guidelines.

For AIRB Approach, the institutions must provide the PD or LGD data at a mitigant level. However, if the reporting bank is able to model the PD or LGD of the exposure considering the mitigation effects, then the application offers the flexibility to the reporting bank to include the mitigation effects at exposure level. In such cases, the reporting bank need not provide mitigant data separately, as they have already factored in its effects at the exposure level PD and LGD.

The PD and LGD assignment for the mitigants are handled in the sub process **CRM PD LGD Assignment**.

Minimum Collateralization & Overcollateralization check

For LGD assignment, the application considers the minimum collateralization effect as stated in the BOT guidelines. Additionally, if there is any over collateralization amount, the application performs the mitigant value adjustment based on the over collateralization percentages as stated in the BOT guidelines.

After the collateralization level is checked, the LGD for exposure and the risk weight for mitigants are assigned as applicable.

This is handled in the **CRM Mitigant collateralization level** sub process.

Inline with the supervisory approval, the banks can opt for CRE/RRE to be risk weighted instead of using LGD. This is based on the run management option.

This is handled in the sub process **CRM RW Assignment.**

Mitigant Correlation Factor

Similar to Non Securitization exposures, correlation factor for collaterals or mitigants are also calculated for mitigants belonging to all asset classes. This is based on the protection provider's PD or the instrument's PD, and the LGD as per the BOT guidelines. The correlation factor calculation is handled in the sub process **CRM Correlation Factor Calculation**.

The effective asset class reclasification is performed for the guarantees and credit derivative. This is required for computing the capital charge, as per the formulae specified in the accord. The effective asset reclassification is handled in the sub process **Effective Asset Reclassification**.

Type of collateral	Minimum LGD	C*	C**
Eligible financial collateral	0%	0%	n.a.
Receivables	35%	0%	125%
CRE / RRE	35%	30%	140%
Other collaterals	40%	30%	140%

Allocation of Mitigants to Exposures

The application has a pre-built optimizer for optimum allocation of mitigants to the exposures for CRM purposes. One-to-One, Many-to-One, and Many-to-Many mapping of mitigants are handled in an efficient manner. This involves storage of intermediate computations for traceability.

All mitigants which are eligible and mapped to an exposure are then populated to a new table where each exposure is broken down to the mitigant types.

An additional row is included which treats the exposure as having covered and uncovered portion. The covered factor and uncovered factor is also populated in this table.

See the Allocation of Mitigants section for more details on this.

Post-CRM RWA Computation

Pre-mitigation EAD is divided into Post-mitigation EAD for the covered portion and Post-mitigation EAD for uncovered portion. Covered portion is the portion of the exposure covered by the mitigant and uncovered portion is portion of the exposure not covered by the mitigant. For multiple mitigants covering one exposure, there is more than one record for the covered portion of that exposure. Post-mitigation RWA UL (Post CRM RWA UL) is calculated by multiplying post-mitigation EAD and its Capital Required UL with 12.5. Post-mitigation RWA Expected Loss is calculated by multiplying the PD, LGD, and post-mitigation EAD amount with 12.5.

This is handled in the sub process **POST_CRM_NON_SEC_IRB**.

5.2.1.8.1 Securitization – Standardized Approach

The BOT guidelines differentiates the Credit Risk computation of the Securitized exposures from Non Securitized exposures. As securitized exposures are part of off-balance sheet transactions, it follows a waterfall cash flow mechanism unlike the other exposures. Hence these exposures are treated differently. Due to the economic crisis of 2008, the Basel Rule has categorized securitized exposures into securitized and re-securitized exposures.

Securitized exposures are exposures which are issued out of a pool of underlying exposures for the transfer of risk.

The treatment of securitization exposures based on the bank role in the securitization transactions as per BOT is as follows:

1. Originator
2. Investor
3. Credit Enhancement Provider
4. Servicer
5. Liquidity Facility Provider
6. Underwriter

For all the Bank Roles, the data is expected in the Stage Underlying Exposures (**STG_UNDERLYING_EXPOSURES**) for the underlying of the pool, Total Pool Level attributes in the Stage Pool table (**STG_SECURITIZATION_POOL**), Tranche Level attributes in the Stage Tranche table (**STG_SECURITIZATION_TRANCHE**), and the Exposure Level Attributes in the respective product processor (PP) tables.

The securitized exposures out of the pool are expected in the respective PP tables, depending on the product type of the underlying exposures.

If the exposure is a credit protection in the form of guarantee, it is expected in the Stage Guarantees table (**STG_GUARANTEES**), and if it is a credit derivative, it is expected in the Stage Credit Derivatives table (**STG_CREDIT_DERIVATIVES**). If it is a regular investment in the Tranches by an investing bank, or it is part of the mandate for retention in the pool or tranche for an originating bank, the data is expected in the Stage Investments table (**STG_INVESTMENTS**).

For exposures being a facility like liquidity facility, or servicer cash advance, the exposures are expected

in the Stage Commitment Contracts table (**STG_COMMITMENT_CONTRACTS**).

For a few procedures, the calculations pertaining to the underlying exposures of the Securitization transaction are required before processing the Securitization exposures. This is computed before processing the Securitization exposures. For Securitization approach, BOT does not have specific treatment in both standardized and IRB.

Process Flow for Securitization – Standardized Approach

The process flow for standardized approach of Securitization exposures are as follows:

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┌─────────────────────────────────┐
│      Securitization Flow        │
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┌─────────────────────────────────┐
│        Reclassification         │
└─────────────────────────────────┘
                 ↓
┌─────────────────────────────────┐
│         CCF Assignment          │
└─────────────────────────────────┘
                 ↓
┌─────────────────────────────────┐
│        EAD Computationn         │
└─────────────────────────────────┘
                 ↓
┌─────────────────────────────────┐
│      Risk Weight Assignment     │
└─────────────────────────────────┘
                 ↓
┌─────────────────────────────────┐
│         RWA Computation         │
└─────────────────────────────────┘
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Sec Data Population

The data pertaining to pool, tranche, and exposures are populated from the staging tables to the processing tables. The underlying exposures data are captured in the respective Product Processor tables (and for these, the process pertaining to the non-securitization exposures is followed).

Sec Reclassification

The application uses the standardized data for all kinds of calculations (product type like eligible liquidity facility, bank role like originator, pool type like mortgage backed securities). Before any computations, the application reclassifies the bank specific data to standard data as stated in the Basel accord. It reclassifies the bank role to the standard bank role of an originator or investor. Any other bank roles like sponsor, credit protection provider, and so on, are reclassified into originator, investor, and so on, respectively. The application also reclassifies the pool type to the standard pool type like credit cards

receivable pool, auto loans, and so on. It also reclassifies the product type to the standard product type like mortgage backed securities, eligible liquidity facility, and so on.

BOT has specific treatment based on bank role and few additional bank roles such as Credit enhancement provider, Servicer, liquidity facility provider, Underwriter is applicable for BOT.

Sec Pre-CRM Computations

The application calculates the pre-CRM RWA for the exposures by multiplying the pre-CRM EAD with the risk weight of the exposures. This is handled in the **Sec STD Pre CRM Computations** sub process.

CCF Assignment

100% CCF is applicable for all the bank roles except underwriter, where bank is acting as underwriter, bank assigns 50% CCF percent to the securitization exposure arising from underwriting activities. CCF is applicable during the underwriting process. After the underwriter proceeding, if bank is not able to offload all the required securities then bank has to invest in those securities in that case bank assigns 100% CCF.

EAD Computation

EAD is computed as the Drawn EAD and Undrawn EAD.

Here,

Drawn EAD - Sec Exp Amount - ((Provision Amount * Sec Exp Amount)/ (Sec Exp Amount + Undrawn Amount))

In order to get drawn EAD, provision attributed for drawn amount gets deductued from exposure amount/drawn amount.

Undrawn EAD - (undrawn amount - (((Provision amount * Undrawn Amount)/(Sec Exp Amount + Undrawn Amount))- sec exp amount))*CCF

In order to get undrawn EAD, provision attributed for undrawn amount gets deductued from exposure amount/undrawn amount.

Risk Weight Assignment

For Securitization, the risk weights assignment are different from the Non Securitization exposures. The application assigns the risk weights based on the following parameters

- Bank role
- Tranche seniority
- Number of tranche in the pool

Risk Weight Assignment for Credit Enhancement Provider

Financial institution provides the credit enhancement as a Guarantor and as a First Loss Facility Provider.

- Bank as a Guarantor, risk weight equal to weighted average risk weight.
- Bank as First Loss position provider receive 1176.5% risk weight

Above treatment is applicable to financial institution other than credit foncier companies.

Part types as Housing Finance Company (HFC) and Mortgage Guarantee Company (MGC) is considered as credit foncier companies.

BOT has suggested capital deduction approach as applicable in Basel II guideline for the amount subjected to first loss position. Since the application supports Basel III calculation, and there is no such mention in the accord, the flow has been taken to be same as in BIS. In BIS, anything which was deducted from T1 and T2 capital of Basel II were assigned the maximum risk weight in Basel III. Hence, in line with the same flow, the maximum risk weight, provided by BOT, of 1176.5% has been assigned, instead of the capital deduction treatment of Basel II.

Risk weight for Servicer/ Back Servicer

Bank acting as a Servicer and back up servicer means bank act as agent for the SPV in collecting or undertaking legal enforcement on the debtors, preparing accounting, reports, keeping documents and so on.

Financial Institutions are not exposed to any kind of risk when they act as servicer. However If the financial institutions assume such liability either fully or partially from acting as servicer, then financial institution has to treat such exposure as first loss position and such exposures get risk weight of 1176.5%.

Risk weight for Underwriter

Where bank is acting as underwriter, bank should attract risk weight of SPV. However; BOT has not specified any method to calculate risk weight for SPV in securitization guideline. Hence, underlying weighted average risk weight is considered in this case.

Risk weight for Investor of Securitization Securities

Financial institution can invest in the securitization securities based on their risk appetite. Securitization securities get divided into various tranches based on their risk profile.

Financial institution has to maintain the capital based on the risk profile of the securities on which they have invested.

BOT suggests average risk weight of underlying risk weight. The application considers weighted average risk weight of underlying asset.

In order to determine if first loss position has adequate risk protection or not, BOT suggests bank to assess capital adequacy of first loss tranche by an external rating agency. Since BOT has not detailed any specific rating which identify capital adequacy of first loss tranche, it is inferred that if Mezzanine tranche has rating equivalent or better than investment grade then first loss tranche is considered to adequate protection else otherwise.

Treatment for Liquidity Facility Provider

Liquidity facility refers to the principal and interest payment made to the investor by the bank wherever there is timing mismatch between SPV receiving principal or interest from the underlying assets and paying interests to the investors and such cases bank role is considered as liquidity facility provider.

However, liquidity or credit facility must not be intended to cover any losses and financial institution shall comply with following regulations:

- Financial institution gets payment as soon as SPV receive interest and principal payment from underlying assets.

- Financial institution granted credit facility must receive payment within three months dated the credit is granted if there is no delinquencies in the underlying assets.

If the financial institution is not able to meet either of the above two regulations then financial institution has to treat such securitization exposures as first loss position and assign 1176.5% risk weight. And if the bank complies with the above regulations,then the treatment is same as bank providing guarantee.

Treatment for Excess Investment

Originator Bank can invest in the securitize exposures no more than 10% value of the tranche and the case where the originating financial institution provided firm underwriting for the instruments issued by the SPV and has to invest more than 10% of the securities value in each tranche, the financial institution disposes the securities within 90 days to reduce its holding to no more than 10% of the value in each tranche.

If bank has investment more than 10% of the tranche value in above cases then excess investment receives risk weight of 1176.5% while investment which is lower than 10% of the tranche value receives treatment as per BOT guideline suggested on investment in securitization exposure by originator bank

BOT has suggested that originator must not invest more than 25% of CET-1 in the first loss position. In that case, application has a rule which compares the amount subjected to first loss position and 25% of bank's net and excess amount first loss position amount is stored against CAP ID.

10.1.1.3 Operational RWA

Operational risk is the total risk the company undertakes when it attempts to operate within a specific sector or industry.

It is the risk not inherent in a financial, systematic, or market-wide risk. It is the risk remaining after determining the financial and systematic risk, and includes risks resulting from breakdowns in internal procedures, people, and systems.

The Accord has prescribed three methods for calculating the Operational Risk capital charges and banks can use any of these methods to calculate the capital charge:

- Basic Indicator Approach

- Standardized Approach

- Alternative Standardized Approach

10.1.1.3.1   Basic Indicator Approach

To calculate the capital charge under the basic indicator approach, the annual gross income for each of the past three years for a standard line of business is multiplied by a fixed percentage of 15%. The average is considered to calculate the capital charge. If the annual gross income is negative or zero in any of the past three years, then the value from the numerator is excluded thereby reducing the base denominator by the same count.

The capital charge formula is as follows:

$$ERWA_{BIA} = 12.5 \times K_{BIA}$$

$$K_{BIA} = \frac{\sum (GI_{1...n} \times \alpha)}{n}$$

Where:

K_{BIA} = the capital charge under the Basic Indicator Approach

GI = annual gross income, where positive, over the previous three years

n = number of the previous three years for which the gross income is positive

α = 15 per cent, which is set by the BCBS, relating the industry wide level of required capital to the industry wide level of the indicator.

10.1.1.3.2   Standardized Approach

In this approach, banking activities are divided into eight lines of business. The gross income for each line of business is multiplied by the beta factor that is pre-defined in the Basel accord. Every year the gross income of the standard line of business is multiplied by the respective beta factor. The total capital charge is calculated as the three-year average of the sum of the regulatory capital charges across each line of business every year. The total capital charge is calculated as follows:

$$ERWA_{SA-OR} = 12.5 \times K_{SA-OR}$$

$$K_{SA-OR} = \frac{\sum_{year1-3} \max\left[\sum (GI_{1-8} \times \beta_{1-8}),0\right]}{3}$$

Where:

K_{TSA} = the Capital Charge under the Standardized Approach

GI_{1-8} **=** annual gross income in a given year (as defined in the Basic Indicator Approach) for each of the eight lines of business.

β_{1-8} **=** a fixed percentage, set by the committee, relating the level of required capital to the level of the gross income for each of the eight lines of business.

10.1.1.3.3   Alternative Standardized Approach

This approach is an extension of the standardized approach. In this approach for two lines of business: Retail Banking and Commercial Banking, the loan and advance amount is used (rather than annual gross income) which is multiplied by the fixed factor "m" and the beta factor. The beta factor as in the standardized approach remains the same for retail and commercial banking. The constant factor "m" is equal to 0.035. The capital charge for retail and commercial banking uses the loan and advance amount

and for the remaining, the calculation of capital charge is the same as in the standardized approach.

The total capital charge is calculated as the three-year average of the sum of the regulatory capital charges across each lines of business every year.

$$K_{RB} = \beta_{RB} \times m \times LA_{RB} \text{ (for retail banking)}$$
$$K_{CB} = \beta_{CB} \times m \times LA_{CB} \text{ (for commercial banking)}$$

Where:

- *KRB, KCB* = Minimum capital base required for retail banking and commercial banking business lines under ASA .

- *βRB, βCB* = Constant risk value (β value) of retail banking and commercial banking business lines under ASA.

- *LARB, LACB* = Average annual outstanding amount over the previous 3 years of retail banking and commercial banking business lines.

- *m* = Fixed value equals to 0.035.

Process Flow for Operational Risk

Prerequisites

Before calculating the capital charge for Operational Risk, the following should be computed as a prerequisite.

In the processes **OPS_RISK_STD_APPROACH**, **OPS_RISK_BASIC_IND_APPROACH**, and **OPS_RISK_ALTERNATE_STD_APPROACH** the task defined as **OR_Capital_Std_App**, **Opr_Risk_Capital_Charge**, and **OR_Capital_Std_App** respectively, should mention the number of years (in the past) as a parameter for capital calculation.

For example: if the previous 3 years are considered, then assign 3 as a parameter against the task **OR_Capital_Std_App**. Therefore, in the future, if the previous 4 years have to be considered then change that particular parameter only.

After defining the parameter, the procedure to compute the Operational Risk is as follows:

Operational Risk Data Population

The input data for each of the financial years mapped along with the internal lines of business are populated in the processing table.

Internal LOB to Standard LOB Reclassification

The internal lines of business are reclassified into the Basel standard lines of business.

Annual Gross Income Calculation

For each of the standard lines of business and for each financial year, the annual gross income is calculated.

Capital Charge Calculation

Capital charge is calculated by multiplying the alpha value or the beta value (for basic indicator approach or standardized approach) with the annual income of each year across each standard line of business. The average of 3 years is considered, if the values of all the 3 years are positive. If the values of all the 3 years are not positive, then zero or the negative value from numerator and denominator is excluded.

Risk-Weight Asset Calculation

The capital charge value obtained is converted to the equivalent RWA value by multiplying with the factor 12.5.

Operational Risk Data Population

Operational Risk inputs are given in the staging table **STG_OPS_RISK_DATA**. The amount for Net Interest Income, Net Provision Amount, Net Non Interest Income, Operating Expenses, Security Sale Gain or Loss from HTM, Insurance Irregular Loss, Security Sale Gain or Loss from AFS, and Insurance Irregular Gain for each line of business and for each financial year is required and is captured in the staging table.

The capital charge and RWA amount is populated in the fact table **FCT_OPS_RISK_DATA**. The application converts all the elements in the annual gross income and loan and advance amount reported in their respective national currency to the reporting currency. While calculating annual gross income or loan and advance amount for the subsidiary that are part of regulatory consolidation, the amount is limited to the share-holding percentage.

Process Flow for Operational RWA

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┌─────────────────────────────────────────┐
│    Operational Risk Data Population       │
└─────────────────────────────────────────┘
                    │
                    ▼
┌─────────────────────────────────────────┐
│   Internal to Standard LOB reclassification │
└─────────────────────────────────────────┘
                    │
                    ▼
┌─────────────────────────────────────────┐
│      Annual Gross Income Calculation      │
└─────────────────────────────────────────┘
                    │
                    ▼
┌─────────────────────────────────────────┐
│        Capital Charge Calculation         │
└─────────────────────────────────────────┘
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                    ▼
┌─────────────────────────────────────────┐
│        Capital Charge Calculation         │
└─────────────────────────────────────────┘
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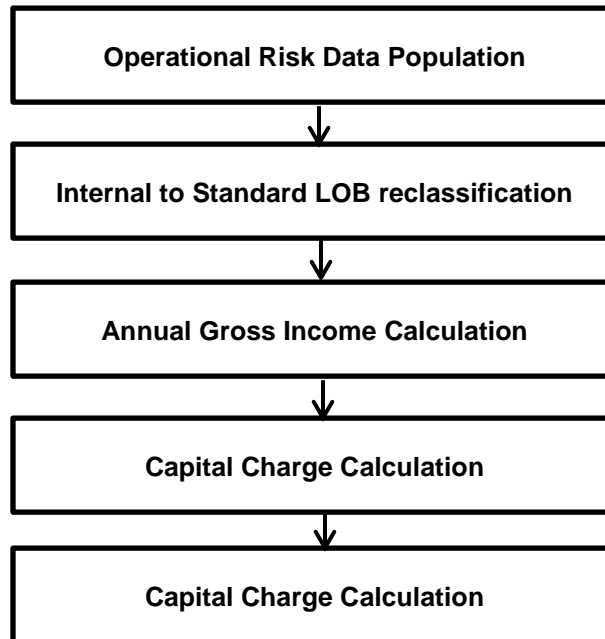
Operational RWA run is executed with the Capital Consolidation process. For example: LOB Reclassification and Gross Income Calculation sub process are detailed as separate processes under the Operational RWA section of this document.

10.1.1.4 Capital Structure

The economic crisis of 2008 showed the need for global banking systems to maintain high quality capital in order to survive. The Basel Committee observed that the definition of the required capital varied across the globe and the regulations governing the same had to be strengthened in order to make the banks less susceptible to a similar crisis like situation. To address this, the Basel Committee has prescribed the Basel III guidelines. The same has been adopted, with jurisdictional modifications, by various regulators, one of them being the Bank of Thailand.

Components of Capital

The Bank of Thailand classifies Capital into three components:

Tier 1 capital

- o Common Equity Tier 1
- o Additional Tier 1

Tier 2 capital

The regulator puts restrictions on each qualifying instrument that needs to be classified into each of the capital components as well as on the minimum required capital to be maintained under each tier. Common Equity Tier 1 (CET1) should be maintained at a minimum of 4.5% of the total risk weighted

assets. Tier 1 capital should be at a minimum of 6% of the total risk weighted assets. The total Capital must be at a minimum of 8.5% of total risk weighted capital.

10.1.1.4.1   Process Flow for Capital Structure

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┌─────────────────────────────────────┐
│         Capital Conslidation         │
└─────────────────────────────────────┘
                  │
┌─────────────────────────────────────┐
│    Computation of surplus of Minority│
│      Interest for CET 1, AT 1 and T2 │
└─────────────────────────────────────┘
                  │
┌─────────────────────────────────────┐
│  Transitional phase-out of de-recognised│
│       instruments from capital       │
└─────────────────────────────────────┘
                  │
┌─────────────────────────────────────┐
│     Gross CET, AT1 and T2 capital    │
│             computation              │
└─────────────────────────────────────┘
                  │
┌─────────────────────────────────────┐
│   Regulatory Adjustment and deductions│
│    from respective tiers of capital  │
└─────────────────────────────────────┘
                  │
┌─────────────────────────────────────┐
│  Transitional phase-out arrangement of│
│        deductions from capital       │
└─────────────────────────────────────┘
                  │
┌─────────────────────────────────────┐
│   Treatment of Insignificant Investments│
└─────────────────────────────────────┘
                  │
┌─────────────────────────────────────┐
│   Treatment of Significant Investments│
└─────────────────────────────────────┘
                  │
┌─────────────────────────────────────┐
│        Post phase in treatment       │
└─────────────────────────────────────┘
                  │
┌─────────────────────────────────────┐
│  Shortfall and Net CET1, AT1, T2 capital│
│             computation              │
└─────────────────────────────────────┘
                  │
┌─────────────────────────────────────┐
│           RWA computation            │
└─────────────────────────────────────┘
                  │
┌─────────────────────────────────────┐
│           Capital Ratios             │
└─────────────────────────────────────┘
                  │
┌─────────────────────────────────────┐
│           Capital Buffers            │
└─────────────────────────────────────┘
```

NOTE: All the GL line items are expected at the Solo level for each entity. The consolidated data is discarded.

While executing the Solo Run, the parent entity data is processed. Investment into the subsidiary data is

processed as per the Credit Risk and Market Risk rule. Capital line items pertaining to the parent entity are processed.

While executing the Consolidation Run, the parent entity and the subsidiary data is considered. The regulatory Investment data to financial institutions that are a part of regulatory consolidation are treated as an internal transaction. Those subsidiaries which are outside the scope of consolidation are treated as per the insignificant and significant rule.

Common Equity Tier 1 capital

The Bank of Thailand lists out a number of items that it deems to be of eligible quality for CET1 capital classification.

a) Gross Capital

This contains the sum of items that are eligible to be considered as a part of CET1 form the Gross CET1 capital. These items are captured as downloads in the **STG_GL_DATA** or **FSI_STD_ACCT_HEAD** tables.

- Reserves appropriated from net profits at the end of an accounting period. This is calculated as the sum of multiple reserves such as General Reserve, Capital Reserve, Revenue Reserve, Contingencies & Special Reserve, Disclosed Reserves, and Undisclosed Reserve.
- Accumulated other comprehensive income.

b) Adjustments and Deductions to CET 1 capital

The Bank of Thailand allows for certain adjustments and deductions to be made from the Gross CET1 capital to arrive at the net CET1 capital. The following are some of the major deductions from CET1 allowed by the Bank of Thailand:

- Accumulated gain and loss from the fair value measurement of derivatives, which are used for hedging cash flow risk
- Accumulated gain and loss from fair value measurements of debt instruments
- Accumulated gain and loss from fair value measurements of loan and other banking products
- Accumulated gains (losses) that have occurred from any changes in commercial banks' own creditworthiness (Debit valuation adjustment)
- Net loss from each accounting period
- Internal transactions and surplus of Non-Controlling Interest
- Goodwill, Intangible assets, Deferred Tax Assets, and Temporary differences after being netted for deferred tax liabilities in respective items are deducted from the gross CET1 capital.
- Gains from securitisation transactions that result in an increase of a commercial banks'

capital

- Investment in their own shares (Treasury Stock) that form a part of the CET1 capital
- Reciprocal cross holding of equity instruments
- Direct and Indirect Investments in equity instruments and warrants of finance companies and credit foncier companies.
- Significant and Insignificant investments in CET1 instruments
- Shortfall in Additional Tier 1 capital

Additional Tier 1 capital

a) Gross Capital

The sum of items that are eligible to be considered as a part of Additional Tier 1 form the Gross Additional Tier 1 capital. These items are captured as downloads in the **STG_GL_DATA** or **FSI_STD_ACCT_HEAD** tables.

- Phase out of ineligible instruments from the capital are also a part of the Additional Tier 1 gross capital along with the other items prescribed by the Bank of Thailand. The items which were previously eligible to be included in Tier 1 capital are ineligible under the eligibility conditions prescribed by the Bank of Thailand Basel III rules.

b) Deductions from AT1 Capital

The Bank of Thailand allows for certain deductions to be made from the Gross AT1 capital to arrive at the net AT1 capital. The following are some of the major deductions from AT1 allowed by the Bank of Thailand:

- Internal transactions and surplus of Non-Controlling Interest
- Investment in their own shares (Treasury Stocks) that form a part of the AT1 capital.
- Reciprocal cross holding of AT1 instruments
- Direct and indirect investments in AT1 of other commercial banks or other finance companies
- Significant and Insignificant investments in AT1 instruments
- Shortfall in Tier 2 capital

Tier 2 capital

a) Gross Capital

The sum of the items that are eligible to be considered as a part of Tier 2 form the Gross Tier 2 capital. These items are captured as downloads in the **STG_GL_DATA** or **FSI_STD_ACCT_HEAD** tables.

- The Phase out of ineligible instruments from the capital are also a part of the Tier 2 gross

capital along with the other items prescribed by the Bank of Thailand. The items which were previously eligible to be included in Tier 2 capital and are ineligible under the eligibility conditions prescribed by Bank of Thailand Basel III rules are to be phased out from the capital.

b) Deductions from Tier 2 Capital

The Bank of Thailand allows for certain deductions to be made from the Gross Tier 2 capital in order to arrive at the net Tier 2 capital. The following are some of the major deductions from Tier 2 that are allowed by the Bank of Thailand.

- Internal transactions and surplus of Non-Controlling Interest
- Investment in their own shares (Treasury Stock) which form a part of the Tier 2 capital.
- Reciprocal cross holding of Tier 2 instruments
- Direct and indirect investments in Tier 2 of other commercial banks or other finance companies.
- Significant and Insignificant investments in Tier 2 instruments

Internal Transactions

The deduction also includes internal transactions in each tier of capital among the various entities which are part of the regulatory consolidation. The internal transactions are identified in the Non Securitization process. The internal transactions are identified as any capital related transactions within the organization structure group, which is part of the regulatory consolidation. These deducted items are not processed further under any other process.

Non-Controlling Interest

Non-Controlling Interest as per the Bank of Thailand Basel III guidelines are calculated and the surplus amount in each tier of capital, which is attributed to third parties, are deducted from the gross capital of the respective tier of capital.

- The minority interest is calculated as the third party's interest (shareholding percent) in the surplus capital (available capital – minimum required capital).
- All the values required for processing are populated into the Minority Interest Capital (**FSI_MINORITY_INTEREST**) table, which is the processing table for minority interest calculations
- The sub process Minority Interest Calculations process covers this processing.

DTL related to Goodwill, Intangible assets, DTA and Temporary differences

All the Deferred Tax Liabilities (DTLs) related to Goodwill, Intangible assets, Deferred Tax Assets (DTA), and Temporary differences are expected as a download in the **STG_GL_DATA** table. The application calculates the values of Goodwill, Intangible Assets, Deferred Tax Assets, and Temporary differences in the net of DTL by deducting the values of the associated DTL from the value of the respective standard

account heads. These are then processed for the Regulatory Adjustments.

Reciprocal Cross Holding

The investments in reciprocal cross holdings are calculated as the sum of the pre-mitigation EAD (EAD Premitigation Measure Value (**N_EAD_PRE_MITIGATION**) in the Fact Non Sec Exposures (**FCT_NON_SEC_EXPOSURES**) table) of the exposures which have the flag of reciprocal cross holding indicator (**F_RECIPROCAL_CROSS_HLDG_IND**) as "Y".

For this processing, the reciprocal amount is expected as a download in the Stage Capital Investments Position Table (**STG_CAP_INVESTMENTS_POSITIONS**) at an instrument level. The instrument code provided in this table is the instrument in which the reporting bank has invested, and for which there is a reciprocal cross holding by the reporting bank. The reciprocal cross holding amount is also captured in this table. The solution expects the staging data of the exposures to have the reciprocal cross holding indicator (**F_RECIPROCAL_CROSS_HLDG_IND**) as 'Y'.

The solution, as part of the sub process Non Sec Reciprocal Cross Holdings Data Population in the processes Non Sec Reciprocal Cross Holdings Data Population splits the exposure into two, based on the reciprocal cross holding amount. The exposure which meets the reciprocal cross holding amount is stamped with the reciprocal cross holding indicator (**F_RECIPROCAL_CROSS_HLDG_IND**) as 'Y'. This will be taken for the reciprocal cross holding treatment for the capital instruments.

The portion of the exposure, which is above the reciprocal cross holding amount, is treated as a regular exposure and is risk weighted as per the Basel asset class for that instrument.

Write down of AT1 instruments

The banks are allowed to convert the convertible equity shares in their portfolio into a paid up common equity by writing down the convertible shares that a form part of AT1 instruments into CET1 instruments of paid up common equity. This is done when the trigger level of CET1 is hit and the bank is required to raise its CET1 capital levels. The trigger level of CET1 prescribed by the Bank of Thailand is at 5.125% of total risk weighted assets. The application reports the amount that the bank is supposed to write down in order to be over the trigger level. This is done in the sub process **Capital Ratio Calculation**.

Net Capital Calculation

The Net CET1, Net AT1, and Net T2 capital amount are calculated post all regulatory adjustments, including the insignificant, significant, and threshold treatment. The net capital is calculated by taking into account any effect that is brought in by the transition arrangement. The deductions and the ineligible instruments are processed in accordance with the transition schedule prescribed by the Bank of Thailand. Any shortfall in the T2 capital amount is adjusted against Net AT1 amount and any shortfall of the AT1 capital amount is adjusted against the Net CET1 amount.

Insignificant Investment Treatment for Accounting Entity where Parent Bank Holding is not more than 10% of Issued Common Shares

The total investment amount of all the insignificant entities are checked against the set limit of 10% of the CET1 amount of the parent bank amount post regulatory adjustments. The amount above the 10% limit is processed for deduction. The total deduction amount is pro-rated among each tier of capital based on the percentage of investment in each tier of capital. The amount arrived at is deducted from each tier of the capital.

The investment amount below the 10% limit is treated as per the trading book and banking book rule for the instrument belonging to trading book and banking book respectively.

The following is the computation done by the application:

- Entities are marked as insignificant investment entities by updating the flag **F_SIGNIFICANT_INVESTMENT_IND** in Fact Entity Information (**FCT_ENTITY_INFO**) with the value N.

- The exposure amount of the banking book and trading book exposures to these entities are summed up by grouping their component of capital. They are then compared against the 10% of the parent bank's CET1 capital. The portion of amount which exceeds the 10% limit is deducted.

- This is done by calculating the tier wise deduction percentage and multiplying this percentage with the exposure amount to arrive at the amount to be deducted from each tier of capital.

- The total investment values are populated into FSI_NON_REG_CONSL_ENTITY_INVST which is the processing table for insignificant and significant investment deductions.

- The **INSIGNIFICANT_INVESTMENT_CALCULATION** process covers this processing.

Significant Investment Treatment for Accounting Entities where the Parent Bank Holding is more than 10% of the Issued Common Shares

The total investment amount of all the significant investment entities is checked against the set limit of 10% of the CET1 amount of the parent bank post insignificant investment amount adjustment. The CET1 amount greater than 10% is deducted from the CET1 post insignificant investment amount deduction. The CET1 amount lower than 10% is then risk weighted at 250%. The investment amount in AT1 and T2 is fully deducted from its respective AT1 and T2 tier of capital. The following is the computation done by the application:

The entities are marked as significant investment entities by updating the flag – 'F_SIGNIFICANT_INVESTMENT_IND' in Fact Entity Information (FCT_ENTITY_INFO) with the value 'Y'. The exposure amount of the banking book and trading book exposures to these entities are summed up by grouping their component of capital and are then compared against 10% of the parent bank's CET1 capital. The portion of amount which exceeds the 10% limit is then deducted from CET1. The exposures of AT1 and T2 are fully deducted from the respective tier of capital. The deduction percentage for CET1 is calculated and this percentage is multiplied with the CET1 exposure's exposure amount to arrive at the amount to be deducted from the CET1 capital.

The investment in venture capital business is also part of significant and insignificant investments. If the private equity and venture capital related investments are more than 50%, it will be consolidated, to

handle this a rule is created for any investment more than 50% to be fully consolidated. Any investment less than 50% will not be part of consolidation. For the same a consolidation flag to be updated by the bank, if any special scenario of considering investments less than 50% to be part of consolidation. The sub process **SIGNIFICANT_INVESTMENT_CALCULATION** process covers this processing.

Direct and Indirect Investments

The direct and indirect investments by banks in Equity and Warrants of Financial institutions, Housing Finance companies, and Mortgage Guarantee companies are deducted from the gross common equity tier 1 capital. Similarly in the case of additional tier 1 and tier 2 capital, the eligible products of the respective capital tiers issued by Commercial Banks and Financial Institutions are deducted from the respective capital tiers. In all cases, any of these direct and indirect investments which have been treated under and deducted as part of investment in their own shares, internal transactions or reciprocal cross holdings are not considered under this head in order to avoid double counting. Similarly, the investments which are deducted under the head of direct and indirect investments are not counted for and processed as significant and insignificant investments for deductions.

To identify and further process the exposures related to the credit foncier and financial companies, the application will consider the party types "Housing Finance Company", "Mortgage Guarantee Company", and "Financial entity"

Fair Value

The fair value option approach is used in accordance with IAS39 for regulatory adjustments of items that are not included in the capital of commercial banks as they are accounting items. Instruments considered for this approach are Accumulated gains (losses) for the debt instruments and loans or financial asset instruments.

Note: In this scenario, the gains/ losses are due to the increase / decrease in fair value arising from the unreliable fair value measurement.

To get these values, which is computed or stored in line with an IFRS guideline, the application integrates with the IFRS application and downloads the gains and losses as mentioned above. The total sum of these values is populated into the required CAP IDs.

Transition Arrangement

Phase in of Deductions

The regulatory adjustment line items that include intangible assets, gain on sales related to sec transaction, minority Interest, cumulative gain and losses from fair value measurement of available for sale debt instruments, cumulative gains and losses arising from translating the financial statements of a foreign operation, cumulative gains and losses from fair value measurement of derivatives used for hedging risks incurred from a net investment in a foreign operation follows the phase-in arrangement as per the timelines defined in the BOT accord. Similarly, insignificant investment, significant investment line

items also follow phase-in arrangement, after insignificant, significant treatment calculation. The phase-in deduction percent for each year is available in the setup table **FSI_SETUP_CAPITAL_HEAD**.

The entire processing is done in the process **TRANSITION_DEDUCTION_TREATMENT**.

All the investment transactions in insignificant entity and significant entity are stamped. Insignificant investment amounts lower than 10% is stamped as "INSIG_RWA". Any amount above 10% is stamped as "INSIG_DED". The same logic is applied to the significant investment amount in CET1. The exposure to be deducted is marked with the standard account head surrogate key based on whether the deduction is an insignificant or significant investment and based on the capital component group.

This splitting of exposures is done in Fact Non Sec Exposures (FCT_NON_SEC_EXPOSURES) in the process **NON_SEC_INSIGNIFICANT_EXPOSURE_POPULATION** and **NON_SEC_SIGNIFICANT_EXPOSURE_POPULATION**.

This splitting logic is carried to Equity Exposures (FCT_EQUITY_EXPOSURES) and Fact Sub Exposures (FCT_SUB_EXPOSURES) as well in the **NON_REGULATORY_EQUITY_INVESTMENT_POPULATION** and **NON_REGULATORY_INV_SUB_EXPOSURE_POPULATION** the sub processes that are involved in this processing.

Phase out of ineligible instruments from gross capital

Ineligible or de-recognised instruments refer to the instruments which were considered to be eligible to form the tier 1 and tier 2 capital in Basel II but with the on-set of the Basel III regulations are no more eligible to be part of Additional Tier 1 or Tier 2 capital. Bank of Thailand says that, in case the banks have on their books investment in these kind of instruments and are used to form their capital then such instruments are to be phased out through divestment at a rate of 10% every year starting 1st of January 2013 resulting in a complete divestment by 1st of January 2022.

The method of identification and qualification of the instrument is as indicated below;

Phase out flow
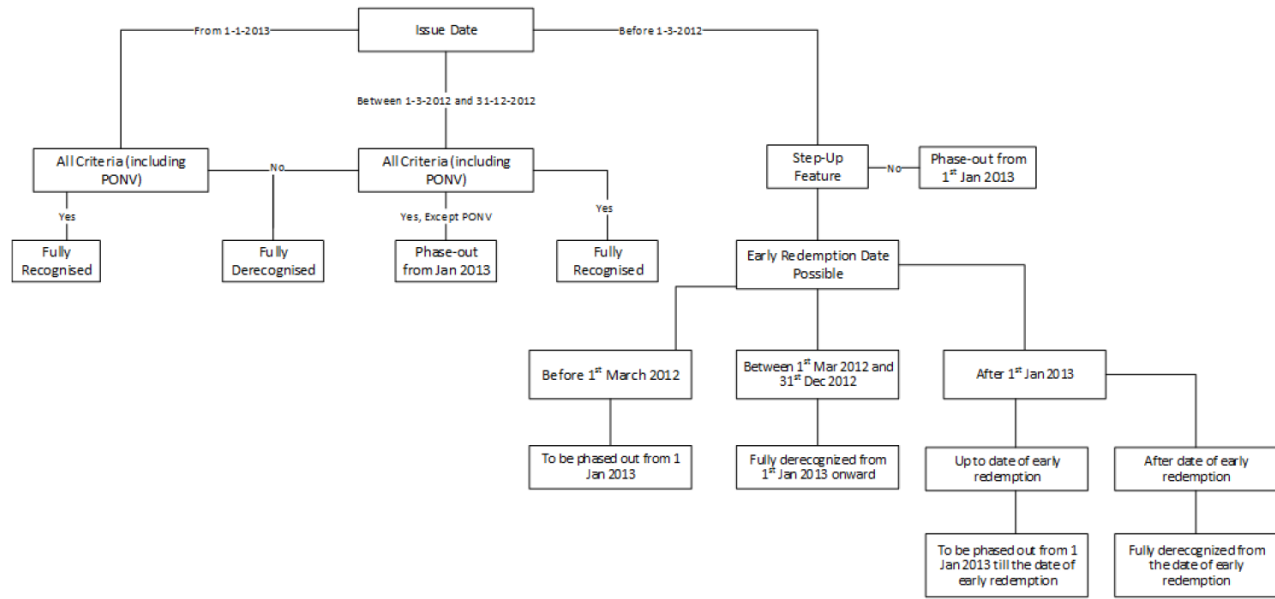
Capital Ratio Calculation

CET1 ratio, T1 ratio, T2 ratio, and Capital Adequacy ratio are calculated by using the Total RWA amount, Net CET1 Capital, Net T1 Capital, Net T2 capital, and Total Capital (sum of Net T1 Capital amount, and Net T2 capital amount) amount.

The transitional arrangement for capital ratios began on April, 2014. The capital ratios and deductions from Common Equity are fully phased-in and implemented as on March 31, 2019. The phase-in arrangements for banks operating in Thailand are indicated in the following table:

Minimum Capital Ratios	1-Apr-13	31-Mar-14	31-Mar-15	31-Mar-16	31-Mar-17	31-Mar-18	31-Mar-19
Minimum Common Equity Tier (CET1)	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Capital Conservation Buffer (CCB)				0.625	1.25	1.875	2.5
Minimum CET1+CCB	4.5	4.5	4.5	5.125	5.75	6.375	7
Minimum Tier 1 Capital	6.0	6.0	6.0	6.625	7.250	7.875	8.5
Minimum Total Capital	8.5	8.5	8.5	8.5	8.5	8.5	8.5
Minimum Total Capital + CCB	8.5	8.5	8.5	9.125	9.750	10.375	11.0

Phase-in of all deductions from CET1	-	20	40	60	80	100	100

Expected loss is more than provision then commercial banks which are locally incorporated can deduct the full amount of difference between total EL and provisions from Common equity tier 1 capital.

Commercial banks which are locally incorporated can include the surplus provisions in Tier 2 capital however the surplus of provision include in Tier 2 capital must not exceed 0.6% of total credit risk-weighted assets calculated under the IRB.

11 Application Processing

11.1 Pre-processing Steps

11.1.1   Data Requirements

Data can be divided into the following categories:

Setup Tables

A setup table is a set of data that is static and does not change on regular intervals. This is a set of seeded data which refers to the initial data that is provided with the application. **DIM_BANDS** table must be setup for the bands which are not used for regulatory reporting. Data should be setup for these bands:

Sl. No.	Column Name	Comments
1	D_RECORD_END_DATE	Date till the value of the band can be used
2	D_RECORD_START_DATE	Any date less than or equal to FIC_MIS_DATE
3	FIC_MIS_DATE	MIS Date of the run
4	F_LATEST_RECORD_INDICATOR	Should be 'Y' for the latest records
5	F_LOWER_VALUE_INCLUSIVE	Should be 'Y' if the value in N_BAND_LOWER_BOUND_VALUE should be included in the range; else 'N'
6	F_UPPER_VALUE_INCLUSIVE	Should be 'Y' if the value in N_BAND_UPPER_BOUND_VALUE should be included in the range; else 'N'
7	N_BAND_CODE	Distinct code should be provided for each member of a band type
8	N_BAND_LOWER_BOUND_VALUE	Lower bound value of the range
9	N_BAND_SKEY	Distinct surrogate keys should be provided for each records in the table
10	N_BAND_UPPER_BOUND_VALUE	Upper bound value of the range
11	V_BAND_CATEGORY	Band Category
12	V_BAND_CATEGORY_DESC	Band Category Description
13	V_BAND_SHORT_DESC	Band Short Description
14	V_BAND_SUB_CATEGORY	Band Sub Category
15	V_BAND_SUB_CATEGORY_DESC	Band Sub Category Description
16	V_BAND_TYPE	Band Type should be codes mentioned in Table 2
17	V_BAND_UNIT	Band Unit

The Band type codes for Dim_Bands table are as follows:

Sl. No.	Band Types
1	DELINQUENCY BAND
2	EXPECTED LOSS BAND
3	LTV BAND
4	LTV BAND USFR
5	MATIRBCB
6	MATURITY BAND
7	MR TIME BAND
8	OPERATIONAL LOSS
9	PD BAND
10	PD BAND USFR
11	RW BAND
12	CVA PD BAND

Dimension Population

This section provides steps required to setup and execute the Slowly Changing Dimension (SCD) process.

Overview of SCDs

This component is used to load data from the stage tables into the slowly changing dimension tables. SCD batches are run usually at fixed intervals for example at the end of each month. This is applicable for dimensions like the Exposure Dimension. There are also tables like the Product dimension where the SCD process for this ideally is needed only when new product types are introduced. When the SCD batch is executed for the first time it loads all the data in the stage tables for that extraction date and it also inserts two records – Missing and Others.

When the batch is run for the next extraction date, then the new records are inserted. The end dates of the modified records are updated with the extraction date and new records with start date as the extraction records are inserted. The records that are the same for both extraction dates are left untouched.

The SCD component is delivered through an executable.

Type 1 SCD Methodology

The Type 1 methodology overwrites old data with new data, and therefore does not track changes to the data across time. For Example

Consider a Dimension Table, DIM_PRODUCT.

N_Product_Skey	V_Product_Name	D_Start_Date	D_End_Date	F_Latest_Record_Indicator
1	PL	5/31/2010	12/31/9999	Y

N_Product_Skey is the surrogate key column which is a unique key for each record in the dimension table.

V_Product_Name is the product name.

D_Start_Date indicates the date from which this product record is valid.

D_End_Date indicates the date to which this product record is valid.

F_Latest_Record_Indicator: A value 'Y' indicates this is the latest record in the dimension table for this product and 'N' indicates it is not.

If the V_Product_Name column is set as a Type 1 and if there is a change in the product name to 'Personal Loan' from 'PL' in the earlier example in the next processing period then, when SCD is executed then the record in the earlier example is changed to:

N_Product_Skey	V_Product_Name	D_Start_Date	D_End_Date	D_End_Date F_Latest_Record_Indicator
1	Personal Loan	6/30/2010	12/31/9999	Y

Type 2 SCD Methodology

The Type 2 method tracks historical data by creating multiple records for a given natural key in the dimensional tables with separate surrogate keys. With Type 2, the historical changes in dimensional data are preserved. In the earlier example, for the change in product name from 'PL' to 'Personal Loan' if history is preserved, then the V_Product_Name column is set as Type 2, that is, when SCD is processed for the processing period, it inserts a new record as shown in the following example.

N_Product_Skey	V_Product_Name	D_Start_Date	D_End_Date	F_Latest_Record_Indicator
1	PL	5/31/2010	12/31/9999	Y
1	Personal Loan	6/30/2010	12/31/9999	Y

A new record is inserted to the product dimension table with the new product name and the latest record indicator for this is set as 'Y' indicating this is the latest record for the personal loan product and the same flag for the earlier record is set to 'N'.

Prerequisites

The setup tables accessed by the SCD component, including **SYS_TBL_MASTER**, **SYS_STG_JOIN_MASTER** have the required entries. The tables **SYS_TBL_MASTER** and **SYS_STG_JOIN_MASTER** are seeded. You must only add entries in these tables if you add user defined dimensions.

Tables used by SCD Component

The SCD Components provide the details of mapping between the Stage Table and its corresponding Dimension table. **SYS_TABLE_MASTER** and **SYS_STG_JOIN_MASTER** form part of the SCD Components and are executable for each report extraction date (MIS). The tables provide information on whether the history of a table attribute is maintained or not.

SYS_TBL_MASTER

The application installer populates one row per dimension for the seeded Dimensions in this table.

Column Name	Data Type	Column Description
MAP_REF_NUM	NUMBER(3) NOT NULL	The Mapping Reference Number for this unique mapping of a Source to a Dimension Table
TBL_NM	VARCHAR2(30) NOT NULL	Dimension Table Name
STG_TBL_NM	VARCHAR2(30) NOT NULL	Staging Table Name
SRC_PRTY	NUMBER(2) NULL	Priority of the Source when multiple sources are mapped to the same target
SRC_PROC_SEQ	NUMBER(2) NOT NULL	The sequence in which the various sources for the DIMENSION is taken up for processing
SRC_TYP	VARCHAR2(30) NOT NULL	The type of the Source for a Dimension,that is, Transaction Or Master Source
DT_OFFSET	NUMBER(2) NULL	The offset for calculating the Start Date based on the FRD
SRC_KEY	NUMBER(3) NULL	Source Key

Example data: The following data is inserted by the application installer for the 'Product' dimension (DIM_PRODUCT).

Row	Fields
DT_OFFSET	0
MAP_REF_NUM	78
SRC_KEY	
SRC_PROC_SEQ	7
SRC_PRTY	
SRC_TYP	MASTER
STG_TBL_NM	STG_PRODUCT_MASTER
TBL_NM	DIM_PRODUCT

The following table lists the columns and data type particulars that the SCD Executable uses:

Column Name	Data Type
MAP_REF_NUM	NUMBER(3) NOT NULL
TBL_NM	VARCHAR2(30) NOT NULL
STG_TBL_NM	VARCHAR2(30) NOT NULL
SRC_PRTY	NUMBER(2)

The following table lists out Stage tables and its corresponding Dimension tables which are used in the BASEL application:

MAP_REF_NUM	DIM TABLE	STG TABLE
1	DIM_ACCT_STATUS	STG_ACCOUNT_STATUS_MASTER
12	DIM_BRANCH	STG_BRANCH_MASTER
25	DIM_COMMODITY	STG_COMMODITY_MASTER
28	DIM_COUNTRY	STG_COUNTRY_MASTER
42	DIM_EXPOSURE	STG_EXPOSURE_MASTER
43	DIM_EXPOSURE	VW_BASEL_STG_FCT_BNK_INST_EXP
47	DIM_GEOGRAPHY	STG_GEOGRAPHY_MASTER

MAP_REF_NUM	DIM TABLE	STG TABLE
51	DIM_INDUSTRY	STG_INDUSTRY_MASTER
53	DIM_INSTRUMENT_CONTRACT	VW_STG_INSTRUMENT_CONTRACT
61	DIM_LOB	STG_LOB_MASTER
64	DIM_MARKET_VARIABLES	STG_MARKET_VARIABLES_MASTER
69	DIM_MITIGANT	STG_MITIGANT_MASTER
70	DIM_MITIGANT_TYPE	STG_MITIGANT_TYPE_MASTER
71	DIM_MR_ASSET	STG_MR_ASSET_MASTER
78	DIM_PRODUCT	STG_PRODUCT_MASTER
99	DIM_SEC_POOL_TYPE	STG_SEC_POOL_TYPE_MASTER
100	DIM_SEC_PROGRAM	STG_SEC_PROGRAM_MASTER
105	DIM_SRC_SYSTEM	STG_SOURCE_SYSTEM_MASTER
110	DIM_TRADING_DESK	STG_TRADING_DESK_MASTER
122	SEC_POOL_MASTER	STG_SEC_POOL_MASTER
168	DIM_PARTY	STG_PARTY_MASTER
179	DIM_ISSUE	VW_STG_ISSUE
180	DIM_PARTY_TYPE	STG_PARTY_TYPE_MASTER
181	FSI_BENCHMARK_CAP_CONS_RATIO	STG_BENCHMARK_CAP_CONS_RATIO
182	FSI_BENCHMARK_CNTR_CYC_BUFFER	STG_BENCHMARK_CNTR_CYC_BUFFER

SYS_STG_JOIN_MASTER

Column Name	Data Type	Column Description
MAP_REF_NUM	NUMBER (3) NOT NULL	The Mapping Reference Number for this unique mapping of a Source to a Dimension Table
COL_NM	VARCHAR2(30) NOT NULL	Name of the column in the Dimension Table
COL_TYP	VARCHAR2(20) NOT NULL	Type of column. The possible values are given below
STG_COL_NM	VARCHAR2(30) NOT NULL	Name of the column in the Staging Table

SCD_TYP_ID	NUMBER(3) NULL	SCD type for the column
PRTY_LOOKUP_REQD	CHAR(1) NOT NULL	Column to determine whether Lookup is required for Priority of Source against the Source Key Column or not
COL_DATATYPE	VARCHAR2(15) NULL	Column Data Type
COL_FORMAT	VARCHAR2(15) NULL	Column Format

The possible values for column type (the column COL_TYPE) in SYS_STG_JOIN_MASTER are:

- PK – Primary Dimension Value (can be multiple for a given "Mapping Reference Number")
- SK – Surrogate Key
- DA – Dimensional Attribute (can be multiple for a given "Mapping Reference Number")
- SD – Start Date
- ED – End Date
- LRI – Latest Record Indicator (Current Flag)
- CSK – Current Surrogate Key
- PSK – Previous Surrogate Key
- SS – Source Key
- LUD – Last Updated Date / Time
- LUB – Last Updated By
- NN – Not Null

For example: The following data is inserted by the application installer for the product dimension (DIM_PRODUCT)

Row	Fields
COL_DATATYPE	VARCHAR
COL_FORMAT	
COL_NM	V_PROD_BRANCH_CODE
COL_TYP	DA
MAP_REF_NUM	78
PRTY_LOOKUP_REQD_FLG	N
SCD_TYP_ID	2
STG_COL_NM	V_PROD_BRANCH_CODE

NOTE:	No changes are needed in this table if the standard key dimensions are being used within the Basel Application. If any new dimensions are added, the related column details are to be inserted to this table manually.

STG_<dimensionname>_MASTER - is the database table which SCD uses as the source. This table comes as a part of the Data model.

DIM_<dimensionname> – is the output table to which SCD writes the dimension data.

A sequence is added for every user-defined dimension.

Example:

create sequence SEQ_DIM_<DIM> minvalue 1

max value 999999999999999999999999999

increment by 1

Executing SCD Components

To execute the SCD component from OFSAAI Batch Process, perform the following steps:

For a more comprehensive coverage of configuration and execution of a batch, see *Oracle Financial Services Analytical Applications Infrastructure User Guide*.

4. From the **Home** menu, select **Operations**, then select **Batch Maintenance**.
5. Click **New Batch** ('+' symbol in Batch Name container) and enter the Batch Name and Description.
6. Click **Save**.
7. Select the Batch you created in the earlier step, by clicking the check box in the Batch Name container.
8. Click **New Task** ('+' symbol in Task Details container).
9. Enter the Task ID and Description.
10. Select Run Executable, from the Component ID list.
11. Click **Parameters**. A pop up window opens, enter the following values and then click **Save**:

    Executable: Scd,<map ref num>>

    For example: Scd 2.

The Basel batch created for SCDs is the <infodom>_SCD. Infodom refers to the Information Domain name. The map_ref_num can be looked up from the which lists the Stage tables and the corresponding Dimension tables.

Wait: When the file is being executed you have the choice to either wait till the execution is complete or proceed with the next task. Click the list box of the field provided for Wait in the Value field and select 'Yes' or 'No'. Clicking 'Yes' confirms that you wish to wait for the execution to be completed. Clicking 'No' indicates that you wish to proceed.

    Batch Parameter: Select 'Y' (upper case required)

Stage Data

In this section, Stage Data can be populated in either the Product Processors or Other Stage tables as follows:

- Product Processor: is an entity in the Basel Regulatory Capital application which stores data from the Operational Systems of the Bank. This entity is created based on the various financial products that the bank caters to. Stage tables for Product Processors are categorized as exposures data of Product Processors. The Product Processors of all the jurisdictions are the same, except for the Islamic Banking Jurisdiction.

- Others: Data can be populated into Stage tables, besides using Product Processors, as per the respective jurisdiction.

For more information on the list of columns to be populated within each table, see the *Download Specifications* document.

The set of sample data to be to be populated for the following tables are listed in the worksheet available in the following location: Sample Data.

- STG_PRODUCT_MASTER

- STG_LOB_MASTER

- STG_MITIGANT_TYPE_MASTER

- STG_PARTY_TYPE_MASTER

Seeded Data

The tables are seeded in the installation as per worksheet available in the following location: Seeded Data.

11.1.2   Data Assumptions

The following section aims to identify certain data related assumptions for specific tables which helps in the smooth functioning of the Basel Regulatory Capital application.

Data Format

1. In all the date columns, data is expected as per the **NIS_DATE_FORMAT** of the atomic schema.

2. Country and Currency codes are expected as per the ISO standard.

Dimension Table

DIM_CAPITAL_ACCT_HEAD: General Ledger items and Non General Ledger items are differentiated in the column **F_GL_IDENTIFIER** with flag **Y** indicating General Ledger items and flag **N** as an indicator for non-General Ledger items).

Mapping Table

FSI_CAPITAL_STANDARD_MAPPING: For certain standard account head line items which are processed by the application (for example: **Net Tier 1 Capital, Total eligible Capital, Tier 1 Capital Ratio, capital Ratio**) you are expected to provide mapping for these items as **'Others'** in the column **V_CAPITAL_ACCOUNT_IDENTIFIER** in the **FSI_CAPITAL_STANDARD_MAPPING** table. These capital line items mapped as **'Others'** are used in the T2T - **CAPITAL_STD_ACCT_HEAD_POP** to insert records into **FCT_STANDARD_ACCT_HEAD** from **FCT_CAPITAL_ACCT_HEAD.**

NOTE: Across the Basel product, in all seeded data tables, the open end date is mentioned as 31-DEC-9999. Open end date should not be modified from this value.

FACT Table

FCT_CAPITAL_ACCT_HEAD: General Ledger items and non-General Ledger items are differentiated in the column **F_GL_IDENTIFIER** with Flag **Y** indicating General Ledger items and Flag **N** indicating non-General Ledger items. The T2T which populates data from **STG_GL_DATA** to the table **FCT_CAPITAL_ACCT_HEAD** populates value **Y** in the column **F_GL_IDENTIFIER**. The T2T which populates data from **STG_STANDARD_ACCT_HEAD** to the table **FCT_CAPITAL_ACCT_HEAD,** populates value **N** in the column **F_GL_IDENTIFIER**. The reclassification of General Ledger and non General Ledger skeys to standard account head skey (**N_STD_ACCT_HEAD_SKEY**) happens in **FCT_CAPITAL_ACCT_HEAD** table by either of the following:

- A Type 2 rule to reclassify using **DIM_CAPITAL_ACCT_HEAD** and **DIM_STANDARD_ACCT_HEAD**

- Referencing the mapping table – **FSI_CAPITAL_STANDARD_MAPPING**

- From the **FCT_CAPITAL_ACCT_HEAD** table General Ledger and Non General Ledger data flows into **FCT_STANDARD_ACCT_HEAD** table. Again, the distinction is based on the flag **Y** in the column **F_GL_IDENTIFIER**.

11.1.3   Data Loading

The OFSAAI Data Integrator framework allows you to move data flexibly within the Oracle Financial Services Analytical Applications (OFSAA) Data Model at different levels of granularity and at various stages of the process.

Data can be loaded into the required Stage or Setup Tables in the following ways:

- **Connecting to other databases**: Relational data sources can be defined to connect to any of the Relational Database Management System (*RDBMS*) like Oracle, IBM DB2, MS SQL Server and any RDBMS through native connectivity drivers or ODBC. RDBMS data source lets you define the RDBMS engine present locally or remotely with *FTP* access to remote server

- **Flat-Files**: Flat File data source lets you define the flat file present locally or remotely with FTP access to remote server. Data files can be made available in the standard staging area configured in OFSAAI. A Flat-File data source is a local data source residing in the staging area of the Infrastructure Database Server.

For more information on format of the flat file or RDBMS file, see the *Download Specifications* document.

Further, data can be loaded or maintained using the following components available in the Data Integrator Framework:

Excel upload: Choose this option when you have moderate quantities of data that is available in an excel file format.

Manual Data Entry – Forms: The Data Entry Forms and Queries (DeFQ) module of the Data Integrator is designed to create user friendly Data Entry windows with a choice of layouts, which enables data viewing and data manipulation easily. You can select tables based on which you can create forms that can be used in any application.

For more information on data loading activities like Flat File Source and Connecting to other databases, see the *OFSAAI 8.0.4 User Manual*.

For more information on Data Entry forms, see *Data Entry Forms and Queries.*

11.1.4   Reclassification Rules

A sample list of products, customer types, issuer types, collateral types, credit ratings, and organization structure are pre-defined in the application. However, the list and naming convention of products, customer types, and so on, might differ from one bank to another. The application re-classifies the bank's data into standard data, which does not change for a given set of regulations, and then processes it based on standard classifications. This restricts the level of modifications needed for each implementation for re-classifying the bank's data into the relevant standard classifications.

Setting up the Data

The respective Dimension Tables corresponding to products (**DIM_PRODUCT**), customer types, issuer types (**DIM_PARTY_ TYPE**), collateral type (**DIM_MITIGANT_TYPE**), credit ratings (**RATING_SRC_MASTER** and **DIM_CREDIT_RATING**), and organization structure (**DIM_ORG_STRUCTURE**) are populated with the list of product types, customer types, issuer types, collateral types, ratings, and organization structure as used in the respective bank.

As described in the Data Requirements section, these tables can be populated by directly uploading data into the tables if they are not likely to change frequently or by using the SCD component, if the data is likely to change over a period of time.

Also data is expected in **STG_PRODUCT_MASTER**, **STG_PARTY_TYPE_MASTER** and **STG_MITIGANT_TYPE_MASTER** for product, party type and mitigant types. SCDs populate data from these tables into **DIM_PRODUCT**, **DIM_PARTY_TYPE** and **DIM_MITIGANT_TYPE**.

Modifying the Re-Classification Rules

The hierarchies related to Product Types, Customer Types, and so on, must be re-saved if the data keeps on changing. This can be done individually for each hierarchy using the Unified Metadata Manager or in bulk using the **Save Metadata** link under **Administration** on the LHS pane of OFSAAI window. A new node is created in the source hierarchy. This node is mapped to the node in the target to be added in the target hierarchy. The pre-configured reclassification rules are modified to map the Bank's data to the Standard data using the Rules Framework. For more information, see *Components of OFSAA Infrastructure* on *page 31.*

11.2 Processing

11.2.1 Introduction

After data stores are created and Rules, Processes, and Runs are defined, the timing and frequency of the Execution can be established. For more information on the Runs pre-configured with the application, see the *Run Charts*. To execute Runs as batches, see the Operations section in the *OFSAAI 8.0.4 User Guide*.

The scheduling of Runs within OFSAAI can be managed on a real-time or batch basis. Batch processes can be executed daily, weekly, monthly, or to meet specific business needs. The Run Management facility also provides the ability to run jobs in a manual or real-time basis, as required. Existing investments in external schedulers can also be used to call web services within this infrastructure.

11.2.2 Batch Processing

A batch refers to a set of executable processes based on a specified rule. Batches relating to the application must be executed as specified below. These batches are executed from the Operations Menu of OFSAAI. For more information of the Operations section, see the *OFSAAI 8.0.4 User Guide*.

Slowly Changing Dimension batch: This must be executed when you are installing the application for the first time. Subsequently, this batch must be executed only when new data is added. The tasks processed and the order in which the tasks are processed, are specified in the Run Charts.

Basel Common batch: The following tasks are mapped to the Basel Common batch:

- Data Population: This task populates the table DIM_DATES.

- Party Role Map Calculation: This task populates the party and the role mapping from STG_PARTY_ROLE_MAPPING to FSI_PARTY_ROLE_MAPPING.

- FSI IRCS Calculation: This task populates FSI_IRCS from STG_IRC_RATE_HIST.

- PARTY_FIN_DATA_POP Batch: Populates the party financial data and executed as required when the party financial data is available.

- BASEL_DAILY Batch: This batch is to be executed on a daily basis. This batch is used to populate the exchange rate between different currencies for each date.

- BASEL_SETUP_TBL_POP Batch: This new batch is introduced for Basel setup tables' population. This batch contains T2Ts to populate new setup tables and includes new rules to mark latest data indicators. The tasks in this batch are adhoc and can be selected as applicable:

  o **Derecognized Fiduciary Assets**: These are applicable when bank has fiduciary assets recorded in the product processor as their own assets. This is applicable when the bank has selective criteria for derecognizing certain fiduciary assets on their books, and not the entire set of fiduciary assets. In these cases, this particular task must be executed. This is expected to be part of every run, but differs based on the client's portfolio.

Task No.	Task Name	Precedence	Description
Task4	FSI_DERECOG_FIDUCIARY _ASSETS_DATA_POP	–	This T2T populates FSI_DERECOG_FIDUCIARY_ASSETS from FSI_SETUP_DEREC_FIDUCIARY_ASST. Data is expected for FIC_MIS_DATE, V_EXPOSURE_ID.
Task6	Leverage Ratio - Latest data for Derecognized Fiduciary Asset	Task4	This rule updates latest record indicator flag. The expiry date for the old data is also updated. And this remains as the updated record till a new record is applicable. Impacted table is FSI_DERECOG_FIDUCIARY_ASSETS.

o **Mitigant Valuation**: These are applicable for capturing the fair value of the mitigants. If the requirement is to use fair value, this particular task must be executed. This is expected to be part of every run, but differs based on the client's portfolio.

Task No.	Task Name	Precedence	Description
Task3	FSI_MITIGANT_VALUATION _DETAILS_DATA_POP	–	This T2T populates FSI_MITIGANT_VALUATION_DETAILS from FSI_SETUP_MTGNT_VALUATION_DTLS. Data is expected for FIC_MIS_DATE, N_FAIR_VALUE, V_CCY_CODE, V_MITIGANT_CODE.
Task9	Leverage Ratio - Latest data for Mitigant Valuation details	Task3	This rule updates latest record indicator flag. The expiry date for the old data is also updated. And this remains as the updated record till a new record is applicable. Impacted table is FSI_MITIGANT_VALUATION_DETAILS.

o **Instrument Valuation**: These are applicable for capturing the fair value, and valuation adjustments of the instruments. If the requirement is to use fair value, or the valuation adjustments, this particular task must be executed. This is expected to be part of every run, but differs based on the client's portfolio.

Task No.	Task Name	Precedence	Description
Task2	FSI_INSTRUMENT_VALUAT ION_DETAILS_DATA_POP	–	This T2T populates FSI_INSTR_VALUATION_DETAILS from FSI_SETUP_INSTR_VALUATION_DTLS. Data is expected for FIC_MIS_DATE, V_INSTRUMENT_CODE, N_OTHER_VALUATION_ADJ_AMOUNT, N_VALUATION_ADJ_AMOUNT , N_FAIR_VALUE ,V_CCY_CODE.
Task8	Leverage Ratio - Latest data for Instrument Valuation detail	Task2	This rule updates latest record indicator flag. The expiry date for the old data is also updated. And this remains as the updated record till a new record is applicable. Impacted table is FSI_INSTR_VALUATION_DETAILS.

- o **CP Banking Exposure**: These are applicable for capturing entire banking system exposure for the counterparties. If the requirement is to use the total banking exposure for a counterparty, which is used for RW calculation, this particular task must be executed. This is expected to be part of every run, but differs based on the client's portfolio.

Task No.	TASK NAMES	Precedence	Description
Task5	FSI_BANKING_SYSTEM_EX POSURE_DATA_POP	–	This T2T populates FSI_CP_BANKING_SYSTEM_EXPOSURE from FSI_SETUP_CP_BANKING_SYSTM_EXP. Data is expected for FIC_MIS_DATE, N_TOTAL_DEPOSITS, N_TOTAL_EXPOSURE, N_TOTAL_INVESTMENTS, N_TOTAL_LOANS, V_CCY_CODE, V_PARTY_ID.
Task10	Leverage Ratio - Latest Data Indicator for CP Banking Exposure	Task5	This rule updates latest record indicator flag. The expiry date for the old data is also updated. And this remains as the updated record till a new record is applicable. Impacted table is FSI_CP_BANKING_SYSTEM_EXPOSURE.

- **Instrument Loss**: These are applicable for capturing the instrument related loss information, during the VaR computations, at an instrument level. If the requirement is to use the total VaR related loss for each instrument, which is used for RW calculation, this particular task must be executed. This is expected to be part of every run, but differs based on the client's portfolio.

Task No.	Task Name	Precedence	Description
Task1	FSI_INSTRUMENT_LOSS_DETAILS_DATA_POP	–	This T2T populates FSI_INSTRUMENT_LOSS_DETAILS from FSI_SETUP_INSTRMNT_LOSS_DTLS. Data is expected for FIC_MIS_DATE, N_POTENTIAL_ESTIMATE_LOSS, V_INSTRUMENT_CODE, V_CCY_CODE.
Task7	Leverage Ratio - Latest data for Instrument Loss Details	Task1	This rule updates latest record indicator flag. The expiry date for the old data is also updated. And this remains as the updated record till a new record is applicable. Impacted table is FSI_INSTRUMENT_LOSS_DETAILS.

11.2.3 Run Management

The Run Management framework is a unique feature of the Basel Regulatory Capital application which enables a business user - *without assistance from a technical analyst* - to easily define and execute a Run. This framework allows you to define a Run by selecting a combination of different Basel approaches for RWA computation. It also allows you to define a Run for a combination of portfolios.

The application Runs can be executed as RRF batch from the Run Management GUI. The Run Management GUI lists all Runs defined in Rules Framework. For more information, see *Rules Framework*.

NOTE: For CBRC Jurisdiction, if Credit Risk is selected in Run Management, then the relevant questions is not displayed as Credit Risk is not a part of CBRC jurisdiction in Basel Regulatory Capital Basic and no approaches/options are mapped to the segment.

The Basel Run Management UI consists of the following 3 functionalities:

Portfolio Definition: wherein you can define a combination of portfolios to participate in a Run. For example: If an institution wants to process only **On Balance Sheet** data and not all the product types, then the institution has the choice of selecting a sub type of an entire portfolio for processing. The other features of **Portfolio Definition** are:

- View details of a defined Portfolio.
- Existing values of a Portfolio can be edited.

A new Portfolio can be created by copying the existing values of a defined Portfolio

Run Definition: wherein you can define a Run for the Portfolios defined in the **Portfolio Definition** window by selecting the Basel approaches relevant to the jurisdiction. The other features of the **Run Definition** are as follows:

- View details of a defined Run.

- Existing values of a Run can be edited.

Run Execution: wherein you can define the parameters of a Run and execute a Run. The other features of the **Run Execution** are as follows:

- View defined parameters of a Run.

- Parameters can be entered at the Run Level.

The Existing Parameter values can be edited and there is an option to create and execute a batch.

Portfolio Definition

Adding a New Hierarchy for Portfolio Creation

To add a new hierarchy for portfolio creation, the hierarchy code must be added in **PORTFOLIO_HIERARCHY_MASTER** as shown below:

Column	Indicative values
V_HIERARCHY_CODE	Contains hierarchy code of the hierarchy to be added
F_LATEST_RECORD_INDICATOR	To be set to 'Y' for the hierarchies which have to be displayed
D_RECORD_START_DATE	Start date of the hierarchy.
D_RECORD_START_DATE	End date of the hierarchy.

Portfolio Definition Window

To access the Portfolio Definition Window:

1. Click **Basel Regulatory Capital Internal Ratings Based Approach** under **Select Applications** on the OFSAAI window.

2. Click **Run Management → Portfolio Definition** from the LHS pane as shown in this screenshot.

   The *Portfolio Definition Summary* Window is displayed, wherein you can define your own portfolio.
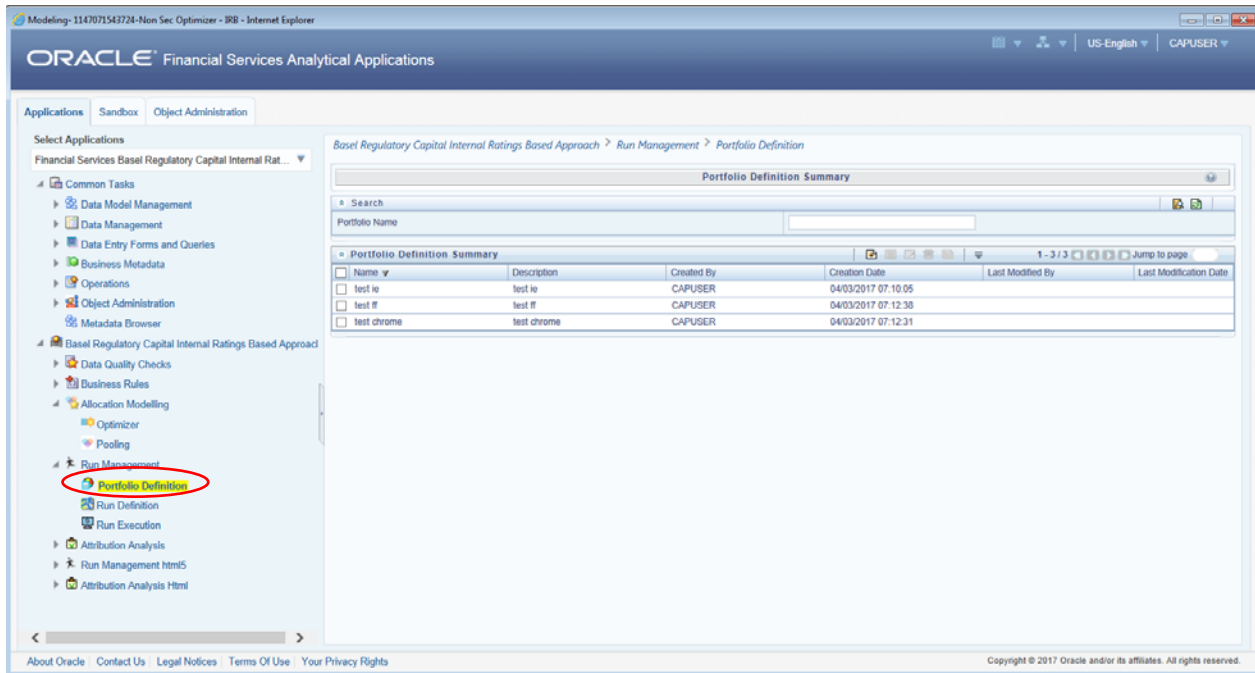
Portfolio Definition UI Icons

Icons Name	Icon	Description
Pagination Options		Helps in navigating from one page to another
View		Helps to view details of a defined Portfolio
Edit		Clicking this icon allows you to update details of a defined Portfolio
Add		Helps in defining a new Portfolio
Copy		Click this icon to create a new Portfolio using the same parameters of an existing Portfolio
Dimension		Click this Icon to select the Dimensions and Hierarchy to define a Portfolio
Delete		Click to Delete a Portfolio
Search		This icon helps in searching a particular Portfolio. Type the Portfolio Name in the Name Text Box and click this icon.

Icons Name	Icon	Description
Reset		The Reset icon refreshes the Portfolio Name field back to the default blank field

Defining a Portfolio

To define a Portfolio, perform the following steps:

1. Click ⊞ in the navigation bar of the **Portfolio** window, to define a new Portfolio. The **Portfolio (Definition Mode)** window is displayed.

2. Enter the **Name** and **Description** of the new Portfolio in the **Portfolio (Definition Mode)** window.

3. Click ▦ in the **Dimension & Member Selection** section of the **Portfolio (Definition Mode)** window. The **Portfolio Map** window is displayed.

4. Click ▦ in the **Portfolio Map** window and select the relevant Dimensions in the **Filter Browser** window by clicking ▶. The selected Dimension appears in the **Portfolio Map** window.
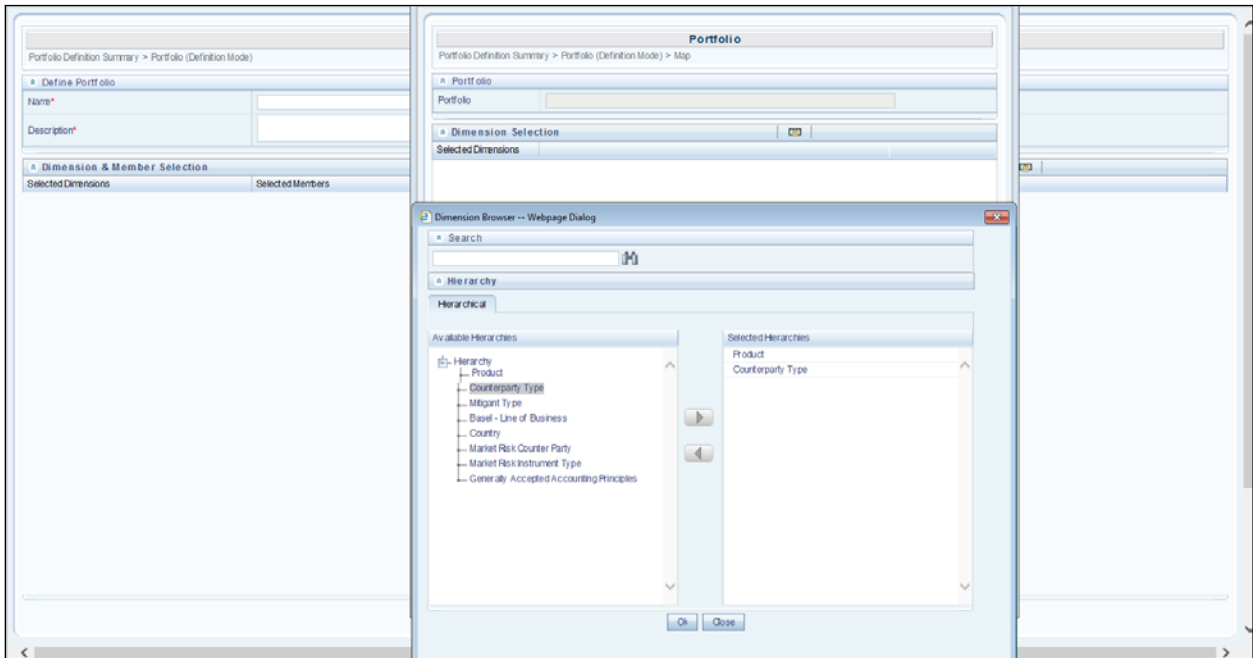
5. Click ☑ on the Dimension appearing in the **Portfolio Map** window to select the Nodes of the selected Dimension shown in the following figure:
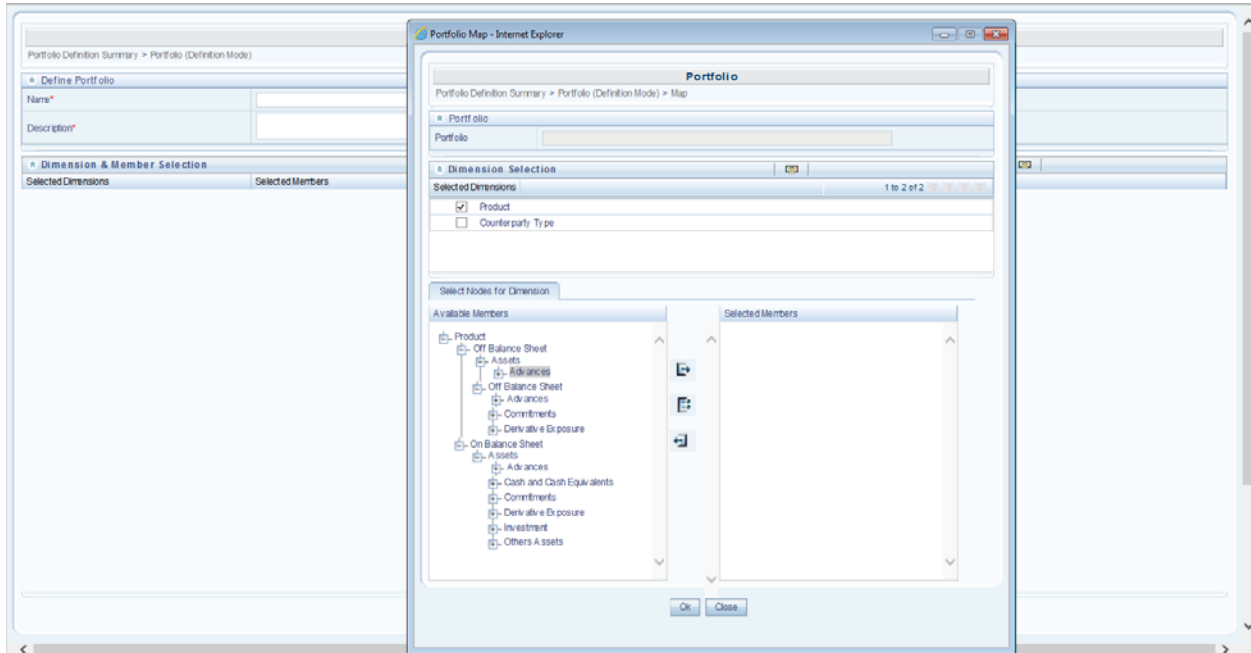
6. Click **OK** on **Portfolio Map** window after selecting nodes. Click **Save** on **Portfolio (Definition Mode)** window to save the portfolio as shown in the following figure:
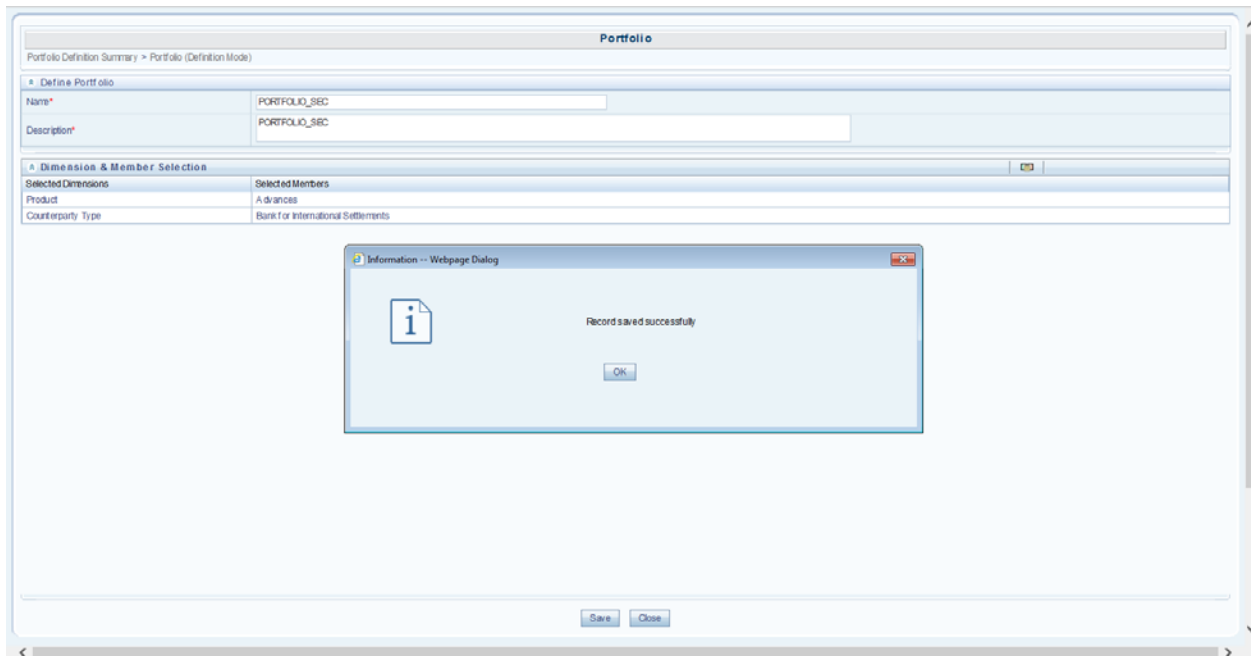
Run Definition

To access the Run Definition Window:

1. Click **Basel Regulatory Capital Internal Ratings Based Approach** under **Select Applications** on the OFSAAI window.

2. Click **Run Management → Run Definition** from the LHS pane as shown in this screenshot.

   The *Run Definition Summary* Window is displayed, wherein you can define your own Runs.

Run Definition UI Icons

Icons Name	Icon	Description
Pagination Options		Helps in navigating from one page to another
View		Helps to view details of a defined Run
Edit		Click this icon to allows you update details of a defined Run
Add		Helps in defining a new Portfolio
Delete		Click to Delete a Run
Search		This icon helps in searching a particular Run. Type the Run Name in the Run Name Text Box and click this icon.
Reset		The Reset icon refreshes the Run Name field back to the default blank field.

Defining a Run

Follow the steps given below to define a new Run:

1. Select the relevant jurisdiction from the Segment dropdown in the **Run Management** Window.

2. Click ⊞ to add a new run.

3. Select the regulation for which the Run must be created.

☆ Information Domain			
Information Domain	BASEL6DOM	Segment	BIS
Regulation	Basel II ▾		

4. Enter the name of the Run and a relevant description in fields Run Name and Comments respectively, in the **Run Management** window.

☆ Run Information			
Run Name*		Comments*	

5. Click ☑ to select the relevant Run type (Capital Calculation or Single Counterparty Exposure) for which you want to create the Run, shown in the following figure:

▫ Run Type			
Select	☑ Capital Calculation	☐ Single Counterparty Exposure	☐ Leverage Ratio

In a Capital Calculation Run the application calculates the Risk Weights, EAD, and the RWA for all the credit exposures to a single counterparty. In this run the capital adequacy ratio is also calculated to the reporting agency. In a Single Counterparty run, the application calculates the concentration of credit exposure against a particular counterparty. No RWA calculation or CAR calculation is required.

    a.   <u>If you are creating a Capital Calculation Run:</u>

        i.   Click ☑ to select the relevant risk type for which you want to execute the Run, shown in the following figure:

ii.   Click ⊙ to select Yes or No to include or exclude Capital Structure Computation and CRM (CRM is the process which incorporates the eligible deductions provided against specific exposures by the bank) functionality in the run, shown in the preceding figure.

iii.   Click the relevant risk tab (highlighted as per earlier selection of risk type) to select the approaches within each risk type, shown in the following figure:

b.   If you are creating a Single Counterparty Run:

i.   Click ⊙ to select Yes or No to include or exclude CRM (CRM is the process which incorporates the eligible deductions provided against specific exposures by the bank) functionality in the Single Counterparty Run, shown in the below figure:

ii.   Only Credit Risk tab is enabled for Single Counterparty Run as shown in the below figure:

6.   For a Capital Calculation run, click ⊞ against **Portfolio Identifier** to select the defined portfolios to participate in the Run. The relevant approaches appear in the Basel II Approaches section (For example: **Non Securitization Standardized**). Click ⊞ to view the sub approaches under section **Basel Regulatory Capital Approaches** as shown in the following figure:

7.   For Single Counterparty Run, click ⊞ against **Portfolio Identifier** to select the defined portfolios to participate in the Run. The relevant approaches appear in the **Basel Regulatory Capital** Approaches section (For example: **Single Counterparty Exposure Calculation**). Click ⊞ to view the sub approaches under section **Basel Regulatory Capital** Approaches as shown in the following figure:

8.   For Capital Calculation Run, click ⊙ to select the relevant sub approaches, shown in the following figure:

9. For Capital Calculation Run, select (✓) a portfolio that you want to map to an approach or sub-approach, shown in the following figure:

10. For Single Counterparty Run, select (✓) a portfolio that you want to map to Single Counterparty Approach.

11. Click **Save** after defining the Approaches, Sub-Approaches, and Portfolios for each risk type.

    You have successfully created a Run.

The following are the valid Run Definition combinations:

SEGMENT	REGULATION	RUN TYPE	RISK
BRAZIL	Basel	Capital Calculation	Credit Risk
			Market Risk
			Operational Risk
BIS	Basel II	Capital Calculation	Credit Risk
			Market Risk
			Operational Risk
	Basel III	Capital Calculation	Credit Risk
			Market Risk
			Operational Risk
CBRC	Basel	Capital Calculation	Credit Risk
			Market Risk
			Operational Risk

SEGMENT	REGULATION	RUN TYPE	RISK
IFSB	Basel	Capital Calculatiom	Credit Risk
			Market Risk
			Operational Risk
INDIA	Basel	Capital Calculation	Credit Risk
			Market Risk
			Operational Risk
USA	US II	Capital Calculation	Credit Risk
USA	US III	Capital Calculation	Credit Risk
USA	Dodd-Frank	Single Counterparty Exposure	Credit Risk

NOTE: For US III, If 'Non sec IRB' approach is selected then 'FLT Indirect Exposure treatment', 'Bank Owned Life Insurance-Indirect Exposure treatment', 'Credit value adjustments' should also be selected.

Run Execution

To access the Run Execution Window:

1. Click **Basel Regulatory Capital Internal Ratings Based Approach** under **Select Applications** on the OFSAAI window.

2. Click **Run Management → Run Execution** from the LHS pane as shown in this screenshot.

    The *Run Management Summary* Window is displayed, wherein you can define and execute Runs.

NOTE: For BASEL-USFED Integration Run, please use the FSDF Run Management screen as the **Request Report Flag**, **Override Report Flag**, and **Approve Report Flag** options are not available in the Basel Run Management Screen to enable the Reporting Flag.

Run Execution UI Icons

The following table aims to familiarize you with the common icons available in the Run Management UI:

Icons Name	Icon	Description
Pagination Options		Helps in navigating from one page to another
View		Helps to view details of a particular Run

Icons Name	Icon	Description
Run Default Parameters		Click this icon to allow you to update the Run Default Parameters
Run Execution Parameters		Click this icon to allow you to update the Run Execution Parameters
Add		Helps in adding a hierarchy
Run Execution		Helps in viewing the Run Execution details
Copy		Click this icon to display the Run Execution Parameters window to modify or create a batch
Search		This icon helps in searching a particular Run. Type the Run Name in the Run Name Text Box and click this icon.
Reset		The Reset icon refreshes the Run Name and Run Type field back to the default blank fields.
Execute		Click to execute a Run

11.2.4   Run Management Summary

Run Management Summary displays the list of runs defined in the Rules Framework except those with Immediate Execution Option **Yes** in the grid. It provides the following details of the run:

- **Run Name**
- **Run Type**
- **Created By**
- **Creation Date**
- **Last Modified By**
- **Last Modified Date**

The Search Panel has a provision to search based on segment, Run name, and Run type.

You can see the complete list of runs with the help of pagination by navigating from one page to another by clicking the ▶ (Next) ◀ (Previous) icons, by clicking the ⩸ (No Records) to be viewed per page or by providing the input for the number of records to be displayed per page or on the bar.

You can also sort the records to view it in convenient way.

Run Default Parameters

Run Default Parameter allows you to enter and save the run level parameters. To input the run level parameters select the checkbox corresponding to that run and click 📝 icon on the navigation bar. **Run Parameters** window is displayed where you can view and input Run level parameters related to that Run. You are allowed to add or modify the parameter values and store the same.

NOTE: To modify or view the parameters the Modify Run Parameters role should be mapped to your user profile.

The following parameters are to be updated:

- **Legal Entity**: The accounts of the selected legal entity and its child entity (depending on the consolidation type selected) are processed to calculate provision. Parent-child relationship between Legal Entity is as defined in **DIM_ORG_STRUCTURE** table.

- **Consolidation Type**: This field is read in conjunction with legal entity field. It is a dropdown box and the value can be **Solo** or **Consolidation**. Select **Solo** if you want to process direct accounts of the legal entity and not that of its child entities. Select **Consolidation** if you want to process all the accounts under the legal entity and its child entities. In case of Consolidation, all intra-group exposures are excluded.

- **Reporting Currency**: The currency can be selected from **Run Parameters** window. All amounts in the run are converted to the selected reporting currency.

- **User Defined Run Parameter Setup**: This is to select the run parameter to be added in the Run Execution.

Run Execution Parameters

In addition to the Run Default parameters, **Run Execution Parameter** window allows you to enter and save the Run execution parameters. By clicking the [Save] icon a batch with the entered Run execution parameters is created. The batch created can be executed by clicking [Execute] icon. To input the Run Execution Parameters, select the check box corresponding to that run and click the ⚙ icon on the navigation bar.

NOTE: To execute a Run, the *execute run* role should be mapped to your user profile.

In the **Run Execution Type** section, you can select **Yes** if you want the portfolio to participate in the execution. The following run execution parameters are to be updated:

- **Legal Entity**: Default legal entity set for the run (*as mentioned in Default Parameters for Run)* can be changed for the specific execution. The accounts of the selected legal entity and its child entity (depending on the consolidation type selected) are processed to calculate provision. Parent-child relationship between legal entities is as defined in **DIM_ORG_STRUCTURE** table.

- **Consolidation Type**: Default consolidation type set for the run (*as mentioned in Default Parameters for Run)* can be changed for the specific execution. This field is read in conjunction with legal entity field. It is a dropdown box and the value can be **Solo** or **Consolidation**. Select **Solo** if you want to process direct accounts of the legal entity and not that of its child entities. Select **Consolidation** if you want to process all the accounts under the legal entity and its child entities. In case of **Consolidation,** all intra-group exposures are excluded.

- **Reporting Currency:** The currency for a particular execution can be selected from **Run Execution Parameters** window. All amounts are converted to the selected reporting currency.

- **User Defined Run Parameter Setup**: This is to select the run parameter to be added in the Run Execution.

- **FIC_MIS_DATE**: Date as-on which data should be picked and processed.

- **Run Execution Description**: This is to describe a run in detail. It is an optional parameter.

Run Name	IND Basel III Capital Calculation - Advanced IRB Approach - Indian Banks
Legal Entity *	ICICI
Consolidation Type	Consolidated
Reporting Currency	Indian Rupee
User Defined Run Parameter Setup	
FIC MIS Date *	01/03/2017
Run Execution Description	

Save   Execute   Close

Run Execution Summary

Selecting a Run from the **Run Management** window and clicking the 🖳 icon displays the **Run Execution Summary** window where the following sections are displayed.

- **Run Details**
- **Run Execution Details**

The Run details, displays the following details:

- **Run Name**
- **Run Type**
- **Run ID**

The **Run Execution Details**, displays the following details:

- **Run Skey**
- **Run Execution ID**
- **FIC MIS DATE**
- **Execution Status**
- **Execution Date**
- **Time of Execution**

Click the checkbox against Run Execution ID for the following:

- View Parameter details

  Clicking the ▤ icon displays the parameter details like Run Execution Parameter Detail.

- Copy

  Clicking ▦ icon to display the **Run Execution Parameter** window with the parameters populated as the selected execution and you can modify or can create a batch and execute the same.

- Execute

Clicking ⚙ icon triggers the batch which is created from the **Run Execution Parameter** window and the status of the triggered batch is displayed. In the execution summary window multiple selections of the execution ids is available to trigger a batch.
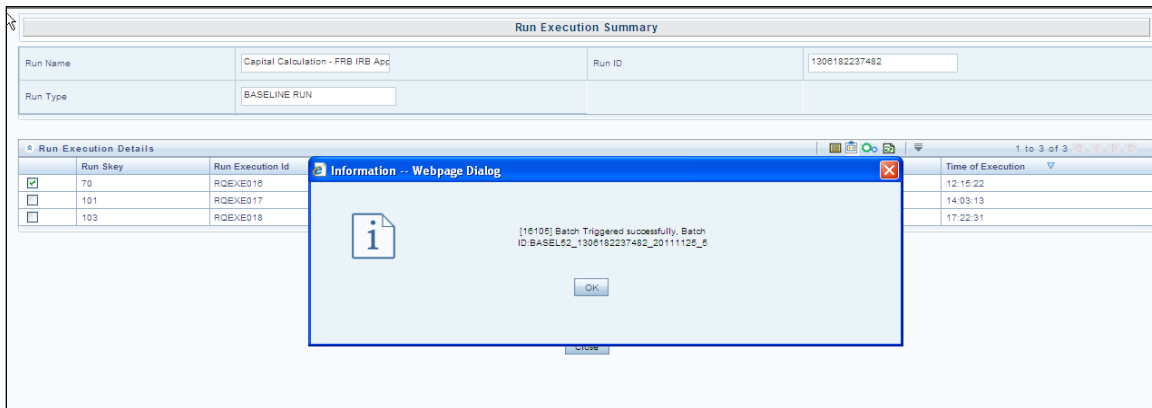
11.2.5   Run Management Maintenance

You also have the option of modifying the various parameters in Run Management. These parameters can be modified in the Run Management Setup tables. The relevant Run Management Setup tables configured in the Basel application are as follows:

- **RM_SETUP_SEG_REGULATION_MAP**: This table contains the list of regulations mapped to each segment.

Primary key → V_SEGMENT_CODE, V_REGULATION

Column	Indicative Values
V_SEGMENT_CODE	Contains the segment Code.
V_REGULATION	Contains the regulation mapped to the segment.

To add a new regulation under a particular segment, an entry must be done in the **RM_SETUP_SEG_REGULATION_MAP** table.

- **RM_SETUP_APPROACH_MASTER**: This table contains the list of approaches used.

Primary key → N_APPROACH_KEY,V_SEGMENT_CODE

Column	Indicative Values
N_APPROACH_KEY	Contains a unique key for each Approach.
V_SEGMENT_CODE	Contains the segment Code.
V_RISK_TYPE	Contains the risk type (for example: 'CR', 'MR').
V_APPROACH_ID	Contains a unique text identifier for each approach.

V_APPROACH_DESC	Contains the description of the approaches used.
V_APPROACH_ENABLED	Is a flag to identify if the approach is enabled.
N_GROUP_ID	A unique number for each risk type.
F_IS_ADDED_BY_DEFAULT	Value is set to 'Y' if this process is used in all executions (for example: 'Capital Consolidation' and 'Credit Rating Population' are used in all runs).
V_REGULATION	Contains the regulation to which the approach is mapped.

- **RM_SETUP_APPROACH_DETAIL**: contains the Run Management questions and answers for each approach.

  Primary key → V_OPTION_ID, V_SEGMENT_CODE

Column	Indicative Values
N_APPROACH_KEY	Contains a unique key for each Approach from RM_SETUP_APPROACH_MASTER.
V_OPTION_ID	Unique key text identifier for each RM Question and answer(The same option IDs can be repeated for multiple segments).
V_OPTION_DESC	The Run Management Questions and answers(The same question and answer can be repeated for multiple segments).
V_OPTION_TYPE	The value in this field is 'TEXT' for the questions, 'OPTS' for the check boxes and 'RADIO' for the radio icons.
V_PARENT_OPTION_ID	Contains the ID of the parent question.
F_ENABLED_IND	Is a flag to identify if the option is enabled.
F_IS_DEFAULT_VALUE	Is a flag to identify whether the flag is a default value or not.
F_IS_CRM	This flag is used to identify the options that are to be disabled when CRM is not selected in the UI.
V_RUN_PARAMETER_COLUMN	Contains the name of the 'RUN_PARAMETRS' column to which the particular option is related to. The value of the child to this option is stored in the 'RUN_PARAMETRS' column.
V_OPTION_DEPENDENCY	Contains a coma separated list of ids which if selected should disable this Question.
V_REGULATION	Contains the regulation to which the approach is mapped.
V_SEGMENT	Contains the segment Code.

- **RM_SETUP_PROCESS_DETAILS**: Contains the processes and sub processes related to each Run Management answer. There can be multiple sub processes mapped to each option ID segment code combination.

  Primary key → N_OPTION_ID,V_SEGMENT_CODE,V_SUB_PROCESS

Column	Indicative values
V_SEGMENT_CODE	Contains the segment Code.
V_RISK_TYPE	Contains the risk type (for example: 'CR', 'MR', and so on).
V_APPROACH	Contains a unique text identifier for each approach.
V_APPROACH_DESC	Contains the description of the approaches used.
N_OPTION_ID	Contains the run management answers ID.
V_SUB_PROCESS	Contains the names of the processes and the sub processes.
N_APPROACH_KEY	Contains a unique key for each Approach.
F_MASTER_PROCESS	This flag is 'Y' for the processes and is null for the sub processes.
N_SUB_SORT_ORDER	It contains the order of processes when there is more than one process for an option ID.
V_REGULATION	Contains the regulation to which the process is mapped.

- **RUN_PARAMETER_DETAILS**: This table contains details of the run parameters.

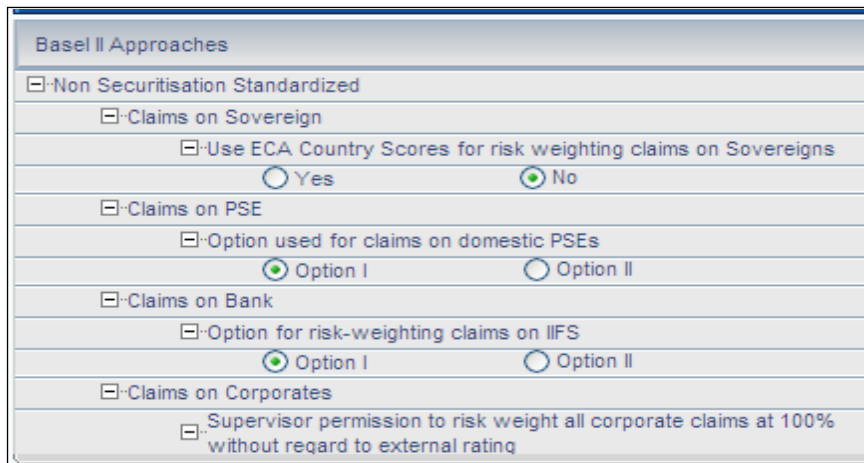| Column	Indicative Values
V_SEGMENT_CODE	Stores the segment codes.
V_PARAM_ID	Stores the parameter ID of the parameters used in the default parameter window.
V_PARAM_DESC	Stores the description of the parameters.
V_PARAM_TYPE	Stores the information on the parameter type. The type can be HIER for Hierarchy, LIST for dropdown, TEXT for input, RADIO for radio icon, CALENDAR for calendar.
F_IS_MANDATORY	Stores the information whether the parameter is mandatory or not.
N_DISPLAY_ORDER	Specifies the order in which the parameters must appear in the window.
F_IS_DEFAULT_PARAM	Specifies if the parameter is default or not.
F_NODE_SELECTION	Specifies if the hierarchy selection is single level or multi level.
V_RUN_TYPE	Specifies the type of run. BR for Baseline Run, SR for Simulation Run, ST for Stress Run.

Column	Indicative Values
F_IS_LEBASED	Specifies that the run is LE based.

- **RUN_PARAMETERS_LOV**: This table contains the details of the run parameters defined in run parameters.

Column	Indicative Values
V_SEGMENT_CODE	Stores the segment codes.
V_PARAM_ID	Stores the parameter ID of the parameters used in the default parameter window.
V_PARAM_VALUE_CODE	Stores the code of the list of values to be displayed.
V_PARAM_VALUE_DESC	Stores the description of the list of values to be displayed.
N_DISPLAY_ORDER	Specifies the order in which the parameters must appear in the window.
V_RUN_TYPE	Specifies the type of Run. BR for Baseline Run, SR for Simulation Run, ST for Stress Run.

There are two types of modifications possible in Run Management as follows:

To Add a New Answer to an Existing Question

For example: Under **Claims on PSE** if you want to add Option III, then the new Setup data is as follows:

Table	Column	Indicative Values
RM_SETUP_APPROACH_DETAIL	n_approach_key	Same as 'Claims on domestic PSEs'
RM_SETUP_APPROACH_DETAIL	v_option_id	New Option ID
RM_SETUP_APPROACH_DETAIL	v_option_desc	Option III
RM_SETUP_APPROACH_DETAIL	v_option_type	RADIO

Table	Column	Indicative Values
RM_SETUP_APPROACH_DETAIL	v_parent_option_id	v_option _id of 'Option used for claims on domestic PSEs'
RM_SETUP_APPROACH_DETAIL	f_enabled_ind	Y
RM_SETUP_APPROACH_DETAIL	f_is_default_value	NULL
RM_SETUP_APPROACH_DETAIL	f_is_crm	NULL
RM_SETUP_APPROACH_DETAIL	v_run_parameter_column	NULL
RM_SETUP_APPROACH_DETAIL	v_option_dependency	NULL
RM_SETUP_APPROACH_DETAIL	v_segment_code	Same as 'Claims on domestic PSEs'
RM_SETUP_APPROACH_DETAIL	v_regulation	Same as 'Claims on domestic PSEs'

To Add a New Question

For example: If you want to add a question such as "Are floor risk weights applicable for corporate?" (This question is applicable only if 100% risk weights corporate are not applicable), then the new set up tables is as follows:

Table	Column	Indicative values		
RM_SETUP_APPROACH_DETAIL	n_approach_key	Same as 'Non Securitization Standardized'		
RM_SETUP_APPROACH_DETAIL	v_option_id	OPT01	OPT02	OPT03
RM_SETUP_APPROACH_DETAIL	v_option_desc	Use floor risk weights for corporate?	Yes	No
RM_SETUP_APPROACH_DETAIL	v_option_type	TEXT	RADIO	RADIO

Table	Column	Indicative values		
RM_SETUP_APPROACH_DETAIL	v_parent_option_id	v_option _id of 'Claims on Corporates'	OPT01	OPT01
RM_SETUP_APPROACH_DETAIL	f_enabled_ind	Y	Y	Y
RM_SETUP_APPROACH_DETAIL	f_is_default_value		Y	
RM_SETUP_APPROACH_DETAIL	f_is_crm			
RM_SETUP_APPROACH_DETAIL	v_run_parameter_column	Run parameter column name		
RM_SETUP_APPROACH_DETAIL	v_option_dependency	v_option _id of 'Yes'		
RM_SETUP_APPROACH_DETAIL	v_segment_code	Same as 'Non Securitization Standardized'		
RM_SETUP_APPROACH_DETAIL	v_regulation	Same as 'Non Securitization Standardized'		

11.2.6   Run Parameters Setup for Run Creation

If the Run is not created through Run Management UI, the **usr_defined_run_parameters** table must be setup manually for the selected options/approaches for a particular regulation and segment. **USER_DEFINED_RUN_PARAMETERS** table has the setup codes for different options. However, if you want to add more options, you can add a record (new setup codes with options) by looking up information from **RM_SETUP_APPROACH_DETAIL** - the setup table for options that are displayed on the Run Definition window. In this table the column names are populated against the questions. Configuration of **RM_SETUP_APPROACH_DETAILS** is explained in the Run Management Maintenance section. The column names and values that are updated for the selected option are given in the following table:

Regulation: Basel

Segment: BRAZIL

RUN_PARAMETERS column name	Approach for Non Securitization Standardized	Selected Option	RUN_PARAMETERS column value
v_crm_method	For CRM Approach for Banking Book	Collateral Simple Approach	OPT0053

Segment: CBRC

RUN_PARAMETERS column name	Approach for Market Risk Standardized Approach	Selected Option	RUN_PARAMETERS column value
v_mrs_interest_rate_method	Approach for Interest Rate Risk	General Market Risk-Duration Method	OPT1003
		General Market Risk-Maturity Method	OPT1004
v_mrs_commodity_risk_method	Approach for Commodity Risk	Simplified Approach	OPT1008
		Maturity Ladder Approach	OPT1009
v_mrs_options_method	Approach for Options	Simplified Approach	OPT1013
		Delta Plus Approach	OPT1014

RUN_PARAMETERS column name	Approach for Non Securitization FIRB	Selected Option	RUN_PARAMETERS column value
v_nfir_explicit_mat_adj	Use of Explicit Maturity Adjustment under FIRB Approach	Yes	OPT0203
		No	OPT0204
v_nir_default_risk_app	For Purchase Receivables using the Default Risk Approach	Top Down	OPT0207
		Bottom Up	OPT0208
v_nir_dil_risk_immaterial	For Purchase Receivables is Dilution Risk immaterial?	Yes	OPT0210
		No	OPT0211
v_nir_1yr_mat_corp_pr	Use of one-year maturity for Dilution Risk of Purchased Corporate Receivables	Yes	OPT0213
		No	OPT0214
v_ns_haircut_method	Applying Haircut	Supervisory Haircut	OPT0216
		Own Estimate	OPT0217
v_ns_sft_method	Approach for Securities Financing Transactions	Simple Approach	OPT0224
		IMM	OPT0225
		VaR Model	OPT0226

RUN_PARAMETERS column name	Approach for Non Securitization FIRB	Selected Option	RUN_PARAMETERS column value
v_ns_otc_method	Approach for OTC Derivatives	CEM	OPT0228
		IMM	OPT0229
		Standard Approach	OPT0230
v_ns_lst_approach	Approach for Long Settlement Transactions	CEM	OPT0232
		IMM	OPT0233
		Standard Approach	OPT0234
v_nir_sl_pref_rw	Using preferential risk weights for specialized lending sub-classes in Strong and Good	Yes	OPT0241
		No	OPT0242
v_nir_equity_approach	Approach for Equity	IMM Approach	OPT0245
		Simple Risk Weight Approach	OPT0246
		PD - LGD Approach	OPT0247

RUN_PARAMETERS column name	Approach for Securitization IRB	Selected Option	RUN_PARAMETERS column value
v_sec_approach	Securitization - Internal Rating Based Approach	Not Applicable	OPT0608

Segment: EUROPE (EU)

RUN_PARAMETERS column name	Approach for Securitization Standardized	Selected Option	RUN_PARAMETERS column value
V_NS_HAIRCUT_METHOD	Applying Haircut	Supervisory Haircut	OPT0056
		Own Estimate	OPT0057
V_NS_LST_APPROACH	Approach for Long Settlement Transactions	MTM	OPT9016
		OEM	OPT9017
		IMM	OPT9018

RUN_PARAMETERS column name	Approach for Securitization Standardized	Selected Option	RUN_PARAMETERS column value
V_NS_OTC_METHOD	Approach for OTC Derivatives	IMM	OPT9004
		MTM	OPT9005
		OEM	OPT9006
V_NS_SFT_METHOD	Approach for Securities Financing Transactions	IMM	OPT9004
		Comprehensive Approach	OPT9009
V_CRM_METHOD	CRM Approach used for Banking Book	Collateral Simple Approach	OPT0053
		Collateral Comprehensive Approach	OPT0054
V_CVA_INCLUDE_SFT	CVA Standardized Approach which includes SFTs for CVA calculation	Yes	OPT0062
		No	OPT0063
V_CVA_METHOD	Approach for Credit Value Adjustments	Alternative Approach	OPT9032
		Standardized Approach	OPT0060
		Advanced Approach	OPT9031
V_DFC_RWA_APPROCH	Default Fund Contribution - Capital Calculation	Calculation of own fund requirement for exposures to a QCCP	OPT9020
		Alternative calculation of own funds requirement for exposures to a QCCP	OPT9021

RUN_PARAMETERS column name	Approach for Securitization Standardized	Selected Option	RUN_PARAMETERS column value
V_MTM_ADD_ON_OPTION	OTC MTM Add-On Approach	Option 1	OPT9013
		Option 2	OPT9014
V_DFC_ALT_CALC_SUP_APRV	Default Fund Contribution - Supervisory Approval available for usage of Alternative calculation of own fund requirements when CCP has stopped calculating hypothetical capital	Yes	OPT9023
		No	OPT9024
V_CVA_ALT_APRCH_SUP_APRV	CVA - Supevisory approval to use Alternative Approach when the bank uses Original Exposure method(OEM) for CCR	Yes	OPT9034
		No	OPT9035
V_INC_INT_TXN_IN_CVA_CAP_CHRG	CVA - Supervisory Approval to include Internal Transactions in the CVA Capital Charge Calculation	Yes	OPT9040
		No	OPT9041
V_FAILED_TRADE_WAIVER	Failed Trade Treatment - Supervisory approval to treat exposures not as failed trade due to system wide failure of settlement system.	Yes	OPT9043
		No	OPT9044
V_NON_DVP_EXP_RW_REDUCTION_OPT	Failed Trade Treatment - Can the Non-DvP (free delivery) exposures be risk weighted instead of deduction from capital ?	Yes	OPT9046
		No	OPT9047
V_QUAL_HLD_FIN_SEC_OPTION	Treatment of Qualifying holdings outside the financial sector	Investment exceeding Threshold	OPT9028
V_INT_TRANS_RW_METHOD	0% Risk Weight For Internal Transactions Not Reclassified As CET1/AT1/T2	Yes	OPT9053
		No	OPT9054
V_SUP_APPR_CB_ULY_INST	Preferential Treatment to Covered Bonds Underlying of Institutions	Yes	OPT9050
		No	OPT9051

Segment: INDIA

RUN_PARAMETERS column name	Approach for Securitization Standardized	Selected Option	RUN_PARAMETERS column value
v_sec_approach	For Securitization Standardized Approach	N/A	OPT00500

RUN_PARAMETERS column name	Approach for Market Risk	Selected Option	RUN_PARAMETERS column value
v_mrs_interest_rate_method	Interest Rate Risk	General Market Risk-Duration Method	OPT1003
v_mrs_options_method	Options	Simplified Approach	OPT1013
		Delta Plus Approach	OPT1014

RUN_PARAMETERS column name	Approach for Non Securitization Standardized	Selected Option	RUN_PARAMETERS column value
v_ns_sft_method	Approach for Securities Financing Transactions	Simple Approach	OPT0037
v_ns_otc_method	Approach for OTC Derivatives	CEM	OPT0041
v_ns_haircut_method	Applying Haircut	Supervisory Haircut	OPT0056

Segment: IFSB

RUN_PARAMETERS column name	Approach for Securitization Standardized	Selected Option	RUN_PARAMETERS column value
v_sec_approach	For Securitization Standardized approach	N/A	OPT0500
v_mrs_commodity_risk_method	For Commodity Risk	Commodity Risk	OPT1008
		Maturity Ladder Approach	OPT1009

RUN_PARAMETERS column name	Approach for Market Risk	Selected Option	RUN_PARAMETERS column value
v_mrs_commodity_risk_method	For Commodity Risk	Commodity Risk	OPT1008
		Maturity Ladder Approach	OPT1009

RUN_PARAMETERS column name	Approach for Non Securitization Standardized	Selected Option	RUN_PARAMETERS column value
v_nss_eca_for_soverign	To use ECA Country Scores for risk weighting claims on Sovereign	Yes	OPT0004
		No	OPT0005
v_nss_rw_option_dpse	Option used for claims on domestic PSEs	Option I	OPT0008
		Option II	OPT0008
v_nss_rw_option_bank	Claims on Bank, option for risk-weighting claims on IIFS	Option I	OPT0012
		Option II	OPT0013
v_nss_100pct_rw_corp	For Claims on Corporate, supervisor permission to risk weight all corporate claims at 100% regardless of external ratings	Yes	OPT0016
		No	OPT0017
v_nss_equity_approach	For Equity Exposures In Banking Book, the option for risk-weighting Equity Exposures in Banking Book	Simple Risk Weight Method	OPT0034
		Slotting Method	OPT0035
v_crm_method	CRM Approach used for Banking Book	Collateral Simple Approach	OPT0053
		Collateral Comprehensive Approach	OPT0054
v_ns_haircut_method	Applying Haircut	Supervisory Haircut	OPT0056
		Own Estimate	OPT0057

Regulation: Basel II

Segment: BIS

RUN_PARAMETERS column name	Approach for Securitization Approaches	Selected Option	RUN_PARAMETERS column value
v_sec_approach	For Standardized Approach	N/A	OPT0500
v_sec_approach	For Rating Based Approach	N/A	OPT0601
v_sec_approach	For Internal Assessment Approach	N/A	OPT0604
v_sec_approach	For Internal Rating Based Approach	N/A	OPT0608

RUN_PARAMETERS column name	Approach for Securitization Approaches	Selected Option	RUN_PARAMETERS column value
v_ssf_simple_n_lgd	Usage of Simplified Method for computing N and LGD - Supervisory Formula Approach	Yes	OPT0611
		No	OPT0612
v_ssf_simple_n_lgd	Usage of Simplified Method for computing N and LGD - Internal Rating Based Approach	Yes	OPT0614
		No	OPT0615

RUN_PARAMETERS column name	Approach for Market Risk	Selected Option	RUN_PARAMETERS column value
v_mrs_interest_rate_method	Approach for Interest Rate Risk (Standardized Approach)	General Market Risk-Duration Method	OPT1003
		General Market Risk-Maturity Method	OPT1004
v_mrs_commodity_risk_method	Approach for Commodity Risk (Standardized Approach)	Simplified Approach	OPT1008
		Maturity Ladder Approach	OPT1009
v_mrs_options_method	Approach for Options (Standardized Approach)	Simplified Approach	OPT1013
		Delta Plus Approach	OPT1014

RUN_PARAMETERS column name	Approach for Non Securitization Standardized Approach	Selected Option	RUN_PARAMETERS column value
v_nss_eca_for_soverign	Use ECA Country Scores for risk weighting claims on Sovereign	Yes	OPT0004
		No	OPT0005
v_nss_rw_option_dpse	Option used for claims on domestic PSEs	Option I	OPT0008
		Option II	OPT0009
v_nss_rw_option_bank	Option for risk-weighting claims on Banks	Option I	OPT0012
		Option II	OPT0013

RUN_PARAMETERS column name	Approach for Non Securitization Standardized Approach	Selected Option	RUN_PARAMETERS column value
v_nss_100pct_rw_corp	Supervisor permission to risk weight all corporate claims at 100% regardless of external ratings	Yes	OPT0016
		No	OPT0017
v_nss_lower_rw_cre	Has the national supervisor permitted a lower RW for certain commercial real estate?	Yes	OPT0020
		No	OPT0021
v_nss_pastdue_for_nonpastdue	Past due treatment for non-past due loans to counterparties is subject to a 150% RW?	Yes	OPT0024
		No	OPT0025
v_nss_0_rw_for_gold	Use of 0% RW for Gold Bullion held in own vaults or on allocated basis	Yes	OPT0027
		No	OPT0028
v_nss_borrower_ccy_rat_mdb	Use of borrower's domestic currency rating for exposure in foreign exchange transactions	Yes	OPT0030
		No	OPT0031
v_ns_sft_method	Approach for Securities Financing Transactions	Simple Approach	OPT0037
		IMM	OPT0038
		VaR Model	OPT0039
v_ns_otc_method	Approach for Over the Counter Products	CEM	OPT0041
		IMM	OPT0042
		Standardized Approach	OPT0043
v_ns_lst_approach	Approach for Long Settlement Transactions	CEM	OPT0045
		IMM	OPT0046
		Standardized Approach	OPT0047
v_ns_haircut_method	Applying Haircut	Supervisory Haircut	OPT0056
		Own Estimate	OPT0057

RUN_PARAMETERS column name	Approach for Non Securitization IRB	Selected Option	RUN_PARAMETERS column value
v_nfir_explicit_mat_adj	Use of Explicit Maturity Adjustment under FIRB Approach	Yes	OPT0203
		No	OPT0204
v_nir_default_risk_app	Using Default Risk Approach for Purchase Receivables	Top Down	OPT0207
		Bottom Up	OPT0208
v_nir_dil_risk_immaterial	For Purchase Receivables is Dilution Risk immaterial	Yes	OPT0210
		No	OPT0211

RUN_PARAMETERS column name	Approach for Non Securitization IRB	Selected Option	RUN_PARAMETERS column value
v_nir_1yr_mat_corp_ pr	Use of one-year maturity for Dilution Risk of Purchased Corporate Receivables	Yes	OPT0213
		No	OPT0214
v_ns_haircut_method	Applying Haircut	Supervisory Haircut	OPT0216
		Own Estimate	OPT0217
v_ns_sft_method	Approach for Securities Financing Transactions	Simple Approach	OPT0224
		IMM	OPT0225
		VaR Model	OPT0226
v_ns_otc_method	Approach for Over the Counter Products	CEM	OPT0228
		IMM	OPT0229
		Standard Approach	OPT0230
v_ns_lst_approach	Approach for Long Settlement Transactions	CEM	OPT0232
		IMM	OPT0233
		Standard Approach	OPT0234
v_nir_sl_pref_rw	Specialized Lending slotting criteria approach - Use of preferential risk weights for specialized lending sub-classes in Strong and Good	Yes	OPT0241
		No	OPT0242
v_nir_equity_approac h	Approach for Equity	IMM Approach	OPT0245
		Simple Risk Weight Approach	OPT0246
		PD - LGD Approach	OPT0247

RUN_PARAMETERS column name	Approach for Non Securitization Standardized (AIRB)	Selected Option	RUN_PARAMETERS column value
v_ns_haircut_method	Applying Haircut	Yes	OPT0004
		Supervisory Haircut	OPT0312
		Own Estimate	OPT0313
v_ns_sft_method	Approach for Securities Financing Transactions	Simple Approach	OPT0320
		IMM	OPT0321
		VaR Model	OPT0322
v_ns_otc_method	Approach for Over the Counter Products	**CEM**	OPT0324
		IMM	OPT0325
		Standard Approach	OPT0326
v_ns_lst_approach	Approach for Long Settlement Transactions	**CEM**	OPT0328
		IMM	OPT0329
		Standard Approach	OPT0330

RUN_PARAMETERS column name	Approach for Non Securitization Standardized (AIRB)	Selected Option	RUN_PARAMETERS column value
v_nir_sl_pref_rw	Use of preferential risk weights for specialized lending sub-classes in Strong and Good	Yes	OPT0337
		No	OPT0338
v_nir_equity_approach	Approach for Equity	IMM Approach	OPT0341
		Simple Risk Weight Approach	OPT0342
		PD - LGD Approach	OPT0343
v_nir_default_risk_app	Default Risk Approach for Purchase Receivables	Top Down	OPT0303
		Bottom Up	OPT0304
v_nir_dil_risk_immaterial	Is Dilution Risk immaterial?	Yes	OPT0306
		No	OPT0307
v_nir_1yr_mat_corp_pr	Use of one-year maturity for Dilution Risk of Purchased Corporate Receivables	Yes	OPT0309
		No	OPT0310

Regulation: US Final Rules

Segment: USA

RUN_PARAMETERS column name	Approach for Securitization	Selected Option	RUN_PARAMETERS column value
v_sec_approach	Rating Based Approach	N/A	OPT0601
v_sec_approach	Internal Assessment Approach	N/A	OPT0604
v_sec_approach	Supervisory Formula Approach	N/A	OPT0607
v_ssf_simple_n_lgd	Internal Ratings Based Approach - Use Simplified Method for computing N and LGD in SFA	Yes	OPT0614
		No	OPT0615
v_ssf_simple_n_lgd	Supervisory Formula Approach - Use Simplified Method for computing N and LGD in SFA	Yes	OPT0611
		No	OPT0612

RUN_PARAMETERS column name	Approach for Non Securitization IRB	Selected Option	RUN_PARAMETERS column value
F_CRM_REQ_SINGLE_PARTY	CRM (For Single Counterparty)	If CRM is selected for Single Counterparty run	CRM SC
v_nir_eq_non_invst_fund_app	Equity Exposures - Non-Investment Funds	IMM Approach	OPT0061
		Simple Risk Weight Approach	OPT0062

RUN_PARAMETERS column name	Approach for Non Securitization IRB	Selected Option	RUN_PARAMETERS column value
v_nir_eq_invst_fund_app	Equity Exposures - Investment Funds (In conjunction with Money Market Fund Approach)	Simple Modified Look Through Approach	OPT0064
		Alternate Modified Look Through Approach	OPT0065
		Full Look Through Approach	OPT0066
v_ns_sft_method	Approach for Securities Financing Transactions	Collateral Haircut Approach	OPT0070
		Internal Model Method	OPT0071
		VaR Models Approach	OPT0072
v_ns_otc_method	Approach for Over the Counter Products	Current Exposure Method	OPT0074
		Internal Model Method	OPT0075
v_ns_haircut_method	Approach for Securities Financing Transactions - Haircut	Supervisory Haircut	OPT0067
		Own Estimate	OPT0068
v_crm_guar_and_cd_approach	Approach for Credit derivatives and guarantees	PD Substitution Approach	OPT0081
		LGD Adjustment Approach	OPT0082
v_crm_collateral_approach	Approach for CRM - SFT Collateral	Comprehensive Approach	OPT0083
		LGD Adjustment Approach	OPT0084
v_crm_collateral_approach_otd	Approach for CRM - OTC Collateral	Comprehensive Approach	OPT0085
		LGD Adjustment Approach	OPT0086
v_dfc_rwa_approch	Default Fund Contribution - Capital Calculation	Total Default Fund Contribution Approach	OPT0034
		Bank's Own Default Fund Contribution Approach	OPT0035

Regulation: Basel III

Segment: BIS

RUN_PARAMETERS column name	Approach for Securitization	Selected Option	RUN_PARAMETERS column value
v_sec_approach	Standardized	N/A	OPT0500
v_sec_approach	Rating Based Approach	N/A	OPT0601
v_sec_approach	Internal Assessment Approach	N/A	OPT0604
v_sec_approach	Internal Rating Based Approach	N/A	OPT0608
v_ssf_simple_n_lgd	Supervisory Formula Approach	Yes	OPT0611
	Usage of Simplified Method for computing N and LGD	No	OPT0612
v_ssf_simple_n_lgd	Internal Rating Based Approach	Yes	OPT0614
	Usage of Simplified Method for computing N and LGD	No	OPT0615

RUN_PARAMETERS column name	Approach for Market Risk Standardized Approach	Selected Option	RUN_PARAMETERS column value
v_mrs_options_method	Options	Simplified Approach	OPT1013
		Delta Plus Approach	OPT1014
v_mrs_interest_rate_method	Interest Rate Risk	General Market Risk-Duration Method	OPT1003
		General Market Risk-Maturity Method	OPT1004
v_mrs_commodity_risk_method	Commodity Risk	Simplified Approach	OPT1008

RUN_PARAMETERS column name	Approach for Non Securitization Standardized	Selected Option	RUN_PARAMETERS column value
v_nss_eca_for_sovereign	Use ECA Country Scores for risk weighting claims on Sovereign	Yes	OPT0004
		No	OPT0005
v_nss_rw_option_dpse	Option used for claims on domestic PSEs	Option I	OPT0008
		Option II	OPT0009
v_nss_rw_option_bank	Option for risk-weighting claims on Banks	Option I	OPT0012
		Option II	OPT0013

RUN_PARAMETERS column name	Approach for Non Securitization Standardized	Selected Option	RUN_PARAMETERS column value
v_nss_100pct_rw_corp	Supervisor permission to risk weight all corporate claims at 100% without regard to external rating	Yes	OPT0016
		No	OPT0017
v_nss_lower_rw_cre	Has the national supervisor permitted a lower RW for certain commercial real estate?	Yes	OPT0020
		No	OPT0021
v_nss_pastdue_for_nonpastdue	Past due treatment for non-past due loans to counterparties subject to a 150% RW	Yes	OPT0024
		No	OPT0025
v_nss_0_rw_for_gold	Use of 0% RW for Gold Bullion held in own vaults or on allocated basis	Yes	OPT0027
		No	OPT0028
v_nss_borrower_ccy_rat_mdb	Use of borrower's domestic currency rating for exposure in foreign exchange transactions	Yes	OPT0030
		No	OPT0031
v_ns_sft_method	Approach for Securities Financing Transactions	Simple Approach	OPT0037
		IMM	OPT0038
		VaR Model	OPT0039
v_ns_otc_method	Approach for Over the Counter Products	CEM	OPT0041
		IMM	OPT0042
		Standard Approach	OPT0043
v_ns_lst_approach	Approach for Long Settlement Transactions	CEM	OPT0045
		IMM	OPT0046
		Standard Approach	OPT0047
v_ns_haircut_method	Applying Haircut	Supervisory Haircut	OPT0056
		Own Estimate	OPT0057
v_cva_method	CVA Standardized Approach	N/A	OPT0060
v_cva_include_sft	CVA Standardized Approach which includes SFTs for CVA calculation	Yes	OPT0062
		No	OPT0063

RUN_PARAMETERS column name	Approach for Non Securitization Standardized (FIRB)	Selected Option	RUN_PARAMETERS column value
v_cva_cds_index_decomposition	CDS Index must be decomposed	Yes	OPT0267
		No	OPT0268

RUN_PARAMETERS column name	Approach for Non Securitization FIRB	Selected Option	RUN_PARAMETERS column value
v_nfir_explicit_mat_adj	Use of Explicit Maturity Adjustment	Yes	OPT0203
		No	OPT0204
v_nir_default_risk_app	Purchase Receivables for Default Risk Approach	Top Down	OPT0207
		Bottom Up	OPT0208
v_nir_dil_risk_immaterial	Is Dilution Risk immaterial for Purchase Receivables?	Yes	OPT0210
		No	OPT0211
v_nir_1yr_mat_corp_pr	Use of one-year maturity for Dilution Risk of Purchased Corporate Receivables:	Yes	OPT0213
		No	OPT0214
v_ns_haircut_method	Applying Haircut	Supervisory Haircut	OPT0216
		Own Estimate	OPT0217
v_ns_sft_method	Approach for Securities Financing Transactions	Simple Approach	OPT0224
		IMM	OPT0225
		VaR Model	OPT0226
v_ns_otc_method	Approach for Over the Counter Products	CEM	OPT0228
		IMM	OPT0229
		Standard Approach	OPT0230
v_ns_lst_approach	Approach for Long Settlement Transactions	CEM	OPT0232
		IMM	OPT0233
		Standard Approach	OPT0234
v_nir_sl_pref_rw	Specialized Lending-Slotting Criteria Approach. Use of preferential risk weights for specialized lending sub-classes in Strong and Good	Yes	OPT0241
		No	OPT0242
v_nir_equity_approach	Approach for Equity	IMM Approach	OPT0245
		Simple Risk Weight Approach	OPT0246
		PD - LGD Approach	OPT0247
v_cva_method	Approach for Credit Value Adjustments	CVA Standardized Approach	OPT0261
		CVA Internal Model Method Approach	OPT0262
v_cva_include_sft	Include SFTs for CVA calculation	Yes	OPT0264
		No	OPT0265

RUN_PARAMETERS column name	Approach for Non Securitization FIRB	Selected Option	RUN_PARAMETERS column value
v_cva_cds_index_decomposition	CDS Index must be decomposed	Yes	OPT0267
		No	OPT0268

RUN_PARAMETERS column name	Approach for Non Securitization Standardized (AIRB)	Selected Option	RUN_PARAMETERS column value
v_nir_default_risk_app	Default Risk Approach for Purchase Receivables	Top Down	OPT0303
		Bottom Up	OPT0304
v_nir_dil_risk_immaterial	For purchase receivables is Dilution Risk immaterial?	Yes	OPT0306
		No	OPT0307
v_nir_1yr_mat_corp_pr	Use of one-year maturity for Dilution Risk of Purchased Corporate Receivables	Yes	OPT0309
		No	OPT0310
v_ns_haircut_method	Applying Haircut	Supervisory Haircut	OPT0312
		Own Estimate	OPT0313
v_ns_sft_method	Approach for Securities Financing Transactions	Simple Approach	OPT0320
		IMM	OPT0321
		VaR Model	OPT0322
v_ns_otc_method	Approach for Over the Counter Products	CEM	OPT0324
		IMM	OPT0325
		Standard Approach	OPT0326
v_ns_lst_approach	Approach for Long Settlement Transactions	CEM	OPT0328
		IMM	OPT0329
		Standard Approach	OPT0330
v_nir_sl_pref_rw	Specialized Lending-Slotting Criteria Approach. Use of preferential risk weights for specialized lending sub-classes in Strong and Good	Yes	OPT0337
		No	OPT0338
v_nir_equity_approach	Approach for Equity	IMM Approach	OPT0341
		Simple Risk Weight Approach	OPT0342
		PD - LGD Approach	OPT0343
v_cva_method	Approach for Credit Value Adjustments	CVA Standardized Approach	OPT0361
		CVA Internal	OPT0362

RUN_PARAMETERS column name	Approach for Non Securitization Standardized (AIRB)	Selected Option	RUN_PARAMETERS column value
		Model Method Approach	
v_cva_include_sft	To include SFTs for CVA calculation?	Yes	OPT0364
		No	OPT0365
v_cva_cds_index_de composition	CDS Index must be decomposed	Yes	OPT0367
		No	OPT0368

Regulation: US III

Segment: USA

RUN_PARAMETERS column name	Approach for Non Securitization IRB	Selected Option	RUN_PARAMETERS column value
f_crm_req_single_par ty	CRM (For Single Counterparty)	If CRM is selected for Single Counterparty run	CRM SC
v_nir_eq_non_invst_f und_app	Equity Exposures - Non-Investment Funds	IMM Approach	OPT0061
		Simple Risk Weight Approach	OPT0062
v_nir_eq_invst_fund_ app	Equity Exposures - Investment Funds (In conjunction with Money Market Fund Approach)	Simple Modified Look Through Approach	OPT0064
		Alternate Modified Look Through Approach	OPT0065
		Full Look Through Approach	OPT0066
v_ns_sft_method	SFT	Collateral Haircut Approach	OPT0070
		Internal Model Method	OPT0071
		VaR Models Approach	OPT0072
v_ns_otc_method	OTC	Current Exposure Method	OPT0074
		Internal Model Method	OPT0075
v_ns_haircut_method	SFT - Haircut	Supervisory Haircut	OPT0067
		Own Estimate	OPT0068

RUN_PARAMETERS column name	Approach for Non Securitization IRB	Selected Option	RUN_PARAMETERS column value
v_crm_guar_and_cd_ approach	CRM - Credit derivatives and guarantees	PD Substitution Approach	OPT0081
		LGD Adjustment Approach	OPT0082
v_crm_collateral_app roach	CRM - SFT Collateral	Comprehensive Approach	OPT0083
		LGD Adjustment Approach	OPT0084
v_crm_collateral_app roach_otd	CRM - OTC Collateral	Comprehensive Approach	OPT0085
		LGD Adjustment Approach	OPT0086
		No	OPT0612
V_INDIRECT_EXP_C ALC_APRCH_FLT	FLT Indirect Exposure treatment Approach	FLT - Simple Calculation Approach	OPT0400
		FLT - Significant/ Insignificant Treatment Approach	OPT0401
V_AOCI_OPT_OUT_ ELECTION_OPTION	AOCI Opt-out Option	Yes	OPT100
		No	OPT1003
V_SEC_METHODOL OGY	Risk Weight Appraoch	Simplified Supervisory Formula Approach	OPT0550
		Gross Up Approach	OPT0551
		1250% RW Approach	OPT0552
V_EQ_OTC_CCR_A PPLICABILITY	CCR Charge for Equity Derivatives	Yes	OPT0011
		No	OPT0012

11.3 Reporting

Oracle Financial Services Basel Regulatory Capital Analytics Release 6.1.2.0.0 provides the customer with a reporting-cum-information framework which can be used for generating reports and viewing information relevant to the capital computations and other aspects of the Basel framework. Basel Analytics provides pre-configured *Pillar III* reports covering all market disclosure requirements of the Basel Accord (*Risk-Capital Standards-Advanced Capital Adequacy Framework).*

It also provides pre-configured reports covering all market disclosure requirements of the Islamic Banking Jurisdiction as prescribed by the Islamic Financial Services Board (IFSB) and the requirements prescribed by the China Banking Regulatory Commission (CBRC). It also provides pre-configured Basel Regulatory Reports for individual jurisdictions such as Federal Financial Institutions Examination Council 101 (FFIEC 101) in the USA and Swiss Financial Market Supervisory Authority (FINMA) for Switzerland. The reports and dashboards can be generated at various levels (solo or consolidated) and downloaded in various formats including .XLS. Basel Analytics additionally provides the built-in capability to produce *pixel-perfect.* Hence, Basel Analytics can serve as a single regulatory and management reporting application, meeting all Basel disclosure, IFSB disclosures and reporting requirements.

For more information on Basel Regulatory Capital Analytics*,* see the *Oracle Financial Services Basel Regulatory Capital Analytics User Guide.*

NOTE:	Oracle Financial Services Basel Regulatory Capital Analytics must be licensed by the Bank separately.

12   Attribution Analysis

Attribution Analysis functionality is introduced in the application as a method to analyze the impact of various attribution variables, on the change in Risk Weighted Assets (RWA). It analyzes the capital ratio of the bank across two runs, which are a quarter apart or even a year apart. This functionality enables you to understand the cause of an RWA increase or capital ratio decrease. This become possible by providing them with a causal analysis of various control factors in attribution classes such as Credit Risk, Market Risk, Operational Risk, and Capital Structure categories.

Attribution variables are clubbed together under Attribution categories which are further under the attribution classes. But you can include other categories, depending on the attributes you must analyze. Thus you can select or deselect the relevant categories for the analysis. In short, Attribution Analysis feature is flexible and enables you to customize the categories and variables to suit your portfolios for analysis.

12.1 Attribution Analysis – User Roles and Access

Workaround:

Attribution analysis supports the role based user access.

NOTE: The user roles and the user related access are not supported in the out of box product for this particular functionality.

These roles are defined on site. Suggested roles and access are as follows:

- ♦ Credit Risk Analyst - view/add/edit/map attribution variables for Credit Risk Class.
- ♦ Market Risk Analyst - view/add/edit/map attribution variables for Market Risk Class.
- ♦ Operational Risk Analyst - view/add/edit/map attribution variables for Operational Risk Class.
- ♦ Capital Analyst - view/add/edit/map attribution variables for Capital structure.
- ♦ Credit Risk Authorizer - view/authorize the control variable definitions and mappings for Credit Risk Class.
- ♦ Market Risk Authorizer - view/authorize the control variable definitions and mappings for Market Risk Class.
- ♦ Operational Risk Authorizer - view/authorize the control variable definitions and mappings for Operational Risk Class.
- ♦ Capital Authorizer - view/authorize the control variable definitions and mappings for Capital structure.
- ♦ Enterprise Risk Analysts and Authorizers have access to control variables for all classes.
- ♦ Super user have all these rights and the right to add a new class and map user role to it.

12.2 Credit RWA

This functionality is useful for the risk analysts in a scenario, where your RWA has increased and capital ratio has decreased, as compared to the previous quarter when the business growth is static. The Basel application performs necessary analyzations to find the root cause behind the Credit RWA attribution changes, based on various contributing factors.

12.2.1   Non Securitized Attribution Categories under Credit RWA

The attribution categories that contribute to the attribution analysis for Non-Securitization are the following:

- ♦ Rating Migration: Rating migration (downgrade or upgrade) leads to a direct impact on the risk weights applied to the credit risk exposures.

- ♦ Exchange Rate Fluctuations: Change in exchange rate of the reporting currency with respect to the major currencies in the bank's portfolio impacts all the inflows and outflows.

- ♦ Effective Maturity: Effective maturity impacts the EAD calculation for advanced approaches. Change in effective maturity leads to a change in RWA for the credit exposures of the advanced approaches.

- ♦ Provisioning: Change in the provisioning amount leads to a change in the exposure amount, which is at risk. This further leads to a change in RWA. Any change in loss provisioning amount can also be attributed to the change in corresponding RWA.

- ♦ Past Due Analysis: Change in the number of exposures and the amount of past due exposures impacts the risk weights. The handling of the same leads to a change in RWA for Credit Risk. Between the two runs, if the status of the exposures changes from current to past due or vice versa, the RWA's for those exposures and the difference of the two sets of RWAs can be computed.

- ♦ Net Business Growth: Change in number and amount of exposures indicate the net business growth of the bank. The change in RWA due to this factor can be attributed to business growth. The application determines the new exposures and the exposures that are closed by comparing the list of the two runs. The difference in the RWA's provide the impact on RWA's of the Net Business Growth.

- ♦ Collateral Valuation: Keeping the mark-to-market value of a collateral against an exposure change leads to a change in the post mitigation RWA of that exposure. Thus, this impacts the overall Credit RWA and capital ratio. The application monitors the mark-to-market values of the collaterals that are kept to mitigate the risk arising out of the exposure. The change in such values are used to identify the change in the RWA across two runs and attribute that difference to these amounts.

- ♦ Probability of Default: Any change in the macroeconomic variables impacts the probability of default percentages of the customers. This in turn leads to the change in RWA. Since directly monitoring the changes in the macroeconomic variables like GDP is not possible, the application monitors the changes in the parameters such as PD that are impacted by them. The change in the PD value of a customer across two runs can contribute to the RWA change for the portfolio.

♦ Loss Given Default: Any change in the macroeconomic variables impacts the LGD percentages of the exposures. This leads to the change in RWA. Since it is difficult to directly monitor the changes in the macroeconomic variables like GDP, the application monitors the changes in the parameters such as LGD that are impacted by them. The change in the LGD value of an exposure across two runs can contribute to the RWA change for the portfolio.

♦ Write-Offs: Number of exposures written off in the latest run as compared with those in the previous run provides an insight into the impact on RWA due to write-offs. This help in attributing the RWA change accordingly.

♦ Exposure Amount: Comparing the exposure amounts of an exposure across the two runs helps in getting an insight into the impact on RWA due to the exposure amount changes.

♦ Others: This captures the changes in RWA across two runs which cannot be attributed to any of the preceding reasons. Computation for this depends on the variables selected while defining an attribution analysis.

12.2.2   Securitized Attribution Categories under Credit RWA

The attribution categories that contribute to the attribution analysis for Securitization are the following:

♦ Due Diligence Requirement: Any change in the due diligence requirement impacts the exposure amount and the RWA of those credit exposures where Basel methodology opted for the run is gross up approach and hence help us to attribute the RWA changes accordingly.

♦ Rating Migration: Rating migration (downgrade or upgrade) leads to a direct impact on the risk weights applied to the credit risk exposures.

♦ Net Business Growth: Change in the number of exposures and amount indicates the net business growth of the bank. The change in RWA due to this factor can be attributed to business growth.

♦ Exchange Rate Fluctuations: Change in the exchange rate of reporting currency with respect to the major currencies in the bank's portfolio impacts all the inflows and outflows which have the natural currency as the one for which the exchange rate is impacted.

♦ SSFA Parameter Impact: Tracking the changes in the RWA as a result of change in the risk weight across two runs where there is no change in the due diligence requirement and bank opts SSFA methodology.

12.3 Capital Structure Attribution Categories

The following are the attribution categories for Capital Structure:

♦ Common Equity Tier 1 Capital: Changes in the CET1 amounts leads to a change in capital ratios. The changes can be monitored from the following attribution variables and the change in capital ratio can be attributed to the same:

  o Paid up equity capital
  o Share premium
  o Undisclosed Reserves
  o Retained Earnings
  o Accumulated Other Comprehensive Income

- o Minority Interest
- o Regulatory Adjustments for CET1

♦ Additional Tier 1 Capital: Changes in the AT1 amounts lead to a change in capital ratios. The changes can be monitored in the following attribution variables and the change in capital ratio can be attributed to the same:
- o Instruments eligible for AT1
- o Share Premium from Instruments Eligible for AT1
- o Minority Interest for AT1
- o Regulatory Adjustments for AT1

♦ Tier 2 Capital: Changes in the Tier 2 amounts lead to a change in capital ratios. The changes can be monitored in the following attribution variables and the change in capital ratio can be attributed to the same:
- o Instruments Eligible for T2
- o Share Premium from Instruments Eligible for T2
- o Minority Interest for T2
- o Loan Provisions
- o Regulatory Adjustments for T2

♦ Transition: Due to the phase-in and phase-out timelines for Basel III implementation, capital compositions and deductions can change. This can lead to a difference in the capital ratios. The application identifies the changes in capital compositions and the deductions introduced due to the transition phases and attributes the capital ratio changes to the same accordingly.

♦ Others: This captures the change in Total Capital Ratio across two runs which cannot be attributed to any of the preceding reasons. Computation for this depends on the variables selected while defining an attribution analysis.

12.4 Market RWA

Attribution analysis for changes in Market RWA is computed for certain control variables, which are essentially the different approaches used for arriving at the RWA. Computation on each control variable is further divided based on the risk types. This section explains such various attribution variables and recognizes the changes in RWA corresponding to these variables. This functionality in the application enables you to understand how the RWA does has increased and capital has declined as compared to the previous quarter even when the business growth is static.

The market risk attribution variables are detailed here:

♦ Exchange Rate Fluctuations: Change in exchange rate of the reporting currency with respect to the major currencies in the bank's portfolio impacts all the inflows and outflows.

♦ Net Business Growth: Change in number and amount of exposures indicate the net business growth of the bank. The change in RWA due to this factor can be attributed to business growth. The application determines the new exposures and the exposures that are closed by comparing the list of the two runs.

The difference in the RWA's provide the impact on RWA's of the Net Business Growth.

♦ Rating Migration: The migration of ratings impact the market risk exposures as it increases the specific risk capital charge that is applied to interest rate securities. Rating migration impact can be seen on the IR exposures where the specific risk charge is applied based on the counterparty ratings. According to the jurisdictions, whichever exposure category considers ratings, the exposure amount of those exposures impacts market RWA. Ratings of the various counterparties can be tracked and the change in exposure amounts with the change in ratings are provided as an end result.

♦ Carrying Value: The change in carrying value of the positions (market value) is responsible for the movement in exposure value without any new business growth accounted for. This impacts RWA. The application monitor the market value changes (carrying value) excluding the exposures or positions added in the new run. Thus this change and the corresponding change in RWA becomes an attribute for analysis.

♦ Bond Rates: The change in the interest rates of the bonds are monitored by the application. This is useful in analyzing the impact of an interest rate movement on RWA due to market risk.

♦ Greek Impact: The change in the Gamma and Vega impact for the exposures leads to a change in General Risk Charge, hence change in the RWA computed for market risk.

♦ Others: This captures the change in Total Capital Ratio across two runs which cannot be attributed to any of the preceding reasons. Computation for this depends on the variables selected while defining an attribution analysis.

12.5 Operational RWA

This section details about various attribution variables and recognizes the changes in RWA corresponding to these variables. It also explains about attributing such changes in RWA and capital ratio to the appropriate Attribution Variable. This functionality of the application enables you to understand why the RWA has increased and capital has decreased as compared to the previous quarter when the business growth was static. This feature identifies the root cause of RWA changes by analyzing various contributing factors.

Attribution analysis for changes in Operational RWA is computed for the following control variables, which are the different approaches used for arriving at the RWA:

♦ Exchange Rate Fluctuations: Change in exchange rate of the reporting currency with respect to the major currencies in the bank's portfolio impacts all the inflows and outflows.

♦ Net Business Growth: Change in number and amount of exposures indicate the net business growth of the bank. The change in RWA due to this factor can be attributed to business growth. The application determines the new exposures and the exposures that are closed by comparing the list of the two runs. The difference in the RWA's provide the impact on RWA's of the Net Business Growth.

♦ Pre Projection Net Revenue (PPNR): PPNR is computed as following:

   o Net Interest Income + Non Interest Income - Non Interest Expense

Change in PPNR can be computed across the two runs by comparing the preceding calculation for both the runs and reporting the difference as per the reporting requirements provided.

♦ Gross Income: For this Attribution Variable category, the following attribution variables are monitored to attribute the impact of change in gross income due to the listed attribution variables over the Operational RWA:

  o Net Interest Income

  o Net Non-Interest Income

  o Provisioning

  o Operating Expenses

  o Gain or Loss from Sale

  o Gain or Loss Position on Net Interest Income

  o Irregular gain or loss from Insurance

  o Income from Insurance

♦ Others: This captures the change in Total Capital Ratio across two runs which cannot be attributed to any of the preceding reasons. Computation for this depends on the variables selected while defining an attribution analysis.

For more information on Attribution Analysis UI, see Attribution Analysis GUI section.

12.6 Attribution Analysis GUI

Access the *Attribution Analysis Window* with these steps:

1. Click **Basel Regulatory Capital Basic** on the Left Hand Side Pane of the OFSAAI.

2. Click **Attribution Analysis** as shown in the following figure.
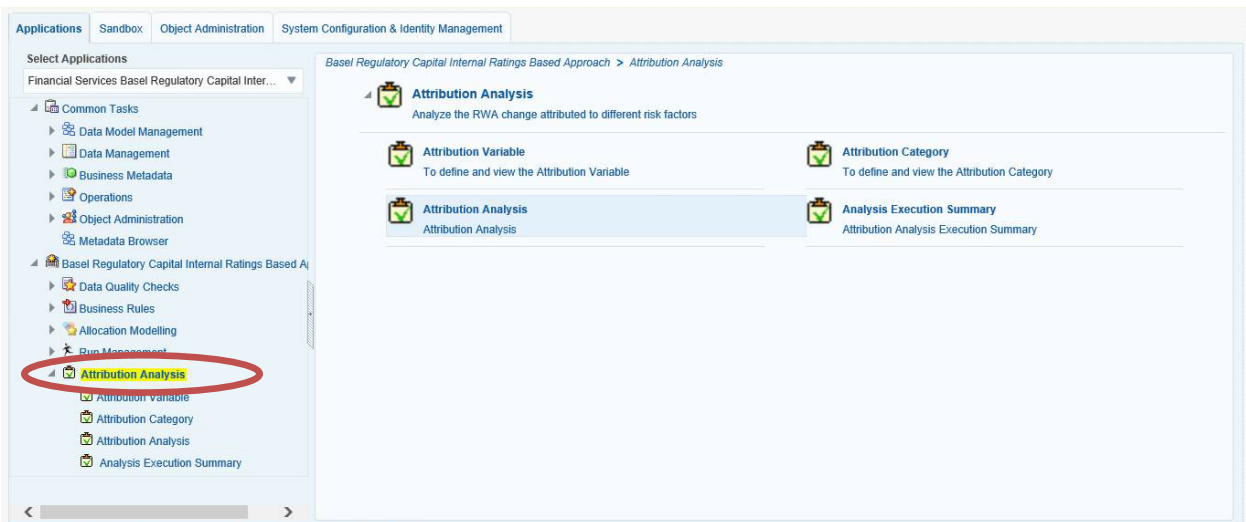
NOTE: It is assumed that all the Basel Runs are executed before performing Attribution Analysis.

12.6.1 Attribution Variable

Create or Select an Attribution Variable with the following steps:

1. Click **Attribution Analysis → Attribution Variable** on the Left Hand Side Pane of the OFSAAI.

2. Click ☑ to select the relevant Attribution Variable from the list or click 🗗 to create an Attribution Variable in the *Attribution Variables Window* as shown in the figure.

NOTE: Enter the **Attribution Variable Name** and click 🔍 to search the Attribution Variable. Click ☑ to select the relevant Attribution Variable to View, Edit, Copy, or Delete.

The *Attribution Variables Window* is displayed as follows.

3. Enter **Name** and **Description** of the Attribution Variable.

4. Select **Category** from the drop-down or click to create a new Attribution Category. See steps in 12.6.2 Attribution Category.

5. Click to select **Process Selection**. The *Process Selection Window* is displayed as follows.

	Segment	Process Name	Process Code
☐	BIS	BASEL_I	1147668568425
☐	INDIA	IND_NON_SEC_STD	1170322101219
☐	CREC	HISTORICAL NON-SEC	1184069636121
☐	CREC	SEC-SFA	1184135938677
☐	CREC	Distribution Fitting for Historical Securitization Exposures	1184154026911
☐	INDIA	IND_OPS_RISK	1202129465217
☐	CREC	GMV-Equity Data Population	1202787219790
☐	CREC	Counterparty Data Population	1202834941086
☐	CREC	RAPM Calculation	1202969312017
☐	OREC	OREC DATA LOAD	1205481226833
☐	OREC	OREC RECLASSIFICATION INTERNAL TO STANDARD	1205481742706
☐	OREC	OREC RECLASSIFICATION EXTERNAL TO INTERNAL	1206378568377
☐	OREC	OREC RECLASSIFICATION EXTERNAL TO STANDARD	1206378622650
☐	BIS	CAP_STRUCT	1228310588048
☐	CREC	Capital Structure-EC	1228310588049
☐	INDIA	IND_CAP_STRUCT_INDIAN_BANKS	1228323341630
☐	USA	USA_CAP_STRUCT	1228363751510
☐	INDIA	IND_CAP_STRUCT_FOREIGN_BANKS	1228364665576
☐	BIS	CAPITAL_CONSOLIDATION	1228479817605
☐	CREC	CAPITAL_CONSOLIDATION-EC	1228479817606

6. Enter **Process Name** or click to select the relevant Process Name as shown in the figure.

7. Select **Segment** from the drop-down and click .

8. Select **Target Measure** from the drop-down.

9. Click .

NOTE: The new variable created must be submitted for approval and then approved by the authorized user for it to be available for attribution analysis creation.

12.6.2 Attribution Category

Create or Select an Attribution Category with the following steps:

1. Click **Attribution Analysis → Attribution Category** on the Left Hand Side Pane of the OFSAAI.

Name ▲	Creation Date	Created By	Last Modification Date	Last Modified By
Additional Tier 1 Capital	06/16/2015 18:03:46	SYSADMN	06/16/2015 18:03:46	SYSADMN
Collateral Valuation	06/18/2015 12:55:22	SYSADMN	06/18/2015 12:55:22	SYSADMN
Commom Equity Tier 1 Capital	06/16/2015 17:28:18	SYSADMN	06/16/2015 17:28:18	SYSADMN
Due diligence requirement	06/18/2015 13:00:22	SYSADMN	06/18/2015 13:00:22	SYSADMN
Effective Maturity	06/18/2015 12:46:47	SYSADMN	06/18/2015 12:46:47	SYSADMN
Exchange Rate Fluctuations	06/18/2015 11:07:03	SYSADMN	06/18/2015 11:07:03	SYSADMN
Exposure Amount	06/18/2015 12:57:18	SYSADMN	06/18/2015 12:57:18	SYSADMN
Gross Income	06/18/2015 14:47:06	SYSADMN	06/18/2015 14:47:06	SYSADMN
Loss given Default	06/18/2015 12:56:26	SYSADMN	06/18/2015 12:56:26	SYSADMN
MR - Bond Rates Change	07/27/2015 16:12:23	SYSADMN	07/27/2015 16:12:23	SYSADMN
MR - Carrying Value Change	07/27/2015 16:13:49	SYSADMN	07/27/2015 16:13:49	SYSADMN
MR - Exchange Rate Fluctuation	07/27/2015 16:14:25	SYSADMN	07/27/2015 16:14:25	SYSADMN
MR - Gamma Impact	07/27/2015 16:14:50	SYSADMN	07/27/2015 16:14:50	SYSADMN
MR - Net Business Growth	07/27/2015 16:13:17	SYSADMN	07/27/2015 16:13:17	SYSADMN
MR - Rating Migration	07/27/2015 16:16:43	SYSADMN	07/27/2015 16:16:43	SYSADMN
MR - Vega Impact	07/27/2015 16:17:16	SYSADMN	07/27/2015 16:17:16	SYSADMN
Net Business Growth	06/18/2015 12:54:55	SYSADMN	06/18/2015 12:54:55	SYSADMN
OR - Net Business Growth	06/18/2015 14:42:23	SYSADMN	06/18/2015 14:42:23	SYSADMN
Past Due Analysis	06/18/2015 12:54:35	SYSADMN	06/18/2015 12:54:35	SYSADMN
Pre Projection Net Revenue	06/18/2015 14:46:41	SYSADMN	06/18/2015 14:46:41	SYSADMN

2. Click ☑ to select the relevant Attribution Category from the list or click ⊞ to create an Attribution Category in the *Attribution Category Window* as shown in the figure.

NOTE: Enter the **Attribution Category Name** and click 🔍 to search the Attribution Category. Click ☑ to select the relevant Attribution Category to View, Edit, Copy, or Delete.

☑ Name ▲	Creation Date	Created By	Last Modification Date	Last Modified By
☑ Additional Tier 1 Capital	06/16/2015 18:03:46	SYSADMN	06/16/2015 18:03:46	SYSADMN

The *Attribution Category Window* is displayed as follows.

3. Enter **Name** and **Description** of the Attribution Category.

4. Select **Segment**, **Attribution Class Selection** and **Target Measure Selection** from the drop-downs.

5. Click Save .

NOTE: The new variable created must be submitted for approval and then approved by the authorized user for it to be available for attribution analysis creation.

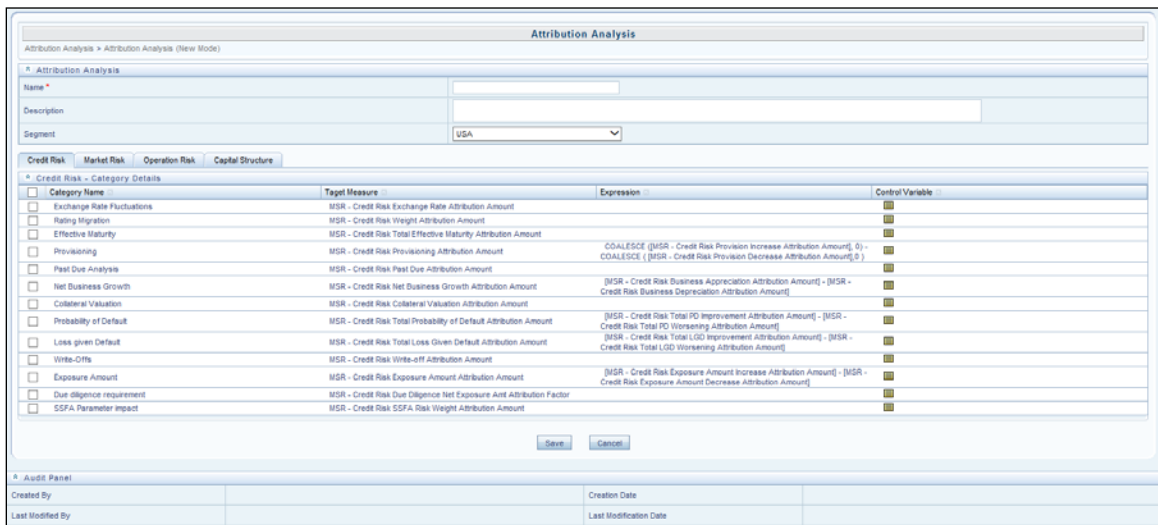## 12.6.3 Attribution Analysis

Creating Attribution Analysis

Create an Attribution Analysis with the following steps:

1. Click **Attribution Analysis** ➔ **Attribution Analysis** on the Left Hand Side Pane of the OFSAAI.
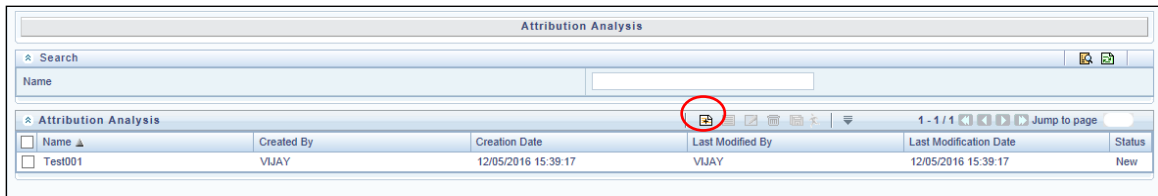
2. Click ⊞ to define an attribution approach to be executed from the *Attribution Analysis Summary Window* as shown in the figure.

The *Attribution Analysis Definition Window* is displayed as follows:

3. Enter **Name** and **Description** of the Attribution Analysis approach.

4. Select **Segment** from the drop-down.

5. Click ☑ to select the relevant **Category Names** from Credit Risk, Market Risk, Operation Risk, and Capital Structure tabs.

NOTE: Click ▤ to view the Attribution Variable for the Category Name.
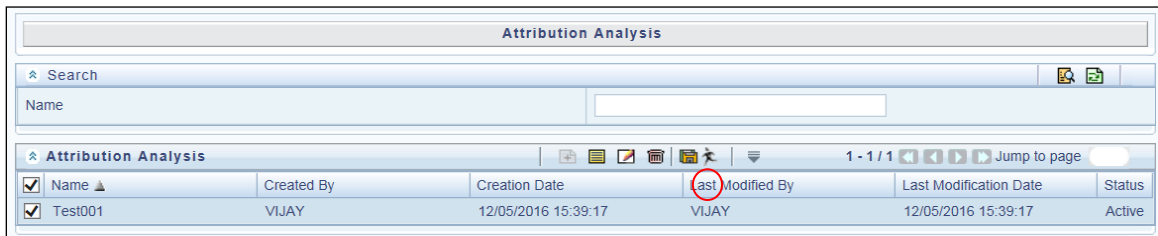
6. Click [Save].

    The newly defined Attribution Analysis computation is displayed in the *Attribution Definition Summary Window*. To execute Attribution Analysis, see 0 Selecting Attribution Analysis.

NOTE: Any new attribution analysis created must be submitted for approval and then approved by the authorized user for it to be available for execution.

Selecting Attribution Analysis

Select an Attribution Analysis with the following steps:

1. Click **Attribution Analysis → Attribution Analysis** on the Left Hand Side Pane of the OFSAAI.

Attribution Analysis					
⌃ Search					
Name					
⌃ Attribution Analysis				1 - 1 / 1 ◀ ◀ ▶ ▶ Jump to page	
☑ Name ▲	Created By	Creation Date	Last Modified By	Last Modification Date	Status
☑ Test001	VIJAY	12/05/2016 15:39:17	VIJAY	12/05/2016 15:39:17	Active

2. Click ☑ to select the relevant Attribution Analysis Name from the list and click 🏃 to run the Attribute Analysis Execution.

NOTE: Enter the **Attribution Analysis Name** and click 🔍 to search the Attribution Analysis. Click ☑ to select the relevant Attribution Analysis to View, Edit, Copy, Delete or Run.

Any new attribution analysis created must be submitted for approval and then approved by the authorized user for it to be available for execution.

The *Attribution Analysis Execution Window* is displayed as follows.

Attribution Analysis Execution		
Attribution Analysis > Execution >		
⌃ Execution Parameters		
Attribution Scenarios	◉ Current Vs Previous ○ Baseline Vs Stress ○ Baseline Vs Projected ○ Projected Vs Projected	
Period	◉ Monthly ○ Quartely ○ Half-Yearly ○ Yearly ○ Custom	
⌃ Run Parameters		
Execution Date *		Risk Type Approach	Capital Basic ▾
Baseline 1 Execution Date *		Baseline 1 Run Name *	🔍
Baseline 2 Execution Date *		Baseline 2 Run Name *	🔍

Execute   Create Batch   Close

3. Select the relevant **Attribution Scenarios** and **Period**.

4. Enter or Select the **Execution Date**, **Baseline 1 Execution Date**, and **Baseline 2 Execution Date**.

5. Select **Risk Type Approach** form the drop-down.

6. Enter the **Baseline 1 Run Name**.

NOTE: The runs are displayed if the legal entity is selected in accordance with the existing/ already executed Basel runs. The legal entity list can be displayed by clicking the [icon] icon. Select the relevant Run from the **Run Execution ID** list. Click [Apply].
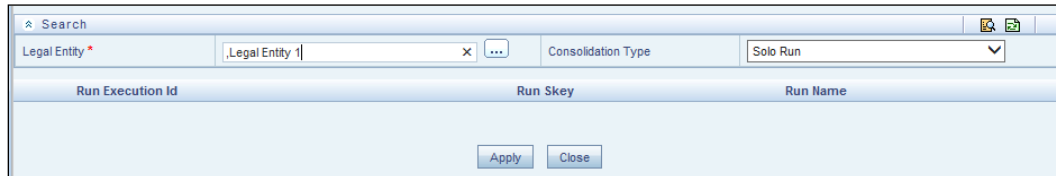
After appropriate legal entity & Consolidation type is selected, the relevant runs are displayed and can be selected for execution in attribution analysis.

7. Enter the **Baseline 2 Run Name**.

NOTE: The runs are displayed if the legal entity is selected in accordance with the existing/ already executed Basel runs. The legal entity list can be displayed by clicking the [icon] icon. Select the relevant Run from the **Run Execution ID** list. Click [Apply].
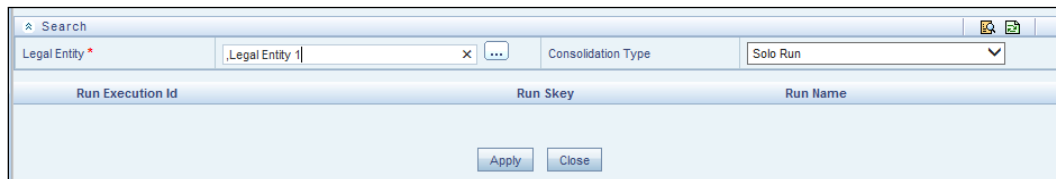
After appropriate legal entity & Consolidation type is selected, the relevant runs are displayed and can be selected for execution in attribution analysis.

8. Select [Create Batch] to schedule the execution for a particular date or select [Execute].

NOTE: These buttons are enabled only when the attribution analysis selected for execution is approved.

12.6.4   Attribution Analysis Execution Summary

Perform Attribution Analysis Execution with the following steps:

1. Click **Attribution Analysis → Analysis Execution Summary** on the Left Hand Side Pane of the OFSAAI.

2. Click ☑ or **Execution ID** to view the relevant Attribution Analysis Execution Summary from the list.

NOTE: Enter the **Attribution Execution Summary Name** and click 🔍 to search the Attribution Execution Summary. Click ☑ or **Execution ID** to view the relevant the Attribution Execution Summary from the list.

The application performs the analysis to quantify the change in CAR based on the approach selected. The Attribution Analysis reports and dashboards are generated in Basel Regulatory Capital Analytics which must be licensed by the bank additionally.

13 RWA Forecasting

RWA Forecasting is mandatory for the banks as a result of the Comprehensive Capital Analysis Review (CCAR) regulations, which are specific to US. These regulations mandate the reporting of the forecasted capital and RWA figures for nine quarters and five years in total.

13.1 Process Flow - RWA Forecasting Simplified Approach

The following flow chart depicts the flow of Simplified RWA Forecasting in Basel application.
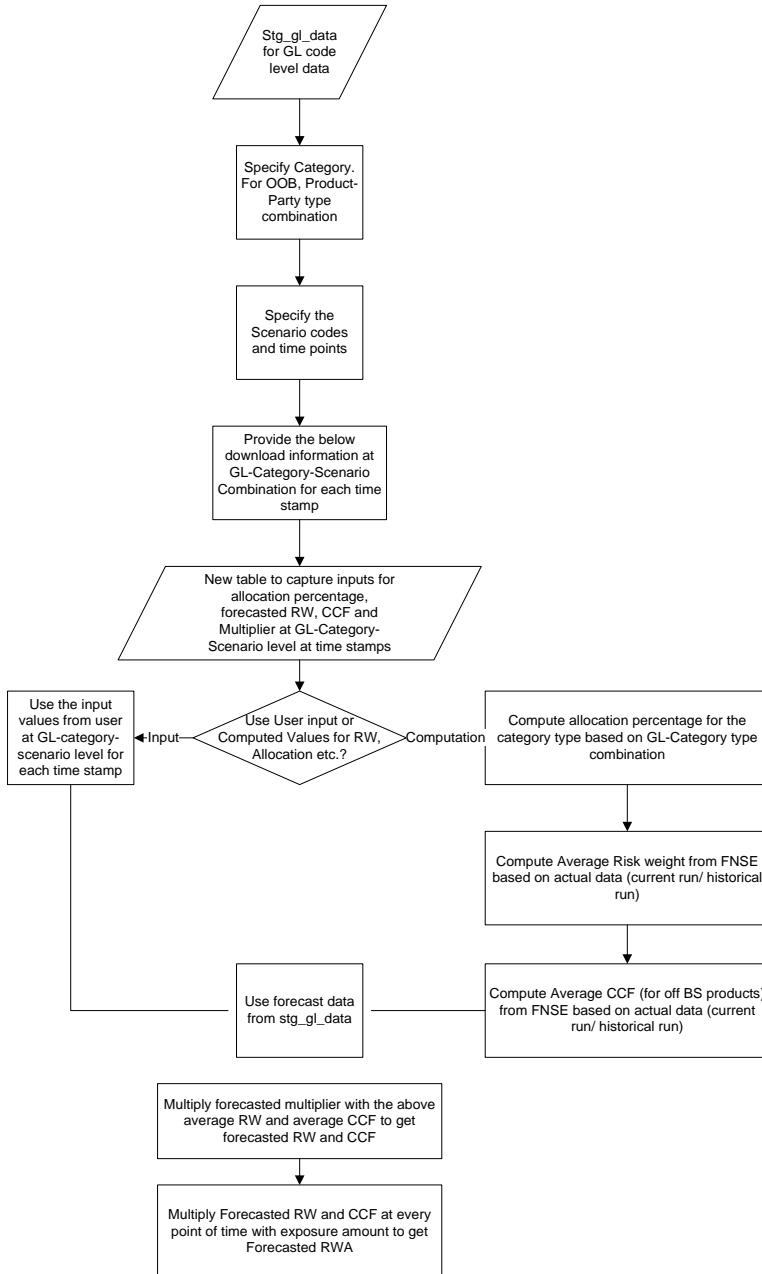
13.2 Data Capturing

In Simplified RWA Forecasting approach, the banks provide forecasted values for the amount of assets from the projected balance sheet. Usually, this amount is the exposure amount, notional principal, and so on, depending on the product for which the bank is providing the forecasted values. This information is provided at various time stamps, which is on the dates on which the projections are done.

The RWA forecasting is performed for nine quarters (quarterly basis) and five years (yearly basis) from the as of date. If the Run is executed in mid-quarter, then the immediate quarter end is considered as the first quarter. For example, if the run is executed on 15th March, then the first quarter for forecasting is the quarter ending on 31st March.

As per CCAR guidelines, the data is captured for each scenarios. The scenarios are at 5:1 Baseline, 1 Supervisory Adverse, 1 Supervisory Severely Adverse, 1 Bank Adverse, and 1 Bank Severely Adverse scenarios.

The Basel Application captures the following in the input data for RWA forecasting:

1. **Time Stamps for Forecasting**: This captures the time points for which the forecasting must be done. Starting from the current date, there are nine quarter end dates and three yearly dates.

   The solution captures the actual and forecasted asset amounts for as-on-date and as-on-forecasted date.

2. **GL Codes**: This is the GL codes that the bank use in its balance sheet. The allocations and forecasts are produced, based on these codes. For capturing the GL data, the Basel application uses STG_GL_DATA table. The bank is expected to provide the inputs for forecast values at the GL code level which is then allocated to Category-Scenario combinations.

   The STG_GL_DATA table is used for capturing of actual and forecasted values at GL level. These values are used in conjunction with allocation percentages to arrive at Category level values.

3. **Category**: This contains the Categories that bank want to use for allocations. The categories can be the dimensions such as Products, Customer Types, Asset Class, or a combination of any of these. The source dimensions are bank specific dimensions such as bank product type, bank party type, and so on. These are reclassified into the standard dimensions such as Basel product type, Standard party type, and so on.

4. **Scenario Codes**: Scenario Codes are used to identify the stress testing scenario for each time stamp. As the guidelines mandate, there are five scenarios for the stress testing, namely:
   - Baseline
   - Supervisory Adverse
   - Supervisory Severely Adverse
   - Bank Adverse
   - Bank Severely Adverse

   The scenario types are seeded in the application, so that these maintain a common definition. The actual Basel Run that is considered for the computations is considered as a Baseline scenario for as-on-date time stamp. The inputs are captured for all the five scenarios for each time stamp. In this manner, there are 60 (12x5) data points in total, for each category. User is expected to execute five separate runs for five different scenarios, having 12 time stamps each for each category.

5. **Actual Asset Amount**: Actual asset amount is the balance sheet asset amount on as-on-date. The balance sheet amount is the exposure amount captured in the PP tables currently for Basel processing. For the defaulted or past-due exposures (NPAs), the exposure amount is the net of specific provisions as per the existing Basel DL specs.

   If Basel product type level 1 = OTD, then N_NOTIONAL_PRINCIPAL column is considered for the actual asset amount, otherwise N_EXPOSURE_AMOUNT column from FCT_NON_SEC_EXPOSURES table is considered. The as-on-date Basel Run is the base for this computation. The scenario for this is considered as 'Baseline' scenario.

6. **Forecasted Asset Amount**: Forecasted Asset amount is provided by the bank in case of Simplified Approach detailed in this document. The assumption is that the bank follows the relevant regulations and process to ensure that the total asset amount is calculated as per the regulatory guidelines. This amount is further divided amongst the GL code-Category combination based on the allocation percentages.

   The forecasted asset amount is captured at GL level for each time stamp and scenario combination. The STG_GL_DATA table is used for this purpose. Banks provide the forecasted values for GL code on an MIS date (which captures the forecast date) and a scenario (which captures the stress scenario types). This forecasted amount is used to compute the forecasted RWA based on Allocation percentages.

7. **Risk Weight Multiplier**: This captures the multiplier that is used to adjust the current risk weights to compute the forecasted risk weights. This is used only in the cases where the bank does not provide forecasted risk weights as inputs.

   The risk weight multiplier is captured by the bank at the GL-category-time-scenario combination. This value is usually over and above the computed average risk weight.

   For example, if the solution has computed an average risk weight for a GL-category-time-scenario combination as 75% and provided a multiplier of 10%, then the final forecasted risk weight for the combination is $(0.75 * (1 + 0.10)) = 82.5\%$.

   Null value of multiplier is considered as 0.

8. **Forecasted Risk Weight**: The solution provides the guidance value for risk weights post calculation. The users are also given an option to provide the post mitigation risk weights based on their estimates under various stress scenarios. The risk weights are provided as weighted average for the GL-category combination.

   Bank can choose either to go with the computed average value for the risk weight or to give the preference to the input of forecasted risk weight for a GL-category-time-scenario combination. In case an input is preferred and the same is provided, multiplier is not used in computation. In such a case, forecasted value (input) is considered as the final value. If computed value is preferred, then the multiplier to compute the forecasted risk weight is used as mentioned in **Risk Weight Multiplier**.

9. **Credit Conversion Factor (CCF) Multiplier**: This captures the Multiplier that is used to adjust the current CCF and to compute the forecasted CCF. This is used only in such cases where the bank does not provide forecasted CCF as input.

The CCF multiplier is captured by the bank at the GL-category-time-scenario combination. This value is usually over and above the computed average CCF.

For example, if the solution has computed the average CCF for a GL-category-time-scenario combination as 20% and provided a multiplier of 10%, then the final forecasted CCF for the combination is (0.2 * (1 + 0.10)) = 22%.

Null value of multiplier is considered as 0.

10. **Forecasted CCF Percentages**: Though the solution provides the guidance value of CCF for off balance sheet categories post calculation, the users are provided with an option to input the CCF based on their estimates under various stress scenarios. The CCF is provided as weighted average for the GL-category combination.

Bank can choose either to go with the computed average value for the CCF or to give the preference to the input of forecasted CCF for a GL-category-time-scenario combination. In case an input is preferred and the same is provided, multiplier is used in computation. In such a case, forecasted value (input) is the final value. If the computed value is preferred, then the multiplier is used to compute the forecasted CCF as detailed in **Credit Conversion Factor (CCF) Multiplier**.

The following input data are required for calculations and can be derived from the Basel application.

1. **Allocation Percentages**: The allocation percentage of the forecasted amounts between various categories assigned to a GL code are computed in the solution. This forms the basis for the RWA forecasting calculation. The computation of Allocation Percentage is as follows:

For a GL Code, the total exposure amount across all categories are summed up. For each category, the sum of exposure amount for the category is divided by the total exposure amount for the GL code. The GL data is converted into reporting currency and stored for easy processing.

Banks have the option to choose between computed allocation percentages or the input of allocation percentages. If the bank uses input of allocation percentages, then the percentage is provided for all the categories mapped to a GL code.

The computed and input allocation percentages are present in the same column of the fact table and is identified by the flag value (input or computed) that bank chooses for usage. Categories are embossed in current Basel Runs so that it can be tracked and used appropriately for computation.

When Basel product type code level 1 is not OTD; the Allocation Percentage is calculated as follows:

Sum (FNSE.N_EXPOSURE_AMOUNT for each GL-Category combination) / Sum (STG_GL_DATA.N_AMOUNT_ACY converted to reporting currency for a GL code).

If Basel product type code level 1 is OTD, then compute allocation percentage as:

Sum (FNSE.N_NOTIONAL_PRINCIPAL for each GL-Category combination) / Sum (STG_GL_DATA.N_AMOUNT_ACY converted to reporting currency for a GL code)

For Securitization exposures, when Basel product type code level 1 is not OTD, computation is;

Sum (FCT_SEC_EXPOSURES.N_SEC_EXP_AMT for each category)/ (Sum (STG_GL_DATA.N_AMOUNT_ACY converted to reporting currency for the GL code mapped to the category)

If Basel product type code level 1 is OTD, then compute allocation percentage as:

Sum (FCT_SEC_EXPOSURES. N_NOTIONAL_PRINCIPAL for each category)/ (Sum (STG_GL_DATA.N_AMOUNT_ACY converted to reporting currency for the GL code mapped to the category)

The GL data should be converted into reporting currency and stored for easy processing. If the bank chooses to use input allocation percentages, then this step is not required and the GL-category combination uses the percentages provided as input by the bank.

2. **Average Risk Weight**: This stores the computed current average risk weight for the GL-Category combination for the as-on-date run, that is, baseline scenario. The category is stampled in the existing Basel Run and use this category to compute average risk weight. The scenario type code used for this is 'baseline'.

   The computation is as follows:

   Sum (risk weight * exposure amount)/ Sum (total exposure amount for GL-Category combination) for each row.

   The exposures that are going for deduction in the Basel Run and the intra-group exposures (internal customers) are excluded from the summation.

   If the bank chooses to use computed risk weights over the inputs, then this step is required. The computation of the weighted average risk weight for baseline scenario, that is, the current Basel run is as follows:

   Sum (FCT_SUB_EXPOSURES. N_RISK_WEIGHT * FCT_SUB_EXPOSURES. N_EAD_POST_MITIGATION for each row)/ Sum (Total FCT_SUB_EXPOSURES. N_EAD_POST_MITIGATION for GL-Category combination).

   The exposures that are going for deduction in the Basel Run and the intra-group exposures (internal customers) are excluded from the summation.

   If the bank chooses to use input forecasted risk weights, then this step is not required and the GL-category-time-scenario combination uses the percentages provided as input by the bank.

3. **Average Credit Conversion Factor (CCF)**: This stores the computed current average credit conversion factor for the GL-Category combination for the as-on-date Run, that is, the baseline scenario. The category is embossed in the existing Basel Run and uses this category to compute average CCF. The computation is as follows:

   Sum (CCF * exposure amount)/ Sum (total exposure amount for GL-Category combination) for each row.

   The exposures that are going for deduction in the Basel Run and the intra-group exposures (internal customers) are excluded from the summation.

   The computation of the weighted average CCF for baseline scenario, that is, the current Basel run, when Basel product type code level 1 is not OTD, is as follows:

   Sum (FNSE. N_CCF_PERCENT * FNSE.N_EXPOSURE_AMOUNT for each row)/ Sum (Total FNSE.N_EXPOSURE_AMOUNT for GL-Category combination).

   If Basel product type code level 1 is OTD, then allocation percentage is computed as:

Sum (FNSE. N_CCF_PERCENT * FNSE.N_NOTIONAL_PRINCIPAL for each row)/ Sum (Total FNSE. N_NOTIONAL_PRINCIPAL for GL-Category combination)

For Securitization exposures, when Basel product type code level 1 is not OTD, computation is as follows:

Sum (FCT_SEC_EXPOSURES. N_SEC_EXP_CCF * FCT_SEC_EXPOSURES. N_SEC_EXP_AMT for each row)/ Sum (Total FCT_SEC_EXPOSURES. N_SEC_EXP_AMT for each Category)

If Basel product type code level 1 is OTD, then compute allocation percentage as:

Sum (FCT_SEC_EXPOSURES. N_SEC_EXP_CCF * FCT_SEC_EXPOSURES. N_NOTIONAL_PRINCIPAL for each row)/ Sum (Total FCT_SEC_EXPOSURES. N_NOTIONAL_PRINCIPAL for each Category)

The exposures that are going for deduction in the Basel run and the intra-group exposures (internal customers) are excluded from the summation.

If the bank chooses to use input forecasted CCF, then this step is not required. Instead, the GL-category-time-scenario combination uses the percentages provided as input by the bank.

4. **Forecasted Average Risk Weight**: This is computed by multiplying the average risk weight computed with the multiplier for each point of time and scenario. User can either give the input upfront or after seeing the results of one run. If the user opts for preference of input values for forecasted risk weights, then the risk weight multiplier is not used.

   The multiplier is an input at GL-category-time-scenario level. Hence the risk weight for GL-category combination is multiplied with respective multiplier to get the forecasted risk weight for each GL-category-time-scenario combination.

5. **Forecasted Average CCF**: This is computed by multiplying the average CCF computed previously with the CCF Multiplier for each point of time and scenario. User can either give the input upfront or after seeing the results of one run. If the user opts for preference of input values for forecasted CCF, then the CCF multiplier is not used.

   The CCF multiplier is an input at GL-category-time-scenario level. Hence the CCF for GL-category combination is multiplied with respective multiplier to get the forecasted CCF for each GL-category-time-scenario combination.

Based on the allocation percentages computed for each category, projected amounts are distributed. The forecasted amounts are provided at the GL level and then be allocated based on the percentages computed for GL-Category-Time-Scenario.

13.3 Currency Conversion and Shareholding Percentage - other Reclassifications

The amounts used in RWA forecasting is determined after performing currency conversion and applying shareholding percentages. The reclassifications for standard product type, standard party type, and asset class remains the same for respective jurisdictions. Shareholding percentages are multiplied with exposure amounts based on the type of run executed (solo or consolidation) and the level of consolidation and org structure. For currency conversion, the forecasted currency rates are used.

Expected GL data for forecast dates are in the natural currency which are converted into the reporting currency based on the forecast exchange rates applicable for the relevant time stamp.

Existing processes of shareholding percentage are carried as such for the respective jurisdictions. The shareholding percentages remains the same in the forecast runs. All the following reclassifications remain the same for the respective jurisdictions:

- Bank Product to Basel Product Type
- Bank Party Type to Standard Party Type
- Asset Class Reclassifications

For Currency conversion, the forward exchange rates corresponding to the time stamp relevant are considered. The value for N_TENOR is set as 0 days as spot rate, that is the rate applicable for the current run/ current date. For the first quarter-end and so forth, the quarter-end is identified as the standard quarter-end and the tenor is the period converted into days. For example, if the execution is done on 15th March, first forecast quarter-end is 31st March and the tenor for the corresponding exchange rate is 15.

The forecast exchange rates are applied to convert the corresponding forecast GL data (STG_GL_DATA) for the respective dates. The currency converted values are stored in an intermediate table to pick up for further processing. Banks provide the respective FIC_MIS_DATE and N_TENOR in STG_FORWARD_EXCHG_RATES table for all the dates that are being used in the forecasting exercise. In case of forecasted exchange rates, the FIC_MIS_DATE remains the same as the current date on which RWA forecasting is executed, but the tenor varies.

13.4 Category Reclassification

The term Category is used in the context of the level at which the bank decides to do its allocations of the forecasted figures. The bank can choose to use asset class or product type or party type for this purpose. This is in conjunction with the GL codes that the bank uses to capture the actual and forecasted amounts.

The bank provide the product and party codes and based on the category on which it needs to do the allocations, the application reclassifies the products into Basel product types and Party into Standard Party types. If the bank chooses Asset Class as category type, then asset class reclassification as per Basel accord, is used.

The application uses a combination of product, party, and asset class for the definition of category in out of the box product. Users can use either asset class or product type or party type or a combination of product and party type. Also, a separate dimension called 'Category' customized as per user's requirements can be used.

The bank provide the category type as detailed in the previous section. The values for category type are from the seeded table. In addition to this, the banks provide the values for product code and party code in the table for capturing forecasted data. The existing reclassification rules for product to Basel product type reclassification and for party type to standard party type reclassification are used. If the category type is Asset Class, then the asset class reclassification rules are used.

The category type is stamped into the existing Basel solution during processing so that the relevant data around actual amount, RW, and CCF can be picked up. There are a corresponding fact table which store the actual and forecasted asset amounts at the GL-Category-Scenario level. The category codes filled into the fact table as the standard party type, Basel product type, or Basel asset class codes is used. Therefore, the source tables for populating category codes are DIM_BASEL_ASSET_CLASS, DIM_STANDARD_PARTY_TYPE, and DIM_BASEL_PRODUCT_TYPE.

This fact table stores the values post reclassification and also stores the allocation percentages corresponding to the GL-Category-Scenario combination. These percentages are used to compute the forecasted values. The average RW and CCF percentages are also computed and stored at the GL-Category-Scenario level. This includes actual and forecasted average RW and CCF.

13.5 Allocation and RWA Computation

This section details the functional aspects of allocation computation used in RWA forecasting. Allocations for the calculation of RWA forecasted numbers are computed as detailed in the Data Capturing section. For each of the categories such as date, scenario, GL, and category combination, the forecasted asset amount is calculated as follows:

Allocated Forecasted Asset Amount = Allocation percentage * Forecasted Asset Amount from GL staging table

If CCF is available for a category, then the forecasted CCF percent is multiplied by the allocated forecasted amount to get the Post CCF forecasted Asset Amount. Weighted Average CCF is picked up for a category if it is applicable for the product type used in the category. This Post CCF Actual Asset Amount is then multiplied by the forecasted risk weight to get the Actual RWA amount. For the calculation of Average forecasted risk weight and for details on the preference between forecasted and input values, see the Data Capturing section.

For the computation of Forecasted RWA, initially the allocation percentages are computed at each GL-Category-Scenario level. This computation is detailed under Solution Detailing in Data Capturing section.

Forecasted amounts which are inputs at GL level are multiplied by the allocation percentages (at GL-Category-Time-Scenario level) to get the Forecasted Amount. As the next step, the weighted average RW and weighted average CCF are computed. Weighted Average CCF is picked up for a category if it is applicable for the product type used in the category.

The CCF percent is picked from FNSE. If the CCF percent is available, then the post CCF forecasted amount is calculated as Average CCF * Forecasted Amount and stores in same fact table as the one used in the forecasted RWA calculations. If CCF is not available for the combination, this column is equal to the exposure amount without considering CCF, that is the forecasted exposure amount. The Post CCF amount is multiplied by the forecasted average risk weight to get the forecasted RWA amount for each GL-Category-Scenario combination.

14 Annexure A: Key Concepts

14.1 Exhibit 1 - Mitigant Allocation Optimizer

The application calculates the RWA based on the allocation of Credit Risk Mitigants (CRM) mapped to each exposure using a linear programming technique to arrive at the least capital. The optimizer engine, also known as the allocation engine, built within the application allocates Credit Risk Mitigants (*CRM)* to each exposure. The optimizer engine takes into consideration the following functionalities while allocating Credit Risk Mitigants (CRM) to each exposure:

There are certain checks which are specific to IRB, and the others are applicable for both Standardized approach and IRB approach.

14.1.1 FIRB Minimum Collateralization Check (IRB Approach)

As per the Basel Accord, Para 296: To apply LGD, bank has to perform Minimum Collateralization check, which includes sum of the value of CRE/RRE and Other Collaterals, to the reduced exposure (after recognizing the effect of eligible financial collateral and receivables collateral). The calculated ratio must be checked for a threshold level. If it falls below the threshold level, then the collateral becomes ineligible and the entire exposure is assigned the unsecured LGD.

The following tasks are performed as part of Minimum Collateralization Check:

- Identification of mitigants for Minimum Collateralization Check
- Mitigant Minimum Collateralization Level assignment
- Identification of mitigants for EAD deduction for Minimum Collateralization Check

After these tasks are computed, the allocation engine allocates the CRM to each exposure. If any CRM mapped to an exposure is below the minimum threshold, allocation does not take place for that particular CRM to that exposure.

14.1.2 FIRB Over Collateralization Amount Adjustment (IRB Approach)

As per the Basel Accord, Para 296: Mitigants forming part of Receivables, CRE/RRE and Other Collateral are adjusted for the overcollateralization level, for the LGD assignment. For Over Collateralization amount adjustment, the following information is required:

Over Collateralization Adjustment Percentage

For each of the CRMs, forming a part of Receivables CRE/RRE and Other IRB Collateral, the CRM Value is adjusted by dividing the CRM Value by the Over Collateralization Adjustment percentage. The adjusted amount of collateral then participates in the allocation for computation of RWA.

14.1.3 Double Default Treatment (IRB Approach)

As per paragraph 284(i) & 284(ii): For hedged exposures to be treated within the scope of the double default framework, capital requirements can be calculated for a hedged exposure subject to the double default treatment (KDD).

Double default information is expected as an input from the institution at an Exposure Mitigants Mapping level. Generally, the identifier is at a mapping level for a mitigant types, for a Credit Derivative or a Guarantee mapped to an Exposure.

The Basel application calculates the double default capital based on the requirement specified in paragraph 284(i) & 284(ii).

The allocation engine allocates on the basis of the double default capital as input.

14.1.4 Double Mitigant Treatment (Standardized Approach and IRB Approach)

You also have a choice to perform a Double Mitigant treatment where an exposure is covered by Collateral, a Guarantee, or a Credit derivative. The requirement in the form of a pre-configured rule at a Basel asset class level is to be specified by the institution. If you choose to perform a Double Mitigant treatment, then for a common portion of the exposure covered by both the mitigants, LGD of the Collateral, and PD of the Guarantee or Credit derivative is used. For the remainder, either the exposure is uncovered or any other mitigant if mapped to that exposure gets allocated. For Basel calculations, if use of Double Mitigant treatment results in a lesser RWA for an exposure, than use of a single mitigant, the allocation logic allocates the mitigant based on Double Mitigant treatment or else the allocation continues as a case for normal mitigants.

14.1.5 Allocation of Mitigants (IRB Approach and Standardized Approach)

The following are the steps for credit risk mitigation irrespective of the approach prescribed in the Basel Accord.

1. The mitigant is identified as eligible or not based on the eligibility rules for CRM under simple and comprehensive approach mentioned in Basel accord. This mitigant eligibility is handled in the **FCT_MITIGANTS**, and **EXP_MITIGANT_MAPPING** table.

2. All mitigants which are eligible and mapped to an exposure are then populated to the processing table where each exposure is broken down by mitigant types, which includes an additional row treating the exposure as uncovered. This is handled in the **FCT_SUB_EXPOSURES** table.

3. Further, RW assignment or Capital computation is performed for each Collateral or Mitigant. For financial collateral, under the BIS Standardized Approach, the RW used is 0. For FIRB approach the LGD used is the LGD* computed as per the Basel guideline. For any other mitigants in the form of Guarantees or Credit Derivative, the RW or PD corresponding to Basel rating or the modeling, as applicable, is used. For Advanced Approach, institutions must give the PD or LGD data either at a mitigant level or at an exposure level, if they are able to model the PD or LGD of the exposure.

4. The Pooling is performed to identify the below cases.

    - One or Many Exposure to One Mitigant

    - One Exposures to Many Mitigants

    - Many Exposures to Many Mitigants

    - One Exposure with No Mitigant

The pooling of the exposures and the mitigants are based on the exposures mapped to the mitigants, and the same mitigant mapped to other exposures. For example, in the below exposure ID and the mitigant ID mapped to each other, all of them belong to the same pool ID, as they have the mitigants shared.

Exposure ID	Mitigant ID
EXP01	MIT01
EXP01	MIT02
EXP01	MIT03
EXP02	MIT01
EXP03	MIT04
EXO04	MIT04
EXP05	MIT05

The treatment of each of the pooled cases in the optimizer engine is detailed in the following section.

One or Many Exposure to One Mitigant

The case, *one or many exposure to one mitigant* is treated as follows by the optimizer engine:

1. First, the exposures are sorted from highest risk weight to lowest. For advanced approach the sorting is based on the capital.

2. EAD amount of each exposure (post credit conversion) is determined.

3. The credit risk mitigant is allocated to the exposure with the highest risk weight.

4. If there is more than one exposure with the same risk weight, then the exposure with the lowest currency mismatch haircut or maturity mismatch haircut is selected for allocation. In the case of Simple Approach, these haircuts will not be applicable, and hence, the volatility haircut and the currency mismatch haircut will be considered as 0, and the maturity mismatch haircut will be considered as 1.

5. Currency haircut (Hfx) is applied to the collateral if there is a currency mismatch between the exposure and collateral. Likewise, for mitigants residual maturity falling short of exposure residual maturity a maturity mismatch haircut (Hm) is applied. These haircuts are assigned based on the Basel guideline.

6. The post-haircut mitigant amount is applied to the exposure based on the previous logic. The allocation engine updates the covered factor against each row for all the exposures in a pool. For any exposure the sum of covered factor across rows is equal to 1.

7. Finally, the pre mitigation EAD is broken into post mitigation EAD net of all haircuts

8. Basel rules then calculate the RWA for each row by multiplying the post mitigation EAD by the RW or capital * 12.5 (in case of advanced approach).

Any remaining collateral amount is applied to the next transaction with the next highest risk weight and so on.

One Exposure to Many Mitigants

The case, one exposure to many mitigants is treated as follows by the optimizer engine:

1. First, the EAD amount of each exposure (post credit conversion) is determined.

2. The mitigant is sorted from lowest to the highest risk weight for each exposure mapped to it.

3. Each mitigant forming a part of Receivables, CRE/RRE, and Other IRB Collateral is adjusted for over collateralization amount while executing foundation IRB.

4. In the Foundation IRB approach, Minimum collateralization check is performed for mitigants in the form of CRE/RRE and other eligible IRB Collateral by grouping the mitigant data in the numerator divided by the available EAD amount, minus any allocated mitigant amount.

   - Financial collaterals are allocated first, and then the minimum collateralization check is performed for the other type of mitigants.

   - The result checks whether it is greater than the percentages specified in the Basel Accord.

   - If the result value is less than the check value, none of the CRE or RRE or Other eligible IRB Collaterals mapped to the exposure is eligible for allocation.

   - This check is done only once for the mitigant mapped to each exposure.

5. After all the checks are done then the computation starts by calculating the covered factor for the first row which is as follows:

$$f1 = (Mitigant\_value * Haircut)/ EAD$$

Where:

Haircut = (1 – volatilityHaircut – FOREXHaircut)*MaturityMismatchHaircut.

The haircut related to volatility, currency mismatch and maturity mismatch are as mentioned in the One or Many Exposure to One Mitigant section.

6. Then, the allocation logic works out the covered factor for the subsequent rows as follows:

$$f(n)= Min ((1- Already\ allocated\ covered\ factor),\ Max\ (fn-1,0))$$

7. Total covered factor for an exposure = Covered Factor for the 1st Row + Covered Factor for all the subsequent rows.

8. Covered Factor is Sum of all Covered amount + Uncovered amount of the mitigant upon its total EAD. For any exposure the sum of covered factor across rows is equal to 1.

Many Exposures to Many Mitigants

In the case, *many exposures to many mitigants* the Optimizer uses a linear programming technique for which you must define the objective functions and a set of constraints for the variables. The objective function and the constraints in the Optimizer are defined as follows:

- Objective Function: Objective Function for CRM is to Minimize RWA

- Bounds for the output:

  o Lower Bound of Covered factor is 0

  o Upper Bound of Covered factor is 1

- Exposure Constraint: Exposure Constraint checks the sum of all the allocated exposure amounts should be equal to the total exposure amount available for allocation:

(E1*x1) + (E1*x2) + (E1*x3) + (E1*x4) = E1

Where,

E1= Exposure amount

X(n)=Allocation percentages (sum of x1……xn = 1, meaning 100%)

- Mitigant Constraint: Mitigant constraint has two objectives as follows:

  o This Constraint checks whether the total amount of mitigant is used is less than or equal to the total amount of mitigant available

  o All the mitigant haircuts are applied in this Constraint.

The formula is as follows:

*[{ E1 * x1 } / { (1-V-Fx1)*(Mm1) }] + [{ E2 * x2 } / { (1-V-Fx2)*(Mm2) }] + [{ E3 * x3 } / { (1-V-Fx3)*(Mm3) }] <= M1*

The Mitigant Constraint Formula table is provided below:

Exposure Amount	E1	E2	E3
Mitigant Amount	M1	M1	M1
Volatility Haircut	V	V	V
FOREX Haircut	Fx1	Fx2	Fx3
Maturity Mismatch	Mm1	Mm2	Mm3
Covered Factor	x1	x2	x3

- Minimum Collateralization Constraints are as follows:

  o Mitigants grouped for Deduction for Minimum Collateralization Check > 0

  o Mitigants grouped for Minimum Collateralization Check < 0

- Double Mitigant Constraint: Double Mitigant Constraint is similar to Mitigant Constraint the only difference being that, Mitigant Constraint is performed across one Mitigant ID however Double Mitigant Constraint is performed across the second Mitigant ID that of the Guarantee.

- Allocation engine updates the covered factor for each exposure based on the previous objective function and the constraints defined by you.

- Total covered factor for an exposure = Covered Factor for all the exposure mitigant combination pertaining to that exposure.

- Covered Factor is Sum of all Covered amount + Uncovered amount of the mitigant upon its total EAD. For any exposure the sum of covered factor across rows is equal to 1.

NOTE: In case of exposure and mitigant having the same risk weight, the covered factor might get allocated to either the uncovered standard mitigant type, or the eligible mitigant, based on the highest mitigant value post haircut.

In the case of certain jurisdictions like EU, the drawn and undrawn portion of the exposures are split into multiple exposures, to ensure that there is an optimized allocation, as the CCF allocation to the off balance sheet exposures are after the CRM process.

14.2 Exhibit 2: Defining Pooling and Optimizers

Steps to define Pooling and Optimizer are as follows:

14.2.1 Pooling Definition

12. Click **Basel Regulatory Capital Internal Ratings Based Approach** under **Select Applications** on the OFSAAI window.

13. Click **Allocation Modelling → Pooling** from the LHS pane as shown in this screenshot.
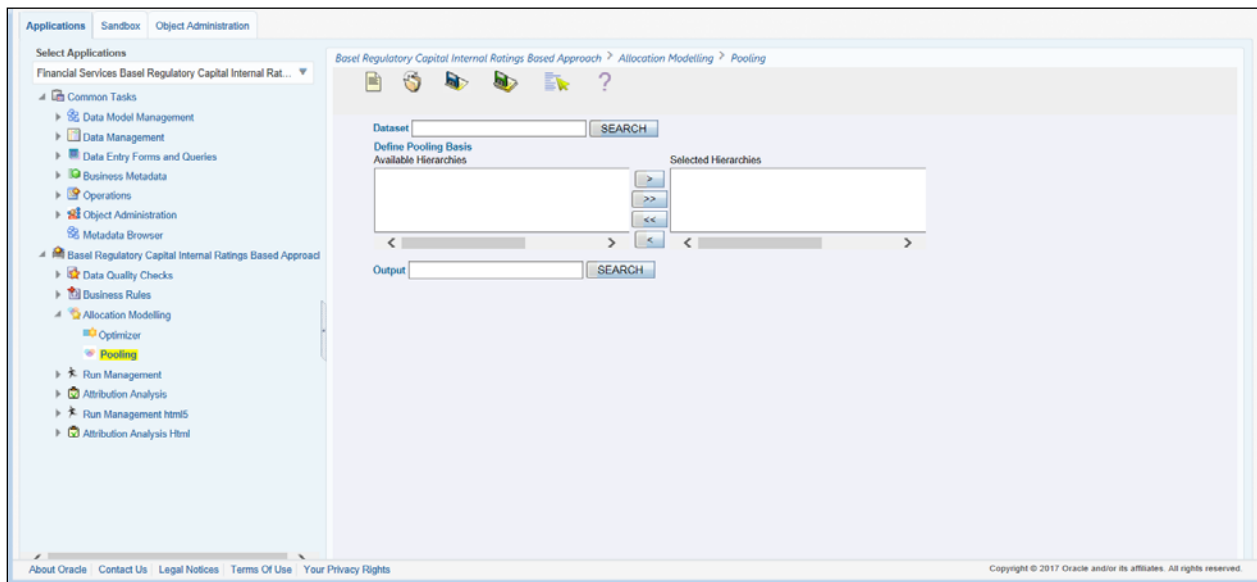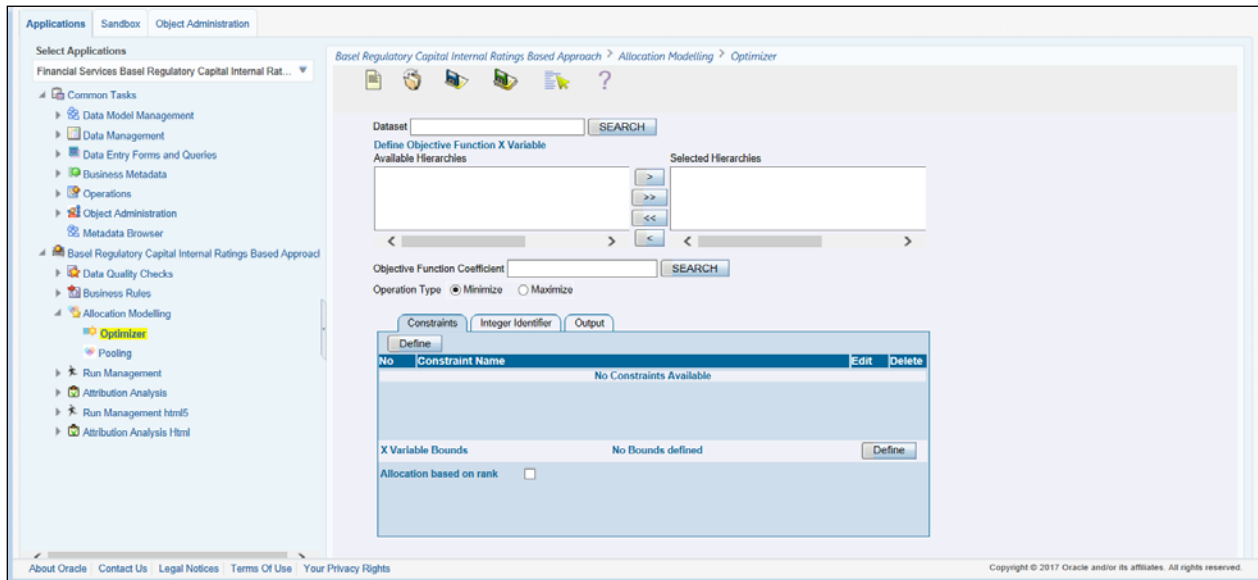

14. Enter the Dataset on which pooling must be performed and click **SEARCH**.

15. Select hierarchies from the available list of hierarchies in the **Define Pooling Basis** field. Pooling is performed on the combinations of hierarchies.

16. Enter the measure for pooling output in the **Output** field.

After all the parameters are selected you can save the definition in the desired segment. This pooling definition can be added in pooling task for execution. On successful execution it assigns pooling ID to exposure-mitigant combination.

14.2.2   Optimizer Definition

A prerequisite for defining the Optimizer, is to update the pool ID in the sub exposures (**FCT_SUB_EXPOSURES**) table for the selected Run.

1. Click **Basel Regulatory Capital Internal Ratings Based Approach** under **Select Applications** on the OFSAAI window.

2. Click **Allocation Modelling → Optimizer** from the LHS pane as shown in this screenshot.

3. Enter the Dataset on which pooling must be performed and click **SEARCH**.

4. Select from the list of available hierarchies in the field **Define Objective Function X Variable.** Optimizer is performed on a combination of these hierarchies.

5. Enter the **Objective Function Co-efficient** and click **SEARCH**.

6. Select the **Operation Type** as **Minimize** or **Maximize**.

7. Click **Define** in the Constraints tab.

8. Enter the Constraint Name.

9. Select Constraint Identifier from the available hierarchies. Enter the Constraint Co-efficient, Condition Value and click **SEARCH**.

10. Select the applicable **Operator** from the drop-down field and click **OK**.

11. Click **Modify** against the **X Variable Bounds** field.


12. Enter the **Lower Bound** and **Upper Bound** against the respective fields and click **SEARCH.**

13. Select the **Lower Bound Operator** and Upper Bound operator against the respective fields and click **OK**.

14. Enter **Measure for Integer Identifier** under the **Integer Identifier** tab and click **SEARCH.**

15. Enter the **Pooling Basis** and the measure in which the output of the pooling basis is to be populated.
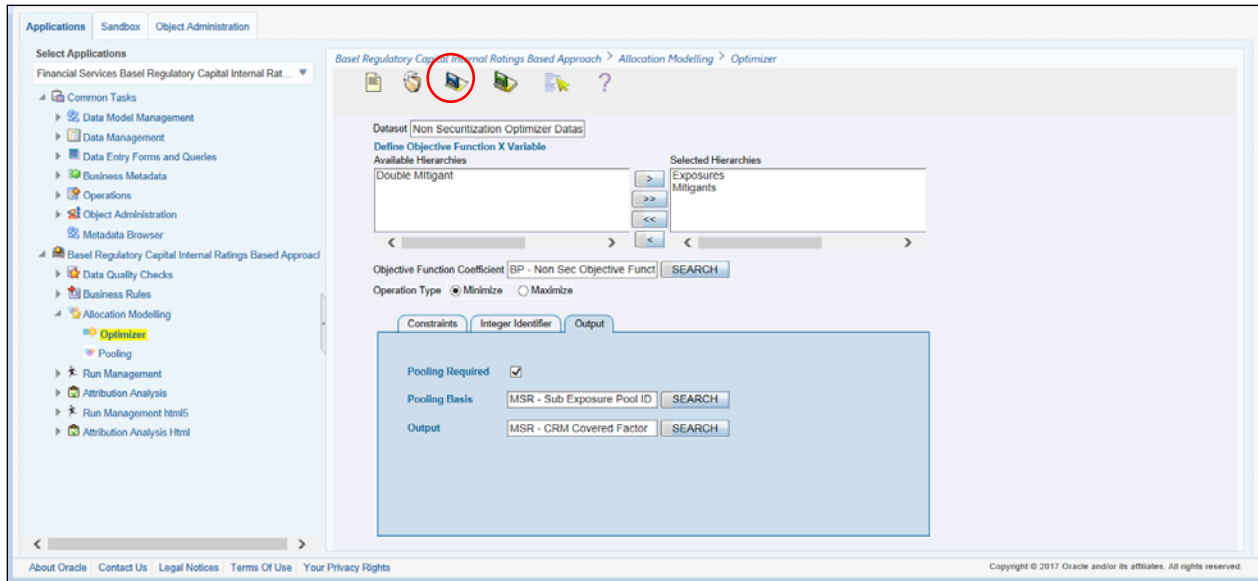
16. Save the definition with proper names in the desired segment. This definition can be added in the optimizer task for execution. The optimizer updates the covered factor for each exposure based on the objective function and the constraints defined by you.

14.3 Exhibit 3: Currency Conversion

SETUP_MASTER table is a setup table, used to provide the setup information of a Run. It can be used to set the default values of Rate Data Source Code or Standard Currency Code. For currency conversion the rate data source and standard currency are important values. If the rate data source value is missing, then BLOOMBERG is by default considered to determine the Rate Data Source Code from DIM_ORG_STRUCTURE table during currency conversion. If the Standard Currency code values are not provided or are missing, then USD is used as the destination currency code from DIM_ORG_STRUCTURE table during currency conversion. This is column under DIM_ORG_STRUCTURE table mapped to these default values are as follows:

V_COMPONENT_CODE	V_COMPONENT_DESC	V_COMPONENT_VALUE
DEFAULT_FX_RATE_SRC	Default Rate Data Source Code	BLOOMBERG
STD_CCY_CD	Standard Currency Code	USD

NOTE: Rule Reporting Currency Code Assignment is set to 'USD' out of box, but can be modified to any other currency. The reporting currency selection can be done in the Run execution windows, if the Run is executed from the Run Execution Window.

Currency conversion is performed on multiple tables to convert the values from its natural currency to reporting currency. The steps which are performed for the currency conversion are as follows:

- The table **Stage Forward Exchange Rates (STG_FORWARD_EXCHG_RATES)** stores the details about the pair of currencies and the corresponding exchange rate to perform the same with the extraction date for which the forward exchange rate is provided. This table also contains the information about the data source from which the exchange rates are quoted and the tenor which is used to identify the period for which the forward exchange rate is applicable for.

- The data from this table is populated to **Exchange Rates** fact table through the common batch which is executed in the beginning. The initial data populated hereby contains the default run Skey which is set to minus 1. Only the records with tenor 0 are used for the purpose of currency conversion for which the spot exchange rate is required.

- After populating the data in the table, in each Run, all the exchange rates are updated based on the conditions at the time of execution to account for the increase or decrease in the exchange rates. A Rule is used which updates the exchange rates and populates the corresponding run Skey which is then used for currency conversion in that particular Run. The exchange rates are then moved into the table wherever currency conversion is required. This is performed in the Product Processor data population step.

- Different legal entities can use the exchange rates quoted by different data sources. Hence, the column which contains the information about the data source in the table **Exchange Rates** is compared with the required data source for a legal entity stored in the **Org Structure Dimension (DIM_ORG_STRUCTURE)** table.

- After the exchange rate population into the required fact tables, the currency conversion rules are executed which take the values stored in amount columns in natural currency, multiply them with the exchange rate and populate to the reporting currency amount columns.

For mitigants table, the exchange rate that is used for currency conversion is the exchange rate for the entity of the exposure which the mitigant belongs to. The list of tables and corresponding columns where currency conversion is carried out is available in the following OTN Documentation Library location:

Currency Conversion Tables and Columns

14.4 Exhibit 4: FSI_CAPITAL_STANDARD_MAPPING Table Mapping

As a part of Basel Capital Structure, information stored in Capital Standard Mapping (**FSI_CAPITAL_STANDARD_MAPPING)** table is a mapping of GL capital line items with seeded data in Standard Accounting Head Dimension table (**DIM_STD_ACCT_HEAD**). This is also required for all the computed fields, so that the computation happens in the soluton for those standard accounting heads.

For all jurisdictions this mapping should be present which is elaborated in the following worksheet, available in the following OTN Documentation Library location:

FSI CAPITAL STANDARD MAPPING

14.5 Exhibit 5: Data Expectations for few of the Basel Products

14.5.1 Equity Exposures Data Expectations

The Equity Exposures and any other exposures which were expected to be treated under Equity Asset Class of the particular jurisdiction were expected in Stage Equity Exposures **(STG_EQUITY_EXPOSURES)** till 8.0.3 release of Basel application.

Starting from 8.0.4 release, any exposure which must be treated under Equity Asset Class is expected to be provided in Stage Investments **(STG_INVESTMENTS)**.

For mandate based approach in equity Investment in funds when there are no entries in STG_FUND_UNDERLYING_COMPOSITION, application assigns Fall Back Approach to the remaining exposures.

All the required attributes pertaining to Equity Exposures are expected to be provided in Stage Investments **(STG_INVESTMENTS)** and any Instrument Specific attributes in Instrument Contract Dimension table **(DIM_INSTRUMENT_CONTRACT)**.

14.5.2   Securitization Exposures Data Expectations

The Securitization Exposures and any other exposures which were expected to be treated under Securitization framework of the particular jurisdiction were expected in Stage Securitization Exposures **(STG_SEC_EXPOSURES)** till 8.0.3 release of Basel application.

Starting from 8.0.4 release, any exposure which must be treated under Securitization Framework is expected to be provided in different product processors depending on the product type.

- If the exposure is to a securitization tranche, retained tranche or retained portion of the pool, it is expected in Stage Investments **(STG_INVESTMENTS)**, with details of the pool ID and the tranche ID to which the exposure belongs to.

- If the exposure is a facility like liquidity facility or servicer cash advance facility, it is expected in Stage Commitment Contracts **(STG_COMMITMENT_CONTRACTS)**, with the pool ID to which the facility is provided to. For any particular tranche level calculations required for SFA/ SSFA process, this must be created as a dummy tranche, and provided with details based on the seniority in the cash flows. In case of the commitment contract, which is issued under a credit line facility, the corresponding entry in Credit Line Dimension table (**DIM_CREDIT_LINE**) is required, with the mapping of the commitment contract to the credit line.

- If the exposure is a credit protection in the form of guarantee, it is expected in Stage Guarantees **(STG_GUARANTEES)**, with the pool ID and the tranche ID to which the credit protection is provided to.

- If the exposure is a credit protection in the form of credit derivatives, it is expected in Stage Credit Derivatives **(STG_CREDIT_DERIVATIVES)**, with the pool ID to which the credit protection is being provided to. For any particular tranche level calculations required for SFA/ SSFA process, this must be created as a dummy tranche, and provided with details based on the seniority in the cash flows.

The pool level aggregate information data capture (Securitization Pool table - **STG_SECURITIZATION_POOL**)) and the tranche level information data capture (Securitization Tranche table – **STG_SECURITIZATION_TRANCHE**)) remain the same as in previous releases. The pool's detailed underlying information are captured in the Stage Underlying Exposures table **(STG_UNDERLYING_EXPOSURES)** for an investor.

In the case of underlying exposures data catpure **(STG_UNDERLYING_EXPOSURES)**, it is currently expected that for each exposure, the pool underlying has to be provided by creating a dummy exposure in the Underlying Exposures table with the Pool ID as the Exposure ID, and the Parent Account ID as the Exposure ID to which this pool detail belongs to. And further pool underlying exposures is created by having the Parent Account ID as the Dummy Pool Exposure ID.

Any Instrument Specific attributes are expected in Instrument Contract Dimension table **(DIM_INSTRUMENT_CONTRACT)**.

14.5.3 Securities Financing Transaction Related Exposures Data Expectations

The Securities Financing Transaction (SFT) related exposures were expected in Stage Repo Contracts **(STG_REPO_CONTRACTS)**, and all their related collateral were expected in Stage Underlying Exposures (**STG_UNDERLYING_EXPOSURES**) till 8.0.3 release of Basel application.

Starting from 8.0.4 release, there are changes to the capture of the collateral related to the SFT.

- The collateral which the bank has received with respect to the SFT transactions are captured in the Stage Mitigants (**STG_MITIGANTS**) table, with the SFT Exposure mapped to the collateral received using the Stage Account Mitigant Map (**STG_ACCOUNT_MITIGANT_MAP**) table.

- The collateral which the bank has placed with respect to the SFT transactions are captured in the Stage Placed collateral (**STG_PLACED_COLLATERAL**) with the SFT Exposure mapped to the collateral placed using the Stage Account Placed Collateral Map (**STG_ACCT_PLACED_COLL_MAP**) table.

Any Instrument Specific attributes are expected in Instrument Contract Dimension table **(DIM_INSTRUMENT_CONTRACT)**

14.5.4 Account Mitigant Mapping Data Expectations

Any account in the product processors, mapped to the various mitigants received were captured in the Stage Exposure Mitigant Mapping (**STG_EXP_MITIGANT_MAPPINGS**) till 8.0.4 release of Basel application.

Starting from 8.0.5 release, this is expected to be provided in the Stage Account Mitigant Map (**STG_ACCOUNT_MITIGANT_MAP**) table

14.5.5 Commitment Contract Data Expectations

Any commitment contracts, issued by the bank were initially expected in Stage LC Contracts (**STG_LC_CONTRACTS**) till 8.0.4 release of Basel application.

Starting from 8.0.5 release, any exposure which is a commitment contract issued by the bank, is expected to be provided in the Stage Commitment Contracts (**STG_COMMITMENT_CONTRACTS**).

In the case of the commitment contracts issued under a credit line facility, then, the linkage of the credit line to the contract is required to be provided. The credit line is expected to be populated into the Dimension Credit Line (**DIM_CREDIT_LINE**) table.

14.5.6 Credit Line Issued Data Expectations

Any credit line, issued by the bank were initially expected in Stage LC Contracts (**STG_LC_CONTRACTS**) till 8.0.4 release of Basel application.

Starting from 8.0.5 release, any exposure which is a line of credit issued by the bank, is expected to be provided in the Stage Credit Line Details (**STG_CREDIT_LINE_DETAILS**) along with entries in the Dimension Credit Line (**DIM_CREDIT_LINE**) table.

The credit line table will hold information with respect to all the lines of credit issued by the bank. The lines of credit can be drawn for various products like Credit Card (corporate credit card issued to various employees under a credit line for that corporate), Loan commitments (loan issued to the customer as part of a credit line issued to that customer) etc. This table will hold all the information related to the credit line, and any undrawn portion related to that credit line.

The drawn portion of the credit line, or the portion which has been earmarked for a specific product like credit card, will be part of the corresponding product processor (**STG_CARDS**, in this example), with the credit line code populated. And under that particular product, there can be both the drawn and undrawn portion, which will be captured in the same product processor (**STG_CARDS**, in this example).

The undrawn portion of the credit line will be the one which will be treated as line of credit, and will receive the corresponding Basel guideline specific treatment.,

14.5.7   Forward Contract Data Expectations

Any forward agreement or contract were initially expected in Stage Futures (**STG_FUTURES**) till 8.0.4 release of Basel application.

Starting from 8.0.5 release, any exposure which is a forward agreement, is expected to be provided in the Stage Forwards (**STG_FORWARDS**).

14.5.8   Asset Sold Data Expectations

Any assets sold with recourse were initially expected in Stage Loan contracts (**STG_LOAN_CONTRACTS**) till 8.0.4 release of Basel application.

Starting from 8.0.5 release, any exposure which is an asset sold, is expected to be provided in the Stage Assets sold (**STG_ASSETS_SOLD**). This will include all the assets sold by the bank. And the assets sold, for which the bank is retaining recourse will be part of the regulatory capital calculations, and that will be taken up for the Basel related processing.

14.5.9   Spot Forex Data Expectations

Any forex transaction, which is a spot were initially expected in Stage Investments (**STG_INVESTMENTS**) till 8.0.4 release of Basel application.

Starting from 8.0.5 release, any forex transaction which is a spot contract, is expected to be provided in the Stage Forex Contracts (**STG_FX_CONTRACTS**).

Note: All other forex transactions are expected to be populated in their respective derivative tables (Currency Swap in **STG_SWAPS_CONTRACTS** and so on).

14.5.10   Underlying Exposures for Derivatives

The underlying exposures for derivatives are now being captured through STG_UNDERLYING_MASTER.

The Data expectation for the underlying relationship for the derivatives is as follows:

1. Case 1 – Both Parent derivative contract and underlying of the derivative are instruments:

    •   This will involve usage of the two tables for capture of the underlying information – STG_UNDERLYING_MASTER/ DIM_UNDERLYING and STG_UNDERLYING_DTL

    •   The parent account will be in one of the derivative contract, and the relationship between the parent and the underlying will be captured in the derivative tables as Underlying Instrument Code or the Underlying code

    •   DIM_UNDERLYING will be used to store the static information about the underlying instruments, and STG_UNDERLYING_DTL will be used to store any variable information about the underlying instruments.

    •   Data for STG_UNDERLYING_DTL

        a. The STG_UNDERLYING_DTL can support the relationship reference of 1 parent to 1 underlying or multiple underlying instruments.

        b. In this, the underlying instrument code will be provided as v_instrument_code and the parent's instrument code will be provided as v_contract_instrument_code

        c. Both these instrument codes will have reference in dim_instrument_contract.

2. Case 2 – If Parent derivative contract or underlying of the derivative are not instruments but instead are accounts or exposure:

    •   This will involve usage of a single table for capture of the underlying information – STG_UNDERLYING_EXPOSURES.

    •   The parent account will be in one of the derivative contract, and the relationship between the parent and the underlying will be captured in the underlying table as the parent exposure ID.

    •   Data for STG_UNDERLYING_EXPOSURES.

        a. The STG_UNDERLYING_EXPOSURES can support the relationship reference of 1 parent to 1 underlying or multiple underlying instruments.

        b. In this, the underlying exposure will be provided as v_exposure_id and parent's exposure ID in v_parent_exposure_ID.

        c. Both these exposure ID's will have reference in dim_exposure.

14.5.11   Underlying Exposures for CIU

The underlying exposures for CIU are now being captured through STG_UNDERLYING_MASTER.

The following is the data flow of underlying exposure of CIU:

1. **Case of Invested Mutual Fund**

   - Invested portion will be in STG_INVESTMENTS

   - Any Fund related information which do not change will be in STG_INSTRUMENT_CONTRACT_MASTER

   - Any Fund related information which changes frequently will be in STG_INTRUMENT_CONTRACT_DTL

   - The composition of the fund will be in STG_FUND_UNDERLYNG_COMPOSITION

   - The assets of the fund will be in STG_FUND_CIS_COMPOSITION

15 Annexure B: Frequently Asked Questions

This section addresses some of the frequently asked questions which are as follows:

15.1 Leverage Ratio

Question 1. **Does the application require a different set of input data to execute the Leverage Ratio?**

No. Leverage Ratio can be executed on the same set of input data required for normal processing to execute the Basel III Run. The input for leverage ratio is the subset of the data provided for Basel III executions. However, an additional set of data is required (total consolidated asset) for accounting entity which is outside the scope of the consolidation process. As per the Basel III Accord, total consolidated asset value should add up to the Total Exposure Measure calculation for Leverage Ratio.

Question 2. **Can we execute Leverage Ratio if the bank has installed the application for the first time?**

Yes, we can compute Leverage Ratio. The application calculates the current month Leverage Ratio and the Leverage Ratio of the previous two months, which is provided as a download by the client or the bank. This information is considered as an input to calculate Regulatory Leverage Ratio. If the previous month's data is not available, then the application considers the value as 0 and computes the Regulatory Leverage Ratio. Also, you have the flexibility to use the current month Leverage Ratio as input for previous two months' leverage ratio, if required.

Question 3. **Can Leverage ratio be calculated on any day during a particular month?**

There is no restriction on the execution date for computing Leverage Ratio. Leverage Ratio can be calculated on any given day. However, Leverage Ratio is to be executed based on the month-end data.

Question 4. **As per Basel III requirement, the Leverage Ratio is to be calculated on Tier 1 capital. However, if a particular jurisdiction prescribes to calculate the Leverage Ratio based on Total capital, then can the application support such modifications?**

Yes, the application has the flexibility to change the input criteria by adding or deleting the Rule related to capital. To achieve this, modify the Business Processor's **BP-Leverage Ratio** expression by modifying one of the used measures. Instead of measure **CS Net Tier1 capital**, add another measure created on Total capital by deleting the existing one. The data model is not affected by such changes.

15.2 Capital Buffers

Question 5. **As per the Basel III Accord, Capital Buffers are required to be maintained from 2016 only. However, if for internal purposes the bank wants to start computing it from 2013 itself, then does the application support such modifications? If yes, then will it consider the required capital ratios as per the transitional arrangement?**

Yes, the application supports the calculation of capital buffers from 2013 and it considers the transitional arrangement for the calculations before 2016.

For Example: The application considers the required Tier 1 Ratio in 2013 as 4.5%. For this calculation, no changes are required in the input data as the calculation in the application begins from 2013.

Likewise, the application selects the required values for CET1, Tier 1, and CAR as per the transitional arrangements for years 2013, 2014 and 2015.

Question 6. **While building quartiles, how much Required CET1 is considered for computing Capital Conservation Ratio?**

Required CET1 ratio is used for computing the four quartiles or intervals for Capital Conservation Ratio. Since Required CET1 is phased out through a transitional arrangement, the value used in the calculation of quartiles is a maximum of 4.5% or the CET1 required by that specific jurisdiction in that specific year.

Question 7. **The computed value for Available Buffer from CET1 capital is considered for all three buffers. Is there any priority of one buffer over the other?**

As per the Basel III Accord, there is no priority given to one buffer over the other. Required Buffer from CET1 capital is compared against the Available Buffer from CET1 capital. Any shortfall or excess is reported at an aggregate level. It cannot be reported for one specific type of buffer. This approach in the application is built as per our interpretation of the Basel guidelines. As per the Basel III Accord, the other two buffers are met through an extension of Capital Conservation Buffer and the accord does not explicitly mention about its priority. The Capital Conservation Ratio for a shortfall is also calculated at an aggregate level and not at individual buffer level.

Question 8. **Can the regulator of the parent jurisdiction prescribe countercyclical buffer requirement different from the one prescribed by the home country's regulator to which the exposure relates to?**

As per our interpretation of the Basel III accord, the countercyclical buffer requirements can be different. By default, the requirement that is prescribed by the parent regulator should be used as input data which in turn is used for further calculations.

Question 9. **If one of the exposure countries has not implemented Basel III and the country's regulator have not recommended any buffer, should countercyclical buffer requirement be taken as 0% for the exposures of that country?**

No, the countercyclical buffer requirement cannot be taken as 0% as the parent company's regulator has exposure to this country. For a consolidated Run, it depends on the buffer requirement required for all the exposure countries by the parent regulator.

By default, the buffer requirement specified by the parent regulator for each exposure country is included in the input data. Therefore, data is not required to be modified.

Question 10. **As per Basel requirements, all three buffers are calculated from CET1. However, in the future as per guidelines of the Basel Committee on banking supervision, it may be required to be calculated from Tier 1 or CAR. Does the application have a provision for that?**

Yes. The application is flexible to compute such changes. It can be modified to compute buffer from Tier 1 capital and CAR. The logic for computing this buffer is similar to the one used for buffer from CET1 capital. The application can calculate buffers form Tier 1 capital, by taking remainder of following:

Excess of Tier1 Capital Ratio over benchmark (6.0 %), after catering to the shortfall, if any, in Tier 2 capital to its respective benchmark level, which is 2%, minus Required Benchmark Buffer from CET1 capital. Hence, Capital Conservation Buffer excludes any additional CET1 needed to 8% Total Capital Ratio.

To calculate buffer form Total Capital, remainder of following is taken:

Excess of Total Capital Ratio over benchmark (8.0%), minus Required Benchmark Buffer from Tier 1 capital.

15.3 Credit Valuation Adjustment

Question 11. **How will the application handle Index Decomposition, if data for index is not provided and index decomposition is selected?**

In this case, the application calculates CVA charge without decomposition. The Run can be successfully executed and Index Hedge position is treated without decomposition.

Question 12. **How does the application handle an Index Hedge position marked to the counterparty wherein multiple counterparties which are part of Index and Index decomposition are selected?**

The application creates a single name CDS hedge for all the counterparties with which the bank has exposures and is a part of the index. Index position mapped to a counterparty is used only to allocate CVA charge to the counterparty while using Standardized Approach for CVA calculation.

Question 13. **Can IMM approach be selected for Capital Conservation Ratio calculation and standardized approach for CVA Calculation?**

No, IMM approach cannot be selected for Capital Conservation Ratio**.** The application requires CEM method output for computing CVA Charge using Standardized approach.

Question 14. **Can the discount factor be changed which is currently proposed as 5% as per the Basel guideline?**

Yes, risk free rate can be changed by modifying Rules. For more information on modifying Rules, see *Rules Framework*.

Question 15.   How is CVA RWA used in the application?

The application calculates CVA RWA and sums it to Credit RWA. CVA RWA is not multiplied by the factor 1.06.

Question 16.   Will the application create a duplicate hedge record from Index Decomposition, if the Run is executed twice?

No, the application does not create a duplicate hedge record. The application checks whether the record already exists and it uses the same. If the record does not exist, then the application creates a hedge record.

15.4 Operational Risk

Question 17.   If the input parameter to calculate the Annual Gross Income is different for other jurisdictions, then can the input parameters be changed?

Yes, you can change the input parameters by adding or deleting the Rule related to Annual Gross Income. To achieve this, modify the BP expression - **Ops Risk Annual Gross Income** by adding the newly defined measure or deleting the used measure. The data model can undergo changes if the newly added parameter is not captured. The data model changes affect the staging table and the processing table.

Question 18.   Can reclassification rule for mapping of internal LOB to standard LOB be modified?

Yes, you can change Reclassification Rule as per jurisdiction requirement. You must add the mapping in the Rule **OR Internal LOB to Standard LOB Reclassification** and make an entry into **DIM_LOB** and **DIM_STANDARD_LOB**.

15.5 Capital Structure (Basel III)

Question 19.   Are the list of instruments provided for each component of capital that is, CET1, AT1, and T2 fixed or can the list of instrument be extended or reduced to accommodate as per the requirement?

The list of instruments mapped to different components of capital is a bare minimum list. You can add or delete as per their definition of capital by adding or deleting a mapping in the Rule – **Non Sec Standard Product type to capital Comp Group Reclassification** for banking book (non securitization) exposures and in Rule – **Mkt Risk Instrument type** to **Capital Comp Group Reclassification** for trading book exposures. No data model changes are required.

Question 20.   The criteria to calculate the surplus capital in CET1 for Minority Interest is Minimum CET1 plus the Capital Conservation Buffer. If the criteria changes in the future to include the countercyclical buffer along with CET1 and CCB, then can the application handle such modifications?

The application has the flexibility to include any parameter or delete any parameters to calculate the Minority Interest. In such a case, the Rule can be modified to include additional parameters or delete if required.

Question 21.   **Is there any flexibility in the Rule to add or delete any regulatory adjustment line item during the calculation of CET1?**

Yes, the application has the capability to add or delete any regulatory adjustment line item. This is handled in the Rule by adding or deleting any regulatory adjustment line item.

Question 22.   **Considering that the phase-in treatment criteria specified as per the accord changes in the future where the deduction values and risk-weighting values change, then can this scenario be handled by the application without affecting other sections?**

The application is flexible to accommodate any scenario for phase-in treatment. For example: if in the future the phase-in criteria changes from 20%, 40%,60%,80% to 25%, 45%,65%, 85%, then the application has the capability to change the value as well during the phase-in. The deduction amount that is not deducted is to be risk-weighted with some different percentage.

The values in the capital component column of the Setup Capital Heads (**FSI_SETUP_CAPITAL_HEAD**) should be changed to accommodate this phase-in treatment.

Question 23.   **What if the Bank doesn't calculate CR RWA, MR RWA, and OR RWA and directly provides a value against each of this line item?**

The application supports such direct download values for RWA in table – **STG_STANDARD_ACCT_HEAD** against appropriate Standard Account Head identifiers (CAP169 for Credit RWA, CAP090 for Market RWA, and CAP170 for Operational RWA).

15.6 Securitization

Question 24.   **The Reporting Bank wants to implement the Securitization aspect of the Credit Risk. The Bank currently does not have the Credit Risk module. How can the Reporting Bank implement only the Securitization module?**

If the bank wants to implement Securitization Standardized approach, then data relevant to the exposures, tranche, pool, rating, and mitigant details are expected. If IRB approach is implemented, underlying pool capital for SFA approach is expected as a download along with exposures apart from the previous mentioned details.

Question 25.   **The reporting bank has the underlying data and has provided the pool, tranche, and exposures data. Additionally, the reporting bank has also provided the pool and tranche information in the exposures table. In this case, will the application use the data from the pool and tranche table or from the exposures table?**

The application expects the data only in either of the following tables:

- Pool, tranche, and exposures table with all the pool, tranche, and exposures attribute data only in their respective tables.
- Exposures table with the entire exposures attribute and few of the attributes of the pool and tranche.

The application gives a preference to the pool and tranche attributes in the exposures table, compared to the attributes given in the pool and tranche table. In this case, all the computations is based out of the data given in the exposures table.

Question 26.   How does the bank select particular Securitization approach?

As per regulator's guidelines, banks are expected to follow the hierarchy of approaches while implementing IRB approach as follows:

- Supervisory Formula Approach (SFA)
- Simplified Supervisory Formula Approach (SSFA)
- Risk Weight at 1250%

The solution supports this hierarchy of approaches. As stated in the accord, the SFA/SSFA approaches are data driven approaches and availability of data drives the approach selection. In case the bank has relevant data of underlying exposures that is required for SFA calculations, it needs to follow SFA approach. Most of banks that are originators and sponsors of deal have this data and some of the investor banks may have it and hence they naturally follow SFA. However, in case the bank does not have this underlying data, it cannot follow SFA approach; such banks can follow SSFA approach by providing parameters that are applicable only to SSFA as direct input to the application.

Question 27.   The reporting bank, who is an investor in securitization transaction, has an unrated securitization exposure. How will this unrated exposure be treated by the application?

The application treats the unrated exposure based on the approach being followed for that exposure. The approach followed is the same for the originator and the investor.

Standardized Approach

In this case, the application calculates the weighted average risk weight of the underlying exposures and assigns this to the exposure.

If the details regarding the underlying exposures are not available, then the unrated exposures are deducted.

Ratings Based Approach

In this case, the application tries to infer the rating based on the presence of the rated subordinate tranche information, belonging to the same pool.

The application tries to identify whether there are any rated subordinate tranche belonging to the same pool, and which has the credit enhancement level less than that of the unrated exposure and which has the residual maturity more than that of the unrated exposure and which has the seniority less than that of the unrated exposure. The seniority is a number denoting the seniority of the cash flows to that tranche and it starts from the value of 1 which is the senior most tranche.

If the ratings are inferred, then the application assigns the rating to the exposure and hence assigns the corresponding risk weight.

All other processing are the same as other rated exposures.

If the rating cannot be inferred, then the unrated exposures are deducted.

Supervisory Formula Approach

In this case, there is no dependency on the ratings. Hence, it proceeds without any difference in the treatment.

Question 28. **The reporting bank, which is an investor in Securitization Transaction, is provided protection on its securitization exposure with the help of an Nth to Default credit derivative mitigant. How will the application recognize the benefit for this exposure?**

The application identifies the nth to default credit derivative protection based on the comparison of the tranche attachment point, initial pool amount, and the cumulative loss amount of the pool. Using this, the application calculates whether the tranche is in default or not. Further, the application counts the number of tranches in default and then compares this number with the defaulted position covered by the mitigant. Hence for this, the entire tranche information of the pool is required, regardless of whether the Bank has an exposure in all those tranches or not.

For example: the exposure held by the bank belongs to tranche T1 and this belongs to the pool P1. Assume that there are a total of 10 tranches being issued out of that pool. (T1 to T10). The mitigant provided is 7^{th} to default credit derivative. Hence, the application recognizes this mitigant only if there are 6 defaults in the basket of exposures (T1 to T10) or else there is an eligible 6^{th} to default credit derivative for the same pool. Assume that the following are the calculations:

The application takes the tranche attachment point and multiplies this with the initial pool amount. This amount is compared by the application with the cumulative loss of the pool. If the amount is less than or equal to the cumulative loss of the pool, then that tranche is in default. Further, the application takes the count of all the tranches which are in default. In the following case, there are 6 defaults in the exposures. This is compared with the defaulted position of the mitigant. Since there are n-1 defaults (7-1 = 6) in the exposure, the mitigant is recognized for this pool. The exposure with the least risk weight and highest seniority is allocated the mitigant and all other exposure combinations mapped to this mitigant iscome ineligible.

Tranche ID	Tranche Attachment Point	Associated Pool ID	Initial Pool Amount	Attachment * Pool	Cumulative Loss of the Pool	Defaulted?
T1	0.75	P1	1,000,000.00	750,000.00	300,000.00	N
T2	0.58	P1	1,000,000.00	580,000.00	300,000.00	N
T3	0.45	P1	1,000,000.00	450,000.00	300,000.00	N
T4	0.34	P1	1,000,000.00	340,000.00	300,000.00	N
T5	0.29	P1	1,000,000.00	290,000.00	300,000.00	Y
T6	0.22	P1	1,000,000.00	220,000.00	300,000.00	Y
T7	0.18	P1	1,000,000.00	180,000.00	300,000.00	Y

Tranche ID	Tranche Attachment Point	Associated Pool ID	Initial Pool Amount	Attachment * Pool	Cumulative Loss of the Pool	Defaulted?
T8	0.15	P1	1,000,000.00	150,000.00	300,000.00	Y
T9	0.05	P1	1,000,000.00	50,000.00	300,000.00	Y
T10	0	P1	1,000,000.00	-	300,000.00	Y

Question 29. **The Reporting Bank has multiple exposures mapped to multiple mitigants. How will the application allocate the mitigants to the exposures?**

The application uses the optimizer to allocate the mitigants to the exposures. The optimizer constraints in the case of securitization are dependent on the seniority of the exposures, risk weight of the exposures, and the mitigant value assigned to the exposure post the haircut. Assume the following case of exposures and mitigants mapped to each other along with the seniority, risk weight, and the haircut factor.

Exposure ID	Exposure amount	Exposure Seniority	Exposure RW	Mitigant ID	Mitigant Amount	Mitigant RW	Haircut Factor
E1	5,000.00	1	0.5	M1	10,000.00	0.2	0.2
E2	3,000.00	2	0.5	M1	10,000.00	0.2	0.4
E3	2,000.00	2	0.5	M1	10,000.00	0.2	0.15
E4	1,500.00	3	1	M1	10,000.00	0.2	0.1
E1	5,000.00	1	0.5	M2	5,000.00	0	0.4
E2	3,000.00	2	0.5	M2	5,000.00	0	0.87
E3	2,000.00	2	0.5	M2	5,000.00	0	0.37
E4	1,500.00	3	1	M2	5,000.00	0	0.64
E1	5,000.00	1	0.5	M3	3,500.00	0.2	0.05
E2	3,000.00	2	0.5	M3	3,500.00	0.2	1
E3	2,000.00	2	0.5	M3	3,500.00	0.2	0.18
E4	1,500.00	3	1	M3	3,500.00	0.2	0.27

The mitigants are assigned to the exposures based on the seniority of the exposures. The mitigants with the least risk weight are assigned first to the exposures. The following is the order in which the mitigants are allocated.

Exposure ID	Mitigant ID
E1	M2
E2	M2
E3	M2
E4	M2
E1	M1
E2	M1
E3	M1

Exposure ID	Mitigant ID
E4	M1
E1	M3
E2	M3
E3	M3
E4	M3

The application assigns the exposures to the mitigants based on this order and computes the Post-CRM RWA of the exposures.

Question 30. **Does optimizer work on pool-by-pool basis? Can the user explicitly mention how many pools can be processed at a time?**

Yes, the optimizer works on pool-by-pool basis. However, you can specify the number of pools to be processed at a single fetch in Optimizer_Config.xml in <PROCESSEDPOOLSIZE> tag.

Question 31. **Is it possible that few of the exposure-mitigant combination can have no pool ids? If so, what happens to those records?**

All the records are expected to have pool IDs based on the exposure mitigant combination. If few records do not satisfy the join/filter condition present in pooling definition, then the pool IDs are not assigned. Such records are not considered for optimizer and covered factor is not calculated for those exposures.

15.7 Capital Structure (Basel II)

Question 32. **Are the list of instruments provided for each component of capital that is, T1, T2, and T3 fixed or can the list of instrument be extended or reduced to accommodate as per the requirement?**

The list of instrument mapping to different components of capital is a bare minimum list. You can add or delete as per their definition of capital in the Rules – '**Bank capital Group Components Reclassification**' and '**STD to Capital Group Components Reclassification**'

Question 33. **Is there any flexibility in the Rule to add or delete any regulatory adjustment line item during the calculation of T1 and T2?**

Yes, the application has the capability to add or delete any regulatory adjustment line item. This is handled in the rule by adding or deleting any regulatory adjustment line item.

Question 34. **What if the Bank does not calculate any of the CR RWA, MR RWA and OR RWA and directly provides a value against each of these line items?**

The application supports and has taken into account for such direct download values for RWA in the table – STG_STANDARD_ACCT_HEAD against appropriate Standard Account Head identifiers (CAP169 for Credit RWA, CAP090 for Market RWA and CAP170 for Operational RWA) for entities for which the bank does not calculate RWA using our application.

15.8 Market Risk (Basel II)

Question 35.   Does the Greeks Engine calculate Greeks parameters for all kind of Options?

Currently, the Greeks Engine calculates parameters only for normal options. The exotic options are not covered by Greeks Engine.

15.9 Mitigant Eligibility (Basel III)

Question 36.   The Reporting Bank has a wholesale exposure and for that guarantee from an issuer is present which can be reclassified under the "Other Entities". The current rating of the guarantor is B-. How does the application handle this in Basel II and Basel III runs?

The application handles the mitigant eligibility of Basel II and Basel III using separate rules. The application using the Basel III Rule, checks for the presence of a rating for this kind of issuer type and if there is a rating available, then this mitigant becomes eligible. The application under the Basel II rule checks for the rating to be A- or better and if the rating is below A-, then this mitigant becomes ineligible.

15.10 Haircut Assignment (Basel III)

Question 37.   The Reporting Bank has a securitized exposure and for that two financial collaterals are present - a debt instrument from an issuer which can be reclassified under the "Non-Sovereign" issuer type and a debt instrument which is part of a securitization transaction. For the first instrument, the current ratings of the instrument by 2 agencies are AAA and A+ and its residual maturity is 4.5 years. For the second instrument which is a securitized debt exposure, the current rating of the instrument by 2 agencies are A and BBB+, and its residual maturity is 8 years. What is the volatility haircut applied for this mitigant by the application under Basel II and Basel III rules?

The application handles the volatility haircut assignment for debt securities of Basel II and Basel III using separate rules. The application requires a single rating for the debt securities. Since there are multiple ratings, the application applies multiple assessment and calculates the final current rating. In this case, the first mitigant is rated A+ and second mitigant is rated BBB+, post multiple assessment. The application under the Basel III rule checks for the current rating of the debt instrument, its residual maturity, whether the debt security is a securitized exposure or not, and the issuer of the debt security.

For the first mitigant, the current final rating is A+ and it is a debt security issued by a non-sovereign with a residual maturity of 4.5 years. The haircut assigned is 6%.

For the second mitigant, the current final rating is BBB+ and it is a debt security which is a securitized exposure with a residual maturity of 8 years, the haircut assigned is 24%.

The application using the Basel II Rule, checks the current rating of the debt instrument, its residual maturity, and the issuer of the debt security.

1. For the first mitigant, the current final rating is A+ and it is a debt security issued by a non-sovereign with a residual maturity of 4.5 years. The haircut assigned is 6%.

2. For the second mitigant, the current final rating is BBB+ and it is a debt security issued by a non-sovereign with a residual maturity of 8 years, the haircut assigned is 12%.

15.11 Cleared Transactions

Question 38. **What is the treatment for the transaction between clearing member and client which arises due to clearing member acting as intermediary for the transaction and reporting bank act as clearing member?**

Currently the treatment assigned in the accord is of bilateral trade and application expects user not to identify the previous trades as cleared transaction.

Question 39. **Will the netting agreement be changed for cleared transaction?**

No. Trade marked for the Netting agreement is the trading input and risk calculation does not change previous logic.

Question 40. **Since the each collateral is treated separately is there a chance that separate risk weight is assigned to different collateral?**

No. Risk Weight assigns changes only when the reporting bank is clearing member client and have not posted the collateral and due diligence is not conducted. Application expects the previous condition to be uniform for all the collateral posted, that is, if collateral is cash and securities will either cover all losses or not cover all losses. Data consistency is expected from the user. Moreover the reporting bank to get the transaction cleared from CCP, previous two conditions are mandatory to meet, so the application expects very less trade to go with 4% risk weight.

Question 41. **Will the transaction with non-qualifying CCP have CVA Charge?**

No. CVA charge is excluded for the transaction with CCP. Qualifying CCP transactions are given preferential treatment for RW and non-qualifying CCP is treated as bilateral trades. Both trades do not qualify for CVA Charge.

Question 42. **How does the application distinguish between qualifying and non qualifying CCP?**

Application expects the user to identify the CCP as qualifying and non-qualifying. Application expects this information as counterparty information. For collateral posted with non-qualifying CCP the application expects other inputs for calculating RWA like, collateral type, pd, lgd, and maturity. Also counterparty type is assumed to be Central Counterparty for the calculation.

Question 43. **Why do application expects the role of the reporting bank with CCP for each transaction?**

As per the example in BIS, a CCP also plays a role of Clearing Member for reporting bank transaction with another CCP. This case makes it difficult for the risk system to capture the role of reporting bank at party level and hence is required for each transaction.

15.12 AOCI Opt-Out Option (US Basel III – Standardized Approach)

Question 44. **How the treatment of pre-tax values of AFS equity securities and AFS preferred stock/non-preferred stock classified as equity to be configured?**

Perform the following steps:

1. Create a new CAPID (CAP1000) for Pre-tax AFS equity securities in dim_standard_acct_head table.

2. Map the CAP1000 to All Component of Tier 2 Capital in Capital Component Group mapping.

3. Design a rule that will take 45% of the value of Pre-tax AFS equity securities in Gross Tier 2 capital. Define the rule name as USA US III Pre-tax value of AFS equity securities part of Gross Tier 2. AOCI opt-out option – Y Standard acct head - Pre-tax AFS equity securities BP Expression - Pre-tax AFS equity securities * 0.45

4. Rule (RLBL0649) is removed from AOCI calculation process which adds Preferred Stock and Non-Preferred Stock into AFS equity securities.

5. Modify the rule RLBL0463 (USA US III Accumulated Other Comprehensive Income Calculation) where in BP (BPBL0432) add new measure as Net Unrealized Gain/Loss on AFS preferred Stock classified as Equity Security and Net Unrealized Gain/Loss on AFS Non-preferred Stock classified as Equity Security add this measure in the expression.

   The following are the codes:

   - MBL0552 - Net Unrealized Gain/Loss on AFS Non-preferred Stock classified as Equity Security

   - MBL0553 - Net Unrealized Gain/Loss on AFS preferred Stock classified as Equity Security

6. Modify the rule RLBL0650. Add Net Unrealized Gain/Loss on AFS preferred Stock classified as Equity Security and Net Unrealized Gain/Loss on AFS Non-preferred Stock classified as Equity Security as a measure into BP- CS Transition AOCI (BPBL0596).

16 Glossary

AIRB	Advanced Internal Rating Based
AMA	Advanced Measurement Approach
ASCII	American Standard Code for Information Interchange
BCBS	Basel Committee on Banking Supervision
Bankruptcy Remote	In case of liquidation of the company, if the collateral is bankruptcy remote then legal proceeding will not have the right to liquidate the collateral.
BIS	Bank of International Settlements
CAR	Capital Adequacy Ratio
Central Counterparty (CCP)	Central Counterparty (CCP) is a clearing house that interposes itself between counterparties to contracts traded in one or more financial markets, becoming the buyer to every seller and the seller to every buyer and thereby ensuring the future performance of open contracts.
CCB	Capital Conservation Buffer
CCF	Credit Conversion Factor
CCR	Counterparty Credit Risk
CET1 Ratio	Common Equity Tier 1 Ratio
Clearing Member (CM)	Clearing Member (CM) is a member of, or a direct participant in, a CCP that is entitled to enter into a transaction with the CCP, regardless of whether it enters into trades with a CCP for its own hedging, investment or Capitalization of exposures to central counterparties.
Clearing Member Client (CMC)	Clearing Member Client (CMC) is the client of the Clearing Member and trades are done via clearing member for the client.
CRE	Commercial Real Estate
CRM	Credit Risk Mitigants
CVA	Credit Valuation Adjustment
DeFQ	Data entry and Forms Queries
EAD	Exposure At Default

FFIEC	Federal Financial Institutions Examination Council
FIRB	Foundation Internal Rating Based
FTP	File Transfer Protocol
GL	General Ledger
GRC	General Risk Charge
GUI	Graphic User Interface
IAA	Internal Assessment Approach
IFSB	Islamic Financial Services Board
IMA	Internal Models Approach
IMM	Internal Modeling Method
IR	Interest Rate
IRB	Internal Rating Based
LGD	Loss Given Default
LIBOR	London Inter Bank Offered Rate
OBIEE	Oracle Business Intelligence Enterprise Edition
OFSAA	Oracle Financial Services Analytical Application
OFSAAI	Oracle Financial Services Analytical Application Infrastructure
OTC	Over the Counter
Non Securitization Exposure	The exposures that are not securitized by the bank which include, loans, investments, Bonds, Facilities Purchase Receivables and so on are known as Non Securitized Exposures.
PD	Probability of Default
Private Sector Credit Exposure	A private sector credit exposure is defined as an exposure to a company or an individual that is included in credit risk-weighted assets (excluding an exposure to a sovereign, the Bank for International Settlements, the European Central Bank, the European Commission, the International Monetary Fund, a multilateral development bank (MDB), a public sector entity (PSE), or a government sponsored entity (GSE). The geographic location of a private sector credit exposure is the national jurisdiction of the place the borrower is located in.

Qualifying Central Counterparty (QCCP)	A qualifying central counterparty (QCCP) is an entity that is licensed to operate as a CCP (including a license granted by way of confirming an exemption), and is permitted by the appropriate regulator/overseer to operate as such with respect to the products offered.
	This is subject to the provision that the CCP is based and prudentially supervised in a jurisdiction where the relevant regulator/overseer has established, and publicly indicated that it applies to the CCP on an ongoing basis, domestic rules and regulations that are consistent with the CPSS-IOSCO Principles for Financial Market Infrastructures.
RBA	Ratings Based Approach
RBI	Reserve Bank of India
RDBMS	Relational Database Management System
Regulatory Reporting	This is a jurisdiction specific requirement. These reporting requirements are over and above the Pillar III reporting requirements and to be submitted to respective regulators.
RRE	Residential Real Estate
RWA	Risk Weighted Assets
SCD	Slowly Changing Dimension
SFA	Supervisory Formula Approach
SFT	Securities Financing Transactions
SRWA	Simple Risk Weight Approach
TXN	Transaction
SLR	Statutory Liquidity Ratio
Stress Testing	Process of defining shocks, stress scenarios and specifying a standalone execution of stress scenarios to obtain the stress values of the variables or mapping a scenario to a Baseline Run
T2T	Table to Table
VaR	Value at Risk

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