

# **Oracle Financial Services Basel Regulatory Capital Internal Ratings Based Approach**

User Guide

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Oracle Financial Services Basel Regulatory Capital IRB Approach User Guide, Release 6.1.0.0.0

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## **Preface**

### ***Intended Audience***

Welcome to Release 6.1.0.0.0 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 would be 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 would control the access rights of users.

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### ***Structure***

- 1 Introduction to Basel Regulatory Capital IRB Approach
  - 2 Overview of OFSAA Infrastructure
  - 3 OFS Basel Regulatory Capital Application
  - 4 Application Processing
  - 5 Reporting
  - 6 Process Tuning
- A Frequently Asked Questions  
Glossary

### ***Related Information Sources***

- Oracle Financial Services Basel Regulatory Capital IRB Approach Release 6.1.0.0.0, Installation Guide
- Oracle Financial Services Basel Regulatory Capital IRB Approach Admin Guide
- Oracle Financial Services Basel Regulatory Capital Analytics User Guide

## What's New in this Release

In the OFS Basel Regulatory Capital Release 6.1.0.0.0, rules relating to 'Regulatory Capital Rules: Advanced Approaches Risk-Based Capital Rule; Market Risk Capital Rule; Proposed Rule (August 2012)' and 'Regulatory Capital Rules: Advanced Approaches Risk-Based Capital Rule; Market Risk Capital Rule; Proposed Rule (US Basel III NPR), August 2012,' have been introduced. The following enhancements have been introduced in this Release for the US jurisdiction:

- **Capital changes:** Through this release the application supports the US Basel III NPR for capital structure, where Common Equity Tier 1 capital must be at least 4.5% of total Risk weighted assets (up from 2% in Basel II). Tier 1 capital must be at least 6.0% of total Risk weighted assets (up from 4% in Basel II). Total capital must be 8.0% of total risk-weighted asset. Each component of capital undergoes minority interest and regulatory adjustments.
- **Capital Buffer:** As introduced in the US NPR III Rules, the application calculates the following 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 Risk weighted assets during periods of high credit growth. Loss absorbency is also required to be met as an extension of Capital Conservation Buffer. The application supports the calculation of additional capital surcharge requirements in the case of Global systemically important banks (G-SIBs).
- **Leverage Ratio:** The application calculates the Minimum Tier 1 Leverage Ratio and Supplementary Leverage Ratio for a Reporting Bank. The application supports calculation of capital measure and Exposure measure that are used in the calculation of Leverage Ratio.
- **CVA Risk:** The application supports calculation of CVA Risk Capital Charge (as introduced in the Basel III accord) in addition to counterparty default risk charge for Over the Counter derivative portfolio.
- **Asset Value Correlation Multiplier:** The changes relating to Asset Value Correlation multiplier introduced in the Basel III accord are supported through this release.
- **Cleared Transactions:** The application supports the guidelines issued by US NPR III Guidelines wherein a new capital requirement has been introduced 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 these guidelines.
- **Single Counterparty Exposure Limits:** 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). In line with the Dodd-Frank Act and the US Agencies proposal on Single Counterparty Exposure Limits, the application supports calculation of Gross credit exposures and Net credit exposures and a comparison against the applicable limits prescribed.
- **Securitization Simplified Supervisory Formula Approach (SSFA):** In line with the Dodd-Frank Act and the US agencies proposal on the introduction of Simplified Supervisory Formula Approach on securitization, the application supports the calculations under this new approach and the revised hierarchy of approaches.
- **Other Amendments:** Amendments with respect to Eligible Guarantees, Qualified Revolving Exposures, Cash Item in process of collection, trade-related letter of credit, Money Market Fund approach, Eligible Double Default Guarantor, and Supervisory Haircuts for Repo, Margin Loans, and Financial Collateral have been incorporated in this release.

# Chapter 1 Introduction to Basel Regulatory Capital

## 1.1 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
  - Tier 1, Tier 2 and Tier 3 capital
  - Credit Risk
  - Market Risk
  - Operational Risk
- The Second Pillar - Supervisory Review Process and
- The Third Pillar - Market Discipline

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**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 as well.

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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.
- **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 Release 6.1.0.0.0 consists of Capital Adequacy and Risk Weighted Assets computations as prescribed in Basel I, Basel II, and Basel III Accord. Regulations in accordance with the Basel accord, as published by the regulatory authorities of the Indian, Islamic Banking, Chinese, Brazilian, and US jurisdictions are also available in this release.

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, Standardized Approach for the Indian, Islamic Banking, Brazilian, and CBRC Jurisdictions.

- OFS Basel Regulatory Capital Internal Rating 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, and CBRC 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
  - Non Securitization – Standardized Approach
  - Securitization - Standardized Approach
- Market Risk
  - Market Risk – Standardized Approach
- Operational Risk
  - Operational Risk – Basic Indicator Approach
- Capital Structure
  - Supervisory Discretionary Formula

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

## ***1.2 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 have been 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.

## ***1.3 Application’s Interface with Other Financial Services Components***

### **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.

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**NOTE:** The Oracle Financial Services Analytical Applications Reconciliation Framework has to be

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additionally licensed.

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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.

### **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 (both internal and standardized) as well as at firm level.

### **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.

### **Market Risk**

Oracle Financial Services Market Risk is concerned with the estimation of market risk for the portfolios held by the bank. These portfolios may 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.

### **Credit Risk Economic Capital**

Economic Capital (EC) is the capital level required by the bank to cover the losses within a given probability. Economic Capital is attributed mainly to three risks: Credit Risk, Operational Risk, and Market Risk. Economic Capital methodologies can be applied across products, lines of business, and other segments as required. Basel Committee, as a part of pillar 2 requirements in Basel accord, emphasizes banks to have their own methods and processes to calculate adequate capital for the risk they have assumed. The focus on Economic Capital calculation is to measure risk and optimize performance by reallocating capital to strategically important businesses as well as businesses with high returns. An Economic Capital framework relates the risk of investment to the amount of capital required, thus putting business performance or investment return into a

proper perspective relative to risk.

On identifying the risk type, EC is computed according to the asset class of the counterparty. Different approaches are followed for counterparties falling under different asset classes. The asset type prescribed according to Basel is:

- Corporate
- Sovereign
- Retail
- Specialized Lending
- Securitization
- Banking Book
- Other Assets

### **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

### **Retail Portfolio Risk Models and Pooling**

Under the Capital Adequacy framework of Basel II, banks are permitted to group their loans to private individuals and small corporate clients into a Retail Portfolio. As a result, they are able to calculate the capital requirements for the credit risk of these retail portfolios rather than for the individual accounts. Basel accord has given a high degree of flexibility in the design and implementation of the pool formation process. However, creation of pools can be voluminous and time-consuming. Oracle Financial Services Retail Portfolio Risk Models and Pooling, classifies the retail exposures into segments (pools) using OFSAAI Modeling framework.

Oracle Financial Services Retail Portfolio Risk Models and Pooling, Release 3.4, uses modeling techniques available in OFSAAI Modeling framework. The application restricts itself to the following operations:

- Sandbox (Dataset) Creation
- RP Variable Management
- Variable Reduction
- Correlation
- Factor Analysis

- Clustering Model for Pool Creation
- Hierarchical Clustering
- K Means Clustering
- Report Generation
- Pool Stability Report

OFSAAI Modeling framework provides Model Fitting (Sandbox Infodom) and Model Deployment (Production Infodom).

### **Basel Regulatory Capital Analytics**

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

### **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.

## Chapter 2 Overview of OFSAA Infrastructure

### 2.1 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
  - Data Integrator Framework
  - Data Entry Forms and Queries
  - Metadata Browser
  - Business Metadata Management
- Rule Framework
- System Configuration
  - Segment/Metadata mapping
- Administration
  - Save metadata
  - Utilities
    - User Group Batch execution Map
- Data Quality Framework
- Stress Testing Framework

### 2.2 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 will provide 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, refer OFSAAI 7.3 Installation manual.*

#### 2.2.1 OFSAA Infrastructure Login

While 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 will be prompted to change your password on your first login. Alternatively, you can also choose to change your password any time.



Refer to 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.

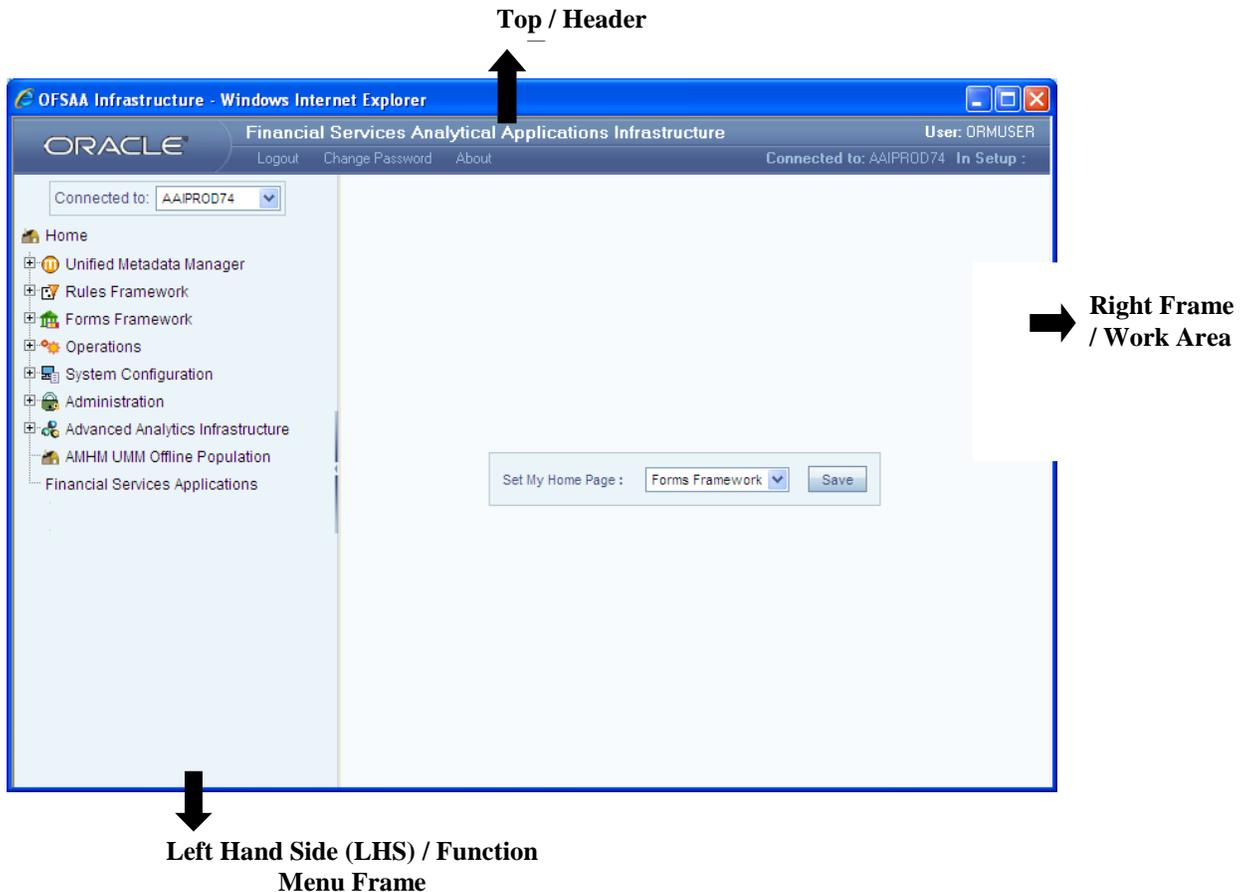
- New password should be different from previously used passwords based on the password history, which can be configured.

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 has been 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:



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.

## 2.3 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

### **2.3.1 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**

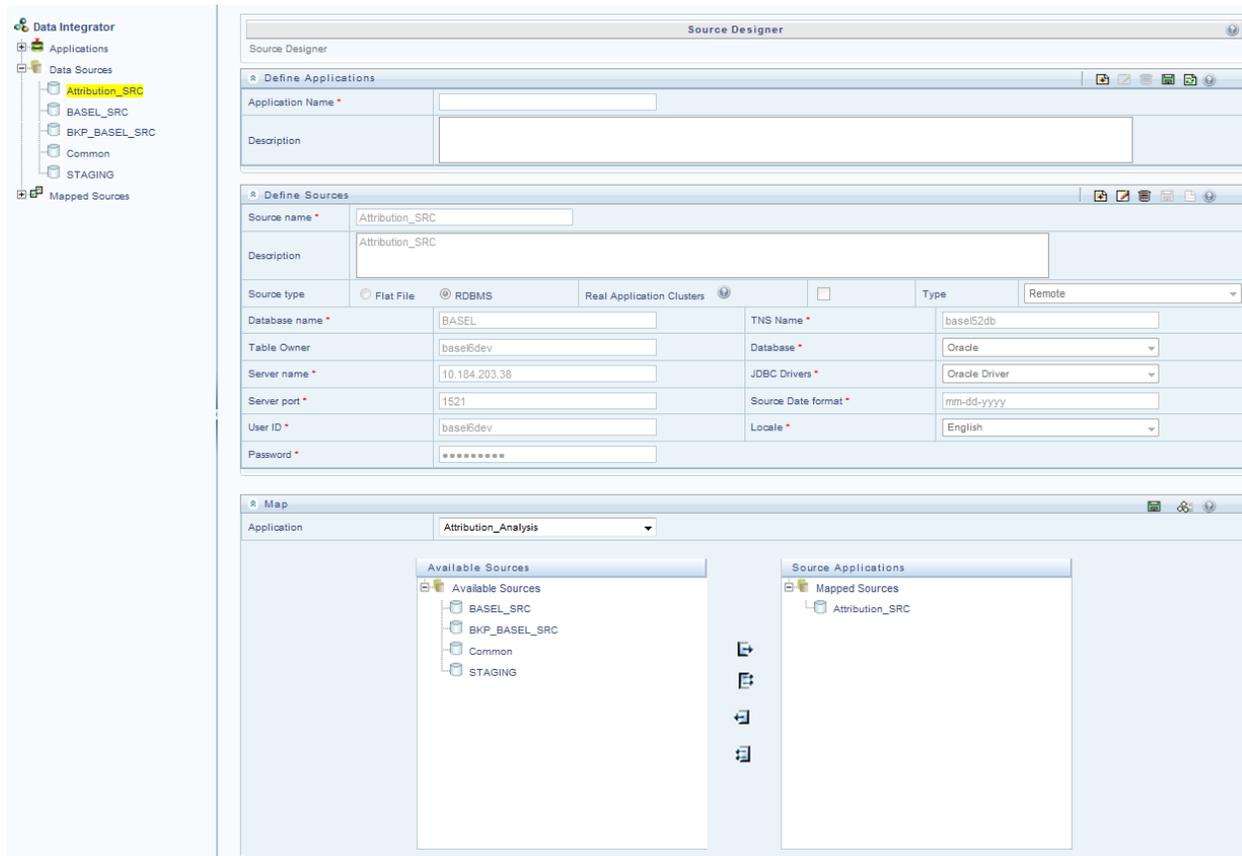
In the Warehouse Designer, you can define Data Source Models, Map Data Source to Applications, and associate Database Extracts to a Table/File for data extraction. The Warehouse Designer consists of the following sections:

- 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 i.e. 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 <i>Define Extracts</i> window.
Remote	<ul style="list-style-type: none"> <li>▪ <b>Server Name:</b> Enter the Server Name or IP address where the Data Source exists.</li> <li>▪ <b>User ID:</b> Enter the FTP User ID required to connect to the server.</li> <li>▪ <b>Server Port:</b> Enter the active server port number which contains the flat files.</li> <li>▪ <b>Password:</b> Enter the FTP user password required to connect to the server.</li> <li>▪ <b>FTP Drive:</b> enter the FTP server path. In case of Unix Servers, the home directory path is taken by default.</li> <li>▪ <b>Source Data Format:</b> Enter the Source Date Format which will be used as the default date format for source data extraction and mapping, and which is unless modified in the <i>Define Extracts</i> window.</li> <li>▪ <b>FTP Share:</b> 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.</li> </ul>

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	<ul style="list-style-type: none"> <li>▪ <b>User ID:</b> 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.</li> <li>▪ <b>Source Data Format:</b> Enter the Source Date Format which will be used as the default date format for source data extraction and mapping.</li> <li>▪ <b>Password:</b> Enter the Database user password required to connect to the server.</li> <li>▪ <b>Locale:</b> Select the language using which the Infrastructure Database components are installed. The available options depend on the languages defined in the “configuration” table.</li> <li>▪ <b>JDBC URL:</b> Enter the JDBC (Java Database Connectivity) URL configured by the administrator to connect to the database.</li> <li>▪ <b>Table Owner:</b> Enter the schema name in case of Oracle database, or Owner of Database Tables in case of SQL Server and other Databases.</li> <li>▪ <b>TNSNAME:</b> It is the SQL*Net configuration file that defines databases address to 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.</li> </ul>
If Real Application Clusters (RAC) checkbox is not selected	<ul style="list-style-type: none"> <li>▪ <b>Database Name:</b> enter the name of the Source Database from which the extraction is required to be done.</li> <li>▪ <b>TNSNAME:</b> It is the SQL*Net configuration file that defines databases address to establish connection. Enter the TNSNAME created for the Information Domain.</li> <li>▪ <b>Table Owner:</b> Enter the schema name in case of Oracle database, or Owner of Database Tables in case of SQL Server and other Databases.</li> <li>▪ <b>Database:</b> Select the Database from the drop down list.</li> <li>▪ <b>Server Name:</b> Enter the Server Name or IP address where the Data Source exists.</li> <li>▪ <b>JDBC Drivers:</b> Select the JDBC (Java Database Connectivity) driver from the drop down list.</li> <li>▪ <b>Server Port:</b> Enter the active port number of the server which contains the flat files.</li> <li>▪ <b>Source Data Format:</b> Enter the Source Date Format which will be used as the default date format for source data extraction and mapping, unless modified in the <i>Define Extracts</i> window.</li> <li>▪ <b>User ID:</b> Enter the FTP User ID required to connect to the server.</li> <li>▪ <b>Locale:</b> Select the language using which the Infrastructure Database components are installed. The available options depend on the languages defined in the</li> </ul>

Field	Description
	<p>“configuration” table.</p> <ul style="list-style-type: none"> <li>▪ <b>Password:</b> Enter the Database password required to connect to the server.</li> </ul>

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.

5. Select the required Data Source from the LHS menu. The Data Source details are displayed in the Define Sources grid.
6. 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:

- Select the Application from the Mapped Sources list in the LHS menu.
- 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:

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

Once 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:
  - Select the Application from the **Mapped Sources** list in the LHS menu.
  - 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**.

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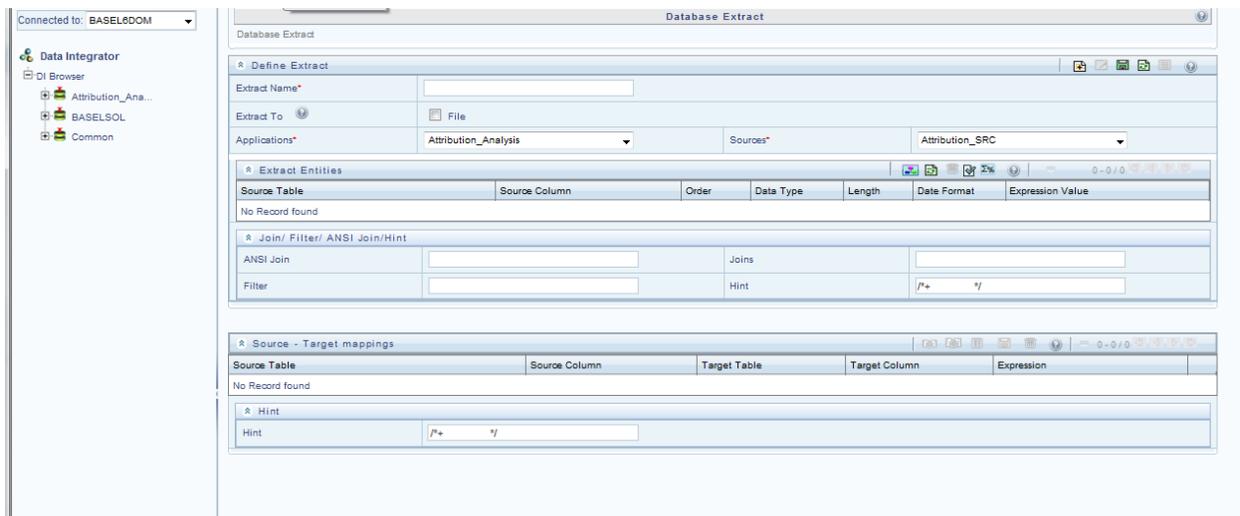
**NOTE:** If the Source Model has already been generated, a confirmation dialog is displayed to replace the existing model. Click **OK** or **Cancel**.

---

The Source Model is generated in the specified directory which has to be 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:

Source Table	Source Column	Order	Data Type	Length	Date Format	Expression Value
BP_MEAS_MAP	V_BP_CODE	1	String	10		
BP_MEAS_MAP	V_MEAS_CODE	2	String	10		
BP_MEAS_MAP	V_MEAS_TYPE	3	String	1		

Source Table	Source Column	Target Table	Target Column	Expression
No Record found				

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 in the Define Entities tool bar.
  - b. In the Choose Entity window, do the following:
    - 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.
2. In the *Specify Expression* window, do the following:
  - Enter the Expression Name.
  - 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:
  - Select the **Table** in the Entities section.
  - 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.
  - Define the **Operators** by selecting Arithmetic, Concatenation, Comparison, Logical or others operators.
  - 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.

---

4. In the Expressions tool bar, you can also:
  - Click  icon to view the Expression details.
  - Click  icon to view the ANSI Join details.
  - Click  icon to view the Joins.
  - Click  icon to view the Filters.

5. Click  icon to clear the details.
6. Select **Show Advanced Options** in the Expression tool bar, and do the following:
  - Click  icon to and specify hints (Rules), if any. Oracle hints follow *(/\*+ RULE \*/)* format. For example, */\*+ FIRST\_ROWS(2) \*/*
  - 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.
  - Click  icon to view SQL, which acts as print command for the complete query.
7. 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.
8. Click  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 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:
  - Select a Definition and Target Entity in each column and click  icon.
  - Click  icon to Auto-Map the selected definitions and Target Entities.
  - You can Un-Map a definition from a Target Entity by clicking  icon or Un-Map All definitions by clicking  icon.
  - 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.

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

In Bulk Mode of loading, note that:

- Loading is possible only when the target database and the data source created for the definition are in the same database.
- 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.
- You cannot specify the **Batch Size** and commit happens at the end of batch load.

- 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. In case of **Direct** mode the Foreign Keys will not return to its initial state.

---

1. In the *Hint* tool bar, specify Hints (if any), for faster loading. Oracle hints follow (/\*+ HINT \*/) format.
2. 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.

1. Click  icon in the Define Entities tool bar.
2. 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**.

---

3. Select the required Entities in the Extract Entities grid.
4. Click  icon in the Define Entities tool bar.
5. In the *Choose Entity* window, do the following:
  - 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.

- 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:
  - Enter the Expression Name.
  - 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:
  - Select the **Table** in the Entities section.
  - 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.
  - Define the **Operators** by selecting Arithmetic, Concatenation, Comparison, Logical or others operators.
  - 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:
  - Click  icon to view the Expression details.
  - Click  icon to view the ANSI Join details.
  - Click  icon to view the Joins.
  - Click  icon to view the Filters.
  - Click  icon to clear the details.
5. Select **Show Advanced Options** in the Expression tool bar, and do the following:
  - Click  icon to and specify hints (Rules), if any. Oracle hints follow *(/\*+ RULE \*/)* format. For example, */\*+ FIRST\_ROWS(2) \*/*
  - 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.
  - 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:
  - Select a Definition and Target Entity in each column and click  icon.
  - Click  icon to Auto-Map the selected definitions and Target Entities.
  - 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.
  - 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.

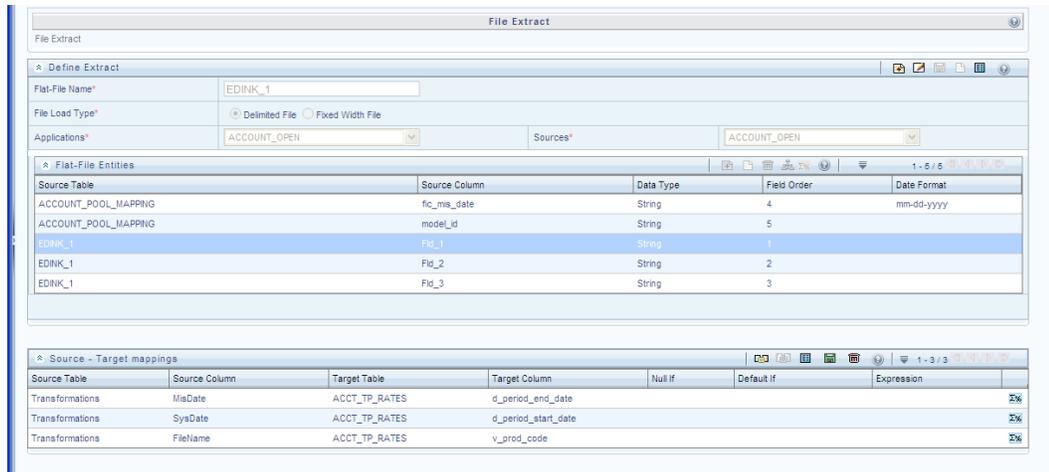
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### **File Extracts**

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, i.e. 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:

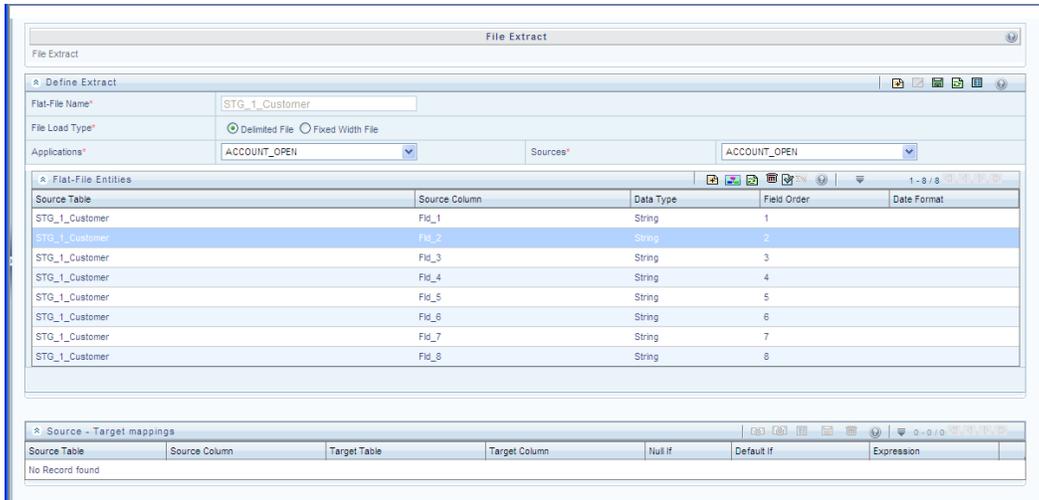
1. Create Flat File Definition
2. Define Flat File Properties
  - Definition (Source) properties: Specified when defining the Flat File Extracts.
  - Loading (Target) properties: Specified when mapping the Flat File Extracts.
3. Map the Flat File to the Target Model

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:
  - Click  icon. Select or specify the required number of columns in the drop down list and click  icon. You can double-click on any row to update the details.
  - Click  icon in the Define Entities tool bar. The **Choose Entity** window is displayed.
    - Select the entity from 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.
    - 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 in the Define Extract 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.

---

**Note:** It is mandatory to set the Data File Locale property for both 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.

---

3. Click  icon in the Define Extract tool bar and save the details.

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

4. Click  icon in the Source-Target Mapping tool bar. The *DI Mapping* window is displayed.
5. Select the **Target Infodom** from the drop down list. The source details in the selected Information Domain are displayed in the Definition pane of Target Table Map Panel.
6. 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:

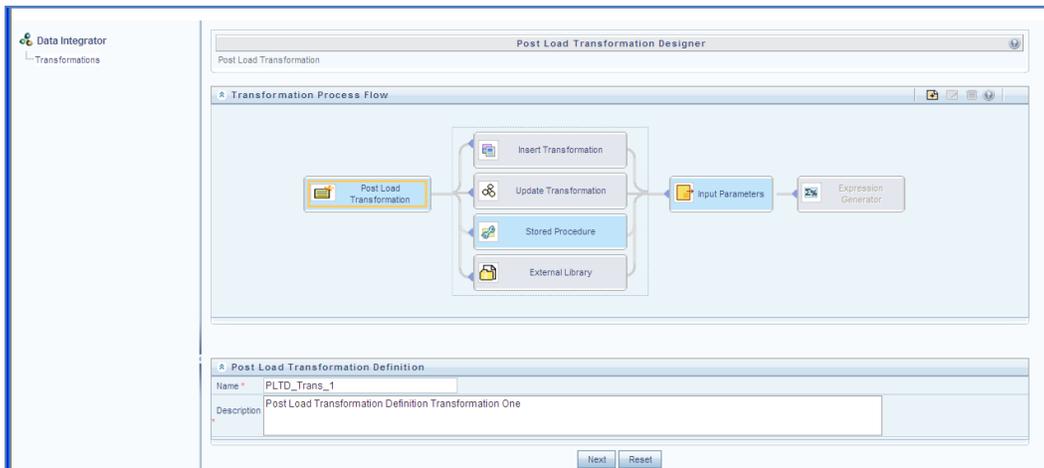
- Select a Definition and Target Entity in each column and click  icon.
- Click  icon to Auto-Map the selected Definitions and Target Entities.
- You can Un-Map a Definition from a Target Entity by clicking  icon or Un-Map All Definitions by clicking  icon. You can also search for a specific Definition by entering the keywords and clicking Search icon or click Add icon to create an expression to join column data in the *Specify Expression* window.
- Click **Save** and save the mapping details.

Specify the Target 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 the required value or selecting an option from the drop down list.
3. Click  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 in the Transformation Process Flow tool bar.
2. In the *Post Load Transformation Definition* grid.
  - Enter the **Transformation Name**. Ensure that there are no special characters or extra spaces in the name specified.
  - Enter a **Description** for the transformation.
  - 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.
  - Double-click on the **Parameter Name** and enter the details.
  - Double-click and select the required **Data Type** from the list.
  - Double-click on the **Default Value** and enter the details.
  - 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:
  - Click  icon. The *Choose Entity* window is displayed.
  - Select the entity from Members list by clicking on the required node, and click .
  - 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 .
  - 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:

- Click  icon and include the Transformation parameter conditions in the *Transformation Logic* grid or click  icon to define an expression.
  - Click  icon to generate Logic and view the SQL query in the *Query Generated* grid.
  - Click **Check Syntax** to check the syntax of the query generated.
6. Click **Finish** and save the Insert or Update 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.

### **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.
  - Enter the **Transformation Name**. Ensure that there are no special characters or extra spaces in the name specified.
  - Enter a **Description** for the transformation.
  - 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.
  - Double-click the **Parameter Name** and enter the details.
  - Double-click and select the required **Data Type** from the list.
  - Double-click on 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.
  - In the Business Process Flow grid, click **Browse** and locate the file path.
  - Click  icon in the Business Process Flow tool bar and upload the file.

Once 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:
  - Enter the **Transformation Name**. Ensure that there are no special characters or extra spaces in the name specified.
  - Enter a **Description** for the transformation.
  - 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.
  - Double-click on the **Parameter Name** and enter the details.
  - Double-click and select the required **Data Type** from the list.
  - 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.

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.

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## **2.3.2 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**

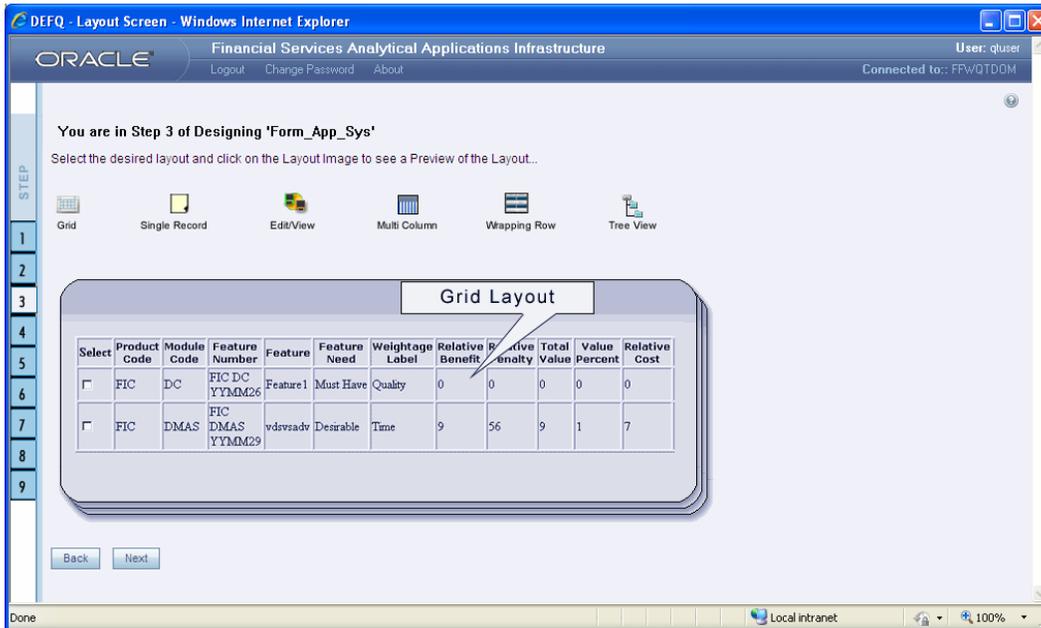
Forms Designer within the Data Entry Forms and Queries section facilitates you to design web based user-friendly Forms using the pre-defined layouts. The *DEFQ - Forms Designer* window displays a list of pre-defined options to create, modify, and delete Forms. You can also assign rights and define messages. 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:
  - Specify the application name by either entering the **New Application Name** or selecting **Available Applications** from the drop down list.
  - 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.



Refer to the following table for information.

Layout	Description
<b>Grid Layout</b>	It is the default layout which displays the records in the Form of a table/grid with multiple rows of data.
<b>Single Record Layout</b>	It displays a single record at a time.
<b>Edit/View Layout</b>	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 will be displayed in the editable grid. <b>Note:</b> The column names are editable only during altering the created Form.
<b>Multi Column Layout</b>	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.
<b>Wrapping Row Layout</b>	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.

Layout	Description
Tree View Layout	<p>It displays the Hierarchical dimensional table with the selected dimension details. You can select the following options:</p> <ul style="list-style-type: none"> <li>▪ Dimensional Table Tree</li> <li>▪ Parent Child Tree</li> </ul> <p><b>Note:</b> The process to create a Form using the Tree View Layout differs from the procedure explained below.</p>

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  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.

- 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.
- (Optional) To arrange multiple fields, select **Sort by Descending** checkbox.
- (Optional) Select the **Excel Map** checkbox to enable *Bulk Authorization*.

---

**NOTE:** In case 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.

The screenshot shows the Oracle Financial Services Analytical Applications Infrastructure interface. At the top, it displays the Oracle logo, the user 'qluser', and connection details. The main area is titled 'Form\_App\_Sys - Table Name : BUSINESSLINE\_LOCATION'. Below this, there are controls for 'Number of Rows to be displayed' (set to 5) and 'Page Size' (set to 20). There are also buttons for 'Batch Commit', 'Message Details', 'Form Filter', and 'Data Versioning'. A table lists the fields to be configured:

Field Name	Display Name	In View	In Edit or Add	Allow Add	Store Field as	Rules	Format Type
HREF001*	HREF001	Display	Text Field	<input checked="" type="checkbox"/>	Normal	Rules	None
HREF002*	HREF002	Display	Text Field	<input checked="" type="checkbox"/>	Normal	Rules	None
LOCALE*	LOCALE	Display	Text Field	<input checked="" type="checkbox"/>	Normal	Rules	None
UK_HREF001*	UK_HREF001	Display	Text Field	<input checked="" type="checkbox"/>	Normal	Rules	None
UK_HREF002*	UK_HREF002	Display	Text Field	<input checked="" type="checkbox"/>	Normal	Rules	None
VERSION_NO*	VERSION_NO	Display	Text Field	<input checked="" type="checkbox"/>	Normal	Rules	None

At the bottom, there are buttons for 'Back', 'Save', and 'Save with Authorization'.

8. Specify the parameters for each field as tabulated.

Field	Description
Display Name	Edit the default Display Name if required.
In View	<p>Select either Display or Do not Display to display the field in the Form.</p> <p>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;</p> <ul style="list-style-type: none"> <li>Same Field</li> <li>Alternate Display Field</li> <li>Do not Display options</li> </ul>
In Edit/Add	<p>Specify the edit parameters by selecting from the drop down list. The available options depend on the type of field selected.</p> <ul style="list-style-type: none"> <li>For normal fields you can select Text Field, Text Area, Select List, Protected Field, Read Only, and Do Not Show.</li> <li>For foreign key fields you can select Read Only, Select List, and Do Not Show.</li> <li>For primary key fields you can select Read Only and Do Not Show.</li> <li>For calendar fields you can select Calendar and Do Not Show.</li> </ul> <p><b>Note:</b> If you choose <b>Select List</b> option, you need to define the values.</p>
Allow Add	<p>Select the checkbox to permit users to add new record.</p> <p><b>Note:</b> An alert message is displayed if you are trying to save a Form with add option disabled for the mandatory fields.</p>

Field	Description
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 <i>Sort Fields Selection</i> window).
Rules	Click <b>Rules</b> and specify Rules and Expressions for the selected field in the <i>Specifying Rules and Expressions for Data - Validations</i> 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 in case, a Form in the table fails to execute, the entire set of Forms are returned.
Message Details	Click <b>Message Details</b> to define the message type for Creator and Authorizer in the <i>Messaging Details for a Form</i> window.
Form Filter	Click Form Filter to define an expression for Form-level filter condition in the <i>Filter for Form</i> window.
Data Versioning	Click <b>Data Versioning</b> to perform data versioning on an authorized Form.

9. 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:
  - Select the **Available Applications** from the drop down list.
  - 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.
  - 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.
  - Select a field and click  or  icons to arrange fields in the required order.
  - (Optional) To arrange multiple fields, select **Sort by Descending** checkbox.
  - (Optional) Select the **Excel Map** checkbox to enable *Bulk Authorization*.

---

**NOTE:** In case 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:
  - Select the application from the **From Application** drop down list which consist of the required Form which you want to copy.
  - Select the application from the **To Application** drop down list for which you want to copy the Form.
  - Select the required Form from the **Save Form** drop down list.
  - 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:
  - Select the application from the **Available Application** drop down list which consist of the required Form which you want to delete.
  - 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:
  - Select the required application from the **Available Application** drop down list.
  - 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 have been 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. In case of normal Authorization, the Record added by the creator has to be 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:
  - The defined **Message Subject** and **Message Content** is auto populated. Edit the details as required.
  - 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.

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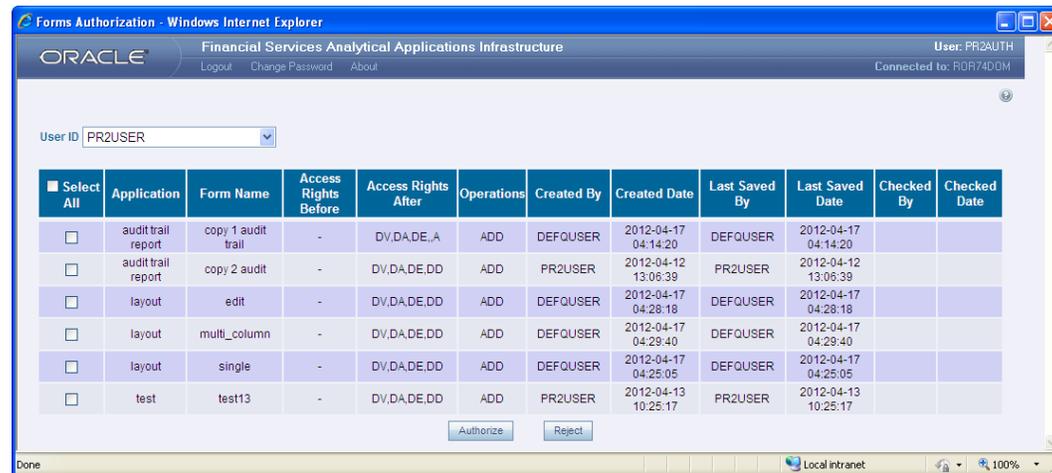
4. Click **Save**. A confirmation is displayed on updating the *Message Type* details.

## 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 has been assigned.
Form Name	Displays the Form Name.
Access Rights Before	Displays the available Right Requests for the selected user in the Form. <i>Note: For new Form, the column remains blank.</i>

Column Name	Description
Access Rights After	Displays the Right Requests raised for authorization. <b>DV</b> - DEFQ VIEW <b>DA</b> - DEFQ ADD <b>DE</b> - DEFQ EDIT <b>DD</b> - DEFQ DELETE <b>A</b> - AUTHORIZE <b>DU</b> - AUTO AUTHORIZE <b>S</b> - SHOW DATA CREATED BY CURRENT USER ONLY
Operations	Displays the operation carried out in the Form. For example, " <b>ADD</b> " indicates a new form is created and specific roles are assigned.
Created By	Displays the USER ID from which the Right Request has been created.
Created Date	Displays the Date on which the Right Request has been created.
Last Saved By	Displays the USER ID from which the previous Right Request change has been saved.
Last Saved Date	Displays the Date on which the previous Right Request change has been saved.
Checked By	Displays the USER ID from which the Right Request has been authorized.
Checked Date	Displays the Date on which the Right Request has been 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.

Once 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

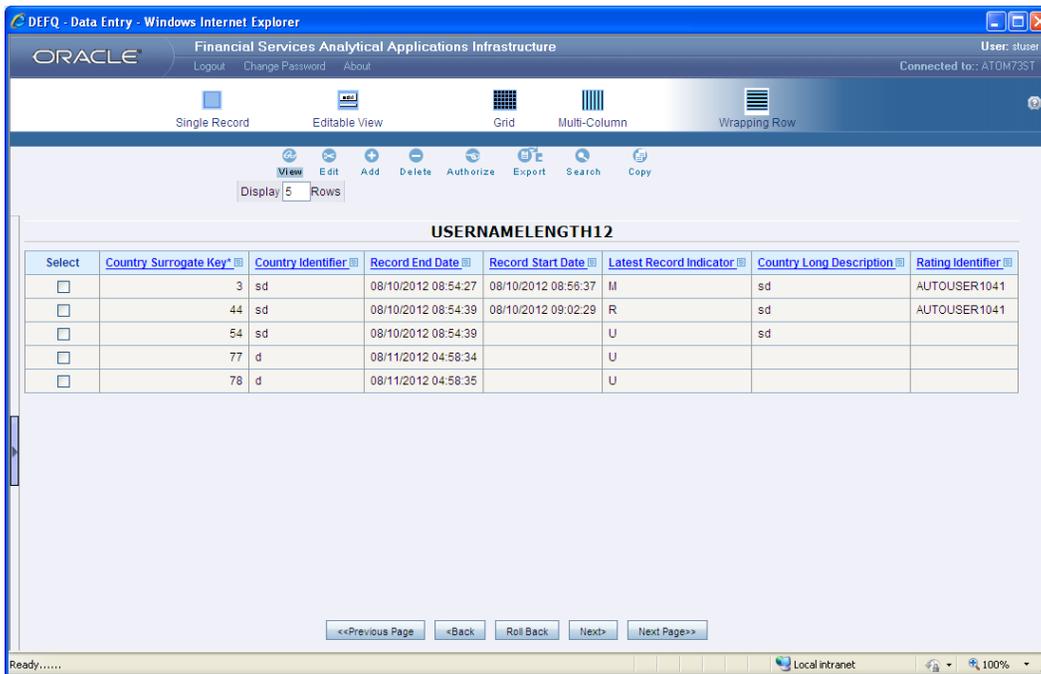
Data Entry within the Data Entry Forms and Queries section of infrastructure system facilitates you to view, add, edit, copy, and delete data using the various layout formats and Authorize/Re-authorize data records based on the permissions defined during the form creation. You can use the Search option 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.

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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:

- View Form Details
- Edit Form Details
- Add Form Data
- Authorize Records
- Export Form Data
- Copy Form Data
- 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 i.e. **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 i.e. after the records are edited and saved, you can roll back/undo the changes in view mode.

Layout	Description
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Layout	Description
<b>Single Record</b>	To view a single record details at any given point. You can use the navigation icons to view the next record in the table.
<b>Editable View</b>	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 <b>Display Rows</b> . You need to select the required record from the list to view/edit and click <b>Save</b> to update the changes.
<b>Grid (Default)</b>	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 <b>Display Rows</b> . You can click on the column header to alphabetically sort the list of records in the table.
<b>Multi column</b>	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.
<b>Wrapped rows</b>	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.

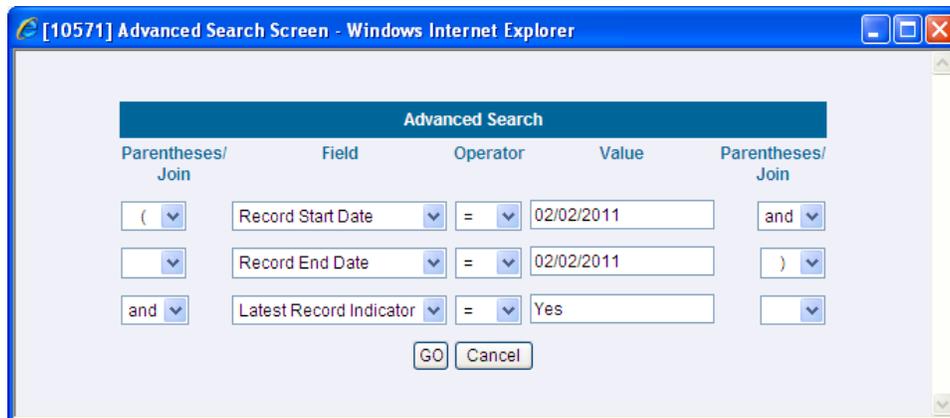
### Search Records

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 **Advanced Search** in the *DEFQ - Data Entry* window:

5. Click  within the Search fields. The *Advanced Search Window* is displayed.



The screenshot shows the 'Advanced Search' window with the following configuration:

Parentheses/Join	Field	Operator	Value	Parentheses/Join
(	Record Start Date	=	02/02/2011	and
	Record End Date	=	02/02/2011	)
and	Latest Record Indicator	=	Yes	

Buttons: GO, Cancel

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

7. 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 . 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. Once 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, i.e. records which are updated and saved.

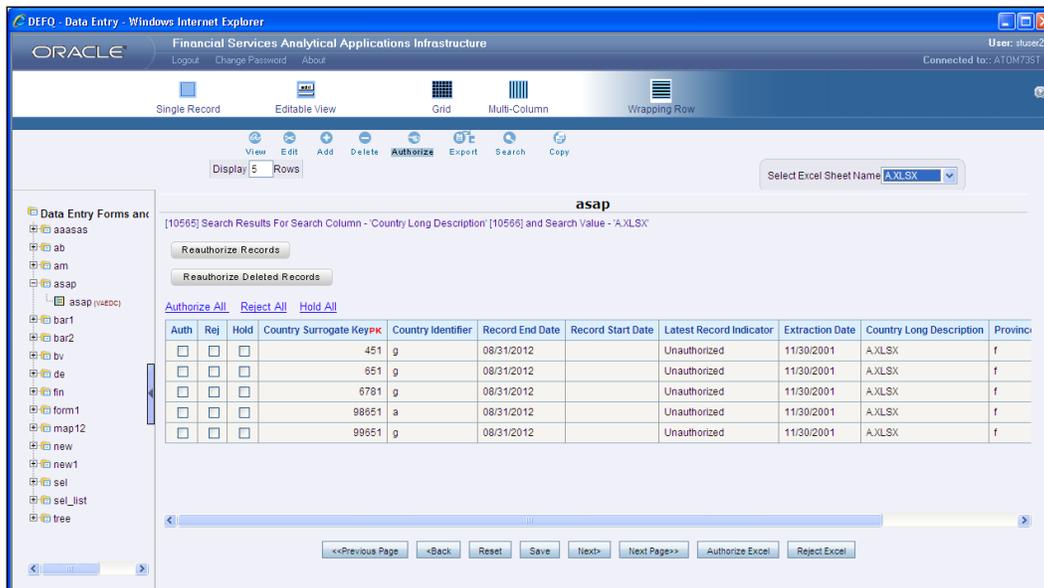
### **Add Form Data**

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 . 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 . 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 through the selected Excel sheet. Click **Authorize Excel**. A confirmation dialog is displayed. Click **OK**.

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

- 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**.

- 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:

- Click **Authorize All** and click on **Save** to authorize all the records displayed in current page.
- Click **Reject All** and click on **Save** to reject all the records displayed in current page.
- 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 has been updated by other users. When an authorized record is updated, the status flag (AuthFlag) is set to “M” indicating that the record has been modified and needs re-authorization.

Auth	Rej	Hold	Extraction Date	Currency Code	Surrogate Key	Currency Code	Record End Date	Record Start Date	Latest Record Indicator	Local Currency Indicator	Reporting
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	06/29/2011 14:52:08	666	3	06/11/2010 10:10:16	06/29/2011 14:52:08	8			Modified
Original Data :			06/29/2011 14:52:08	666	3	06/11/2010 10:10:16	06/29/2011 14:52:08	8			Modified

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 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.

### **Re-authorize Deleted Records**

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



Auth	Rej	Hold	Extraction Date	Currency Code Surrogate Key	Currency Code	Record End Date	Record Start Date	Latest Record Indicator	Local Currency Indicator	Reporting
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	06/29/2011 14:52:08	990	45		07/23/2009 14:22:25	U		Deleted

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.

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  **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 . 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 both 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.

Excel Fields	Field Order	Date Format	Destination table	Destination column
<input type="checkbox"/> Field1	1	-	COM_ENTITY_GROUP_MAP	f_dim_fact_flag
<input type="checkbox"/> Field2	2	-	COM_ENTITY_GROUP_MAP	n_mismatch_rows
<input type="checkbox"/> Field3	3	-	COM_ENTITY_GROUP_MAP	v_attribute_name
<input type="checkbox"/> Field4	4	-	COM_ENTITY_GROUP_MAP	v_source_attribute_name

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 i.e. Maker\_id, System\_Date, and Authorization\_Status, are displayed in the *Select Excel Columns* grid.
9. You can also select **Bulk Authorization** checkbox to assign the “Excel\_Name” across the selected column. For example, the selected column “v\_fic\_description” will have 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.

---

10. 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:
  - Click  icon in the Mappings Summary tool bar to **View** the mapping details.
  - Click  icon in the Mappings Summary tool bar to **Edit** the mapping details.

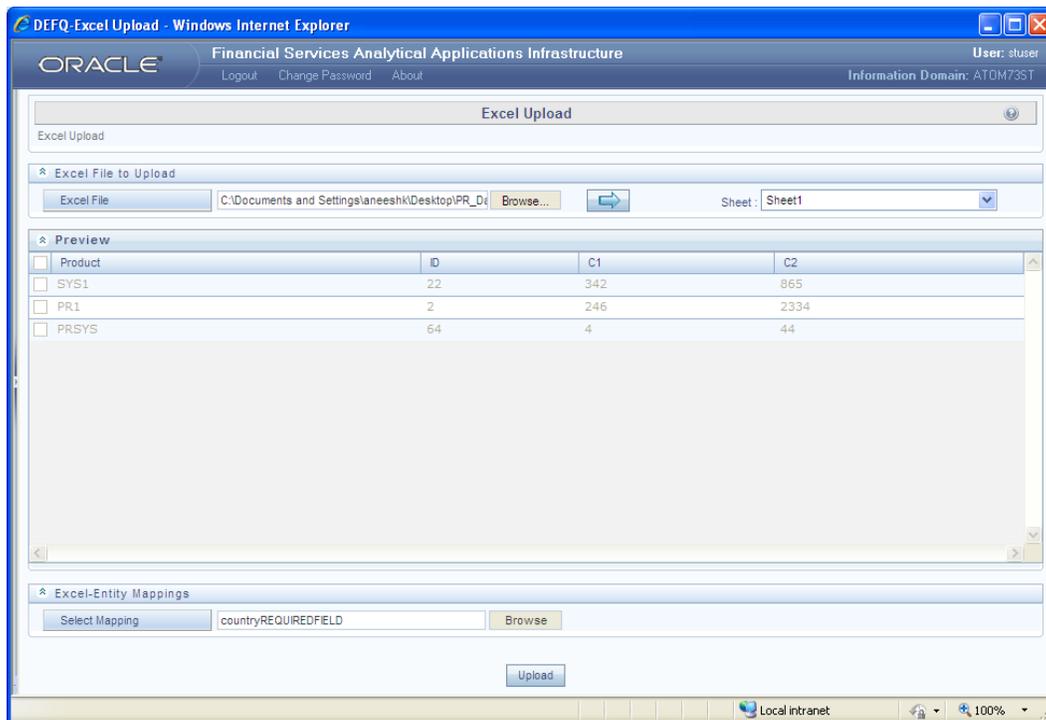
- Click  icon in the Mappings Summary tool bar to **Delete** the mapping details.

### **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  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.

### **2.3.3 Metadata Browser**

The Metadata Browser component of OFSAAI, allows you to view the pre-defined metadata in the Basel Regulatory Capital application, by providing a browsing capability through the various metadata elements that are linked to each other. You may start navigating through the Metadata Browser from a Run in a particular segment and drill down to the processes used in the Run, the Sub Processes in the Processes and the tasks

mapped to each Sub-Process. Alternatively, you may start navigating from the granular metadata element and trace the tasks that use this metadata, thereby the Sub Processes, Processes, and Runs that use the task.

### Tools in Metadata Browser

The following are the tools used in Metadata Browser window. The icons appear on the pages as the functions are derived.

Icon	Description
	Display the trace details of Definitions mapped to a dimension, hierarchy, measure, cube, or mart.
	Display the trace details of Datasets defined for a definition.
	Display the trace details of Dimensions mapped to the definition.
	Display the trace details of Measures mapped to the definition.
	Display the trace details of Cubes mapped to the definition.
	Display the details of the mapped Models for a definition.
	Display the trace details of Hierarchy Attributes of a definition.
	Display the trace details Source of the definition.
	Display the trace details of Transformations defined for a definition.
	Display the trace details of mapped Scenarios for a definition.
	Display the details of the mapped Stress Definitions.
	Display the details of mapped Variable Shocks to a particular variable.

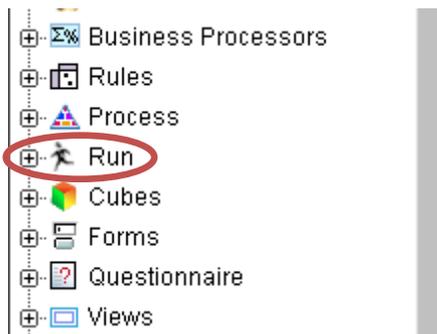
To help you navigate through the Metadata Browser, starting from a Run, refer to the following steps:

1. Click **Metadata Browser** on the LHS pane of OFSAAI, to view the Metadata Browser window.
2. Select the relevant jurisdiction from **Segment** dropdown on the LHS pane of OFSAAI, shown in the following figure:



Information Domain: BASEL6DOM  
Segment: BIS

3. Click , to view the Runs defined for the selected jurisdiction, shown in the following figure:



Name
Capital Calculation - BIS Basel I Approach
Capital Calculation - BIS Standardised Approach
Capital Calculation - BIS Advanced IRB Approach
Risk Weighted Asset Calculation - Operational Risk - BIS Standardised Approach
Capital Calculation - BIS Foundation IRB Approach
Risk Weighted Asset Calculation - Credit Risk - BIS Standardised Approach
Risk Weighted Asset Calculation - Credit Risk - BIS Advanced IRB Approach
Risk Weighted Asset Calculation - Credit Risk - BIS Foundation IRB Approach
Capital Calculation - IFSB Standardised Approach - CAR Standard Formula
Risk Weighted Asset Calculation - Credit Risk - IFSB Standardised Approach
Capital Calculation - IFSB Standardised Approach - CAR Discretionary Formula
Risk Weighted Asset Calculation - Market Risk - IFSB Standardised Approach
Risk Weighted Asset Calculation - Operational Risk - IFSB Basic Indicator Approach

## Run

Select a Run (Risk Weighted Asset Calculation-Credit Risk-BIS Standardized Approach) and click  to view the details of the Run, shown in the following figure:

Information Domain: BASEL6DOM  
Segment: BIS

Run Rule Framework >> Run

Code: [ ] Version: 0  
Name: [ ] Active: Yes  
Folder: [ ] Type: [ ]

Code	Name	Type	Folder	Version	Active
1305855181022	Capital Calculation - BIS Basel I Approach	Base Run	BIS	0	Yes
1305855301374	Capital Calculation - BIS Standardised Approach	Base Run	BIS	0	Yes
1305855512993	Capital Calculation - BIS Advanced IRB Approach	Base Run	BIS	0	Yes
1305855600303	Risk Weighted Asset Calculation - Operational Risk - BIS Standardised Approach	Base Run	BIS	0	Yes
1305855689766	Capital Calculation - BIS Foundation IRB Approach	Base Run	BIS	0	Yes
1305855864629	Risk Weighted Asset Calculation - Credit Risk - BIS Standardised Approach	Base Run	BIS	0	Yes
1305907201323	Risk Weighted Asset Calculation - Credit Risk - BIS Advanced IRB Approach	Base Run	BIS	0	Yes
1305907253832	Risk Weighted Asset Calculation - Credit Risk - BIS Foundation IRB Approach	Base Run	BIS	0	Yes
1305912873509	Capital Calculation - IFSB Standardised Approach - CAR Standard Formula	Base Run	IFSB	0	Yes
1305913610550	Risk Weighted Asset Calculation - Credit Risk - IFSB Standardised Approach	Base Run	IFSB	0	Yes
1305916596330	Capital Calculation - IFSB Standardised Approach - CAR Discretionary Formula	Base Run	IFSB	0	Yes
1305917022346	Risk Weighted Asset Calculation - Market Risk - IFSB Standardised Approach	Base Run	IFSB	0	Yes
1305917115300	Risk Weighted Asset Calculation - Operational Risk - IFSB Basic Indicator Approach	Base Run	IFSB	0	Yes
1305917182301	Staging Data Population - Market Risk - IFSB Standardised Approach	Base Run	IFSB	0	Yes
1305923761818	Staging Data Population - Market Risk - BIS Standardised Approach	Base Run	BIS	0	Yes
1306182237482	Capital Calculation - FRB IRB Approach	Base Run	USA	0	Yes
1306182268889	Risk Weighted Asset Calculation - Credit Risk - FRB IRB Approach	Base Run	USA	0	Yes
1306255867872	Capital Calculation - RBI Standardised Approach - Indian Banks	Base Run	INDIA	0	Yes
1306256086204	Capital Calculation - RBI Standardised Approach - Foreign Banks	Base Run	INDIA	0	Yes
1306256149536	Risk Weighted Asset Calculation - Credit Risk - RBI Standardised Approach	Base Run	INDIA	0	Yes

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

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

Folder: BIS

Master Information | Properties

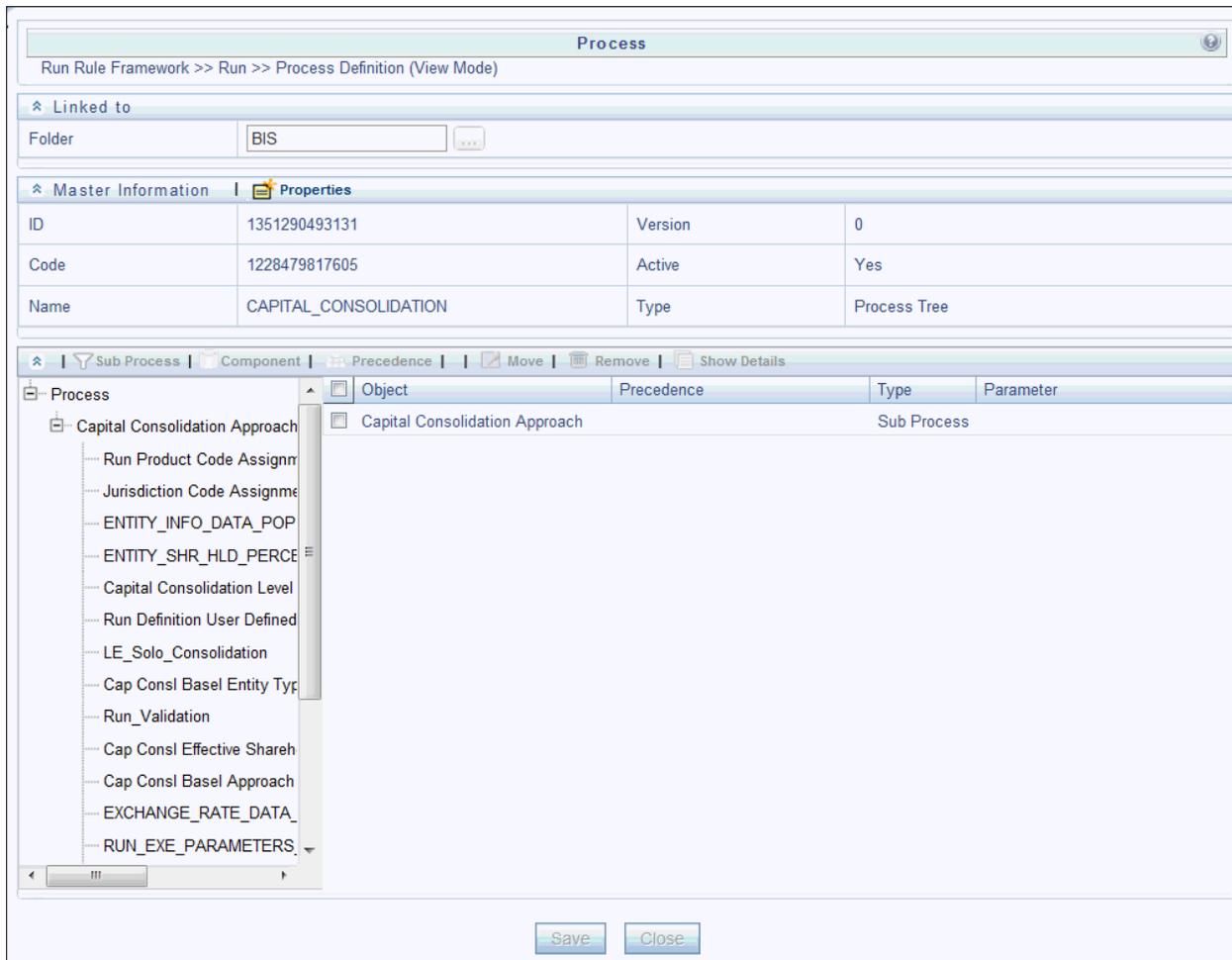
ID	1350345616019	Version	0
Code	1305855864629	Active	Yes
Name	Risk Weighted Asset Calculation - Credit Risk - BIS Standardised Approach	Type	Base Run

List

Location	Code	Name	Type	Simulation Job
Job	1228479817605	CAPITAL_CONSOLIDATION	Process	
Job	1281368142488	CREDIT_RATING_PROCESSING	Process	
Job	PRBL0019	PARTY_RECLASSIFICATION_STD	Process	
Job	1308699026230	NON_SEC_DATA_POPULATION	Process	
Job	1308860226730	MITIGANT_DATA_POPULATION	Process	
Job	1308860522544	NON_SEC_EXP_MITIGANT_MAPPING_POP	Process	
Job	1259809926621	NON_SEC_STD	Process	
Job	1308846730198	SEC_DATA_POPULATION	Process	
Job	1308860632939	SEC_EXP_MITIGANT_MAPPING_POP	Process	
Job	1261519197321	SEC_STD	Process	

A process is a combination of Sub Processes. Select a Process and click 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 will be 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 will help 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  to view the details of the Rule, as shown in the following figure:

The screenshot shows the 'Process' window in 'View Mode'. The breadcrumb path is 'Run Rule Framework >> Run >> Process Definition (View Mode)'. The 'Linked to' section shows the folder 'BIS'. The 'Master Information' tab is active, displaying the following properties:

Property	Value	Property	Value
ID	1351290493131	Version	0
Code	1228479817605	Active	Yes
Name	CAPITAL_CONSOLIDATION	Type	Process Tree

The 'Sub Process' section is expanded, showing a list of sub-processes on the left and a table of details on the right. The table has columns for 'Object', 'Precedence', 'Type', and 'Parameter'. The selected row is:

Object	Precedence	Type	Parameter
Cap Consl Effective Shareholding Percent for an Entity	Run_Validation	Computation Rule	

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, refer to the Comments section in the window.

The screenshot displays the 'Rule' configuration interface. At the top, the breadcrumb path is 'Run Rule Framework >> Run >> Rule Definition (View Mode)'. The 'Linked to' section shows 'Folder' set to 'BISSEG' and 'Dataset' set to 'Entity Shareholding Perc'. The 'Properties' section includes fields for ID (1228142436138), Version (0), Code (1228142436138), Active (checked), Name (Cap Consl Effective Shareholding Percent for an Entity), and Type (Computation). The 'List' section contains a table with the following data:

Location	Code	Name	Type
Source	H0242	Cap Consl Entity Level Ind	Hierarchy
Target	M0719	MSR - Cap Consl Entity Shareholding Per...	Measure

The 'Comments' section at the bottom shows a table with the following data:

Comments	Created By	Creation Date	Last Modified By	Last Modification Date	Operation Type
Para 215-216	SYSADMN	06/25/2012 06:16:42	SYSADMN	06/25/2012 06:16:42	Not Editable

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**.

Details of Dataset Entity Shareholding Percent Dataset	
<b>Name</b>	DS0089
<b>Short Description</b>	Entity Shareholding Percent Dataset
<b>Long Description</b>	Entity Shareholding Percent Dataset
<b>Comments</b>	
<b>Created By</b>	SYSADMIN
<b>Creation Date</b>	November 25, 2008 4:54:38 PM
<b>Last Modified By</b>	SYSADMIN
<b>Modification Date</b>	December 16, 2009 11:35:47 AM
<b>Authorized By</b>	SYSADMIN
<b>Authorization Date</b>	December 16, 2009 11:35:48 AM
<b>Selected Entities</b>	<a href="#">Fact Shareholding Percent</a> <a href="#">Fact Entity Information</a> <a href="#">Run Dimension</a> <a href="#">Date Dimension</a> <a href="#">PARENT_ENTITY</a>
<b>Join Condition</b>	COALESCE(PARENT_ENTITY.f_cap_consl_parent_entity_ind,'N') = 'Y' AND COALESCE(PARENT_ENTITY.f_cap_consl_entity_ind,'N') = 'Y'
<b>ANSI Join</b>	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
<b>Date Filter</b>	DIM_DATES.D_CALENDAR_DATE=\$MISDATE AND DIM_RUN.n_run_skey = '\$RUNSK'
<b>Order By</b>	

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.





Trace Dimensions Trace Cubes Trace Definitions Trace Forms

### Details of Hierarchy Cap Consl Entity Level Ind

<b>Name</b>	H0242
<b>Short Description</b>	Cap Consl Entity Level Ind
<b>Long Description</b>	Cap Consl Entity Level Ind
<b>Comments</b>	
<b>Created By</b>	SYSADMN
<b>Creation Date</b>	November 26, 2008 2:54:38 PM
<b>Last Modified By</b>	SYSADMN
<b>Modification Date</b>	November 27, 2012 7:24:08 PM
<b>Authorized By</b>	SYSADMN
<b>Authorization Date</b>	November 27, 2012 7:24:09 PM
<b>Type</b>	REGULAR
<b>BI Enabled</b>	No
<b>Is Parent Child</b>	No
<b>Entity</b>	<a href="#">Fact Entity Information</a>
<b>Attribute</b>	<a href="#">Capital Consolidation Entity Indicator</a>
<b>Level Details</b>	

Description	Identifier	
 Cap Consl Entity Level Ind		

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:
  - To specify a calculated column that the OFSAA derives from other columns in the database
  - To calculate assignments in data correction
  - 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

<b>Name</b>	DS0089
<b>Short Description</b>	Entity Shareholding Percent Dataset
<b>Long Description</b>	Entity Shareholding Percent Dataset
<b>Comments</b>	
<b>Created By</b>	SYSADMIN
<b>Creation Date</b>	November 25, 2008 4:54:38 PM
<b>Last Modified By</b>	SYSADMIN
<b>Modification Date</b>	December 16, 2009 11:35:47 AM
<b>Authorized By</b>	SYSADMIN
<b>Authorization Date</b>	December 16, 2009 11:35:48 AM
<b>Selected Entities</b>	<a href="#">Fact Shareholding Percent</a> <a href="#">Fact Entity Information</a> <a href="#">Run Dimension</a> <a href="#">Date Dimension</a> <a href="#">PARENT_ENTITY</a>
<b>Join Condition</b>	COALESCE(PARENT_ENTITY.f_cap_consl_parent_entity_ind,'N') = 'Y' AND COALESCE(PARENT_ENTITY.f_cap_consl_entity_ind,'N') = 'Y'
<b>ANSI Join</b>	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
<b>Date Filter</b>	DIM_DATES.D_CALENDAR_DATE=\$MISDATE AND DIM_RUN.n_run_skey = '\$RUNSK'
<b>Order By</b>	

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 will be 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.






### Details of Measure MSR - Cap Consl Entity Shareholding Percent

<b>Name</b>	M0719
<b>Short Description</b>	MSR - Cap Consl Entity Shareholding Percent
<b>Long Description</b>	Measure for Storing Shareholding Percent of the Entity
<b>Comments</b>	
<b>Created By</b>	SYSADMIN
<b>Creation Date</b>	November 25, 2008 12:42:54 PM
<b>Last Modified By</b>	SYSADMIN
<b>Modification Date</b>	
<b>Authorized By</b>	SYSADMIN
<b>Authorization Date</b>	November 25, 2008 12:42:54 PM
<b>Entity</b>	<a href="#">Fact Entity Information</a>
<b>Attribute</b>	<a href="#">Shareholding Percentage</a>
<b>Aggregation Type</b>	SUM
<b>Measure Type</b>	Base Measure
<b>Summary Condition</b>	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	<input checked="" type="checkbox"/>	
Name	Cap Consl Basel Entity Type Reclassification	Type	Classification	
List				
Location	Code	Name	Type	
<input checked="" type="checkbox"/> Source	HBL0028	Counterparty Type	Hierarchy	
<input checked="" type="checkbox"/> Target	HBL0045	Standard Counterparty Type	Hierarchy	

## 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.

Click **Pooling Sub Exposures- Mitigant**, appearing under Sub Process **Exposures Mitigant Pooling** in the Run Details Window. The following figure, displays the metadata mapped to **Pooling Sub Exposures- Mitigant**.

Details of Pooling Sub Exposures-Mitigant Pooling	
Name	Sub Exposures-Mitigant Pooling
Code	1147078004924
Created By	SYSADMN
Creation Date	08-MAY-2006 02:46:45 PM
Last Modified By	SYSADMN
Last Modification Date	12-JUN-2008 05:53:25 PM
Comments	NA
Dataset	<a href="#">Non Securitization Optimizer Dataset</a>
<b>Pooling Basis</b>	
<a href="#">Exposures</a>	
<a href="#">Mitigants</a>	
<b>Output</b>	
<a href="#">MSR - Sub Exposure Pool ID</a>	

Click Dataset (**Optimizer Dataset**) to view further details on the Dataset. In the following figure the tables used in the Data Set are displayed in the **Selected Entities** field and the inter-relationships defined between these tables are displayed as an **ANSI join** and **Join Condition**.

Details of Dataset Non Securitization Optimizer Dataset	
<b>Name</b>	DS0023
<b>Short Description</b>	Non Securitization Optimizer Dataset
<b>Long Description</b>	Non Securitization Optimizer Dataset
<b>Comments</b>	
<b>Created By</b>	SYSADMN
<b>Creation Date</b>	October 16, 2012 1:17:36 PM
<b>Last Modified By</b>	SYSADMN
<b>Modification Date</b>	October 27, 2012 3:53:39 PM
<b>Authorized By</b>	SYSADMN
<b>Authorization Date</b>	October 27, 2012 3:53:40 PM
<b>Selected Entities</b>	<a href="#">Party Dimension</a> <a href="#">Fact Sub Exposures</a> <a href="#">Date Dimension</a> <a href="#">Run Dimension</a> <a href="#">Mitigant Dimension</a> <a href="#">Standard Mitigant Type Dimension</a> <a href="#">Run Identifier</a> <a href="#">Basel Product Types Dimension</a> <a href="#">Generally Accepted Accounting Principles Dimension</a> <a href="#">Country Dimension</a> <a href="#">Basel Asset Class</a> <a href="#">Run Parameters</a>
<b>Join Condition</b>	1=1
<b>ANSI Join</b>	FCT_SUB_EXPOSURES INNER JOIN DIM_DATES ON FCT_SUB_EXPOSURES.n_mis_date_skey = DIM_DATES.n_date_skey LEFT OUTER JOIN DIM_RUN ON FCT_SUB_EXPOSURES.n_run_skey = DIM_RUN.n_run_skey LEFT OUTER JOIN DIM_MITIGANT ON FCT_SUB_EXPOSURES.n_mitigant_skey = DIM_MITIGANT.n_mitigant_skey LEFT OUTER JOIN DIM_STD_MITIGANT_TYPE ON FCT_SUB_EXPOSURES.n_std_mitigant_type_skey = DIM_STD_MITIGANT_TYPE.n_std_mitigant_type_skey LEFT OUTER JOIN DIM_PARTY ON FCT_SUB_EXPOSURES.n_issuer_skey = DIM_PARTY.n_Party_Skey LEFT OUTER JOIN DIM_BASEL_PRODUCT_TYPE ON FCT_SUB_EXPOSURES.n_basel_prod_type_skey = DIM_BASEL_PRODUCT_TYPE.n_basel_prod_type_skey LEFT OUTER JOIN DIM_GAAP ON FCT_SUB_EXPOSURES.n_gaap_skey = DIM_GAAP.n_gaap_skey LEFT OUTER JOIN DIM_COUNTRY ON FCT_SUB_EXPOSURES.n_country_skey = DIM_COUNTRY.n_country_skey LEFT OUTER JOIN DIM_BASEL_ASSET_CLASS ON FCT_SUB_EXPOSURES.n_basel_asset_class_skey = DIM_BASEL_ASSET_CLASS.n_basel_asset_class_skey LEFT OUTER JOIN RUN_PARAMETERS ON FCT_SUB_EXPOSURES.n_run_parameter_setup_skey = RUN_PARAMETERS.n_run_parameter_setup_skey LEFT OUTER JOIN DIM_RUN_IDENTIFIER ON DIM_RUN_IDENTIFIER.n_run_identifier_skey = FCT_SUB_EXPOSURES.n_run_identifier_skey

Click **Exposures**, under field **Pooling Basis**, in the Details of Pooling Window. The following figure, displays the table (**Fact Sub Exposures**) from which Exposure Data is identified using the Attribute, **Account Surrogate Key**.

Details of Hierarchy Exposures	
Name	H0131
Short Description	Exposures
Long Description	Exposures
Comments	
Created By	SYSADMN
Creation Date	October 4, 2012 1:51:45 PM
Last Modified By	SYSADMN
Modification Date	October 27, 2012 12:20:53 AM
Authorized By	SYSADMN
Authorization Date	October 27, 2012 12:20:53 AM
Type	REGULAR
BI Enabled	Yes
Is Parent Child	No
Entity	<a href="#">Fact Sub Exposures</a>
Attribute	<a href="#">Account Surrogate Key</a>
Level Details	

Click **Mitigants**, under field **Pooling Basis**, in the Details of Pooling Window. The following figure, displays the table (**Fact Sub Exposures**) from which Mitigant Data is identified using the Attribute, **Mitigant Surrogate Key**.

Details of Hierarchy Exposures																											
<b>Name</b>	H0131																										
<b>Short Description</b>	Exposures																										
<b>Long Description</b>	Exposures																										
<b>Comments</b>																											
<b>Created By</b>	SYSADMN																										
<b>Creation Date</b>	October 4, 2012 1:51:45 PM																										
<b>Last Modified By</b>	SYSADMN																										
<b>Modification Date</b>	October 27, 2012 12:20:53 AM																										
<b>Authorized By</b>	SYSADMN																										
<b>Authorization Date</b>	October 27, 2012 12:20:53 AM																										
<b>Type</b>	REGULAR																										
<b>BI Enabled</b>	Yes																										
<b>Is Parent Child</b>	No																										
<b>Entity</b>	<a href="#">Fact Sub Exposures</a>																										
<b>Attribute</b>	<a href="#">Account Surrogate Key</a>																										
<b>Level Details</b>																											
	<table border="1"> <thead> <tr> <th>Description</th> <th>Identifier</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>FCT_SUB_EXPOSURES.n_acct_skey='1'</td> </tr> <tr> <td>2</td> <td>FCT_SUB_EXPOSURES.n_acct_skey='2'</td> </tr> <tr> <td>3</td> <td>FCT_SUB_EXPOSURES.n_acct_skey='3'</td> </tr> <tr> <td>4</td> <td>FCT_SUB_EXPOSURES.n_acct_skey='4'</td> </tr> <tr> <td>5</td> <td>FCT_SUB_EXPOSURES.n_acct_skey='5'</td> </tr> <tr> <td>6</td> <td>FCT_SUB_EXPOSURES.n_acct_skey='6'</td> </tr> <tr> <td>7</td> <td>FCT_SUB_EXPOSURES.n_acct_skey='7'</td> </tr> <tr> <td>8</td> <td>FCT_SUB_EXPOSURES.n_acct_skey='8'</td> </tr> <tr> <td>9</td> <td>FCT_SUB_EXPOSURES.n_acct_skey='9'</td> </tr> <tr> <td>10</td> <td>FCT_SUB_EXPOSURES.n_acct_skey='10'</td> </tr> <tr> <td>11</td> <td>FCT_SUB_EXPOSURES.n_acct_skey='11'</td> </tr> <tr> <td>12</td> <td>FCT_SUB_EXPOSURES.n_acct_skey='12'</td> </tr> </tbody> </table>	Description	Identifier	1	FCT_SUB_EXPOSURES.n_acct_skey='1'	2	FCT_SUB_EXPOSURES.n_acct_skey='2'	3	FCT_SUB_EXPOSURES.n_acct_skey='3'	4	FCT_SUB_EXPOSURES.n_acct_skey='4'	5	FCT_SUB_EXPOSURES.n_acct_skey='5'	6	FCT_SUB_EXPOSURES.n_acct_skey='6'	7	FCT_SUB_EXPOSURES.n_acct_skey='7'	8	FCT_SUB_EXPOSURES.n_acct_skey='8'	9	FCT_SUB_EXPOSURES.n_acct_skey='9'	10	FCT_SUB_EXPOSURES.n_acct_skey='10'	11	FCT_SUB_EXPOSURES.n_acct_skey='11'	12	FCT_SUB_EXPOSURES.n_acct_skey='12'
Description	Identifier																										
1	FCT_SUB_EXPOSURES.n_acct_skey='1'																										
2	FCT_SUB_EXPOSURES.n_acct_skey='2'																										
3	FCT_SUB_EXPOSURES.n_acct_skey='3'																										
4	FCT_SUB_EXPOSURES.n_acct_skey='4'																										
5	FCT_SUB_EXPOSURES.n_acct_skey='5'																										
6	FCT_SUB_EXPOSURES.n_acct_skey='6'																										
7	FCT_SUB_EXPOSURES.n_acct_skey='7'																										
8	FCT_SUB_EXPOSURES.n_acct_skey='8'																										
9	FCT_SUB_EXPOSURES.n_acct_skey='9'																										
10	FCT_SUB_EXPOSURES.n_acct_skey='10'																										
11	FCT_SUB_EXPOSURES.n_acct_skey='11'																										
12	FCT_SUB_EXPOSURES.n_acct_skey='12'																										

Click **Measure (MSR-Sub Exposures Pool ID)**, under the **Output** field, the Details of Pooling Window. The following figure, displays the details of the measure in the output. The pooled categories of the Exposure and Mitigants data are stored in the entity **Fact Sub Exposures**. The Exposures and Mitigants data is pooled into set categories by the Attribute **Pool Identifier**.

Details of Measure MSR - Sub Exposure Pool ID	
Name	M0304
Short Description	MSR - Sub Exposure Pool ID
Long Description	Measure for Pool ID
Comments	Measure for Pool ID
Created By	BASELSOL
Creation Date	December 18, 2006 4:35:11 PM
Last Modified By	BASELSOL
Modified Date	December 18, 2006 4:35:11 PM
Authorized By	BASELSOL
Authorized Date	
Entity	<a href="#">Fact Sub Exposures</a>
Attribute	<a href="#">Pool Identifier</a>
Aggregation Type	SUM
Measure Type	Base Measure
Summary Condition	1 = 1

## 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

Click **Non Sec Optimizer-STD** under Sub Process **Exposures Mitigant Optimizer** appearing in the Run Details Window. The following figure, displays the metadata mapped to **Non Sec Optimizer-STD**:

Details of Optimizer Non Sec Optimizer - STD			
<b>Name</b>		Non Sec Optimizer - STD	
<b>Code</b>		1147069858460	
<b>Created By</b>		SYSADMN	
<b>Creation Date</b>		08-MAY-2006 12:30:58 PM	
<b>Last Modified By</b>		SYSADMN	
<b>Last Modification Date</b>		08-JUN-2006 04:30:12 PM	
<b>Comments</b>		NA	
<b>Dataset</b>		<a href="#">Non Securitization Optimizer Dataset</a>	
<b>Operation Type</b>		Minimize	
<b>Objective Function X Variable</b>			
<a href="#">Exposures</a>			
<a href="#">Mitigants</a>			
<b>Objective Function Coefficient</b>			
<a href="#">BP - Non Sec Objective Function Co-efficient for STD</a>			
<b>Constraints</b>			
0	Exposure Constraint	Constraint Identifier	<a href="#">Exposures</a>
		Constraint Coefficient	<a href="#">BP - Sub Exposure Pre-Mitigant EAD Amt</a>
		Operator	=
		Condition Value	<a href="#">BP - Sub Exposure Pre-Mitigant EAD Amt</a>
1	Mitigant Constraint	Constraint Identifier	<a href="#">Mitigants</a>
		Constraint Coefficient	<a href="#">BP - CRM Pre-Mitigant EAD Constraint Co-Efficient</a>
		Operator	<=
		Condition Value	<a href="#">BP - Sub Exposure Mitigant Amount</a>
<b>X Variable Bounds</b>			
<a href="#">BP - Lower Bound for Optimizer</a> <= X <= <a href="#">BP - Upper Bound for Optimizer</a>			
<b>Integer Identifier</b>			
Integer Identifier			No
			NA
<b>Output</b>			
Pooling Required		Yes	
Auto Pooling		Yes	
Pooling Basis		<a href="#">MSR - CRM Covered Factor</a>	
Output		<a href="#">MSR - CRM Covered Factor</a>	

To view further details on the Dataset, like the Selected Entities used in the Data Set and the Join Condition, as shown in the following figure, click **Optimizer Data set**.

Details of Dataset Non Securitization Optimizer Dataset	
Name	DS0023
Short Description	Non Securitization Optimizer Dataset
Long Description	Non Securitization Optimizer Dataset
Comments	
Created By	SYSADMN
Creation Date	October 16, 2012 1:17:36 PM
Last Modified By	SYSADMN
Modification Date	October 27, 2012 3:53:39 PM
Authorized By	SYSADMN
Authorization Date	October 27, 2012 3:53:40 PM
Selected Entities	<a href="#">Party Dimension</a> <a href="#">Fact Sub Exposures</a> <a href="#">Date Dimension</a> <a href="#">Run Dimension</a> <a href="#">Mitigant Dimension</a> <a href="#">Standard Mitigant Type Dimension</a> <a href="#">Run Identifier</a> <a href="#">Basel Product Types Dimension</a> <a href="#">Generally Accepted Accounting Principles Dimension</a> <a href="#">Country Dimension</a> <a href="#">Basel Asset Class</a> <a href="#">Run Parameters</a>
Join Condition	1=1
ANSI Join	FCT_SUB_EXPOSURES INNER JOIN DIM_DATES ON FCT_SUB_EXPOSURES.n_mis_date_skey = DIM_DATES.n_date_skey LEFT OUTER JOIN DIM_RUN ON FCT_SUB_EXPOSURES.n_run_skey = DIM_RUN.n_run_skey LEFT OUTER JOIN DIM_MITIGANT ON FCT_SUB_EXPOSURES.n_mitigant_skey = DIM_MITIGANT.n_mitigant_skey LEFT OUTER JOIN DIM_STD_MITIGANT_TYPE ON FCT_SUB_EXPOSURES.n_std_mitigant_type_skey = DIM_STD_MITIGANT_TYPE.n_std_mitigant_type_skey LEFT OUTER JOIN DIM_PARTY ON FCT_SUB_EXPOSURES.n_issuer_skey = DIM_PARTY.n_Party_Skey LEFT OUTER JOIN DIM_BASEL_PRODUCT_TYPE ON FCT_SUB_EXPOSURES.n_basel_prod_type_skey = DIM_BASEL_PRODUCT_TYPE.n_basel_prod_type_skey LEFT OUTER JOIN DIM_GAAP ON FCT_SUB_EXPOSURES.n_gaap_skey = DIM_GAAP.n_gaap_skey LEFT OUTER JOIN DIM_COUNTRY ON FCT_SUB_EXPOSURES.n_country_skey = DIM_COUNTRY.n_country_skey LEFT OUTER JOIN DIM_BASEL_ASSET_CLASS ON FCT_SUB_EXPOSURES.n_basel_asset_class_skey = DIM_BASEL_ASSET_CLASS.n_basel_asset_class_skey LEFT OUTER JOIN RUN_PARAMETERS ON FCT_SUB_EXPOSURES.n_run_parameter_setup_skey = RUN_PARAMETERS.n_run_parameter_setup_skey LEFT OUTER JOIN DIM_RUN_IDENTIFIER ON DIM_RUN_IDENTIFIER.n_run_identifier_skey = FCT_SUB_EXPOSURES.n_run_identifier_skey
Date Filter	DIM_DATES.D_CALENDAR_DATE=\$MISDATE AND DIM_RUN.n_run_skey = '\$RUNSK' AND FCT_SUB_EXPOSURES.V_EXPOSURE_TYPE = 'NON-SEC' AND ((1- COALESCE(n_volatility_haircut,0) - COALESCE(n_forex_haircut,0) ) * COALESCE(n_maturity_mismatch_haircut,1)) > 0
Order By	

The X Variable function for Exposures identifies the Exposures data from the Entity **Fact Sub Exposures** using the Attribute **Account Surrogate Key**. The X Variable function for Mitigants identifies the Mitigants data from the Entity **Fact Sub Exposures** using the Attribute **Mitigant Surrogate Key**. Click **Exposures** or **Mitigants** to view details of the same.

Objective Function X Variable
<a href="#">Exposures</a>
<a href="#">Mitigants</a>

There are two Constraints detailed in this Optimizer as follows:

- **Exposure Constraint:** ensures that the Sum of all the Sub exposures is equal to one.
- **Mitigant Constraint:** ensures that the total Mitigant amount used is less than or equal to total amount of Mitigant available. All Mitigant Haircuts are applied in this Constraint.

To view the measures used you can click the Business Processor (**BP**) shown in the following figure:

Constraints			
0	Exposure Constraint	Constraint Identifier	<a href="#">Exposures</a>
		Constraint Coefficient	<a href="#">BP - Sub Exposure Pre-Mitigant EAD Amt</a>
		Operator	=
		Condition Value	<a href="#">BP - Sub Exposure Pre-Mitigant EAD Amt</a>
1	Mitigant Constraint	Constraint Identifier	<a href="#">Mitigants</a>
		Constraint Coefficient	<a href="#">BP - Sub Exposure Pre-Mitigant EAD Constraint Co-Efficient</a>
		Operator	<=
		Condition Value	<a href="#">BP - Sub Exposure Mitigant Amount</a>

The **X Variable Bounds** defines the Lower and Upper bound of the covered factor to be between 0 and 1, shown in the following figure. Click the **BP** to view the measures mapped to the **BP**.

X Variable Bounds	
<a href="#">BP - Lower Bound for Optimizer</a>	<= X <= <a href="#">BP - Upper Bound for Optimizer</a>

The **Output** calculates and stores the percentage of exposure amount covered by a Mitigant. Click the Measure (**MSR**) to see the Entity wherein data is stored and the description of the Attribute.

Output	
Pooling Required	Yes
Auto Pooling	Yes
Pooling Basis	<a href="#">MSR - CRM Covered Factor</a>
Output	<a href="#">MSR - CRM Covered Factor</a>

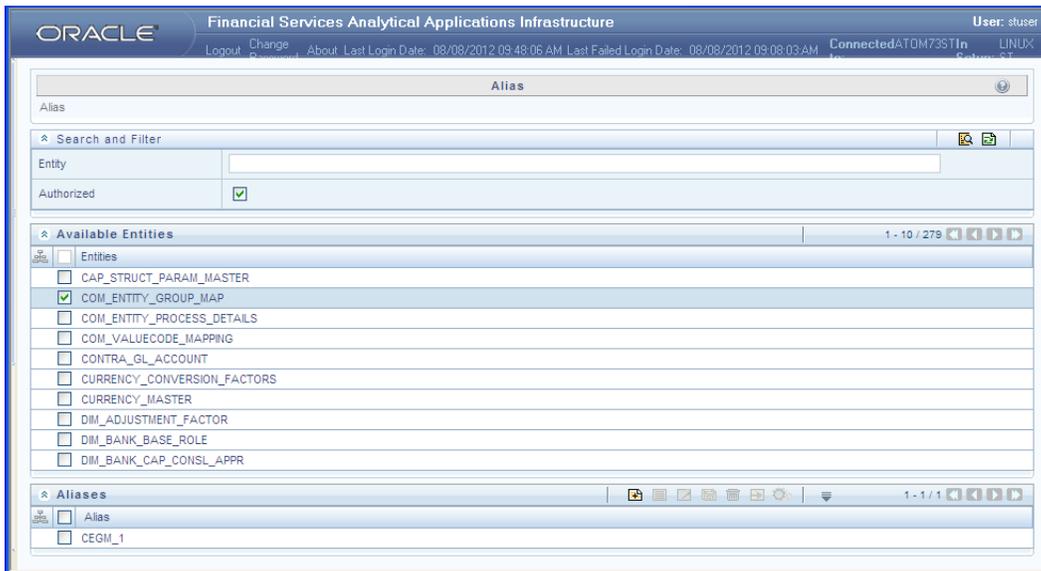
### 2.3.4 Business Metadata Management

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.

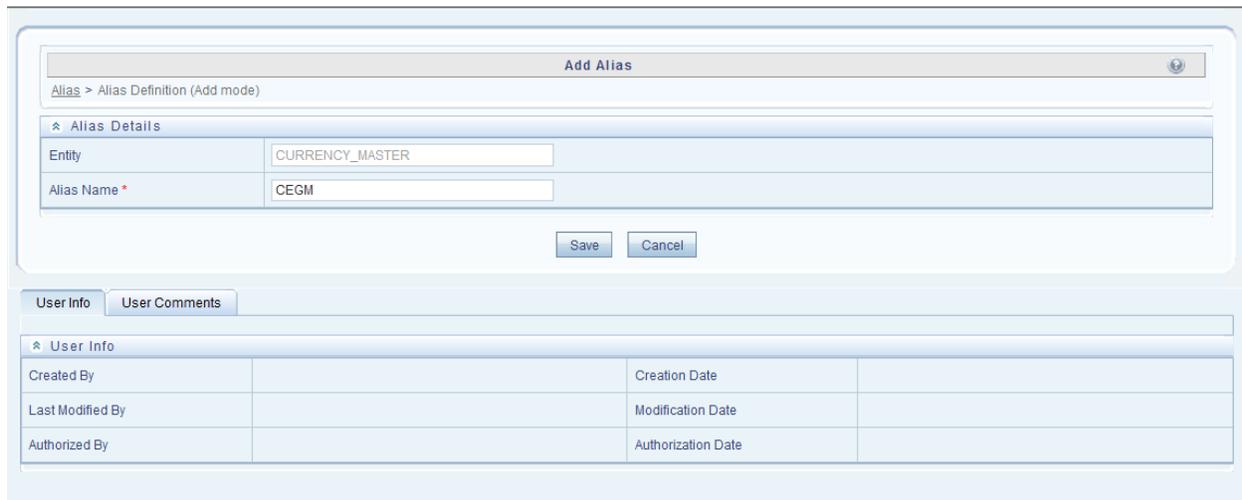


You (Business Analysts) need to have SYSBAU, Oracle Cube Administrator (ORACUB), and View Alias function roles mapped to access Aliases section in the BMM framework. You can access Aliases by expanding BMM section within the tree structure of LHS menu. The *Alias* window displays the options to create, 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.

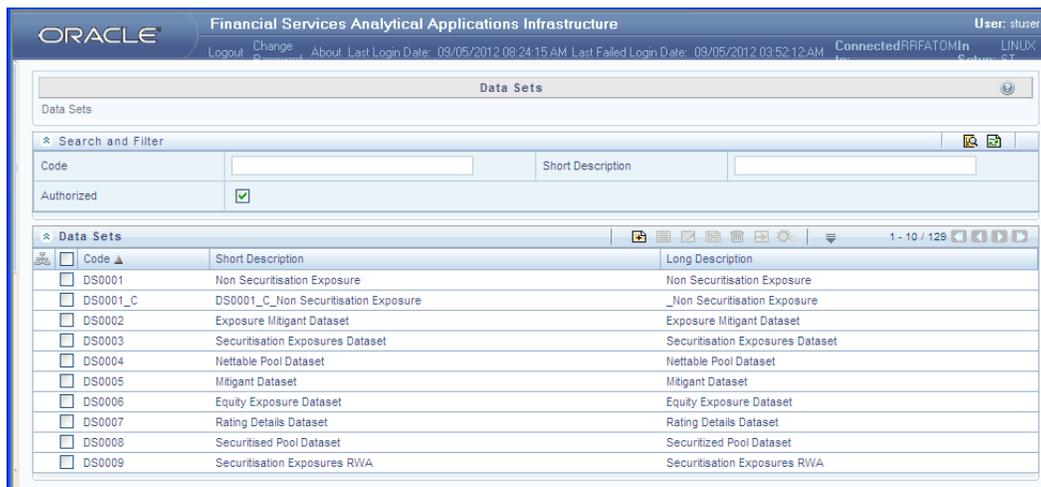
You can view individual Alias definition details at any given point. To view the existing Alias definition in the *Alias* window, select the required Alias and click the  icon. The *View Alias* window displays the details of the selected Alias definition. The *User Info* grid at the bottom of the window 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. Refer to 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.



Code	Short Description	Long Description
DS0001	Non Securitisation Exposure	Non Securitisation Exposure
DS0001_C	DS0001_C_Non Securitisation Exposure	_Non Securitisation Exposure
DS0002	Exposure Mitigant Dataset	Exposure Mitigant Dataset
DS0003	Securitisation Exposures Dataset	Securitisation Exposures Dataset
DS0004	Nettable Pool Dataset	Nettable Pool Dataset
DS0005	Mitigant Dataset	Mitigant Dataset
DS0006	Equity Exposure Dataset	Equity Exposure Dataset
DS0007	Rating Details Dataset	Rating Details Dataset
DS0008	Securitized Pool Dataset	Securitized Pool Dataset
DS0009	Securitisation Exposures RWA	Securitisation Exposures RWA

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	<p>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 “_”.</p> <p><b>Note the following:</b></p> <ul style="list-style-type: none"> <li>▪ The code can be indicative of the type of Data Set being created.</li> <li>▪ A pre-defined Code and Short Description cannot be changed.</li> <li>▪ Same Code or Short Description cannot be used for Essbase installation: "\$\$\$UNIVERSE\$\$\$", "#MISSING", "#MP", "CALC", "DIM", "ALL", "FIX", "ENDFIX", "HISTORY", "YEAR", "SEASON", "PERIOD", "QUARTER", "MONTH", "WEEK", "DAY".</li> <li>▪ In Unauthorized state, the users having Authorize Rights can view all the unauthorized Metadata.</li> </ul>
Short Description	<p>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 “_”.</p>

Field	Description
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:
  - Click Select icon from the Entities tool bar.
  - The *Entity and Attribute* window is displayed.
  - 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.
  - 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
<b>ANSI Join</b>	The ANSI Join condition defines which set of data have been 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.
<b>Join/Filter Condition</b>	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: <ul style="list-style-type: none"> <li>▪ JOIN condition for SQL Server/SQL OLAP combination should contain only EQUI JOIN condition as required by SQL OLAP.</li> <li>▪ In case of SQL Server/Essbase and Oracle/Essbase, data set must be 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.</li> </ul>
<b>Date Filter</b>	The Date Filter condition enables you to cascade the cubes that are using the data set with the defined Date Filter.
<b>Order By</b>	The Order By condition enables you to sort the dimension data in order. The order of the Dimension nodes will be 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 has to be **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.

Code	Short Description	Long Description	Aggregation Function	Entity	Attribute
M0001	MSR - Non Sec Outstanding Principal	Measure for Outstanding Principal	SUM	FCT_NON_SEC_EXPOSURES	n_outstanding_principal
M0001CRP	Original Exposure Pre Conversion Factors	Original Exposure Pre Conversion Factors	SUM	VW_CRP_SA_CR_NON_SEC_REP	ORIG_EXP_PRE_CONV_FACTORS
M0002CRP	Of Which Arising from Counterparty Credit Risk	Of Which Arising from Counterparty Credit Risk	SUM	VW_CRP_SA_CR_NON_SEC_REP	OF_ARISING_COUNTERPARTY_CR
M0003CRP	Value Adjustments and Provisions Associated with the Original Exposure	Value Adjustments and Provisions Associated with the Original Exposure	SUM	VW_CRP_SA_CR_NON_SEC_REP	VALUE_OF_ADJ_PROV_ORIG_EXP
M0004CRP	Guarantees	Guarantees	SUM	VW_CRP_SA_CR_NON_SEC_REP	GUARANTEES
M0005	MSR - Non Sec Add On Percent	Measure for Add On Percent	SUM	FCT_NON_SEC_EXPOSURES	n_addon_percent
M0005CRP	Credit Derivatives	Credit Derivatives	SUM	VW_CRP_SA_CR_NON_SEC_REP	CREDIT_DERIVATIVES
M0006	MSR - Non Sec Notional Principal	Measure for Notional Principal	SUM	FCT_NON_SEC_EXPOSURES	n_notional_principal
M0006CRP	Financial collateral simple method	Financial collateral simple method	SUM	VW_CRP_SA_CR_NON_SEC_REP	FIN_COLL_SIMPLE_METHOD
M0007	MSR - Non Sec Current Exposure Amount	Measure for Current Exposure Amount	SUM	FCT_NON_SEC_EXPOSURES	n_exposure_amount

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 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	<p>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 “_”.</p> <p><b>Note the following:</b></p> <ul style="list-style-type: none"> <li>▪ The code can be indicative of the type of Measure being created.</li> <li>▪ A pre-defined Code and Short Description cannot be changed.</li> <li>▪ 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".</li> <li>▪ In Unauthorized state, the users having Authorize Rights can view all the unauthorized Metadata.</li> </ul>

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.

- Based on the selected Aggregation Function the **Data Type** is auto populated.
  - 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.
    - Select the checkbox adjacent to the required Entities from the **Available Entities** list. The corresponding attributes are displayed in the **Available Attributes** list. Select the checkbox adjacent to the required Attribute.

---

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

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

- 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. 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.

You can copy the existing Business Measure details to quickly create a new Business Measure by clicking the  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.

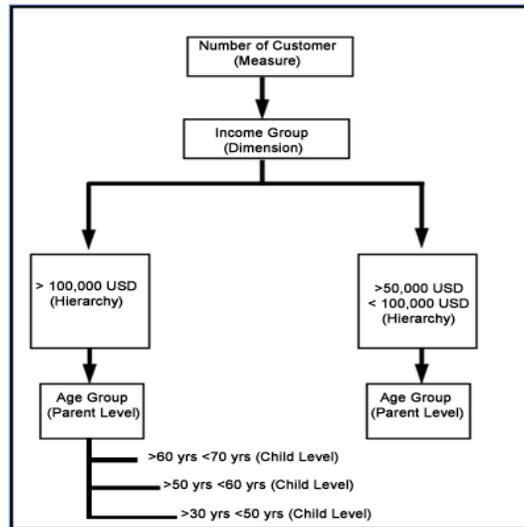
You can remove the Business Measure definition(s) which are created by you and which are no longer required in the system by deleting from the Business Measures window, by clicking the  icon. You need to have Delete Measures function role mapped to delete a Business Measure. Delete function permanently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

- A Business Measure definition marked for deletion is not accessible for other users.
- Every delete action has to be **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

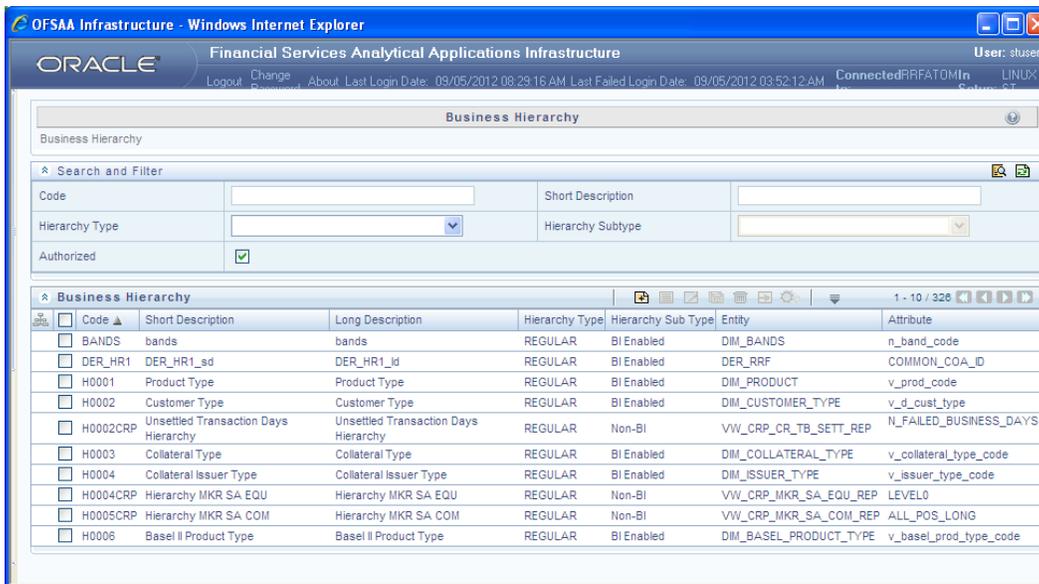
Business Hierarchy refers to *Organizing Data* into logical tree structure to represent the groups and relations among various levels at which measure can be viewed. A measure can be viewed at different levels depending upon the hierarchy breakdown of the dimension category.

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 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	<p>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 “_”.</p> <p><b>Note the following:</b></p> <ul style="list-style-type: none"> <li>▪ The code can be indicative of the type of Hierarchy being created.</li> <li>▪ A pre-defined Code and Short Description cannot be changed.</li> <li>▪ Same Code or Short Description cannot be used for Essbase installation: "\$\$\$UNIVERSE\$\$\$", "#MISSING", "#MP", "CALC", "DIM", "ALL", "FIX", "ENDFIX", "HISTORY", "YEAR", "SEASON", "PERIOD", "QUARTER", "MONTH", "WEEK", "DAY".</li> <li>▪ In Unauthorized state, the users having Authorize Rights can view all the unauthorized Metadata.</li> </ul>

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 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.

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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	<p>In a Regular Hierarchy Type, you can define the following Hierarchy Sub Types:</p> <ul style="list-style-type: none"> <li>Non Business Intelligence Enabled                     <p>In a non Business Intelligence Enabled Hierarchy, you need to manually add the required levels. The levels defined will form the Hierarchy.</p> </li> <li>Business Intelligence Enabled                     <p>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 will automatically detect the values based on the actual data.</p> <p>In a BI enabled Hierarchy, you will be 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:</p> <table border="1"> <thead> <tr> <th>Region (1)</th> <th>State (2)</th> <th>Place (3)</th> </tr> </thead> <tbody> <tr> <td>South</td> <td>Tamil Nadu</td> <td>Madras</td> </tr> <tr> <td></td> <td>Karnataka</td> <td>Bangalore</td> </tr> <tr> <td></td> <td>Andhra Pradesh</td> <td>Hyderabad</td> </tr> <tr> <td>North</td> <td>Punjab</td> <td>Chandigarh</td> </tr> </tbody> </table> </li> </ul> <ul style="list-style-type: none"> <li>Parent Child</li> </ul>	Region (1)	State (2)	Place (3)	South	Tamil Nadu	Madras		Karnataka	Bangalore		Andhra Pradesh	Hyderabad	North	Punjab	Chandigarh
Region (1)	State (2)	Place (3)														
South	Tamil Nadu	Madras														
	Karnataka	Bangalore														
	Andhra Pradesh	Hyderabad														
North	Punjab	Chandigarh														

Hierarchy Type	Description / Hierarchy Sub Type
	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 <i>Non Business Intelligence Enabled</i> as Hierarchy Sub Type.
Time	A Time Hierarchy consists of the levels/nodes of high time granularity and has only the <i>Business Intelligence Enabled</i> 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, refer Large Hierarchy.

Once you have populated the required details in Business Hierarchy Definition and Hierarchy details section, save the details.

4. 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 has to be **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.



Field	Description
Code	<p>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 will help in identifying it while creating rules.</p> <p>Note the following:</p> <ul style="list-style-type: none"> <li>It is mandatory to enter a Code.</li> <li>The Code should be minimum eight characters in length; it can be alphabetical, numerical (only 0-9) or alphanumerical characters.</li> <li>The Code should start with an Alphabet.</li> <li>The Code cannot contain special characters with the exception of the underscore symbol (_).</li> <li>The saved Code or Short Description cannot be changed.</li> </ul>

2. Enter the details as tabulated:

Field	Description
Code	<p>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 will help in identifying it while creating rules.</p> <p>Note the following:</p> <ul style="list-style-type: none"> <li>It is mandatory to enter a Code.</li> <li>The Code should be minimum eight characters in length; it can be alphabetical, numerical (only 0-9) or alphanumerical characters.</li> <li>The Code should start with an Alphabet.</li> <li>The Code cannot contain special characters with the exception of the underscore symbol (_).</li> <li>The saved Code or Short Description cannot be changed.</li> </ul>

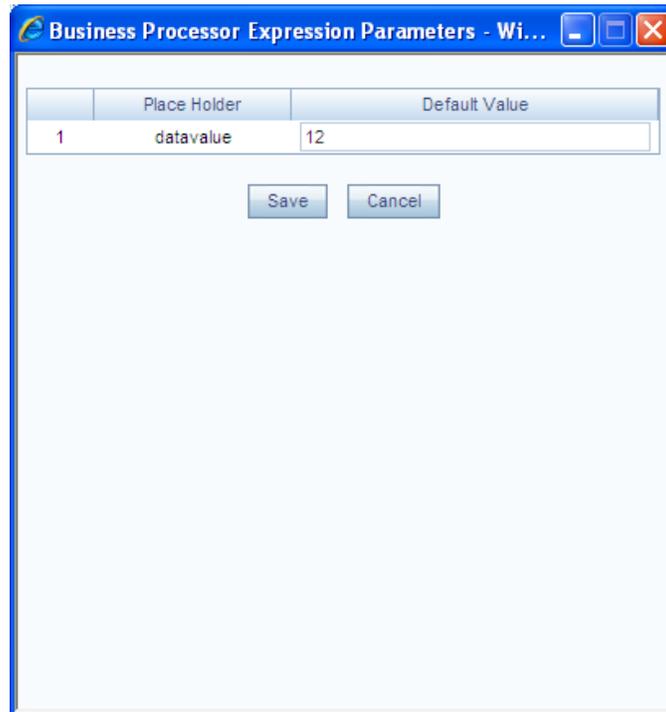
Field	Description
Short Description	<p>Short description is useful in understanding the content of the Business Processor you are creating. It would help to enter a description based on the code.</p> <p>Note the following:</p> <ul style="list-style-type: none"> <li>▪ It is mandatory to enter a Short Description.</li> <li>▪ The Short Description should be of minimum one character and maximum of 80 characters in length.</li> <li>▪ Only Alphanumeric, non-English, and Special characters such as “&lt;blank space&gt;”, “.”, “\$”, “&amp;”, “%”, “&lt;”, “&gt;”, “()”, “(”, “_”, and “-” are permitted to be entered in the Short Description field.</li> </ul>
Long Description	<p>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.</p> <p>The Long Description should be of minimum one character and maximum 100 characters in length.</p>
Data Set	<p>Select the Data Set from the drop-down list. The list of available Data Sets for the selected Information Domain will appear in the drop-down.</p> <p>The Short Description of the Data Sets as entered in the <i>Data Sets</i> window under <b>Business Metadata Management</b> will be reflected in the dropdown.</p>
Measure	<p>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 will appear in the drop-down.</p> <p>If the underlying measure is deleted after the Business Processor definition, then the corresponding <b>Business Processor</b> definition will automatically be invalidated.</p>
Expression	<p>Click  icon. The <i>Expression</i> window is displayed.</p> <p>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 “<b>Expression</b>” field.</p> <p>Note the following:</p> <ul style="list-style-type: none"> <li>▪ The values for the placeholders can be alphanumeric.</li> <li>▪ The process of specifying place holders enables the user to execute the same business processor definition with different values during the run time.</li> </ul>

Field	Description
Expression has Aggregate Function	The expression may require an aggregation function depending on the business logic. The aggregation functions have to be entered in the expression field per acceptable syntax. IF an aggregation function is used in the expressions, the checkbox “ <b>Expression has Aggregate Function</b> ” must be enabled. Leave the checkbox “ <b>Expression has Aggregate Function</b> ” 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.



1. Enter a default value for the place holders defined along with the expression in the **Default Value** box.
2. 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.
3. 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*

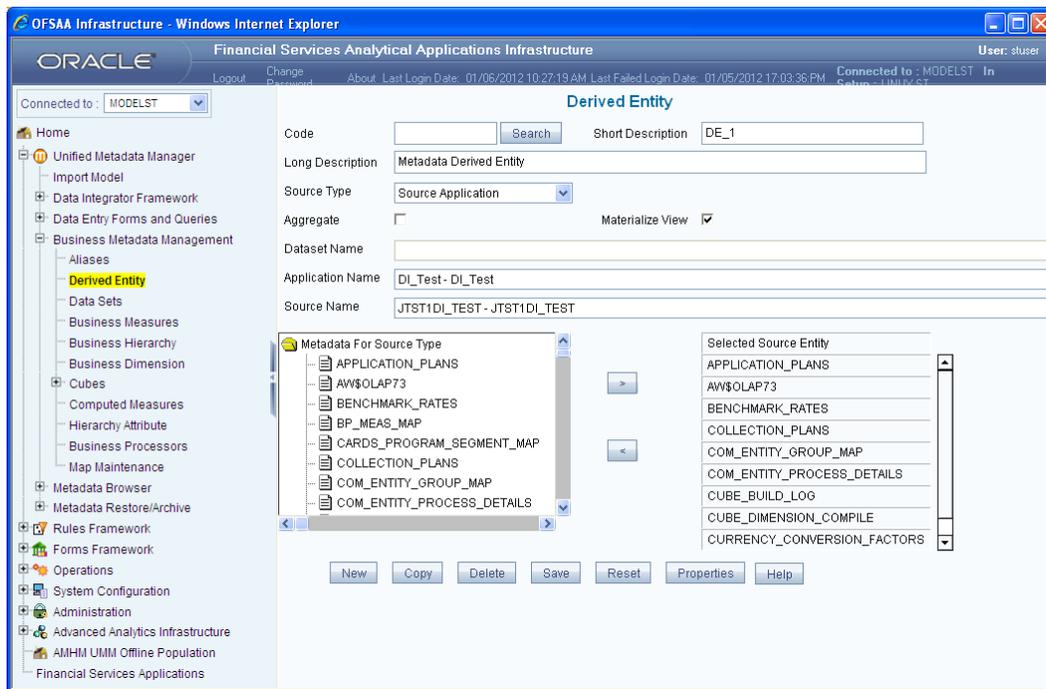
Info grid at the bottom of the window displays the metadata information about the Business Processor definition along with the option to add comments.

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

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. You can remove Business Processor definition(s) which are no longer required in the system by clicking the  icon.

## Derived Entity

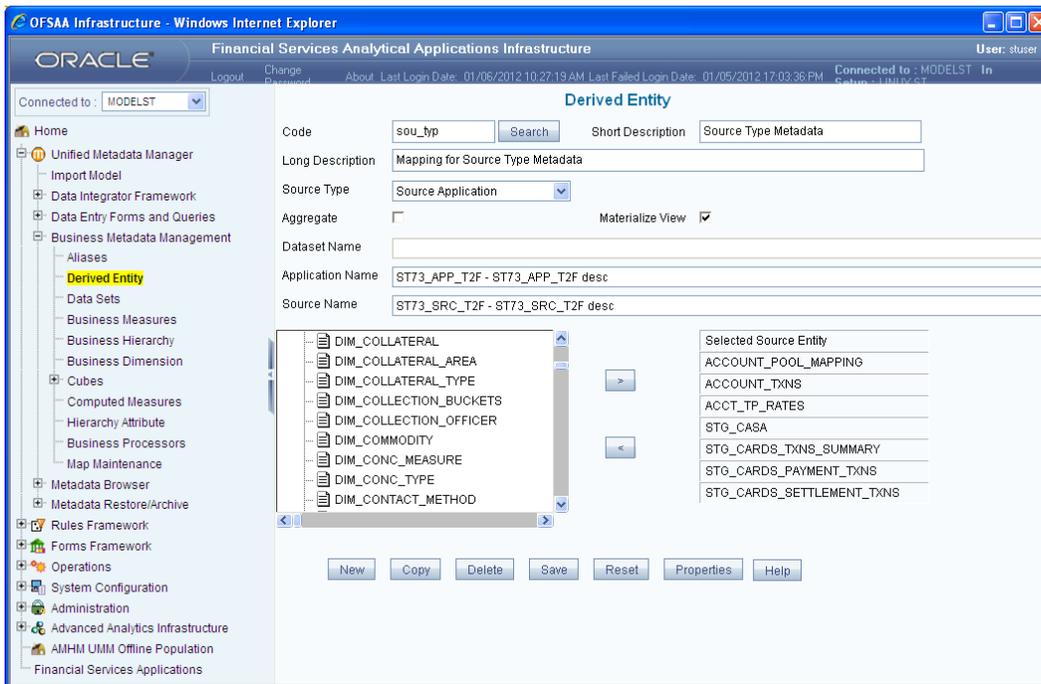
Entity refers to a table in which data is stored. Derived Entity within the Infrastructure system facilitates you to define entities which are populated through a series of data transformation processes resulting from an existing Data Set or a Source Application. An Entity can be used to define other 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	<p>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 “_”.</p> <p><b>Note the following:</b></p> <ul style="list-style-type: none"> <li>▪ The code can be indicative of the type of Derived Entity being created.</li> <li>▪ A pre-defined Code and Short Description cannot be changed.</li> <li>▪ 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".</li> <li>▪ In Unauthorized state, the users having Authorize Rights can view all the unauthorized Metadata.</li> </ul> <p>You can also search for an existing code or Derived Entity.</p> <ul style="list-style-type: none"> <li>▪ Click <b>Search</b>, the <i>Search</i> window is displayed.</li> <li>▪ Double-click the required code from the list of available Derived Entities or enter the description for the required Derived Entity in <b>Description Filter</b> and press <b>Enter</b>. The</li> </ul>

Field	Description
	<p>matching Derived Entity code is displayed.</p> <ul style="list-style-type: none"> <li>Select <b>List Un Authorized</b> checkbox to view all the un authorized metadata.</li> </ul>
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 <b>Data Set</b> or <b>Source Application</b> from the drop down list.
Aggregate	Select <b>Aggregate</b> checkbox to collate the information for the Derived Entity.
Materialize View	<p>(Optional) Select the <b>Materialize View</b> checkbox if you are using Oracle database to create a Materialized View with the Derived Entity Name and short description.</p> <p><b>Note:</b> You cannot enable the Materialize View option if you are using IBM DB2 database.</p>
Data Set Name	<p><i>Option available only if the Source Type is selected as <b>Data Set</b>.</i></p> <p>Select the <b>Data Set Name</b> from the drop-down list. The Short Description for the Data Sets is available in the drop down list to select.</p>
Application Name	<p><i>Option available only if the Source Type is selected as <b>Source Application</b>.</i></p> <p>Select the <b>Application Name</b> from the drop down list.</p>
Source Name	<p><i>Option available only if the Source Type is selected as <b>Source Application</b>.</i></p> <p>Based on the Application selected the related Sources are listed. Select the <b>Source Name</b> from the drop-down list.</p>

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

1. Double-click **Metadata for Source Type**. The list of Metadata defined on the selected Data Set or Application and Source is displayed.
2. Click + to expand the folders. Select the required metadata and click .
3. 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.

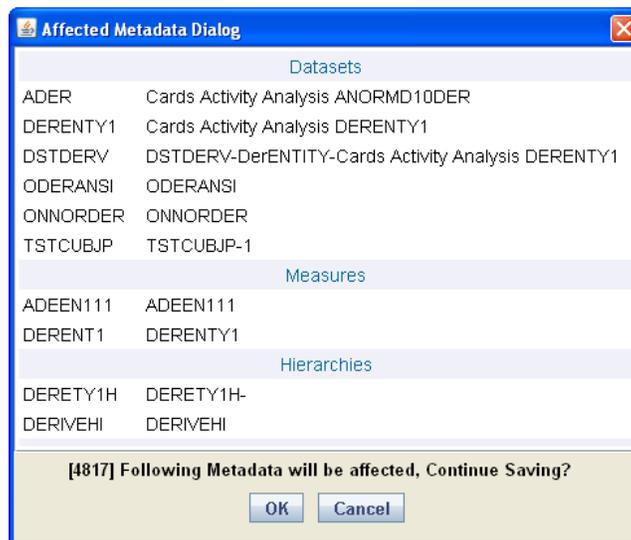
You can view the metadata of the selected Derived Entity. In the *Derived Entity* window click **Properties** and open the *Properties* dialog.

- 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.

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 indicated below:

- A Derived Entity definition marked for deletion is not accessible for other users.
- Every delete action has to be **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.

## 2.4 Rules Framework

Rules Framework has been 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 must be 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 has been 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 have been mapped.

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**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 will be 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 will 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.

The screenshot shows the Oracle Financial Services Analytical Applications Infrastructure (FAAI) interface. The main window is titled 'Run Rule Framework >> Rule'. It features a search and filter section at the top with fields for Code, Name, Version, Active, Folder, Type, and Dataset. Below this is a table listing various rules. The table has columns for Code, Name, Type, Folder, Dataset, Version, and Active. The rules listed include various financial calculations and classifications, such as 'Non Sec Add - on Estimation', 'Basel I Customer Type Reclassification', and 'Equity RWA Calculation'.

Code	Name	Type	Folder	Dataset	Version	Active
1111241886631	Non Sec Add - on Estimation	Computation	BIS	Non Securitisation Exposure	0	Yes
1117016036934	Basel I Customer Type Reclassification	Classification	BIS	Non Securitisation Exposure	0	Yes
1128403465564	Non Sec Expected Loss Band Skey Assignme...	Computation	BIS	Non Securitization Band Skkeys	0	Yes
1128411980620	Sec Exposure Risk Weight Band Skey Assig...	Computation	BIS	RWA Computations - Securitizat...	0	Yes
1136285107137	Non Sec Pre-Mitigation Capital Required ...	Computation	BIS	Non Securitisation Exposure	0	Yes
1136287177302	Non Sec Effective Maturity Assignment - ...	Computation	BIS	Non Securitisation Exposure	0	Yes
1137126999734	Non Sec Pre-Mitigation PD Assignment	Computation	BIS	Non Securitisation Exposure	0	Yes
1137496095751	Non Sec Capital Required for UL - Defaul...	Computation	BIS	Non Securitisation Exposure	0	Yes
1137496648996	Non Sec Pre-Mitigation EAD Amount - IRB	Computation	BIS	Non Securitisation Exposure	0	Yes
1137497129859	Non Sec RWA For Dilution Risk	Computation	BIS	Non Securitisation Exposure	0	Yes
1137561353899	Equity Correlation Factor	Computation	BIS	Equity Exposure Dataset	0	Yes
1137561926026	Equity RWA Calculation	Computation	BIS	Equity Exposure Dataset	0	Yes
1137645483897	Non Sec Basel II Transaction Type Reclas...	Classification	BIS	Non Securitisation Exposure	0	Yes
1137646268878	Party Type Reclassification - IRB	Classification	BIS	Party type reclassification - ...	0	Yes
1137646548485	Non Sec Basel II Asset Class Reclassific...	Classification	BIS	Non Securitisation Exposure	0	Yes
1137646548485_bkp	Non Sec Basel II Asset Class Reclassific...	Classification	BIS	Non Securitisation Exposure	0	Yes
1137651218893	Equity Minimum RW Assignment - PD - LGD ...	Computation	BIS	Equity Exposure Dataset	0	Yes
1137651249717	Non Sec Pre-Mitigation Post Volatility H...	Computation	BIS	Non Securitisation Exposure	0	Yes
1137656131798	Non Sec Pre-Mitigation Risk Weight - UL	Computation	BIS	Non Securitisation Exposure	0	Yes
1137656202121	Non Sec Pre-Mitigation Risk Weight - EL	Computation	BIS	Non Securitisation Exposure	0	Yes

## 2.4.1 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 must be transformed to support such measurements and calculations. The data transformation is achieved through a set of defined Rules.

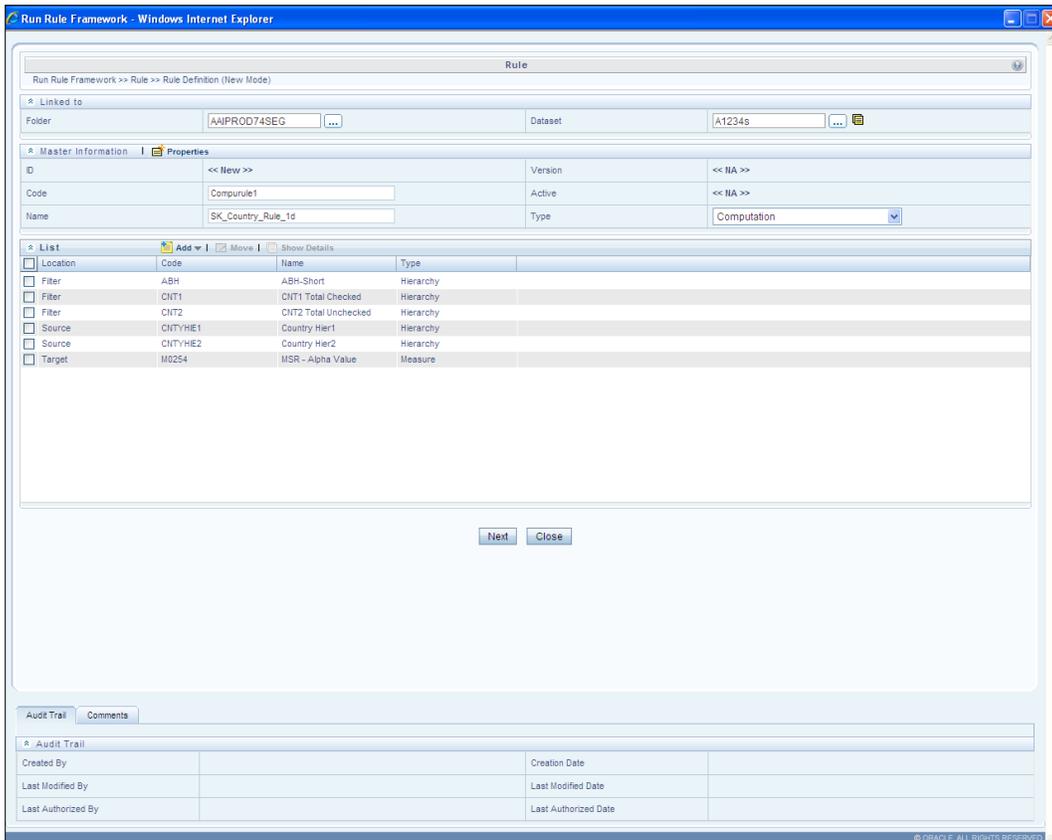
The Rules option in the Rules Framework provides a framework that facilitates the definition and maintenance of a transformation. The metadata abstraction layer is used in the definition of rules where the user is permitted to re-classify the attributes in the data warehouse model thus transforming the 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 must be 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.

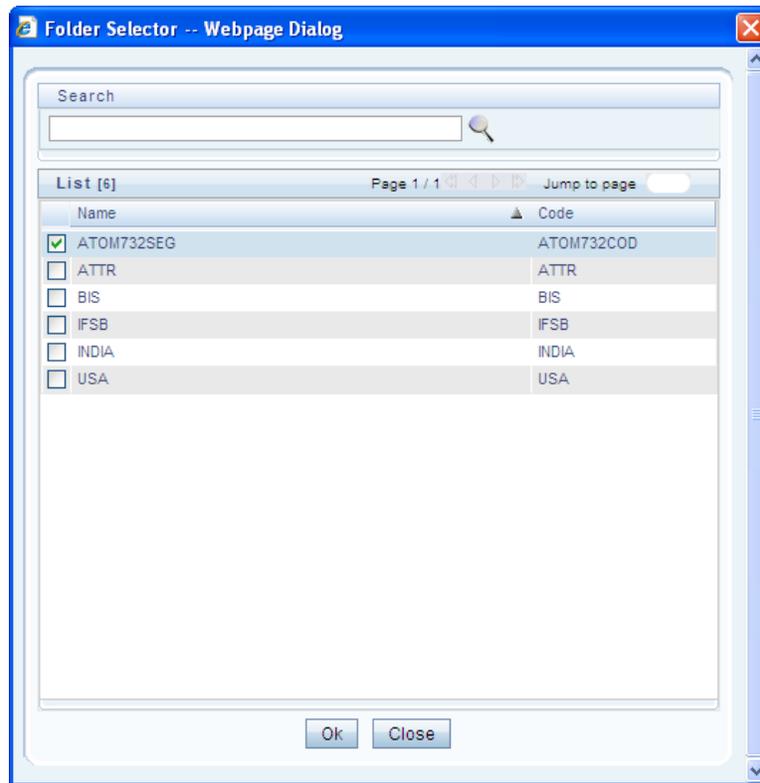
### Create Rule

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

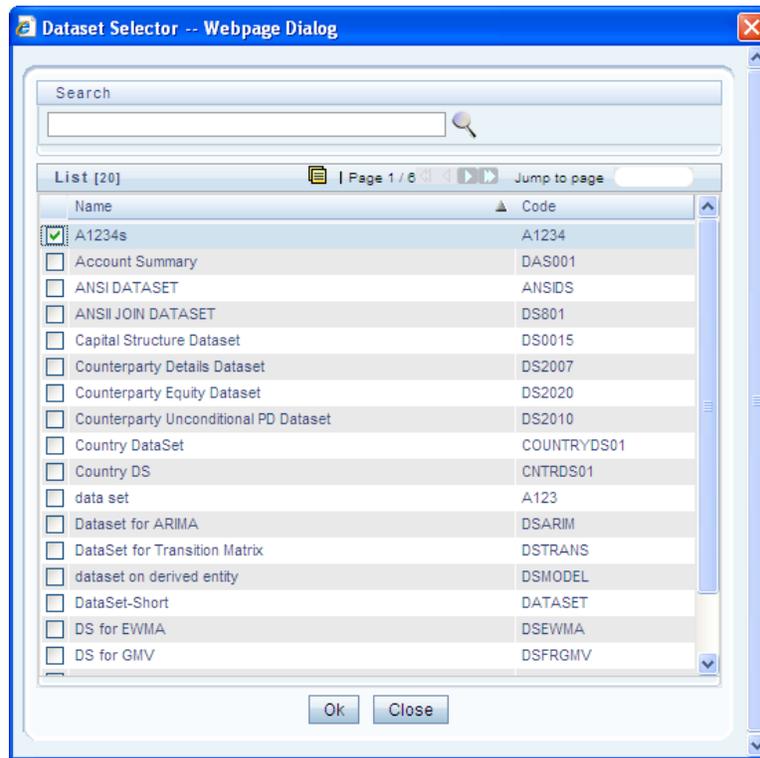
1. Click  icon from the List toolbar. The *Rule Definition (New Mode)* window is displayed.



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.

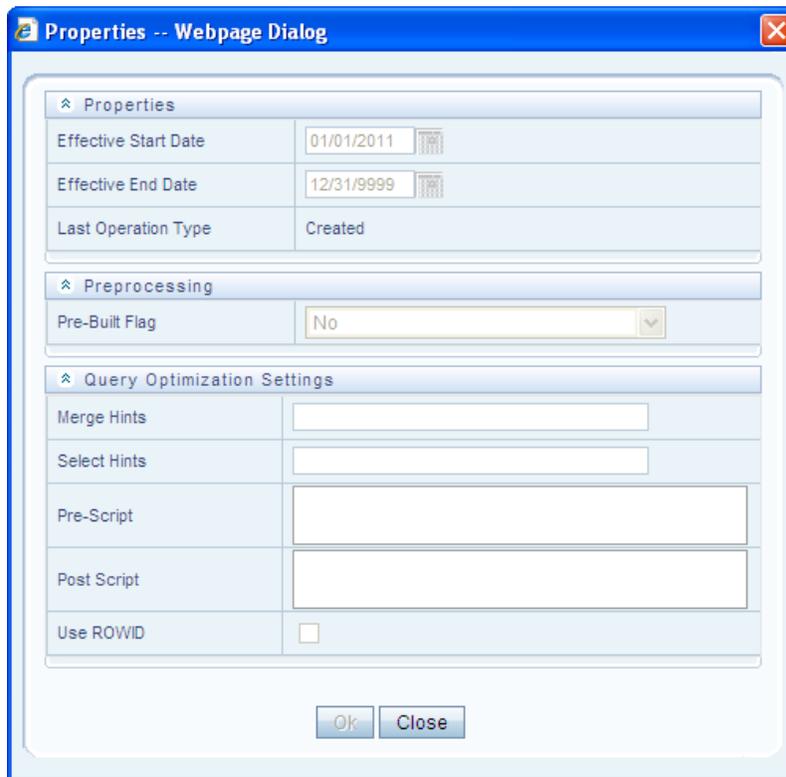


5. Select the checkbox adjacent to the required Dataset name. Click **OK**. In the *Dataset Selector* dialog, you can also do the following:
  - Search for a particular folder by specifying keyword and clicking  icon.
  - View properties of the selected Dataset by clicking  icon.
  - Make use of Pagination 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. Once 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. Once the Rule definition is saved, the status is set to “Yes” if you are an <i>Authorizer</i> creating the Rule or “No” if the created Rule needs to be Authorized by an <i>Authorizer</i> .
Type	Select the “Type” based on which you would like to create the rule from the dropdown list. You can select either <b>Computation</b> or <b>Classification</b> .

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
<b>Properties</b>	
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 <b>Created</b> .
<b>Pre processing</b>	
Pre Built Flag	<p>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.</p> <p>By default, Pre Built Flag status is set to “<b>No</b>”. This indicates that the query statement is formed dynamically retrieving the technical metadata details. If the Pre Built Flag status is set to “<b>Yes</b>” then the relevant metadata details required to form the rule query is stored in database on “Save” of a Rule definition. Also, the Rule will not be 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.</p> <p>Select the required option from the drop down list.</p>
<b>Query Optimization Settings</b>	
Merge Hints	<p>Specify the SQL Hint that can be used to optimize Merge Query.</p> <p>For example, “/*+ ALL_ROWS */”</p> <p>In a Rule Execution, Merge Query formed using definition level Merge Hint precede over the Global Merge Hint Parameters defined in the <i>Optimization</i> tab of <i>System Configuration &gt; Configuration</i> window. In case the definition level Merge Hint is empty / null, Global Merge Hint (if defined) is included in the query.</p>
Select Hints	<p>Specify the SQL Hint that can be used to optimize Merge Query by selecting the specified query.</p> <p>For example, “SELECT /*+ IS_PARALLEL */”</p> <p>In a Rule Execution, Merge Query formed using definition level Select Hint precede over the Global Select Hint Parameters defined in the <i>Optimization</i> tab of <i>System Configuration &gt; Configuration</i> window. In case the definition level Select Hint is empty / null, Global Select Hint (if defined) is included in the query.</p>

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

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.

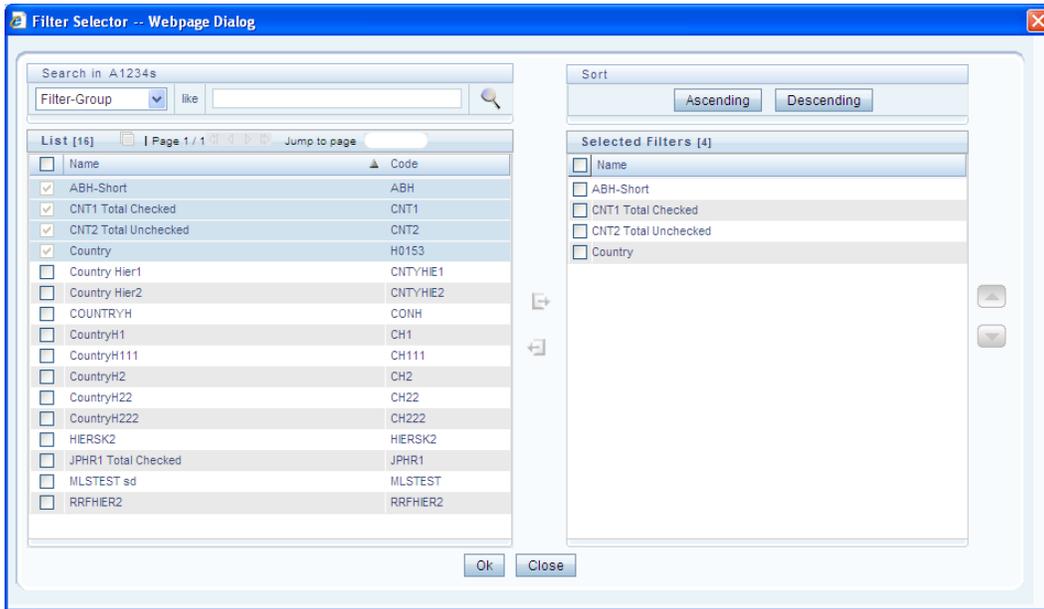
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**NOTE:** In order to access *Filter Selector* window and to select the pre-defined filters, you need to have **FILTERRULE** function mapped to your role.

---

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	<b>Hierarchy</b> refers to the defined Business Hierarchies and will list all the UMM Hierarchies pertaining to the selected dataset.
Filter-Data Element	<b>Data Element Filter</b> 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	<b>Hierarchy Filter</b> allows you to utilize rollup nodes within a Hierarchy to help you exclude (filter out) or include data within an OFSAA rule.
Filter-Group	<b>Group Filters</b> 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:

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

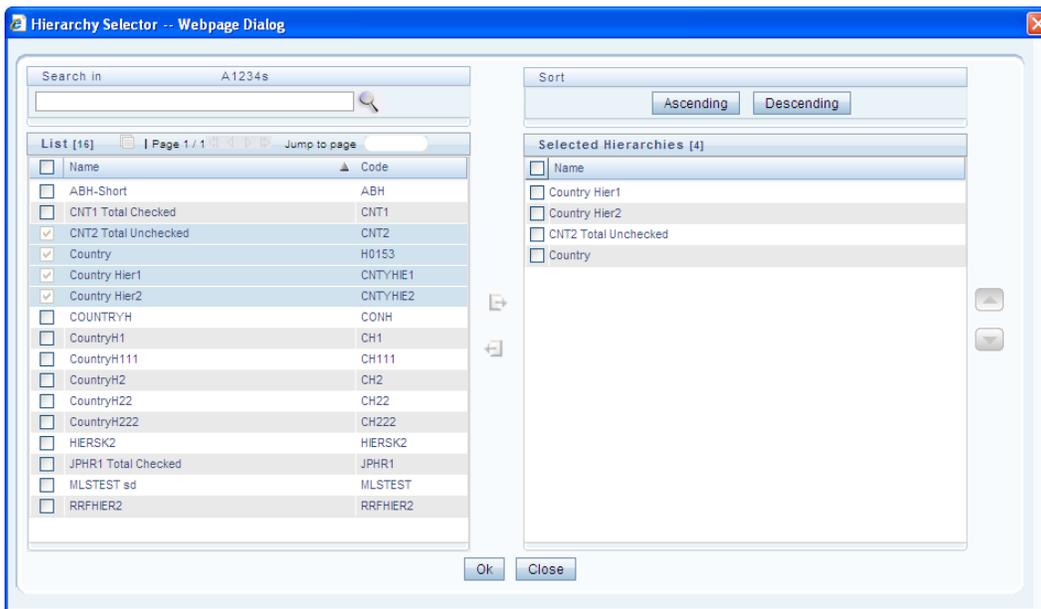
system.

- Click  icon to view the details of a selected member.
  - Click **Ascending** or **Descending** icon to sort the selected components in Ascending or Descending order.
  - 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:

- Search for a member by specifying the nearest keyword and clicking  icon.
- The Pagination option helps you to manage the view of existing Hierarchies within the system.
- Click  icon to view the details of a selected hierarchy.
- Click **Ascending** or **Descending** icon to sort the selected components in Ascending or

Descending order.

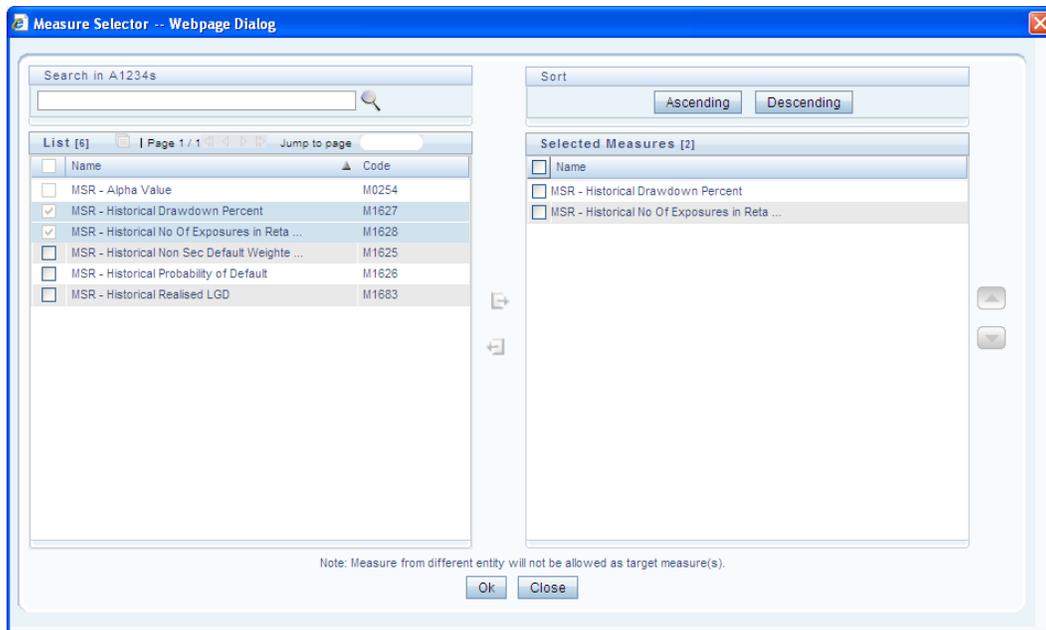
- Click  or  icon to re-arrange the selected list of hierarchies.
- Click  icon to remove selected hierarchies from the Selected Hierarchies pane.

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 from the *List* grid and select  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, i.e. 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 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:

- Search for a member by specifying the nearest keyword and clicking  icon.
- The Pagination option helps you to manage the view of existing members within the system.

- Click  icon to view the details of a selected member.
  - Click **Ascending** or **Descending** icon to sort the selected components in Ascending or Descending order.
  - Click  or  icon to re-arrange the selected list of members.
  - 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:

- Click  icon to move a selected member between **Filter**, **Source**, or **Target**.
- Click  icon to view the selected member details.

Once all the necessary information in the first window of the *Rule Definition (New Mode)* is populated, click **Next** button 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.

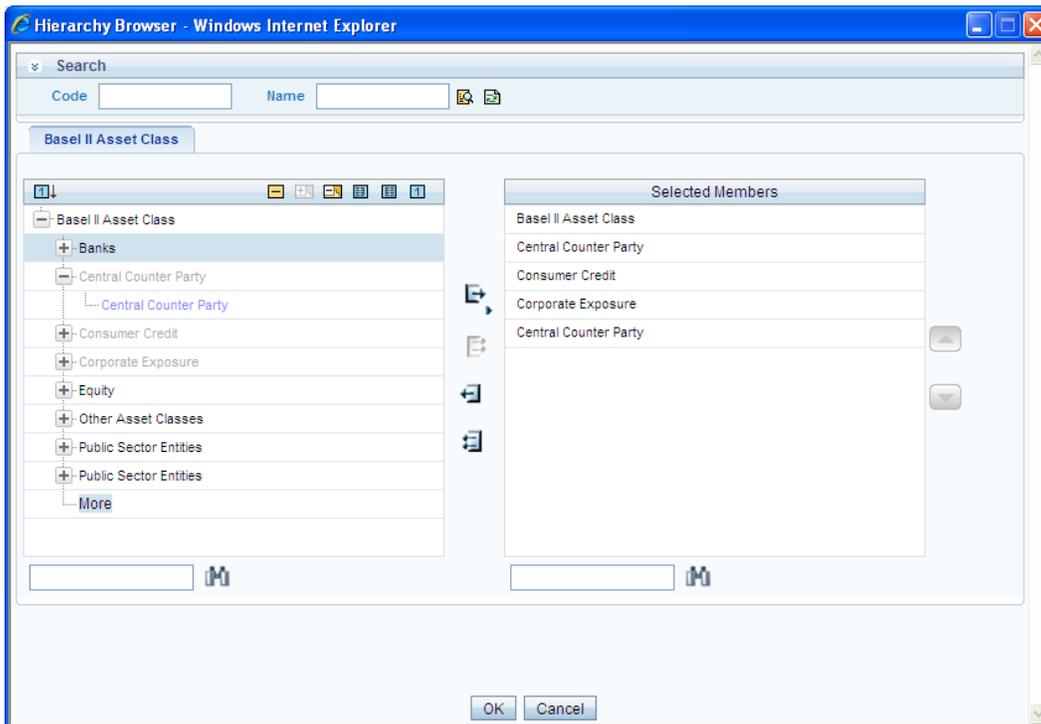
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**NOTE:** In case of Data Element, Group, or Hierarchy filters, you can only view the SQL query.

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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.



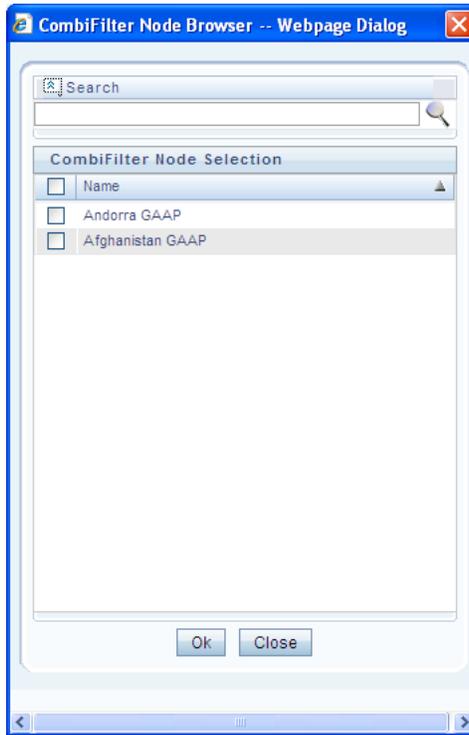
The *Search* grid allows you to search for a particular member by entering Code or any part of the Name and clicking  icon. You can click  icon to refresh the Code or name fields. You can also find a member in the grid using  icon.

1. 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 or Parent. In the *Hierarchy Browser* window you can also:
  - Click  or  to sort the members by Code or Name.
  - Click  or  to expand or collapse the members under a node.
  - Click  or  to expand a branch or collapse a branch.
  - Click  or  to view the code values of members right or left.
  - Click  or  to show code or show name of the members.
- 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.
3. 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 to select the members of a Hierarchy. The *Hierarchy Browser* is displayed.
3. Click  icon. The *CombiFilter Node Browser* window is displayed.

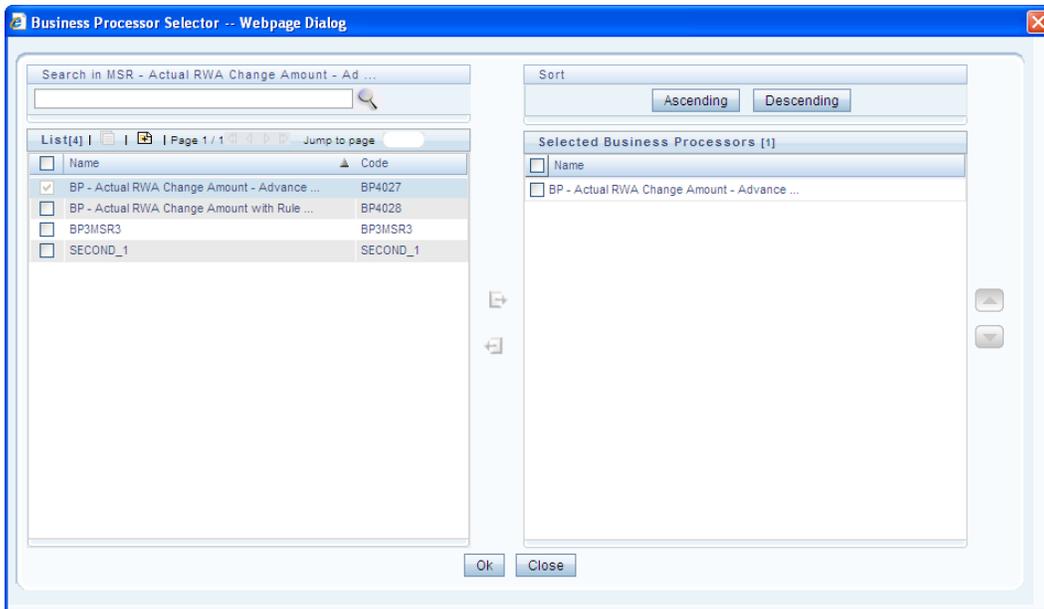


4. Select the checkbox adjacent to the member name and click **OK**.

### **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 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:

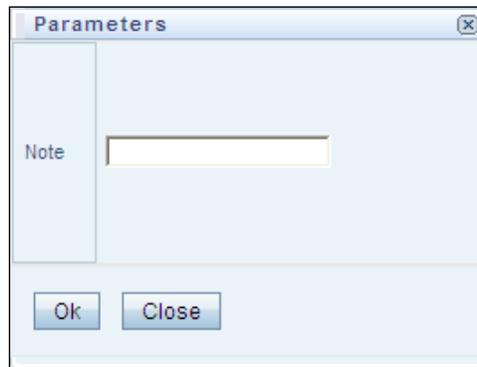
- Search for a Business Processor by specifying the nearest keyword and clicking  icon.
  - The Pagination option helps you to manage the view of existing Business Processors within the system.
  - Click  icon to view the details of a selected Business Processor.
  - Click  icon to define a new Business Processor.
  - Click **Ascending** or **Descending** icon to sort the selected components in Ascending or Descending order.
  - Click  or  icon to re-arrange the selected list of Business Processors.
  - 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 **Filter** 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.
    - 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 will be 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 will not overwrite the physical mapping.
    - 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.

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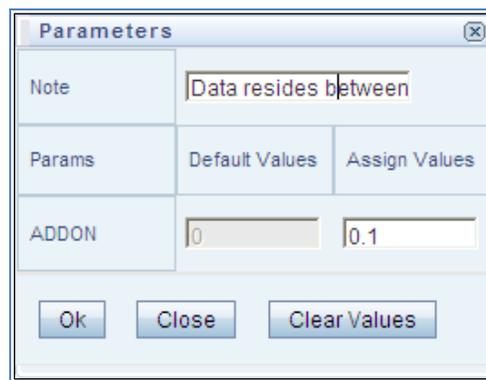
**NOTE:** A physical mapping is established when mapping is explicitly done upon a combination of source and target members.

---

- 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**.

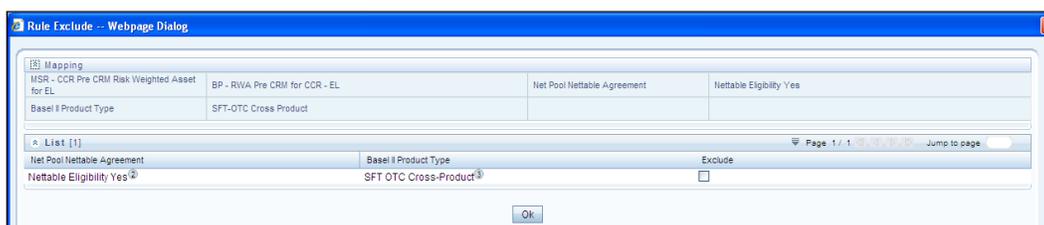


- For a Computation Rule with parameterized BP, the Parameters pop-up is as displayed. Enter the required note in the text field. The *Parameter Default Value* is fetched from the *Business Processor* definition and the *Assign Value* can be entered manually which is considered during Rule execution at Runtime. You can also clear the *Assign Value* field by clicking the **Clear Values** icon. Click **OK**.



- 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.



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

Once 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.

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.

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

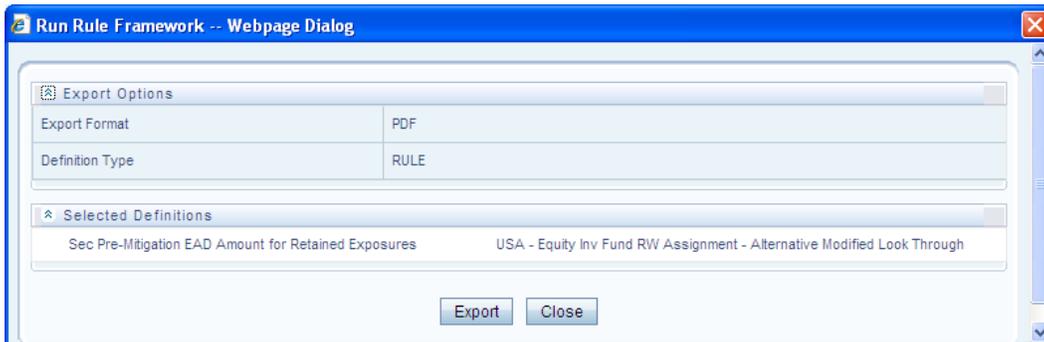
- To **Approve** the selected Rule definitions, click  icon.
- To **Reject** the selected Rule definitions, click  icon.

A Rule is made available for use only after the approval. For a rejected definition a comment with the rejection details will be 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 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, 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. Once 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.

## 2.4.2 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.

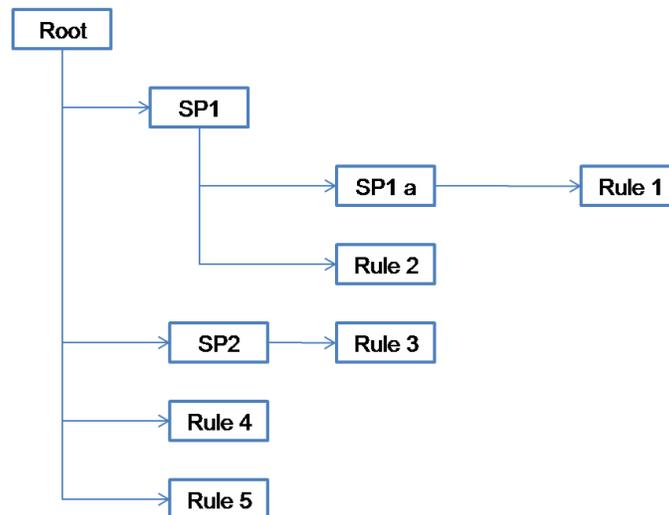
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### NOTE:

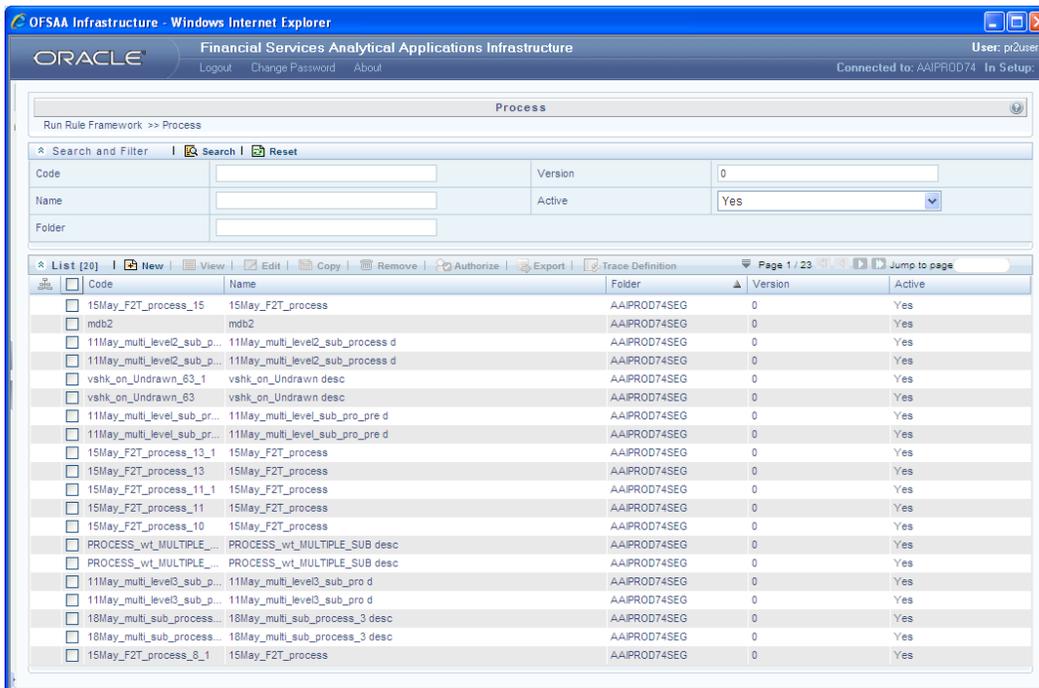
- Precedence defined to each Process determines the Process Initiation Sequence.
  - If Precedence is defined, Process Execution (along with the associated Rules) happens based on the precedence defined to each component.
  - If no precedence is defined, all the processes within the process tree are 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 may 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.

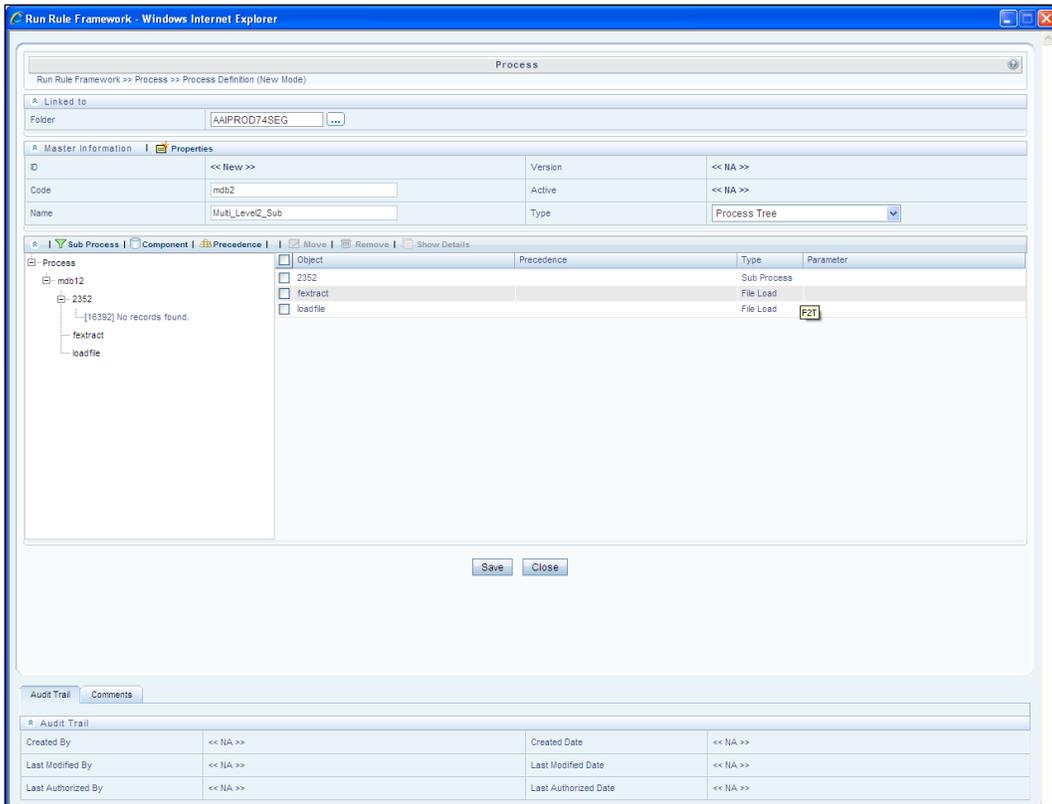


The *Process* window displays the processes created in the current Information Domain with the metadata details such as Code, Name, Folder, Version, and Active. You can archive/restore the existing PR2 definitions using the Metadata Restore/Archive utility and also migrate PR2/RRF definitions through the Command Line Utility across Information Domains / Setups.

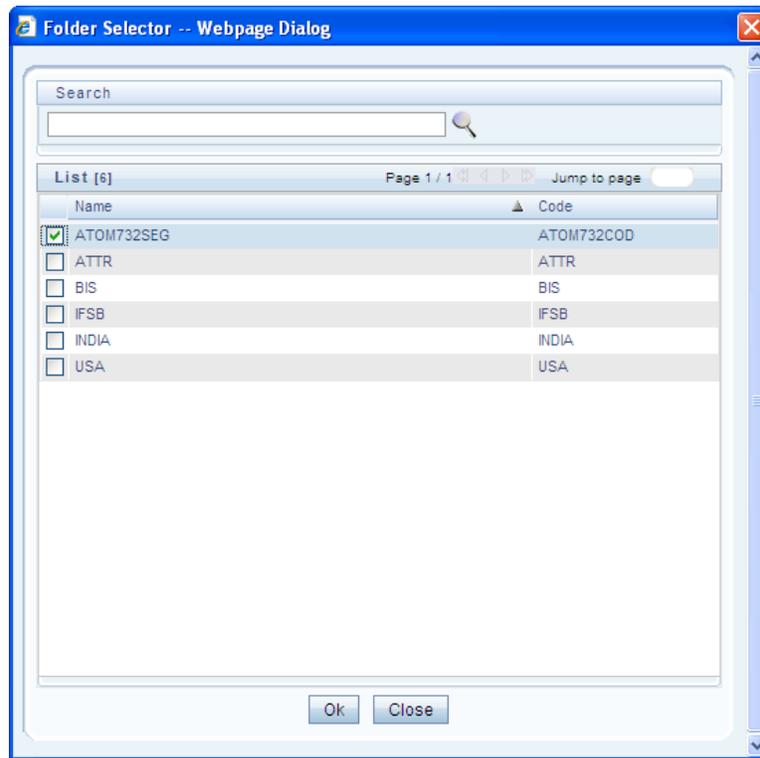
## Create Process

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**.

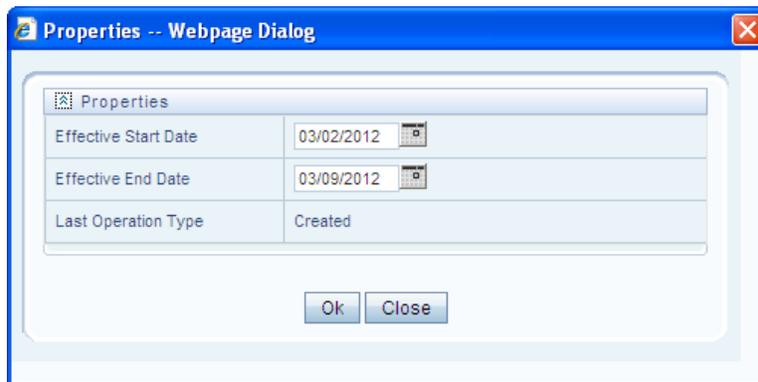
You can also enter a keyword and click  icon in the Search field of *Folder Selector* dialog to locate a particular folder. The Pagination option helps you to manage the view of existing Folders within the system.

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. Once the Process 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 Process being created. Once 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 needs to be Authorized by an Authorizer.
Type	Select the “Type” based on which you would like to create the rule from the dropdown list.

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



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

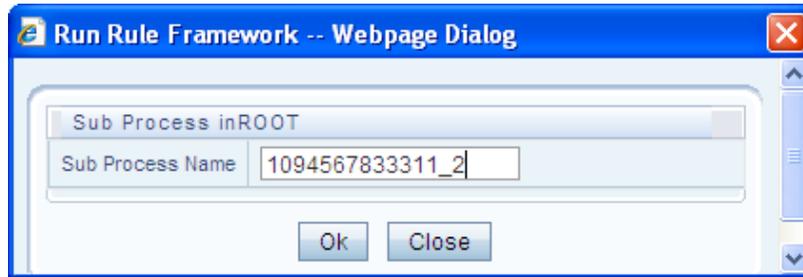
Field Name	Description
Effective Start Date	Select the Effective Start Date by clicking  (Calendar) icon.
Effective End Date	Select the Effective Start Date by clicking  (Calendar) icon.
Last operation type	By default, this field displays the last change done to the Process definition. While creating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

- 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:

- 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.

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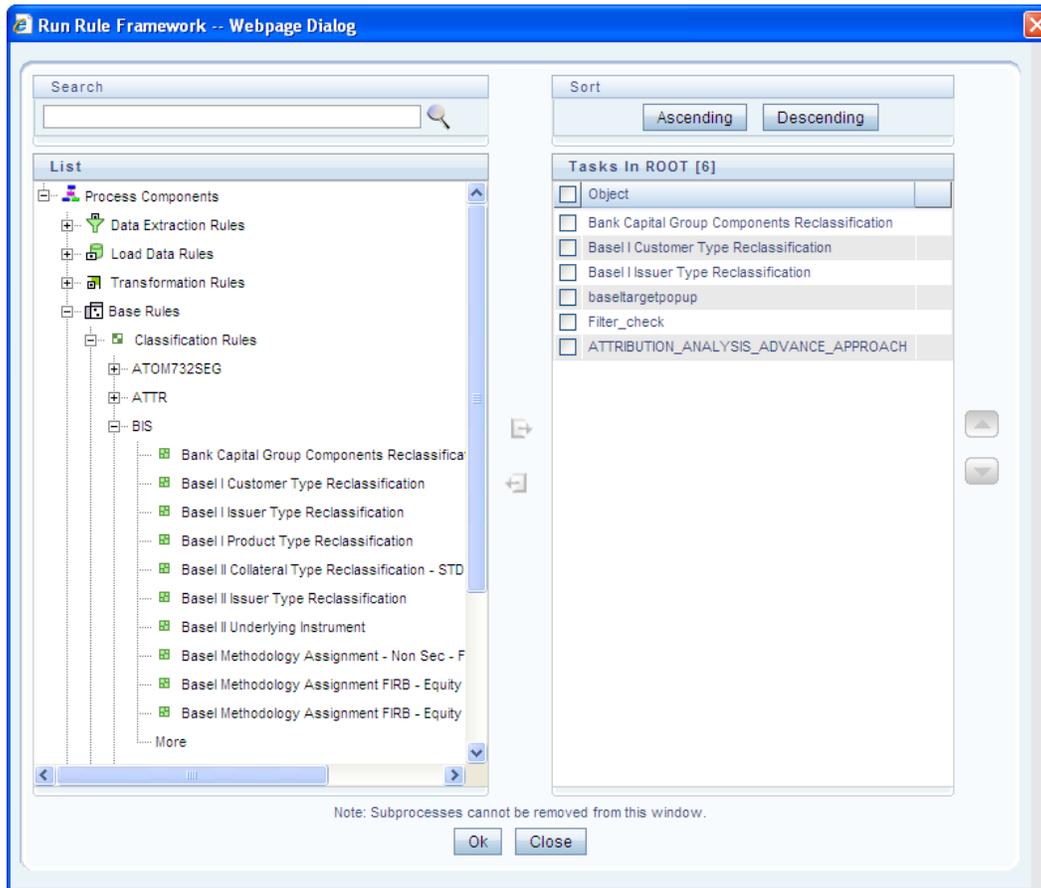
**NOTE:** You can further create sub processes for the existing processes or for the base process by selecting the process and following the above procedure.

---

### ***Add Component to Base Process / Sub Process***

You can add process components to the base process as well as 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:

- Search for a component by specifying the nearest keyword and clicking  icon.
- Click **Ascending** or **Descending** icon to sort the selected components in Ascending or Descending order.
- Click  or  icon to move up or move down the selected components.
- Click  icon to add parameters for the selected components.
- The parameters must be specified in double quotes and in case of multiple parameters, specify the values separated by commas. E.g.: "value 1","value 2".
- Click  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.

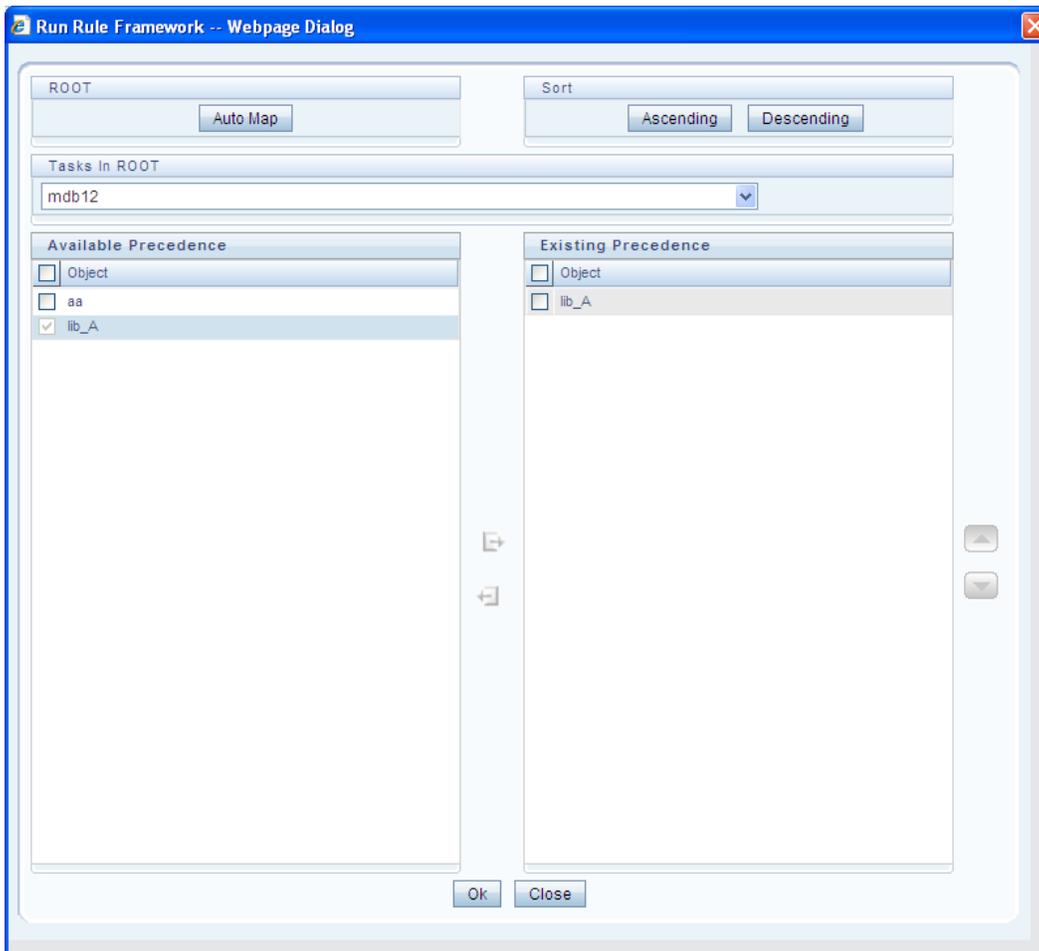
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4. Click **OK**. The components are listed under the selected process.

### **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  (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:

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

---

In the *Precedence Selector* window you can also:

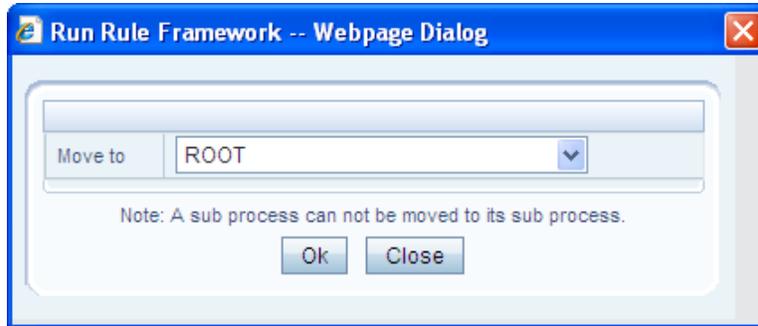
- Click **Ascending** or **Descending** icon to sort the selected tasks in Ascending or Descending order.
- Click  or  icon to move up or move down the selected tasks.
- Click  icon to remove selected tasks from the **Existing Precedence** pane.

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.

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:

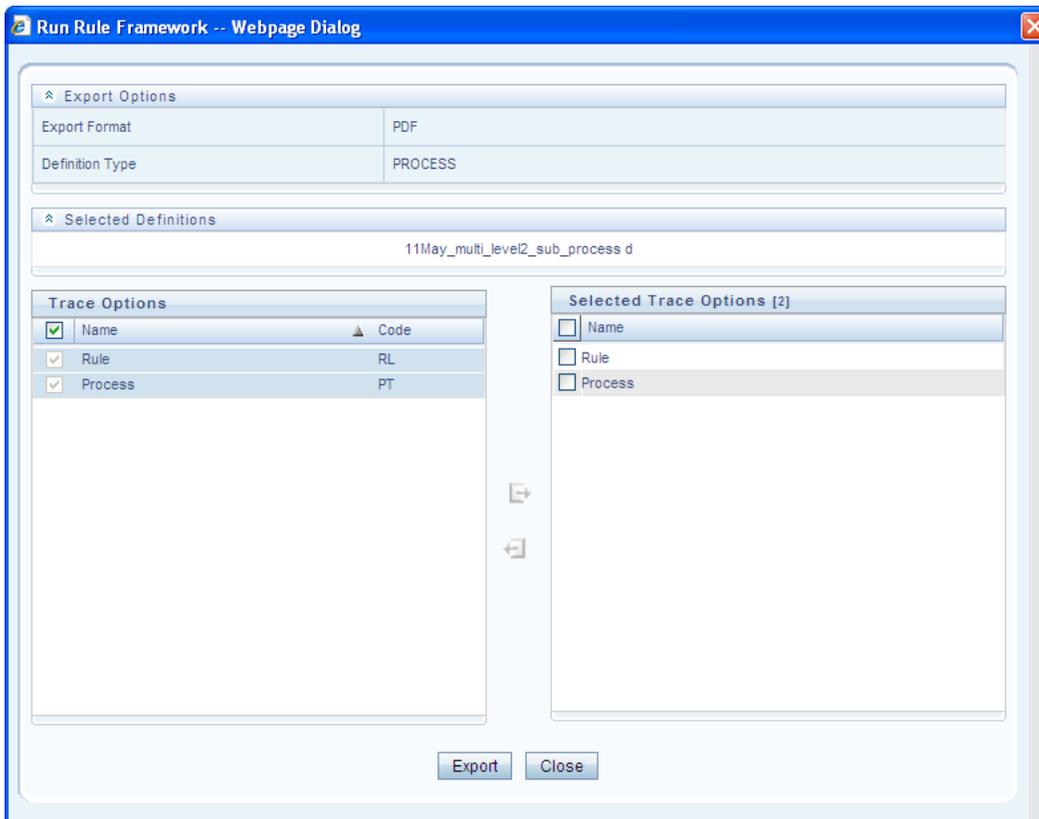
- To **Approve** the selected Process definitions, click  icon.
- To **Reject** the selected Process definitions, click  icon.

A Process is made available for use only after the approval. For a rejected definition a comment with the rejection details will be 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:

- Select the checkbox(s) adjacent to the available options.
  - 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. Once 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.

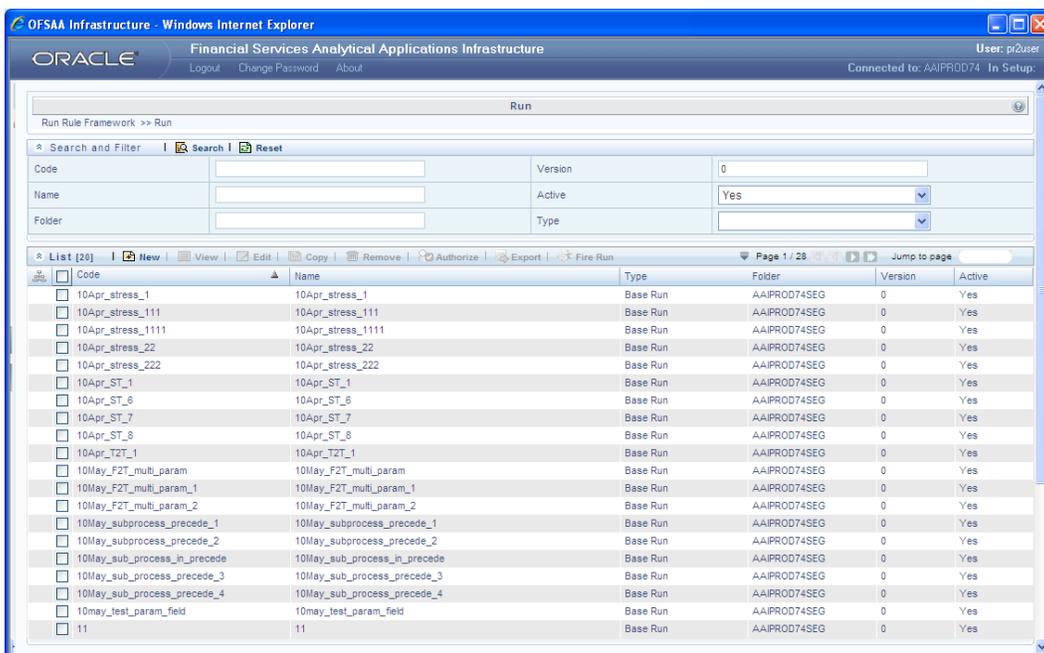
1. Select the checkbox(s) adjacent to the Process Code(s) whose details are to be removed.
2. Click  icon from the List tool bar.
3. Click **OK** in the information dialog to confirm deletion. An information dialog is displayed confirming the deletion of the Process definition(s) and asking the authorization of the same.

## 2.4.3 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.

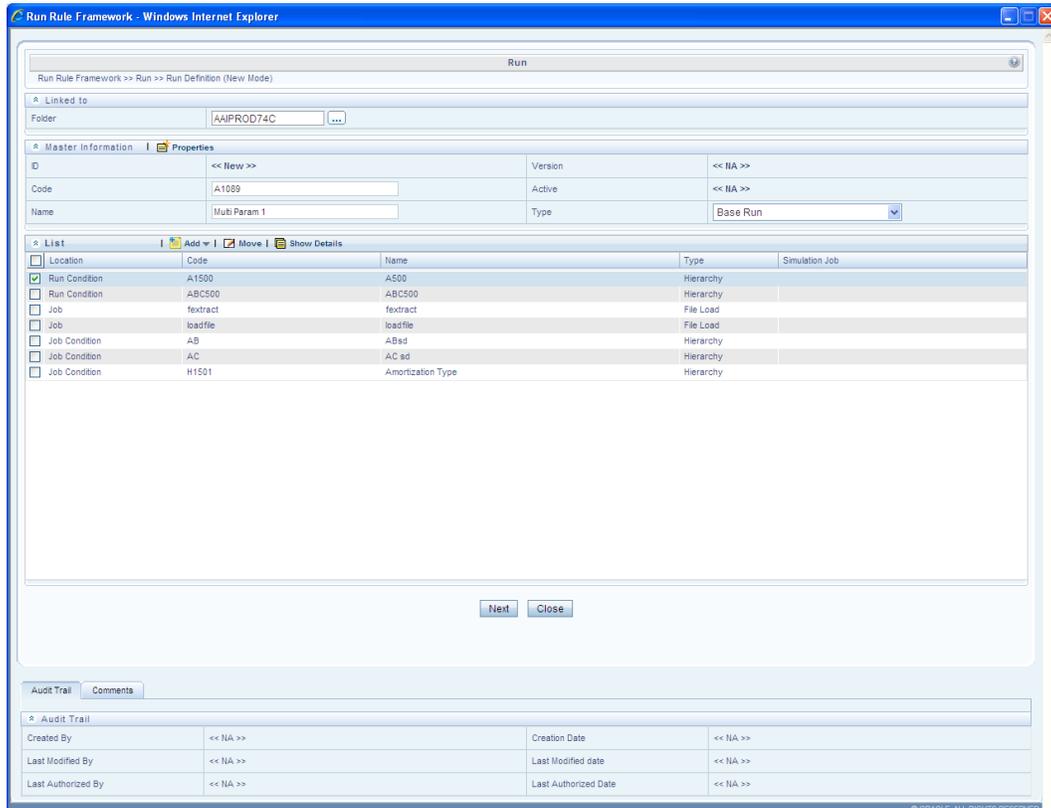
## Create Run

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:

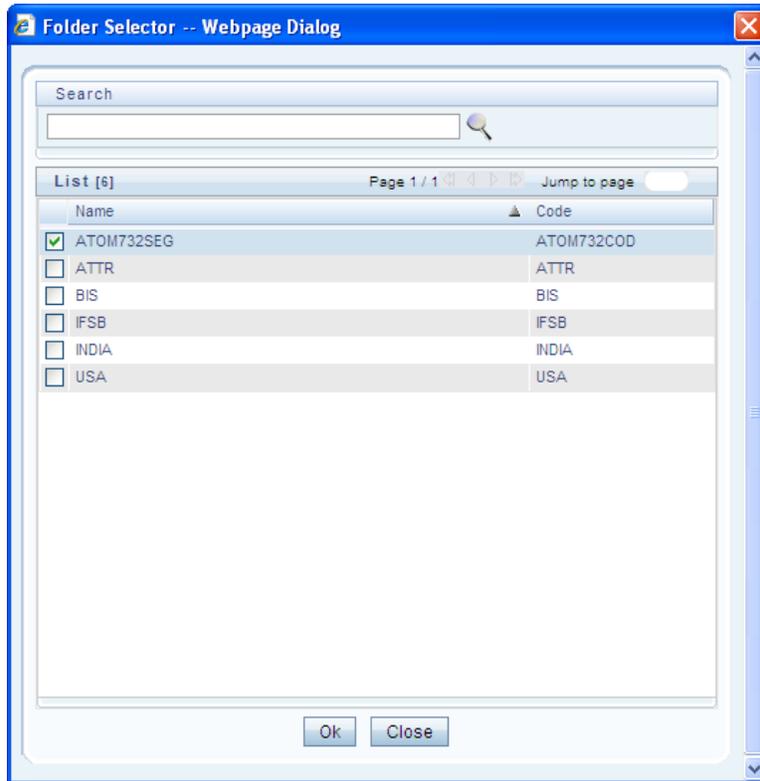
Condition Type	Description
Run Condition	When multiple components are selected, there is likelihood that the components may contain Rules / T2Ts whose target entities are across multiple datasets. When the selected components contain Rules, the target entities (hierarchies) which are common across the 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**.

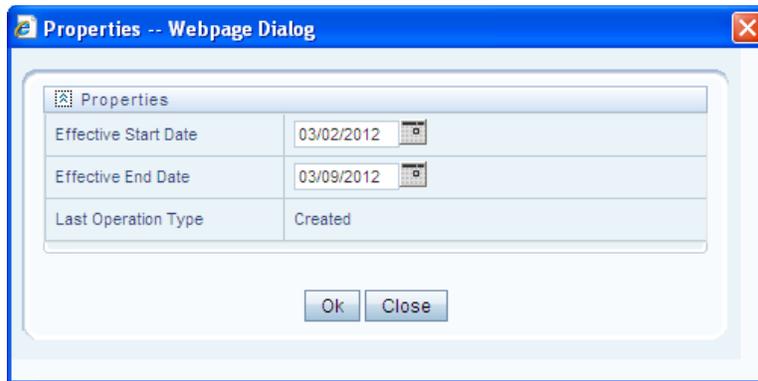
You can also enter a keyword and click  icon in the **Search** field of *Folder Selector* dialog to locate a particular folder. The Pagination option helps you to manage the view of existing Folders within the system.

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. Once 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. Once the Run definition is saved, the status is set to “Yes” if you are an <i>Authorizer</i> creating the Run or “No” if the created Run needs to be Authorized by an <i>Authorizer</i> .

Field Name	Description
Type	Select the type of the Run from the dropdown box either as Base Run or as Simulation Run.

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



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

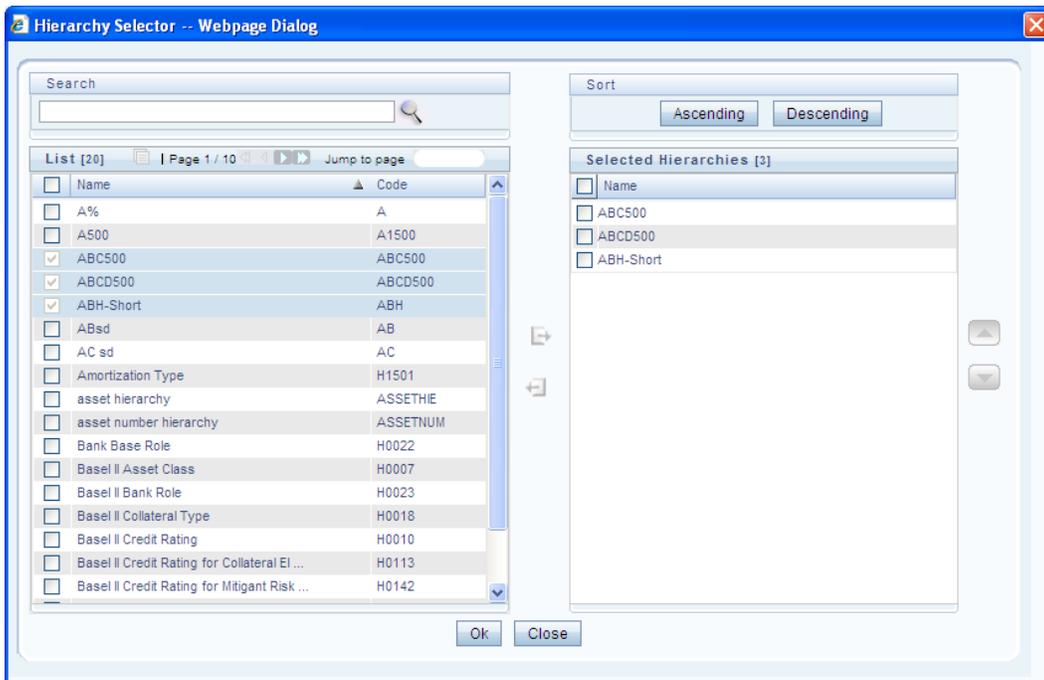
Field Name	Description
Effective Start Date	Select the Effective Start Date by clicking  (Calendar) icon.
Effective End Date	Select the Effective Start Date by clicking  (Calendar) icon.
Last operation Type	By default, this field displays the last change done to the Run definition. While creating a Run, the field displays the operation type as <b>Created</b> .

- 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:

- 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.

1. Select the checkbox(s) adjacent to the members you want to select.
2. Click  to move the selected members to the **Selected Hierarchies** pane.

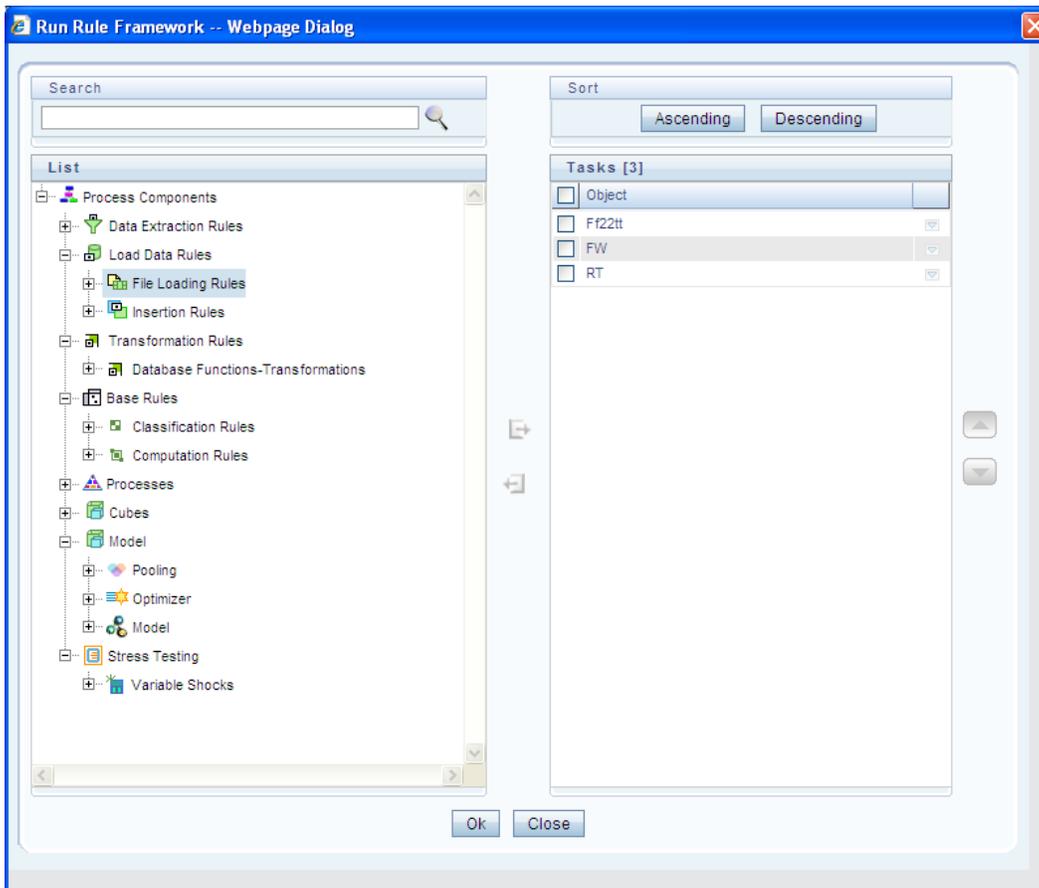
In *Hierarchy Selector* window you can:

- Search for a member by specifying the nearest keyword and clicking  icon.
  - The Pagination option helps you to manage the view of existing Hierarchies within the system.
  - Click  icon to view the details of a selected member.
  - Click **Ascending** or **Descending** icon, to re-arrange the selected list of members.
  - Click  or  icon to move up or move down the selected members.
  - Click  icon to remove selected members from the Selected Hierarchies pane.
3. 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 both Aggregate data and Create Cube components, since those two definitions will have the same unique code.

---

In *Job Selector* window you can also:

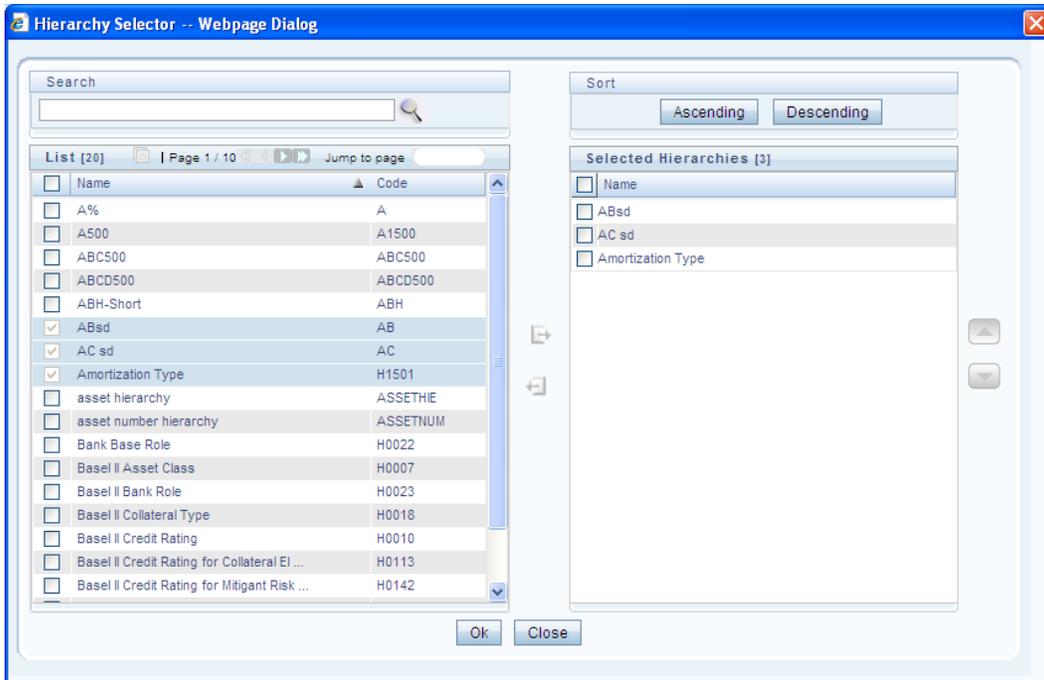
- Search for a component by specifying the nearest keyword and clicking  icon.
- Click Ascending or Descending icon to sort the selected components in Ascending or Descending order.
- Click  or  icon to move up or move down the selected components.
- Click  icon to add parameters for the selected components.
- 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:

- Search for hierarchies by specifying the nearest keyword and clicking  icon.
- The Pagination option helps you to manage the view of existing Hierarchies within the system.
- Click  icon to view the details of a selected Hierarchy.
- Click **Ascending** or **Descending** icon to sort the selected Hierarchies in Ascending or Descending order.
- Click  or  icon to move up or move down the selected Hierarchies.
- 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 both Run & Job conditions.

---

4. Click **OK**. The selected hierarchies are listed in the *Run Definition (New Mode)* window. In the *List* grid you can also:

- Click  icon to move a selected member between Run Condition and Job Condition.
- Click  icon to view the selected member details.

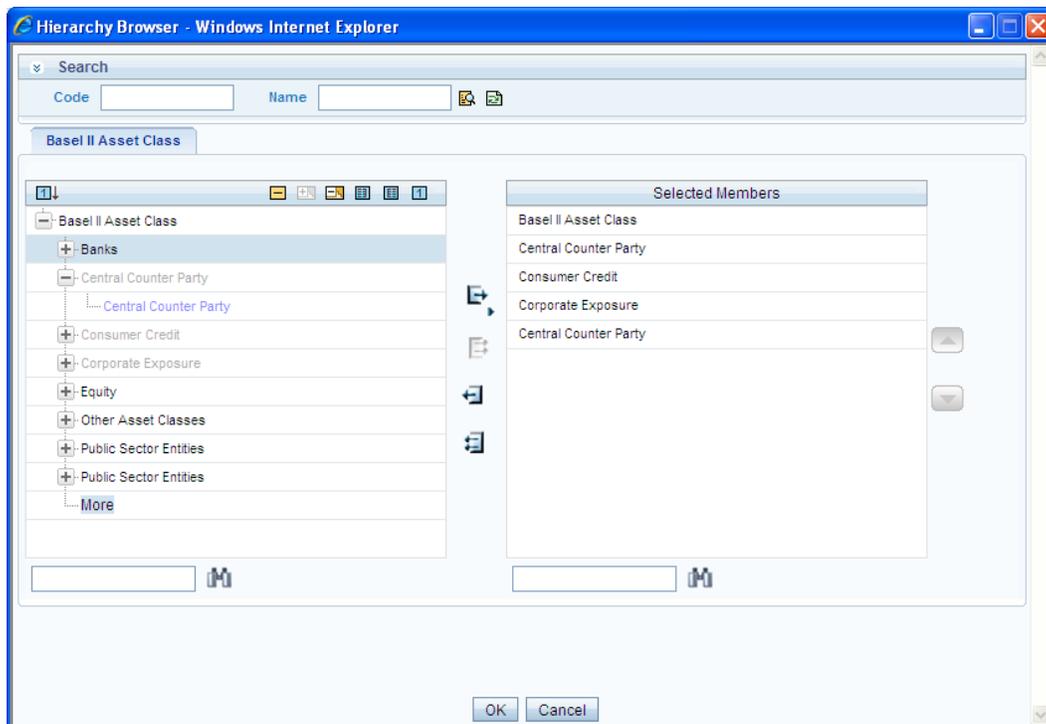
Once all the necessary information in the first window of the *Run Definition (New Mode)* is populated, click **Next** icon to navigate to the concurrent procedures of defining a Rule.

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.

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:

- Click  or  to sort the members by Code or Name.
- Click  or  to expand or collapse the members under a node.
- Click  or  to expand a branch or collapse a branch.

- Click  or  to view the code values of members right or left.
  - Click  or  to show code or show name of the members.
  - Click  or  to move the members up or down in the Selected Members pane.
2. 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.

- Click  icon adjacent to the Job Names to reorder the selected Jobs.
- Select the checkbox in the selected Hierarchy member column to apply the Job condition.
- 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.

Once 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:

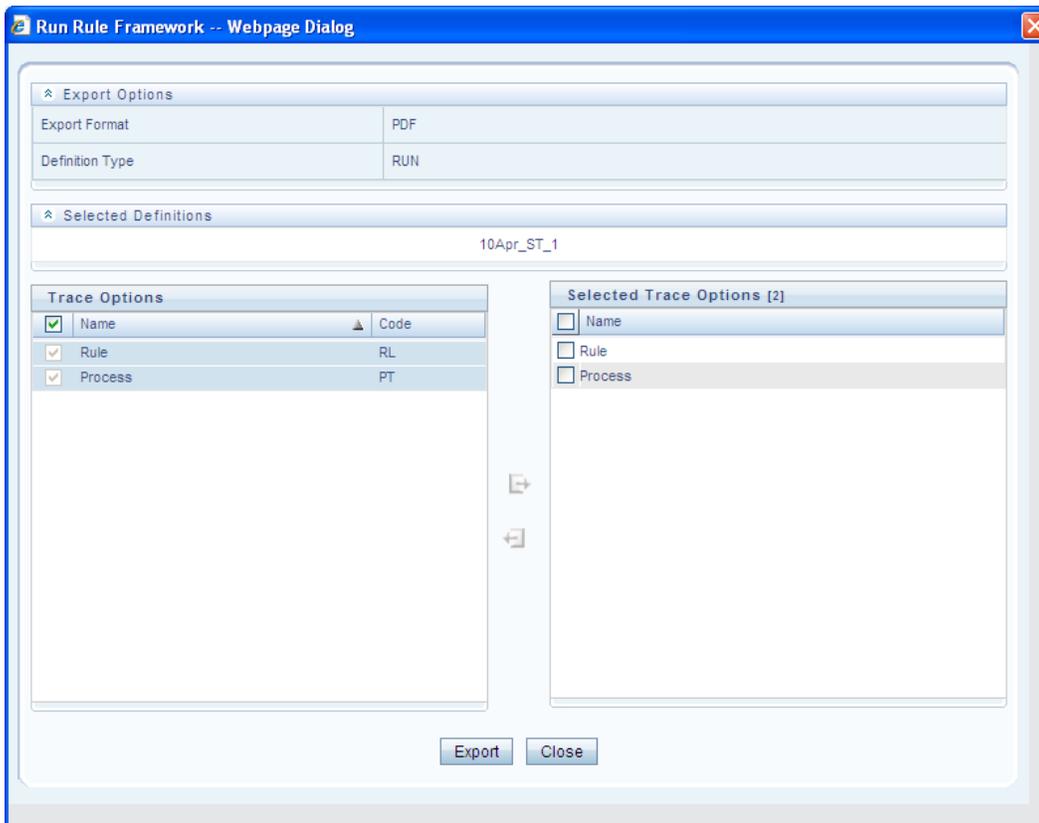
- To Approve the selected Run definitions, click  icon.
- To Reject the selected Run definitions, click  icon.

A Run is made available for use only after the approval. For a rejected definition a comment with the rejection details will be 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:

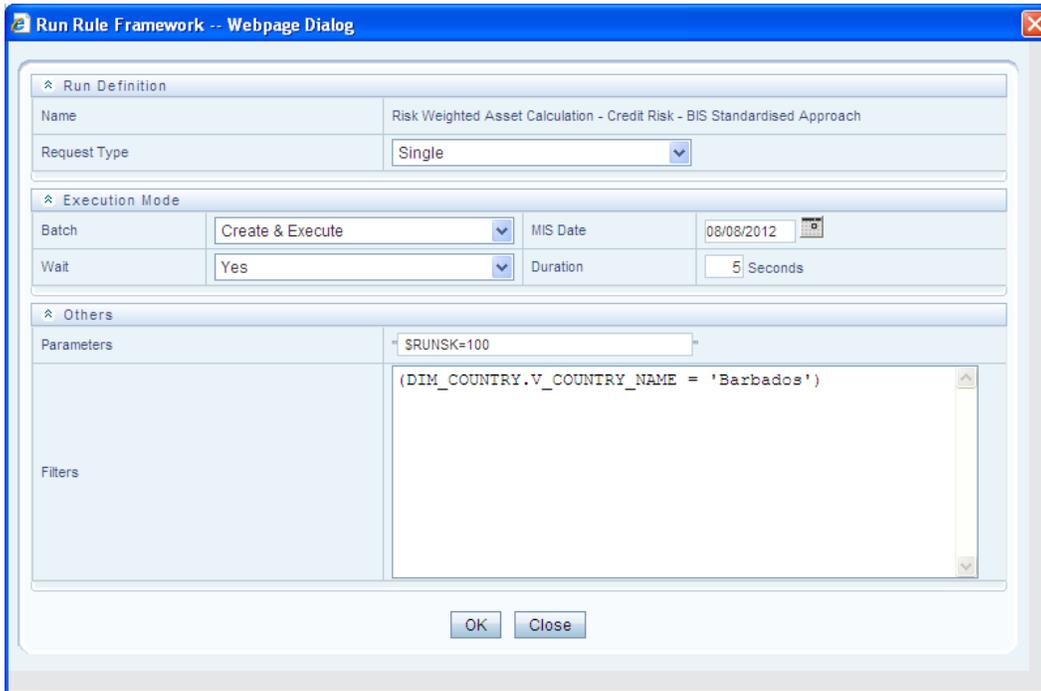
- Select the checkbox(s) adjacent to the available options.
- Click  icon. The selected options are displayed in the Selected Trace Options pane. You can also select a trace option and click  icon to deselect it from the Selected Trace Options pane.

Click **Export**. The process is initiated and is displayed in a pop-up specific to the current download. Once 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 Run:

1. Select the checkbox adjacent to the Run Code which you want to execute.
2. Click  icon in the List toolbar.
3. The *Fire Run* window is displayed.



4. 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 <b>Single</b> or as <b>Multiple</b> from the drop down box. <i>Note: A <b>Single</b> request creates a Batch where as a <b>Multiple</b> request creates Batch group.</i>
Batch	Select the Batch either as Create or as Create & Execute.
MIS Date	Click  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 <b>Multiple</b> with any of the Batch mode or Request Type as <b>Single</b> with Batch mode as <b>Create &amp; Execute</b> .
Wait	Select the Wait value either as <b>Yes</b> or as <b>No</b> . <ul style="list-style-type: none"> <li>Select <b>Yes</b> to provide the Duration in seconds after which the Fire Run status should be displayed.</li> <li>Select <b>No</b> to display the Fire Run status immediately.</li> </ul>
Duration	Enter the duration in seconds after which the Fire Run status should be displayed. <i>Note: This field is displayed only if you have selected the Wait value as <b>Yes</b>.</i>

Field Name	Description
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.

5. Click **OK**. The details are saved and the Run is executed as per the Fire Run details.

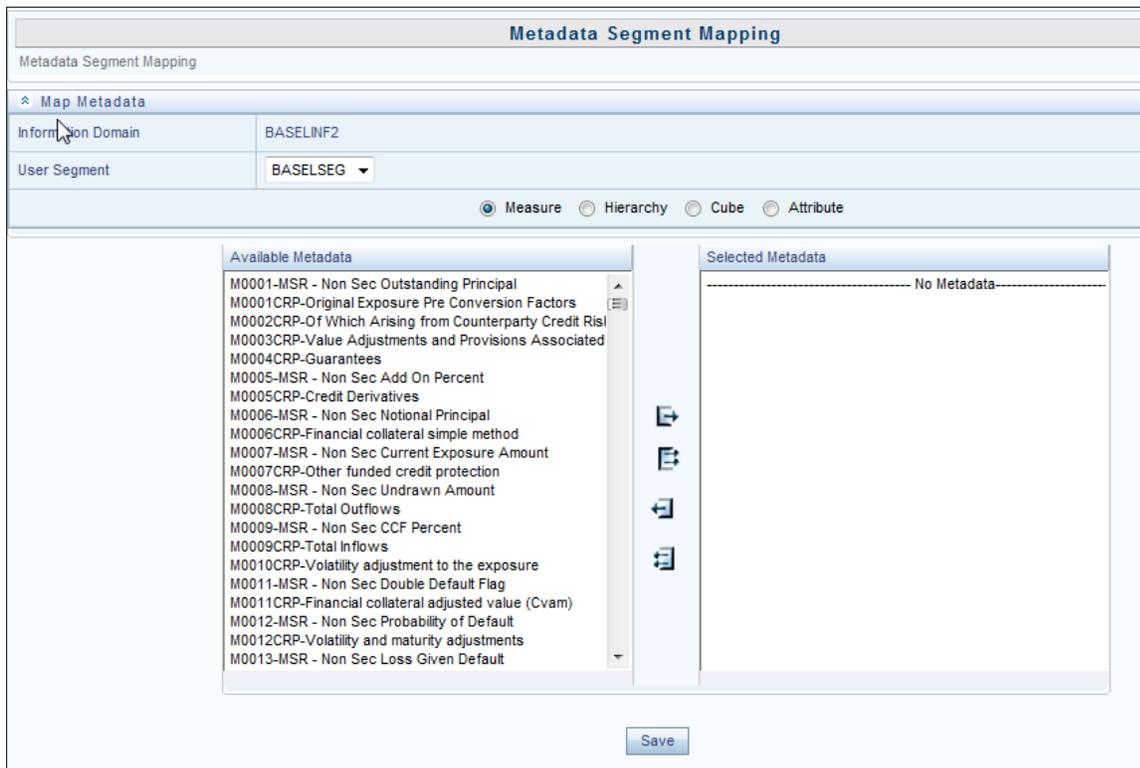
You can remove Run definition(s) which are no longer required in the system by deleting from *Run* window, selecting the Run Codes whose details are to be removed and clicking the  icon.

## 2.5 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 must be mapped to SYSADM function role within the Infrastructure system.

### 2.5.1 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:
  - 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.
  - To map all the listed metadata definitions, click  icon.
  - To remove a metadata mapping, select the metadata from the Selected Metadata list and click  icon.
  - 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.

## 2.6 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, refer to 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.

### 2.6.1 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.

The screenshot shows the 'Metadata Resave' window. At the top, the title bar reads 'Metadata Resave'. Below it, the 'Metadata Details' section shows 'Information Domain' as 'BASELINF2'. There are three radio buttons: 'Hierarchy' (selected), 'Derived Entity', and 'Map'. The main area is divided into two panes: 'Available Metadata' on the left and 'Selected Metadata' on the right. The 'Available Metadata' pane contains a list of metadata items such as 'Hedge In effective Pair', '100 pct RW for Corporates', 'AFC Indicator', 'Actual Business Days', 'Attribution Analysis Rule Change Indicator - Advance Appro', 'Attribution Analysis Rule Change Indicator - Simple Approach', 'Attribution to multiplication factor', 'Automatic Cancellable Facility', 'BCB - Backed by Mortgage', 'BCB - Financial Statement Disclosure Indicator', 'BCB - LTV Ratio', 'BCB - Non Sec OTC Indicator', 'BCB - Residual Maturity Band', 'BCB - Underlying Type', 'Balance Phase In Capital Component Group', 'Bank Base Role', 'Bank Cap Consl Approach', 'Bank Collateral Type', 'Bank Equity Issuer Type', and 'Bank Holds Debt of the Company'. There are three arrow buttons between the panes: a right-pointing arrow, a left-pointing arrow, and a double-headed arrow. At the bottom of the window, there are 'Save' and 'Reset' buttons.

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 by selecting Hierarchy, Derived Entity, or Map. The list of Available Metadata is populated. Do one of the following:

- Select the required metadata from the Available Metadata list and click  icon. You can press Ctrl key for multiple selection.
- To select all the Available Metadata, click  icon.
- You can also deselect a metadata by selecting from the Selected Metadata list and clicking  icon or deselect all the selected metadata by clicking  icon.

2. Click **Save** and update the metadata changes.

Once the details are updated, you can click **Show Details** to view the status. You can also click **Reset** to clear the selection.

## 2.6.2 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:
  - To map batch(s) to the selected UserGroup, select Batch Map checkbox.
  - To map all the batches to the selected UserGroup, click Check All.
  - You can also click Uncheck All to remove all the mapping.
6. Click Save to save the UserGroup-Batch mapping details.

## ***2.7. 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, refer to the *OFS Analytical Applications Infrastructure User Guide*.

## ***2.8. 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, refer to the *OFS Analytical Applications Infrastructure User Guide*.

## Chapter 3 BIS Jurisdiction

Capital Adequacy guidelines as issued in the following regulations have been incorporated in this OFS Financial Services Basel Regulatory Capital Release 6.1.0.0.0:

- 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

- Credit Risk
  - Non Securitization – Standardized Approach
- Capital Structure

### Basel II and Basel III

- [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
- [Market Risk](#)
  - Market Risk – Standardized Approach
  - Market Risk – Internal Model Method (IMM) Approach
- Operational Risk
  - Operational Risk – Basic Indicator Approach
  - Operational Risk – Standardized Approach
  - Operational Risk – Alternate Standardized Approach
- [Capital Structure](#)

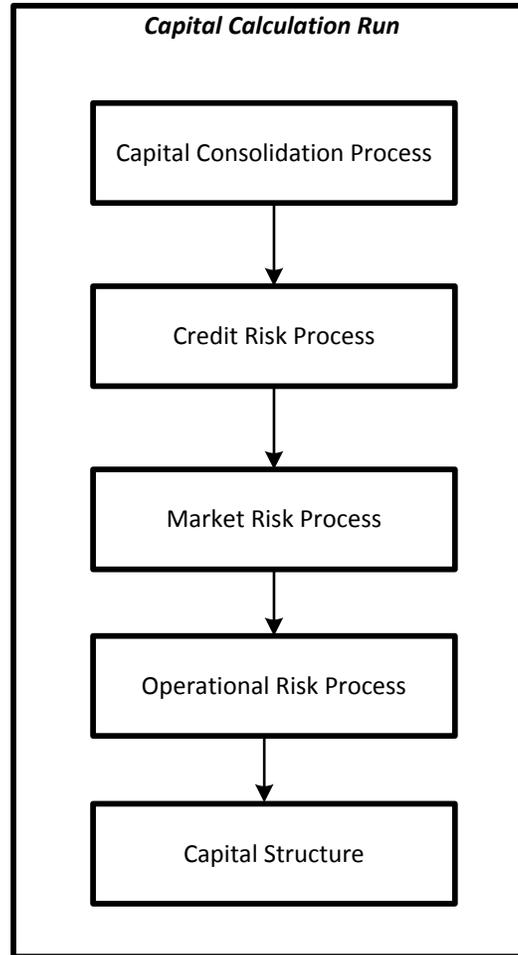
## 3.1. Basel II

### 3.1.1. BIS- 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, refer *OFS Basel Regulatory Capital Run Charts*.

### Process Flow for Capital Adequacy Ratio Calculation



## Capital Calculation Run

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, Market Risk process, and so on, also exist as individual runs which is described in the following sections.

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 may 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.

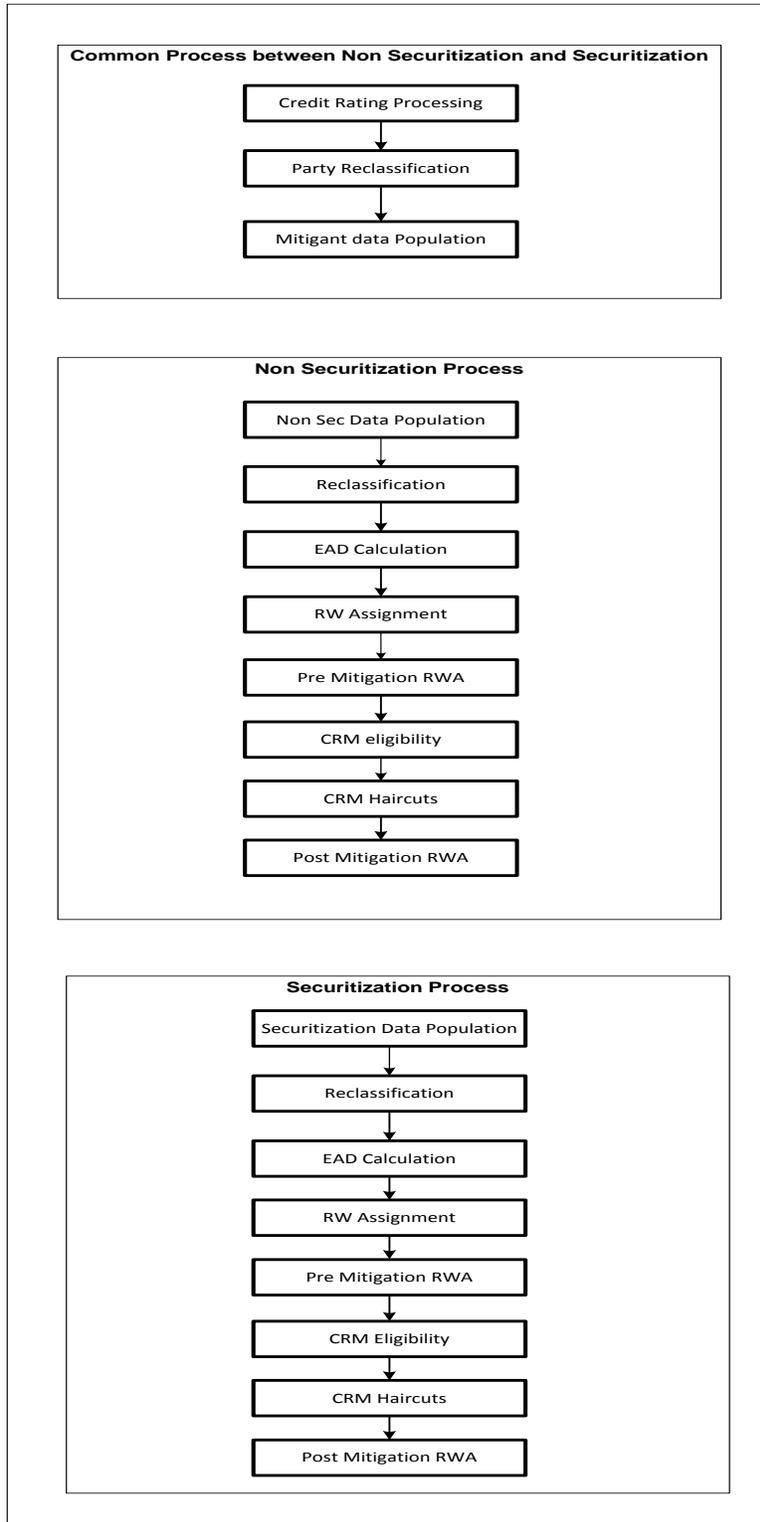
### **Currency Conversion**

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.

## **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 both Non Securitization and Securitization section of this document, it is executed only once under the

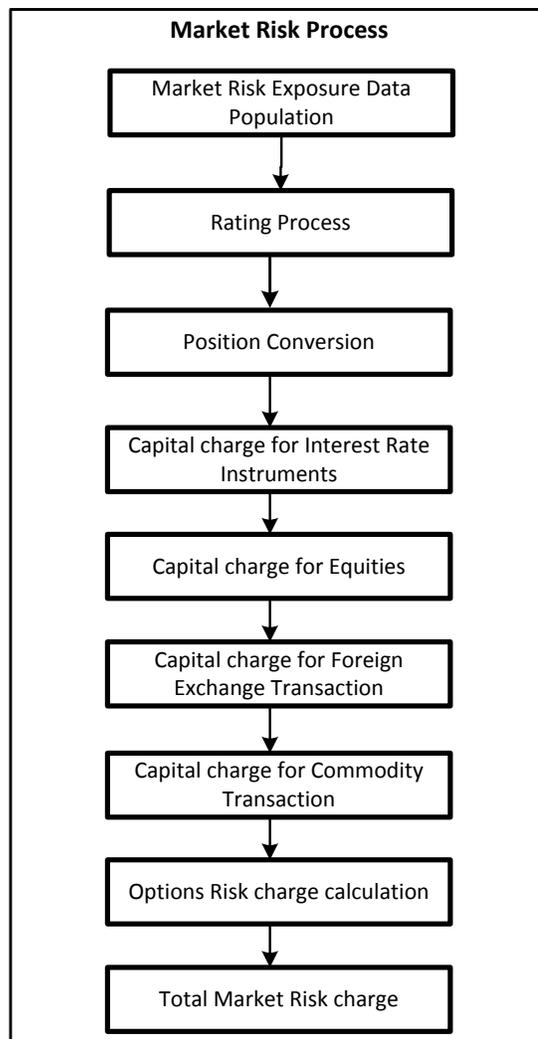
Credit RWA run

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, refer *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.

**Process Flow for Market RWA Calculation**



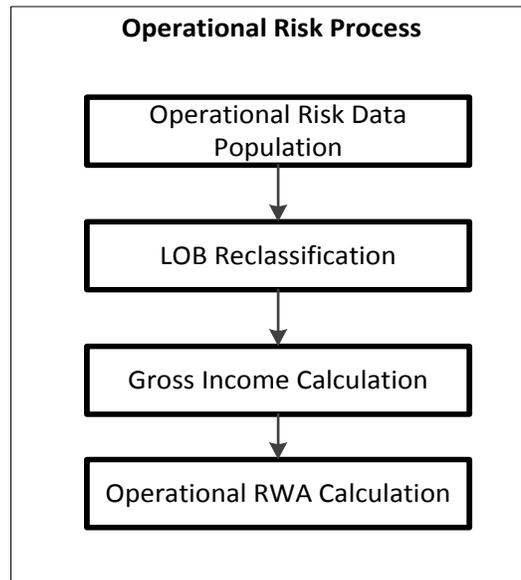
Market RWA Run is made up of multiple sub processes specific to Market Risk. However, when Market Risk is bundled under a Consolidated Run and triggered, Capital Consolidation and Rating process is executed only

once for both 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, refer *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.

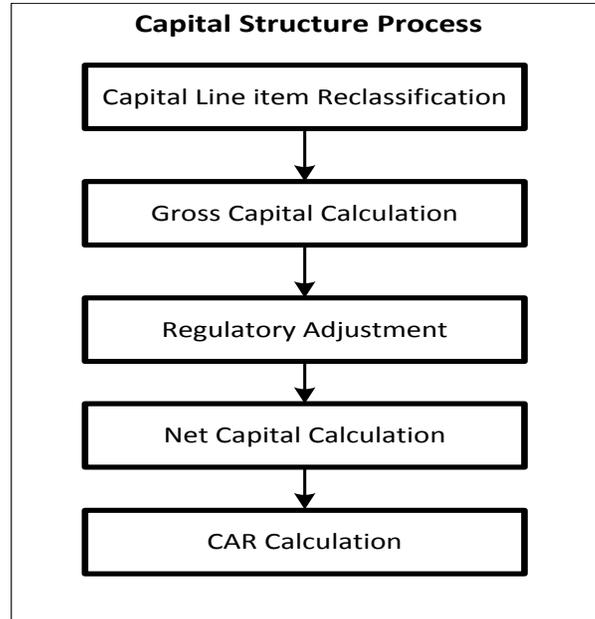
### Process Flow for Operational RWA calculation



Operational RWA run is executed with the [Capital Consolidation](#) process. For more information on the Operational RWA computation, refer *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.

### 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, refer *Capital Structure*.

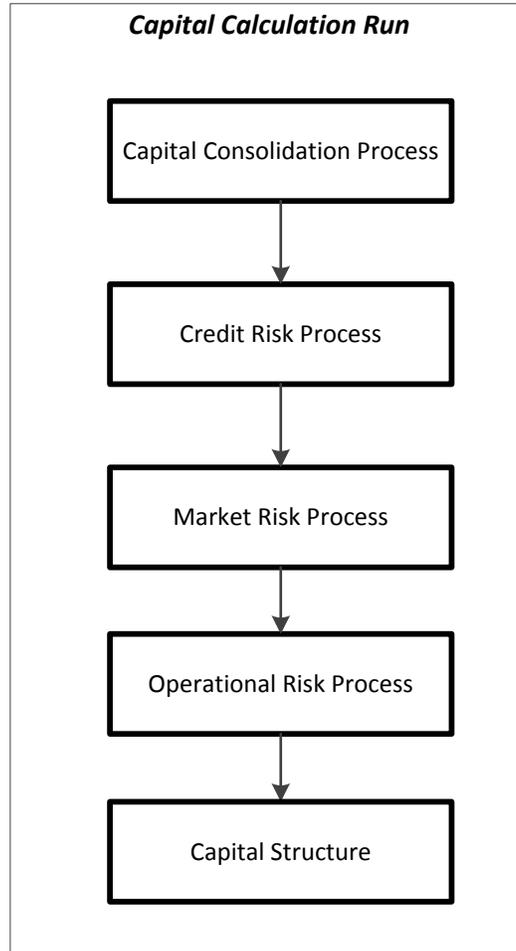
For example: 'Gross Capital Calculation' mentioned in the preceding flow chart is explained in detail under 'Gross Capital Calculation for T1, T2 and T3' sub process section of the Basel II Capital Structure in this document. Likewise 'Regulatory Adjustment' and 'Net Capital Calculation' is detailed 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.

### **3.1.2. BIS – High Level Process Flow- 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, refer *OFS Basel Regulatory Capital Run Charts*.

#### **Process Flow for Capital Adequacy Ratio Calculation**



## **Capital Calculation Run**

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. 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 may 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.

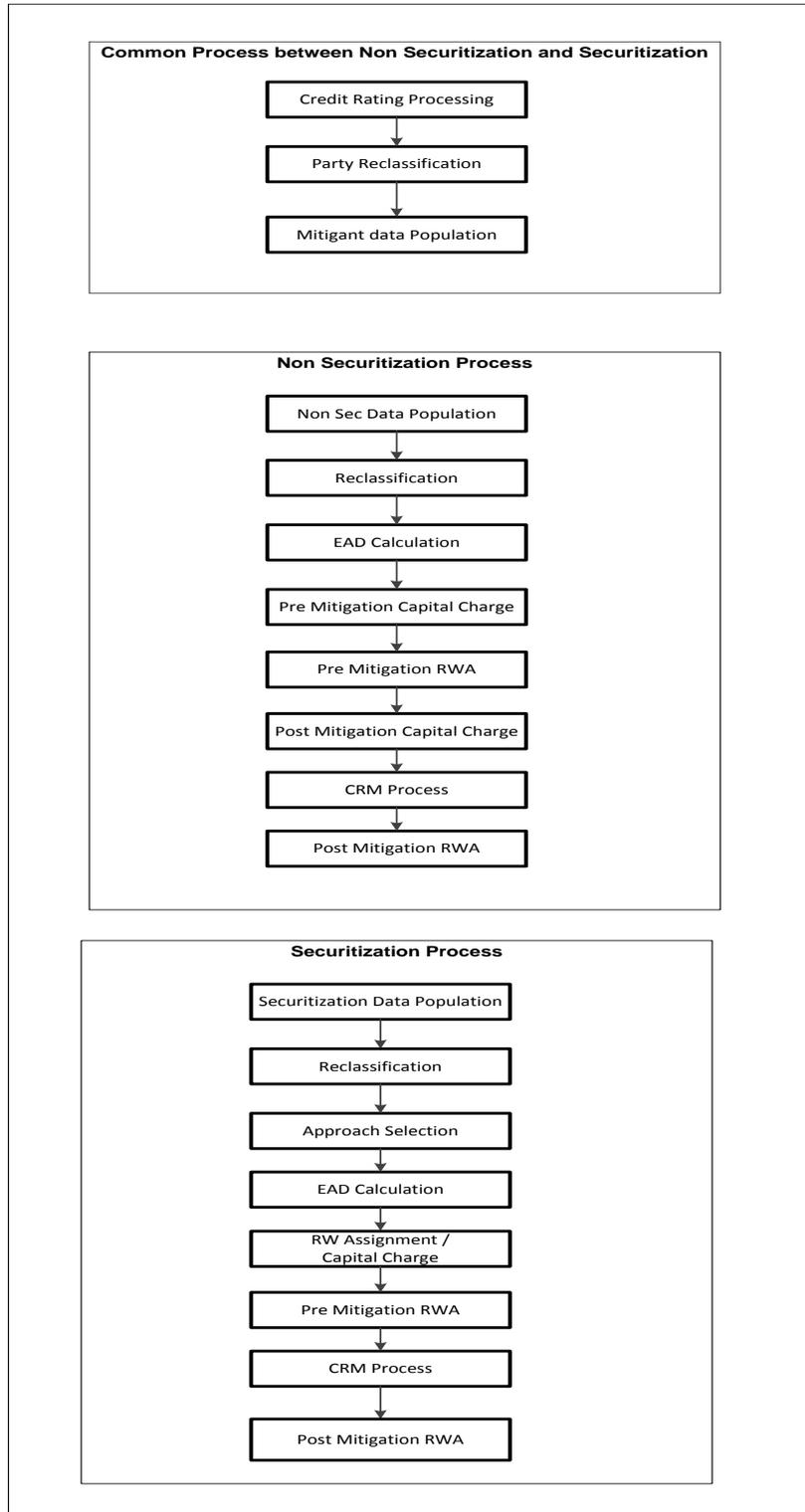
Run Parameter Assignment is also part of **Capital Consolidation** process. The Rule '**Run Definition User Defined Run Param Assignment**' is used to assign the Run parameters if a Run is executed in the RRF. If the Run is executed from the Run Management UI, then the parameters are populated based 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.



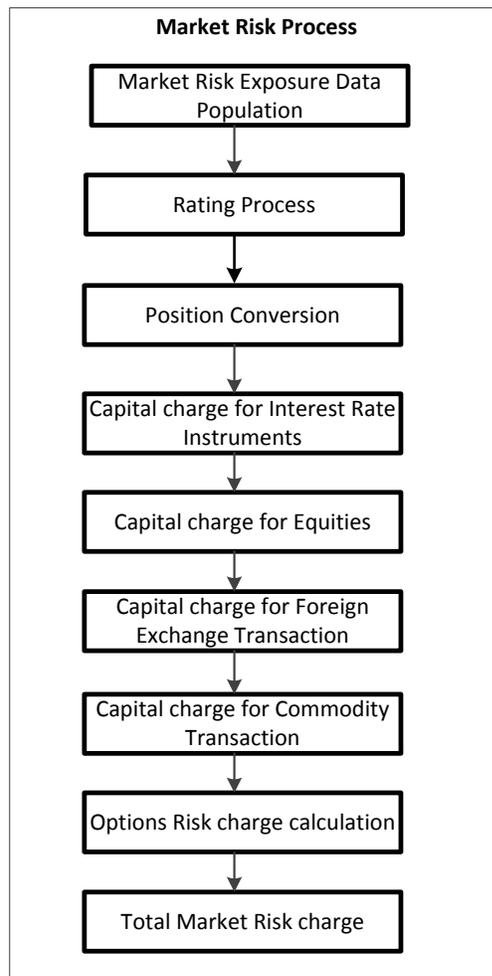
A Credit RWA Run is a combination of the Non Securitization RWA process and Securitization RWA process. A few processes like Credit Rating, Party Type Reclassification, and Mitigant Data Population are common between Non Securitization and Securitization process. Though these sub processes are explained separately under both 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, refer *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.

## Process Flow for Market RWA Calculation



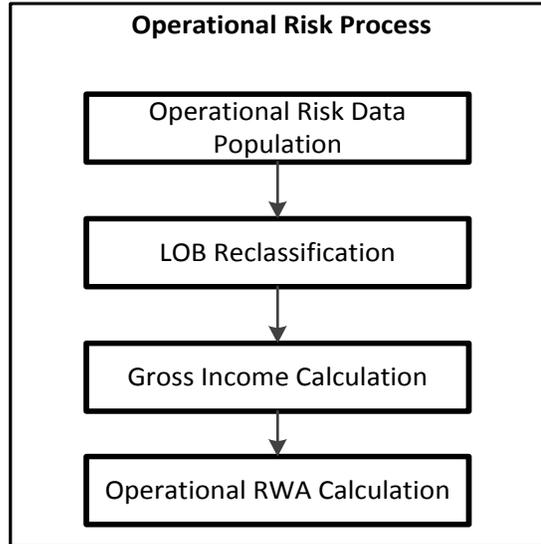
Market RWA Run is made up of multiple sub processes specific to Market Risk. However, when Market Risk is bundled under a Consolidated Run and triggered, Capital Consolidation and Rating process is executed only once for both Credit Risk and Market Risk. The details of each of the sub process mentioned in the preceding flow chart are present under Market Risk section of this document.

For more information on Market RWA computation, refer *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.

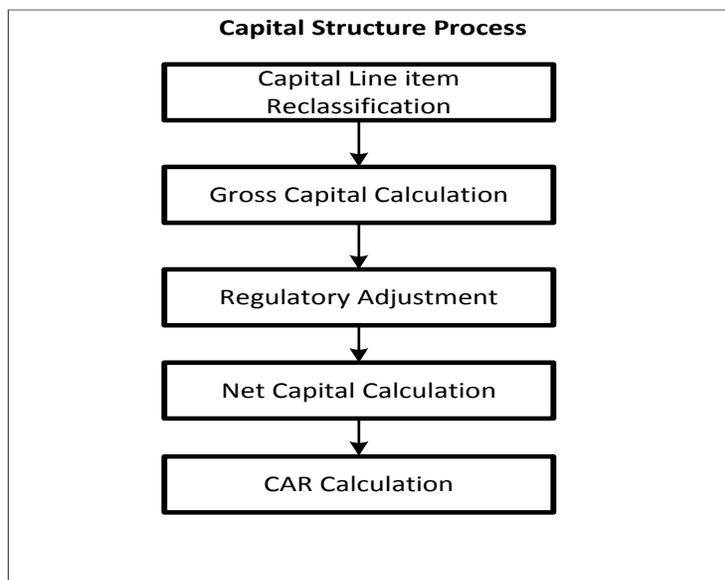
### Process Flow for Operational RWA Calculation



Operational RWA run is executed with the [Capital Consolidation](#) process. For more information on the Operational RWA computation, refer *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.

### 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, refer *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.

### **3.1.3. 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 exposures, the application follows the Standardized Approach, Foundation IRB Approach (FIRB), and Advanced IRB Approach (AIRB).

#### **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.

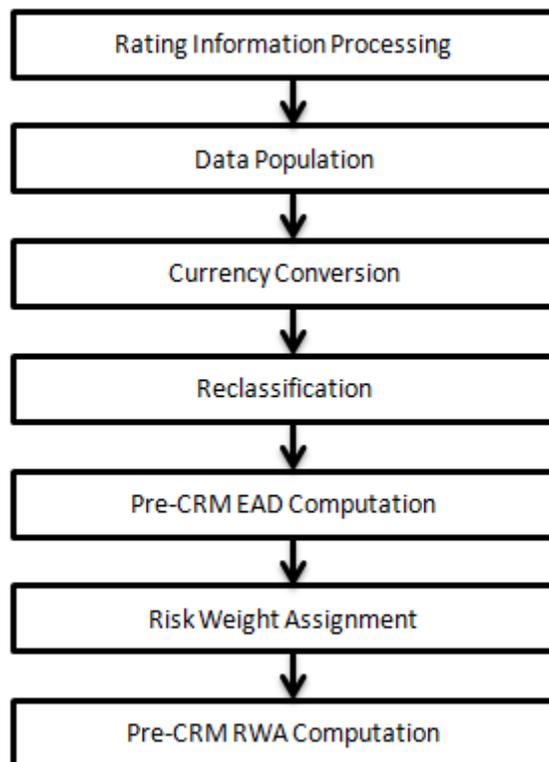
Some exposures may be hedged against credit risk through various mitigants like guarantors, collaterals, credit derivatives, and so on. These provide mitigation to credit risk and should be considered while computing Credit RWA, as per the Basel Accord. Hence, the application calculates both pre-mitigation 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, (except investment exposures in **STG\_INVESTMENTS** table, credit cards in **STG\_CARDS**, and equities in **STG\_EQUITY\_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\_RECLASSIFICATION**) to obtain reclassified rating.

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**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 will be 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
Swaps	STG_SWAPS_CONTRACTS
Futures	STG_FUTURES
Guarantees	STG_GUARANTEES
Investments	STG_INVESTMENTS
Lease Contracts	STG_LEASE_CONTRACTS
Letters of Credit	STG_LC_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_EQUITY_EXPOSURES
Underlying exposures for repo contracts along with some securitization exposures' underlying	STG_UNDERLYING_EXPOSURES
Credit Derivatives	STG_CREDIT_DERIVATIVES

#### 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, refer to 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:

$$\text{Exposure Amount} \times \text{Share Holding Percent} = \text{Updated Exposure Amount}$$

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:

- 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, refer Exhibit 4 in *Annexure A: Key Concepts*.

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**NOTE:** The data populated in the Product Processor is expected in natural currency of the exposure.

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- **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 both 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.

- **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**

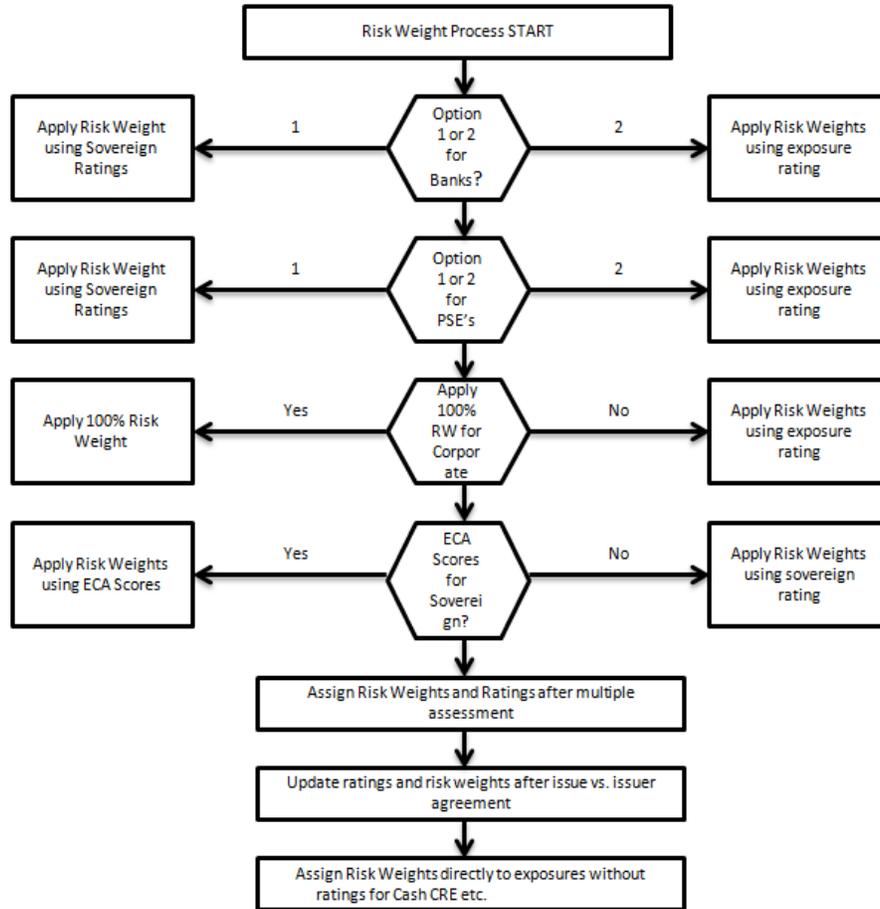
- **Risk Weight Assignment**

- **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 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. 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 will be assigned a risk weight which will be the worst of the best two risk weight. And the corresponding rating will be assigned to the exposure.

For more information on setting up this Rule, refer *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 may 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.

***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.

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**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.

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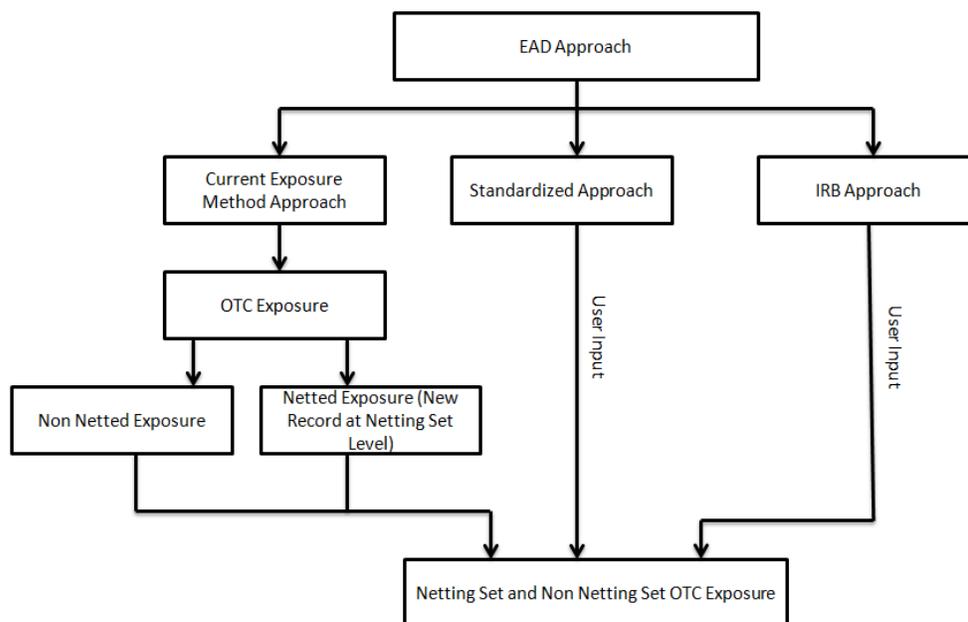
The application's treatment for the instrument with CCR is divided into three categories:

- Exposure at Default (EAD)
- Risk Weighted Asset (RWA)
- Credit Risk Mitigation (CRM)

**Process Flow for Over the Counter Derivatives – EAD Approach**

- **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 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 Set Records and Non Netting Set 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 sets 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 set 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 set and then populates into the OTC Exposure table. It selects all the records with the following attributes which are similar to computing the netting set 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 set 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.

### **Key Data Elements**

Key data elements that need 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 set, the nettability flag should be set as 'Y'.  
Instruments with the same agreement code are netted in the same netting set. The application handles both 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:

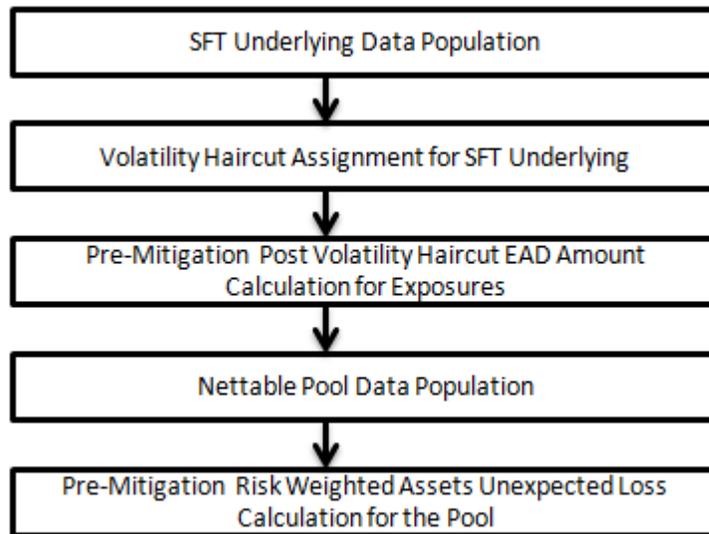
- Collateral Haircut Approach
- Simple VaR Approach

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**.



A comprehensive explanation of the process flow is as follows:

- **SFT Underlying Data Population:**

The two data elements present in SFT transactions are as follows:

Firstly, the parent transaction is captured and second 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.

- **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.

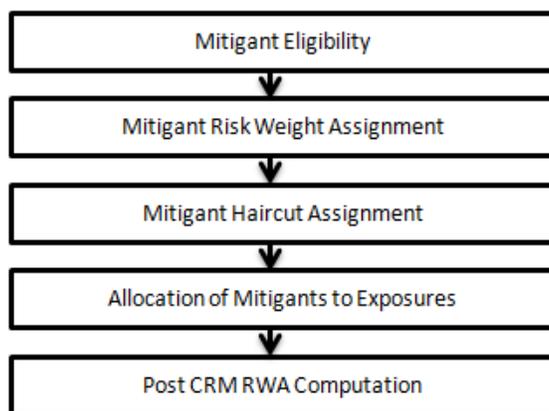
- **Pre-Mitigation Risk Weighted Assets Unexpected Loss Calculation for the Pool:**

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, refer Exhibit 2 and Exhibit 3 in *Annexure A: Key Concepts*.

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**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 will be disabled by default, due to which the following warning appears which will be 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.

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- **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 will be 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.

## Non Securitization - Foundation IRB/Advanced IRB Approach

Foundation IRB/Advanced IRB Approach consists of the following:

- Banking Book Products
- Over the Counter Derivative Products: Refer to [Over the Counter Derivatives](#) in Standardized Approach section.
- Securities Financing Transactions: Refer to [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 may 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 both pre-mitigation RWA amount and post-mitigation RWA amount.

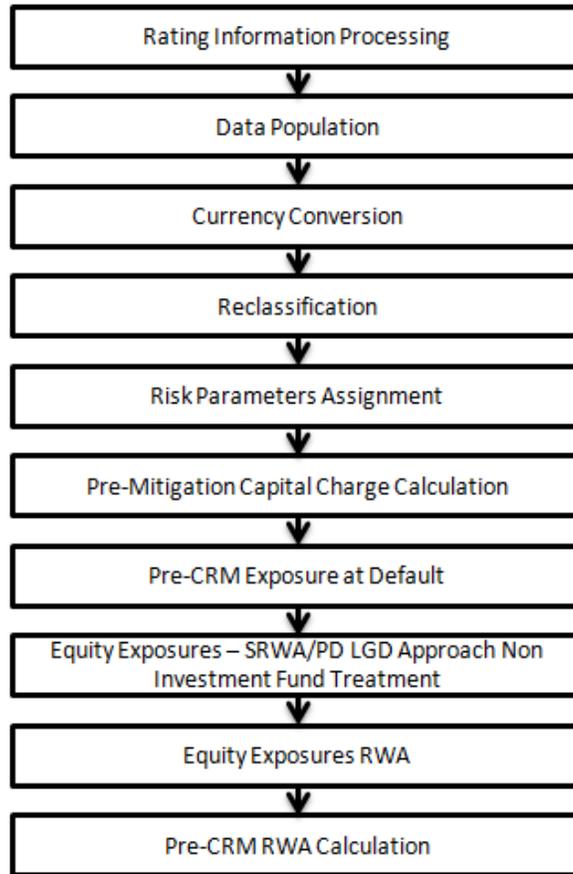
The application calculates the correlation factor using the formula specified for each asset class. Using this Correlation Factor, Probability of Default (PD), and Loss Given Default (LGD), the application calculates the pre-mitigation capital charge for each exposure. This value signifies the capital 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, (except investment exposures in **STG\_INVESTMENTS** table, credit cards in **STG\_CARDS**, and equities in **STG\_EQUITY\_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 will be 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
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_EQUITY_EXPOSURES
Underlying exposures for repo contracts along with some securitization exposures' underlying	STG_UNDERLYING_EXPOSURES
Credit Derivatives	STG_CREDIT_DERIVATIVES

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:

$$\text{Exposure Amount} \times \text{Share Holding Percent} = \text{Updated Exposure Amount}$$

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:**

For more information refer to the [Currency Conversion](#) in the Standardized Approach section.

- **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 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 assessment. These multiple assessment of ratings are 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 will be assigned a risk weight which will be the worst of the best two risk weight. And the corresponding rating will be assigned to the exposure.

For more information on setting up this Rule, refer *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 may 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:

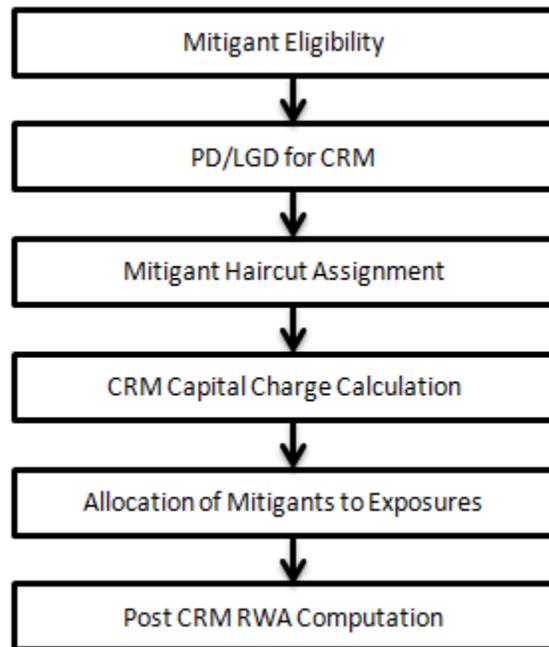
- Exposure Accrued Interest
- Off-Balance Sheet Drawn CCF Percent
- Write Off Amount

- 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.

**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 need to 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 both 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, refer Exhibit 1 and Exhibit 3 in *Annexure A: Key Concepts*.

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**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 will be disabled by default due to which a warning appears as follows, which will be 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 will be 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.

## Securitization

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 as well as some portion of securitized exposures. The application is capable of handling both securitized exposures as well as re-securitized exposures. It also handles the calculation for the originator as well as the investor bank roles. At a broad level, there are two categories of Investors:

- An Investing Bank who has invested heavily in securitization:
  - These investors are prepared to provide the entire details of the securitization transaction
  - To cater to these investor needs, the entire pool, entire or invested tranche details, and the invested exposures information are required to be provided by the bank. This information is captured in the pool, tranche, and exposures table.
- An Investing Bank who has invested minimal in securitization:
  - These investors are prepared to provide the necessary inputs required for the calculation of the capital charge pertaining to their invested exposure.
  - To cater to these investor needs, the invested exposures information is required to be provided as an input by the bank. A few pool and tranche attributes required for the computation are also to be provided as an input by the bank in the Stage Securitization Exposure (STG\_SEC\_EXPSOURE) table.

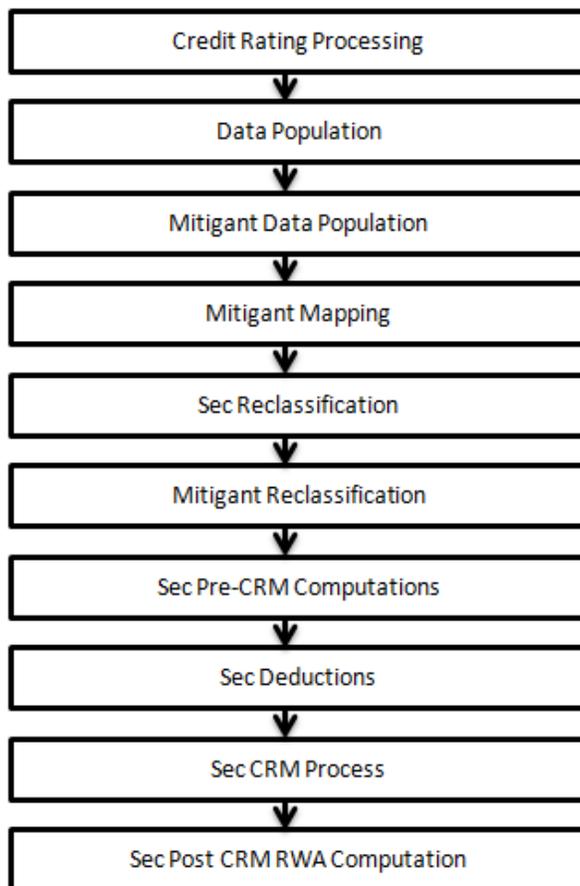
The Basel Accord specifies two broad approaches for the calculation of the capital charge for the Securitization exposures:

- Standardized Approach
- IRB Approach
  - Ratings Based Approach
  - Internal Assessment Approach
  - Supervisory Formula approach

Both 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 Basel II standardized approach, Basel II FIRB approach, and Basel II 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). For the reporting bank providing only exposure level information, the application expects a few pool level and tranche level parameters to be provided in the Securitization Tranche in the Stage Securitization Exposure (**STG\_SEC\_EXPOSURE**) table. 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 has been handled in the process **MITIGANT\_DATA\_POPULATION** and Exposure Mitigant Mapping Population has been 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 will be 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 as well as 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:

<b>Data Transformation Name</b>	<b>Objective</b>	<b>Processing Logic</b>
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 will be

Data Transformation Name	Objective	Processing Logic
		minimum defaulted position in the basket minus 1. Also other credit derivative in the basket of exposures which are having the defaulted position consecutively will become eligible. For each eligible mitigant, the exposure mitigant mapping wherein the exposure has the least risk weight or capital charge will become eligible. All other exposure mitigant mapping for that mitigant will be 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.

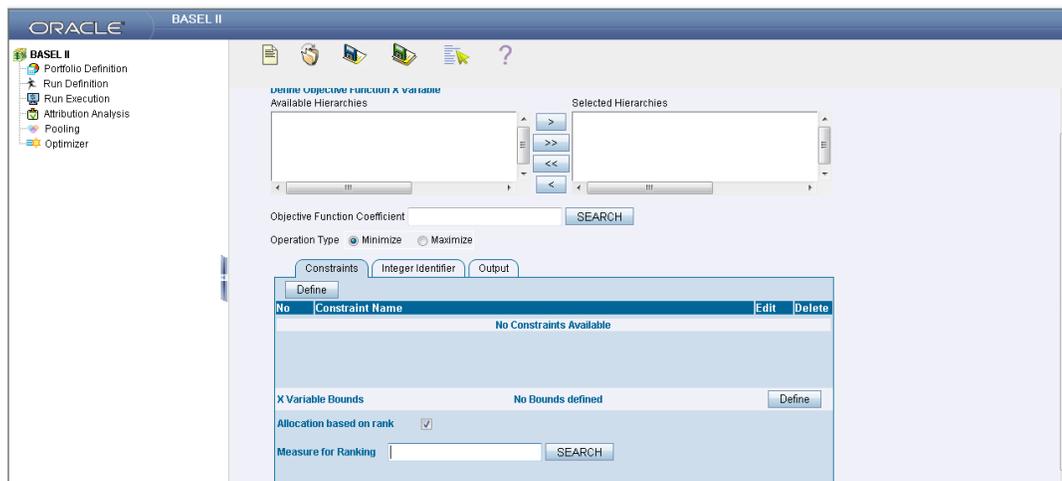
- Allocation of Mitigants to Exposures:

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 Securitization 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, refer 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 has to be assigned to the exposures. The treatment pertaining to single exposure mapped to multiple mitigants have to be 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:**

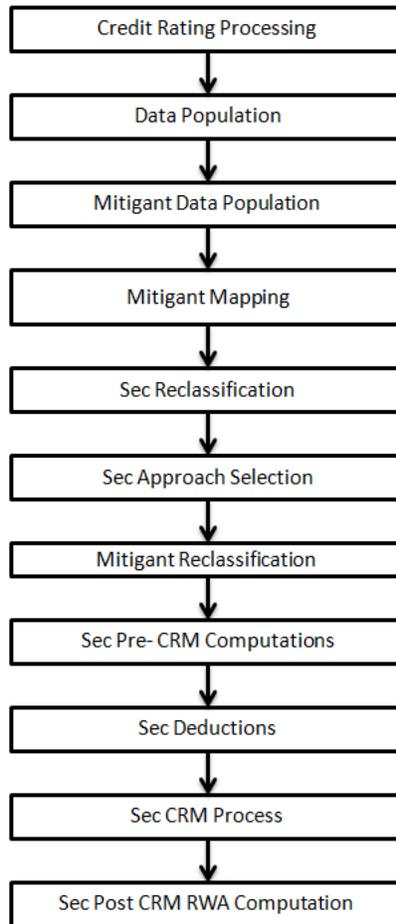
The application computes the covered amount and the uncovered amount for the exposures. The covered amount is computed by multiplying the covered factor with the exposure amount, and to this covered amount, the application assigns the mitigant risk weight. The product of the covered amount and the mitigant 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.

$$\text{Post-CRM RWA} = \text{Covered Amount} * \text{Risk Weight of the Mitigant} \\ + \text{Uncovered Amount} * \text{Risk Weight of the Exposure}$$

This logic is handled in **Sec Post-CRM RWA computation** sub process.

**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). For a reporting bank providing only the exposure level information, a few pool level and tranche level parameters, which are required for further processing, are to be provided as an input in the Stage Securitization Exposure (**STG\_SEC\_EXPOSURE**) tables. 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.

- **Pre-CRM EAD Computation**

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.

- **Risk Weight Assignment**

*Ratings Based Approach*

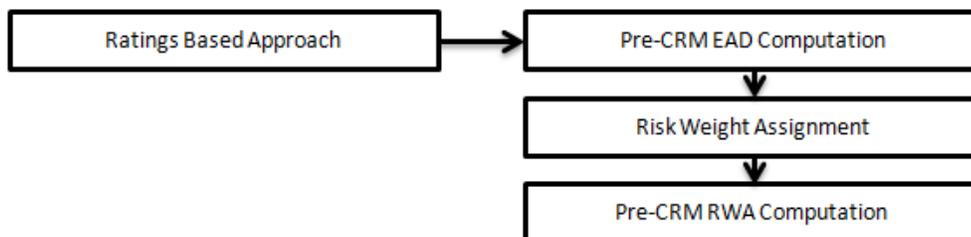
For exposures that follow the ratings based approach, the risk weight assignment is similar to the standardized approach, except for the difference on the criteria used for risk weighting. The application uses the granularity of the pool, seniority position of the exposure, and the credit rating of the 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 will be assigned a standard rating which will correspond to the worst of the best two risk weights associated with the various tranche ratings.

Based on all the above 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 will never 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.

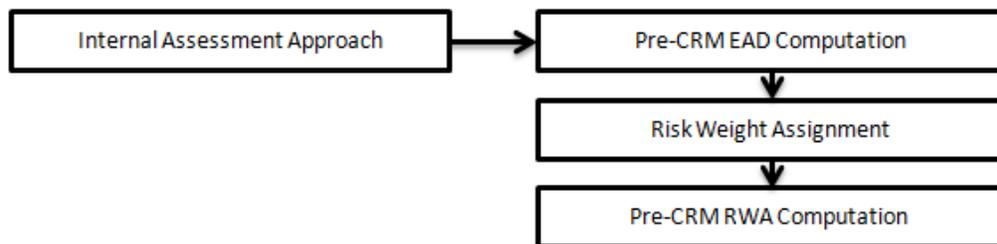
This is handled in the **Pre-CRM Computations** sub-process.



*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 (KIRB), 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 KIRB, the exposures are deducted from the capital. The exposures for which the credit enhancement level is more than that of the KIRB, the exposures have the SFA Parameters 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 are straddled, 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.

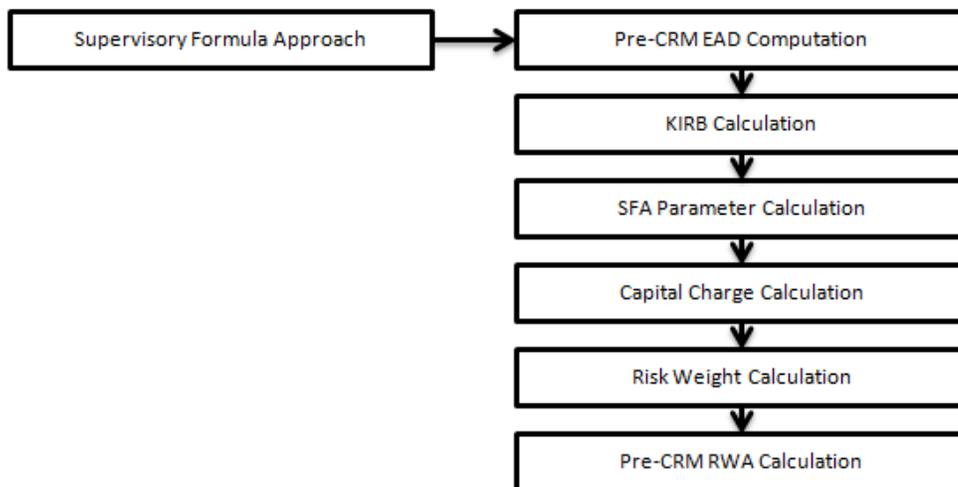
The application populates straddled tranche information into Securitization Straddled Tranche (**FSI\_SEC\_STRADDLED\_TRANCHE**) table. The application splits each of the exposures of the identified straddled tranche, into two. The account skye of the parent exposure, which is undergoing the split, is added as the parent account key for the new exposures formed. The straddled tranche deduction amount (the KIRB 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	Cases where $L < KIRB < (L+T)$ , the position is split into two position, where

Data Transformation Name	Objective	Processing Logic
	position belonging to straddling qualifying tranche into two positions (senior and junior) and treat them as per regulator guidelines.	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 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 Securitised 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 as well as 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 will be minimum defaulted position in the basket minus 1. Also other credit derivative in the basket of exposures which are having the defaulted position consecutively will become eligible. For each eligible mitigant, the exposure mitigant mapping wherein the exposure has the least risk weight or capital charge will become eligible. All other exposure mitigant mapping for that mitigant will be 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.

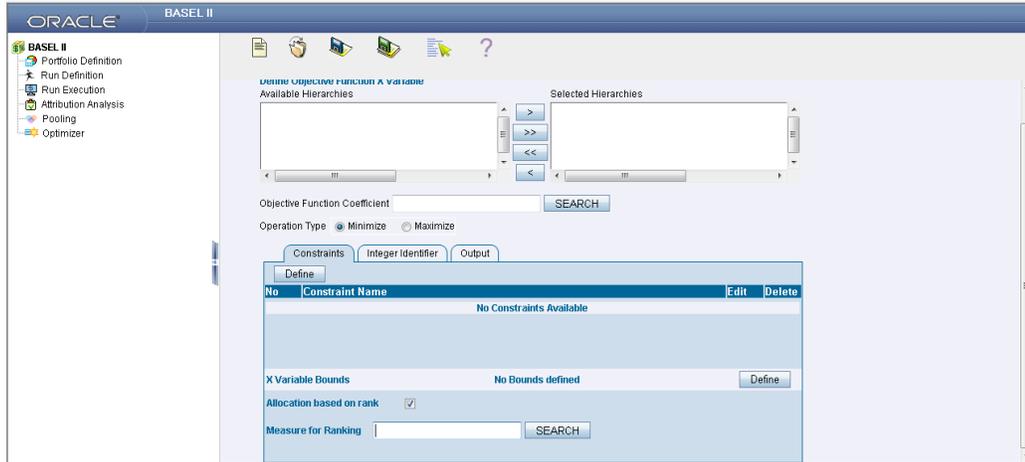
The application populates an uncovered mitigant for each exposure in the **FCT\_SEC\_EXPOSURES** table. This uncovered mitigant has same features as that of the exposure and are created in the **FCT\_MITIGANTS** table

- 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 will be 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, refer 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 has to be 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.

$\text{Post-CRM RWA} = \text{Covered Amount} * \text{Risk Weight of the Mitigant} \\ + \text{Uncovered Amount} * \text{Risk Weight of the Exposure}$
--

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 (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

#### ***Mitigant Eligibility (Standardized Approach)***

- Eligible Mutual Fund Indicator, Main Index Equity Indicator, and Equity Traded Indicator

#### ***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

#### ***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.

### **3.1.4. 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

#### **Standardized Approach**

In standardized approach (STD Approach) the Market Risk Capital Charge need to be 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 - 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.

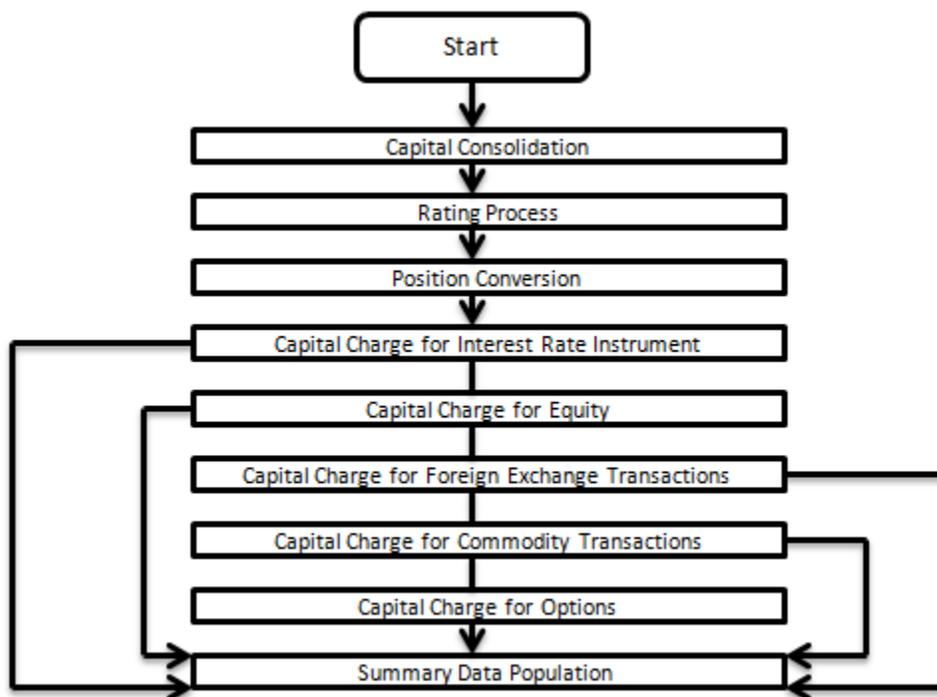
- Interest Rate Curve Data
- Market prices of the instruments
- Bank positions

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**

- **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

- **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:
  - 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
- 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 will be 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 will be converted to two child positions which will be in zero specific risk securities. The exposure amount for each of these positions will be 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

#### Commodity Derivatives

- Commodity Forward
- Commodity Future
- Commodity Swap
- Gold Forward

#### Credit Derivatives

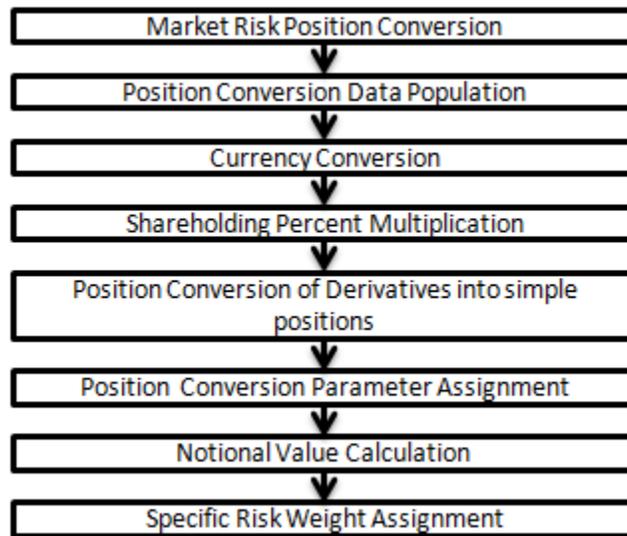
- Credit Default Swap
- Total Rate of Return Swap
- Cash Funded Credit Linked Notes
- First and Second-to-Default Basket Credit Derivatives

#### 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
  - Puttable 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 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 refer 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 refer 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 refer 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 refer 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 refer 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 refer the following:***

*Process:* MKT\_RISK\_POSITION\_CONVERSION

*Sub-process:*

- Mkt Risk Specific Risk IR Assignment
- Market Risk CD Underlying Specific Risk

There is some dependency on different instrument types, like exotic options which may 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 may 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 above 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 will have positions exactly opposite to the one given in the preceding example, that is, the long position will become short and short position will become long, with the value, maturity, and coupon remaining the same.

Taking the preceding example into consideration, it should be noted that the actual discount rates for discounting the notional values of the two legs, will be 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% has been considered in the preceding example. Taking the preceding example into consideration, the steps processed in the application are as follows:

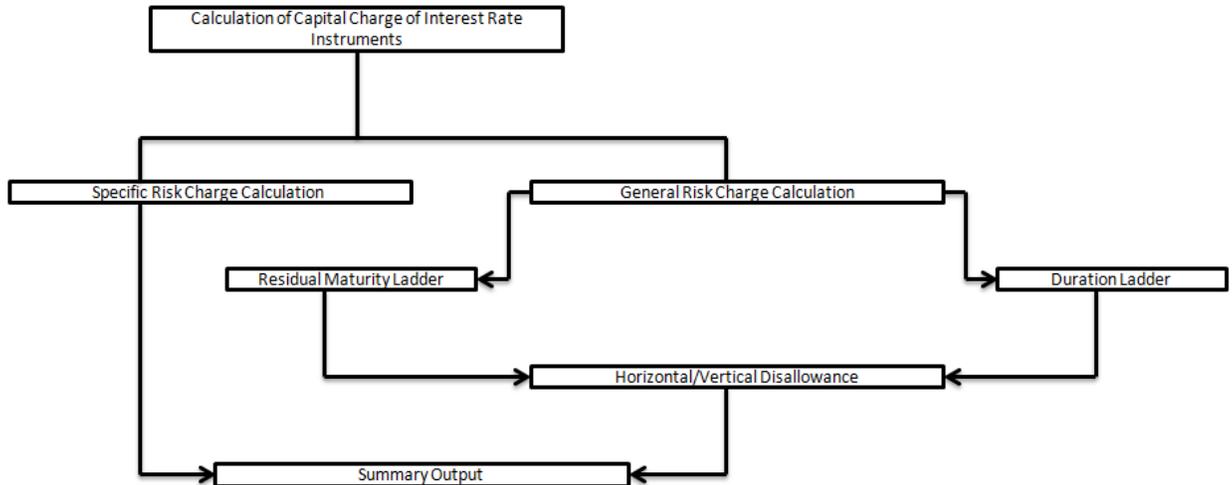
1. The FRA as a contract is captured in the contract record details table with the banks position in the contract in the position table. The application also captures the position mapping table for the above instrument type which will be used for position conversion under data population as detailed in the high level Market Risk process flow. 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.

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. Once 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 refer 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 refer 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 refer 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 both 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'.
3. 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'.
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, further 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 Basel accord for Maturity and Duration approach as applicable.

***For more information on processes and sub processes that compute this refer 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 refer the following:***

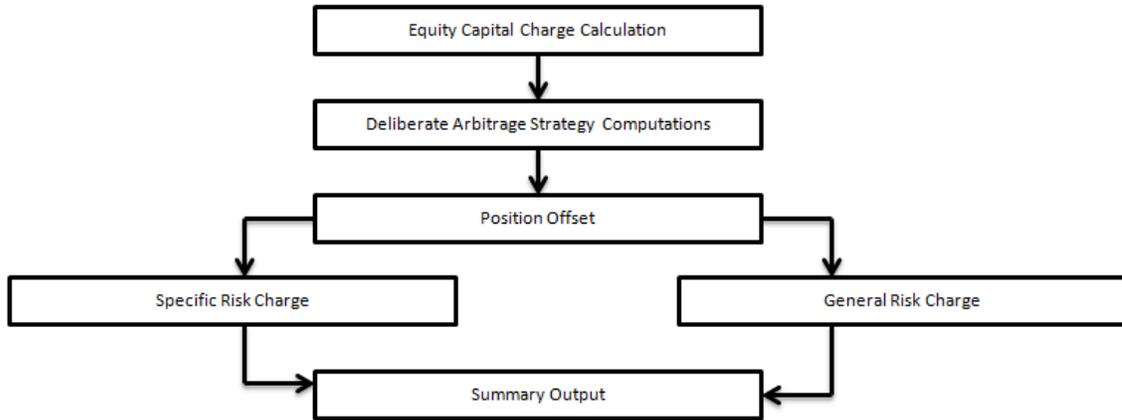
*Process:* MKT\_RISK\_STD\_APPROACH

*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 refer 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 refer 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 refer 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 refer 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 refer the following:***

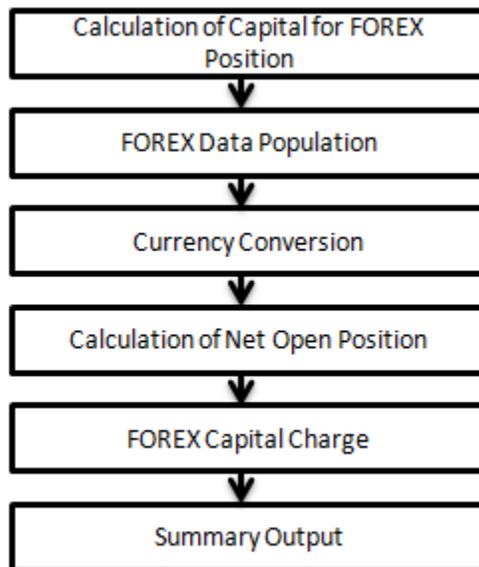
*Process:* MKT\_RISK\_STD\_APPROACH

*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 refer 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 refer 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 refer 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\_Chrg\_FOREX'.

*For more information on processes and sub processes that compute this refer 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.

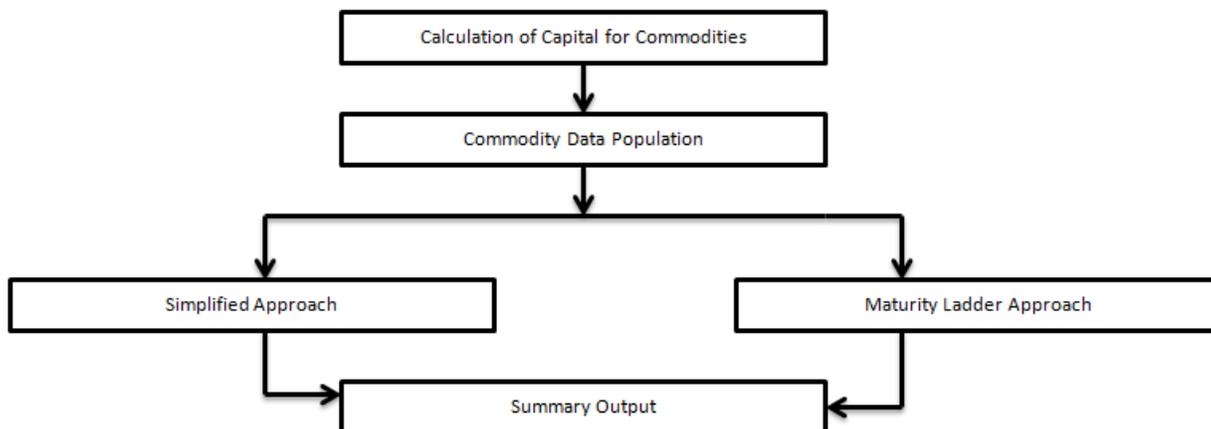
*For more information on processes and sub processes that compute this refer the following:*

*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 refer 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 refer the following s:*

*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 refer 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.

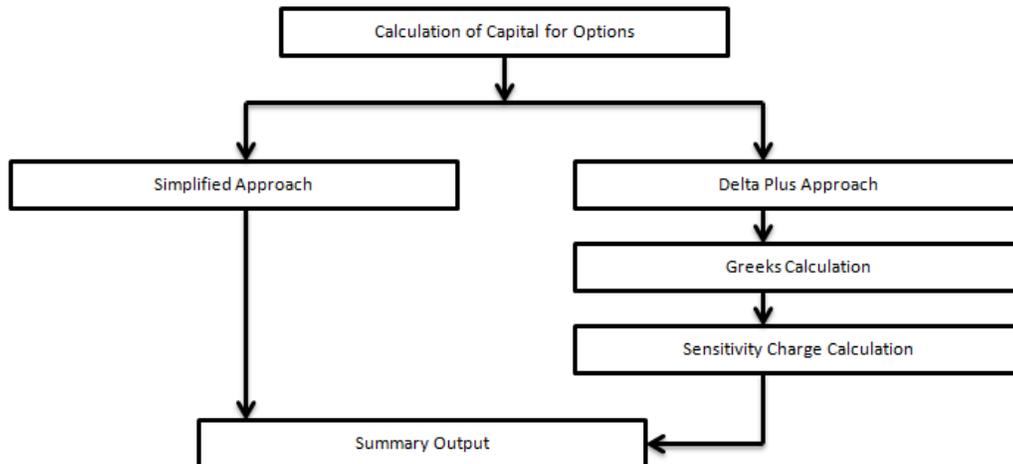
*For more information on processes and sub processes that compute this refer the following:*

*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 refer 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 refer 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 refer 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 refer the following:***

*Process:* MKT\_RISK\_STD\_APPROACH

*Sub-process:* Market Risk Generic Risk Charge Calculation - IR and Equity

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**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 refer the***

*following:*

*Process:* MKT\_RISK\_STD\_APPROACH

*Sub-process:* Market Risk Sec Specific Risk Charge Calculation Market Risk Sec Deductions

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**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.

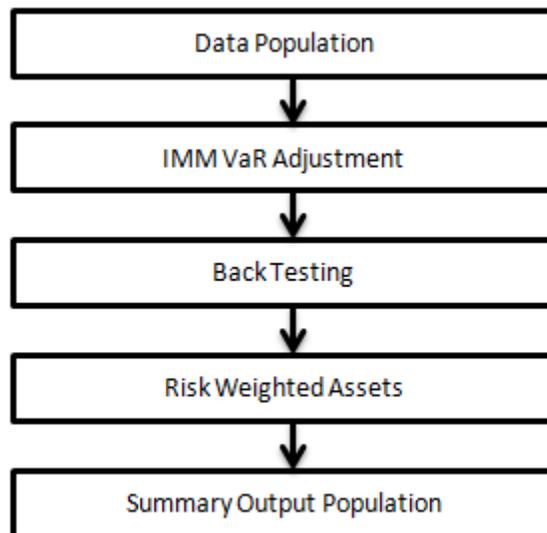
**Internal Models Method**

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 refer 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 refer 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 refer 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 refer 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 refer the following:*

*Process:* MKT\_RISK\_IMM\_VAR

*Sub-process:* Market Risk VaR Capital Charge Population

### **3.1.5. 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

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**NOTE:** While executing Solo Run for computing Operational Risk, the parent entity data is processed. However, for a Consolidated Run the parent entity as well as the subsidiary data is processed.

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### 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:

$$K_{BIA} = \left[ \sum (GI_{1..n} \times \alpha) \right] / n$$

### 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:

$$K_{TSA} = \left\{ \sum_{\text{years } 1-3} \max \left[ \sum (GI_{1-8} \times \beta_{1-8}), 0 \right] \right\} / 3$$

#### 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.

$\beta_{1-8}$  = 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.

### 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

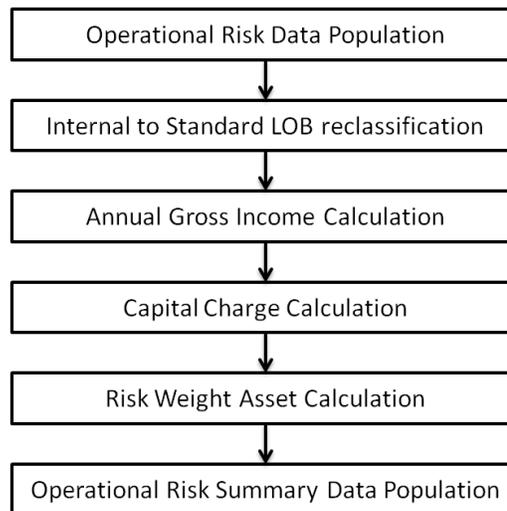
**Prerequisite**

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 both 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.

## Key Data Elements

Key data elements need to 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.

### 3.1.6. 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%.

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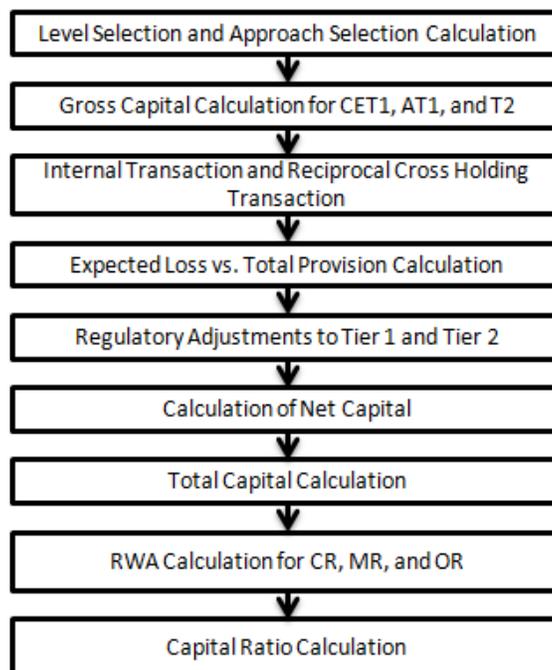
**NOTE:** While executing Solo Run the parent entity data is processed. Investment into the subsidiary data undergoes RWA calculation as per the Credit Risk and Market Risk rule. Capital line item pertaining to parent entity is only processed. For consolidation approach, the parent entity as well as the subsidiary data is considered. All the GL line items are expected at solo level for each entity. The consolidated data is discarded.

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## Assumption

The GL codes are expected to be unique across entities in **STG\_GL\_DATA** and **DIM\_CAPITAL\_ACCT\_HEAD**.

## 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 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 3 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 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 above processing is done in sub process – Capital Components Calculations in the process CAP\_STRUCT.

## 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, refer Exhibit 5 in *Annexure A: Key Concepts*.

## ***3.2. Basel III***

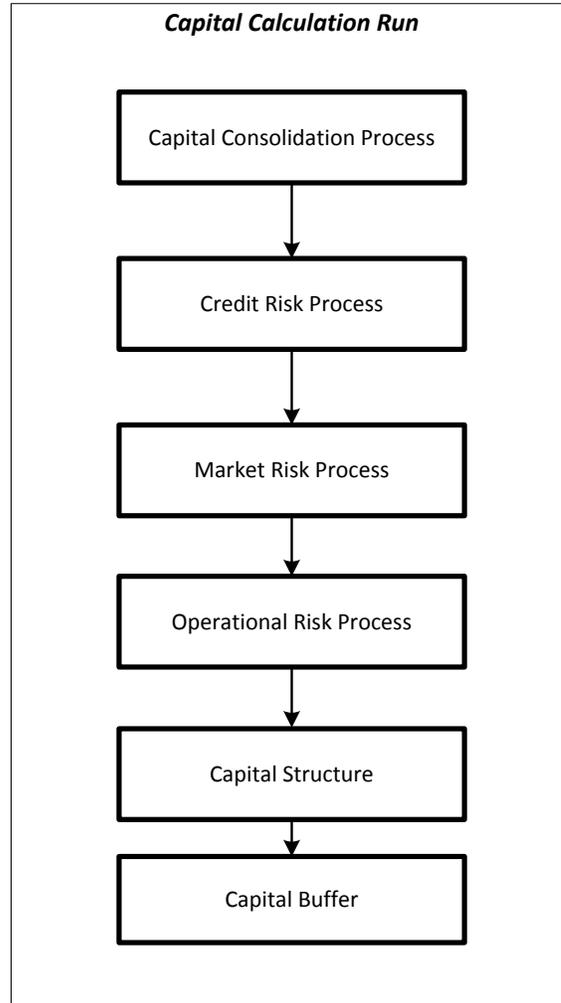
### **3.2.1. BIS- High Level Process Flow- Standardized Approach**

The Capital Consolidation approach in the previous releases of the application was compliant with Basel II guidelines. With this release, this has been 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, refer *OFS Basel Regulatory Capital Run Charts*.

#### **Process Flow for Capital Adequacy Ratio Calculation**



## Capital Calculation Run

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.

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 may 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.

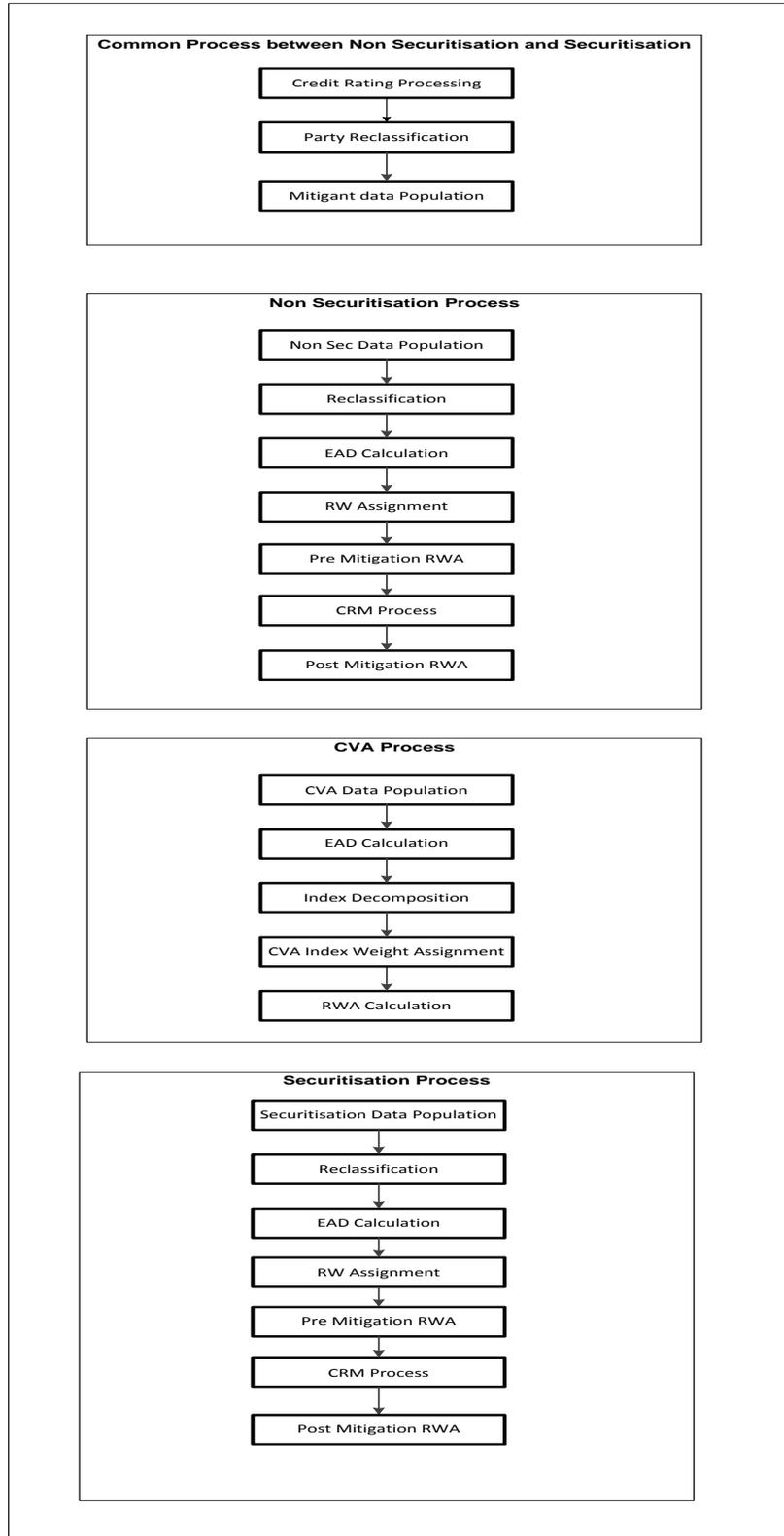
### **Currency Conversion**

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.

## **Process Flow for Credit RWA calculation**



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 both Non Securitization and Securitization section of this document, it is executed only once under the Credit RWA run.

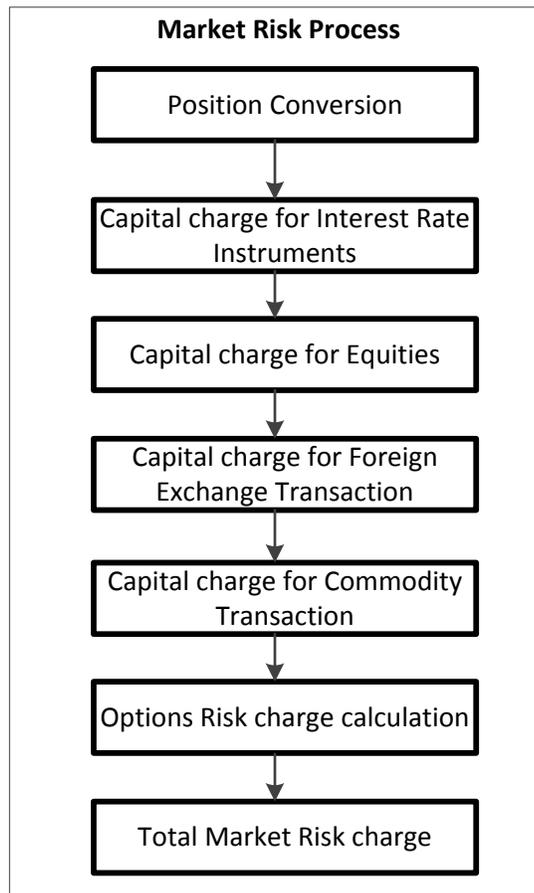
Certain sub processes under Non Securitization process like Reclassification, RW assignment, and so on are common across all types of exposures for example: banking book, over the counter derivative transactions, and securities financing transactions, and are executed only once in the Run. The details 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, CVA processes, and Securitization process, refer *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.

### Process Flow for Market RWA calculation

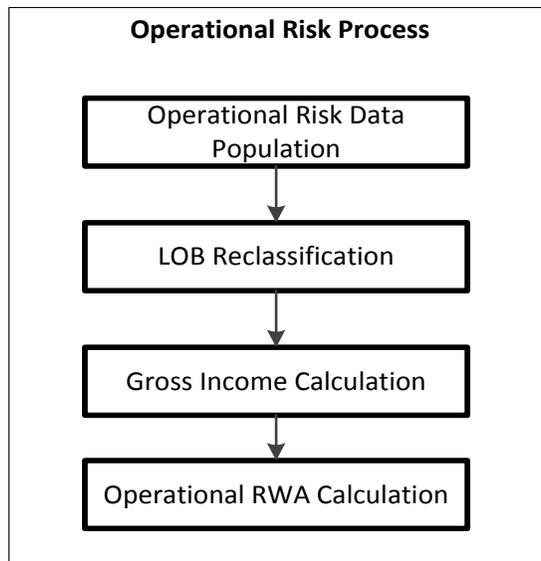


Market RWA Run is made up of multiple sub processes specific to Market Risk. However, when Market Risk is bundled under a Consolidated Run and triggered, Capital Consolidation and Rating process is executed only once for both Credit Risk and Market Risk. The details of each of the sub process mentioned in the preceding flow chart are present under Market Risk section of this document.

For more information on Market RWA computation, refer *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.

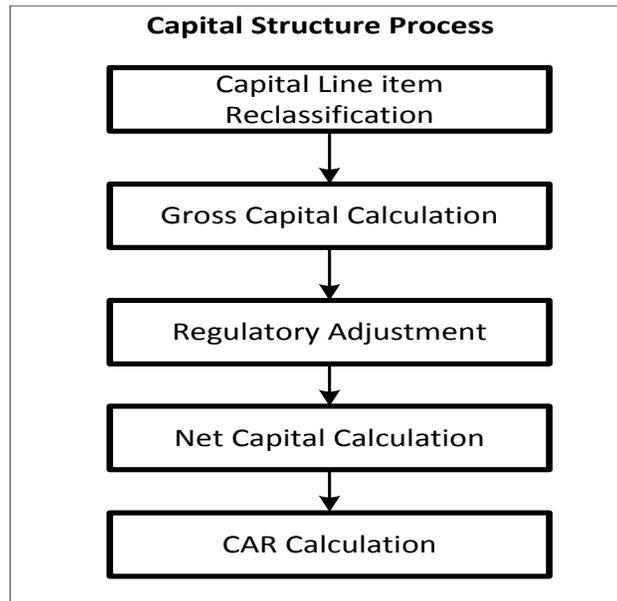
### Process Flow for Operational RWA Calculation



Operational RWA run is executed with the [Capital Consolidation](#) process. For more information on the Operational RWA computation, refer *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.

### Process Flow for Capital Structure

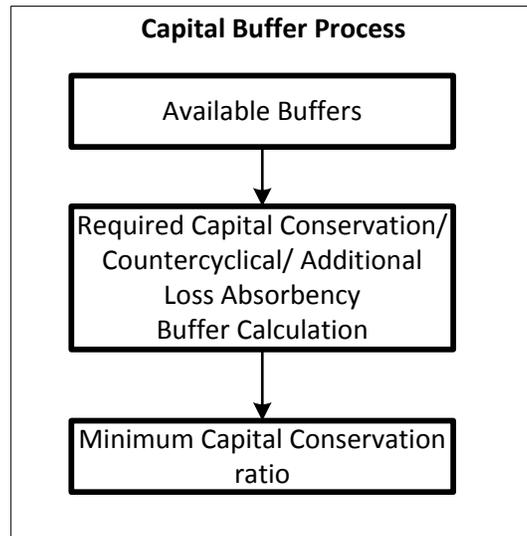


Capital Structure is executed with Capital Consolidation, Credit Risk, Market Risk, and Operational Risk RWA processes.

For more information on the sub processes of Capital Structure, refer *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.

### **Process Flow for Capital Buffer Process**



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, refer *Capital Buffers*.

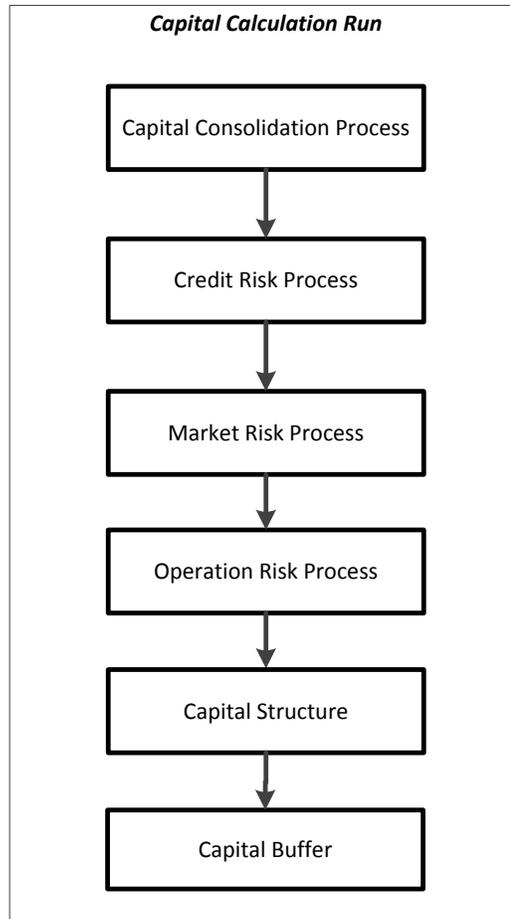
For example, Required Capital Conservation Buffer and Required Countercyclical Buffer calculation are detailed in the ‘Required Total Buffer’ sub-section of the Capital Buffer section in this document. Similarly, Minimum Capital Conservation ratio has been detailed in the ‘Capital Conservation Ratio’ sub section of Capital Buffer section in this document.

### **3.2.2. BIS – High Level Process Flow – 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, refer *OFS Basel Regulatory Capital Run Charts*.

#### **Process Flow for Capital Adequacy Ratio Calculation**



## Capital Calculation Run

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. 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 may 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.

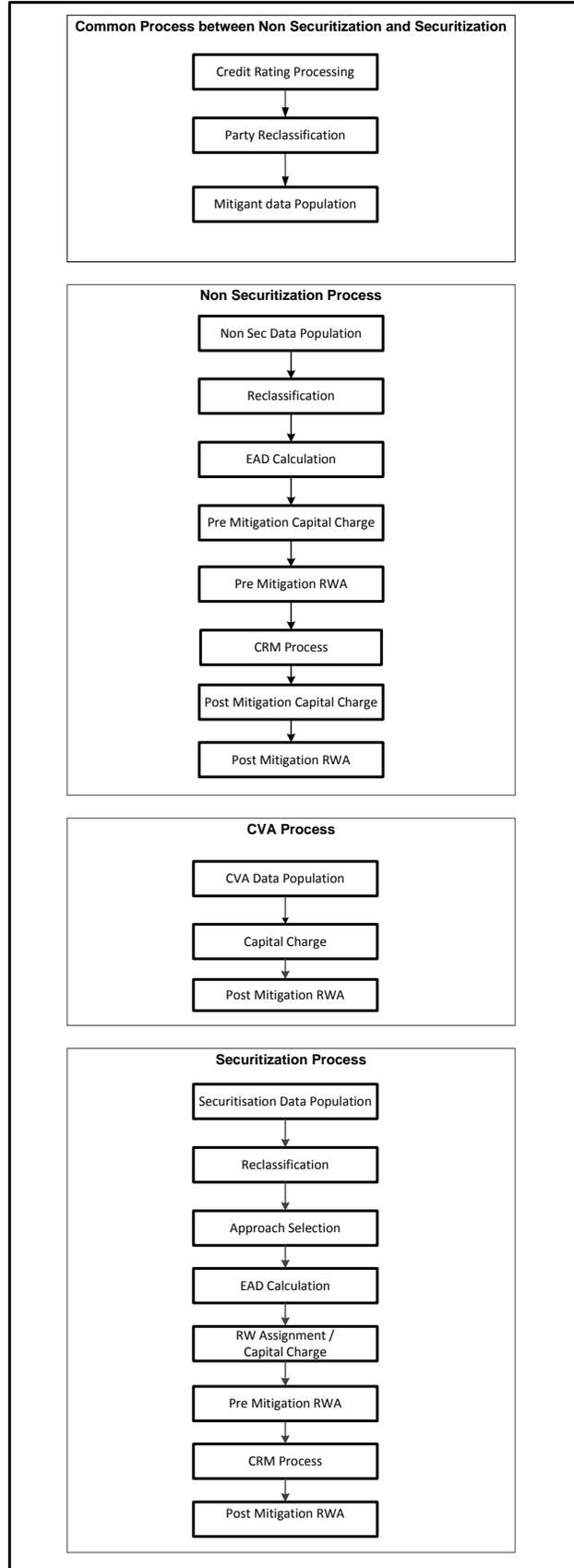
### **Currency Conversion**

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.

## **Process Flow for Credit RWA Calculation**



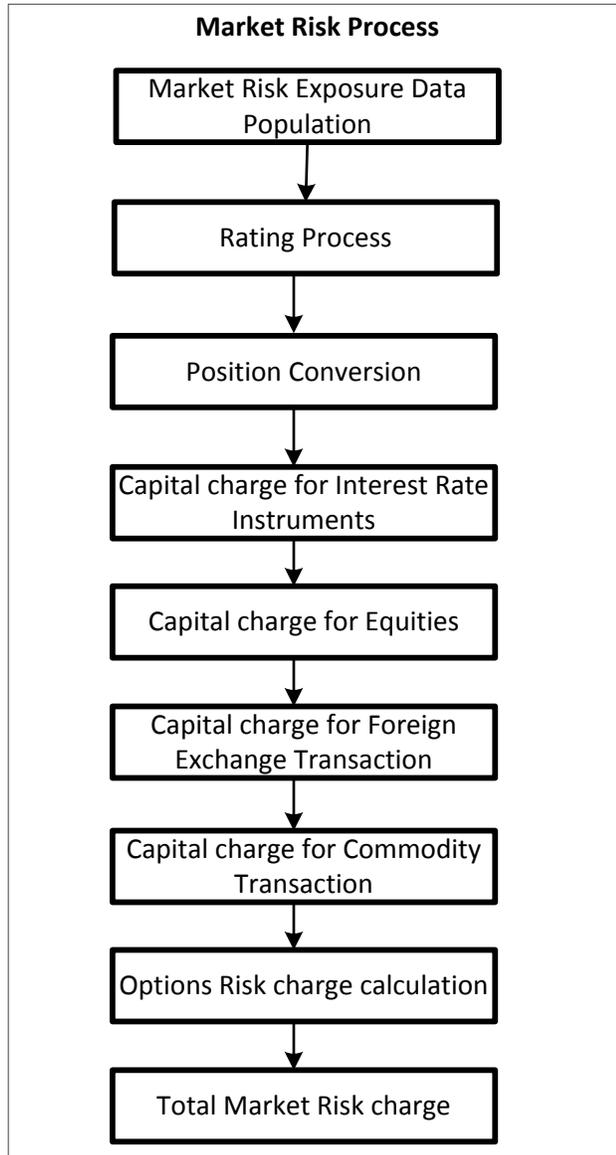
Credit RWA Run is a combination of Non Securitization RWA, Credit Valuation Adjustment RWA, and Securitization RWA computation. A few processes like credit rating, party type reclassification, and mitigant data population are common between Non Securitization and Securitization processes and are executed only once under the Credit RWA Run even though these sub processes are explained separately under both 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, refer *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.

### **Process Flow for Market RWA Calculation**

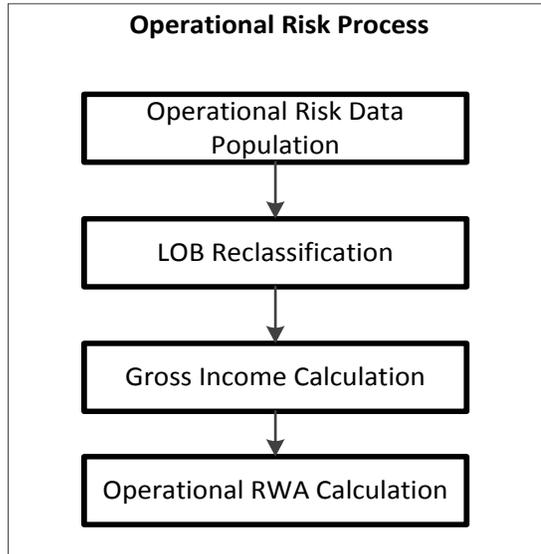


Market RWA Run is made up of multiple sub processes specific to Market Risk. However, when Market Risk is bundled under a Consolidated Run and triggered, Capital Consolidation and Rating process is executed only once for both Credit Risk and Market Risk. The details of each of the sub process mentioned 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.

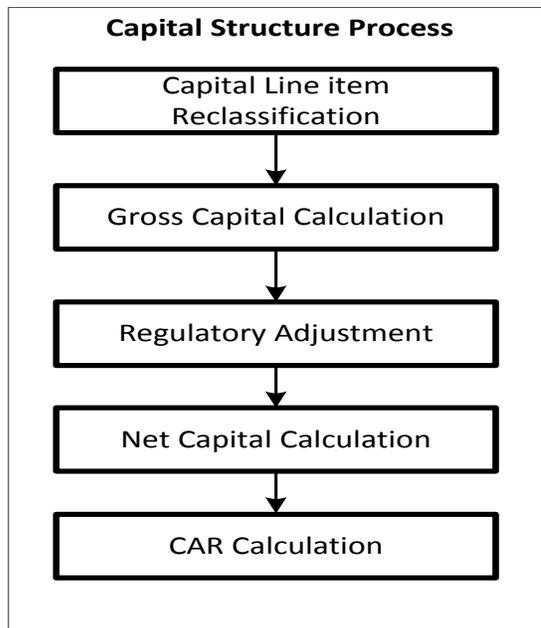
For more information on Market RWA computation, refer *Market RWA*.

**Process Flow for Operational RWA calculation**



Operational RWA Run is executed with [Capital Consolidation](#) process. For more information on Operational RWA computation, refer *Operational RWA*.

**Process Flow for Capital Structure**

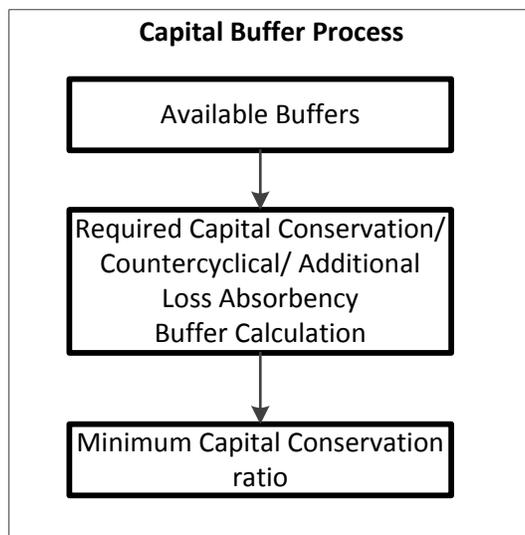


Capital Structure is executed with Capital Consolidation, Credit Risk, Market Risk, and Operational Risk RWA processes. For more information on the sub processes of Capital Structure, refer *Capital Structure*.

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.

### 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, refer *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 has been detailed in the 'Capital Conservation Ratio' section of Basel III Capital Buffers, in this document.

### 3.2.3. 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.

#### Non Securitization: Standardized Approach

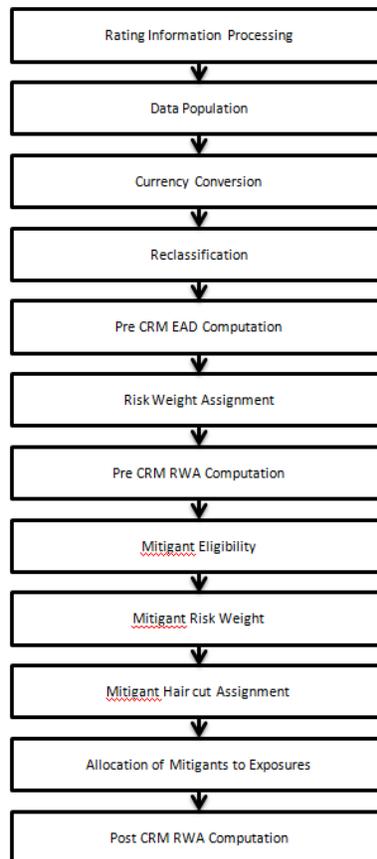
All the credit risk exposures are identified by their product types, counterparty types, and their corresponding asset classes by the application. A sample list of products types, party types, mitigant types, and credit ratings are pre-defined in the Basel application. However, this list and naming convention 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. 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 have been added in the list and the application is updated to reclassify them to new Basel standard product types.

Some exposures may 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 both 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 have been incorporated in the application. The changes at a macro level relate to the recognition of the eligible mitigants, applicable for both the Securitized as well as 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.



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, refer *Non Securitization- Standardized Approach*.

### **Mitigant Eligibility and Haircut Assignment**

#### Overview

As per the Basel III guidelines, BCBS recognizes the need to 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 both the Securitized as well as 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 in the case of Standardized Approach as well as 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 as well as 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 as well as 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	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 will be assigned a standard initial rating which will correspond to the worst of the best two risk weights associated with the initial ratings assigned.

Data Name	Transformation	Objective	Processing Logic
		CRM framework.	

- **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 have been 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 both 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 refer to the Download Specifications document.

#### *For Mitigants*

- Re-securitized exposures Mitigant – The mitigants belonging to re-securitized exposures will have “Y” value in this field. The application will mark them as ineligible mitigants.
- Securitized exposures Mitigant – The mitigants belonging to securitized exposures will have “Y” value in this field. The application will assign 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.

### **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.

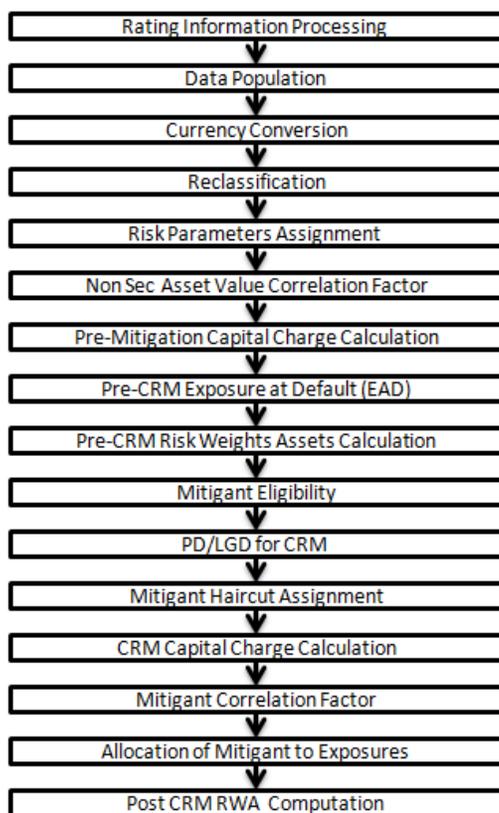
In the current release, a few additional product types have been added in the list and the application is updated to reclassify these products. Some exposures may be hedged against credit risk through various mitigants like guarantors, collaterals, credit derivatives, and so on. These provide mitigation to credit risk and should be considered while computing Credit RWA as per Basel norms. Hence, the application calculates both 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 would have 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 could arise 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 both the Securitized as well as 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**

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, refer [Non Securitization FIRB/AIRB Approach](#).

- [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 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, refer [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:

$$\text{Correlation (R\_FI)} = 1.25 \times [0.12 \times (1 - \text{EXP}(-50 \times \text{PD})) / (1 - \text{EXP}(-50)) + 0.24 \times [1 - (1 - \text{EXP}(-50 \times \text{PD})) / (1 - \text{EXP}(-50))]]$$

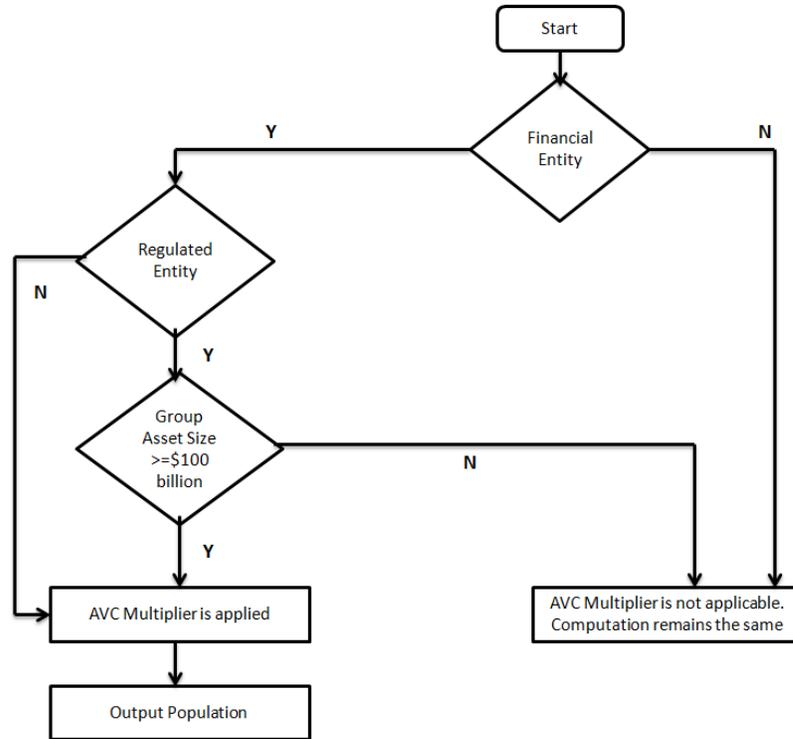
AVC Rule is applicable for both Non Securitization accounts and for issuers of credit risk mitigation.

**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 refer to 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.

## Credit Valuation Adjustment

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 both 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 both 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.

### 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.

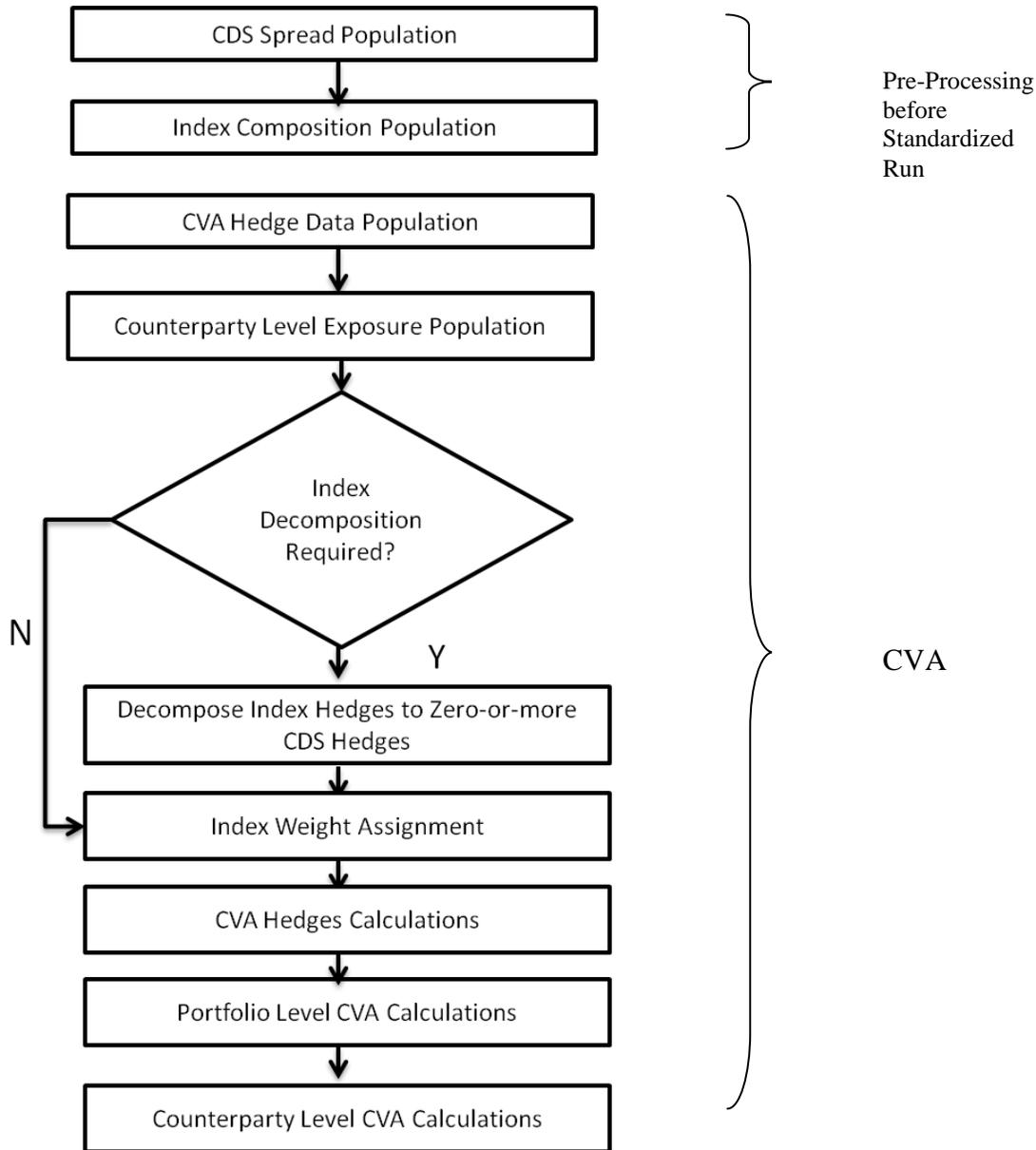
### Process Flow for Credit Valuation Adjustments

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:

$$K = 2.33 \cdot \sqrt{h} \cdot \sqrt{\left( \sum_i 0.5 \cdot w_i \cdot (M_i \cdot EAD_i^{total} - M_i^{hedge} B_i) - \sum_{ind} w_{ind} \cdot M_{ind} \cdot B_{ind} \right)^2 + \sum_i 0.75 \cdot w_i^2 \cdot (M_i \cdot EAD_i^{total} - M_i^{hedge} B_i)^2}$$



- **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 - 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 set level or at trade level. This is available as an output of Current Exposure Method (CEM). If more than one netting set 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 set level or for each netting set using the formula  $1 - \exp(-0.05 * M_i) / (0.05 * M_i)$ .

Maturity is the notional weighted maturity at netting set level. The application sums the data for exposure at counterparty level. If more than one netting set 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  $(1 - \exp(-0.05 * M_{ihedge})) / (0.05 * M_{ihedge})$ . If more than one CDS Contract is available for the counterparty, the above 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 above 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:

$$K = 2.33 \cdot \sqrt{h} \cdot \sqrt{\left( \sum_i 0.5 \cdot w_i \cdot (M_i \cdot EAD_i^{total} - M_i^{hedge} \cdot B_i) - \sum_{ind} w_{ind} \cdot M_{ind} \cdot B_{ind} \right)^2 + \sum_i 0.75 \cdot w_i^2 \cdot (M_i \cdot EAD_i^{total} - M_i^{hedge} \cdot B_i)^2}$$

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:**

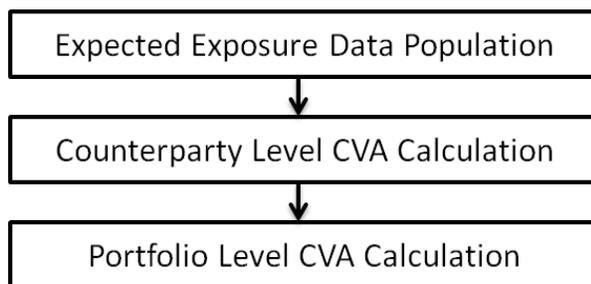
CVA Capital Charge at counterparty level is allocated using the following formula:

$$CVA \text{ at Counterparty} = \text{Total CVA at Portfolio} * W_{CVAi}$$

$$W_{CVAi} = \text{Absolute}[0.5 * W_i * (M_i * EAD_{itotal} - M_i^{hedge} * B_i) - \sum_{indi} (W_{ind} * M_{ind} * B_{ind})] /$$

$$\sum_i \text{Absolute}[0.5 * W_i * (M_i * EAD_{itotal} - M_i^{hedge} * B_i) - \sum_{indi} (W_{ind} * M_{ind} * B_{ind})]$$

### **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:

- **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  $T_i$ , 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.

- EE<sub>i</sub>: This is the expected exposure (EE) of the counterparty at revaluation time  $t_i$  where exposures of different netting sets of counterparties is added. Expected exposure is an input at each counterparty and tenor level.
  - D<sub>i</sub>: 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  $t_i$ .
- **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.

$$K = 3 * (CVA_{Unstressed VAR} + CVA_{Stressed VAR})$$

$$CVA = (LGD_{MKT}) \cdot \sum_{i=1}^T \text{Max} \left( 0; \exp \left( -\frac{s_{i-1} \cdot t_{i-1}}{LGD_{MKT}} \right) - \exp \left( -\frac{s_i \cdot t_i}{LGD_{MKT}} \right) \right) \cdot \left( \frac{EE_{i-1} \cdot D_{i-1} + EE_i \cdot D_i}{2} \right)$$

The application calculates the CVA Charge at counterparty level using the above 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\_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.

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**NOTE:** CVA RWA is added to Credit RWA and is not multiplied by the factor 1.06.

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### **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 refer to 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.

### **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

## Securitization

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 as well as some portion of securitized exposures. The application is capable of handling both securitized exposures as well as re-securitized exposures. It also handles the calculation for the originator as well as the investor bank roles. At a broad level, there are two categories of Investors:

- An Investing Bank who has invested heavily in securitization:
  - These investors are prepared to provide the entire details of the securitization transaction
  - To cater to these investor needs, the entire pool, entire or invested tranche details, and the invested exposures information are required to be provided by the bank. This information is captured in the pool, tranche, and exposures table.
- An Investing Bank who has invested minimal in securitization:
  - These investors are prepared to provide the necessary inputs required for the calculation of the capital charge pertaining to their invested exposure.
  - To cater to these investor needs, the invested exposures information is required to be provided as an input by the bank. A few pool and tranche attributes required for the computation are also to be provided as an input by the bank in the Stage Securitization Exposures Table (**STG\_SEC\_EXPOSURES**).

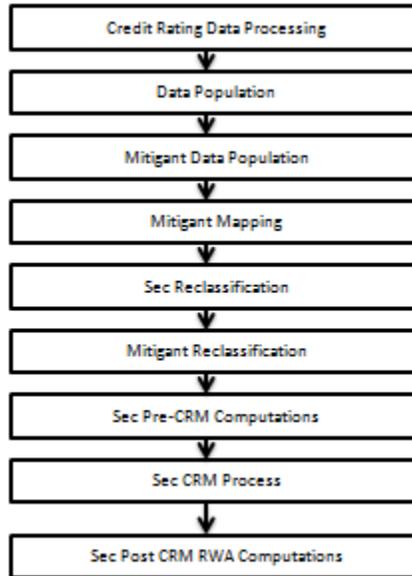
The Basel Accord specifies two broad approaches for the calculation of the capital charge for the Securitization exposures:

- Standardized Approach
- IRB Approach
  - Ratings Based Approach (RBA)
  - Internal Assessment Approach (IAA)
  - Supervisory Formula Approach (SFA)

Both the standardized approach and IRB 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:

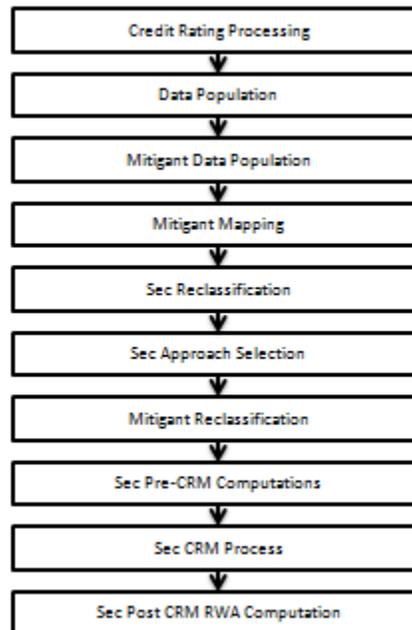


The only change in the computation of the [Securitization - Standardized Approach](#) process, in the Basel III processing of the current release of the application is in the Sec Pre-CRM Computation Process. Under this process, for Sec Deduction Process, the exposures which are lower than the investment 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, refer *Securitization* on page 169.

**Process Flow for Securitization -IRB Approach**

The application handles the IRB Approach of the Securitization Exposures as follows:



The only change in the computation of the Securitization - IRB Approach process, in the Basel III processing of the current release of the application is in the Sec Pre-CRM Computation process. In this process, for Sec

Deductions, the exposures which are unrated and do not qualify for any of the approach are risk weighted at 1250%. Also, the exposures under Rating Based Approach and Internal Assessment Approach, which are below investment grade, are also risk weighted at 1250%. The exposures which follow the Supervisory Formula Approach and which are below the KIRB, is also risk weighted at 1250%.

For more information on the processing of the remaining line items Securitization –IRB Approach process flow, refer *Securitization*.

### **3.2.4. 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

#### **Standardized Approach**

In standardized approach (STD Approach) the Market Risk Capital Charge need to be calculated for the following instrument types:

- Interest Rate related instruments (IR Instruments)
- Equity Position Risk
- Foreign Exchange risk
- Commodities
- Options

#### **Pre-requisite 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.

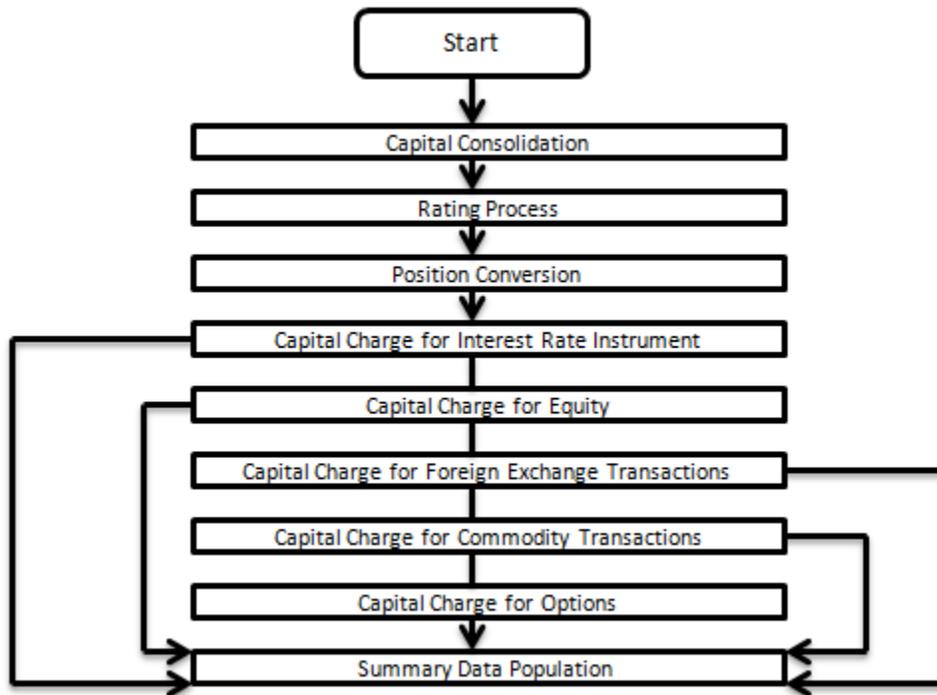
- Interest Rate Curve Data
- Market prices of the instruments
- Bank positions

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, refer *Market RWA*.

### 3.2.5. 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

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**NOTE:** While executing Solo Run for computing Operational Risk, the parent entity data is processed. However, for a Consolidated Run the parent entity as well as the subsidiary data is processed.

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#### **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:

$$K_{BIA} = \left[ \sum (GI_{1..n} \times \alpha) \right] / n$$

### 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:

$$K_{TSA} = \left\{ \sum_{\text{years 1-3}} \max \left[ \sum (GI_{1-8} \times \beta_{1-8}), 0 \right] \right\} / 3$$

#### 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.

$\beta_{1-8}$  = 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.

### 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, refer *Operational RWA*.

### 3.2.6. 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
  - Common Equity Tier 1
  - 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 will 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 has to be adjusted for the split exposures for the Market Risk record and this task will be repeated for each record.

If the RWA for the split exposures is adjusted, then it will be 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.

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**NOTE:** All the GL line items are expected at Solo level for each entity. The consolidated data will be 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 as well as 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.

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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

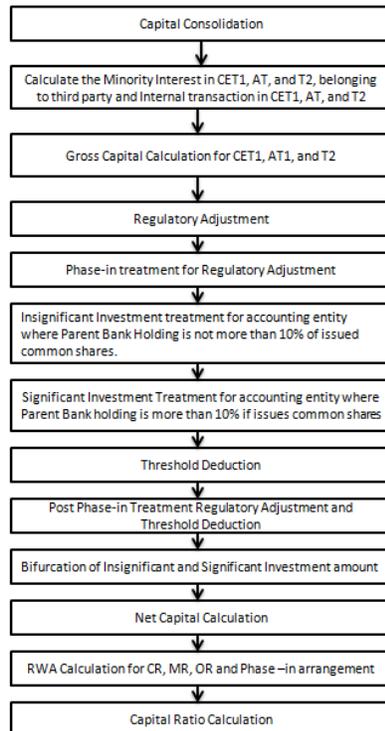
### Assumption

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 will be 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**).

### Process Flow for Capital Structure



- **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 the above 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 as well as 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. Tier wise deduction percentage is calculated and this percentage is multiplied 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, by summing up the Pre Mitigation EAD amount in the Non Sec Exposures (**FCT\_NON\_SEC\_EXPOSURES**) table.
- The sub process – **Insignificant Investment in entities outside Regulatory Consolidation Processing** in **BASELIII\_CAPITAL\_STRUCTURE** process covers the above processing.

- **Significant Investment Treatment for accounting entity where parent bank holding is more than 10% if issues 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 the above 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 will be risk weighted 250% during the transition period and will be 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 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**.

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
- Mkt Risk Insignificant Investment Exposure Processing
- Non Sec Significant Investment Exposure Processing
- Mkt 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 above 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’.

## 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 refer to 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 are 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 refer to the sample data.

N_CAPITAL_COMPO ENT_VALUE	D_START_ DATE	D_END_ DATE	F_LATEST_RECORD_ INDICATOR	V_STD_ACCT_HE AD_DESC	V_CAPITAL_ADEQUACY REGULATOR
0.035	1/1/2013	12/31/201 3	Y	Required Common Equity Tier 1 capital Ratio	RBI
0.04	1/1/2014	12/31/201 4	Y	Required Common Equity Tier 1 capital Ratio	RBI
0.045	1/1/2015	12/31/999 9	Y	Required Common Equity Tier 1 capital Ratio	RBI
0.045	1/1/2013	12/31/201 3	Y	Required Tier 1 capital Ratio	RBI
0.055	1/1/2014	12/31/201 4	Y	Required Tier 1 capital Ratio	RBI
0.06	1/1/2015	12/31/999 9	Y	Required Tier 1 capital Ratio	RBI
0.08	1/1/2013	12/31/999 9	Y	Required capital Adequacy Ratio	RBI
0.035	1/1/2012	12/31/201 2	Y	Required Common Equity Tier 1 capital Ratio	BIS
0.04	1/1/2014	12/31/201 4	Y	Required Common Equity Tier 1 capital Ratio	BIS
0.045	1/1/2015	12/31/999 9	Y	Required Common Equity Tier 1 capital Ratio	BIS
0.045	1/1/2012	12/31/201 3	Y	Required Tier 1 capital Ratio	BIS
0.055	1/1/2014	12/31/201 4	Y	Required Tier 1 capital Ratio	BIS
0.06	1/1/2015	12/31/999 9	Y	Required Tier 1 capital Ratio	BIS
0.08	1/1/2012	12/31/999 9	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**).

### 3.2.7. **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 will be 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.

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**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 has been included in the application.

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## **Assumptions**

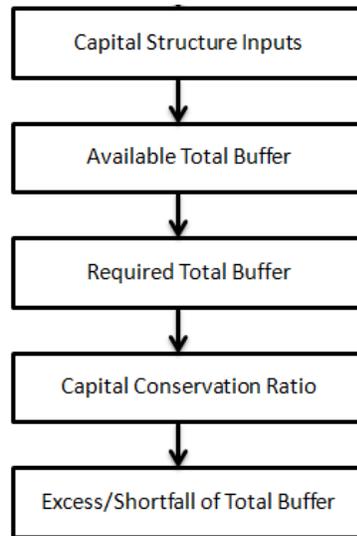
Countercyclical Buffer requirement for each country should be provided by the client or the bank as the final percentage applicable for each country and this is dependent on the home regulator. G-SIB status and applicable bucket information for each entity should also be provided by the client/bank.

For Required Weighted Average Countercyclical Buffer calculation, the exposures used in the bank are all accounts exposed to both 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 will 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%

## 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 will have 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.

- **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 will be 0 as the benchmarks will be 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)<sup>th</sup> 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 will be 0.

## Key Data Elements

Key data elements have been elaborated in this section. For a complete list of tables to be updated refer to 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 both 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) needs to be met as per the transitional arrangement, therefore the required buffer value needs to 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 needs to 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 both Non Securitization and Securitization exposures) and Market Risk.

### **3.2.8. 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 Basel committee has introduced a non-risk based leverage ratio which is a new regulatory tool supplementing risk-based capital requirement. The application calculates the leverage ratio for a reporting bank. The minimum required leverage ratio is 3%. Regulatory leverage ratio is calculated as an arithmetic mean of the monthly leverage ratio over a quarter. Monthly leverage ratio is calculated at the end of the month. The leverage ratio is calculated by dividing an institution's capital measure by the total exposure.

$$\text{Leverage Ratio} = \text{Capital Measure} / \text{Exposure Measure}$$

Capital measure is defined as Net Tier 1 capital which 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, Over the Counter (OTC), Structured Financial Transactions (SFT), Securitization, and all market related instrument's transaction amounts. Mitigation amount is not considered while calculating exposure amount. An additional Total Asset of the Entity (where parent bank holding is more than 10% of the issued common share capital of the entity and entity is not part of the regulatory consolidation) also forms a part of the exposure measure.

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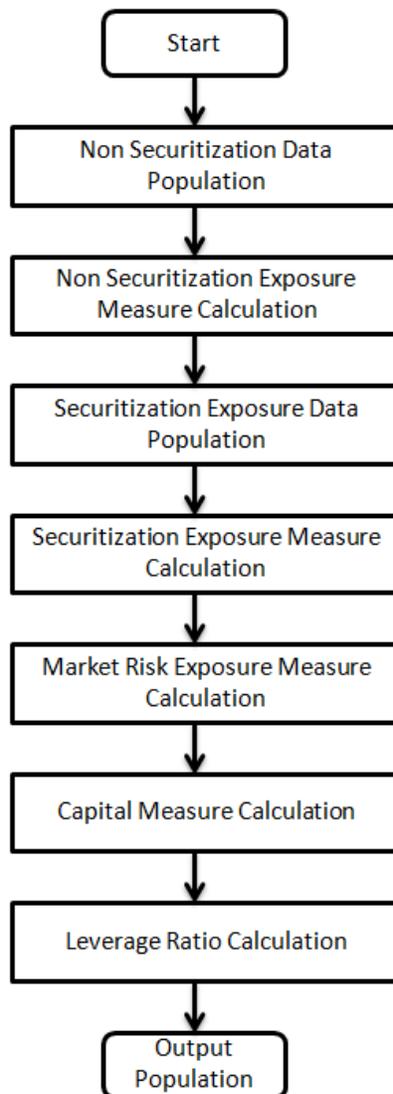
**NOTE:** While executing a Solo Run, the parent entity’s exposure amount related to on-balance sheet items, off-balance sheet items, OTC, SFT, securitization, and market related instruments are considered. The total consolidated asset of the significant entity is not calculated in exposure measure while executing a Solo Run. Executing a Consolidated Run requires subsidiary data and the total consolidated assets of significant investment entity.

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**Assumptions**

Total additional asset to be included in the exposure measure calculation for the significant investment subsidiary, is not explicitly stated in the Basel III Rules (June 2011 revision), hence the instructions as published by BIS in Sept 2011 (page 34) for Basel III implementation monitoring are followed, where the formula of total additional asset to be included in exposure measure is provided. Also, the Basel III accord is silent on the inclusion of Securitization and market related transactions, however the application has considered Securitization as well as the market related transactions in the calculation of leverage ratio.

**Process Flow for Leverage Ratio**



A prerequisite for leverage ratio processing is **Staging Market Risk Data Population**. Market Risk exposure is aggregated from the outstanding positions of the instruments. Hence, population of Market Risk positions is a

pre-requisite for the exposure measure calculation of Market Risk. Market Risk positions are calculated by executing the Run **Basel III Staging Data Population - Market Risk - BIS Standardized Approach**.

Leverage ratio is calculated by executing the Run **Basel III Leverage Ratio Calculation**. This Run contains the following processes

- BASELIII\_CAPITAL\_CONSOLIDATION
- PARTY\_RECLASSIFICATION\_STD
- NON\_SEC\_DATA\_POPULATION
- NON\_SEC\_LEVERAGE\_RATIO
- SEC\_DATA\_POPULATION
- SEC\_LEVERAGE\_RATIO
- MKT\_RISK\_LEVERAGE\_RATIO
- BASELIII\_CAPITAL\_STRUCTURE
- LEVERAGE\_RATIO

The process flow for calculation of leverage ratio is as follows:

- **Non Securitization Exposure Data Population:**

Data from the Product Processors are populated to the non sec processing table in the process NON\_SEC\_DATA\_POPULATION. Non Sec Exposure Measure used in the leverage ratio is the summation of the following products:

- On-Balance Sheet Item
- Repo-Style Transaction
- Derivative Transaction
- Off-Balance Sheet Item

Details on the calculation of these exposure measures are mentioned in the following section.

- **Non Securitization Exposure Measure Calculation:**

After data is populated in non sec processing table, the exposure measure is calculated in the process NON\_SEC\_EXPOSURE\_MEASURE\_CALCULATION. As the CCF value, (which is further used in exposure measure calculations) for off-balance sheet items are different for leverage ratio calculation and capital calculation, leverage ratio cannot be calculated as part of the Capital Calculation Run.

Details on the calculation of non sec exposure measures are as follows:

- **On Balance Sheet Items**

The accounting value of the on-balance sheet items is considered. The on-balance sheet item is the net of specific provisions and valuation adjustments. The following items are not considered while calculating the exposure measure for on-balance sheet item thereby reducing the exposure amount:

- Physical or financial collateral
- Guarantee or credit risk mitigants elements
- Netting of loans and deposits.

The exposure amount for on-balance sheet items is a download amount and is available as an input data. Nettable transaction related to OTC, SFT, internal transactions (like inter group

transaction), treasury stock, and reciprocal cross-holding is not a part of on-balance sheet transactions.

- **Repo-Style Transaction**

Repo-style transaction (repo/reverse repos and securities lending/borrowing) that follows the bilateral netting agreements forms a part of exposure measure. To calculate the exposure amount for repo transactions, the application follows the same treatment as prescribed in the Basel II guidelines. The repo transaction undergoes volatility and FOREX haircut as defined in Basel II guidelines before calculating the exposure amount.

- **Derivative Transaction**

Derivative transactions (OTC Derivatives) are calculated using the Current Exposure Method as prescribed in the Basel II guidelines. All derivative transactions including Credit Default Swap are assigned an add-on percent based on the underlying type as per the Current Exposure Method. The add-on assignment is as per the table provided in the Annexure 4 of Basel II guidelines. The exposure amount is the sum of current exposure amount and the notional principal multiplied by the add-on percent. Transactions in which bilateral netting is applicable, the exposure amount is netted and calculated.

- **Off-balance sheet items**

All the off-balance sheet items listed below are converted into credit exposure equivalent through CCF assignment:

- Commitments (including liquidity facilities)
- Unconditionally cancellable commitments
- Direct credit substitutes
- Acceptances
- Standby letters of credit
- Trade letters of credit
- Failed transactions and unsettled securities

100% CCF is uniformly assigned. However, any commitment that is unconditionally cancellable at any time by the bank without prior notice, a CCF of 10% is applied. The exposure amount for off-balance sheet items is obtained after multiplying the undrawn amount with the CCF percent and the exposure amount.

- **Securitization Data Population:**

Securitization exposure data is populated to securitization processing table in the process **SEC\_DATA\_POPULATION**.

- **Securitization Exposure Measure Calculation:**

After securitization exposure data is populated, exposure measure is calculated in the process **SEC\_EXPOSURE\_MEASURE\_CALCULATION**. Securitization transactions follow the accounting measure of exposure. The exposure amount of both the originator and investor are considered to arrive at the exposure amount. The securitization transaction where CCF assignment is applicable is assigned as prescribed in the Basel II guidelines.

- **Market Risk Exposure Measure Calculation:**

Market risk data that is populated through **Staging MR Data Population Run**, is populated in the market risk processing table and the exposure measure is calculated in the process **MKT\_RISK\_EXPOSURE\_MEASURE\_CALCULATION**. The following market related

instruments are considered for exposure measure. The total exposure measure used in the leverage ratio is the sum of the exposure amount for all products:

- Interest rate
- Equity
- FOREX
- Commodity
- Options

Netting of long and short position is done at instrument level. The post netting value is considered as the exposure measure. While calculating the exposure amount for subsidiaries that are part of regulatory consolidation and used in the leverage ratio, the exposure amount is limited to the shareholding percentage. For example: a subsidiary which is part of regulatory consolidation and parent holding in the subsidiary is 45%, only exposure amount limited to 45% is considered for exposure measure calculation. Similarly, if the holding is more than 50%, the entire amount is considered for exposure measure calculation.

- **Capital Measure Calculation:**

Capital measure is calculated in **BASELIII\_CAPITAL\_STRUCTURE** process. Capital measure used in the leverage ratio is equal to net Tier 1 and is calculated as follows:

**Net Tier 1 Capital = CET1 Capital + AT1 Capital – Regulatory Adjustment to CET1 – Regulatory Adjustment to AT1**

- **Leverage Ratio Calculation:**

The calculation of leverage ratio is detailed as follows:

- Total Additional Asset of Significant Investment Entity where Bank owns more than 10% of Issued Capital:

Subsidiaries that are outside the scope of regulatory consolidation (as defined in the Basel III accord, Para 84) where the parent bank owns more than 10% of the issued common share capital of the entity, subsidiary's additional assets are to be included in the exposure measure (as per Para 156 of the Basel III Accord). The **total assets to be included in the exposure measure** is calculated as follows:

**Total assets of the entity (included in the consolidated figures) multiplied by the percentage of the entity's capital that has not been deducted, less the share of the investment that has not been deducted.**

To arrive at the percentage of the entity capital that has not been deducted, (Investment in capital not deducted and total investment will be considered) is derived as follows:

**Capital not Deducted/Total Investment**

The total consolidated asset of an accounting entity is captured in the **entity share holding** table and the percentage of subsidiary capital that has not been deducted is obtained from the capital calculation (for more information refer *Capital Structure*), where the application calculates the percentage of amount deducted, which in turn is deducted from the value 1 to obtain the value of percentage not deducted.

Total additional asset amount is populated from **entity details** table to the **entity processing table** for further processing. This amount is used during total exposure measure amount calculation.

- Total Exposure Measure Amount Calculation

The exposure amount for each category of product along with total additional asset for significant investment entity is calculated and the sum of all transactions related to each category of the product, is stored against each line separately. Exposure measures for different products are aggregated against different standard account heads in **accounting head processing** table.

Standard Account Head Identifier	Standard Account Head Description
CAP846	Exposure Measure of On-Balance Sheet Item and Off-Balance Sheet Item
CAP850	Exposure Measure of OTC and SFT transaction
CAP847	Exposure Measure for Market Related Instrument
CAP849	Exposure Measure for Sec Transaction
CAP851	Exposure Measure for Total Additional Asset for Significant Investment Entity
CAP848	Total Exposure Amount

If the exposure measure of any of the product is calculated by any other application other than OFS Basel Regulatory capital application, a provision is made available to provide these values against the respective standard account head IDs in the staging table for **non-accounting data** table.

▪ Current Month Leverage Ratio:

The application uses the total exposure measure amount and net Tier 1 capital to calculate the current month leverage ratio by dividing the net Tier1 capital by total exposure measure amount. The amount is stored under the standard account description as “Leverage Ratio” and head ID CAP843.

▪ Regulatory Leverage Ratio:

The regulatory leverage ratio is the mean of three month leverage ratio using the current month leverage ratio and previous two months’ leverage ratio which is a download value. The regulatory leverage ratio is stored against the standard accounting ID CAP842. Leverage and the regulatory leverage ratio are calculated in the process **LEVERAGE\_RATIO**.

To calculate the regulatory leverage ratio, the application requires the previous two current month leverage ratio. The client or the bank should provide the previous two month leverage ratio value as a download in **STG\_STANDARD\_ACCOUNTING\_HEAD** against the standard accounting head ID CAP844 and CAP845 corresponding to previous month leverage ratio and second previous month leverage ratio.

If the leverage ratio Run batch is executed separately for the past two months, then these values are populated back to staging table for **non-accounting data** table for the current execution date. The Run Basel III Staging Data Creation - Previous Month Leverage Ratio is created with the T2Ts **LEVERAGE\_RATIO\_PREVIOUS\_MONTH\_DATA\_POPULATION** and **LEVERAGE\_RATIO\_SECOND\_PREVIOUS\_MONTH\_DATA\_POPULATION**. You need to change the Run key of the Runs corresponding to previous two months’ leverage ratio calculation Run, before executing this Run. This Run needs to be executed prior to executing the leverage ratio calculation Run.

## Key Data Elements

Key data elements have been elaborated in this section. For a complete list of tables and columns to be populated refer to the Download Specifications document.

To calculate the leverage ratio, exposure amount for all product types are required as well as total consolidated asset for significant investment entity is required to calculate exposure measure. The key data elements for exposure measure calculation of the various product types are as follows:

- On-Balance Sheet Item: For on-balance sheet items, End of Period (EOP) balance amount, write-off, and accrued interest amount is required.
- Repo-Style Transaction: For repo products, exposure amount, and instrument rating are required.

- Derivative Transaction: For derivative products, exposure mark to market value, notional principle amount, and underlying instrument types are required.
- Off-Balance Sheet Item: For off-balance sheet items, undrawn amount is required.
- Securitization Transaction: For securitization transactions, exposure amount is required.
- Market risk related instrument: For market risk instruments, the unit price as well as the number of units are required.
- Total consolidated asset of the significant investment entity: The total consolidated asset value of the significant investment entity is required.

## Chapter 4 US Jurisdiction

### 4.1. Basel II

Capital Adequacy related regulations as issued in the US Final Rules of December 2007 have been 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, as stated in the US Final Rules, are supported:

- Credit Risk
  - Non Securitization – Foundation Internal Ratings Based Approach
  - 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
  - Securitization - IRB Approach
    - Ratings Based Approach
    - Internal Assessment Approach
    - Supervisory Formula Approach
- Capital Structure

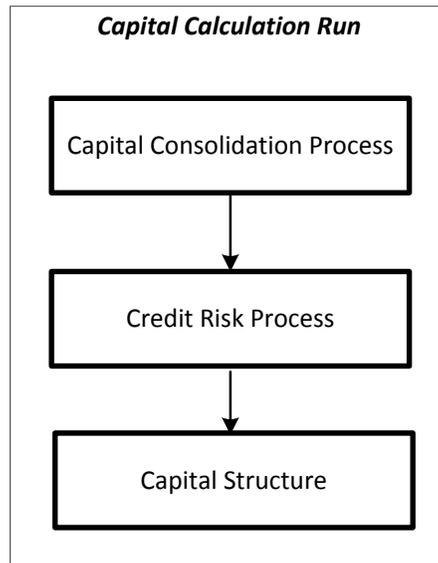
#### 4.1.1. US- High Level Process Flow-Internal Ratings Based Approach

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, refer *OFS Basel Regulatory Capital Run Charts*.

The flow of the processes in the order in which it is executed the application is as follows:

#### **Process Flow for Capital Adequacy Ratio Calculation**



## Capital Calculation Run

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, and so on, also exist as individual runs which is described in the following section.

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 may 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.

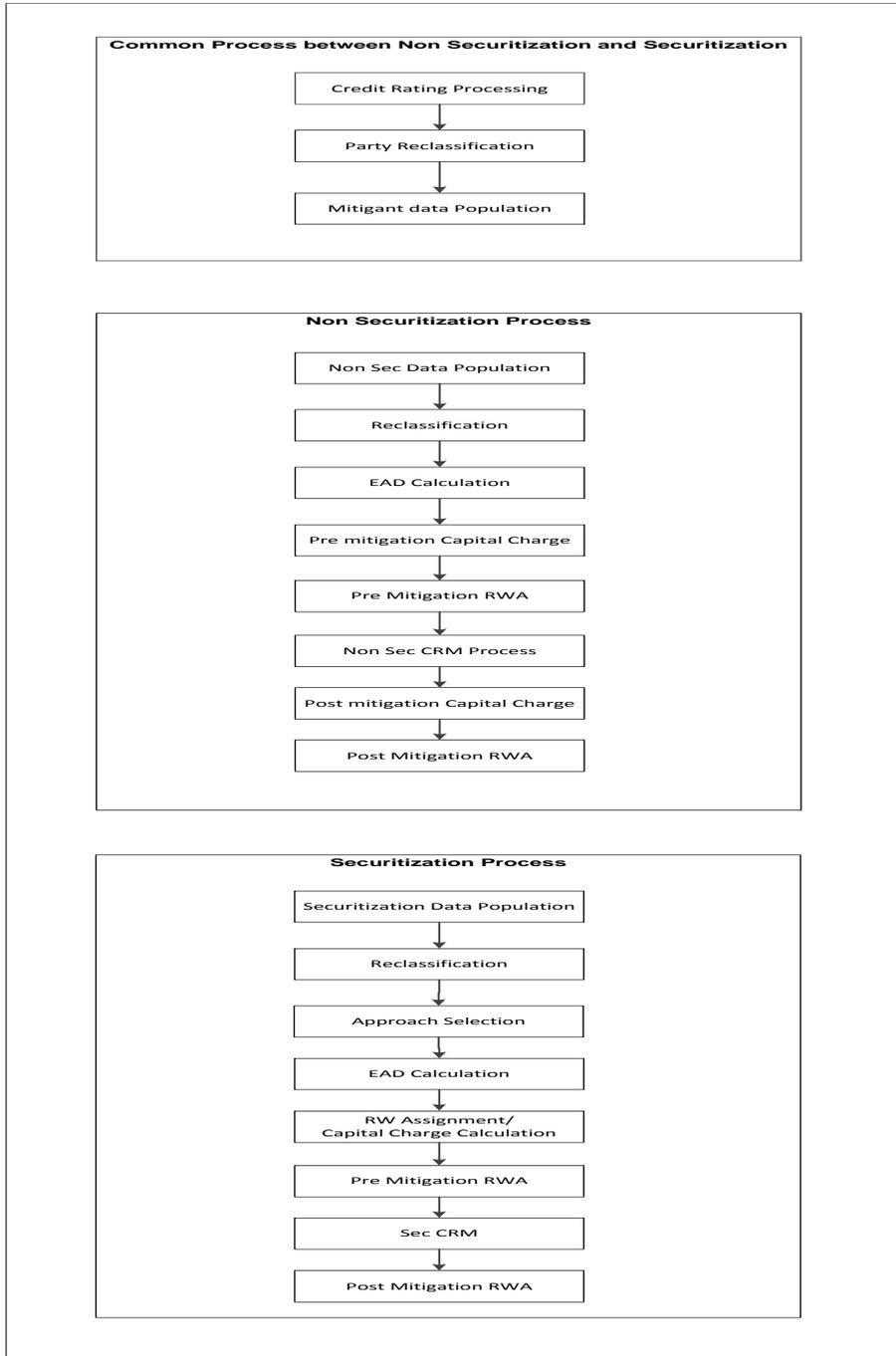
### **Currency Conversion**

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.

## **Process Flow for Credit RWA**



Credit RWA Run is a combination of the Non Securitization RWA process and Securitization RWA process. For Credit Risk for 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 both Non Securitization and Securitization section of this document, it is executed only once under the Credit RWA run.

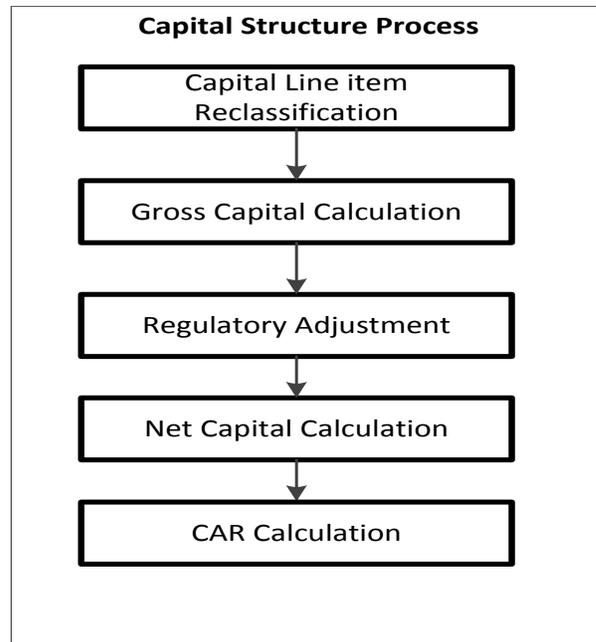
Certain sub processes under the Non Securitization process like Reclassification, are common across Non Securitization exposures such as Over the Counter derivative transactions and Securities Financing Transactions and are executed only once in the Run. The details of this sub processes are explained 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, refer *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.

## 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, refer *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.

### 4.1.2. 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.

#### **Non Securitization**

For Credit RWA computation of Non Securitized exposures, the application follows the Advanced Approaches.

#### **Advanced Approach**

The Advanced 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 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.

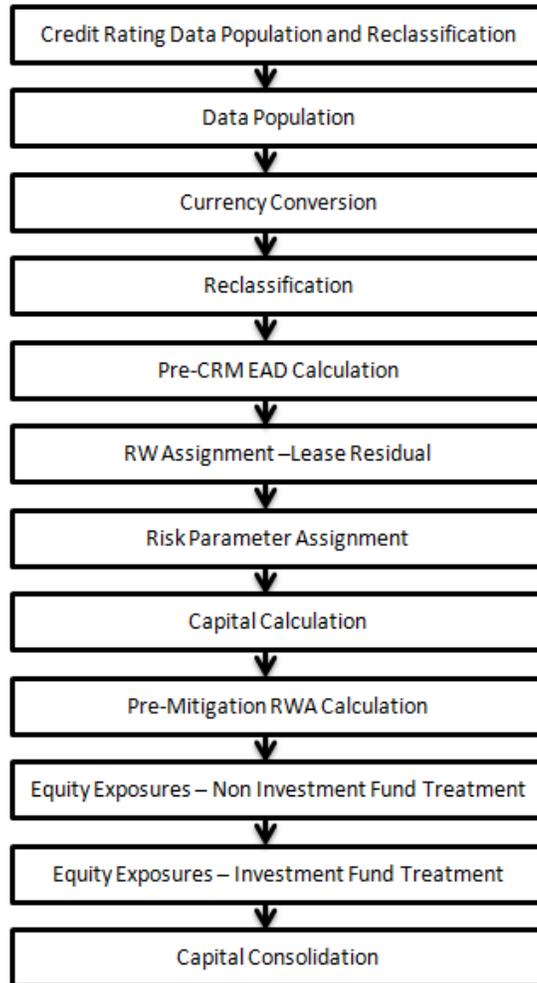
For equity exposures, the asset class is formed on the basis of standard issuer type and standard Basel product type. The application does further data processing based on these standard reclassifications. Some exposures may be hedged against credit risk through various mitigants like guarantors, collaterals, credit derivatives, and so on. These provide mitigation to credit risk and should be considered while computing Credit RWA. Hence, the application calculates both 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 would have 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 could arise 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, (except investment exposures in **STG\_INVESTMENTS** table, credit cards in **STG\_CARDS**, and equities in **STG\_EQUITY\_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:

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\_RECLASSIFICATION**) to obtain reclassified rating.

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**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 will be 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 Type	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
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_EQUITY_EXPOSURES
Underlying exposures for repo contracts along with some securitization exposures' underlying	STG_UNDERLYING_EXPOSURES
Credit Derivatives	STG_CREDIT_DERIVATIVES
Leases	STG_LEASES_CONTRACTS

#### 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:

$$\text{Exposure Amount} \times \text{Share Holding Percent} = \text{Updated Exposure Amount}$$

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, refer Exhibit 4 in *Annexure A: Key Concepts*.  


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**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.  


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  - **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, the residual portion of the lease transaction needs to be created. 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 a 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 will be assigned a risk weight which will be the worst of the best two risk weight. And the corresponding rating will be assigned to the exposure.

For more information on setting up this Rule, refer *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.

- **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.

### **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:

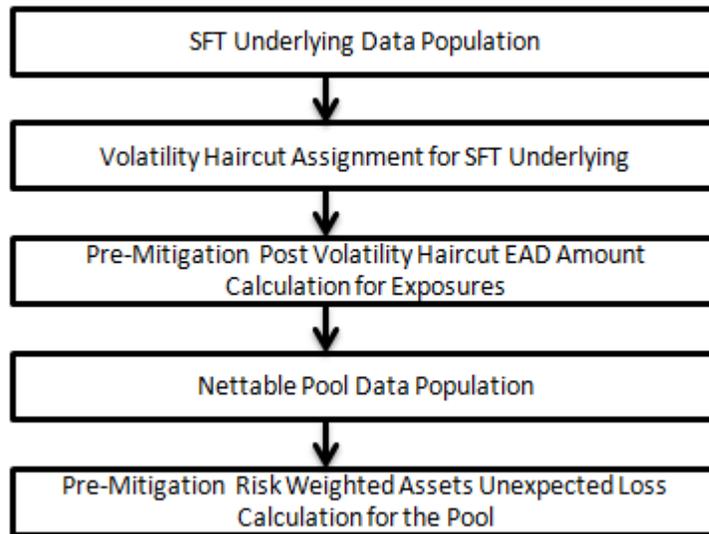
- Collateral Haircut Approach

- 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 SFT transactions are as follows:

Firstly, the parent transaction is captured and second 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.

- **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:**

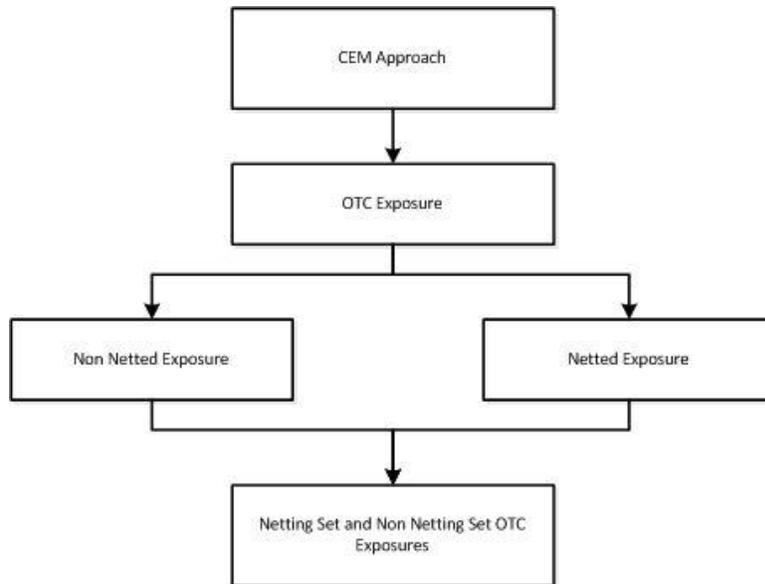
The application nets SFT contracts based on the same customer, common netting agreement identifier, transaction of repo, re-repo or margin lending, trading or banking book, and so on. Margin lending transaction being SFT also follows the same EAD calculation methodology, however repo or reverse repo 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- EAD Approach



- **Exposure at Default (EAD)**

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 Set Records and Non Netting Set 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 sets 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 set 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 set and then populates into the OTC Exposure table. It selects all the records with the following attributes which are similar to computing the netting set 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 set 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**

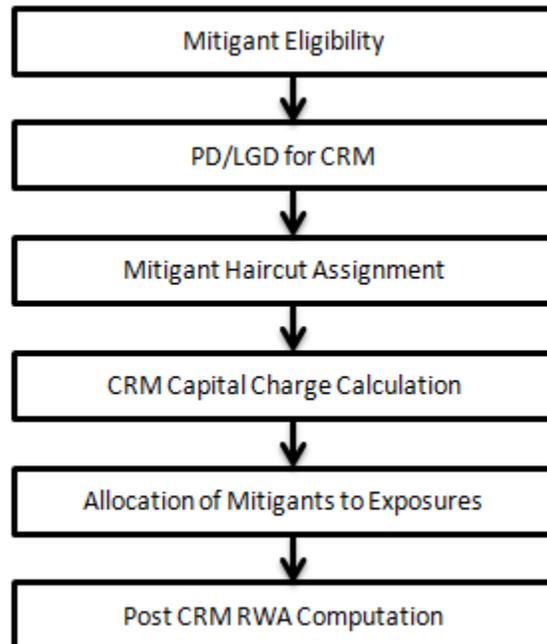
Key data elements need to be noted while computing Counterparty Credit Risk. To view the complete list of tables used for CCR computation refer to the *Download Specification* document.

- For instruments participating in netting set, the Nettability flag should be set as ‘Y’.  
Instruments with the same agreement code will be netted in the same netting set. The application handles both 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 both the covered and uncovered portion.
- If PD Substitution Approach is used, then LGD assigned to both 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 both 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, refer 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 will be 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.

## Securitization

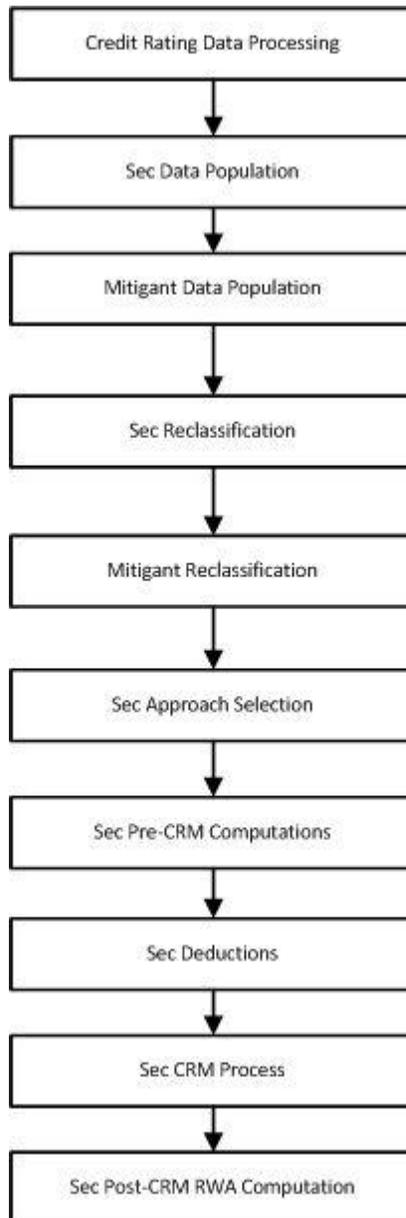
US Final rules differentiate the Credit Risk computation of the Securitized exposures from Non Securitized exposures. As securitized exposures are part of off-balance sheet transactions, it follows a waterfall cash flow mechanism, unlike the other exposures. Hence these exposures are treated differently.

The securitized exposures are the exposures which are issued out of a pool of underlying exposures for the transfer of risk. The Re-securitized exposures are the exposures which are issued out of a pool of underlying exposures which constitutes of at least some portion of Securitized exposures, Non Securitized exposures as well as underlying exposures. The application is capable of handling both securitized exposures as well as re-securitized exposures. It also handles the calculation for the originator as well as the investor bank roles. At a broad level, there are two categories of Investors:

- An Investing Bank who has invested heavily in securitization.
  - These investors are prepared to provide the entire details of the securitization transaction
  - To cater to these investor needs, the entire pool, entire or invested tranche details, and the invested exposures information are required to be provided by the bank. This information is captured in the pool, tranche, and exposures table.
- An Investing Bank who has invested minimal in securitization:
  - These investors are prepared to provide the necessary inputs required for the calculation of the capital charge pertaining to their invested exposure.

- To cater to these investor needs, the invested exposures information is required to be provided as an input by the bank. A few pool and tranche attributes required for the computation are also to be provided as an input by the bank in the Stage Securitization Exposures (**STG\_SEC\_EXPOSURES**) table
- US guidelines specify two broad approaches for the calculation of the capital charge of Securitization exposures:
  - Standardized Approach
  - IRB Approach
    - Ratings Based Approach
    - Internal Assessment Approach
    - Supervisory Formula approach

For the USA 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**

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). For Re-securitization positions, if underlying exposure is a Securitization position, then the information is available in Securitization exposures (STG\_SEC\_EXPOSURES) table. For a reporting bank providing

only the exposure level information, the application expects a few pool level and tranche level parameters which are required for further processing, to be provided in the exposures table.

- **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:*

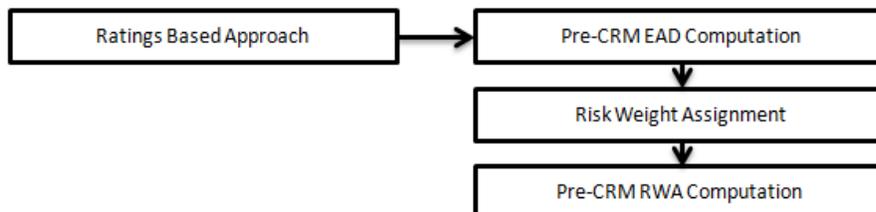
For exposures that follow the ratings based approach, the risk weight assignment is similar to the standardized approach, except for the difference on the criteria used for risk weighting. The application uses the granularity of the pool, seniority position of the exposure, and the credit rating of the 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 will be assigned a standard rating which will correspond to the worst of the best two risk weights associated with the various tranche ratings.

Based on all the above 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 will never have ratings more than that of the immediate senior tranche.

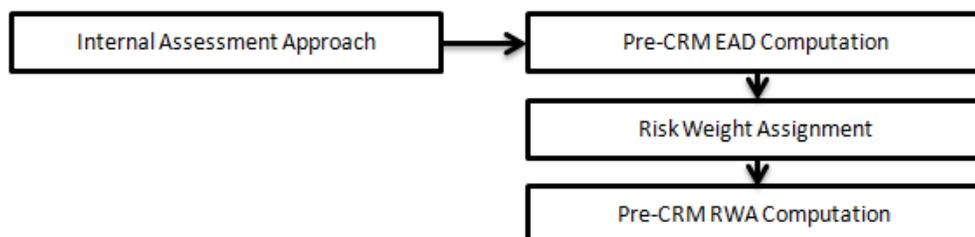
This is handled in the Pre-CRM Computations sub-process.



*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 (KIRB), 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.

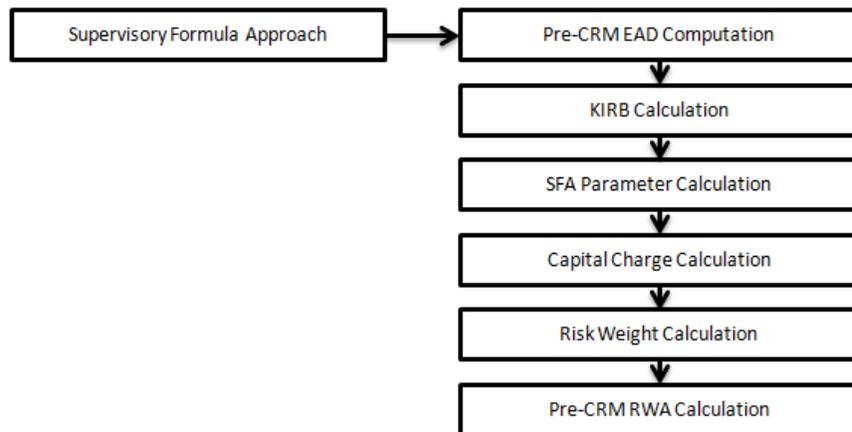
The exposures for which the sum of the credit enhancement level and the tranche thickness are less than that of the KIRB, the exposures are deducted from the capital. The exposures for which the credit enhancement level is more than that of the KIRB, the exposures have the SFA Parameters computed. The 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 are straddled, 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 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 key of the parent exposure, which is undergoing the split, is added as the parent account key for the new exposures formed. The straddled tranche deduction amount (the KIRB 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 as well as 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 will be minimum defaulted position in the basket minus 1. Also other credit derivative in the basket of exposures which are having the defaulted position consecutively will become eligible. For each eligible mitigant, the exposure mitigant mapping wherein the exposure has the least risk weight or capital charge will become eligible. All other exposure mitigant mapping for that mitigant will be 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 will have the same feature as that of the exposure and are created in the **FCT\_MITIGANTS** table

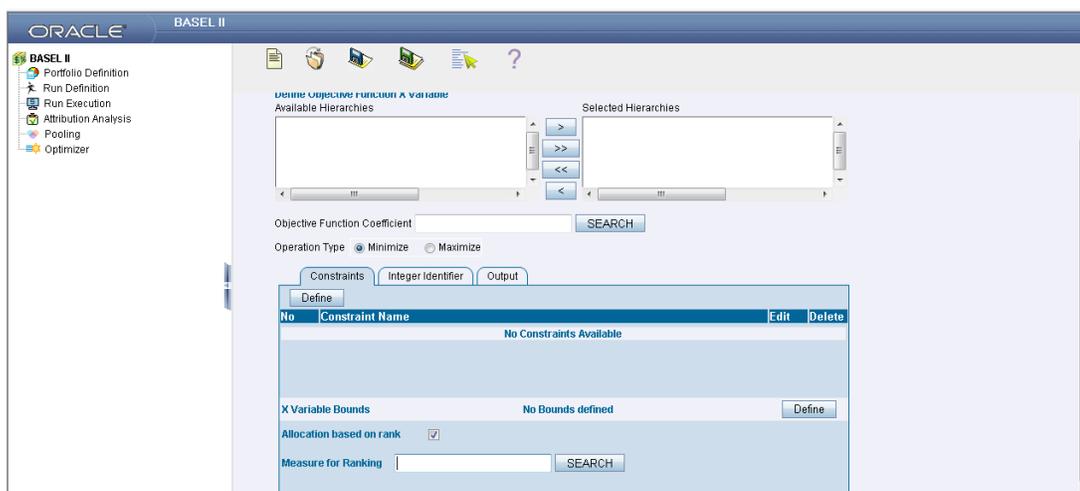
- Allocation of Mitigants to Exposures:

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 will be 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 has to be 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  $1 - \text{sum of all covered factors for that exposure}$ ) 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 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 refer to 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

- **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.

### **4.1.3. Capital Structure**

The capital structure of USA 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 3 (T3) 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. Tier 3 capital consists of few of the capital instruments like short term debt instruments, allocated to Market Risk. These are used in the capital calculation,

as well as 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%.

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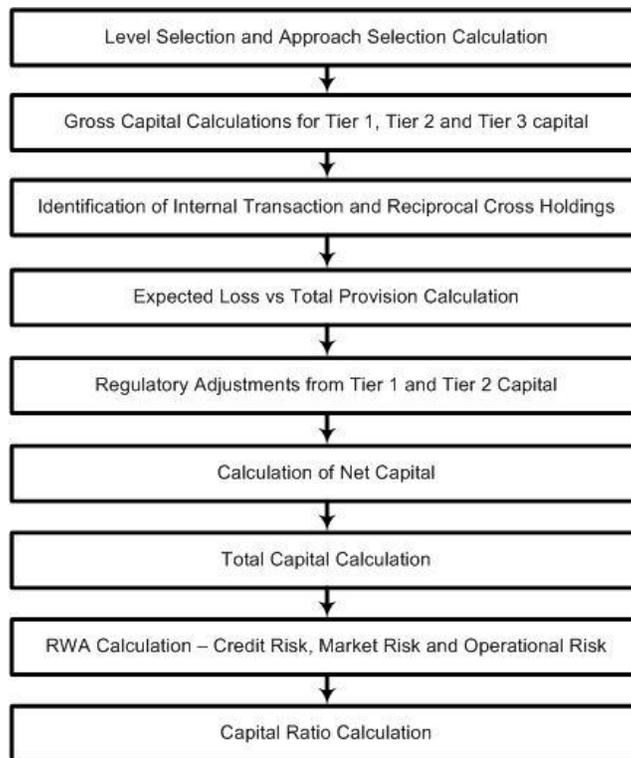
**NOTE:** While executing Solo Run the parent entity data is processed. Investment into the subsidiary data undergoes RWA calculation as per the Credit Risk and Market Risk rule. Capital line item pertaining to parent entity is only processed. For consolidation approach, the parent entity as well as the subsidiary data is considered. All the GL line items are expected at solo level for each entity. The consolidated data is discarded.

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### Assumption

The GL codes are expected to be unique across entities in **STG\_GL\_DATA** and **DIM\_CAPITAL\_ACCT\_HEAD**.

### 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 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 aggregate entity level tier 3 capital is expected as a download. The above 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 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 ‘**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 above 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, Net Tier 2 capital, and Net Tier 3 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 processed in the sub process – **Capital Components Calculations** in the process **USA\_CAP\_STRUCT**.

## 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 refer to 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 (**FACT\_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, refer Exhibit 5 in *Annexure A: Key Concepts*.

## 4.2. Basel III

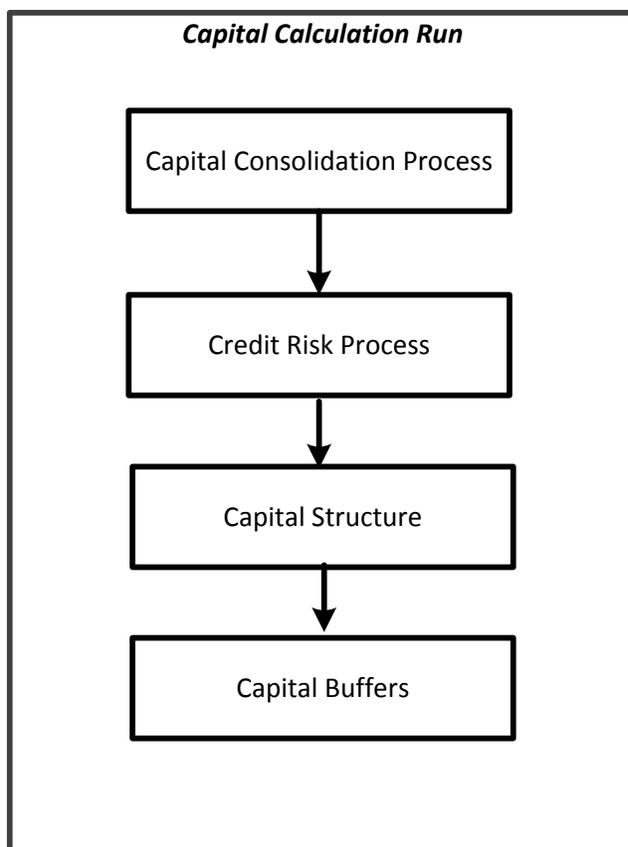
### 4.2.1. US- High Level Process Flow- Internal Ratings Based Approach

The application supports capital computations for Credit Risk along with Capital Structure, Capital Buffers, and Capital Consolidation process as per the guidelines laid down by the Federal Reserve Board.

For more information on the pre-defined Runs available with the application, refer *OFS Basel Regulatory Capital Run Charts*.

The sequence wise flow of processes included in the application is as follows:

#### Process Flow for Capital Adequacy Ratio calculation



## **Capital Calculation Run**

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, Market Risk process, and so on, also exist as individual runs which is described in the following sections.

### **Capital Consolidation Level Selection**

The reporting bank may 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**

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 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.

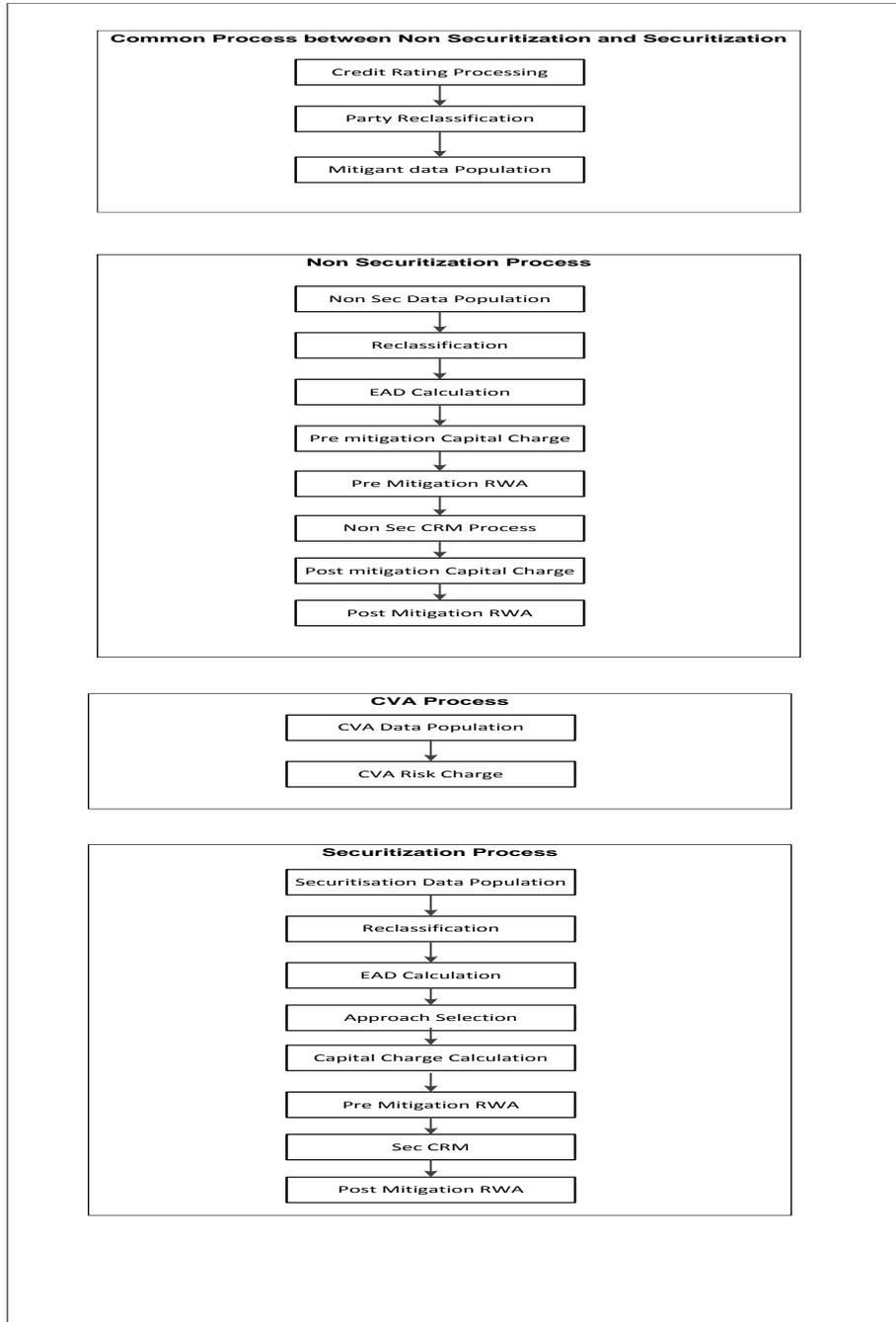
### **Currency Conversion**

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 will be updated with 1 as value and for each child entity the data will be based on the parent's holding percentage specified for each child in the fact entity share holding percent table.

### **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 Internal Ratings Based Approach.

CVA calculation has two approaches, the Standardized Approach and Advanced Approach, which is detailed separately under [Credit Valuation Adjustment](#) section under Credit RWA.

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

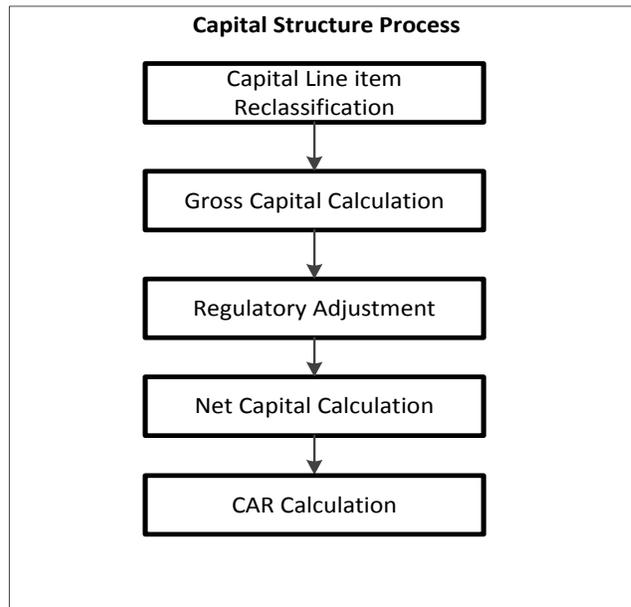
Securitization section of this document.

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, refer to *Credit RWA*.

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.

## Process Flow for Capital Structure

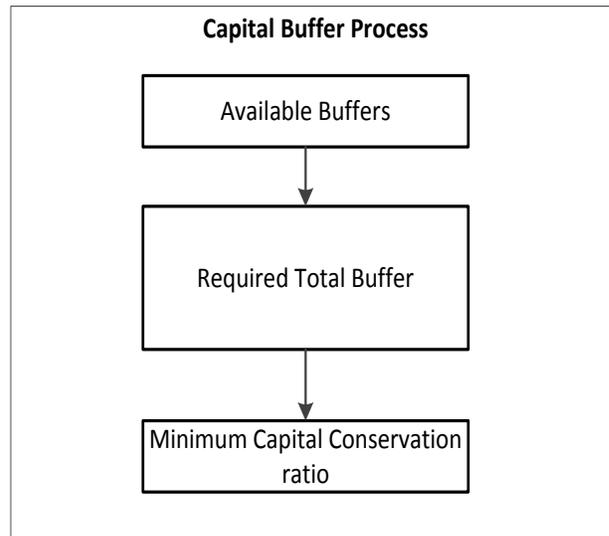


Capital Structure is executed along with Capital Consolidation and Credit RWA process. Each sub process mentioned in the preceding flow chart has a detailed explanation present in the Capital Structure section of this document.

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, refer to *Capital Structure*.

## Process Flow for Capital Buffer



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.

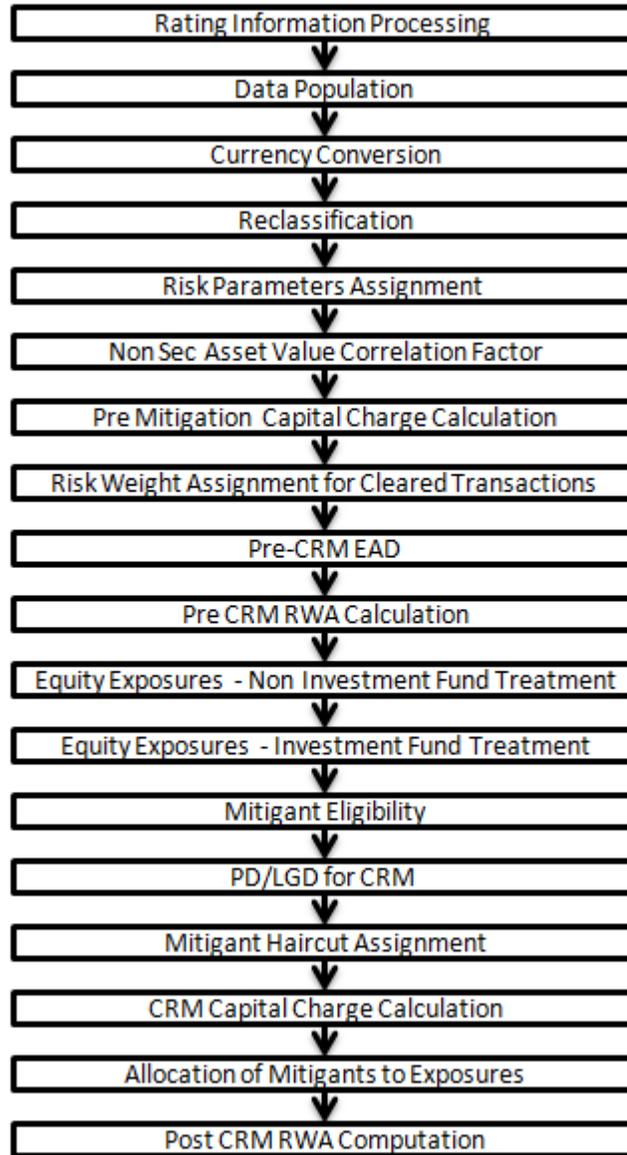
For example, required total buffer and capital conservation buffer calculation are detailed of this document. For more information, refer to *Capital Buffers*.

### **4.2.2. Credit RWA**

#### **Non Securitization**

The application supports the computation of Credit RWA as per the guidelines laid out in the US Basel III NPR. Credit RWA computation is broken down to credit risk for Non Securitized exposures and credit risk for Securitized exposures. This section details the Credit Risk computation for Non Securitized exposures.

**Process Flow**



- **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 except for Investment Exposures (present in STG\_INVESTMENTS), Securitized Exposures, and Securitized Tranches.
- **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 need to be uploaded to the application through the four rating tables. The application re-classifies the rating information to standard Basel ratings.

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**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 will be 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.

Once 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 Basel accord. 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:

Credit risk exposures' data needs to 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
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
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_EQUITY_EXPOSURES
Underlying exposures for repo contracts	STG_UNDERLYING_EXPOSURES
Credit Derivatives	STG_CREDIT_DERIVATIVES
Leases	STG_LEASES_CONTRACTS

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, refer to 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:

$$\text{Exposure amount} \times \text{share holding percent} = \text{Updated Exposure Amount}$$

(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, refer Exhibit 4 in *Annexure A: Key Concepts*.

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**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.

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- **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 Final Rules. These product types after reclassification are stored as Basel product types. For Example: Housing Loan is reclassified as Residential Mortgage Exposure.

As proposed in USA Basel III NPR, 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 have been modified to include charge card which will be reclassified into QRE in the product re-classification to standard product type. For more information on this amendment, refer to *Other Amendments*.

Cash item in process of collection is now risk weighted at 20%. A new Rule (USA NPR III - Non Sec Asset Class Reclassification – IRB) 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’. For more information on cash items in process of collection, refer to *Other Amendments*.

- 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.

USA Basel III NPR 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 guarantee:

- 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. For more information on Eligible Guarantees, refer to *Other Amendments*.

As per the US Basel III NPR, standard supervisory haircuts for repo, margin loans, and financial collateral amendments have been introduced. In this case, a foreign PSE is reclassified into standard party type. For more information on standard supervisory haircuts for repo, margin loans, and financial collateral amendments, refer to *Other Amendments*.

▪ 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**) has been introduced in the application.

- **Non Sec Asset Value Correlation Factor:**

USA Basel III NPR 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:

$$\text{Correlation (R\_FI)} = 1.25 \times [0.12 \times (1 - \text{EXP}(-50 \times \text{PD})) / (1 - \text{EXP}(-50)) + 0.24 \times [1 - (1 - \text{EXP}(-50 \times \text{PD})) / (1 - \text{EXP}(-50))]]$$

AVC Rule is applicable for both Non Securitization accounts and for issuers of Credit Risk Mitigation.

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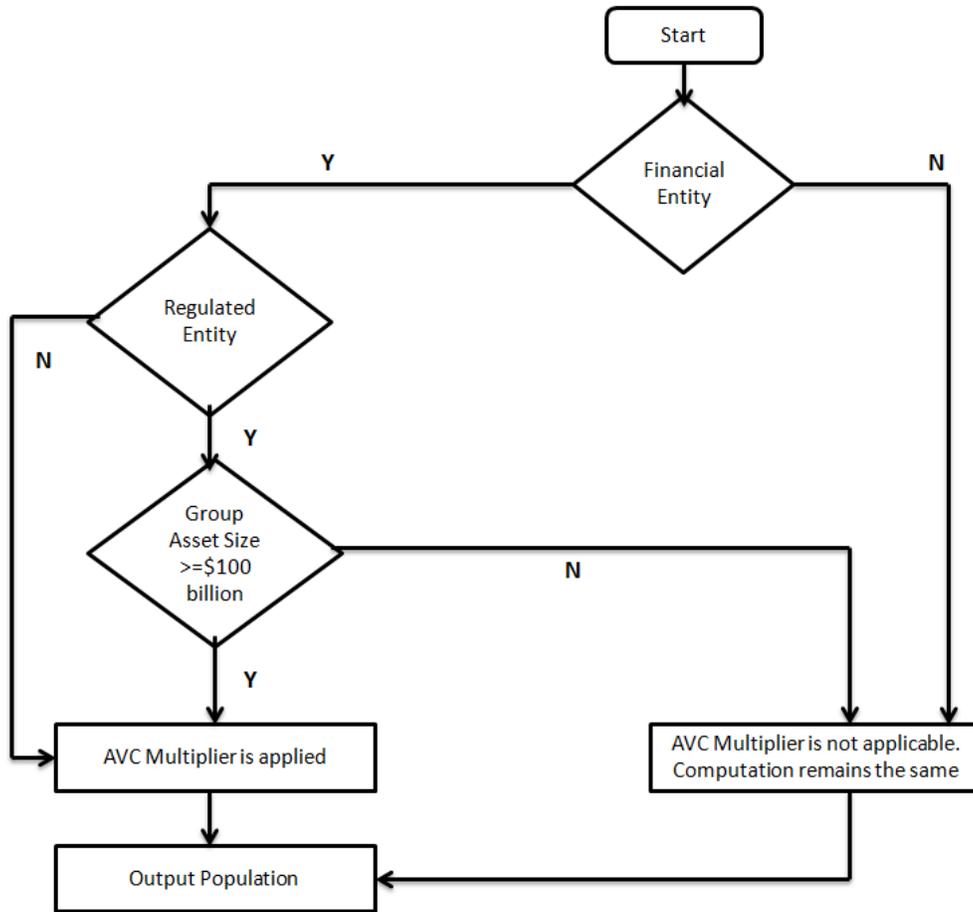
**NOTE:** The computation of AVC does not change for any entity executing a Solo or Consolidation Basel Run.

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#### Assumptions

USA Basel III NPR 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:

- 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.

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  $\geq$  \$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 may 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 Basel III NPR. For more information on cleared transactions, refer to *Cleared Transactions*.

- **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 Basel III NPR 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:**

Credit rating of the mitigant of the collateral are 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 configured Rules that carry out the eligibility checks. There are 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.

- **PD/LGD for CRM:**

The application assigns the PD and LGD to the mitigants as per the following conditions:

- As per the US Final Rules, if the guarantee and credit derivative are used as eligible mitigants, then you can select the LGD adjustment approach or PD substitution approach for the two mitigants against an exposure. If the LGD adjustment method is selected, then the LGD of the mitigants is assigned to the covered portion of the exposures. For the uncovered exposure the LGD of the exposures is assigned. The PD assigned is that of the obligor for both the covered and uncovered portion.
- If PD substitution approach is used, then LGD assigned to both the covered and uncovered, is the adjusted LGD. PD assigned to the covered portion is that of the mitigant and uncovered is that of the obligor.
- For other collateral where comprehensive approach is used, LGD used for the covered portion is that of the mitigant and for uncovered, the LGD is that of exposures.
- For LGD assignment, the application also takes care of the minimum collateralization effect as stated in Basel II guidelines. Additionally, if there is any over collateralization amount, then the application does the mitigant value adjustment based on the over collateralization percentages as stated in Basel II guidelines.

- **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 both 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 two methods for assigning volatility haircut:

- Supervisory Haircut
- Scaling Up

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 Final Rule. In 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 and for further processing. The eligible mitigants are moved from mitigants table to the sub exposures table. Haircuts mentioned by 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:** 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, refer 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 will be 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 its 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.

## Credit Valuation Adjustment

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 Basel Accord, The US Federal Reserve System has also introduced CVA as part of US NPR 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 both 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 both IMM approval SIR risk as a part of approved VaR model for bonds,  
**CCR Capital Charge = Default Risk Capital Charge + Advanced CVA Capital Charge**

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**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.

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### 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.

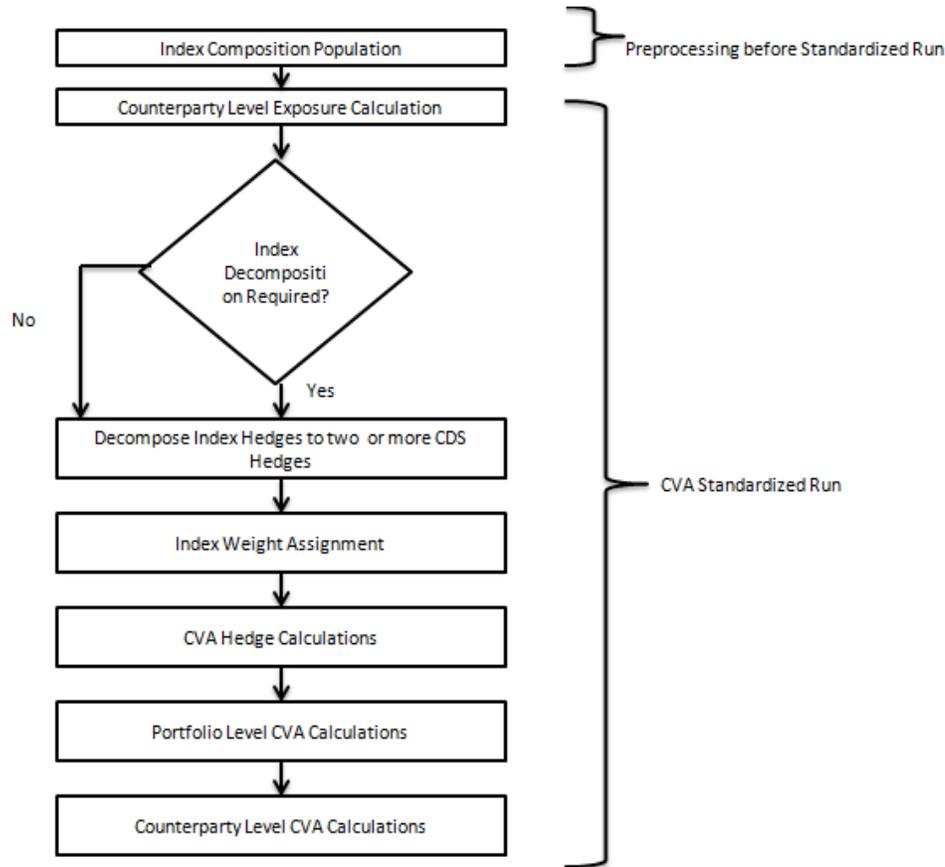
### Process Flow

This process flow is divided into two sections, for standardized approach and advanced approach.

### Simple CVA Approach

The application calculates CVA capital charge at portfolio level using the following formula as specified by US Basel III NPR guidelines:

$$K = 2.33 \cdot \sqrt{h} \cdot \sqrt{\left( \sum_i 0.5 \cdot w_i \cdot (M_i \cdot EAD_i^{total} - M_i^{hedge} B_i) - \sum_{ind} w_{ind} \cdot M_{ind} \cdot B_{ind} \right)^2 + \sum_i 0.75 \cdot w_i^2 \cdot (M_i \cdot EAD_i^{total} - M_i^{hedge} B_i)^2}$$



- **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 - US 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:

- **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 set level or at trade level. This is available as an output of Current Exposure Method (CEM). If more than one netting set 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 set level or for each netting set using the formula  $1 - \exp(-0.05 \cdot M_i) / (0.05 \cdot M_i)$ .

Maturity is the notional weighted maturity at netting set level. The application sums the data for exposure at counterparty level. If more than one netting set 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  $(1 - \exp(-0.05 \cdot M_{ihedge})) / (0.05 \cdot M_{ihedge})$ . 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  $(1 - \exp(-0.05 \cdot M_{ind})) / (0.05 \cdot M_{ind})$ . 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:

$$K = 2.33 \cdot \sqrt{h} \cdot \sqrt{\left( \sum_i 0.5 \cdot w_i \cdot (M_i \cdot EAD_i^{total} - M_i^{hedge} B_i) - \sum_{ind} w_{ind} \cdot M_{ind} \cdot B_{ind} \right)^2 + \sum_i 0.75 \cdot w_i^2 \cdot (M_i \cdot EAD_i^{total} - M_i^{hedge} B_i)^2}$$

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**

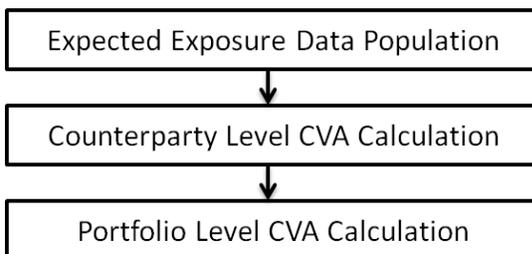
CVA Capital Charge at counterparty level is allocated using the following formula:

CVA at Counterparty = Total CVA at Portfolio \*  $W_{CVAi}$

$$W_{CVAi} = \text{Absolute} [0.5 * W_i * (M_i * EAD_{itotal} - M_i^{hedge} * B_i) - \sum_{indi} (W_{ind} * M_{ind} * B_{ind} )] /$$

$$\sum_i \text{Absolute} [0.5 * W_i * (M_i * EAD_{itotal} - M_i^{hedge} * B_i) - \sum_{indi} (W_{ind} * M_{ind} * B_{ind} )]$$

**Advanced CVA Approach**



The application calculates the CVA charge at counterparty level and is aggregated at portfolio level using the following formula:

$$K = 3 * (\text{CVA Unstressed VAR} + \text{CVA Stressed VAR})$$

$$CVA = (LGD_{MKT}) \cdot \sum_{i=1}^T \text{Max} \left( 0; \exp \left( -\frac{s_{i-1} \cdot t_{i-1}}{LGD_{MKT}} \right) - \exp \left( -\frac{s_i \cdot t_i}{LGD_{MKT}} \right) \right) \cdot \left( \frac{EE_{i-1} \cdot D_{i-1} + EE_i \cdot D_i}{2} \right)$$

The application calculates the CVA charge at counterparty level using the above 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:

- **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  $T_i$ , 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  $t_i$  where exposures of different netting sets 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  $t_i$ .
- **Counterparty Level CVA Calculation**
  - CVA RWA calculation at counterparty level is computed by the following formula:

$$\text{CVA RWA} = 12.5 * K$$

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:

$$\text{CVA RWA} = 12.5 * K$$

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.

---

### **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 refer to 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.

### **Out of Scope**

The following is not covered by the application in the computation of CVA:

- Treatment of specific wrong way risk.

### **Securitization**

Due to the economic crisis in 2008 and other amendments brought in by the Dodd-Frank Act, USA Basel III NPR has revised the treatment of securitized exposures. The application supports the following revised hierarchy of approaches for securitization exposures:

- Supervisory Formula Approach (SFA)
- Simplified Supervisory Formula Approach (SSFA)
- Risk Weight at 1250%

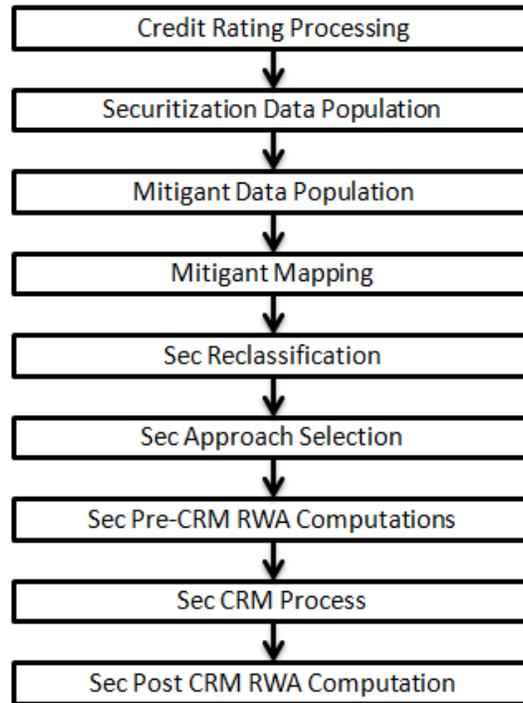
### **Assumptions**

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

### **Process Flow**

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. 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. For reporting bank providing only the exposure level information, the application expects a few pool level and tranche level parameters, which are required for further processing, to be provided in the exposures (**STG\_SEC\_EXPOSURE**) table.

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 **USA NPR 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**

The application assigns the appropriate approach to the exposures, based on the criteria specified in the US Basel III NPR. 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. Similarly, if data of underlying exposures is available for SSFA then exposure is marked as SSFA is 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**.

- **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 Supervisory Formula Approach, Simplified Supervisory Formula Approach Risk Weight Assignment Rules are computed.

- **Pre-CRM EAD Computation:**

The application assigns the Credit Conversion Factor (CCF) to the off-balance sheet items, based on the product type. Further, it computes the Pre-Mitigation EAD based on whether the exposure is an off-balance sheet item or not and whether the exposure is held for sale or for maturity. 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:**

*Supervisory Formula Approach:*

For exposures which follow SFA, the application calculates the underlying capital of the securitization pool (KIRB), using the non securitization process. It then calculates the SFA parameters based on the pool and tranche details. However, if downloaded pool and tranche parameters are provided by the client as input, preference is given to those values. The application calculates these using the calculation logic as specified by the US Basel III NPR. It also verifies 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 credit enhancement level and the tranche thickness are also calculated for the sold credit protection. This is done using the Data Transformation “TRANCHE\_L\_T\_CALC\_SCP”. The details of the Data Transformation are as follows:

Data Transformation Name	Objective	Processing Logic
TRANCHE_L_T_CALC_SCP	The objective of this Data Transformation is to calculate SFA parameters - Credit Enhancement Level (L) and Tranche Thickness (T) 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. L 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 T is calculated as [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.

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**Note:** The RWA formula for KIRB calculation has changed from the previous release to the current release of OFS Basel Regulatory Capital Release 6.1.0.0.0.

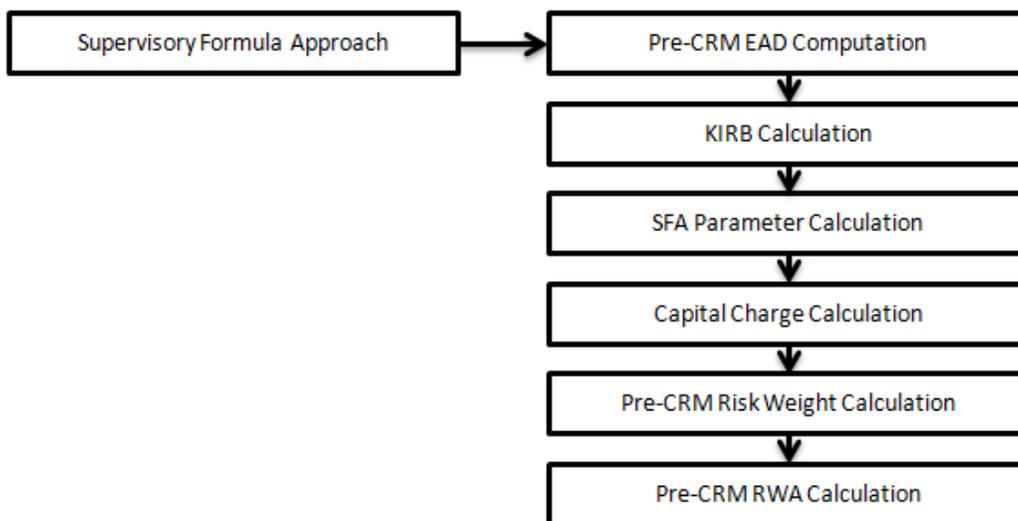
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The exposures for which the sum of the credit enhancement level and the tranche thickness is less than that of the KIRB, the exposures are deducted from the capital. The exposures for which the credit enhancement level is more than that of the KIRB, 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 of the KIRB, the exposures are straddled, and that is, the tranche to which the exposure belongs to, is split into a position below KIRB and a position above KIRB. 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 key of the parent exposure, which is undergoing a split, is added as the parent account key for the new exposures formed. The straddled tranche deduction amount (the KIRB amount less the tranche amount) is calculated and populated from the securitization straddled tranche (**FSI\_SEC\_STRADDLED\_TRANCHE**) in a pro-rated manner to all the junior exposures. The remaining amount (which is the tranche amount above the KIRB) is the exposure amount of the senior exposure 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. 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 converted into the risk weight. This is handled in the **Sec Pre-CRM RWA Computation** sub-process. The process flow of SFA is as follows:



*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. 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 Basel III NPR.

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 Basel III NPR. The solution calculates the balance of the subordinated funded reserve balance using the Data Transformation “Subrdntd\_Fnnd\_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:

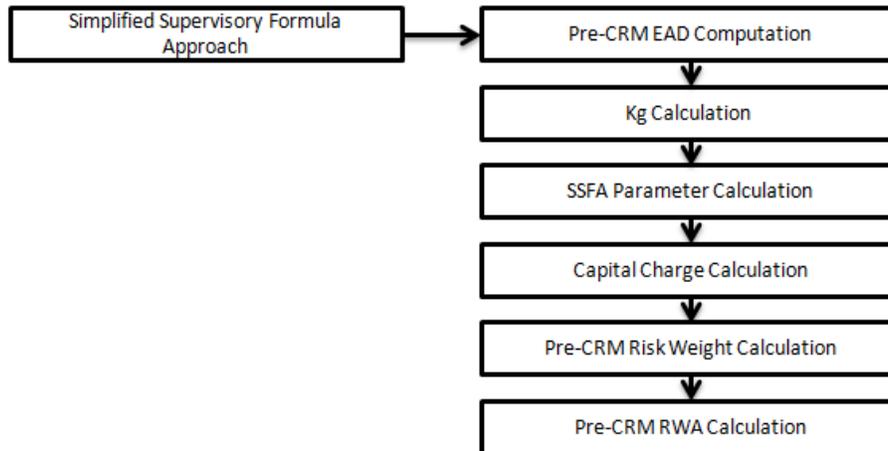
Data Transformation Name	Objective	Processing Logic
Subrdntd_Fnnd_Amt_Pop	The objective of this Data Transformation is to calculate the sum of the subordinate tranche amounts of a securitization tranche.	For each tranche, pick the tranches which junior to the current tranche, sum those tranche's amount and update FCT_SECURITIZATION_TRANCHE.n_subordinated_tranche_s_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.

Once 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 will be 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:




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Note: Due to the hierarchy of approaches, all Sec Exposures which have valid Pool and Tranche level data go through SFA and not SSFA. The remaining will undergo 1250% risk weight approach.

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*Risk Weight at 1250%:*

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  $K_{IRB}$  for SFA.

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 will assign them 1250% risk weight. This exception in risk weight assignment is handled after the Supervisory Formula Approach, Simplified Supervisory Formula Approach tasks in the **Sec Pre-CRM RWA Computation** sub process.

In this current release of OFS Basel Regulatory Capital Release 6.1.0.0.0, the capital calculation of re-securitized positions has changed. For capital calculations of re-securitized positions,

information of underlying exposures capital (in SFA, this data is required for KIRB calculations and in 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.

- **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 Basel III NPR. 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 Basel III NPR.

- **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 Basel III NPR. 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 Basel III NPR. 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.

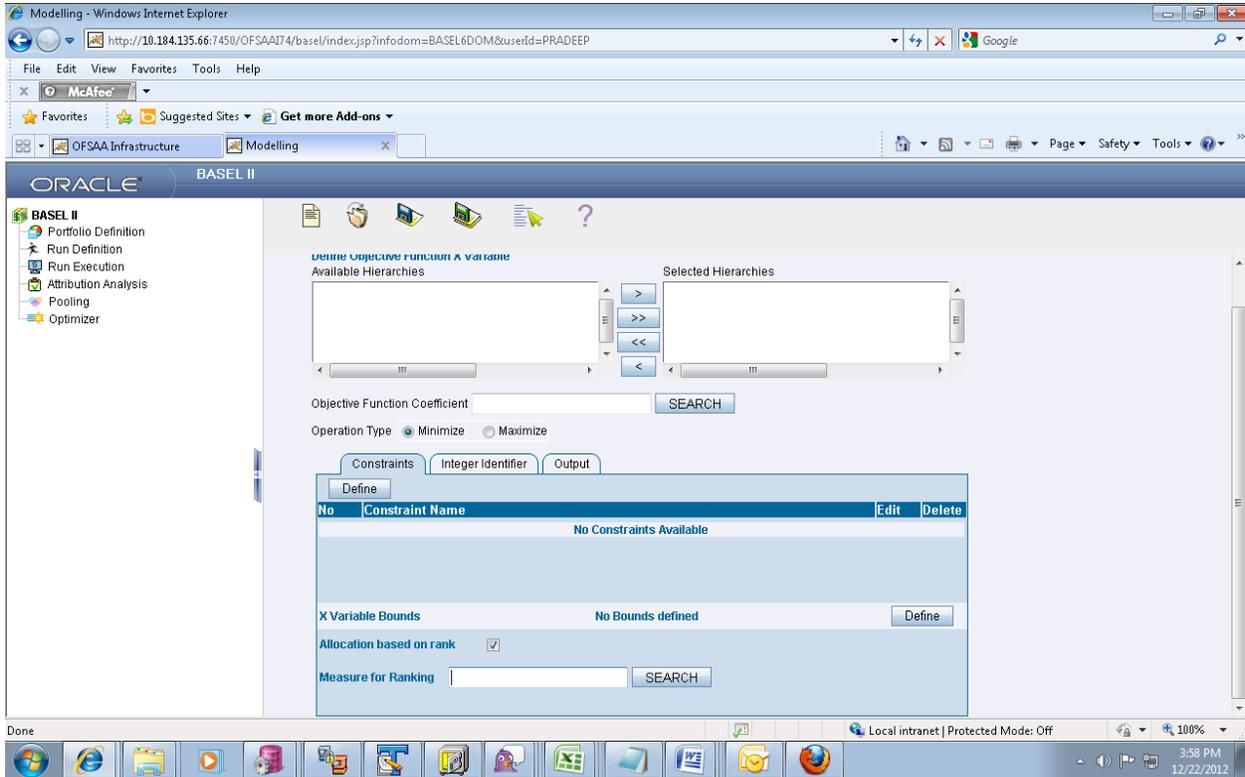
The same scaling up is done for FOREX haircut. Once the haircut assignment is complete, zero risk weight is assigned to financial collaterals. Only eligible mitigants are considered for haircut assignment and for further processing. Post haircut assignment, the eligible mitigants are moved from mitigants 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 will be 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 the above logic, the application calculates the factor of exposure covered by the mitigant and the factor of the exposure uncovered (without any protection).

- **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  $1 - \text{sum of all covered factors for that exposure}$ ) 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 - Supervisory Formula 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

### **Key Data Elements**

A few key data elements are provided in this section. For an entire list of tables and columns to be populated refer to the Download Specifications document.

### **Securitization Exposures:**

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 SFA are:
  - n\_credit\_enhancement\_level
  - n\_thickness
  - n\_kirb
  - n\_lgd\_percent
  - n\_granularity
  - Pool Exposure Amount
  - Tranche Percentage
- Parameters for SSFA are:
  - n\_pool\_kg
  - n\_ssfa\_pool\_parameter\_w

- n\_ssfa\_tranche\_parameter\_a
- n\_ssfa\_tranche\_parameter\_d

If both 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.

## **4.2.3. Capital Structure**

Under the new proposed rule of the US jurisdiction (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 as well as the Dodd-Frank Act. The total capital requirement of 8% remains the same as in the US Final Rule. However, the total capital increases after addition of the capital conservation buffer and countercyclical buffer.

### **Components of Capital**

As per the US Basel III NPR, the total capital consists of the sum of the following elements:

- Tier 1 capital
  - Common Equity Tier 1 (CET1)
  - Additional Tier 1 (AT1)
- Tier 2 (T2) Capital

### **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:

- 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 US Basel III NPR 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 will be phased out using the transitional arrangements.

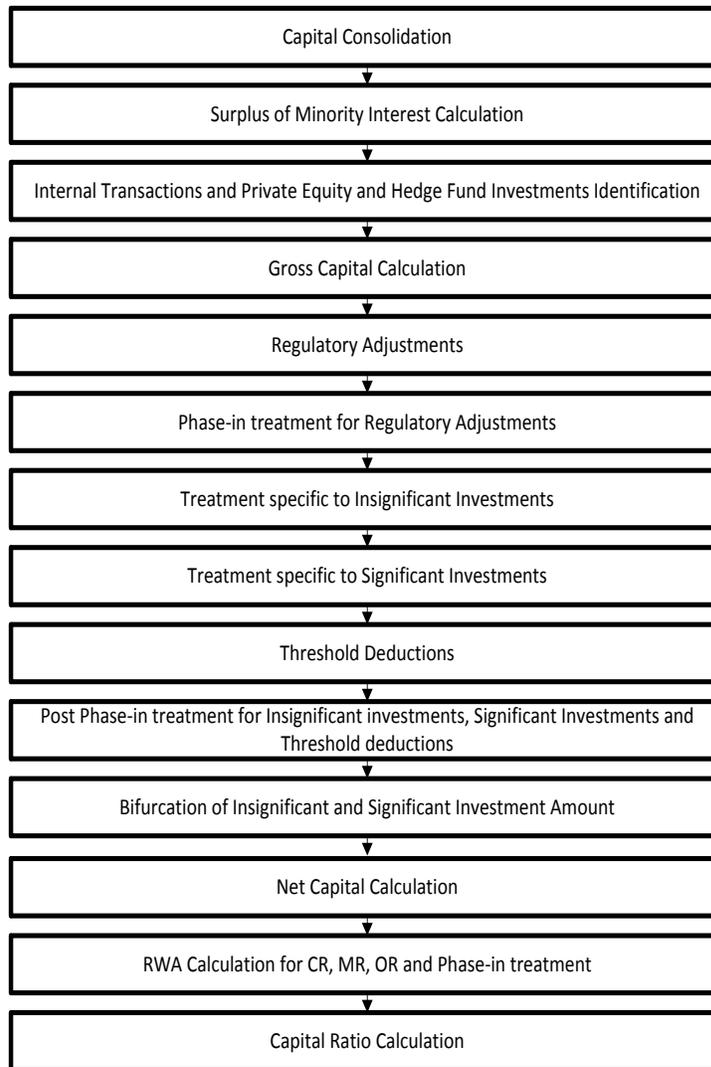
### **Assumptions**

- **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 would generally be 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 need to be risk weighted as per IRB approach of Banking Book products for both 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 would qualify 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.
- **Calculation of Regulatory Adjustments and Threshold deduction**
  - As per Accord:
    - In the Accord, the phase-in calculation logic for the regulatory adjustment and threshold

deductions are based on the base year calculations. However, there is no clarity on the phase-in arrangement for regulatory adjustment and threshold deductions to be applied (for example 2016) if the amount varies from year to year (for example the change in any of the deduction line items for the year 2014 and 2016).

- Interpretation in the application:
  - The BIS Basel III guidelines on regulatory adjustment and threshold deduction for phase-in arrangement are applied, since there is not much clarity on this change.
- **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 will generally be outside the regulatory consolidation and hence will be 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.

## Process Flow



- **Capital Consolidation:**

To process the capital for a bank, the organization level at which the capital has to be calculated and whether a Solo Run or Consolidation Run should be executed, must be 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**’

- **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.

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 is computed by multiplying the total RWA by the minimum required tier-wise capital as a percentage (Total RWA \* Minimum Required CET1%, Total RWA \* Minimum Required AT1%, Total RWA \* Minimum Required T2%). The Surplus of the capital is computed as the difference between the tier wise available capital and the tier-wise 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 – **Surplus of Minority Interest Calculations** in **USA\_BASELIII\_CAPITAL\_STRUCTURE** process covers the above processing.
- **Internal Transactions and Private Equity and Hedge Funds 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.

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.
- **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 4 elements:

  - Net unrealized gains and losses on AFS debt securities
  - Accumulated Net gains and losses related to defined pension benefit obligations
  - Unrealized gains on AFS equity securities
  - Accumulated net gains and losses on cash flow hedges related to the items that are reported on the balance sheet at fair value

Also, the unrealized gain on AFS Equity securities 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 of Gross AT1 or T2. The balance phase-in amount is not used for further processing.

The sub process – **Provisions and Gross Capital Calculations** in **USA Basel III Capital Structure** process covers this processing.

- **Regulatory Adjustment:**

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 use these in the deduction of regulatory adjustments and in threshold deduction treatment.

Shortfall of stock of provision to expected loss is applicable only for the advanced approaches portfolio. The allowance for loan and lease losses for IRB 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 IRB approach 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.

- **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, AOCI Transition 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.

The balance phase-in amount of the capital line item is either deducted from the AT1 tier of capital or assigned a Risk Weight.

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	FRB

The entire processing is done in sub processes –**Regulatory Adjustment Phase in Deduction Data Processing** calculation in process – **USA Basel III Capital Structure**.

- **Treatment specific to Insignificant Investments**

The entities which are outside the scope of regulatory consolidation and are part of the organization structure (**DIM\_ORG\_STRUCTURE**) will be identified for significant and insignificant investments. The entities which have a shareholding percent of 10% or more are identified as significant entities and

the entities which have a shareholding percent of less than 10% are identified as insignificant entities. 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. 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:

- 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 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 will 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 will also follow phase –in arrangement which is similar to the phase-in arrangement for Regulatory Adjustments.

- **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.

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. 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 will be risk weighted 100% during the transition period and will be 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 must be 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 have to be 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)**. This splitting logic is carried to **Equity Exposures (FCT\_EQUITY\_EXPOSURES)** and **Fact Sub Exposures (FCT\_SUB\_EXPOSURES)** as well.

The entire processing is done in the sub processes –**Non Sec Insignificant Investment Exposure Processing, Non Sec Significant Investment Exposure Processing, Non Regulatory Investment Sub Exposures Population, and Equity Non Regulatory Investment Processing** in the process – **USA Basel III Capital Structure**.

- **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 IRB 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**.

- **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 **USA Basel III Capital Structure Capital Ratio**.

## 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 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 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.
- AOCI Amount
  - 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 will undergo transitional arrangements.
- 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 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 as well as 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.

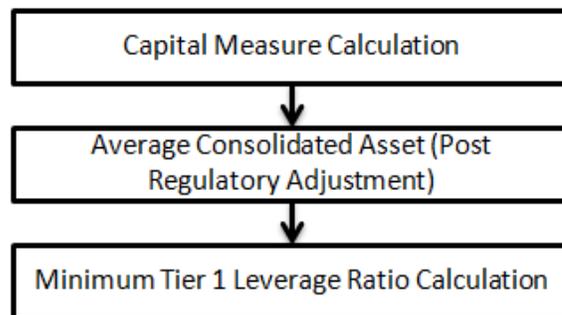
- Internal Transactions Data Expectation
  - The Customer Reference code of the exposures should be of any entity’s party id, which is part of the Organization Structure Dimension (**DIM\_ORG\_STRUCTURE**), to be identified as internal transactions.
- Investment in own shares data expectation
  - The 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.

#### 4.2.4. Leverage Ratio

US Basel III NPR rules have identified two types of leverage ratios which are as follows:

- **Minimum Tier 1 Leverage Ratio:** as per US Basel III NPR 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** has been incorporated in the application to compute Minimum Tier 1 Leverage Ratio.
- **Supplementary Leverage Ratio:** As per US Basel III NPR rules Supplementary Leverage Ratio should not be less than 3% for a banking organization. Supplementary Leverage Ratio is defined as tier 1 capital / total leverage exposure. A separate Run **USA - Basel III - Supplementary Leverage Ratio Calculation** has been incorporated in the application to compute Supplementary Leverage Ratio.

#### 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 USA Basel III NPR). For more information on Calculation of Net Tier 1 Capital refer to 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 as well as 80% of the amount needs to be 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 both 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

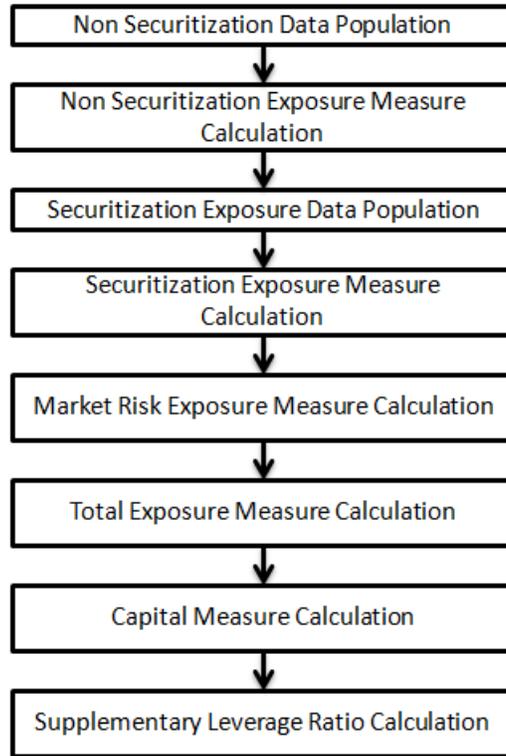
Whereas, for other intangible assets (threshold deduction amount above 10% and 15%) where only a certain portion, as per the phase-in arrangement, is being deducted from CET1, the same amount is reduced from the average consolidated asset. The remaining amount being risk-weighted is not deducted.

- **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.

### Process Flow for Supplementary Leverage Ratio



A prerequisite for Supplementary Leverage Ratio processing is market risk data population. Market risk exposure is aggregated from the outstanding positions of the instruments. Hence, population of market risk positions is a prerequisite for the exposure measure calculation of market risk. These market risk positions are expected as a direct download from the bank.

The process flow for calculation of leverage ratio is as follows:

- **Non Securitization Exposure Data Population**

Data from the Product Processors are populated to non securitization processing table in the process **Non Sec Data Population**. Non Securitization Exposure Measure used in leverage ratio is the summation of the following products:

- On-Balance Sheet Item
- Repo-Style Transaction
- Derivative Transaction
- Off-Balance Sheet Item

Details on the calculation of these exposure measures are explained in the following section.

- **Non Securitization Exposure Measure Calculation**

After data is populated in the non sec processing table, the exposure measure is calculated in the process **Non Sec Exposure Measure Calculation**. As the Credit Conversion Factor (CCF) value (which is further used in exposure measure calculations) for off-balance sheet items is different for

leverage ratio calculation and capital calculation, leverage ratio cannot be calculated as part of the Capital Calculation Run.

- **Securitization Data Population**

Securitization exposure data is populated to securitization processing table in the process **Sec Data Population**.

- **Securitization Exposure Measure Calculation**

After securitization exposure data is populated, exposure measure is calculated in the process **SEC\_EXPOSURE\_MEASURE\_CALCULATION**. Securitization transactions follow the accounting measure of exposure. The exposure amount of both the originator and investor are considered to arrive at the exposure amount. The securitization transaction where CCF assignment is applicable is assigned as prescribed in the Basel II guidelines.

- **Market Risk Exposure Measure Calculation**

Market risk data that is populated through Staging MR Data Population Run, is populated in the market risk processing table and the exposure measure is calculated in the process **Mkt Risk Exposure Measure Calculation**. The following market related instruments are considered for exposure measure. The total exposure measure used in the leverage ratio is the sum of the exposure amount for all products:

- Interest rate
- Equity
- Forex
- Commodity
- Options

Netting of long and short position is done at instrument level. The post netting value is considered as exposure measure. All the internal transactions, treasury stock, and reciprocal cross holding transactions is excluded while calculating the total exposure amount for the market related instruments.

While calculating exposure amount for subsidiaries that are part of regulatory consolidation and used in the leverage ratio, the exposure amount is limited to the share-holding percentage. For example: A subsidiary which is part of regulatory consolidation and parent holding in the subsidiary is 45%, only exposure amount limited to 45% is considered for exposure measure calculation. Similarly, if the holding is more than 50%, the entire amount is considered for exposure measure calculation.

- **Total Exposure Measure Calculation**

Total Leverage exposure is sum of the following exposures:

- **On Balance Sheet Items:**

Accounting value of the on-balance sheet items is used. The on-balance sheet item value is net of specific provision and valuation adjustments. The on-balance sheet item does not consider the physical or financial collateral, guarantee or credit risk mitigants elements and no netting of loans and deposits. Nettable transaction related to OTC and SFT, Internal Transactions, Treasury Stock, and Reciprocal Cross-Holding does not form a part of on-balance sheet transactions.

- **Repo-Style Transaction:**

Repo-style transaction (repo or reverse repos and securities lending or borrowing) follows the bilateral netting agreements and the accounting measure of the exposure. The Repo transaction undergoes volatility and FOREX haircut as defined in the US Final Rules before the exposure amount is calculated.

- **Derivative Transaction:**

Derivative transaction (OTC Derivative product) is calculated using the Current Exposure Method as prescribed in the US Final Rules. All derivative transactions including Credit Default Swap (CDS) are assigned an add-on percent based on the underlying type as per the Current Exposure Method. The exposure amount is the sum of current exposure amount and the notional principal multiplied by the add-on percent. For transactions where bilateral netting is applicable, the exposure amount is netted and the exposure amount is calculated.

- **Securitized:**

Securitization transaction follows the accounting measure of exposure of securitizations. The exposure amount of both the originator and investor is considered to arrive at exposure amount. The CCF assignment of securitization exposure is as per USA Basel III NPR rules.

- **Off Balance Sheet Items:**

For all the off balance sheet items, excluding repurchase agreements and SFT, the notional amount which include commitments (including liquidity facilities), unconditionally cancellable commitments, direct credit substitutes, acceptances, standby letters of credit, trade letters of credit, failed transactions, and unsettled securities are considered. A uniform 10% of the notional amount is applied to all unconditionally cancellable commitments.

- **Market Related Instrument Items:**

All market related instruments associated with interest rate, equity, FOREX, commodity, and options are considered for calculation of exposure measure. This data is expected to be a direct download value. Each instrument post netting of gross long position net of short position is considered for exposure measure except FOREX instrument. For FOREX, the exposure amount is used in the exposure measure. All the internal transactions, treasury stock, and reciprocal cross holding transactions is excluded while calculating the total exposure amount for the market related instruments.

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**Note:** If an exposure is reported in the national currency then it has to follow currency conversion if the reporting currency is different from the national currency.

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While calculating the exposure amount for the subsidiary that is part of the regulatory consolidation and used in the Supplementary Leverage Ratio, the exposure amount is limited to the share-holding percentage. Hence, if the share holding % is between 20% and 50%, the exposure amount will be limited to the percentage of the shareholding. If the shareholding percentage is greater than 50%, the entire exposure amount related to that financial entity is considered for exposure measure. However, if share-holding is less than 20%, then the exposure is not considered for exposure measure calculation.

Percentage of share-holding in the BFSI – part of Regulatory Consolidation	Part of exposure amount to be in exposure measure
<20%	Exposure will not be considered
>20% - <50%	Pro-rata basis.
>50%	Full amount to be considered.

- **Total Additional Asset of Significant Investment Entity where Bank owns more than 10% of Issued Capital:**

This requirement is not explicitly stated in the USA Basel III NPR, however the application calculates the total additional asset of significant investment entity as per BIS Basel III guidelines. Subsidiaries that are outside the scope of regulatory consolidation (as defined in the Basel III Accord paragraph 84) where the parent bank owns more than 10% of the issued common share capital of the entity, subsidiary’s additional assets is included in the exposure measure (as per paragraph 156 of the Basel III Accord).

The total assets included in the exposure measure are calculated as follows: total assets of the

entity (included in the consolidated figures) multiplied by the percentage of the entity's capital that has not been deducted, less the share of the investment that has not been deducted. To arrive at the percentage of the entity capital that has not been deducted refer to the following calculation: (investment in capital not deducted and total investment is considered):

#### **Capital not Deducted/Total Investment.**

- **Supplementary Leverage Ratio Calculation**

Supplementary Leverage Ratio is calculated as tier 1 capital amount divided by the total exposure measure amount. USA Basel III NPR calls for calculation of Supplementary Leverage Ratio in conjunction to Minimum Tier 1 Leverage Ratio. As per the US Basel III NPR rules, the Supplementary Leverage Ratio should not be less than 3% for a banking organization and is defined as tier 1 capital / total leverage exposure. As per the US Basel III NPR rules, a bank should calculate the Supplementary Leverage Ratio, including each of the ratio components, at the end of every month and then calculate a quarterly leverage ratio as the simple arithmetic mean of the three monthly leverage ratios over the reporting quarter.

For example: the Supplementary Leverage Ratio calculated for the month of January, February, and March is SL1, SL2, and SL3. The average of the Supplementary Leverage ratio is calculated as  $(SL1+SL2+SL3)/3$ .

If Supplementary Leverage Ratio is calculated in between the month, then Supplementary Leverage Ratio of the previous three months should be calculated. Tier 1 capital used in the numerator of the Supplementary Leverage Ratio is equal to net tier 1.

$$\text{Net Tier 1} = \text{Gross CET1 Capital} + \text{Gross AT1 Capital} - \text{Regulatory Adjustment to CET1} - \text{Regulatory Adjustment to AT1}$$

### **4.2.5. 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 Basel III NPR, 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 Basel III NPR.

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 refer *Glossary*.

#### **Out of Scope**

The concept of Default Fund Requirement of the bank has not been incorporated in the current release of the application.

#### **Assumption**

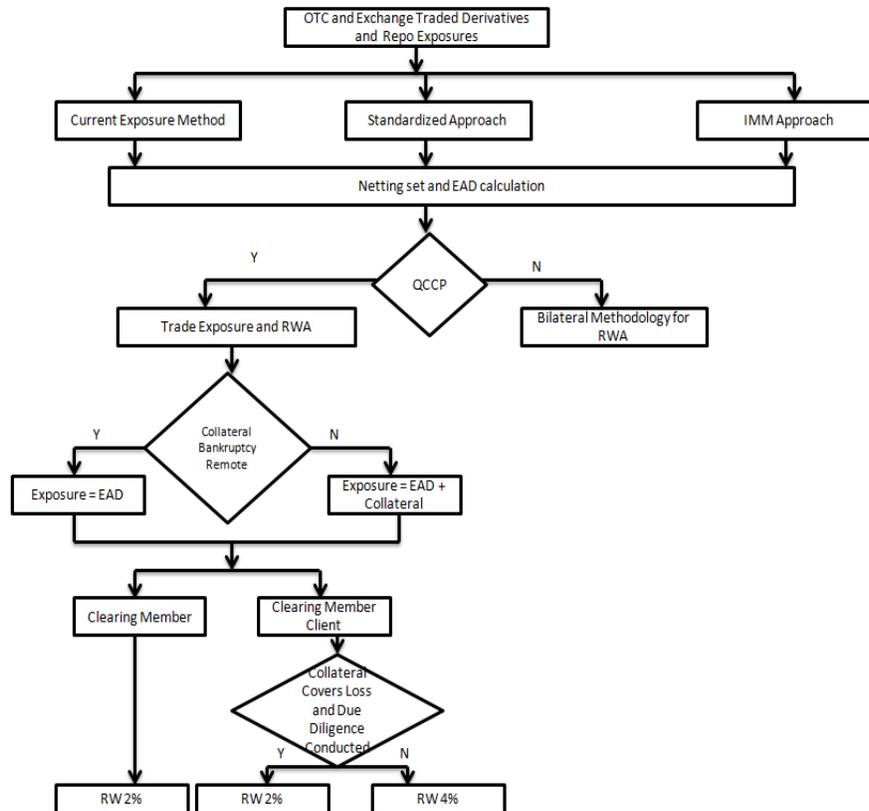
Fair value of collateral will be at counterparty and collateral type level.

#### **Interpretation**

- US NPR 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 NPR 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 will be no restrictions on the clearing member or QCCP for using posted collateral, in case of any legal proceeding at 2%.

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**Note:** These two conditions (that is, collateral covers the loss and due diligence conducted) are expected to be provided as an input.

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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 both 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**.

### **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

### **4.2.6. Capital Buffers**

There are three types of Capital Buffers prescribed in the US NPR II Rules, 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**

The US NPR III Rules 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 Final Rules.

### **Countercyclical Buffer**

The US NPR III Rules requires banks to maintain Countercyclical Buffer that is prescribed by the respective jurisdiction's regulator through an extension of CCB. Banks determine its 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, refer to the *Glossary*.

If the guarantor and credit default swap is present for an exposure, then as per the 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 would be 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 would be 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 will be split between these two countries equally, likewise it will be split in three countries if EOP principal balance is same across three countries.

While calculating the weighted average countercyclical buffer, only the non securitized and securitized exposures need to be considered. Market related data is not considered for the computation of weighted average countercyclical buffer. 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 will be 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 US NPR III Rules 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 NPR 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

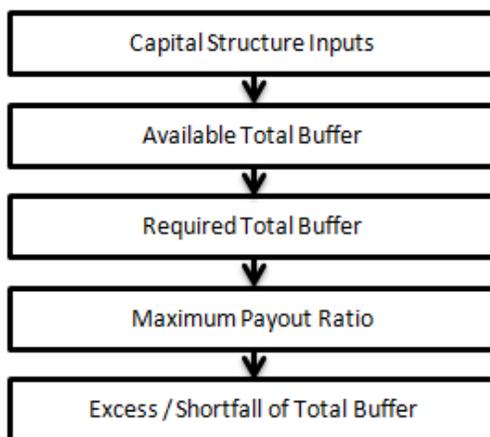
from CET1 capital. If the banks are unable to meet their total buffer requirements for all the three buffers, then they are subject to constraints on the discretionary payments of earnings. In this case, the Maximum Payout Ratio is calculated and represents the percentage of net earnings after tax (positive) 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.

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**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 has been included in the application.

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## Process Flow



The tasks related to capital buffer calculations are present in the process named **CAPITAL\_BUFFER**. The processing is as following:

- **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 will have 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. In a case where no Countercyclical Buffer is available, the required weighted average will be 0 as the benchmarks will be 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 (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)<sup>th</sup> 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 will be 0.

## Key Data Elements

A few key data elements have been elaborated in this section. For a complete list of tables to be updated refer to 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. In case of 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 both 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) needs to be met as per the transitional arrangement, the required buffer value needs to be setup 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 needs to 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 **Loss Absorbency Override (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 both Non Securitization and Securitization exposures)

## **4.2.7. Other Amendments**

### **Eligible Guarantees**

USA Basel III NPR 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 guarantee:

- 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 have been modified to incorporate this amendment in the current release.

### **Qualified Revolving Exposure**

As per USA Basel III NPR, 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 USA Basel III NPR, 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 have been modified to include charge card which will be 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**) has been introduced in the application.

### **Trade-Related Letter of Credit**

In USA Basel III NPR, 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 has been 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. USA Basel III NPR 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 has been removed in the current release.

### **Eligible Double Default Guarantor**

US Basel III NPR 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 Final Rules, the volatility haircut for collateral and repo transactions was based on the credit rating of the issuer. However, now as per US Basel III NPR, 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:

<b>Issuer Type - Sovereign</b>	
<b>CRC</b>	<b>Risk Weight</b>
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.

<b>Issuer Type - Foreign Banks</b>	
<b>CRC of entity's home country</b>	<b>Risk Weight</b>
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		AAA		Investment Grade
Aa1		AA+		AA+		Investment Grade
Aa2		AA		AA		Investment Grade
Aa3		AA-	A-1+	AA-	F1+	Investment Grade
A1		A+	A-1	A+	F1	Investment Grade
A2		A		A		Investment Grade
A3		A-	A-2	A-	F2	Investment Grade
Baa1		BBB+		BBB+		Investment Grade
Baa2		BBB		BBB		Investment Grade
Baa3		P-3	BBB-	A-3	BBB-	F3

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 multiple assessments needs to be performed. 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%	25.00%	4.00%
> 1 year and <= 5 years	2.00 %	3.00%	3.00%	15.00%	4.00%	6.00%	25.00%	12.00%
> 5 years	4.00 %	6.00%	6.00%	15.00%	8.00%	12.00%	25.00%	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%)			

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%	
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 have been modified in this current release.

#### **4.2.8. Single Counterparty Exposure Limit**

Single Counterparty Exposure Limit calculation has been 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 towards counterparty during the calculations.

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**NOTE:** Single Counterparty Exposure Limit calculations need to be 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.

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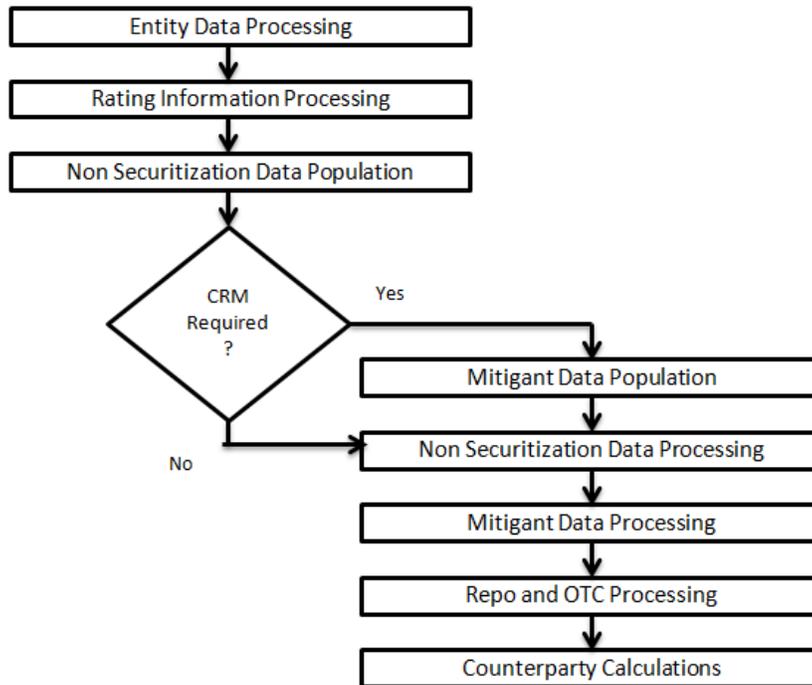
#### **Assumptions**

Our interpretation of a few sections pertaining Single Counterparty Exposure Limit from the Basel accord 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 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.

**Process Flow**



• **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 has to be 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 reclassifies 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 – Both 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 <b>Product Processor</b> )
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
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_EQUITY_EXPOSURES
Underlying exposures for repo contracts	STG_UNDERLYING_EXPOSURES
Credit Derivatives	STG_CREDIT_DERIVATIVES

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, refer to 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, in case of a consolidated Run, the parent exposure is considered only on the basis of shareholding percentage, based on the following calculation:

$$\text{Exposure Amount} \times \text{Share Holding Percent} = \text{Updated Exposure Amount}$$

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 USA NPR

- If a new standard product type is added to the single counterparty Run, then it has to be mapped to one of the EAD calculation Rules if the EAD calculations are similar. If it is not similar, a new Rule has to be 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 USA NPR 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 in case of 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 may be subjected to in case of 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:
    - **$0.4 * \text{Gross Potential Exposure Amount} + 0.6 * \text{Net Gross Ratio} * \text{Gross Potential Exposure Amount}$**
  - 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 in case of currency mismatches.
- Mitigation allocation process is handled through the optimizer. The process to allocate Mitigants are as follows:
  - 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 will 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 both 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.

### 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 refer to the Download Specifications document.

The mandatory data that has to be provided for the different products are as follows:

- Lending Instruments - Current Exposure Value
- Equities – Equity Market value, Carrying cost
- Debt Securities – EOP Balance
- REPO - Underlying exposure value
- Guarantees and Letter of Credit - the exposure value, maximum potential loss
- OTC Derivatives - MTM value, Notional principal of the derivative
- 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)**.

## Chapter 5 Brazilian Jurisdiction

Capital Adequacy related regulations as issued in the circulars of Banco Central Do Brasil, have been 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:

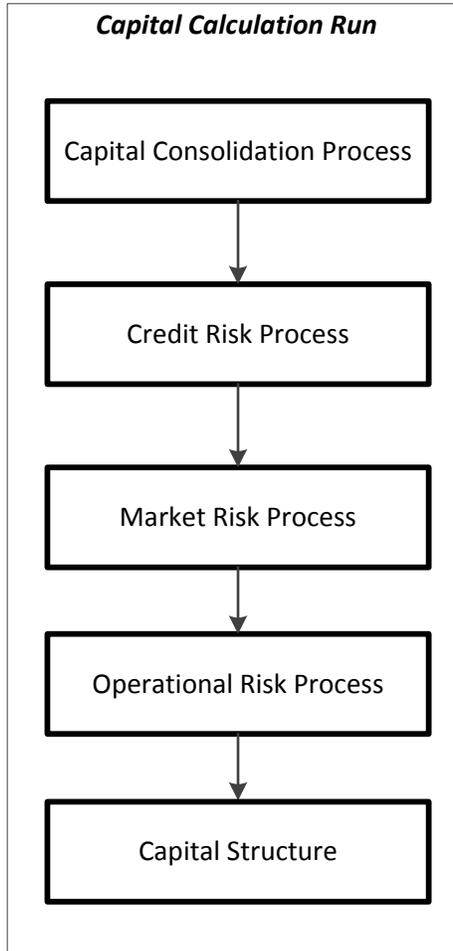
- Credit Risk
  - Non Securitization – Standardized Approach
- Market Risk
  - Market Risk – Standardized Approach
- Operational Risk
  - Operational Risk – Basic Indicator approach
  - Operational Risk – Alternative Standardized Approach
  - Operational Risk – Simplified Alternative Standardized Approach
- Capital Structure

### ***5.1. Brazil- High Level Process Flow – 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, refer *OFS Basel Regulatory Capital Run Charts*.

### **Process Flow for Capital Adequacy Ratio Calculation**



## **Capital Calculation Run**

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, Market Risk process, and so on, also exist as individual runs which is described in the following sections.

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 may 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 Basel II approaches for RWA computation.

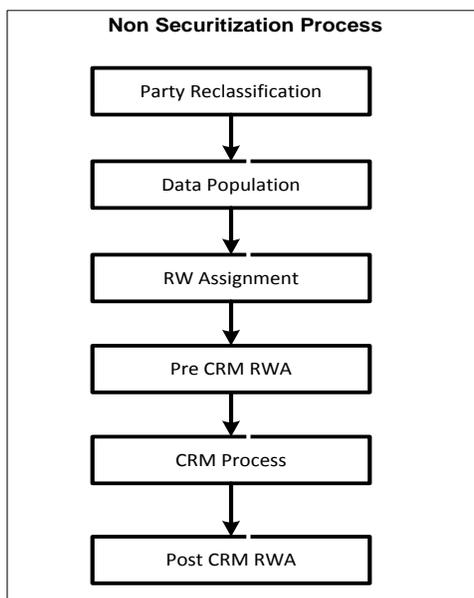
Run Parameter Assignment is also part of **Capital Consolidation** process. The Rule '**Run Definition User Defined Run Param Assignment**' is used to assign the Run parameters if a Run is executed in the RRF. If the Run is executed from the Run Management UI, then the parameters are populated based 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.

**Process Flow for Credit RWA calculation**

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.

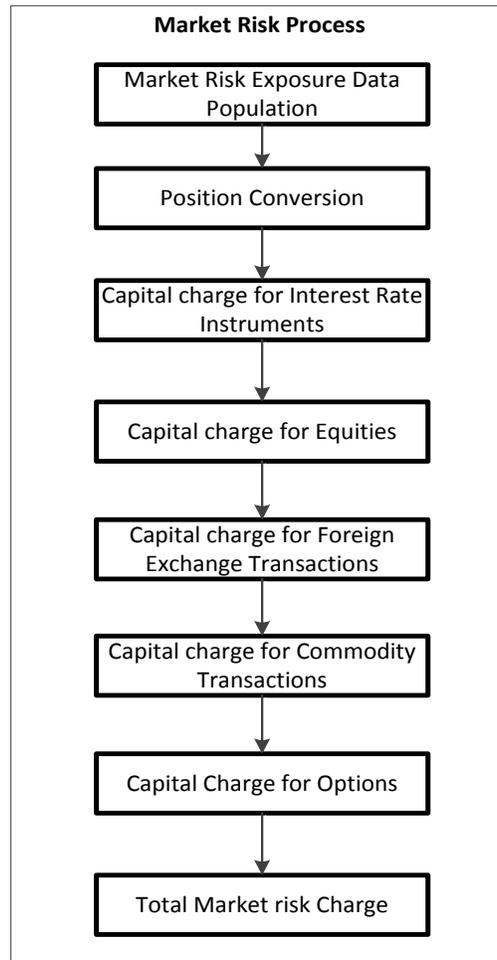
The sub process Party Reclassification is detailed in the section 'Reclassification' under 'Banking Book Product' in the Credit RWA section of this document. Similarly, Data Population, Risk Weight (RW) Assignment, and

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 has been 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, refer *Credit RWA*.

### Process Flow for Market RWA calculation

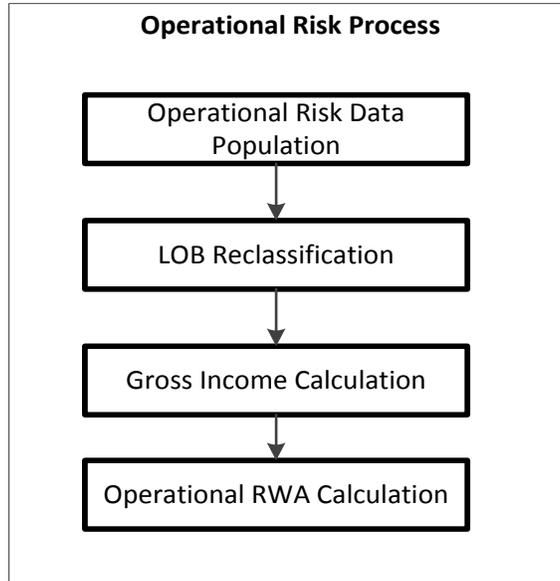


Market RWA Run is made up of multiple sub processes specific to Market Risk. However, when Market Risk is bundled under a Consolidated Run and triggered, Capital Consolidation and Rating process is executed only once for both Credit Risk and Market Risk. The details of each of the sub process mentioned in the preceding flow chart are present under Market Risk section of this document.

For more information on Market RWA computation, refer *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.

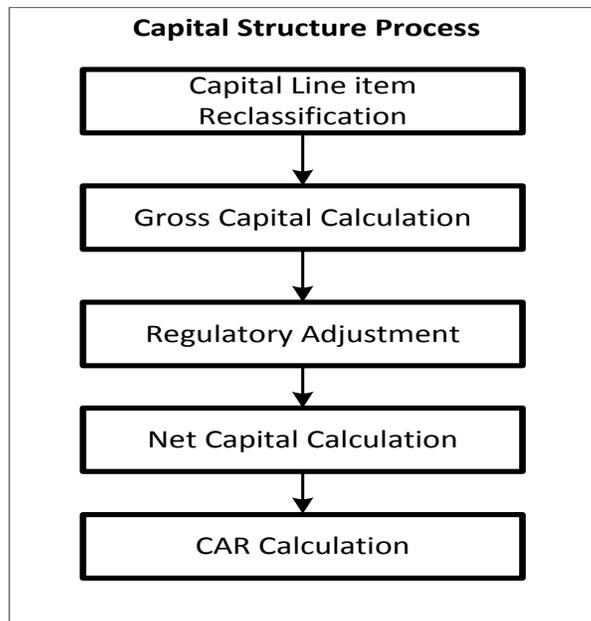
### Process Flow for Operational Risk RWA Calculation



Operational RWA run is executed with the [Capital Consolidation](#) process. For more information on the Operational RWA computation, refer *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.

### 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, refer *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.

## **5.2. 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.

### **5.2.1. 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.

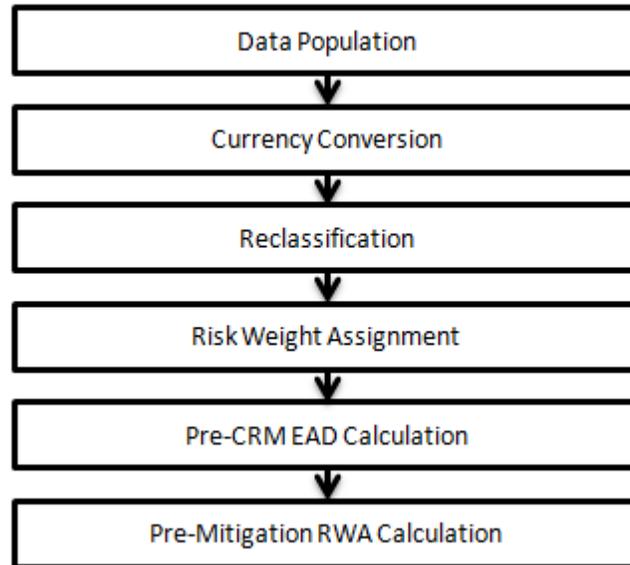
Some exposures may be hedged against credit risk through various mitigants like guarantors, collaterals, credit derivatives, and so on. These provide mitigation to credit risk and should be considered while computing Credit RWA, as per the issued circular. Hence, the application calculates both pre-mitigation 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 needs to be 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:

Products	Source Product Processors
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
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_EQUITY_EXPOSURES
Underlying exposures for repo contracts along with some securitization exposures' underlying	STG_UNDERLYING_EXPOSURES
Credit Derivatives	STG_CREDIT_DERIVATIVES

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:

$$\text{Exposure Amount} \times \text{Share Holding Percent} = \text{Updated Exposure Amount}$$

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:

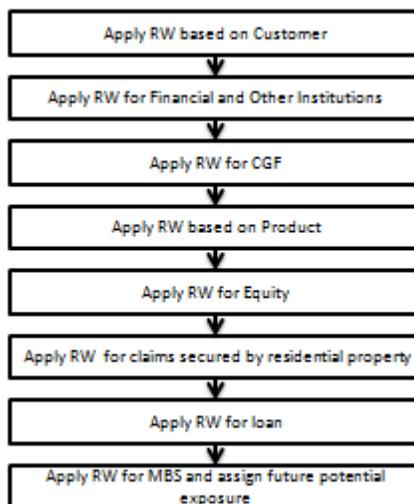
Product types used by the reporting bank as input data are reclassified to standard product types. The product types, after reclassification, are stored as Basel product types. For Example: Unsecured Bonds is reclassified as Debt Securities.

- 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 (FEPPF) 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:**

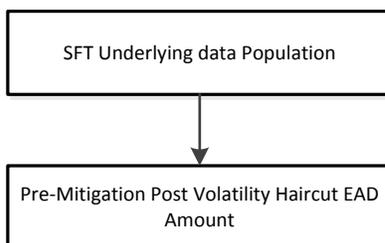
Pre-mitigation RWA is calculated by considering the pre-CRM EAD amount with the risk weight.

## 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:**

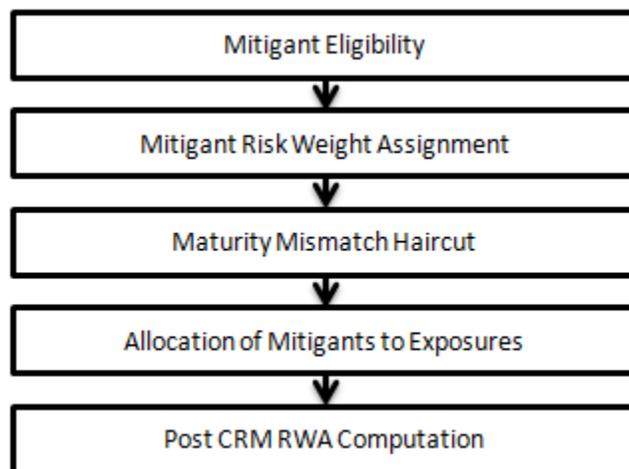
For SFT transactions, the application calculates EAD for the parent exposure based on the underlying information. The underlying exposures are moved to the Sft Underlyings (**FCT\_SFT\_UNDERLYING**) table from Fact Non Sec Exposures (**FCT\_NON\_SEC\_EXPOSURES**). Each SFT underlying exposure is adjusted 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 key 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, refer 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.

### ***5.3. 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

#### **5.3.1. Standardized Approach**

In the Standardized Approach (STD Approach), the Market Risk Capital Charge needs to be 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.

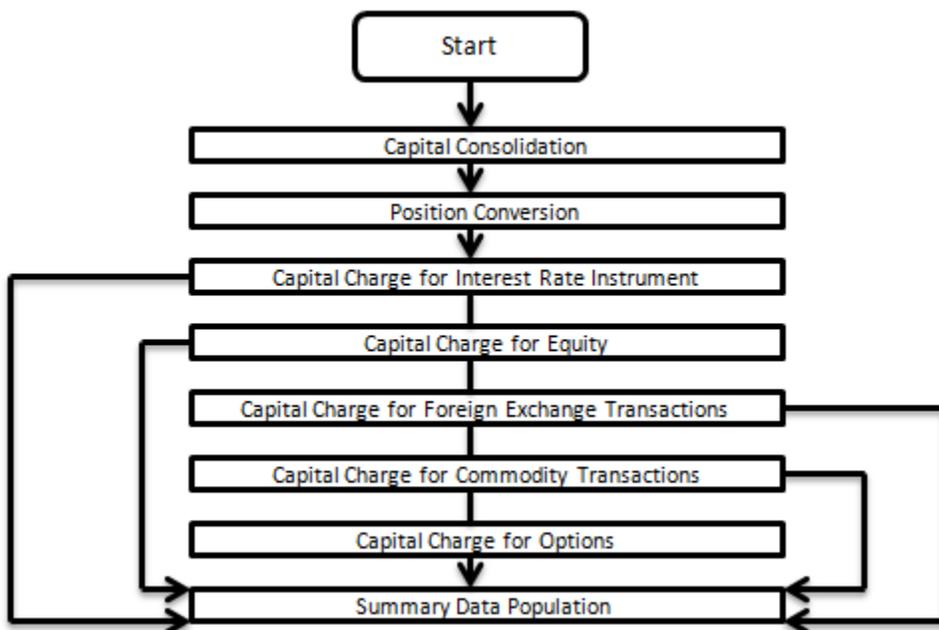
For non OTC instruments the data for instruments' price is captured in the Market Instrument Contract table (**STG\_MKT\_INSTRUMENT\_CONTRACT**). This data flows into the fact table for further processing.

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

- **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:

- 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.
- 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 will be 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 will be converted to two child positions which will be in zero specific risk securities. The exposure amount for each of these positions will be 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

#### Commodity Derivatives

- Commodity Forward
- Commodity Future
- Commodity Swap
- Gold Forward

#### Credit Derivatives

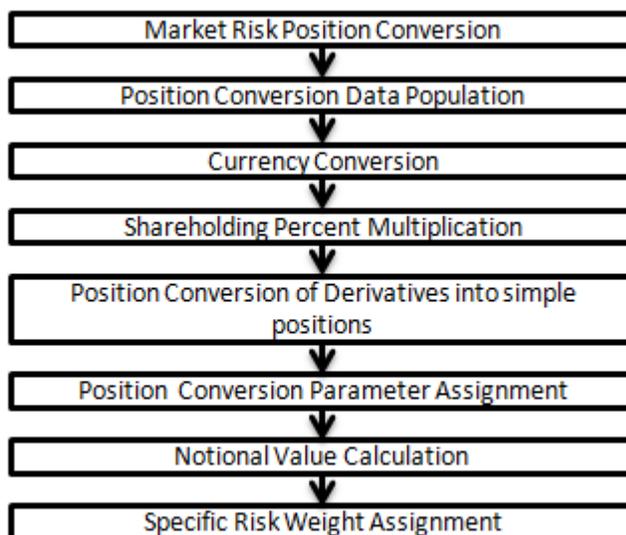
- Credit Default Swap
- Total Rate of Return Swap
- Cash Funded Credit Linked Notes
- First and Second-to-Default Basket Credit Derivatives

#### 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
- Puttable 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 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 refer 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 may 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 may 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 will have 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, will be 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:

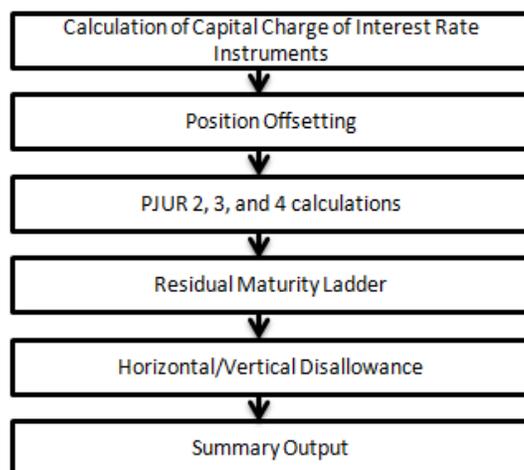
1. Initially, the FRA as contract is captured in the contract record details table with banks position in the contract in the position table. The application also captures the position mapping table for the above instrument type which is used for position conversion under the data population block. For 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.
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 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 diagram 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:

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 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'.
4. 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.
5. 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\_Chrg\_PJUR2
- Mkt\_Risk\_Cap\_Chrg\_PJUR3
- Mkt\_Risk\_Cap\_Chrg\_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:*

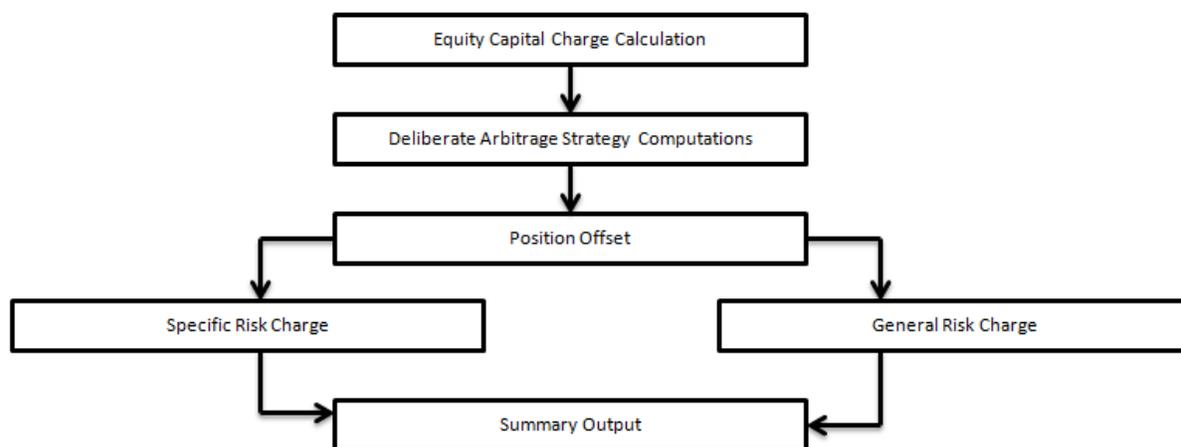
*Process:* BCB\_MKT\_RISK\_STD\_APPROACH

*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 diagram 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.

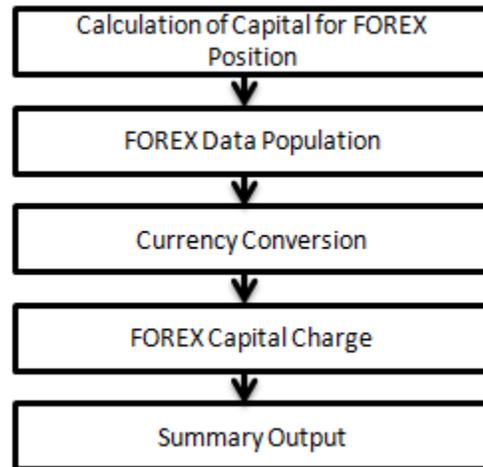
***For more information on the process and sub processes that compute this task, refer the following:***

*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:

1. EXP1: This is calculated as the sum of the net position in each currency in the currency portfolio of the bank
2. 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

3. 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.

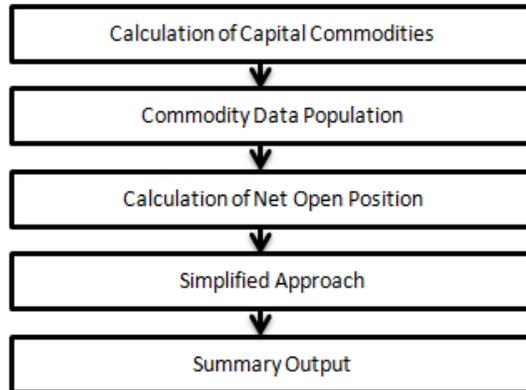
*For more information on the process and sub processes that compute this task, refer the following:*

*Process:* BCB\_MKT\_RISK\_STD\_APPROACH

*Sub-process:* Market Risk Capital Risk Charge Calculation

- **Capital Charge for Commodities:**

Process flow diagram for Commodity



- 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 both 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.

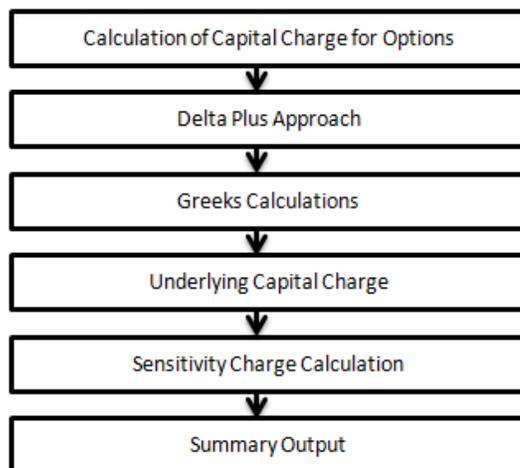
*For more information on the process and sub processes that compute this task, refer the following:*

*Process:* BCB\_MKT\_RISK\_STD\_APPROACH

*Sub-process:* Market Risk Capital Risk Charge Calculation

- Capital Charge for Options

Process flow diagram 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 have been 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

### **Key Data Elements**

Key data elements are listed in this section. For a complete list of tables and columns to be populated refer to 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.

## **5.4. 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 as well as the subsidiary data is processed.

---

### **5.4.1. 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:

$$P_{OPR} = Z \cdot \frac{\sum_{t=1}^3 \max [0,15 \times IE_t ; 0]}{n}$$

Where

$P_{OPR}$  = capital charge for Operational Risk

Z = factor of 1.00 starting from 1<sup>st</sup> 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

### 5.4.2. 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:

$$P_{OPR} = Z \cdot \frac{\sum_{t=1}^3 \max \left[ \left( \sum_{i=1}^2 LAE_{i,t} \times \beta_i \right) + \left( \sum_{i=3}^8 IE_{i,t} \times \beta_i \right); 0 \right]}{3}$$

Where

$P_{OPR}$  = capital charge for Operational Risk

Z = factor of 1.00 starting from 1<sup>st</sup> January 2010

$IAE_{i,t}$  = Exposure Alternative Indicator for each line of business and for each financial year

$\beta_i$  = Beta factor corresponding to each line of business

### 5.4.3. 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:

$$P_{OPR} = Z \cdot \frac{\sum_{t=1}^3 \max \left[ \left( (IAE_t \times 0,15) + (IE_t \times 0,18) \right); 0 \right]}{3}$$

Where

$P_{OPR}$  = capital charge for Operational Risk

Z = factor of 1.00 starting from 1<sup>st</sup> January 2010

$IAE_t$  = Exposure Alternative Indicator for each financial year

$IE_t$  = Exposure Indicator for each financial year

### 5.4.4. Process Flow for Operational RWA

#### Prerequisite

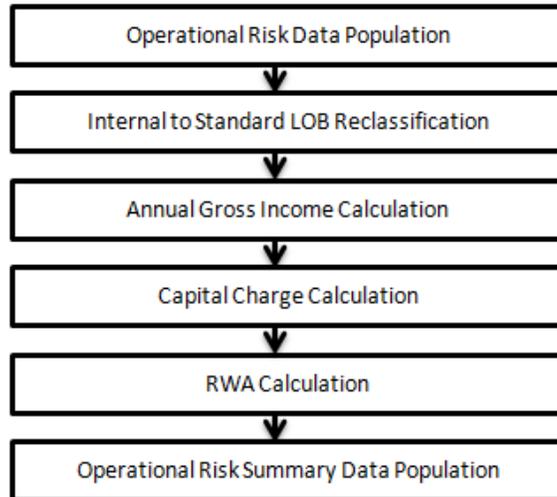
Before calculating the capital charge for Operational Risk, the following should be computed as a prerequisite:

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:**

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 both 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.

### **5.4.5. Key Data Elements**

Key data elements that need 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.

## ***5.5. 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%.

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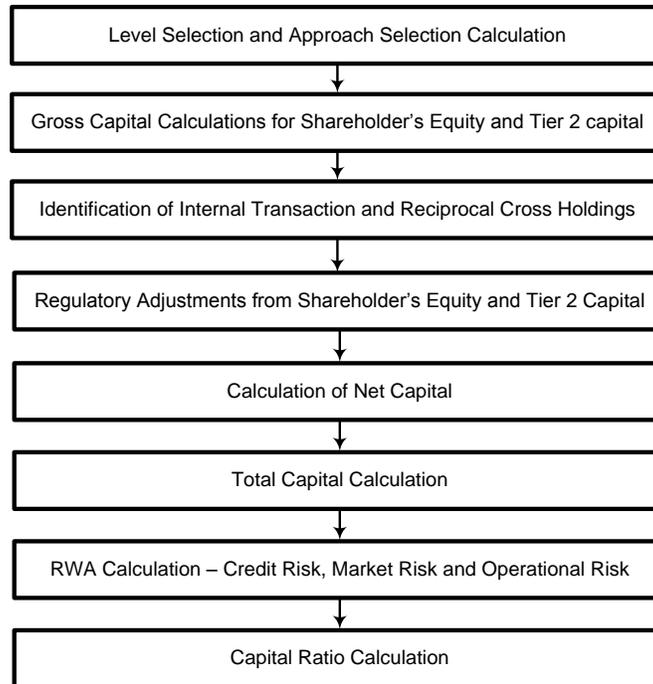
**NOTE:** While executing Solo Run the parent entity data is processed. Investment into the subsidiary data undergoes RWA calculation as per the Credit Risk and Market Risk rule. Capital line item pertaining to parent entity is only processed. For consolidation approach, the parent entity as well as the subsidiary data is considered. All the General Ledger line items are expected at solo level for each entity. The consolidated data is discarded.

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### **5.5.1. Assumption**

The General Ledger codes are expected to be unique across entities in **STG\_GL\_DATA** and **DIM\_CAPITAL\_ACCT\_HEAD**.

### **5.5.2. 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**.

### 5.5.3. **Key Data Elements**

Key data elements that need 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, refer Exhibit 5 in *Annexure A: Key Concepts*.

## Chapter 6 CBRC Jurisdiction

Capital Adequacy related regulations as issued in the following regulations have been 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
  - Non Securitization – Foundation Internal Ratings Based Approach/Advanced Internal Ratings Based Approach
  - Securitization - Foundation Internal Ratings Based Approach
- Market Risk
  - Market Risk – Standardized Approach
  - Operational Risk
- Operational Risk – Standardized Approach
- Capital Structure

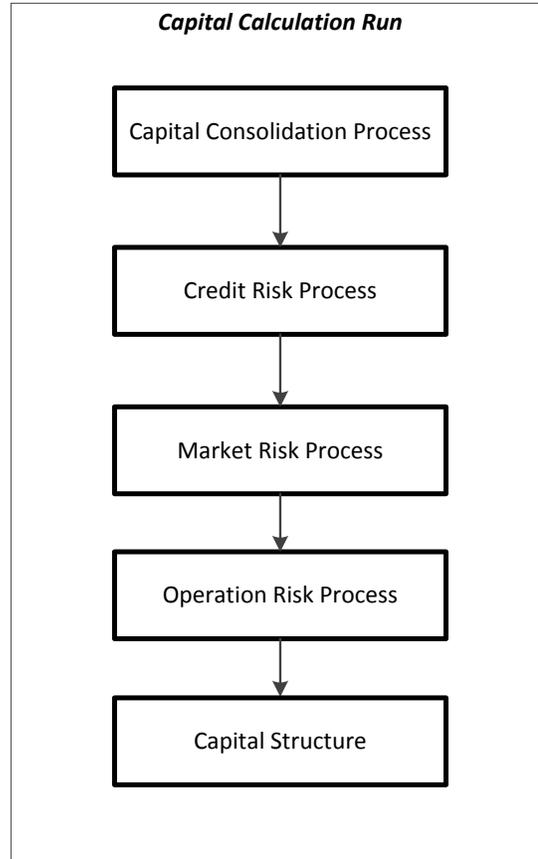
### ***6.1. CBRC- High Level Process Flow***

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, refer *OFS Basel Regulatory Capital Run Charts*.

The order in which the processes are executed in the application, as are as follows:

### **Process Flow for Capital Adequacy Ratio Calculation**



## Capital Calculation Run

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, Market Risk process, and so on, also exist as individual runs which is described in the following sections.

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 may 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.

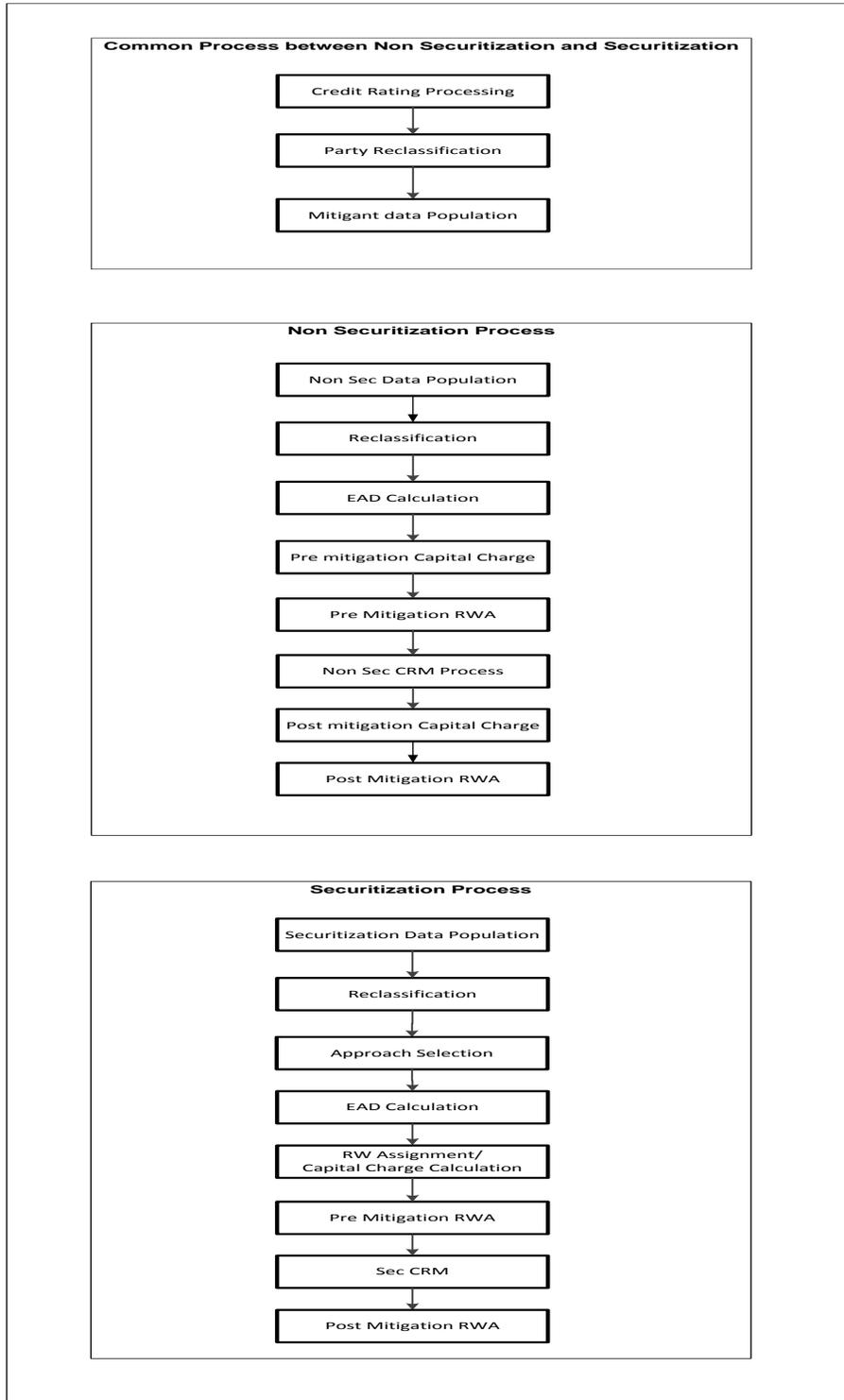
### **Currency Conversion**

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.

## **Process Flow for Credit RWA**



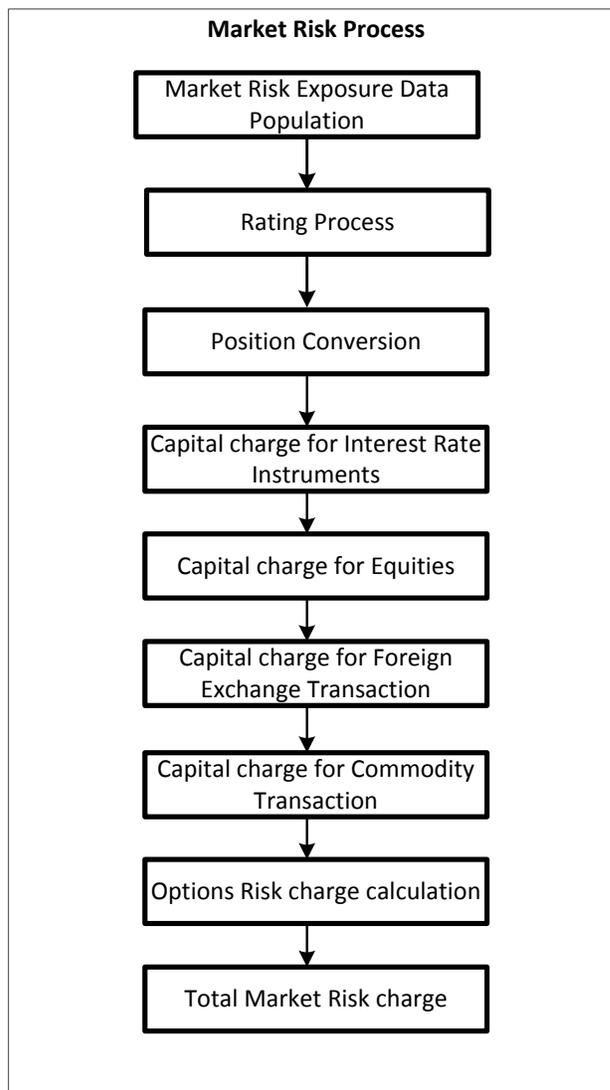
A Credit RWA Run is a combination of the Non Securitization RWA process and Securitization RWA process. A few processes like Credit Rating, Party Type Reclassification, and Mitigant Data Population are common between Non Securitization and Securitization process. Though these sub processes are explained separately under both 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, refer *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.

### Process Flow for Market RWA Calculation



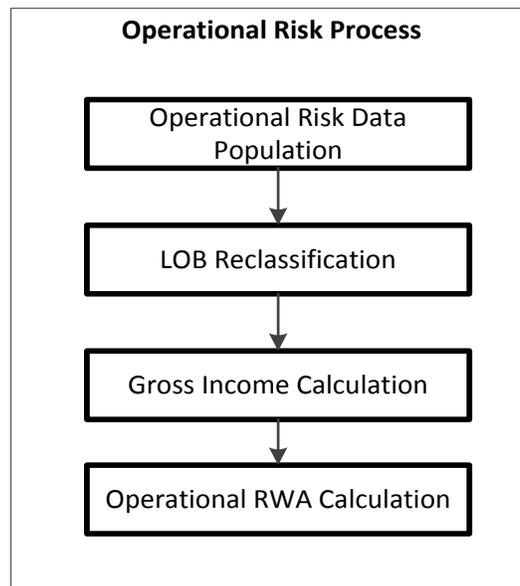
Market RWA Run is made up of multiple sub processes specific to Market Risk. However, when Market Risk is bundled under a Consolidated Run and triggered, Capital Consolidation and Rating process is executed only once for both Credit Risk and Market Risk. The details of each of the sub process mentioned in the preceding flow chart are present under Market Risk section of this document.

For more information on Market RWA computation, refer *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.

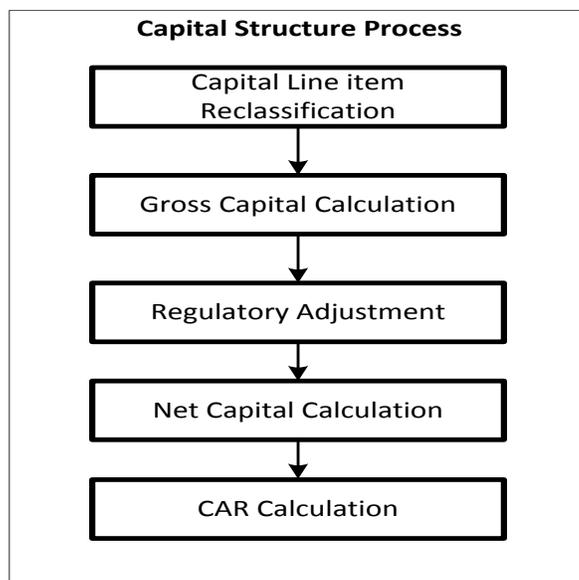
## Process Flow for Operational RWA Calculation



Operational RWA run is executed with the [Capital Consolidation](#) process. For more information on the Operational RWA computation, refer *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.

## 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, refer *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.

## 6.2. 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).

### 6.2.1. 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 may 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 both pre-mitigation risk weighted assets amount and post-mitigation risk weighted assets amount.

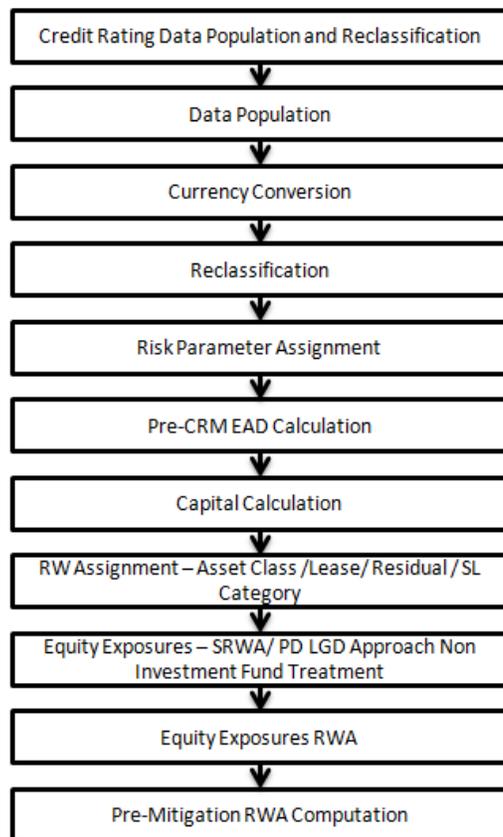
The application calculates the correlation factor using the formula specified for each asset class. Using the Correlation factor, Probability of Default (PD), and Loss given Default (LGD), the application calculates the pre-mitigation capital charge for each exposure. This value signifies the capital charge the bank would have 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 could arise 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, (except investment exposures in **STG\_INVESTMENTS** table, credit cards in **STG\_CARDS**, and equities in **STG\_EQUITY\_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 be populated

- Sovereign Rating Table (STG\_SOVEREIGN\_RATING\_DETAILS)

Credit Rating for all countries are required to be 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 will be 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
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_EQUITY_EXPOSURES
Underlying exposures for repo contracts along with some securitization exposures' underlying	STG_UNDERLYING_EXPOSURES
Credit Derivatives	STG_CREDIT_DERIVATIVES

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:

$$\text{Exposure Amount} \times \text{Share Holding Percent} = \text{Updated Exposure Amount}$$

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, refer Exhibit 4 in *Annexure A: Key Concepts*.

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**NOTE:** The data populated in the Product Processor is expected in natural currency of the exposure.

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• **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.

- **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:

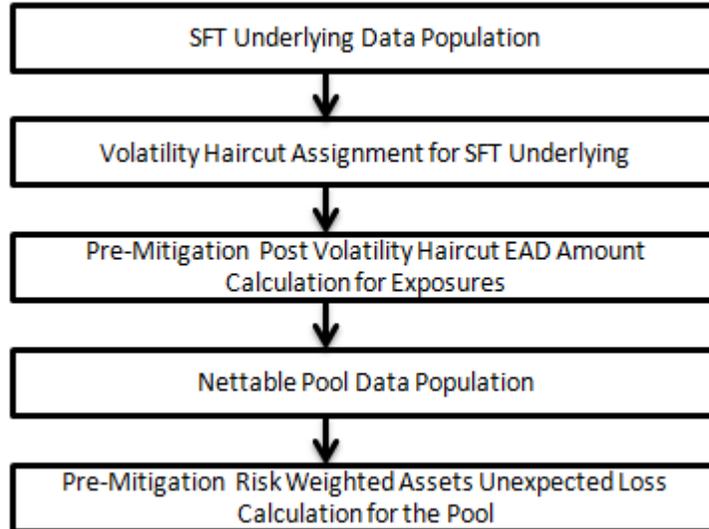
- Collateral Haircut Approach
- Simple VaR Approach

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:**

Two data elements are present in SFT transactions. First, the parent transaction is captured and second 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 the 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.

- **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 Underlyings (**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 could default 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.

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**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.

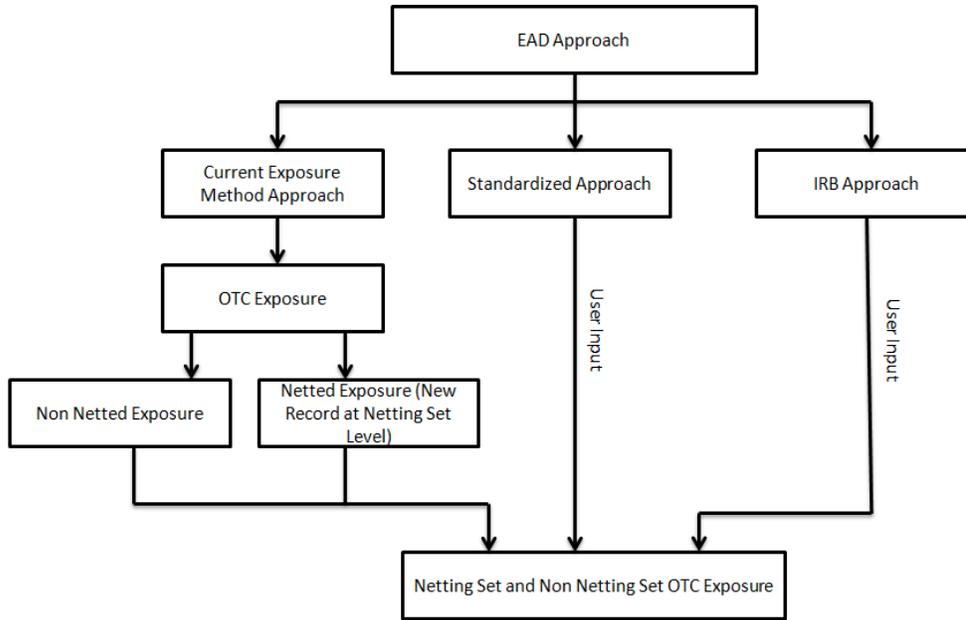
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The application's treatment for the instrument with CCR is divided into three categories:

- 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 at Default (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 Set Records and Non Netting Set 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 sets 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 set 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:

$$A_{\text{net}} = 0.4 * A_{\text{Gross}} + 0.6 * \text{NGR} * A_{\text{Gross}}$$

The application creates new records for netting set 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 set 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 set 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.

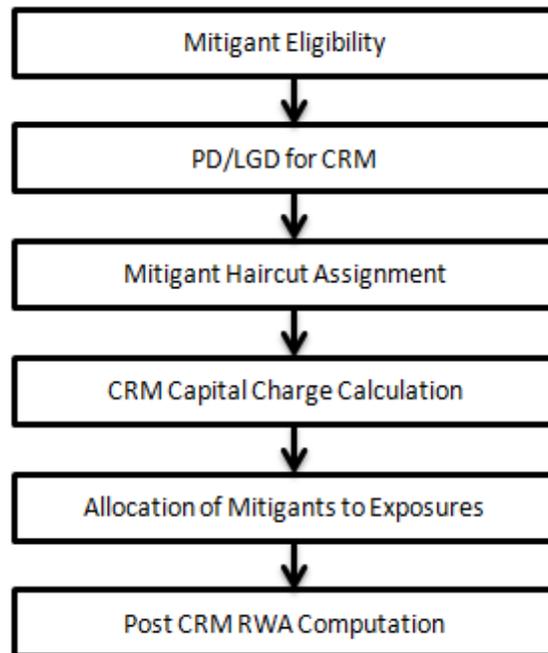
**Key Data Elements**

Key data elements need 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 set, the Nettability flag should be set as ‘Y’.
- Instruments with the same agreement code are netted in the same netting set. The application handles both 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:**

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 does not need to provide mitigant data separately as they have already factored in 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 both 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, refer 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.

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**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 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.

## **6.2.2. Securitization**

CBRC guidelines differentiate the Credit Risk computation of Securitized exposures from Non Securitized exposures, as the securitized exposures are part of an off-balance sheet transaction which follows a waterfall cash flow mechanism.

The Securitized exposures are the exposures which are issued out of a pool of underlying exposures for the transfer of risk. The Re-Securitized exposures are the exposures which are issued out of a pool of underlying exposures which constitutes of at least some portion of Securitized exposures, Non Securitized exposures as well as underlying exposures. The application is capable of managing the computation of the Securitized exposures as well as the Re-Securitized exposures. It also manages the calculation for the originator as well as the investor bank roles. At a broad level, there are two categories of investors:

- An Investing Bank who has invested heavily in Securitization:
  - These kinds of investors are prepared to provide the entire details of the Securitization transaction

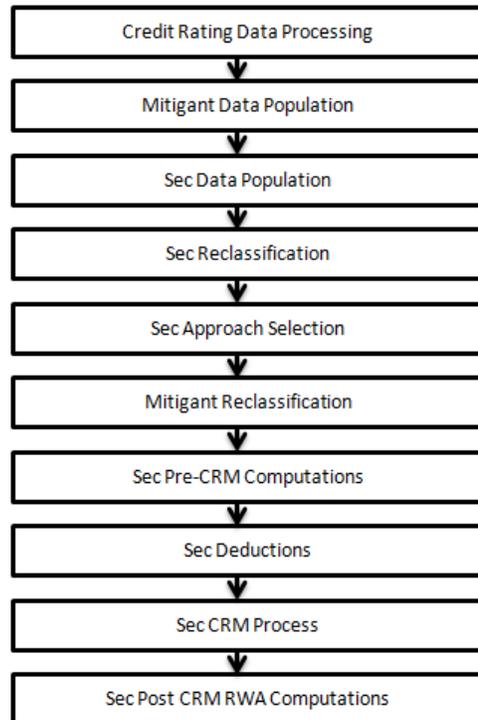
- To cater to these investor needs, the entire pool, entire or invested tranche details, and the invested exposures information are required to be provided by the bank. This information is captured in the pool, tranche and exposures table.
- An Investing Bank who has invested minimal in Securitization:
  - These kinds of investors are prepared to provide the necessary inputs required for the calculation of the capital charge pertaining to their invested exposure.
  - To cater to these investor needs, the invested exposures information is required to be provided by the bank. Along with that, few of the pool and tranche attributes required for the computation are required to be provided by the bank in the exposures (**STG\_SEC\_EXPOSURES**) table itself.

CBRC guidelines specify two broad approaches for the calculation of the capital charge for the Securitization exposures.

- Standardized Approach
- IRB Approach
  - Ratings Based Approach
  - Internal Assessment Approach
  - 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 both the Securitized exposures and the Non Securitized exposures.

### Process Flow for Securitization – Foundation Internal Ratings Based (FIRB) 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 (for which the process pertaining to the Non Securitization exposures is followed). For Re-Securitization positions, if the underlying exposure is a securitization position, the information will be available in sec exposures table. If the reporting bank provides only the exposure level information, then the application expects a few pool level and tranche level parameters to be provided in the Exposures (**STG\_SEC\_EXPOSURES**) table.

- **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:**

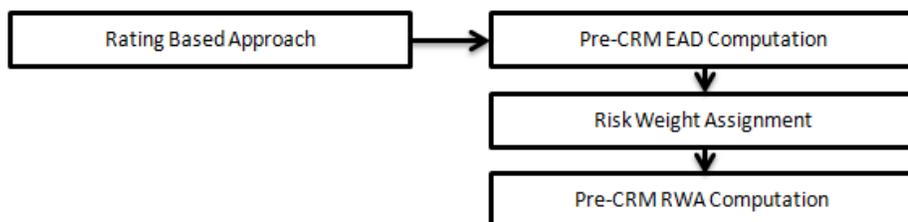
*Ratings Based Approach:*

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.

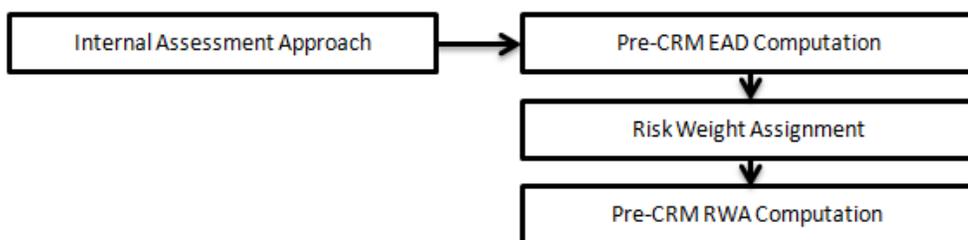


*Internal Assessment Approach:*

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:*

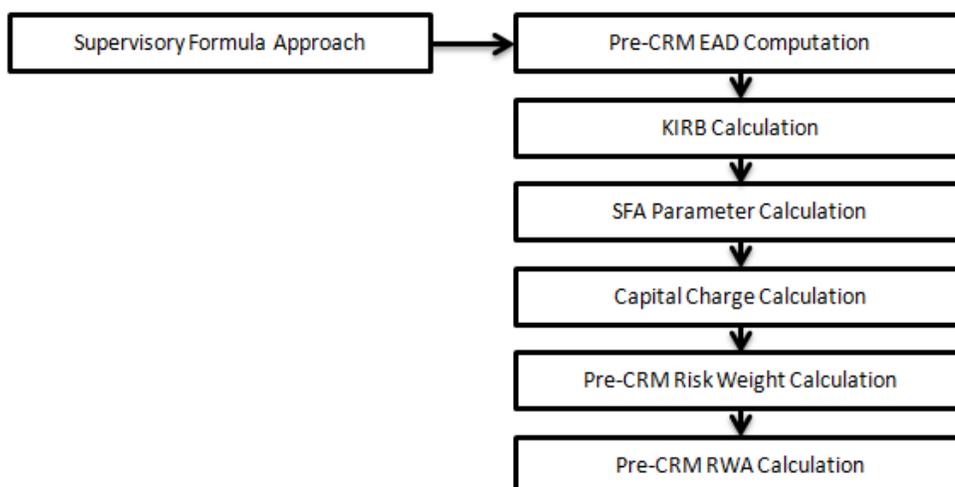
For exposures that follow the Supervisory Formula Approach, the application calculates the underlying capital of the securitization pool (KIRB), using the Non Securitization process. The application calculates the SFA parameters based on the pool and tranche details, by using the calculation logic specified 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.

Once 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.

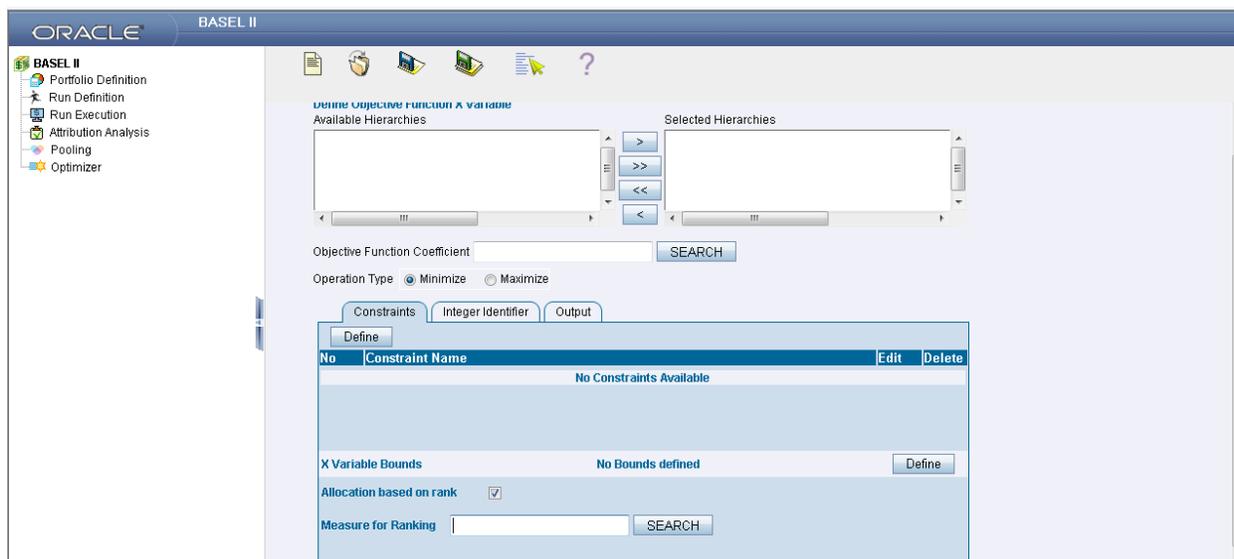
The application populates an uncovered mitigant for each exposure in the **FCT\_SEC\_EXPOSURES** table. This uncovered mitigant will have the same feature as that of the exposure and are created in the **FCT\_MITIGANTS** table.

- **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, refer 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 has to be assigned to the exposures. The treatment pertaining to single exposure mapped to multiple mitigants have to be 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

#### ***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.

### **6.3. 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

- Standardized Approach
- Internal Model Method Approach

#### **6.3.1. 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 - 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

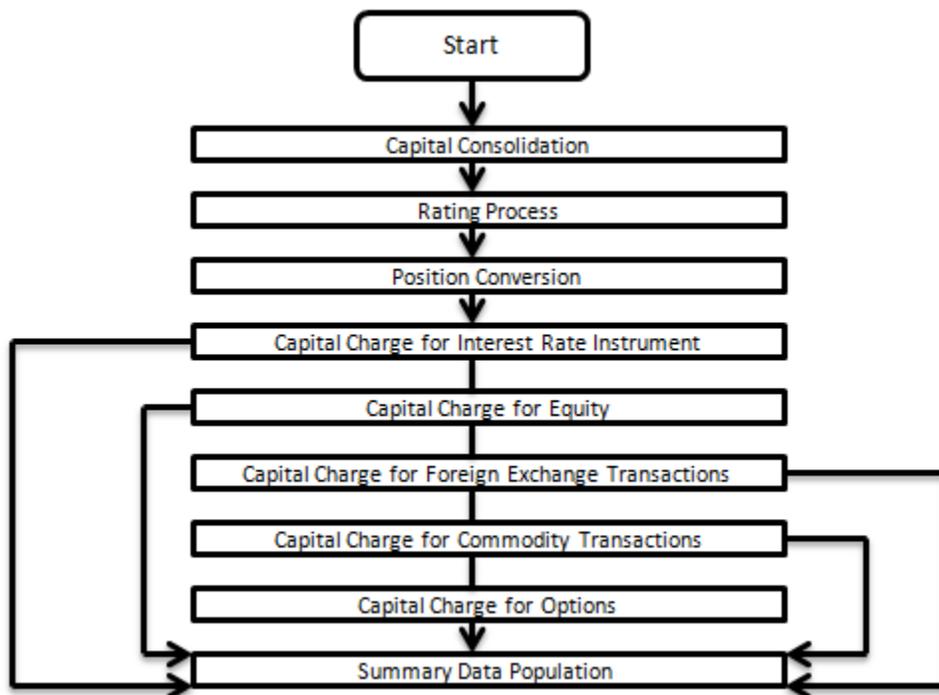
This Run populates the instrument level data that is required by the actual Run for further processing. The instrument level data such as number of units of the instruments on that particular MIS date is downloaded in the bank instrument position (**STG\_BANK\_POSITIONS**) table. This data flows into 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, refer the following:*

*Process:* CBRC\_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 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, refer 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:
  - 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.
- For an Interest Rate (IR) Swap, the parent instrument will be 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 will be converted to two child positions which will be in zero specific risk securities. The exposure amount for each of these positions will be 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

#### Commodity Derivatives

- Commodity Forward
- Commodity Future
- Commodity Swap
- Gold Forward

#### Credit Derivatives

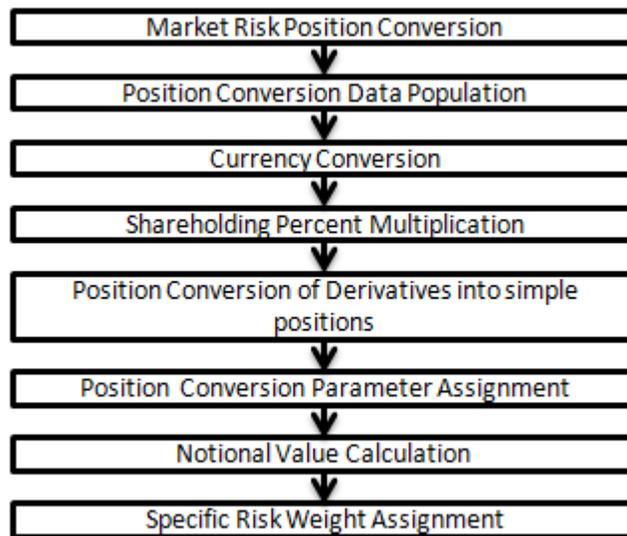
- Credit Default Swap
- Total Rate of Return Swap
- Cash Funded Credit Linked Notes
- First and Second-to-Default Basket Credit Derivatives

#### 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
  - Puttable 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, refer 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, refer 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, refer 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, refer the following:***

*Process:* CBRC\_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 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, refer the following:*

*Process:* CBRC\_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 the process and sub processes that computes this, refer the following:*

*Process:* CBRC\_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 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, refer the following:***

*Process:* CBRC\_MKT\_RISK\_POSITION\_CONVERSION

*Sub-process:*

- Mkt Risk Specific Risk IR Assignment
- Market Risk CD Underlying Specific Risk

There is some dependency on different instrument types, like; the exotic options may 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 may 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 will have positions exactly opposite to the one provided in the preceding example. The long position will become short and short position becomes long, with the value, maturity, and coupon remaining the same.

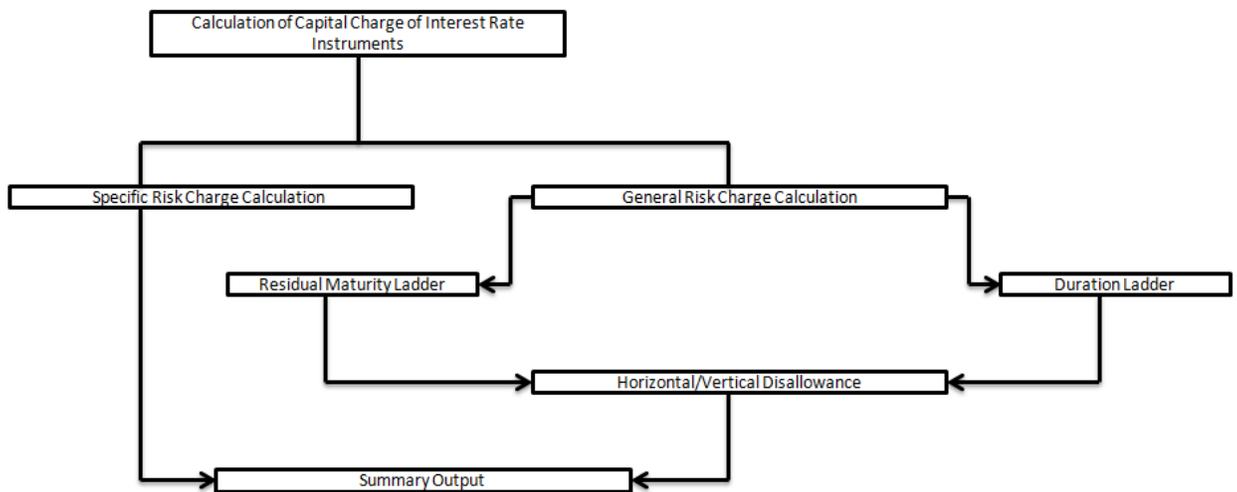
It may be noted that the actual discount rates for discounting the notional values of the two legs, as stated in the previous example, are the interest rates pertaining to the respective maturities, that is, 3 months (long leg) and 6 months (short leg). For simplification purposes, an assumed rate of 5% has been 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 will be 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 diagram 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. Once 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, refer 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, refer 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, refer 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 both 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'.
3. 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'.
4. 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.
5. 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, refer 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, refer the following:***

*Process:* CBRC\_MKT\_RISK\_STD\_APPROACH

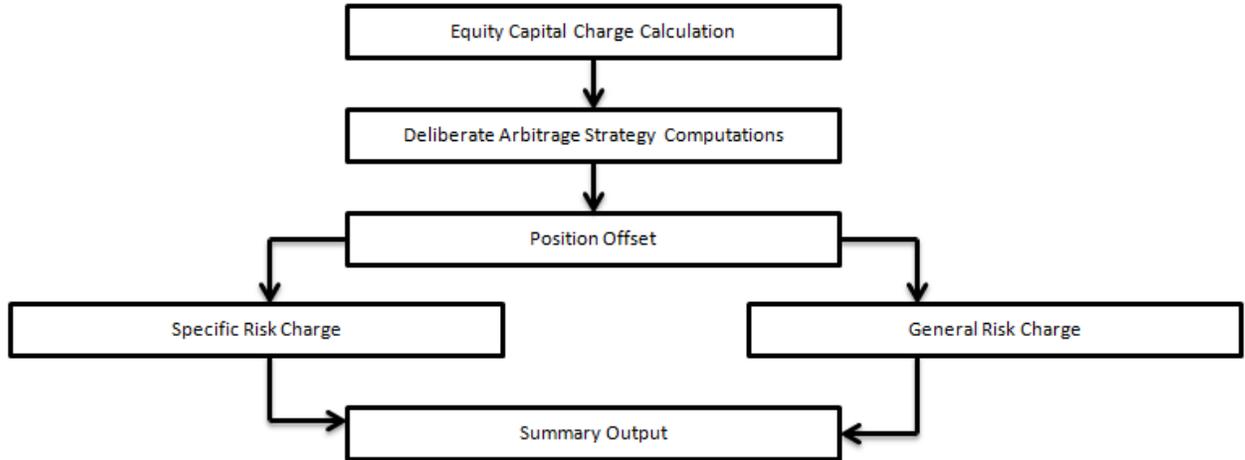
*Sub-process:*

- Market Risk Capital Risk Charge Calculation
- 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, refer 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, refer 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, refer the following:*

*Process:* CBRC\_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 the process and sub processes that computes this, refer the following:***

*Process:* CBRC\_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 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, refer the following:***

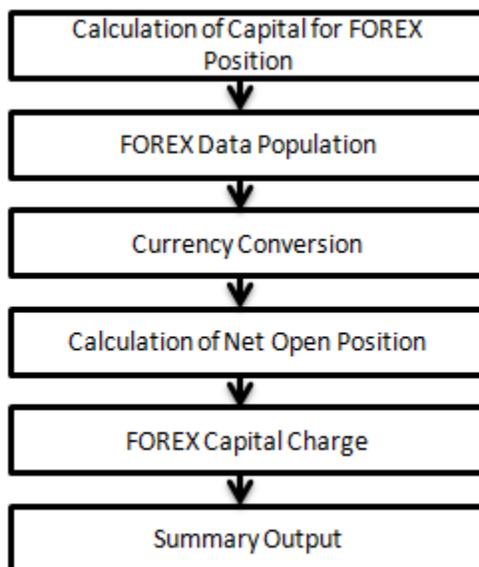
*Process:* CBRC\_MKT\_RISK\_STD\_APPROACH

*Sub-process:*

- Market Risk Capital Risk Charge Calculation
- Market RWA Calculation

• **Capital Charge for Foreign Exchange Transactions:**

Process flow diagram for Foreign Exchange transaction



- 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, refer 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, refer 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, refer 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\_Chrg\_FOREX’.

*For more information on the process and sub processes that computes this, refer 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.

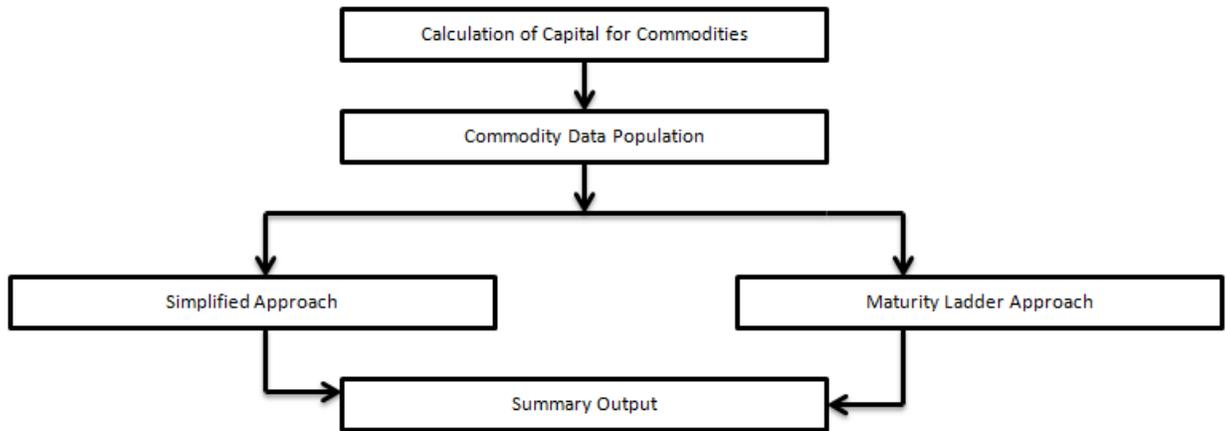
*For more information on the process and sub processes that computes this, refer the following:*

*Process:* CBRC\_MKT\_RISK\_STD\_APPROACH

*Sub-process:* Market RWA Calculation

- **Capital Charge for Commodities:**

Process Flow diagram 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 computes this, refer 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, refer 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, refer the following:***

*Process:* CBRC\_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 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, refer the following:***

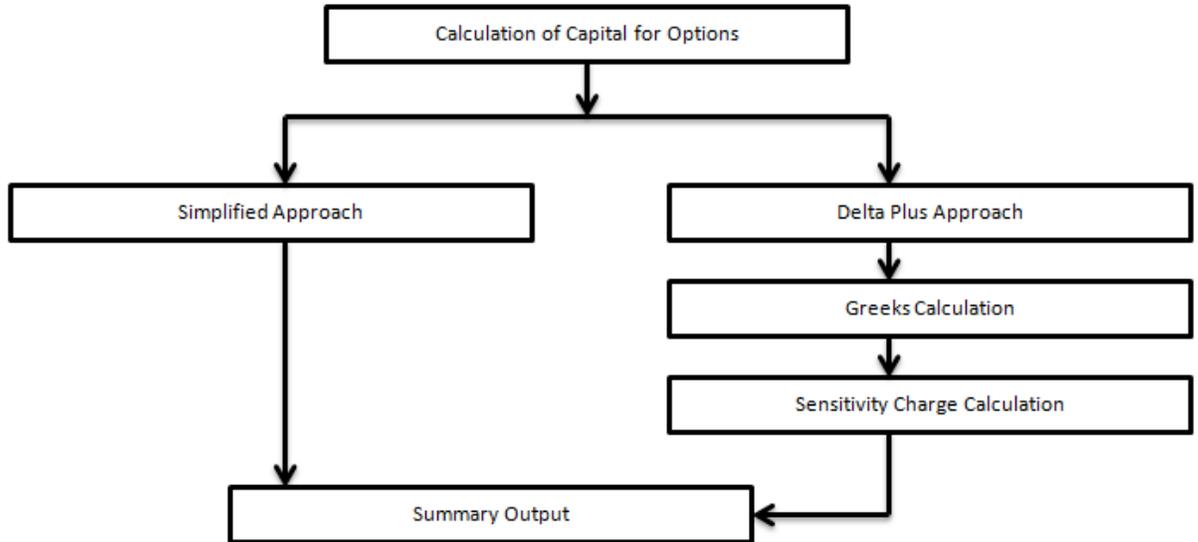
*Process:* CBRC\_MKT\_RISK\_STD\_APPROACH

*Sub-process:*

- Market Risk Capital Charge Calculation
- Market Risk Commodities Reporting Data Population - Maturity Approach
- Market RWA Calculation

• **Capital Charge for Options:**

Process Flow for Capital Charge 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 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, refer 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, refer 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, refer 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, refer the following:***

*Process:* CBRC\_MKT\_RISK\_STD\_APPROACH

*Sub-process:* Market Risk Generic Risk Charge Calculation - IR and Equity

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**NOTE: 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, refer the following:***

*Process:* CBRC\_MKT\_RISK\_STD\_APPROACH

*Sub-process:* Market Risk Sec Specific Risk Charge Calculation Market Risk Sec Deductions

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**Key Data Elements**

Key data elements are listed in this section. For a complete list of tables and columns to be populated refer to 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.

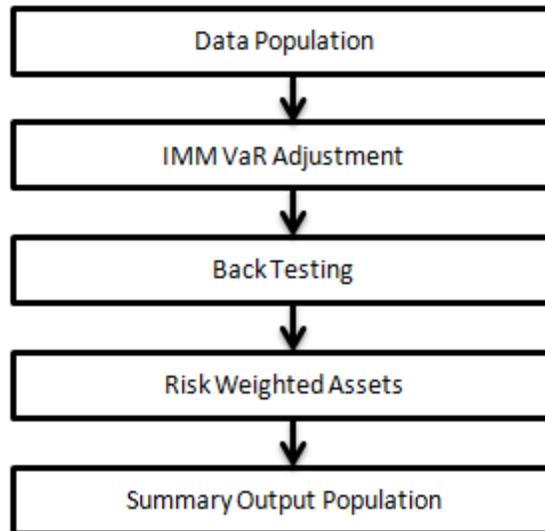
### Internal Models Method

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, refer 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, refer the following:*

*Process:* CBRC\_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 sVar 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. 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, refer 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, refer 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, refer the following:*

*Process:* CBRC\_MKT\_RISK\_IMM\_VAR

*Sub-process:* Market Risk VaR Capital Charge Population.

## 6.4. 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 as follows:

- Standardized Approach

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**NOTE:** While executing Solo Run for computing Operational Risk, the parent entity data is processed. However, for a Consolidated Run the parent entity as well as the subsidiary data is processed.

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### 6.4.1. 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:

$$K_{TSA} = \left\{ \sum_{\text{years } 1-3} \max \left[ \sum (GI_{1-8} \times \beta_{1-8}), 0 \right] \right\} / 3$$

**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.

$\beta_{1-8}$  = 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.

**Process Flow for Operational RWA**

**Prerequisite**

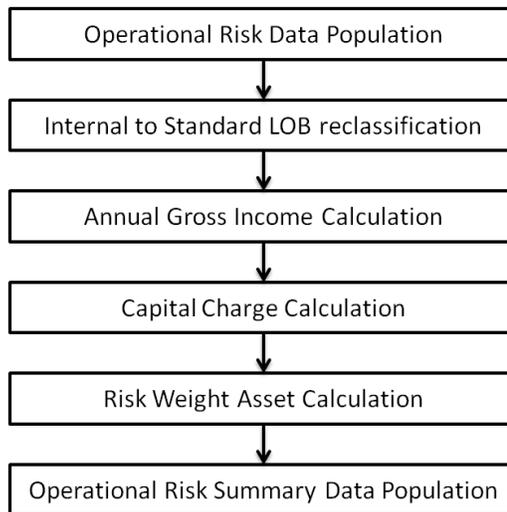
Before calculating the capital charge for OR, the following should be computed as a prerequisite:

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 both 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.

## Key Data Elements

Key data elements that need 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.

## 6.5. 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
- Tier 2 capital
- Tier 3 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%.

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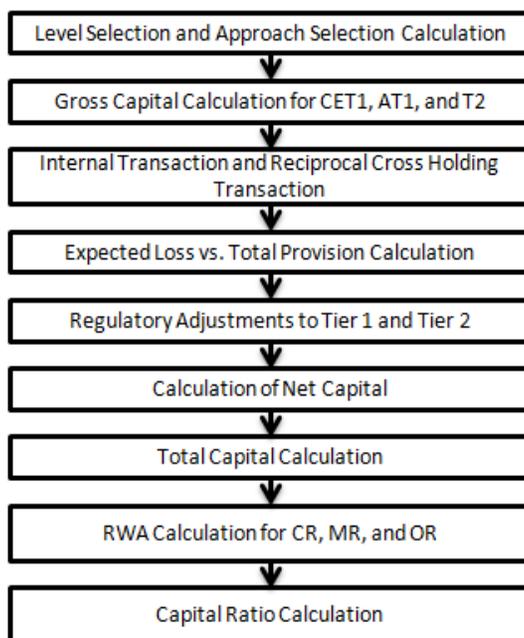
**NOTE:** While executing Solo Run the parent entity data is processed. Investment into the subsidiary data undergoes RWA calculation as per the Credit Risk and Market Risk rule. Capital line item pertaining to parent entity is only processed. For consolidation approach, the parent entity as well as the subsidiary data is considered. All the GL line items are expected at solo level for each entity. The consolidated data is discarded.

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### 6.5.1. Assumption

The General Ledger codes are expected to be unique across entities in **STG\_GL\_DATA** and **DIM\_CAPITAL\_ACCT\_HEAD**.

### 6.5.2. 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 3 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, 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**.

### 6.5.3. **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, refer Exhibit 5 in *Annexure A: Key Concepts*.

## Chapter 7 Indian Jurisdiction

Capital Adequacy related regulations as issued in the RBI-Final Guidelines of April 2007 and Amendments to Final Guidelines issued in March 2008, have been 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:

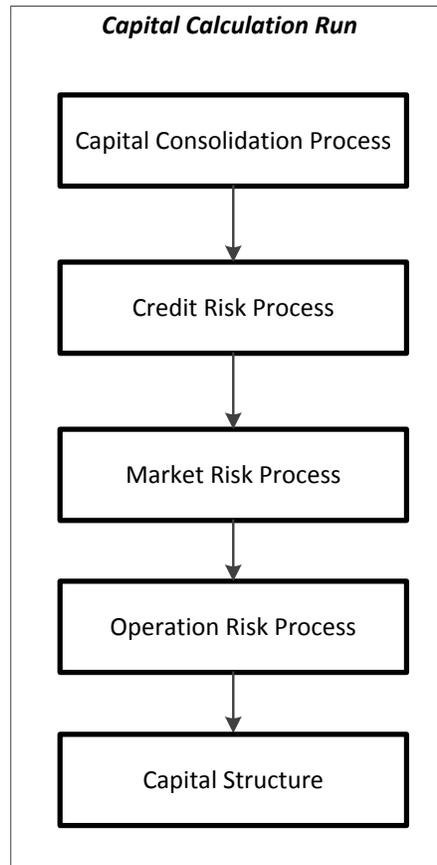
- Credit Risk
  - Non Securitization – Standardized Approach
  - Securitization - Standardized Approach
- Market Risk
  - Market Risk – Standardized Approach
- Operational Risk
  - Operational Risk – Basic Indicator approach
- Capital Structure

### ***7.1. India- High Level Process Flow- 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, refer *OFS Basel Regulatory Capital Run Charts*.

### **Process Flow for Capital Adequacy Ratio Calculation**



## **Capital Calculation Run**

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, Market Risk process, and so on, also exist as individual runs which is described in the following sections.

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 may 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.

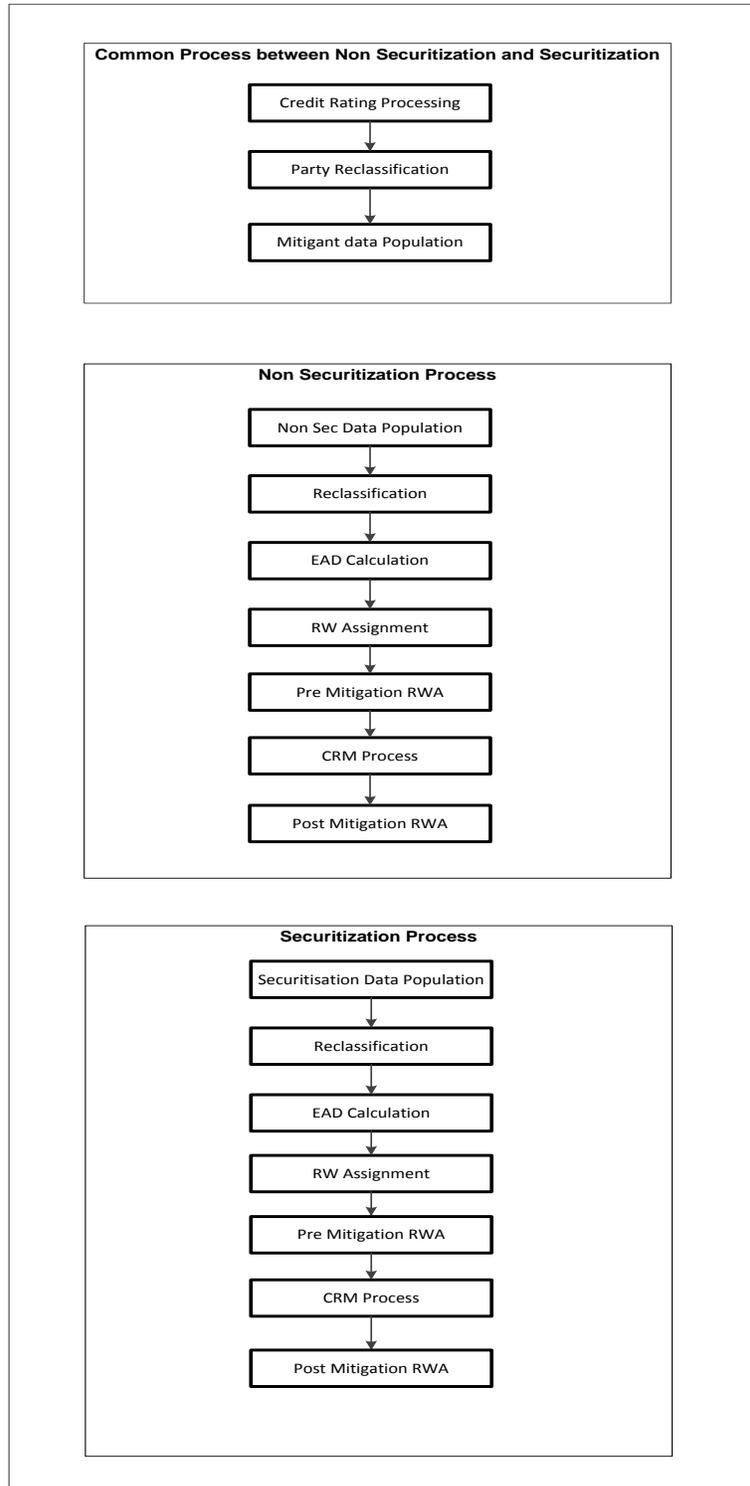
### **Currency Conversion**

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.

## **Process Flow for Credit RWA Calculation**



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 both Non Securitization and Securitization section of this document, it is executed only once under the Credit RWA run.

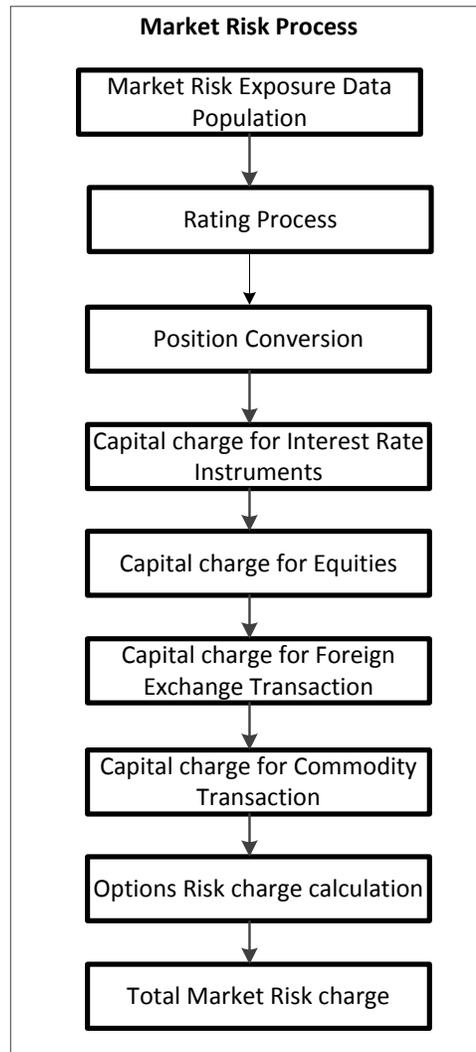
Certain sub processes under Non Securitization process like Reclassification, RW assignment, and so on are common across all types of exposures for example: banking book, over the counter derivative transactions, and

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, refer *Credit RWA*.

For example: Non Sec Data Population is detailed under Data Population and Currency Conversion of Credit RWA section of this document.

### Process Flow for Market RWA calculation

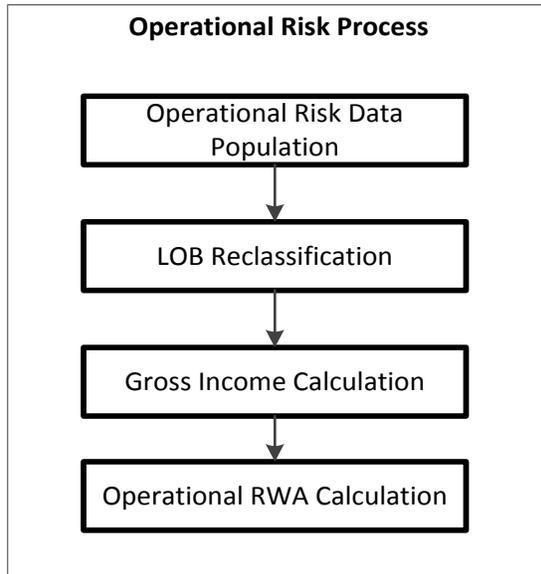


Market RWA Run is made up of multiple sub processes specific to Market Risk. However, when Market Risk is bundled under a Consolidated Run and triggered, Capital Consolidation and Rating process is executed only once for both Credit Risk and Market Risk. The details of each of the sub process mentioned in the preceding flow chart are present under Market Risk section of this document.

For more information on Market RWA computation, refer *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.

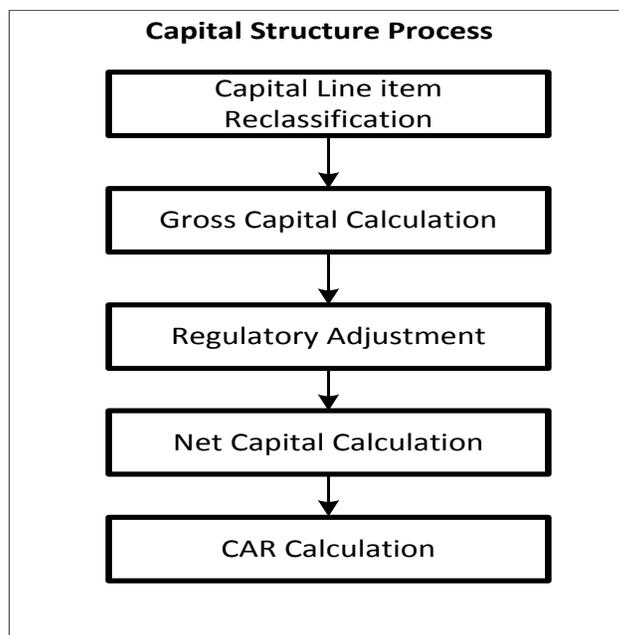
### Process Flow for Operational RWA calculation



Operational RWA run is executed with the [Capital Consolidation](#) process. For more information on the Operational RWA computation, refer *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.

### 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, refer *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.

## 7.2. *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.

### 7.2.1. 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.

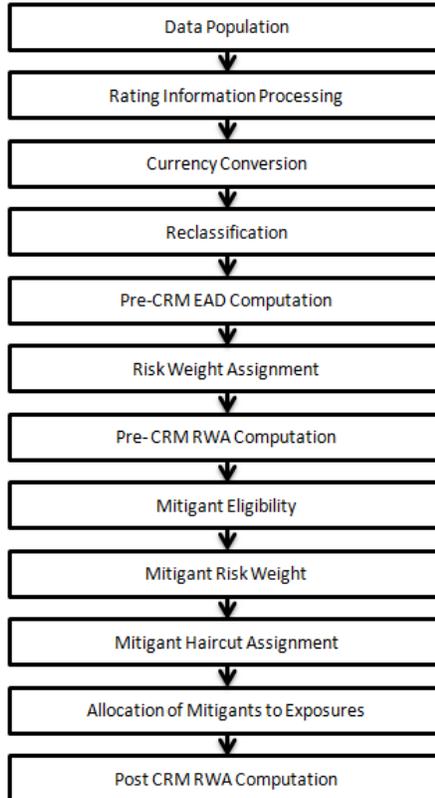
Some exposures may be hedged against Credit Risk through various mitigants like guarantors, collaterals, credit derivatives, and so on. These provide mitigation to credit risk and are considered while computing Credit RWA as per RBI norms. Hence, the application calculates both the pre-mitigation RWA 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 Credit Risk – 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

Product	Source Product Processor
Investments	STG_INVESTMENTS
Lease Contracts	STG_LEASE_CONTRACTS
Letters of Credit	STG_LC_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_EQUITY_EXPOSURES
Underlying exposures for repo contracts along with some securitization exposures' underlying	STG_UNDERLYING_EXPOSURES
Credit Derivatives	STG_CREDIT_DERIVATIVES

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, refer to 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:

$$\text{Exposure Amount} \times \text{Share Holding Percent} = \text{Updated Exposure Amount}$$

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 may be a part of a financial group that has multiple legal entities as subsidiaries under its holding. You need to select the entity on which capital consolidation needs to 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**, refer *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, (except investment exposures in **STG\_INVESTMENTS** table, credit cards in **STG\_CARDS**, and equities in **STG\_EQUITY\_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\_RECLASSIFICATION**) to obtain reclassified rating.

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**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**)
-

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○ 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 will be considered as unrated.

○ Rating Code (**V\_RATING\_CODE**)

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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, refer Exhibit 4 in *Annexure A: Key Concepts*.

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**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.

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- **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, refer 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.

## **7.2.2. Securitization**

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. 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 as well as some portion of securitized exposures. The application is capable of handling both securitized exposures as well as re-securitized exposures. It also handles the calculation for the originator as well as the investor bank roles. At a broad level, there are two categories of Investors:

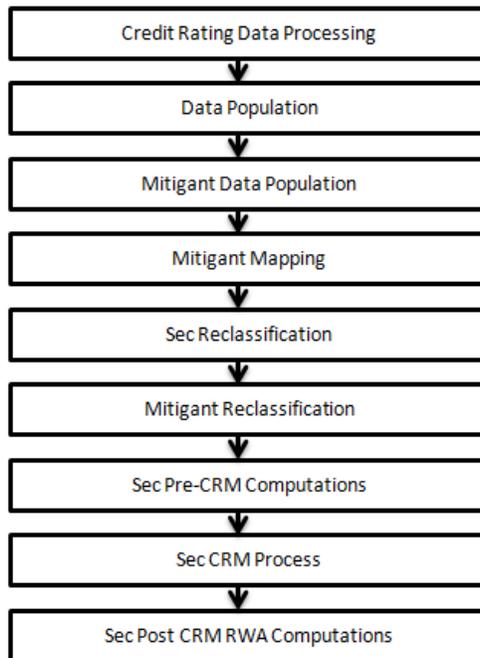
- An Investing Bank who has invested heavily in securitization.
  - These investors are prepared to provide the entire details of the securitization transaction
  - To cater to these investor needs, the entire pool, entire or invested tranche details and the invested exposures information are required to be provided by the bank. This information is captured in the pool, tranche and exposures table.
- An Investing Bank who has invested minimal in securitization
  - These investors are prepared to provide the necessary inputs required for the calculation of the capital charge pertaining to their invested exposure.
  - To cater to these investor needs, the invested exposures information is required to be provided as an input by the bank. A few pool and tranche attributes required for the computation are also to be provided as an input by the Bank in the Stage Securitization Exposure (**STG\_SEC\_EXPOSURE**) table.

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 both the Securitized exposures and the Non Securitized exposures.

### Process Flow

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). For re-securitization positions, if the underlying exposure is a securitization position, then the information is available in the Sec Exposures table. If the reporting bank provides the exposure level information only, then the application expects few pool level and tranche level parameters, which are required for further processing, to be provided in the Exposures (**STG\_SEC\_EXPOSURES**) table.

- **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:**

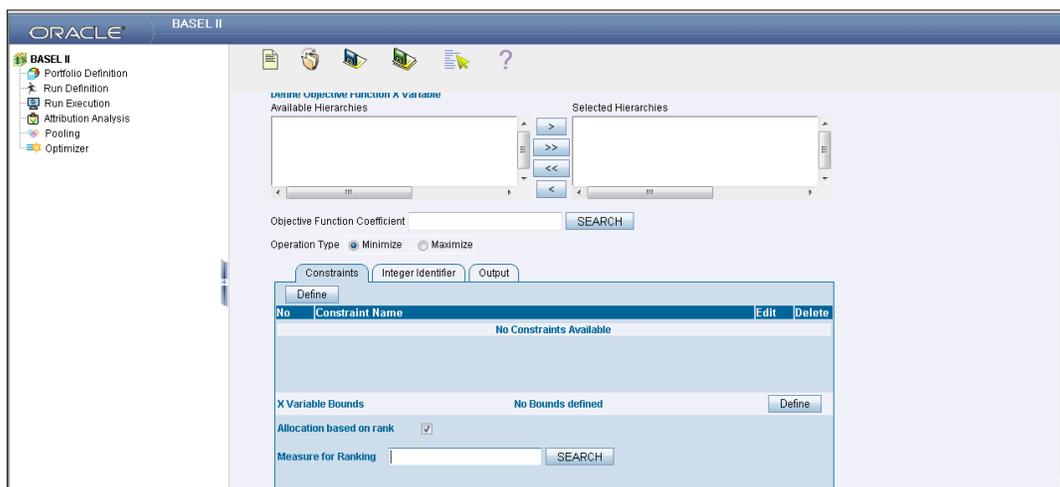
The application assigns the various haircuts, as applicable to the mitigants. Haircut is assigned to mitigants in the **FCT\_SUB\_EXPOSURES** table. The application uses supervisory haircuts and scales up, if required, based on the minimum holding period or uses the bank's own estimate of haircuts. The 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 will have 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, refer 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 has to be assigned to the exposures. The treatment pertaining to single exposure mapped to multiple mitigants have to be 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  $1 - \text{sum of all covered factors for that exposure}$ ) 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 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 refer to 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.

### *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.

## 7.3. 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 have been issued for the Standardized approach only.

### **7.3.1. Standardized Approach**

In the Standardized Approach (STD Approach), the Market Risk Capital Charge needs to be calculated for the following instrument types:

- Interest Rate related instruments (IR Instruments)
- Equity Position Risk
- Foreign Exchange risk
- Options

#### **Pre-requisite 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.

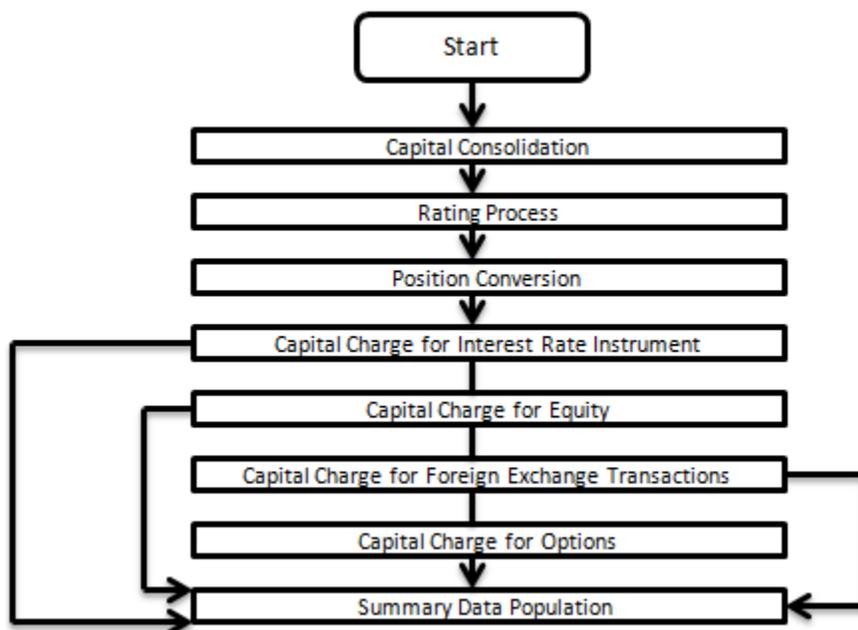
- IRC Data
- Market prices of the instruments
- Bank positions

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**



- **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, refer 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, refer 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 will be 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 will be converted to two child positions which will be in zero specific risk securities. The exposure amount for each of these positions will be 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

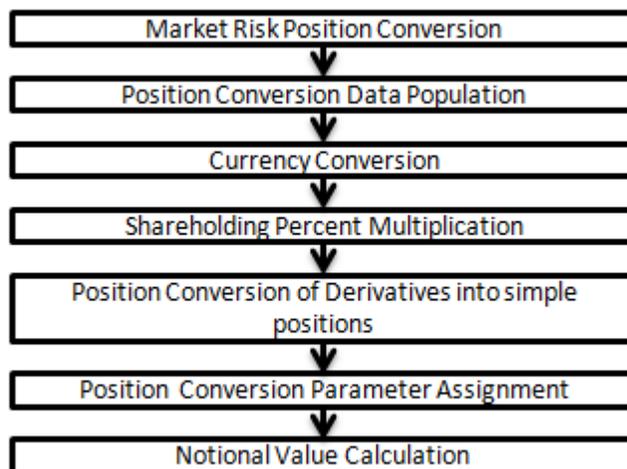
- Currency Forward
- Currency Future
- Currency Swap
- Gold Forward

Options / Structured Products

- Option on Equity
- Option on Currency
- Option on Commodity
- Option on Currency Future
- Option on Currency Forward
- Currency Swaption
- Option on a bond
- Option on a bond future
- Option on a Forward Rate Agreement
- Option on an Interest Rate Future
- 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, refer 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 refer the following:

*Process:* IND\_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:* 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, refer the following:***

*Process:* IND\_MKT\_RISK\_POSITION\_CONVERSION

*Sub-process:*

- Position Conversion Options
- Position Conversion Basket Futures - Interest Rate
- Position Conversion Swaps
- 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, refer the following:***

*Process:* IND\_MKT\_RISK\_POSITION\_CONVERSION

*Sub-process:*

- Position Conversion Options
- Position Conversion Basket Futures - Interest Rate
- Position Conversion Swaps
- 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 may 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, refer the following:***

*Process:* IND\_MKT\_RISK\_POSITION\_CONVERSION

*Sub-process:*

- Position Conversion Options
- Position Conversion Basket Futures - Interest Rate
- Position Conversion Swaps
- Position Conversion Forwards and Futures

**Example of a Forward Rate Agreement (FRA) Position Conversion:**

A purchased FRA may 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 will have positions exactly opposite to the one given in the preceding example, that is, the long position will become short and short position will become 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 will be 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

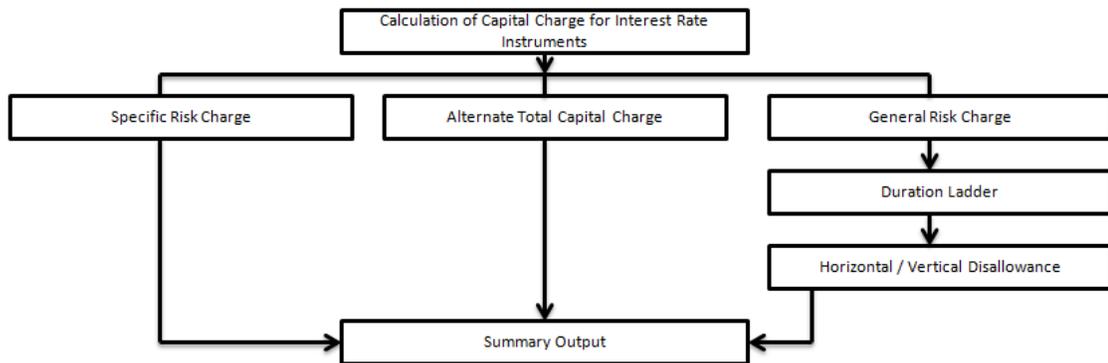
example, two positions are created, one long position with a maturity of 3 months and a short position for the life of the contract, that is, with a maturity of 6 months.

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, refer 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, refer 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, refer the following:***

*Process:* IND\_MKT\_RISK

*Sub-process:*

- Time Band Assignment
- Market Risk Assumed Rate Assignment
- 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, refer 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, refer the following:***

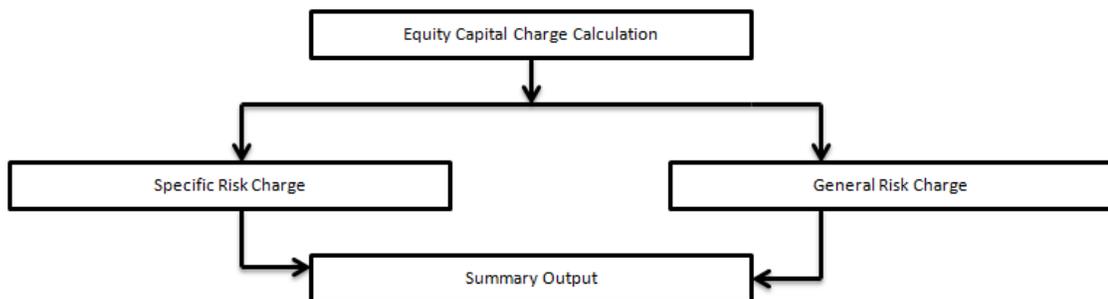
*Process:* IND\_MKT\_RISK

*Sub-process:*

- Market Risk Capital Risk Charge Calculation
- 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, refer the following:*

*Process:* IND\_MKT\_RISK

*Sub-process:*

- Market Risk Specific RW Assignment
- 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, refer the following:*

*Process:* IND\_MKT\_RISK

*Sub-process:*

- Market Risk General RW Assignment
- 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, refer the following:*

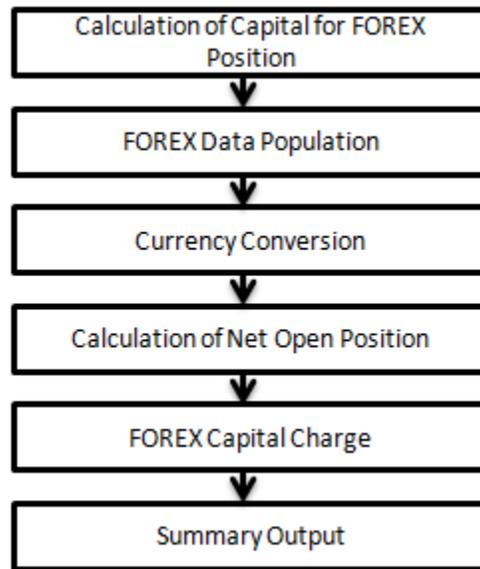
*Process:* IND\_MKT\_RISK

*Sub-process:*

- Market Risk Capital Risk Charge Calculation
- 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, refer 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, refer 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, refer 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\_Chrg\_Frx\_Ind’.

*For more information on the process and sub process that computes this task, refer the following:*

*Process:* IND\_MKT\_RISK

*Sub-process:* Market Risk Capital Risk Charge Calculation

- Summary Output:

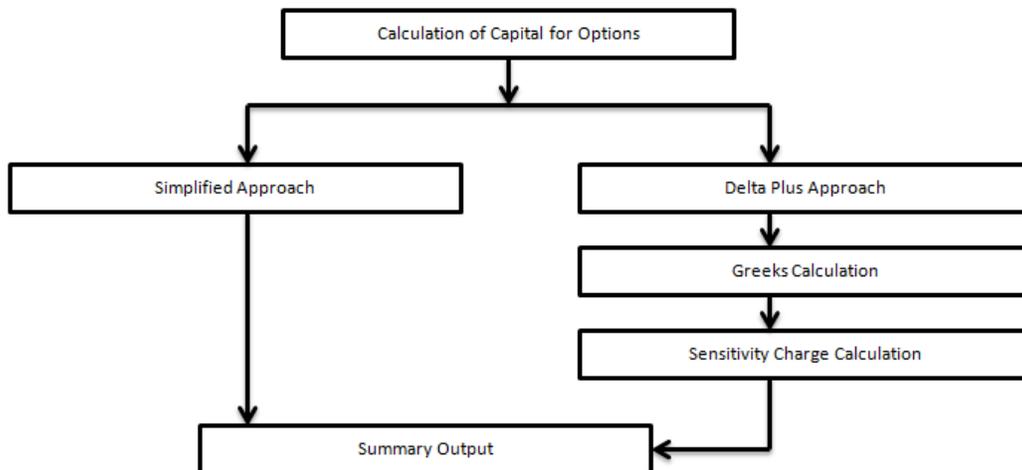
The FOREX risk charge gets reported out of market risk summary table under FOREX charge reporting line.

*For more information on the process and sub process that computes this task, refer 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, refer the following:***

*Process:* IND\_MKT\_RISK

*Sub-process:*

- Market Risk Generic Risk Charge Calculation - Simple Approach
- 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, refer the following:***

*Process:* IND\_MKT\_RISK

*Sub-process:*

- Market Risk Gamma Impact - Delta Plus
- 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, refer 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, refer the following:*

*Process:* IND\_MKT\_RISK

*Sub-process:* Market RWA Calculation

### **Key Data Elements**

Key data elements are listed in this section. For a complete list of tables and columns to be populated refer to 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.

## **7.4. 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:

- Basic Indicator Approach

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**NOTE:** While executing Solo Run for computing Operational Risk, the parent entity data is processed. However, for a Consolidated Run the parent entity as well as the subsidiary data is processed.

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### **7.4.1. 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:

$$K_{BIA} = \left[ \sum (GI_{1..n} \times \alpha) \right] / n$$

## Process Flow for Operational RWA

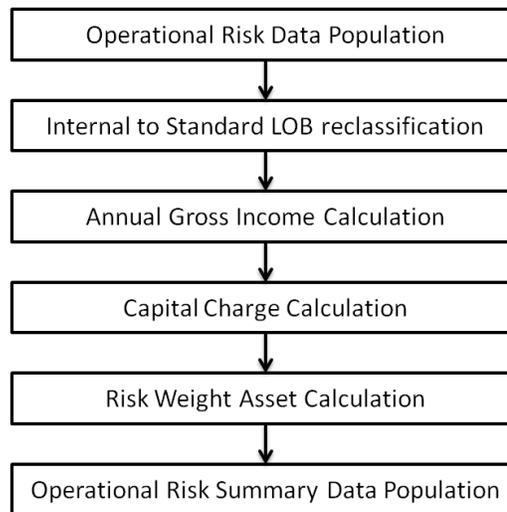
### Prerequisite

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 both 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%, 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.

## Key Data Elements

Key data elements need 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.

## 7.5. 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%.

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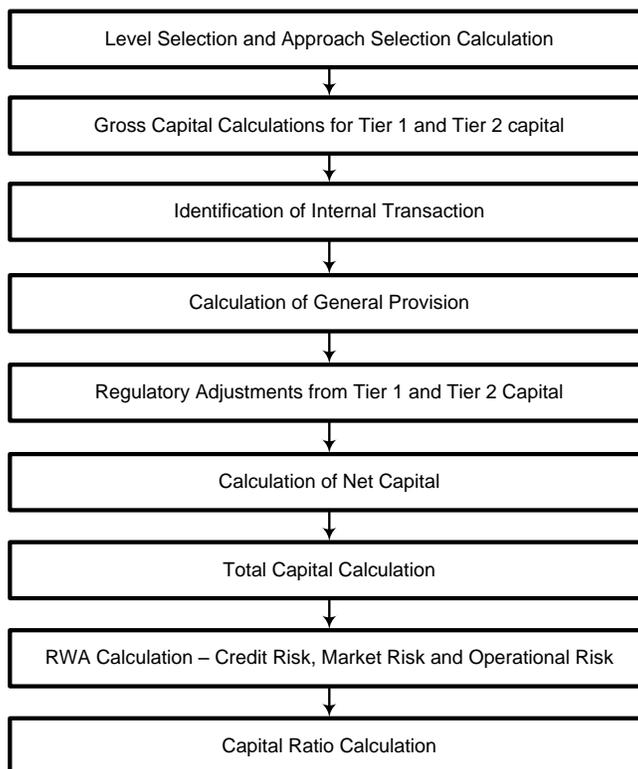
**NOTE:** While executing Solo Run the parent entity data is processed. Investment into the subsidiary data undergoes RWA calculation as per the Credit Risk and Market Risk rule. Capital line item pertaining to parent entity is only processed. For consolidation approach, the parent entity as well as the subsidiary data is considered. All the General Ledger line items are expected at solo level for each entity. The consolidated data is discarded.

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### 7.5.1. Assumption

The General Ledger codes are expected to be unique across entities in **STG\_GL\_DATA** and **DIM\_CAPITAL\_ACCT\_HEAD**.

## 7.5.2. 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 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 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 processed 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.

- **Calculation of Net capital:**

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.

- **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.

### 7.5.3. **Key Data Elements**

Key data elements that need to be notes 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, refer Exhibit 5 in *Annexure A: Key Concepts*.

## Chapter 8 Application Processing

### 8.1. Pre-processing Steps

#### 8.1.1. 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 needs to 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 would be changed to

N_Product_Skey	V_Product_Name	D_Start_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 has to be preserved then the V\_Product\_Name column has to be set as Type 2 in which case when SCD is processed for the processing

period in which the change happens it will insert 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'.

### **Pre-requisites**

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 will only need to 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 will populate 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_PRIORITY	NUMBER (2)  NULL	Priority of the Source when multiple sources are mapped to the same target
SRC_PROCESS_SEQ	NUMBER (2)  NOT NULL	The sequence in which the various sources for the DIMENSION will be taken up for processing
SRC_TYP	VARCHAR2(30)  NOT NULL	The type of the Source for a Dimension i.e., 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
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

MAP_REF_NUM	DIM TABLE	STG TABLE
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



7. Select Run Executable, from the Component ID list.
8. Click Parameters. A pop up window will open, 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 [previous table](#) 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 have been 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, refer to the *Download Specifications* document.

The set of sample data to be to be populated for the following tables are listed in the attached worksheet.

- Stg\_product\_master
- Stg\_lob\_master
- Stg\_mitigant\_type\_master
- Stg\_party\_type\_master



Sample Data.xls

### 8.1.2. Data Assumptions

The following section aims to identify certain data related assumptions for specific tables which will help in the smooth functioning of the Basel Regulatory Capital application.

#### 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**

**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 both 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**.

**8.1.3. 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 refer to 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, refer to

the *OFSAAI 7.3 User Manual*.

For more information on Data Entry forms, refer to *Data Entry Forms and Queries*.

### **8.1.4. 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**) need to be 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 will 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, needs to 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 has to be 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, refer to *Components of OFSAAI Infrastructure on page 8*.

## ***8.2. Processing***

### **8.2.1. Introduction**

Once 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, refer to the *Run Charts*. To execute Runs as batches refer to the Operations section, refer to the *OFSAAI 7.3 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.

### **8.2.2. Batch Processing**

A batch refers to a set of executable processes based on a specified rule. Batches relating to the application needs to be executed as specified below. These batches are executed from the Operations Menu of OFSAAI. For more information of the Operations section, refer to the *OFSAAI 7.3 User Guide*.

- Slowly Changing Dimension batch: The needs to be executed when you are installing the application for the first time. Subsequently, this batch needs to 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\_FINANCIAL\_DATA\_POPULATION Batch: Populates the party financial data. Need to be 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.

### 8.2.3. 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, refer to *Rules Framework*.

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**NOTE:** For CBRC Jurisdiction, if Credit Risk is selected in Run Management, then the relevant questions will not be 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.

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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
  - The 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 needs to 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_END_DATE	End date of the hierarchy.

## Portfolio Definition Window

To access the Portfolio Definition Window:

1. Click **Risk Applications** on the Left Hand Side (LHS) pane of OFSAAI Window.
2. Click Basel Regulatory Capital.
3. Click **Portfolio Definition**.



## Portfolio Definition UI Icons

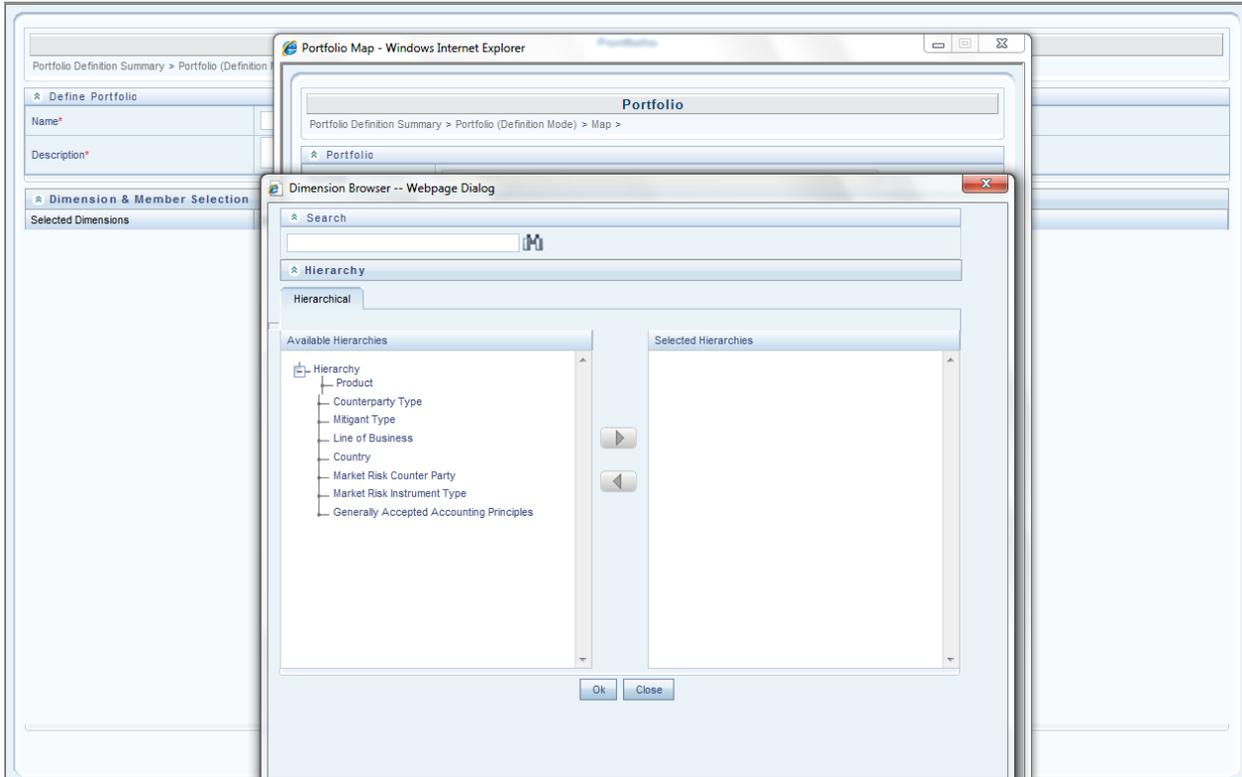
Icons Name	Icon	Description
Pagination Options		Helps in navigating from one page to another
View		Helps to view details of a defined Portfolio
Edit		Clicking this icon allows you to update details of a defined Portfolio
Add		Helps in defining a new Portfolio
Copy		Click this icon to create a new Portfolio 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 <b>Name</b> Text Box and click this icon.
Reset		The Reset icon refreshes the Portfolio Name field back to the default blank field

## Defining a Portfolio

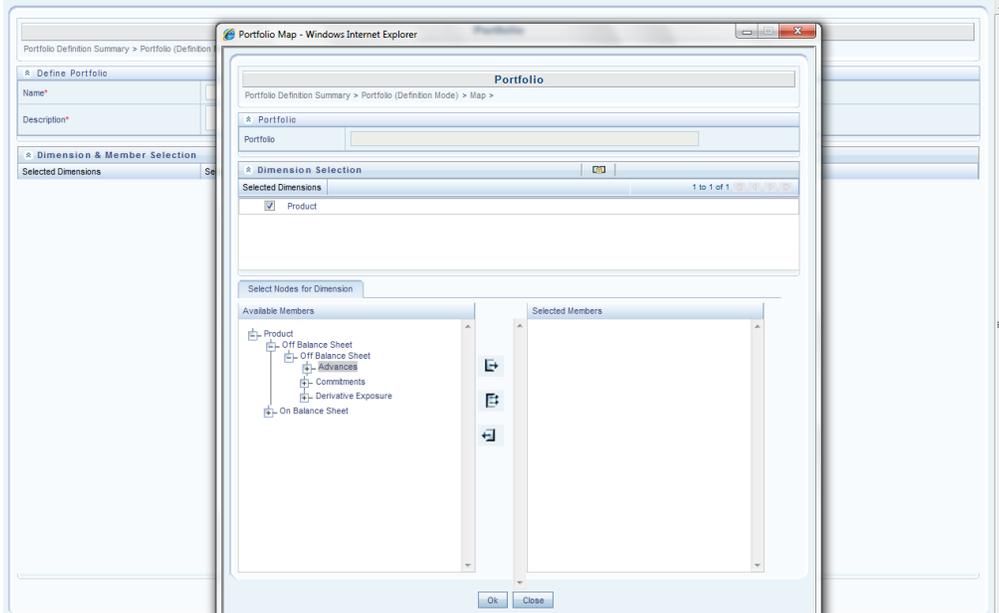
To define a Portfolio, refer to the following steps:

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.

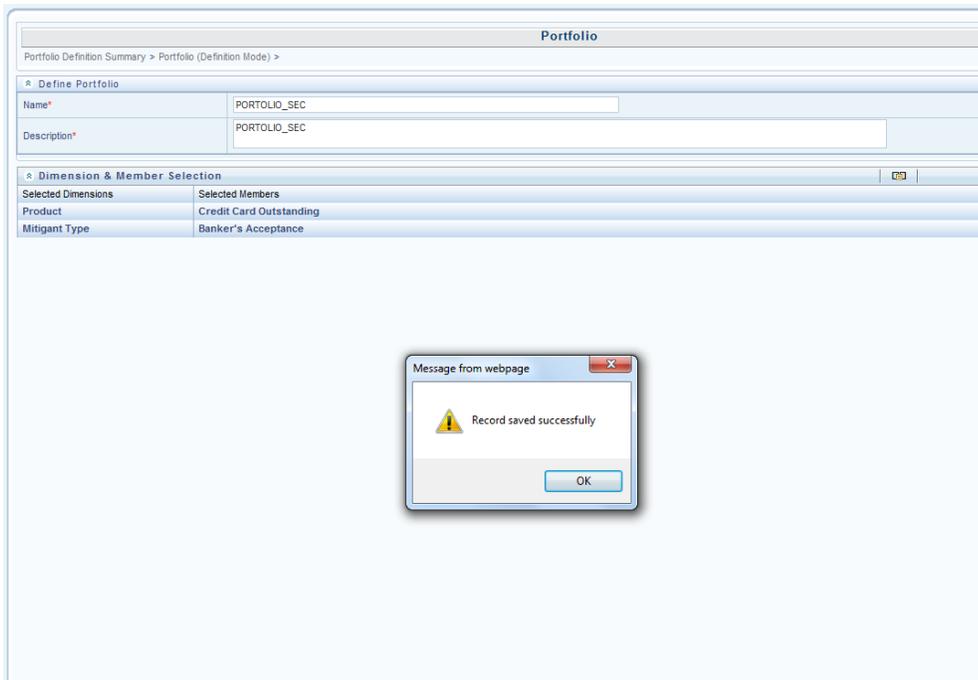
3. Click  in the **Dimension & Member Selection** section of the **Portfolio (Definition Mode)** window. The **Portfolio Map** window is displayed.
4. Click  in the **Portfolio Map** window and select the relevant Dimensions in the **Filter Browser** window by clicking . The selected Dimension appears 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 **Risk Applications** on the Left Hand Side (LHS) pane of OFSAAI Window.
2. Click **Basel Regulatory Capital**.
3. Click **Run Definition** on the LHS Pane. The Run 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 <b>Run Name</b> 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 needs to be created.

4. Enter the name of the Run and a relevant description in fields Run Name and Comments respectively, in the **Run Management** window.

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:

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.

If you are creating a Capital Calculation Run:

- 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:



**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 will be 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:

For Single Counterparty Run, click  against **Portfolio Identifier** to select the defined portfolios to participate in the Run. The relevant approaches will 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:

Credit Risk	
Basel Regulatory Capital Approaches	<input type="checkbox"/> Portfolio Identifier
<input type="checkbox"/> Non Securitisation Standardized	
<input type="checkbox"/> Non Securitisation FIRB	
<input type="checkbox"/> Non Securitisation AIRB	
<input type="checkbox"/> Securitisation Standardized	
<input type="checkbox"/> Securitisation - Rating Based Approach	
<input type="checkbox"/> Securitisation - Internal Assessment Approach	
<input type="checkbox"/> Securitisation - Supervisory Formula Approach	
<input type="checkbox"/> Securitisation - Internal Rating Based Approach	

- 7. For Capital Calculation Run, click  to select the relevant sub approaches, shown in the following figure:

Credit Risk	
Basel II Approaches	
<input checked="" type="checkbox"/>	Non Securitisation Standardized
<input checked="" type="checkbox"/>	Claims on Sovereign
<input checked="" type="checkbox"/>	Use ECA Country Scores for risk weighting claims on Sovereigns
<input type="radio"/>	Yes
<input checked="" type="radio"/>	No
<input checked="" type="checkbox"/>	Claims on PSE
<input checked="" type="checkbox"/>	Option used for claims on domestic PSEs
<input checked="" type="radio"/>	Option I
<input type="radio"/>	Option II
<input checked="" type="checkbox"/>	Claims on Bank
<input checked="" type="checkbox"/>	Option for risk-weighting claims on Banks
<input checked="" type="radio"/>	Option I
<input type="radio"/>	Option II
<input checked="" type="checkbox"/>	Claims on Corporates
<input checked="" type="checkbox"/>	Supervisor permission to risk weight all corporate claims at 100% without regard to external rating
<input checked="" type="radio"/>	Yes
<input type="radio"/>	No
<input checked="" type="checkbox"/>	Claims Secured by Commercial Real Estate
<input checked="" type="checkbox"/>	Has the national supervisor permitted a lower RW for certain commercial real estate exposures?
<input checked="" type="radio"/>	Yes
<input type="radio"/>	No
<input checked="" type="checkbox"/>	Past Due
<input checked="" type="checkbox"/>	Past due treatment for non-past due loans to counterparties subject to a 150% RW
<input checked="" type="radio"/>	Yes
<input type="radio"/>	No
<input checked="" type="checkbox"/>	Use of 0% RW for Gold Bullion held in own vaults or on allocated basis
<input checked="" type="radio"/>	Yes
<input type="radio"/>	No
<input checked="" type="checkbox"/>	Use of borrower's domestic currency rating for exposure in foreign exchange transactions when loans extended to certain MDBs
<input checked="" type="radio"/>	Yes
<input type="radio"/>	No
<input checked="" type="checkbox"/>	SFT
<input type="checkbox"/>	Simple Approach
<input type="checkbox"/>	IMM

8. For Capital Calculation Run, select (✓) a portfolio that you want to map to an approach or sub-approach, shown in the following figure:

For Single Counterparty Run, select (✓) a portfolio that you want to map to Single Counterparty Approach.

<input type="checkbox"/> Non Securitisation IRB			✓
<input type="checkbox"/> Equity			
<input type="checkbox"/> Equity Exposures - Non-Investment Funds			
<input checked="" type="radio"/> IMM Approach <input type="radio"/> Simple Risk Weight Approach			
<input type="checkbox"/> Equity Exposures - Investment Funds (In conjunction with Money Market Fund Approach)			
<input checked="" type="radio"/> Simple Modified Look Through Approach <input type="radio"/> Alternate Modified Look Through Approach <input type="radio"/> Full Look Through Approach			
<input type="checkbox"/> SFT			
<input type="radio"/> Collateral Haircut Approach <input checked="" type="radio"/> Internal Model Method <input type="radio"/> VaR Models Approach			
<input type="checkbox"/> Haircut			
<input checked="" type="radio"/> Supervisory Haircut <input type="radio"/> Own Estimate			
<input type="checkbox"/> OTC			
<input type="radio"/> Current Exposure Method <input checked="" type="radio"/> Internal Model Method			
<input type="checkbox"/> CRM			
<input type="checkbox"/> Credit derivatives and guarantees			
<input checked="" type="radio"/> PD Substitution Approach <input type="radio"/> LGD Adjustment Approach			
<input type="checkbox"/> SFT Collateral			
<input checked="" type="radio"/> Comprehensive Approach <input type="radio"/> LGD Adjustment Approach			
<input type="checkbox"/> OTC Collateral			
<input type="radio"/> Comprehensive Approach <input checked="" type="radio"/> LGD Adjustment Approach			

9. 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
IFSB	Basel	Capital Calculation	Credit Risk
			Market Risk
			Operational Risk
INDIA	Basel	Capital Calculation	Credit Risk
			Market Risk
			Operational Risk
USA	US II	Capital Calculation	Credit Risk

SEGMENT	REGULATION	RUN TYPE	RISK
USA	US III	Capital Calculation	Credit Risk
USA	Dodd-Frank	Single Counterparty Exposure	Credit Risk

## Run Execution

To access the Run Execution Window:

1. Click **Risk Applications** on the Left Hand Side pane of the OFSAAI Window.
2. Click **Basel Regulatory Capital**.
3. Click **Run Execution** on the LHS Pane. The Run Summary Window is displayed, wherein you can define and execute Runs.

## Run Execution UI Icons

The following table aims to familiarize you with the common icons available in the Run Management UI:

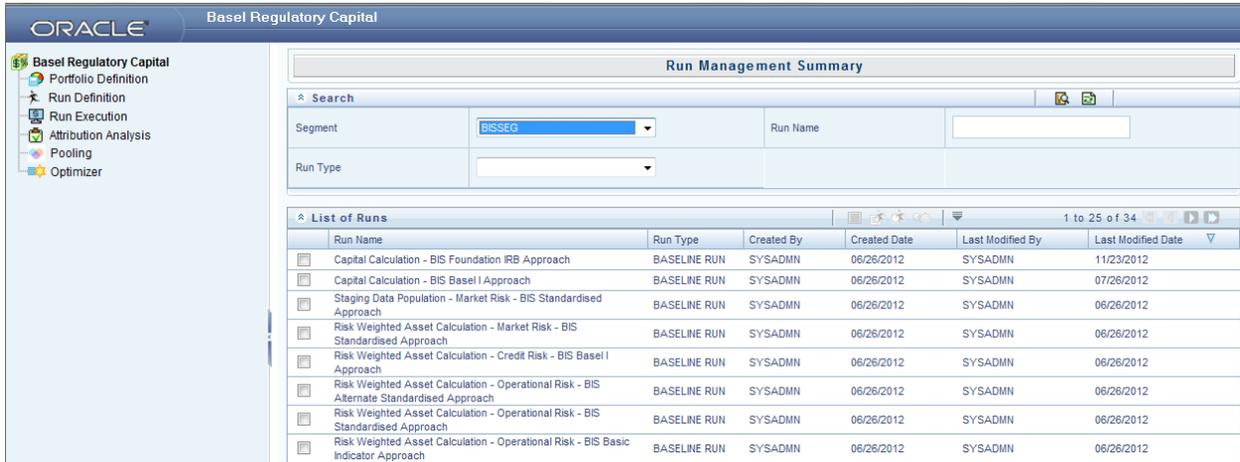
Icons Name	Icon	Description
Pagination Options		Helps in navigating from one page to another
View		Helps to view details of a particular Run
Run Default Parameters		Click this icon to allow you to update the Run Default Parameters
Run Execution Parameters		Click this icon to allow you to update the Run 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 <b>Run Name</b> 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

### 8.2.4. 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**
- **Modification By**
- **Modification 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.

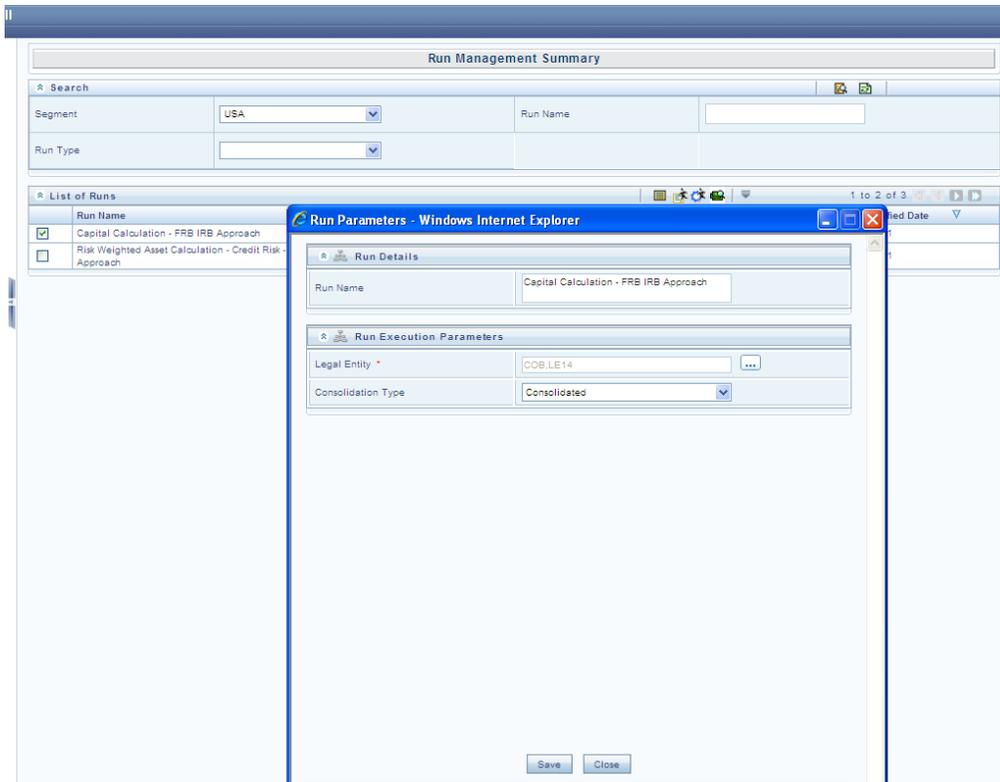
## Run Default Parameters

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) is processed to calculate provision. Parent-child relationship between Legal Entity will be 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 could 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.



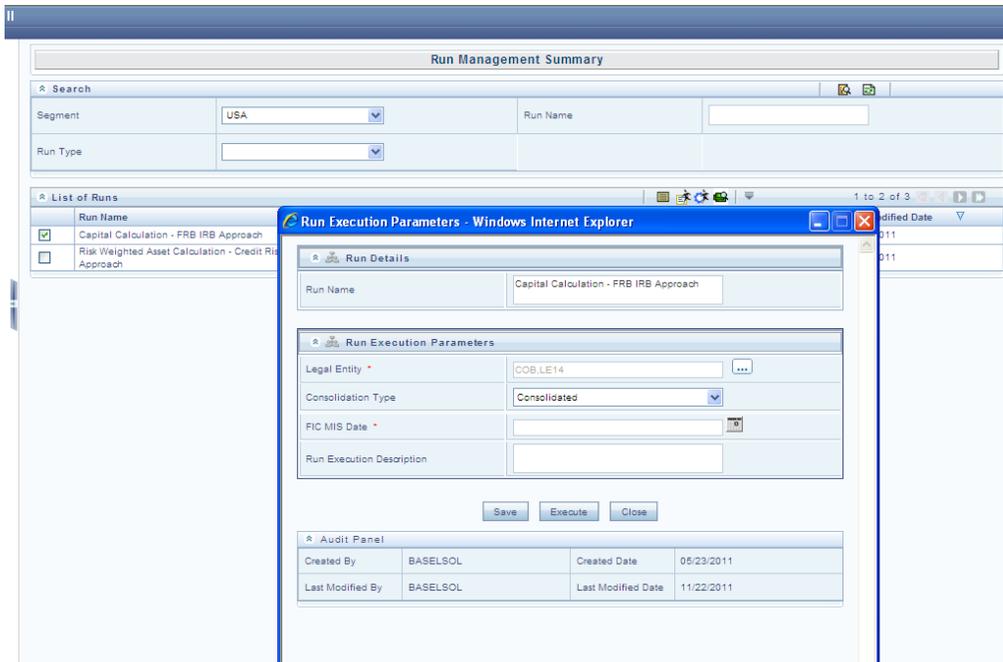
## Run Execution Parameters

In addition to the Run Default parameters, **Run Execution Parameter** window allows you to enter and save the Run execution parameters. By clicking the  icon a batch with the entered Run execution parameters is created. The batch created can be executed by clicking  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 will be 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 could 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 will be converted to the selected reporting currency.
- **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 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:

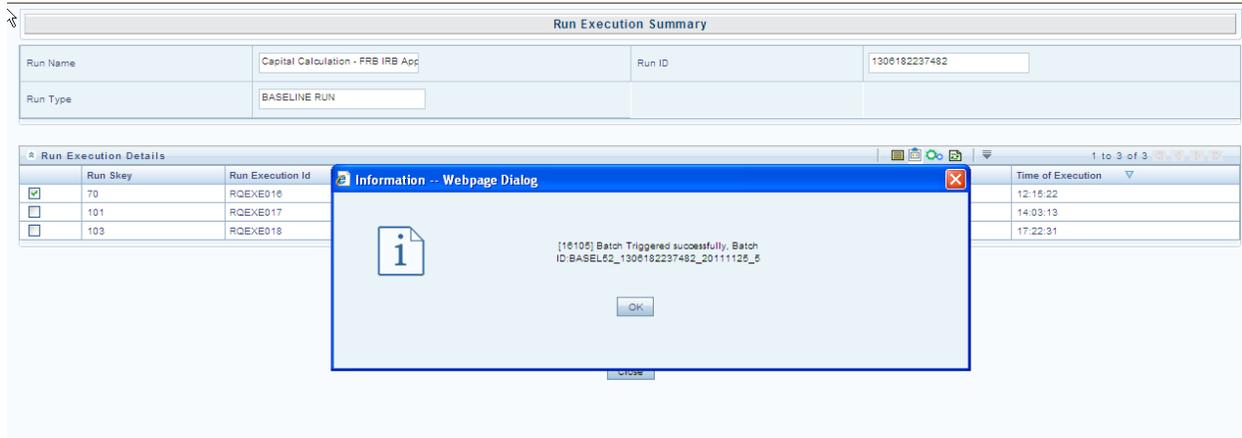
- **Run Skey**
- **Run Execution Id**
- **FIC MIS DATE**
- **Execution Status**
- **Execution Date**
- **Time of Execution**

Run Execution Summary						
Run Name	Capital Calculation - FRB IRB App		Run ID	1306182237482		
Run Type	BASELINE RUN					
Run Execution Details						
Run Key	Run Execution Id	FIC MIS DATE	Execution Status	Execution Date	Time of Execution	
<input type="checkbox"/>	103	RQEXE018	10/20/2011	ONGOING	11/28/2011	17:22:31

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 has been 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.



### 8.2.5. 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 needs to 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 it 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_PARAMETERS' column to which the particular option is related to. The value of the child to this option is stored in the 'RUN_PARAMETERS' 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' etc)
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** table: This tables 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 need to appear in the window

Column	Indicative Values
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
F_IS_LEBASED	Specifies that the run is LE based

- **Run\_Parameters\_LOV** table: 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 need to 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:**

The screenshot shows a configuration window with a tree structure of questions and options. The 'Claims on PSE' section is expanded, showing 'Option I' selected and 'Option II' unselected. Other sections include 'Non Securitisation Standardized', 'Claims on Sovereign', 'Claims on Bank', and 'Claims on Corporates'.

For example: Under **Claims on PSE** if you want to add Option III, then the new Setup data will be 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
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

Table	Column	Indicative values
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 will be 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
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'

**8.2.6. Run Parameters Setup for Run Creation**

If the Run is not created through Run Management UI, the **usr\_defined\_run\_parameters** table needs to 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 need to be 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

RUN_PARAMETERS column name	Approach for Non Securitization FIRB	Selected Option	RUN_PARAMETERS column value
		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 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: INDIA**

RUN_PARAMETERS column name	Approach for Securitization Standardized	Selected Option	RUN_PARAMETERS column value
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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_sovereign	To use ECA Country Scores for risk weighting claims on Sovereign	Yes	OPT0004

RUN_PARAMETERS column name	Approach for Non Securitization Standardized	Selected Option	RUN_PARAMETERS column value
		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
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
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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_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
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_nss_sft_method		Simple Approach	OPT0037

RUN_PARAMETERS column name	Approach for Non Securitization Standardized Approach	Selected Option	RUN_PARAMETERS column value
	Approach for Securities Financing Transactions	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_PARAMETER S column name	Approach for Non Securitization IRB	Selected Option	RUN_PARA METERS 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
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

<b>RUN_PARAMETER S column name</b>	<b>Approach for Non Securitization IRB</b>	<b>Selected Option</b>	<b>RUN_PARAMETER S column value</b>
		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

<b>RUN_PARAMETERS column name</b>	<b>Approach for Non Securitization Standardized (AIRB)</b>	<b>Selected Option</b>	<b>RUN_PARAMETERS column value</b>
		Yes	OPT0004
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	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

RUN_PARAMETERS column name	Approach for Non Securitization Standardized (AIRB)	Selected Option	RUN_PARAMETERS column value
		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_PARAMETER S 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
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	OPT0075

RUN_PARAMETERS column name	Approach for Non Securitization IRB	Selected Option	RUN_PARAMETER S column value
		Method	
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

**Regulation: Basel III**

**Segment: BIS**

RUN_PARAMETERS column name	Approach for Securitization	Selected Option	RUN_PARAMETER S 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 Usage of Simplified Method for computing N and LGD	Yes	OPT0611
		No	OPT0612
v_ssf_simple_n_lgd	Internal Rating Based Approach Usage of Simplified Method for computing N and LGD	Yes	OPT0614
		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

RUN_PARAMETERS column name	Approach for Market Risk Standardized Approach	Selected Option	RUN_PARAMETERS column value
		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
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		Yes	OPT0027

RUN_PARAMETERS column name	Approach for Non Securitization Standardized	Selected Option	RUN_PARAMETERS column value
	Use of 0% RW for Gold Bullion held in own vaults or on allocated basis	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_PARAMETER S column value
v_cva_cds_index_decomposition	CDS Index Needs to be decomposed	Yes	OPT0267
		No	OPT0268

RUN_PARAMETER S column name	Approach for Non Securitization FIRB	Selected Option	RUN_PARAMETERS column value

<b>RUN_PARAMETERS column name</b>	<b>Approach for Non Securitization FIRB</b>	<b>Selected Option</b>	<b>RUN_PARAMETERS column value</b>
v_nfir_explicit_mat_adj	Use of Explicit Maturity Adjustment	Yes	OPT0203
		No	OPT0204
v_nir_default_risk_approach	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_corporate	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		CVA Standardized	OPT0261

<b>RUN_PARAMETERS column name</b>	<b>Approach for Non Securitization FIRB</b>	<b>Selected Option</b>	<b>RUN_PARAMETERS column value</b>
	Approach for Credit Value Adjustments	Approach	
		CVA Internal Model Method Approach	OPT0262
v_cva_include_sft	Include SFTs for CVA calculation	Yes	OPT0264
		No	OPT0265
v_cva_cds_index_decomposition	CDS Index Needs to be decomposed	Yes	OPT0267
		No	OPT0268

<b>RUN_PARAMETERS column name</b>	<b>Approach for Non Securitization Standardized (AIRB)</b>	<b>Selected Option</b>	<b>RUN_PARAMETERS column value</b>
		Top Down	OPT0303
v_nir_default_risk_app	Default Risk Approach for Purchase Receivables	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		Yes	OPT0337

RUN_PARAMETERS column name	Approach for Non Securitization Standardized (AIRB)	Selected Option	RUN_PARAMETERS column value
	Specialized Lending-Slotting Criteria Approach. Use of preferential risk weights for specialized lending sub-classes in Strong and Good	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 Model Method Approach	OPT0362
v_cva_include_sft	To include SFTs for CVA calculation?	Yes	OPT0364
		No	OPT0365
v_cva_cds_index_decomposition	CDS Index Needs to be decomposed	Yes	OPT0367
		No	OPT0368

**Regulation: NPR III**

**Segment: USA**

RUN_PARAMETER column name	Approach for Non Securitization IRB	Selected Option	RUN_PARAMETER 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
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
		Current Exposure Method	OPT0074

RUN_PARAMETER column name	Approach for Non Securitization IRB	Selected Option	RUN_PARAMETER column value
v_ns_otc_method	OTC	Internal Model Method	OPT0075
v_ns_haircut_method	SFT - Haircut	Supervisory Haircut	OPT0067
		Own Estimate	OPT0068
v_crm_guar_and_cd_approach	CRM - Credit derivatives and guarantees	PD Substitution Approach	OPT0081
		LGD Adjustment Approach	OPT0082
v_crm_collateral_approach	CRM - SFT Collateral	Comprehensive Approach	OPT0083
		LGD Adjustment Approach	OPT0084
v_crm_collateral_approach_otd	CRM - OTC Collateral	Comprehensive Approach	OPT0085
		LGD Adjustment Approach	OPT0086
		No	OPT0612

### 8.3. Reporting

Oracle Financial Services Basel Regulatory Capital Analytics Release 6.1.0.0.0 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) as well as 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, refer to the Oracle Financial Services Basel*

*Regulatory Capital Analytics User Guide.*

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**NOTE:** Oracle Financial Services Basel Regulatory Capital Analytics needs to be licensed by the Bank separately

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## Chapter 9 Attribution Analysis

Attribution Analysis is increasingly becoming the requirement of advanced markets complying with the Basel Accord. Attribution Analysis is the technique to quantify the change in the Capital Adequacy Ratio (CAR) in relation to Risk Weighted Assets (RWA) computation and the Eligible Capital on a given date against the previous baseline date. Attribution Analysis is a key management tool for senior management in regulatory capital analysis and planning.

### 9.1. Risk Weighted Assets

Analysis for change in RWA is classified into the following based on the risk types:

- Credit RWA
- Market RWA
- Operational RWA

#### 9.1.1. Credit RWA

The Basel Regulatory Capital application has the ability to perform attribution of changes in Credit RWA based on the following approaches:

- Simplified Approach: In this approach, individual exposures in the application Runs are computed based on the following sub-portfolios:
  - Book Type – Banking book or Trading book
  - Credit Risk Type – Non-Securitized or Securitized
  - Basel Approach – Standardized or IRB
  - Basel (Sub-Approach) – FIRB, AIRB, and so on.
  - Currency
  - Asset Class
  - Basel Product Type

Attribution Analysis is then performed for the above mentioned sub portfolios based on the following control variables:

- Business Growth: Amount of business growth is calculated as change in EAD Post Mitigation amount in Natural Currency (NCY) multiplied by the applicable risk weight in the latest Run from the baseline Run. This amount is then converted into the reporting currency as per the applicable currency rate.
- Risk Migration: Attribution of risk migration is calculated as change in average Risk Weight Post Mitigation multiplied by the EAD in the latest Run from the baseline run. This amount is then converted into the reporting currency as per applicable currency rate.
- Foreign Exchange Rate change: Percentage attribution of foreign exchange rate change is calculated as percentage change in exchange rate for the portfolio currency between the two MIS dates. This amount is then converted into the reporting currency as per applicable currency rate
- Multiplication Factor: A residual change in the Credit RWA which occurs due to the interaction between the control variables mentioned above and which cannot be directly attributed to any of these variables is assigned a Multiplication Factor control variable. Its value is calculated as the difference between actual change in Credit RWA and sum of percentage change in the first three control variables.

- **Advanced Approach:** In this approach, the analysis is performed at the exposure-level granularity and aggregated to higher levels. Under the Advanced approach, Attribution Analysis is performed at an individual exposure level. Attribution analysis for the exposures which exist in both the current and baseline application Runs are performed based on the following control variables:
  - **Foreign Exchange Rate Change:** Percentage attribution of Foreign Exchange Rate change is calculated as percentage change in exchange rate for the portfolio currency between the two MIS dates.
  - **Credit Quality Migration:** Credit Quality Migration analysis, before application of any credit risk mitigation techniques, is further divided into the following:
    - **Probability of Default (PD) Migration:** The calculations performed to compute this attribute value are as follows:
      - Re-calculate capital required (K) using PD of the latest Run and LGD and M from the baseline Basel Run.
      - Find the percent change between capital required (K) of the latest Run and above calculated K.
    - **Loss Given Default (LGD) Migration:** The calculation performed to compute this attribute value are as follows:
      - Re-calculate capital required (K) using LGD of the latest Run and PD and M from the baseline Basel Run.
      - Find the percent change between capital required (K) of the latest Basel Run and above calculated K.
    - **Effective Maturity (M) Migration:** The following calculation is performed to find the attribution value:
      - Re-calculate capital required (K) using M of the latest Basel Run and PD and M from the baseline Basel Run.
      - Find the percent change between capital required (K) of the latest Basel Run and above calculated K.
  - **Residual Factor -** The residual change in the Capital Required (K) which occurs due to the interaction between PD, LGD and M and cannot be directly attributed to any of them is assigned a Residual Factor control variable. Its value is calculated as the difference between actual percentage change in Capital Required (K) and sum of percentage change in PD, LGD, and M.

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**NOTE:** In addition to the above, for Credit Risk Migration, effect of the Credit Risk Mitigants is calculated as percentage change in risk weights after application of Credit Risk Mitigation techniques.

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- **Exposure or Exposure at default (EAD):** Attribution of Exposure or EAD is calculated as change in EAD Post Mitigation amount in the latest Run from the baseline Run. This amount is then converted into the Reporting currency as per applicable currency rate
- **Multiplication Factor:** The residual change in the Credit RWA which occurs due to the interaction between the above three control variables and which cannot be directly attributed to any of them is assigned a Multiplication Factor control variable. Its value is calculated as difference between actual percentage change in Credit RWA and sum of percentage change in first three control variables.

The attribution of exposures which matures during the timeframe between the two Basel Runs, that is; exposures present only in the baseline Run for credit RWA is calculated as follows:

**RWA of matured exposures from baseline Run ÷ Total RWA of latest Run.**

The attribution of exposures which increases during the timeframe between the two Basel Runs, that is; exposures present only in the latest Run for credit RWA is calculated as follows:

**RWA of new exposures from latest run ÷ Total RWA of latest run.**

For all securitized assets, credit risk migration analysis is done only between Pre- CRM and Post-CRM. Pre-CRM is divided into PD, LGD, or M migration. Also, when Advanced Attribution Analysis Run is executed for Basel Runs, with Standardized Approach for Credit Risk computation, PD, LGD, or M migration is not calculated.

### **9.1.2. Market RWA**

Attribution analysis for changes in Market RWA is computed for the following 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 as follows:

- Standardized Approach
  - Interest Rate Risk
    - Specific Risk
    - General Market Risk
  - Equity Risk
    - Specific Risk
    - General Market Risk
  - Commodity Risk
  - Foreign Exchange Risk
- Internal Model Method
  - Value at Risk
  - Stressed Value at Risk
  - Incremental Risk Charge
  - Comprehensive Risk Measure

Percentage attribution for RWA is calculated as percentage change in Market RWA between the two Basel Runs for each approach and risk type.

### **9.1.3. Operational RWA**

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:

- Basic Indicator Approach
- Standardized Approach
- Advanced Measurement Approach

Percentage attribution for RWA is calculated as percentage change in Operational RWA between the latest and the baseline runs for each approach.

## ***9.2. Eligible Capital***

The application computes the attribution of changes in Eligible Capital from one period to the next period with the following control variables:

- Tier 1 capital, components and deductions
- Tier 2 capital, components and deductions
- Tier 3 capital and components

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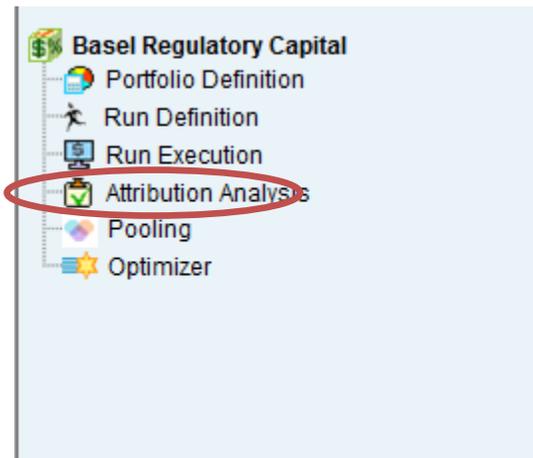
**Note:** Attribution Analysis is computed at the most granular level in case of attribution of Eligible capital.

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### 9.3. Attribution Analysis GUI

To perform Attribution Analysis follow the steps given below to access the Attribution Analysis window:

1. Click **Basel Regulatory Capital** on the Left Hand Side Pane of the OFSAAL.
2. Click **Attribution Analysis**, shown in the following figure:



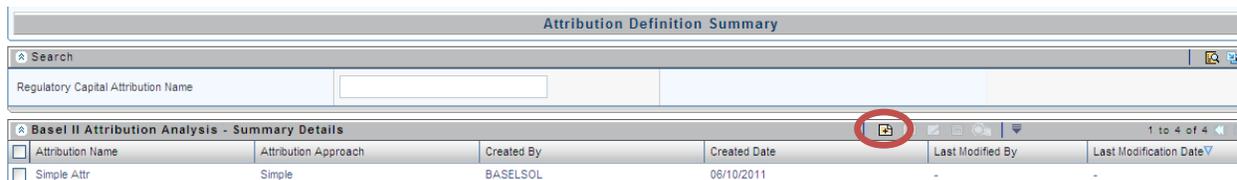

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**NOTE:** It is assumed that all the Basel Runs are executed before performing Attribution Analysis.

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Follow the steps given below to perform Attribution Analysis:

1. Click  to define an attribution approach to be executed, in the Attribution Analysis Summary Window as shown in the following figure:



The Attribution Analysis Definition Window is displayed as follows:

2. Enter **Name** and **Description** of the Attribution Approach.
3. Select **Yes** if you want to compute Attribution Analysis for capital (Eligible capital) or else select **No**
4. Select **Yes** if you want to include Attribution Analysis for Credit Risk Weighted Assets or else select **No**.
5. Click  to include Simplified Approach computation or Advanced Approach computation.
6. Select **Yes** if you want to include the Multiplication factor variable in the computation or else select **No**.
7. Select **Yes** to include Market RWA computation or else select **No**.
8. Select **Yes** to include Operational **RWA** computation or else select **No**.
9. Click  .

The newly defined Attribution Analysis computation appears in the **Attribution Definition Summary** window. To execute Attribution Analysis, refer to the following steps:

1. Click  to select the relevant approach shown in the following figure:

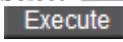
Attribution Definition Summary						
Search						
Regulatory Capital Attribution Name						
Basel II Attribution Analysis - Summary Details						
<input type="checkbox"/>	Attribution Name	Attribution Approach	Created By	Created Date	Last Modified By	Last Modification Date
<input type="checkbox"/>	Mix Appr	Advanced	BASELSOL	01/24/2011	-	-
<input type="checkbox"/>	Simple Final	Simple	BASELSOL	01/21/2011	-	-
<input checked="" type="checkbox"/>	Advance Final	Advanced	BASELSOL	01/21/2011	-	-

- Click  to define the variables for Analysis in the Attribution Definition Summary window. The following figure represents the Attribution Analysis- Execution window.

Basel Regulatory Capital Attribution Analysis - Execution	
Attribution Definition	
Name	Description
Execution Details	
Execution Description*	
Select MIS Date*	
Select Run ID*	
Period*	<input checked="" type="radio"/> Monthly <input type="radio"/> Quarterly <input type="radio"/> Half_Yearly <input type="radio"/> Yearly <input type="radio"/> Custom
Select Previous MIS Date*	
Select Previous Run ID*	
Approach/Rule Changes	No
<input type="button" value="Execute"/> <input type="button" value="Schedule for Execution"/> <input type="button" value="Cancel"/>	

- Enter a description in the Executive Description field.
- Click  to select the MIS date of the latest Basel Run in **Select MIS date** field.
- Select the relevant Run from the dropdown list in **Select Run ID** field.
- Click  to select the period of analysis.

**NOTE:** If monthly, quarterly, half yearly or yearly is selected, the **previous MIS date** field is auto populated accordingly. If custom is selected, then click  to select the previous MIS date.

- Select the relevant Run from the **Previous Run ID** field list.
- Select No in the Approach/Rule changes field if there are no changes in the rules for previous MIS date run, shown in the following figure or else follow the step 10.
- Select the Previous Run ID (executed for previous MIS date) and Previous MIS Date modified Run.
- Select  to schedule the execution for a particular date or else select .

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 the Basel Regulatory Capital Analytics which has to be licensed by the bank additionally.

## Annexure A: Key Concepts

### Exhibit 1 - Mitigant Allocation Optimizer (IRB Approach)

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:

#### FIRB Minimum Collateralization Check

**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 needs to 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.

Once, the above 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.

#### FIRB Over Collateralization Amount Adjustment

**As per the Basel Accord, Para 296:** Mitigants forming part of Receivables, CRE/RRE and Other Collateral has to be 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.

- Double Default Treatment

**As per paragraph 284(i) & 284(ii):** For hedged exposures to be treated within the scope of the double default framework, capital requirements may 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 II 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.

- Double Mitigant Treatment

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 II 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 will be used. For the remainder, either the

exposure will be uncovered or any other mitigant if mapped to that exposure will get allocated. For Basel II calculations, if use of Double Mitigant treatment results in a lesser RWA for an exposure, than use of a single mitigant, the allocation logic will allocate the mitigant based on Double Mitigant treatment or else the allocation continues as a case for normal mitigants.

The following are the steps for credit risk mitigation irrespective of the approach prescribed in the Basel II 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 II accord.
2. 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 types, which includes an additional row treating the exposure as uncovered.
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 0. For any other mitigants in the form of Guarantees or Credit Derivative, the RW or PD under FIRB approach corresponding to Basel II rating, is used. For Advanced Approach, institutions need to 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. In the new table, 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 treatment of each of the pooled cases in the optimizer engine has been 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. 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.
4. 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.
5. The post-haircut mitigant amount is applied to the exposure based on the above 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.
6. Finally, the pre mitigation EAD is broken into post mitigation EAD net of all haircuts
7. Basel II 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).
8. 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 II 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 will be 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:

$$f1 = (\text{Mitigant\_value} * \text{Haircut}) / \text{EAD}.$$

Where  $\text{Haircut} = (1 - \text{volatilityHaircut} - \text{FOREXHaircut}) * \text{MaturityMismatchHaircut}$ .

6. Then, the allocation logic works out the covered factor for the subsequent rows as follows:

$$f(n) = \text{Min}((1 - \text{Already allocated covered factor}), \text{Max}(fn-1, 0)).$$

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.

#### Many Exposures to Many Mitigants

In the case, *many exposures to many mitigants* the Optimizer uses a linear programming technique for which you need to 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:
  - Lower Bound of Covered factor is 0
  - 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:
  - This Constraint checks whether the total amount of mitigant is used is less than or equal to the total amount of mitigant available
  - All the mitigant haircuts are applied in this Constraint.

The formula is as follows:

$$\left[ \frac{E1 * x1}{(1-V-Fx1)*(Mm1)} \right] + \left[ \frac{E2 * x2}{(1-V-Fx2)*(Mm2)} \right] + \left[ \frac{E3 * x3}{(1-V-Fx3)*(Mm3)} \right] \leq M1$$

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:

- Mitigants grouped for Deduction for Minimum Collateralization Check > 0
- 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 above objective function and the constraints defined by you.

### **Exhibit 2 -Mitigant Allocation Optimizer (Standardized Approach)**

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

The treatment of each of the pooled cases in the optimizer engine has been 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. If there is more than one exposure with the same risk weight, the exposure with the lowest currency mismatch haircut or maturity mismatch haircut is selected for allocation.
4. 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.
5. The post-haircut mitigant amount is applied to the exposure based on the above 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.

6. Finally, the pre mitigation EAD is broken into post mitigation EAD net of all haircuts
7. Basel II rules then calculates the RWA for each row by multiplying the post mitigation EAD by the RW or capital \* 12.5 (in case of advanced approach).
8. 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. After all the mitigant eligibility 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  $Haircut = (1 - volatilityHaircut - FOREXHaircut) * MaturityMismatchHaircut$ .

4. Then the allocation logic works out the covered factor for the subsequent rows as follows:

$$f(n) = \text{Min}((1 - \text{Already allocated covered factor}), \text{Max}(f(n-1), 0)).$$

5. Total covered factor for an exposure = Covered Factor for the 1st Row + Covered Factor for all the subsequent Rows.

**Covered Factor is Sum of all Covered amount + Uncovered amount of the mitigant upon its total EAD**

#### Many Exposures to Many Mitigants

In the Case, *many exposures to many mitigants*, the optimizer uses a linear programming technique for which you need to 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:
- Lower Bound of Covered factor is 0
- 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:

- This Constraint checks whether the total amount of mitigant is used is less than or equal to the total amount of mitigant available
- All the mitigant haircuts are applied in this Constraint. The formula is as follows:

$$[ \{ E1 * x1 \} / \{ (1-V-Fx1)*(Mm1) \} ] + [ \{ E2 * x2 \} / \{ (1-V-Fx2)*(Mm2) \} ] + [ \{ E3 * x3 \} / \{ (1-V-Fx3)*(Mm3) \} ] \leq MI$$

Where,

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

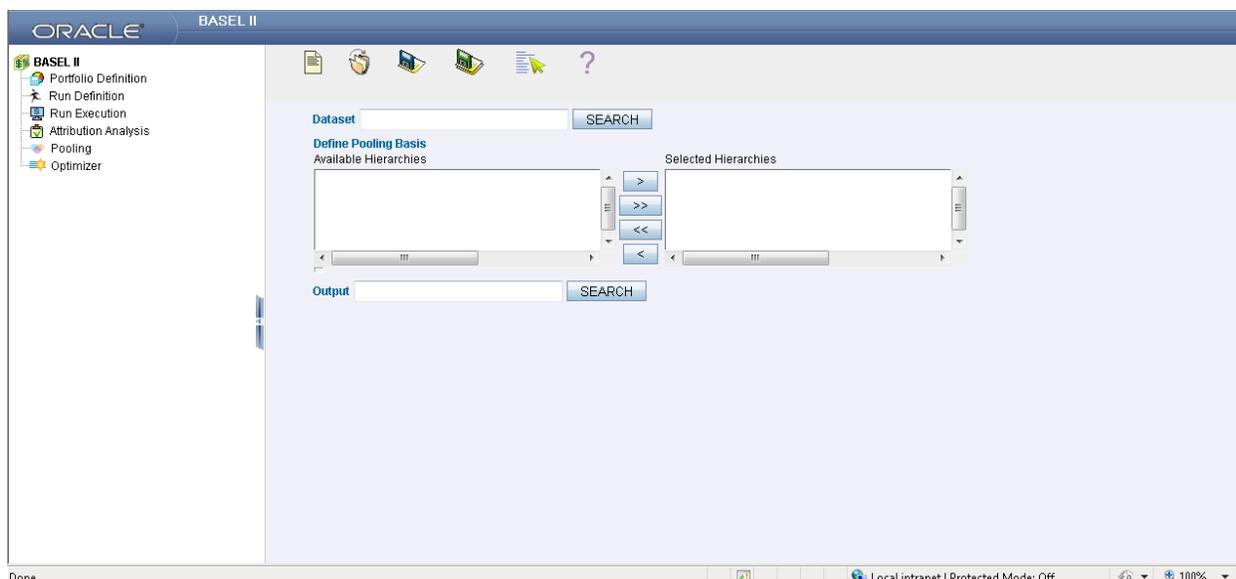
Allocation engine updates the covered factor for each exposure based on the above objective function and the constraints defined by you.

**Exhibit 3: Defining Pooling and Optimizers**

Steps to define Pooling and Optimizer are as follows:

Pooling Definition

1. Click the **Basel Regulatory Capital** link under **Risk Applications** on the OFSAAI window.
2. Click **Pooling** from the LHS menu, shown in the following screenshot:



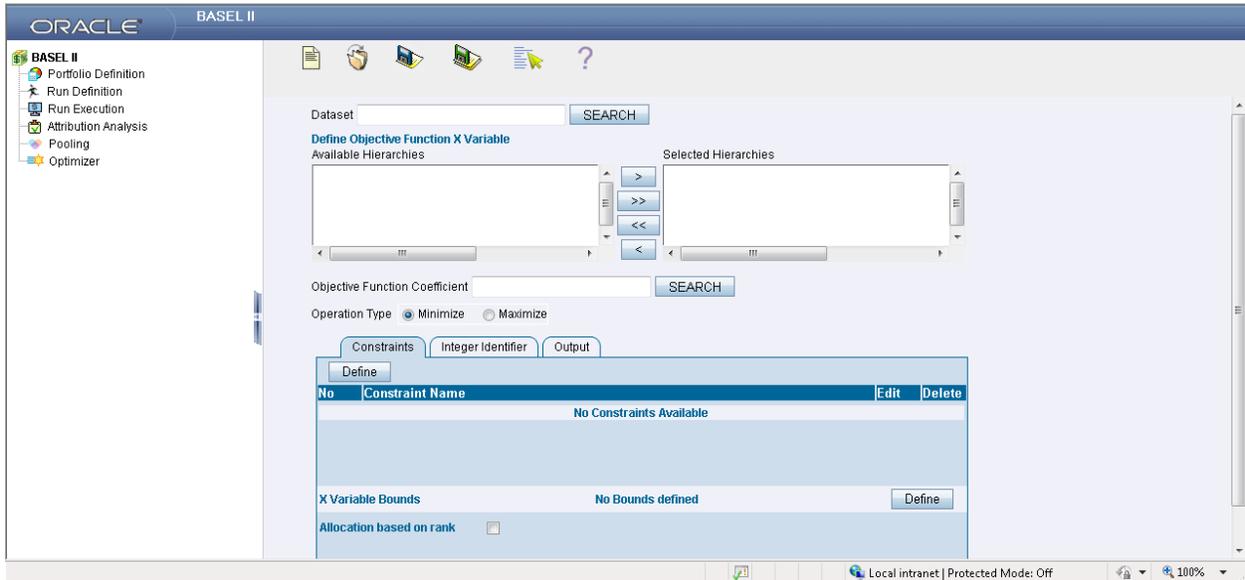
3. Enter the Dataset on which pooling needs to be performed and click **SEARCH**.
4. Select hierarchies from the available list of hierarchies in the **Define Pooling Basis** field. Pooling is performed on the combinations of hierarchies.
5. Enter the measure for pooling output in the **Output** field.

Once 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.

**Optimizer Definition**

A pre-requisite for defining the Optimizer, is to update the pool id in the sub exposures (**FCT\_SUB\_EXPOSURES**) table for the selected Run.

1. Click the **Basel Regulatory Capital** link under **Risk Applications** on the OFSAAI window.
2. Click **Optimizer** from the LHS menu, shown in the following screenshot:



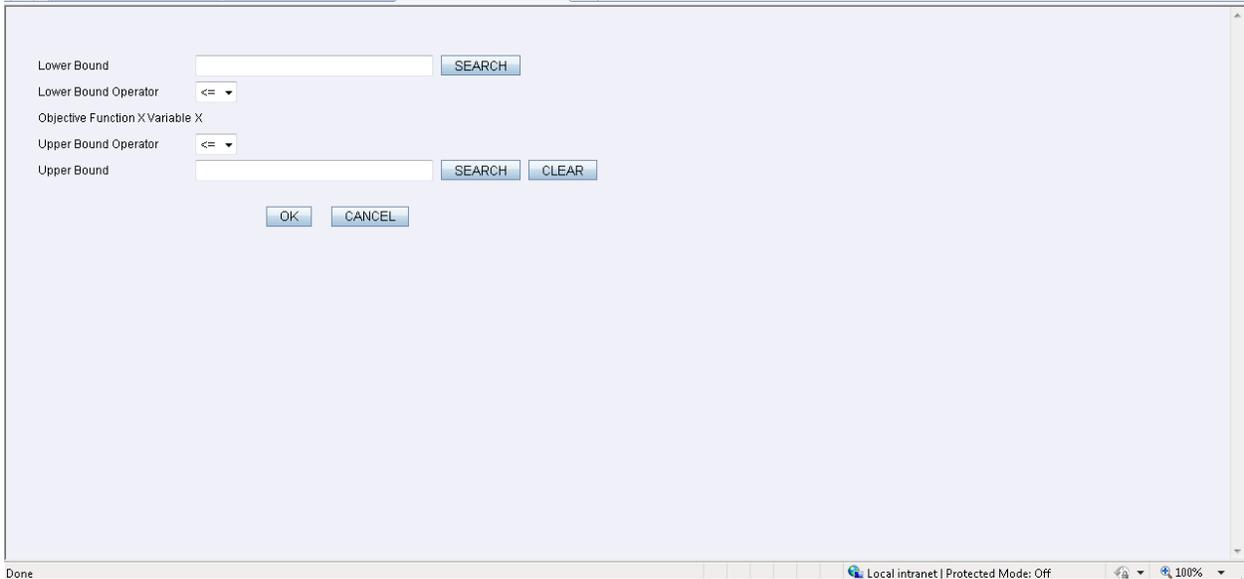
3. Enter the Dataset on which pooling needs to be performed and click **SEARCH**.
4. Select from the list of available hierarchies in the field **Define Objective Function X Variable**. Optimizer is performed on a combination of these hierarchies.
5. Enter the **Objective Function Co-efficient** and click **SEARCH**.
6. Select the Operation Type as **Minimize** and **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 and Condition Value and click **SEARCH**.
10. Select the applicable **Operator** from the drop-down field and click **OK**.

11. Click **Define** against the **X Variable Bounds** field.

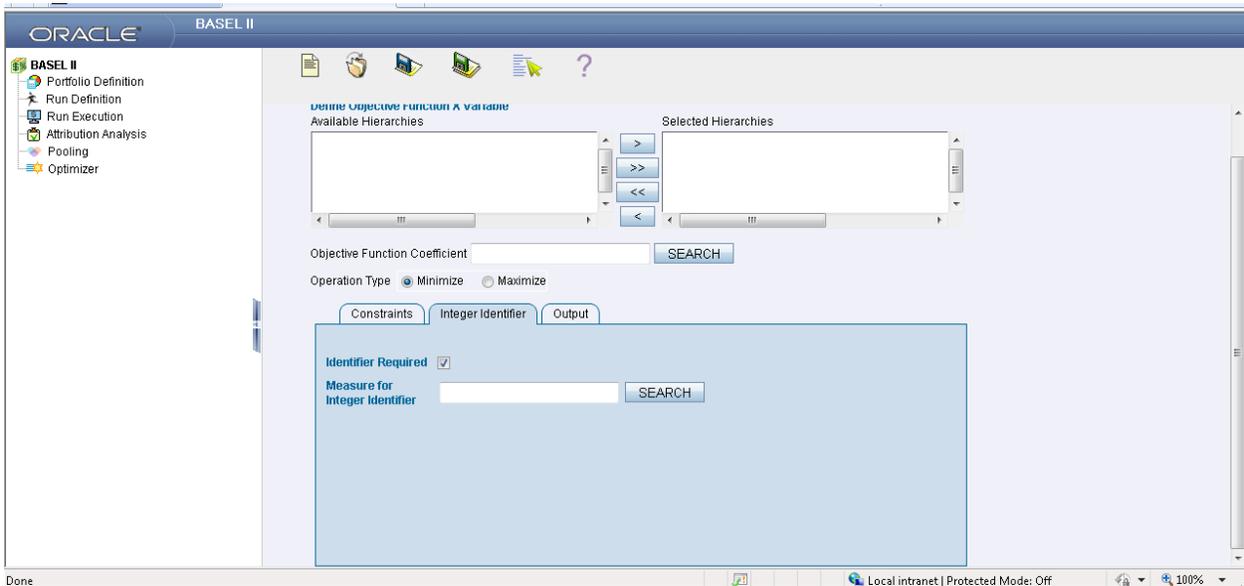
No	Constraint Name	Edit	Delete
	No Constraints Available		
	X Variable Bounds	No Bounds defined	Define

12. Enter the **Lower Bound** and **Upper Bound** against the respective fields and click **SEARCH**.

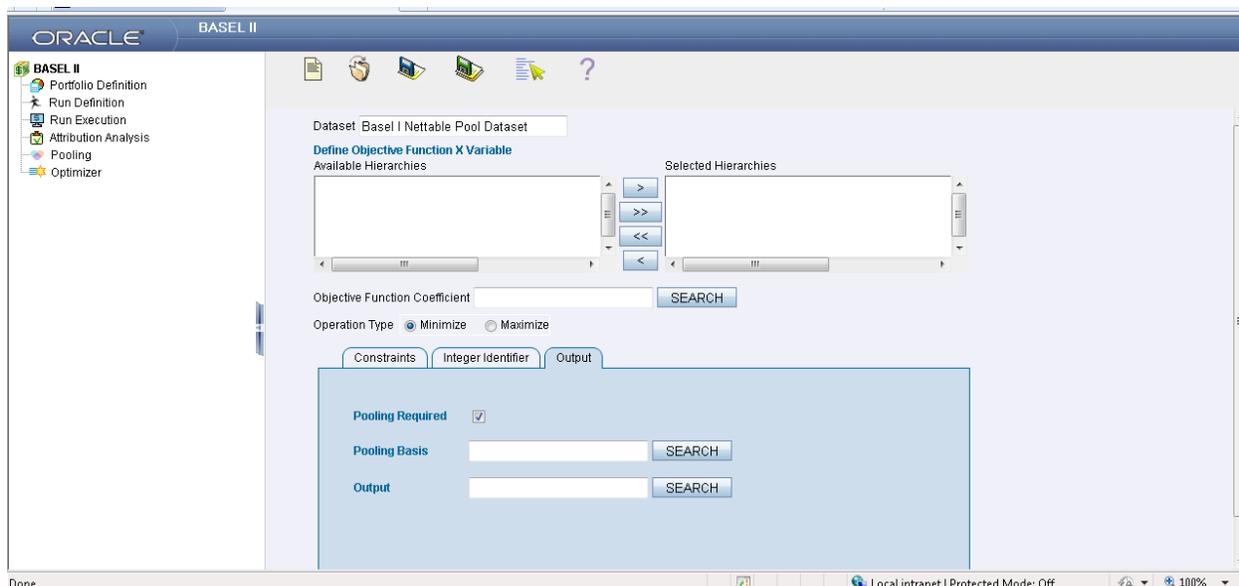
13. Select the **Lower Bound Operator** and Upper Bound operator against the respective fields and click **OK**.



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.

**Exhibit 4: 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 have been 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 -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 may 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 attached below.



Currency Conversion  
- Tables and Columns

**Exhibit 5: FSI CAPITAL STANDARD MAPPING table mapping**

As a part of Basel II 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 DIM\_STD\_ACCT\_HEAD. For all jurisdictions this mapping should be present which is elaborated in the following worksheet.



FSI\_CAPITAL\_STAN  
DARD\_MAPPING.xls

## Annexure B: Frequently Asked Questions

This section addresses some of the frequently asked questions which are as follows:

### 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 will not be affected by such changes.

### 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 has been 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 would depend 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 from 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 from Total Capital, remainder of following is taken:

- Excess of Total Capital Ratio over benchmark (8.0%), minus Required Benchmark Buffer from Tier 1 capital.

**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 will be 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, refer *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.

**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 as well as 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 need to add the mapping in the Rule **OR Internal LOB to Standard LOB Reclassification** as well as make an entry into **DIM\_LOB** and **DIM\_STANDARD\_LOB**.

**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).

### **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 above 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 will be 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 the above 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 will have this data and some of the investor banks may have it and hence they will 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 as well as 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 will proceed without any difference in the treatment.

**Question 28. The reporting bank, which is an investor in Securitization Transaction, has been 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<sup>th</sup> to default credit derivative. Hence, the application will recognize this mitigant only if there are 6 defaults in the basket of exposures (T1 to T10) or else there is an eligible 6<sup>th</sup> 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 will be allocated the mitigant and all other exposure combinations mapped to this mitigant will become 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
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
E4	M1
E1	M3
E2	M3
E3	M3
E4	M3

The application assigns the exposures to the mitigants based on the above 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 will not be assigned. Such records are not considered for optimizer and covered factor is not calculated for those exposures.

### 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.

### 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.

### 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.

### **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 will be 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.

- 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 issued by a non-sovereign with a residual maturity of 8 years, the haircut assigned is 12%.

### **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 above trades as cleared transaction.

**Question 39. Will the netting set be changed for cleared transaction?**

No. Trade marked for the Netting set is the trading input and risk calculation will not change above 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 above condition to be uniform for all the collateral posted i.e. if collateral is cash and securities either 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, above two condition 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 will be treated as bilateral trades. Both trades don't 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 could also play a role of Clearing Member for reporting bank transaction with another CCP. The above 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.

## Glossary

<b><u>AIRB</u></b>	Advanced Internal Rating Based
<b><u>AMA</u></b>	Advanced Measurement Approach
<b><u>ASCII</u></b>	American Standard Code for Information Interchange
<b><u>BCBS</u></b>	Basel Committee on Banking Supervision
<b><u>Bankruptcy Remote</u></b>	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.
<b><u>BIS</u></b>	Bank of International Settlements
<b><u>CAR</u></b>	Capital Adequacy Ratio
<b><u>Central Counterparty (CCP)</u></b>	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.
<b><u>CCB</u></b>	Capital Conservation Buffer
<b><u>CCF</u></b>	Credit Conversion Factor
<b><u>CCR</u></b>	Counterparty Credit Risk
<b><u>CET1 Ratio</u></b>	Common Equity Tier 1 Ratio
<b><u>Clearing Member (CM)</u></b>	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.
<b><u>Clearing Member Client (CMC)</u></b>	Clearing Member Client (CMC) is the client of the Clearing Member and trades are done via clearing member for the client.

<b><u>CRE</u></b>	Commercial Real Estate
<b><u>CRM</u></b>	Credit Risk Mitigants
<b><u>CVA</u></b>	Credit Valuation Adjustment
<b><u>DeFQ</u></b>	Data entry and Forms Queries
<b><u>EAD</u></b>	Exposure At Default
<b><u>FFIEC</u></b>	Federal Financial Institutions Examination Council
<b><u>FIRB</u></b>	Foundation Internal Rating Based
<b><u>FTP</u></b>	File Transfer Protocol
<b><u>GL</u></b>	General Ledger
<b><u>GRC</u></b>	General Risk Charge
<b><u>GUI</u></b>	Graphic User Interface
<b><u>IAA</u></b>	Internal Assessment Approach
<b><u>IFSB</u></b>	Islamic Financial Services Board
<b><u>IMA</u></b>	Internal Models Approach
<b><u>IMM</u></b>	Internal Modeling Method
<b><u>IR</u></b>	Interest Rate
<b><u>IRB</u></b>	Internal Rating Based
<b><u>LGD</u></b>	Loss Given Default
<b><u>LIBOR</u></b>	London Inter Bank Offered Rate
<b><u>OBIEE</u></b>	Oracle Business Intelligence Enterprise Edition
<b><u>OFSAA</u></b>	Oracle Financial Services Analytical Application
<b><u>OFSAAI</u></b>	Oracle Financial Services Analytical Application Infrastructure
<b><u>OTC</u></b>	Over the Counter
<b><u>Non Securitization Exposure</u></b>	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

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.

**Private Sector Credit Exposure**

**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.
<b><u>RRE</u></b>	Residential Real Estate
<b><u>RWA</u></b>	Risk Weighted Assets
<b><u>SCD</u></b>	Slowly Changing Dimension
<b><u>SFA</u></b>	Supervisory Formula Approach
<b><u>SFT</u></b>	Securities Financing Transactions
<b><u>SRWA</u></b>	Simple Risk Weight Approach
<b><u>TXN</u></b>	Transaction
<b><u>SLR</u></b>	Statutory Liquidity Ratio
<b><u>Stress Testing</u></b>	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
<b><u>T2T</u></b>	Table to Table
<b><u>VaR</u></b>	Value at Risk