Oracle Financial Services Cash Flow Engine

User Guide

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OFS Cash Flow Engine User Guide

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1 Introduction to Oracle Cash Flow Engine

This chapter introduces Oracle Financial Services Cash Flow Engine and discusses its place in the Oracle Financial Services Analytical Applications (OFSAA) group.

1.1 Overview

Cash flow calculation is an integral part of finance and risk solutions. Oracle Financial Services Cash Flow Engine (OFSCFE) is designed to help institutions to take a fresh and granular look at their cash inflows and outflows. It allows you to calculate cash flows of their Assets, Liabilities, and Off-Balance Sheet products at instrument level. The application measures and models every loan, deposit, and off-balance sheet instrument individually, using deterministic methods. This helps gain a better insight into the granularity of cash inflows and outflows to be utilized for multiple non-regulatory and regulatory purposes. Due to its generic nature OFSCFE is suitable for both financial and non-financial institutions with exposure to financial securities/instruments.

1.1.1 Key Benefits

OFSCFE calculates cash flows at the most granular level of account/instrument and sometimes at sub-account level if tiered-balance interest rate is used or multiple repayment types are used for same account. Since no aggregation is performed, it allows you to do micro-analysis of each payment. You can choose to generate cash flows using pure contractual terms agreed with customer or incorporate certain customer behaviour like prepayment, redemptions, non-maturity profiles, and so on.

Since cash flows are at an instrument level, you can perform unlimited dimensional analysis for an advanced insight. Few ways in which you can benefit from this are:

- Improve insight into branch liquidity and cash-in-hand
- Optimize payables and receivables by focusing on customers with large exposure
- Cash management
- Create analytics-driven efficient collections strategy, chase late payers promptly and regularly

In addition to cash flows such as principal, interest, prepayment, maturity, etc, the CFE calculates and stores a variety of financial measures for greater insight and auditability:

- Accrual period, Rate set date
- Accrual adjusted and Compounded interest rate used for calculations
- Repricing balance, Before and after repricing interest rates
- Accrued interest

- Accumulated interest amount, Interest credited
- Core, Volatile runoff for non-maturing deposits
- Devolvement and recovery runoff for products like bank guarantee
- Non-performing runoff
- Periodic & Life cap effect rate and amount
- Tease effect rate and amount
- Negative amortization balance
- Prepayment rate and runoff
- Mortgage offset account expected balance and runoff

OFSCFE is designed to operate on instrument-level data, using Oracle's highly accessible and flexible financial data model. Each account is modelled independently on a daily cash flow basis using daily forecasted interest rates, where applicable.

A wide range of products are supported for both on-balance sheet and off-balance sheet, with a variety of amortization and repricing methods, including:

- Revolving loans, Mortgages, Consumer loans, Leases
- Negative amortization mortgages
- Mortgage offset accounts
- Irregular payment and repricing schedules on, for example, agricultural or construction loans
- Step-up and step-down loans
- Balloon and Bullet instruments
- Instruments with different interest and principal frequency and dates
- Bonds and money market instruments
- Open and fixed maturity deposits
- Tiered rate loans and deposits
- Annuities
- Swaps, Caps, Floors, FRAs, Forwards and FX Derivatives
- Inflation indexed instruments

Unique payment, interest rate and holiday characteristics are directly used to accurately model cash flows for multiple time horizons:

- Conventional, simple Interest and Level Principal for regular payments
- Principal only
- Interest only
- Schedule and Patterns for irregular payments

- Fixed, floating, adjustable rates and pattern (for irregular repricing)
- Interest payments in advance and arrears
- Multiple day count conventions
- Caps and floors, both absolute and incremental
- Gross and Net Rates
- Margin, Spread
- Rate cap & floor - Life
- Rate increase & decrease limit – periodic
- First reset cap/floor (tease)
- Lag, rounding
- Compounding and interest credited
- Holiday adjustments

1.2 Oracle Cash Flow Engine and Other Oracle Financial Services Applications

OFSCFE operates on top of a common infrastructure, Oracle Financial Services Analytical Applications Infrastructure (OFSAAI). OFSAA applications form a comprehensive decision support solution that significantly enhances enterprise risk and performance management functions across a financial institution.

2   Overview of OFSAA Infrastructure

2.1   OFSAA Infrastructure

OFSCFE utilizes the following components of OFSAA Inflastructure:

- Data Model Management
- Data Management Tools
- Data Entry Forms and Queries
- Dimension Management
- Filters
- Operations
- Object Administration

For more information, refer to the Oracle Financial Services Analytical Applications Infrastructure User guide.

The remainder of this chapter documents:

- Overview of Dimensionality in OFSAA
- Overview of OFSAA Rules
- Hierarchies
- Filters

2.2   Overview of Dimensionality in OFSAA

Dimensions are used to stratify your business data for processing or reporting purposes. For example, at a minimum General Ledger systems are typically stratified by a General Ledger dimension, an organization or cost center dimension, and a time dimension. Customer account-level data will normally have these same dimensions but are often additionally segmented by dimensions such as Product or Customer. You may wish to construct models using a specialized product dimension or other customized dimensions such as geography, cost pool, transaction, activity or channel.

Dimensions are comprised of lists of members. For example, the Organizational Unit dimension might be comprised of Branch #1, Branch #2, Branch #3, etc. Some dimensions may contain tens or even hundreds of thousands of members (for example, a large organizational or customer dimension) while others may contain as few as two members (for example, a simple product-type dimension with values of Fixed and Variable).

The member values or "Chart of Accounts" for each dimension may be maintained either internally within the OFSAA Infrastructure or externally.

2.2.1 Internally

OFSAA Infrastructure includes functionality for Adding, Viewing, Editing, or Deleting dimension member values. Which of these functions you can access depends on your logon privilege and on the dimension with which you wish to work. For details, on the creation and maintenance of Dimension Members, refer to the Oracle Financial Services Analytical Applications Infrastructure User guide.

2.2.2 Externally

You may choose to source and maintain some Charts of Accounts from external systems such as your General Ledger, a Data Warehouse, or from some other external master data management system. For more information, see the Oracle Financial Services Analytical Applications Data Model Utilities User Guide.

2.2.3 Combination

You may also choose to maintain some Chart of Account values from an external source while maintaining other Chart of Account values internally.

2.2.4 Referential Integrity

You may have dimension member values defined in your Chart of Accounts that do not exist in your business data, particularly if the dimension member values are used as attribute values (see discussion of attributes below). But you would never want to have an occurrence of a dimension member value in your business data that did not exist in the dimension's Chart of Accounts. When you load business data into OFSAA, you need assurance that there are no dimension member values present in the business data that are not defined in your Chart of Accounts. For details on ensuring referential integrity between your business data and your Chart of Accounts data, see the Oracle Financial Services Analytical Applications Infrastructure (OFSAAI) Installation and Configuration Guide.

2.2.5 Dimension Attributes

Some OFSAA dimensions support attributes. Dimension attribute values are used to qualify dimension members. For example, a cost center, say Branch #1, might have a Headcount attribute with a value of 32 and a Volume attribute with a value of High. A product dimension member, say 30-year fixed-rate jumbo LIBOR mortgage, might have a Rate attribute with a value of LIBOR, a Size attribute with a value of Jumbo, and a Loan Type attribute of Fixed. A General Ledger account, say Benefit Expense, might have an Account Type attribute with a value of Non-Interest Expense.

Like dimensions, attributes are used to stratify your business data for processing or reporting purposes. Some dimension attributes are seeded within the OFSAA data model and are used extensively in processing. You may define as many user-defined attributes as you need.

OFSAA Infrastructure includes functionality for Adding, Viewing, Editing, or Deleting dimension attributes. Which of these functions you can access depends on your logon privilege and on the dimension with which you wish to work.

Once an attribute has been defined for a dimension, attribute values may be assigned to individual dimension member values. These attribute values may be open-ended (dates, numbers, or strings) or may be restricted to a defined set of members.

2.2.6 Hierarchies

Some OFSAA dimensions support hierarchies. Hierarchies may be used to provide sophisticated stratification for either processing or reporting purposes. For example, an organizational hierarchy might start with a Division level containing Western Region, Eastern Region, and Southern Region; the next level down within the hierarchy might be state or county. A product hierarchy might begin with branches for Asset vs. Liability vs. Service products; under the Asset branch, you might define additional branches for Mortgage Lending, Commercial Lending, Consumer Lending, and so on. Hierarchies are used extensively in OFSAA models to assign methods to products and to support allocation methodologies.

Like dimension members, dimension hierarchies may be maintained either internally within the OFSAA Infrastructure or externally.

2.2.6.1 Internally

OFSAA Infrastructure includes functionality for Adding, Viewing, Editing, or Deleting hierarchies. Which of these functions you can access depends on your logon privilege and on the hierarchy with which you wish to work.

2.2.6.2 Externally

You may choose to source and maintain some or all of your hierarchies from external systems such as your General Ledger, a Data Warehouse, or from some other external master data management system, such as Oracle Data Relationship Management (DRM). For more information on loading hierarchy data from external systems, see the Oracle Financial Services Analytical Applications Data Model Utilities User Guide.

2.2.6.3 Combination

You may also choose to maintain some hierarchies from an external source while maintaining other hierarchies internally.

2.3 Rollup Members for Dimensions Supporting Hierarchies

For dimensions that support hierarchies, every dimension member value has the property of being either a **leaf** value (child-only or last descendent child value) or a **rollup node** value. For example, if Branch #1, Branch #2, and Branch #3 all belonged to the West rollup point of an organizational hierarchy, then West would also be a dimension member value of the Organizational Unit dimension. Your business data is typically expressed at the leaf level.

2.4 Dimension Types

OFSAA supports the following three fundamentally different kinds of dimensions:

- Key Processing Dimensions
- Standard Dimensions
- Simple Dimensions

2.4.1 Key Processing Dimensions

Key Processing Dimensions have the following features:

- Accessible as modeling dimensions for all of the OFSAA analytical engines.
- Expressed as columns in nearly all of your business fact tables.
- Support both attributes and hierarchies

Metadata for Key Processing Dimensions are stored in four tables:

- A base table (For example, `DIM_PRODUCTS_B`)
- A translation table (For example, `DIM_PRODUCTS_TL`)
- An attribute table (For example, `DIM_PRODUCTS_ATTR`)
- A hierarchy table (For example, `DIM_PRODUCTS_HIER`)

Base tables store basic information about each dimension member and translation tables store names and descriptions for each dimension member in multiple languages. Attribute tables store one or many attribute values for each dimension member. Hierarchy tables store one or more hierarchies for each dimension (you may define as many hierarchies as you wish for any dimension that supports hierarchies).

2.4.1.1 Seeded Key Processing Dimensions

OFSAA is seeded with six Key Processing dimensions:

- Financial Element
- Organizational Unit

- General Ledger Account

- Common Chart of Accounts

- Product

- Legal Entity

Among the six seeded Key Processing dimensions, only the Financial Element dimension is pre-populated with a Chart of Accounts, but it is only populated in the range between 0 and 10,000 (For more details on the seeded Chart of Accounts for the Financial Element dimension see the Oracle Financial Services Profitability Management User Guide. This is a reserved range in which you may not add new members, or edit or delete existing members. You may add user-defined Financial Elements anywhere outside the reserved range.

2.4.1.2 User-Defined Key Processing Dimensions

For more information on adding your own user-defined Key Processing dimensions, see the Oracle Financial Services Analytical Applications Infrastructure (OFSAAI) Installation and Configuration Guide.

2.4.2 Standard Dimensions

Standard dimensions may support attributes and/or hierarchies depending on how they are configured, but are not used as processing dimensions within any of the analytical application engines. Like Key Processing Dimensions, metadata for Standard Dimensions is stored in a base table and in a translation table. A Standard Dimension may or may not have an attribute table or a hierarchy table depending it is configured. Within the OFSAA modules, Standard dimensions that are defined as having a hierarchy table will support hierarchies, and Standard dimensions that are defined as having an attribute table will support attributes. See the Oracle Financial Services Analytical Applications Infrastructure (OFSAAI) Installation and Configuration Guide.

2.4.2.1 Seeded Standard Dimensions

OFSAA is seeded with two Standard Dimensions

- Country

- Customer

Both dimensions support attributes and hierarchies. Default member values are provided for the Country dimension, but no values are provided for the Customer dimension.

2.4.2.2 User-Defined Standard Dimensions

Refer to the Oracle Financial Services Analytical Applications Infrastructure (OFSAAI) Installation and Configuration Guide for details on adding user-defined Standard dimensions.

2.4.3   Simple Dimensions

Sometimes referred to as Code dimensions, Simple dimensions are a "list of values" that support neither attributes nor hierarchies. Their three key uses are:

- Reserved for use within the analytical application engines

- Stratifying your data for process or report filtering purposes

- Serving as the **list of values** when used as attributes

The OFSAA Data Model comes with more than 150 seeded Simple dimensions. Many of these seeded Simple dimensions are also seeded with dimension members. Unlike Key Processing dimensions and Standard dimensions, Simple dimensions are stored in two tables:

- A code table (For Example, `AMRT_TYPE_CD`)

- A Multi-Language Support or MLS table (For Example, `AMRT_TYPE_MLS`)

Simple Dimension "Process Identifier Code" helps to improve CFE process execution performance by skipping VALIDATE_NODE_MAP_CFE package execution incase there is no change in underlying metadata while running CFE Process everytime. There is no direct method to identify whether any change in underlying data at the node level and one need to execute VALIDATE_NODE_MAP_CFE and thats where the "Process Identifier Code" Simple Dimension takes place. This dimension should contain the list of process Ids for which there is no change in underlying node level metadata hence no need to run VALIDATE_NODE_MAP_CFE everytime the process is run. In turn whenever CFE Engine is run; it checks the currently considered process id and checks its existence in FSI_PROCESS_IDENTIFIER_CD table; if present then ignores VALIDATE_NODE_MAP_CFE procedure run.

2.4.4   Reserved Simple Dimensions

Accrual Basis Code is an example of a seeded Simple dimension that is used extensively by the application modules. It is seeded with a small list of values (such as 30/360, Actual/360, Actual/Actual, and so on.) and its value set may not be modified.

Amortization Type Code is another example of a reserved Simple Dimension. Amortization Type Code is populated with reserved values that the Cash Flow engine interprets, and its value set may not be modified. Many other Simple Dimensions are reserved and may not be modified.

2.4.5   Simple Dimensions Used for Processing or Reporting Purposes

This kind of Simple Dimension cannot be used directly by the application engines, but they are accessible to OFSAA Filter rules.

Credit Rating is an example of a seeded Simple Dimension that may be used for processing or reporting purposes. You may, for example, wish to allocate risk equity to

individual instruments as a function of Credit Rating. The seeded values for Credit Rating are Moody's credit ratings, but you are free to completely redefine the membership of this dimension. Geographic Location is another example. Geographic Location is pre-populated with the US States and Canadian provinces, but you are free to completely redefine the completely geographic locations.

2.4.6   Simple Dimensions Used as Attribute Domains

Both seeded and user-defined attributes often utilize a Simple Dimension to provide a list of values. For example, you might create an Adjustable Type attribute on your Product dimension and you might want this attribute to be limited to the values of Fixed, Variable, or Administered. In this case, you might first build a Simple Dimension called Type whose dimension members were limited to three values: Fixed, Variable, or Administered. Next you could assign the Type dimension to be the domain of your new Adjustable Type attribute.

See Oracle Financial Services Analytical Applications Infrastructure (OFSAAI) Installation and Configuration Guide.

2.5   Attributes

OFSAA Infrastructure includes functionality for Adding, Viewing, Editing, or Deleting dimension attributes. Which of these functions you can access depends on your logon privilege and on the dimension with which you wish to work.

2.5.1   Overview of Attributes

The seeded OFSAA Key Processing Dimensions have a number of seeded or seeded & required attributes. For example, the Common Chart of Accounts dimension includes an Account Type attribute and an Accrual Basis attribute; the Financial Element dimension includes an Aggregation Method attribute. Some of these attributes have important implications in processing within OFSAA.

You may add Attributes to any Key Processing Dimension or to any Standard Dimension that supports Attributes (see sections above describing Key Processing Dimensions and Standard Dimensions).

One of the important properties of an Attribute is its Data Type. OFSAA Infrastructure supports Dimension Attribute Data Types of:

- Date, String, or Number
- Dimension

2.5.2   Unbounded and Bounded Attribute Data Types

Dimension attribute data types may be either bounded or unbounded. The Date, String, and Number types are unbounded, that is, there is no predetermined set of attribute values. A Date attribute value may be any valid date, a String attribute value may be any

string up to 30 characters in length, and a Number attribute value may be any number. Examples of these kinds of attribute data types might include:

- Cost Center Open Date (a Date attribute on the Organizational Unit dimension)

- Product Memo (a String attribute on the Product dimension)

- Cost Center Headcount (a Number attribute on the Organizational Unit dimension)

Unlike attributes having the Date, String, or Number data type, attributes whose data type is Dimension have defined sets of values. For example, the Product dimension has a seeded attribute called Accrual Basis the data type of which is Dimension. The Accrual Basis dimension is seeded with 8 values. Accrual Basis is a restricted dimension (you may View Accrual Basis dimension members but you may not delete them or add new accrual bases), but whenever you assign an Accrual Basis attribute value to one of your Product dimension member values, you must select from the list of 8 available Accrual Bases.

2.6 Overview of OFSAA Rules

OFS Analytical Application models are constructed using combinations of OFSAA rules. For example:

- An Allocation rule might utilize a Hierarchy Filter rule, an Expression rule, and a Static Table Driver rule

- A Transfer Pricing rule might utilize a Hierarchy rule, a Data Element Filter rule, and a Prepayment rule

- A Data Element Filter rule might utilize an Expression rule

- A Group Filter rule always incorporates one or more underlying Data Element Filter rules

- Hierarchy Filter rules always utilize an underlying Hierarchy rule

The advantage of constructing models from discrete rule components is that individual rules may be re-used dozens or even hundreds of times. For example, if you wish to build a large series of allocation rules which operate on non-interest expense data in the Western region, you may build filters for (1) non-interest expense and (2) the Western region and then utilize these filters in every allocation rule. As another example, if you wanted to assign the same transfer pricing method and assumptions to all mortgage products, you could build a Hierarchy on the product dimension containing a Mortgage Products rollup point and assign your method and assumptions at the rollup level. You could subsequently utilize the same Hierarchy rule for allocation processing or reporting purposes.

Many rule types are specific to individual analytical applications (For example, Transfer Pricing rules, Cash Flow Engine rules, Allocation rules, and so on.) while OFSAA Infrastructure rules are shared across all OFS applications. Rule types that are shared across all applications include:

- Hierarchies

- Hierarchy Filters
- Data Element Filters
- Group Filters

Dimensions, dimension members, attributes, and currency exchange rates are also shared across all applications.

2.6.1   Dependencies

OFSAA rules often depend on other rules for some or all of their data or usefulness. For example, an Allocation rule may depend on a Data Element Filter rule to select and focus data in a meaningful way. If that Data Element Filter is deleted, then the Allocation rule becomes unusable. OFSAA applications track such dependencies and ensure that users may not delete rules that are consumed by other rules. Additionally, rule summary screens that present lists of rules that you have defined, offer functionality for you to generate reports on rule interdependency.

2.7   OFSAA Filters

OFSAA Infrastructure supports three kinds of filtering:

- Data Element Filters
- Group Filters
- Hierarchy Filters

2.7.1   Data Element Filters

Data Element Filters are used to select and focus data. For example, you may transfer price some financial instruments at their source and may therefore wish to ensure that you do not overwrite the transfer rates for any instruments that already have a non-zero transfer rate. In such a case, you could construct a Data Element Filter to isolate only those instruments having a non-zero transfer rate. As another example, you may wish to allocate a charge to demand deposit accounts having small balances. In this case, you could construct a Data Element Filter to focus on just those instrument records having balances less than your chosen threshold.

2.7.2   Group Filters

Group Filters are used to join together one or more Data Element Filters. For example, if you built one Data Element Filter that focused on balances less than 10,000 and a second Data Element Filter that focused on accounts whose origination date was prior to 2009, a Group Filter built on the two Data Element Filters would focus on accounts with balances less than 10,000 AND whose origination dates were prior to 2009.

2.7.3 Hierarchy Filters

Hierarchy Filters allow you to focus on data that rolls up to one or more points within a chosen hierarchy. You may also focus on "leaf" level data or a combination of "leaf" level and rollup levels. For example, if your organization had a Western, Northern, Southern, and Eastern division, you could construct a Hierarchy Filter that focused on data belonging to branch 1, 2, or 7 within the Eastern division plus any data belonging to the Northern division.

2.8 OFSAA Expressions

Expressions represent formulas for combining data from your data model (For example, Column A divided by Column B times Column C). The results of Expressions may be invoked within a number of OFSAA rule types (For example, Data Element Filters, Allocation rules, and so on).

2.9 Folders

One of the fundamental properties of any OFSAA rule is the Folder in which it is stored. Your System Administrator will configure your user ID to have access to one or more folders in which you can store your rules. Your access rights will likely be similar to co-workers who have a similar business role. For details on security management and defining Segment Maintenance in OFSAA, refer to Oracle Financial Services Analytical Applications Infrastructure User Guide.

Storing rules in folders gives you the means to segregate your rules for functional or security considerations. For example, you may wish to:

- Set up folders to store Transfer Pricing rules that are separate from folders you have built for Profitability Management rules and that are also separate from folders you have built for Asset/Liability Management rules

- Establish some folders for rules you are in the process of developing and testing and other folders for fully tested, production-ready rules

- Segregate some rules that are fundamental to the definition of other rules (For example, some Data Element Filters may be used in dozens or hundreds of other rules) to ensure that access to those fundamental rules is highly controlled

- Segregate your hierarchies, which are also frequently fundamental to OFSAA models, into a restricted-access folder

2.10 Visibility of Rules

Every navigation path to view a rule in OFSAA begins with a Summary screen. Within the Summary screen for each rule type, a user may browse through all of the rules that are stored within Folders to which the user has access. From each Summary screen, users may be granted the ability to Add, Edit, View, or Delete rules.

When building rules in an OFS Analytical Application, you frequently call upon other OFSAA rules (For example., a Data Element Filter nested within an Allocation rule or a Hierarchy utilized within a Transfer Pricing rule). When nesting a child rule within a parent rule you must specify the child rule by its Name and Folder (where both Name and Folder are presented in drop-down list boxes). In this context, the Folder drop-down list box for every user will include every Folder in the Information Domain regardless of his Folder access rights. This means that a user may invoke a child rule from any Folder even if he cannot access that child rule directly through its Summary screen.

Additionally, whenever a user nests a parent rule within a child rule, the OFSAA user interface provides the user the ability to view a read-only version of the underlying child rule.

2.11 OFSAA 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. An authorized user can enter new data and update the existing data in the shared database. Data entry Forms are primarily focused to create data entry systems that access the database and load the generated input data.

For more information, refer to Oracle Financial Services Analytical Applications Infrastructure User Guide Release 8.0.0.0.0.

2.12 Access Type

Another fundamental property of every OFSAA rule is its Access Type.

Access Type may be set to either Read/Write or Read Only. Only the "creator" or "owner " of a rule may modify the rule if it is set to Read Only. The user ID under which a rule is initially built is the owner of a rule. You may modify a rule that you do not own provided that:

- The rule has been stored with the Read/Write access type
- You have been granted Edit privilege for the rule's type
- You have been granted access to the Folder in which the rule is stored

Again, for details on security management in OFSAA, refer to Oracle Financial Services Analytical Applications Infrastructure (OFSAAI) Installation and Configuration Guide.

2.13 Global Preferences

Clicking Global Preferences invokes the Global Preferences screen. Global Preferences items are used to configure your user interface. Here, you set your default application language and date format, and your desired Pagination Records. Pagination Records determine how many rows will be displayed on summary screens. If you select Pagination Records to be 25 records, then any screen displaying results in a tabular format will display

a maximum of 25 records. To see the next set of 25 records, you can use the Next VCR button.

Functional Currency and Signage are installation-time parameters that may not be reset in Global Preferences.

Functional Currency is defined as the currency of the primary economic environment in which an entity conducts its business. For details on signage, see the Oracle Financial Services Analytical Applications Profitability Management User Guide.

Normally, you will set preferences for yourself, but if you are logged in as an Administrator, you may set Global Preferences for All Users. When setting preferences for All Users, you may restrict the ability of non-Administrators to change a Global Preference item by deselecting the Is Editable check box. If a preference item is defined as not editable, a user who is not an Administrator will inherit the value of the preference item that his Administrator has set for him and he will not have the ability to change it for himself.

2.14　Application Preferences

In addition to Global Preferences, each of the OFS Analytical Applications has its own local application preferences. In the same way as in Global Preferences, Application Preferences (for each application) employs a "delegation" model that allows Administrators to set some preference items for all users while allowing non-administrative users to personalize other preference items.

Normally, you will set Application Preferences for yourself, but if you are logged in as an Administrator, you may set Application Preferences for all users of an application. When setting preferences for all users, you may restrict the ability of non-Administrators to change an Application Preference item by deselecting the **Is Editable** check box. If a preference item for a non-administrative user is defined as **not editable**, a user who is not an Administrator will inherit the value of the preference item that his Administrator has set for him and he will not have the ability to change it for himself.

While most Application Preferences items are unique to the application to which they belong, two properties are common to Application Preferences for each of the OFS Analytical Applications: Folder Name and Access Type.

Having the Folder Name and Access Type properties set at the application level allows you to have a different default Folder and Access Type for each OFS Analytical Application. Within the Left Hand Side or LHS menu, all OFSAA Infrastructure rules (Hierarchies, Filters, and Expressions) are maintained under Master Maintenance.

Since Folder and Access Type are not Global Preference items, a user must select one application's set of Application Preferences to be **Active** to govern the default values of Folder and Access Type for Oracle Financial Services Analytical Applications Infrastructure rules. This is done by selecting one of your Application Preference sets to be the one that is **Active for Master Maintenance**.

2.15 System Configuration

Once an application pack is installed, you can use only the Production or Sandbox information domain, created during the installation process. Though there is an option to create a new Information Domain, there is no menu to work with the frameworks on this new information domain. This new information domain then created acts only as a Sandbox Infodom. The Create New Application feature allows you (System Administrator) to create a new Application other than the standard OFSAA Applications and associate the standard/default platform framework menu with it, thereby enabling the new application for usage. The standard platform framework menu is seeded and rendered.

For more information, see the System Configuration section in the Oracle Financial Services Analytical Applications User Guide.

3   Boundaries and Limitations

This chapter lists the boundaries and limitations that apply to the Oracle Cash Flow Engine and the configuration of the Oracle Financial Services Analytical Applications (OFSAA) database.

Topics:

- Oracle Cash Flow Engine
- Database Configuration

3.1   Oracle Cash Flow Engine

The following limitations apply to this product.

3.1.1   Product Dimension

The product dimension ID must be a numeric integer value greater than 0. In application preferences, users must always select 'Product' in preferences. Common COA and GL Account are not used by Cash Flow Engine.

3.1.2   CFE Processing

When a process generates a balance value larger than 999,999,999,999.99, the database cannot support the value and a numeric overflow occurs.

This may be caused if multiple accounts have been aggregated before giving as input to Cash Flow.

3.1.3   Forecast Rates

Only one scenario can be defined within a single Forecast Rates assumption rule.

The following methods to forecast Interest Rate Curve are supported:

- Flat
- Direct Input

Forecasting of Economic Indicator is not supported in CFE release 8.1.1.0.0.

3.1.4   Prepayment Model

There is a maximum of three dimensions/drivers per Prepayment Model.

3.1.5   Prepayment Rule

There is a maximum of 100 origination or maturity date ranges per product within a Prepayment rule. The earliest and maximum origination or maturity date that can be entered through the user interface are 01/01/1900 and 12/31/2499, respectively.

Cash Flow Engine does not support conditional assumption in the Prepayment rule. Prepayment method can be specified only at product and currency combination.

3.1.6   User-defined Behavior Patterns

Cash Flow Engine supports unlimited number of Behavior Pattern. However, due to compatibility with other applications like Asset Liability Management, Fund Transfer Pricing, there is a restriction in User Interface where the valid range for user-defined pattern codes is 70000-99999.

3.1.7   User-defined Payment Patterns

Cash Flow Engine supports unlimited number of Payment Pattern. However, due to compatibility with other applications like Asset Liability Management, Fund Transfer Pricing, there is a restriction in User Interface where the valid range for user-defined pattern codes is 1000-69999.

3.1.8   User-defined Repricing Patterns

Cash Flow Engine supports unlimited number of Repricing Pattern. However, due to compatibility with other applications like Asset Liability Management, Fund Transfer Pricing, there is a restriction in User Interface where the valid range for user-defined pattern codes is 500-99999.

3.1.9   Filter

Cash Flow Engine only supports Data Filter.

3.2   Database Configuration

The following limitations apply to the configuration of the OFSAA database.

3.2.1   Users and Groups

User names have a maximum of 16 characters.

3.2.2   OFSAA Assumption Rule Names

The maximum number of characters in a short description name is 15, and in a long description name is 60.

3.2.3   Number of assumption rules

The maximum System ID number in the system is 9,999,999,999. The maximum number of assumption rules for each rule type is 16,000.

3.2.4   SQL Statements in All Processes

SQL statements within processes are limited to a maximum length of 65,535 characters.

3.2.5   User Interface Display of Dates

All dates displayed in user interfaces have an input and display range of 01/01/1901 to 12/31/2499.

3.2.6   Dimension Leaf Member Set-Up

Dimension Leaf values can have a maximum of 14 digits.

Only 26 key (processing) dimensions are allowed in the database. Examples of seeded key leaf types are Common COA ID, Organizational Unit ID, GL Account ID, Product ID, Legal Entity ID.

The maximum number of columns that the Oracle database allows in a unique index is 32. This is the overriding constraint. After subtracting `IDENTITY_CODE, YEAR_S, ACCUM_TYPE_CD, CONSOLIDATION_CD`, and `ISO_CURRENCY_CD`, this leaves 27 columns available for Key Processing Dimensions (leaf dimensions). `BALANCE_TYPE_CD` is now part of the unique index so this brings the maximum number of leaf columns down to 26.

3.2.7   Balances

Balances stored in Instrument tables are limited to 999,999,999,999.99.

The maximum precision for a balance used in a calculation process is 15 digits, with the range of 1.7e-308 to 1.7e+308. Calculation precision on larger numbers is compromised.

3.2.8   Rates

By default, rates stored in instrument tables are limited to 9999.999999 and -9999.999999. More precision can be achieved by increasing the number of decimals in the column. Internally, rates are stored with the same precision as balances.

3.2.9   Terms and Frequencies

The maximum size of a term used within any process is 32,767, although interface limits are imposed to restrict this number to 999 when entered through a user interface. Terms affected by this restriction include payment frequency, reprice frequency, original term, amortization term, negative amortization frequency, and payment change frequency.

4 OFSAA Rate Management

OFSAA Rate Management is a comprehensive utility enabling you to manage currencies, yield curves, interest rates, and currency exchange rate data with a high degree of security and. OFSAA Rate Management also allows you to maintain economic forecasts such as GDP growth, inflation rates, or unemployment projections that can be linked to your models for interest rates, exchange rates, or new business growth.

Historical rate data obtained from OFSAA Rate Management is utilized by the Enterprise Performance Management (EPM) applications (OFS Funds Transfer Pricing, OFS Profitability Management, OFS Asset Liability Management, OFS Balance Sheet Planning, and OFS Cash Flow Engine).

- Interest Rates
- Currency
- Currency Rates

4.1 Interest Rates

The quality and availability of interest rate information vary throughout the world. In many markets, gathering comprehensive rate information is a challenge because of insufficient security types, inconsistent quoting conventions, and lack of liquidity. The Interest Rates module in OFSAA Rate Management allows you to define and manage complex yield curve definitions using multiple rate formats and other rate attributes to give you data storage capabilities appropriate to your market. The Interest Rates module also supports the creation and maintenance of historical rate data for each yield curve you define.

Historical interest rate data from OFSAA Rate Management is utilized in OFSAA Transfer Pricing to generate transfer rates and option costs. Historical interest rate data is also utilized in OFSAA Asset Liability Management, OFSAA Balance Sheet Planning, and OFSAA Cash Flow Engine to generate forecasted interest rate scenarios.

To view the Interest Rate Code Summary page, navigate to **Common Object Maintenance** and select **Rate Management**, and then select **Interest Rates**.

Figure: Interest Rate Summary Page

4.1.1 Searching for Interest Rate Curve

A Search pane is provided to search for interest rate curves using **Code, Name, Currency, Rate Format,** or **Curve Type** parameters.

To search the Interest Rate, follow these steps:

1. Enter the search criteria and click **Search**.

2. Click **Reset** to remove any **Code, Name, Currency, Rate Format**, or **Curve Type** constraint specified and refreshes the window.

3. The search results are displayed in a table containing all of the interest rate curves that meet the search criteria. The **Interest Rates Summary** page offers several icons that allow you to perform different functions when an interest rate curve is selected.

Table: Interest Rate – Icons and Descriptions

Fields	Description
Add ✚	Click **Add** icon to build a new interest rate curve. The **Add** icon is disabled if any row is selected in the table.
View ▣*	Select a single row in the table to enable the **View** icon. Click **View** to view the contents of an Interest rate curve in read-only format. The **View** icon is enabled only when a single **Interest rate curve** is selected in the table.
Edit ✎	Selecting a single row out of the pane enables the **Edit** icon. Click the **Edit** icon to modify a previously saved **interest rate curve**. The Edit icon is only enabled when a single **Interest rate curve** has been selected. You can control the number of rows to display on the window by selecting the **Pagination Options** icon from the action bar.
Copy 🖷	Selecting a single row out of the pane enables the **Copy** icon. Click the **Copy** icon to create a copy of an existing **Interest rate curve**. The **Copy** icon is only enabled when a single **Interest rate curve** has been selected.
Check Dependencies ▦	Select an interest rate curve and then click the **Check Dependencies** to generate a report on all rules that utilize your selected interest rate curve. The **Check Dependencies** icon is only enabled when a single interest rate curve has been selected.
Delete 🗑	Select one or more rows in the table to enable the **Delete** icon. Click **Delete** to delete the selected interest rate curves.

Fields	Description
Execute the Historical Interest Rates Data Loader	This icon executes a function to import historical rates and parameters for all defined Interest rate curves. For more information on setting up the automated process, see the Oracle Financial Services Analytical Applications Data Model Utilities User Guide. **FusionApps.properties** file must be present under *Web Server <deployed path>/WEB-INF/props* and *$FIC_WEB_HOME/webroot/WEB-INF/props* directories. Update the entry details of the source name. It must be **infodom_SOURCE_NAME=Actual_Source_Name**. For example, if Infodom Name is **DEV6INFO** and the source Name is **DEVETLSRC**, then the entry will be **DEV6INFO_SOURCE_NAME=DEVETLSRC**. Launch the Historical Interest Rates Data Loader from the Interest Rates Summary page after making this change. For more information, see Doc ID 2233513.1. To execute a historical Interest Rate data load, execute the **Historical Interest Rates Data Loader**. A warning message will appear *Upload all available Interest Rates and Parameters?* Click **Ok** to load all historical rates and parameters. Click **Data Loader** to execute all the interest rates and parameters.

4. To select an **Interest rate curve**, select a check box in the first column of the table. More than one Interest rate curve can be selected at a time, but this disables some of the icons.

   You can select or deselect all the Interest rate curves in the Summary page by selecting the check box in the upper left-hand corner of the Summary table directly to the left of the Code column header.

   The following table provides the Interest Rate details based on the search criteria.

   Table: Interest Rate – Columns and Descriptions

Column	Description
Code	Displays the interest rate curve's code. Code is an unique number in the range 1 to 9999999. Hover on a row in the pane to display the interest rate curve's detailed description.
Name	Displays the interest rate curve's short name.
Rate Format	Displays the Interest rate curve's rate format (zero-coupon or yield-to-maturity).
Compound Basis	Displays the Interest rate curve's compounding basis (Annual, Semiannual, Monthly, or Simple).
Accrual Basis	Displays the Interest rate curve's Accrual Basis (that is, 30/360, Actual/Actual, and so on).
Currency	Displays the Currency (Reference Currency) to which an Interest rate curve is applicable.
Curve Type	Displays the curve type as an Interest rate curve or Volatility Curve.
Creation Date	Displays the Date and Time at which an Interest rate curve was created.
Created By	Displays the Name of the user who created the Interest rate curve.
Last Modification Date	Displays the Date and Time at which an Interest rate curve was last modified.
Modified By	Displays the Name of the user who last modified the Interest rate curve.

4.1.2 Interest Rates Details

When you Add, Edit, or View an interest rate curve, the Interest Rate Code Details window is displayed. The Interest Rate Code Details window includes an Interest Rate Code Details pane, five Interest Rate Code tabs, and an Audit Trail pane.

The **Audit Trail** pane is a standard footer pane for every OFSAA rule type. It displays Created By, Creation Date, Last Modified By, and Modification Date on the **Audit Trail** pane. The **User Comments** tab can be used to add comments to any rule, subject to a maximum of 4000 characters.

4.1.2.1 Creating an Interest Rate Code

To create an Interest Rate Code, follow these steps:

1. Click Add from the Interest Rate Code Summary page.

Figure: **Interest Rate Code Details window**

2. Enter the following information in the **Interest Rate Code** window.

Table: **Interest Rate Code window – Fields and Descriptions**

Fields	Description
Interest Rate Code	When constructing a new yield curve, you must specify an Interest Rate Code between 1 and 9999999. Interest Rate Codes are used internally to uniquely identify yield curves. When working with Rate Management or other OFS Analytical Applications, you reference yield curves by Name, not by Interest Rate Codes. Interest Rate Codes are embedded within your instrument data (for example, the INTEREST_RATE_CD and T_RATE_INT_RATE_CD columns within the instrument data are populated with Interest Rate Codes). After you have saved a yield curve, you cannot renumber its Interest Rate Code.
Name and Reference Currency	You must provide a Name and Reference Currency for your yield curve. Unlike Interest Rate Codes, you can rename or change the Reference Currency for previously saved yield curves. While you can choose to rename a yield curve, however, it is very unlikely that you will choose to modify a yield curve's Reference Currency. A yield curve's Reference Currency is the currency for which your market rates are valid. For example, the Reference Currency for a Prime Rate yield curve would be US Dollars. LIBOR or other internationally quoted rates are always quoted with respect to an underlying Reference Currency (for example, US Dollar LIBOR, Euro LIBOR, and so on). The **Reference Currencies** drop-down list displays only **Active** currencies. For more information on Active and Inactive currencies, see the Currency section.
Description	You can optionally describe or modify your yield curve's description at any time.
Structure Type	This attribute is required for each yield curve. Structure Type supports both Standard and Hybrid yield curve definitions. Hybrid yield curves are re-expressions of one or more pre-existing Standard yield curves. For more information, see Hybrid Term Structure Tab under Interest Rate Code Tabs. After you have saved the yield curve, you cannot change the selected Structure Type.

Fields	Description
Volatility Curve	You can select the **Volatility Curve** option to indicate the curve selected will contain volatility rates. If you select this option, all other curve attributes become disabled and the curve is used exclusively for managing volatility details. For FTP Volatility, both the **Terms** tab and **Historical Rates** tab are available with this option. For CFE Volatility, only the **Historical Rates** tab is available. After you have saved the yield curve, you cannot change the selected Volatility Curve. Volatility curves are used in FTP to calculate the Rate Lock Option Costs. CFE Volatility is used to evaluate embedded options for the Black 76 market valuation.
Risk-Free	(Optional) This flag is for tagging IRC's as risk-free. That is editable in new and edit modes. It is available for non-hybrid curves and hybrid curves, and not available for Volatility Curves.
Display for all currencies	This option allows you to designate certain Interest rate curves to make them available for assumption mapping to any currency. Assumption rules filters the list of Interest Rate Codes based on the currency when defining assumptions for a specific product/currency combination. When this option is enabled, the Interest Rate Code appears in assumption rules for all currencies.

3. Click **Save**. To build out the Interest Rate Code, you must enter data within the **Interest Rate Code** tabs. For more information, see the Interest Rate Code Tabs section.

4.1.2.2   Interest Rate Code Tabs

Interest Rate Code tabs are used to define the yield curve and to add, edit, or delete historical interest rate data. The Interest Rate Code tabs are:

- Attributes
- Terms
- Historical Rates
- Parameters
- Hybrid Term Structure

4.1.2.2.1   Navigating Between Interest Rate Code Tabs

For new yield curves, you must begin with the Attributes tab. After you have selected attributes for a yield curve, you can not edit them. After assigning the attributes, navigate to the Terms tab to define a term structure for your yield curve or volatility curve, that is, an overnight rate, a one-month rate, a three-month rate, and so on.

To navigate to the Terms tab, either click Apply on the Attribute tab or click the Terms tab

| NOTE | You must specify an Interest Rate Code, Name, and Reference Currency in the **Interest Rate Code Details** window before navigate to the **Terms** tab. |

The first time you navigate to the **Terms** tab, an initial 1-month term point is provided, but even if this is the only term point you want for the curve, you must click **Apply** to finish term structure specification. In future revisions to the curve's definition, navigate directly to the **Historical Rates** tab, but if you modify the term structure, you must always click **Apply** on the **Term** tab before navigating to the **Historical Rates** tab.

The Historical Rates tab is used to input interest rate or volatility data. This tab is used for maintaining the interest rates database. To navigate to the Historical Rates tab, either click Apply on the Terms tab or select the Historical Rates tab if you have already defined your term structure.

| NOTE | You must specify the following before navigating to the **Historical Rates** tab

(1) an Interest Rate Code, Name, and Reference Currency in the Interest Rate Code Details window

(2) a term structure in the **Terms** tab |

4.1.2.2.2 Attributes Tab

Yield curve attributes include Rate Format, Compounding Basis, Accrual Basis, and Curve Identifier.

Figure: **Attribute Tab of Interest Rate Code window**

All attributes are disabled if the **Volatility Curve** is selected.

Table: **Attributes tab of Interest Rate Code window – Fields and Descriptions**

Fields	Description
Rate Format	To define the yield curve, you must select either the **Zero Coupon** or **Yield to Maturity** Rate Format. Rates entered into Rate Management (in the **Historical Rates** tab) are always entered in the nominal form, such as, 5.125% or 6.875%, not as discount factors. For more information on how the two rate formats affect internal cash flow engine calculations, see the Oracle Financial Services Analytical Applications Cash Flow Engine Reference Guide.
Compounding Basis	Select a Compounding Basis for the yield curve: **Annual, Semiannual, Monthly,** or **Simple.** Annual is the most common method. The Monthly Option is enabled based on Rate Format selection (if Rate Format is selected as **Yield to Maturity**). For more information on Compounding Basis and how different compounding bases affect cash flow calculations in OFSAA, see the Oracle Financial Services Analytical Applications Cash Flow Engine Reference Guide.
Accrual Basis	Select an Accrual Basis for the yield curve. The **Accrual Basis** list depends on the Compounding Basis selection. If the Compounding Basis is selected as **Annual, Semiannual**, or **Monthly**, then the following Accrual Basis types are available:
	Actual/Actual
	30/365
	Actual/365
	If the Compounding Basis is selected as **Simple**, then the following Accrual Basis types are available:
	30/360
	Actual/360
	Actual/Actual
	30/365
	30/Actual
	Actual/365
	For more information on Accrual Basis and how different accrual bases affect cash flow calculations in OFSAA, see the Oracle Financial Services Analytical Applications Cash Flow Engine Reference Guide.
Curve Identifier	The curve identifiers can be mapped to the Adjustable Rate Mortgage (ARM) indices used for ADCO prepayment model processing. This is a drop-down list that contains the six Curve Identifier types, that is, **Par Treasury, Zero-coupon Treasury, Par LIBOR/Swap, Zero-coupon LIBOR/Swap, Prime Lending Rate,** and **Cost of Funds Index**. The Reference Currency for these indices is always US Dollar.
	The curve identifier is optional when the IRC is not used for ADCO prepayment model processing. This is applicable only in CFE and HM applications.

4.1.2.2.3   Terms Tab

Use the **Terms** tab to construct the yield curve's term structure. You can specify as many yield curve's terms from 1 day to 100 years range.

Figure: **Terms Tab on Interest Rate Code window**
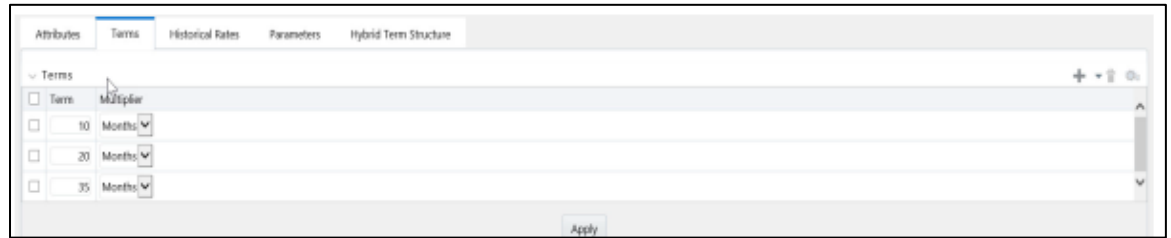
NOTE	When constructing a volatility curve, the term types available are **Contract Term** and **Expiration Term**. You must add the relevant terms for each of these dimensions. Click **Apply** after defining terms for each dimension to save the assumptions before proceeding.

Fields	Description
Adding New Term Points	Click **Add** ✚ to add new term points by selecting a Term value and a Multiplier (such as 7 days, 2 months, 5 years, and so on). You can also add term points using the **Data Input Helper** option. For more information, see the Data Input Helper section.
Deleting Existing Term Points	To delete an existing term, select the term point (or terms) and click **Delete** 🗑 . A confirmation message is displayed. Click **Ok**.

4.1.2.2.4   Historical Rates Tab

Use the **Historical Rates** tab to define, modify, or view interest rate data. Enter data in simple percentages (such as 5.125, 4.875, and so on). If you are entering historical rates for a volatility curve, then enter volatilities for the combination of **Contract Term** and **Expiration Term**. Select the desired **Expiration Term** from the drop-down list to complete the **Volatility Matrix**. Effective dates must be entered separately for each **Expiration term** in the list.

Figure: **Historical Rates Tab on Interest Rate Code window**

<table>
<tr><td>NOTE</td><td>FTP Volatility curves are only applicable to FTP Rate lock option cost calculations and CFE Volatility only applies to embedded option market valuation.</td></tr>
</table>

To enter historical rates for an FTP volatility curve, enter volatilities for the Contract Term. Select the desired Expiration Term from the drop-down list to complete the **Volatility Matrix**. Effective Dates must be entered for each Expiration Term.

To enter historical rates for a CFE Volatility Surface, enter volatilities based on the following two dimensions:

- Strike Rate (Vertical Axis)
- Expiration Date (Horizontal Axis)

For a new CFE Volatility Surface, enter an As of Date and the number of breakpoints for **Strike Rate** and **Expiration Date**, then click **Generate**. The size of the matrix cannot exceed 20 x 20. For Strike Rate, enter values in ascending order. For **Expiration Date,** enter values in ascending order with values greater than the currently specified As of Date. At every intersection of Strike Rate and Expiration Date, enter a volatility amount in percent (that is, 25 = 25%).

The **Rate Data Source** parameter shows from where the rates have been taken from, either they are entered through the User Interface, loaded through the Data Loader, or generated using the Generate Rates of Hybrid IRC.

You can perform the following tasks:

- Add Historical Rates
- Rate Lookup Behavior Between Term Points
- Rate Lookup Behavior Beyond Term Points
- Rate Lookup Behavior Between Effective Dates
- Generate Graph
- Excel Import or Export
- Deletion of Historical Rates
- Data Input Helper

Add Historical Rates

By default, the Historical Rates tab displays interest rate data for the past month (for example, for the 30 days leading up to the current date). Click the **Effective Date Range** drop-down list to expand your view to the last 3 months, 6 months, one year, 3 years, 6 years, or all rate data.

Rate Lookup Behavior Between Term Points

The OFS Cash Flow Engine is common to OFS FTP, OFS PMTPC, OFS CFE, and OFS BSP applications. To lookup rates from Rate Management, the Cash Flow Engine performs an interpolation between yield curve Term Points. For example, in determining a Straight Term Transfer Rate (common for products such as time deposits), the Engine must determine a three-month rate from a yield curve that contains only a one-month rate and a six-month rate. In such a case, the Cash Flow Engine performs interpolation to determine the implied three-month rate. While each of the applications supports simple linear interpolation, OFS FTP and OFS CFE also support Cubic and Quartic Spline interpolation methods. These more advanced methods will be supported for all the OFS Analytical Applications in a future release.

Rate Lookup Behavior Beyond Term Points

If the Cash Flow Engine must determine a rate from a yield curve for a term point smaller than the first term point of the yield curve, then Engine utilizes the first term point of the yield curve. For example, if the Engine must determine an overnight rate from a yield curve whose first term point is one month, the Engine utilizes the one-month rate.

If the Cash Flow Engine must determine a rate from a yield curve for a term point greater than the longest term point on the yield curve, the Engine utilizes the last term point of the yield curve. For example, if the Engine must determine a 30-year rate from a yield curve whose last term point is 10 years, the Engine utilizes the 10-year rate.

Rate Lookup Behavior Between Effective Dates

When you are looking up rates from Rate Management for a business date, the Cash Flow Engine helps to find if there is no rate data for that specific business date.

For example, in generating an original term transfer rate for an instrument with an origination date of June 14, 2010, the Cash Flow Engine may find rate data for May 31, 2010 and for June 30, 2010 but no rate data for any dates between May 31, 2010 and for June 30, 2010. In such cases, the Cash Flow Engine always falls back to the latest available rate data before the business date of interest (May 31, 2010 in this case).

Deletion of Historical Rates

To delete historical rates entered, select one or more rows and then click **Delete** 🗑 .

Generate Graph

The **Generate Graph** option allows you to generate the graph for selected Historical rates.

To generate a graph, follow these steps:

1. Select the Effective Date Range on the Historical Rates tab.

2. The From Date and To Date fields will be automatically updated after selecting the Effective Date Range.

3. Select the Effective Date using the corresponding Calendar icon.

4. Enter the term points in respective fields and click Apply.

5. Select the Terms using the corresponding check boxes.

6. Click Generate Graph . The graph is generated. Here, you can view the graph for Interest Rate vs Effective Date or Interest Rate vs Term Point.

Excel Import or Export

NOTE	Starting from the 8.0.4 release, the Excel Import feature will work only on that Internet Explorer browser. Excel Export feature is supported by all browsers such as Chrome or Firefox.

To aid in data entry, use the **Excel Import or Export** functionality to add or edit rate data to historical rates. This is an optional step.

Excel Export:

To export the data, follow these steps:

1. On the Interest Rates toolbar, click the **Excel** icon.

2. Click **Export** to export data for the chosen selected effective date range. Within the same block, select Export to Excel, which launches the Excel application and displays the data window including headers.

Figure: **Export and Import options for Historical Rates data**
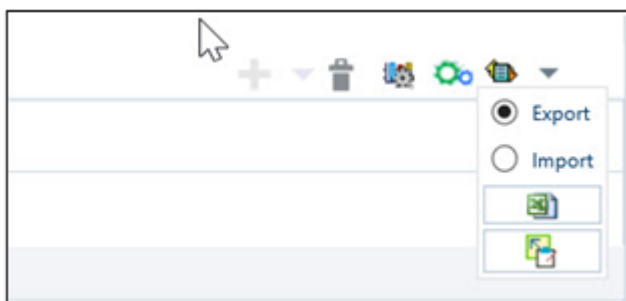
Excel Import:

You can add rows to the pane in the same format. After complete data is entered (or existing data is edited), copy the range of the pane you want to append and go back to the Historical Rates pane. In the same block, click the Import . The data copied from excel will appear in the Historical Rates pane.

1. If appending data that pre-existed for the same effective date, the import it will overwrite existing data.

2. In some cases, some fields will be output to the pane that is not editable, such as bucket start and end dates (when defining forecast assumptions). Add or edit data in the columns that would be editable only in the UI itself.

Data Input Helper

Use the Data Input Helper feature to copy from a row where you have already defined the interest rate definition or apply a fixed value down the page. This is an optional step. To use data input helper, follow these steps:

1. Select the check box next to the rows that you want to work with or use the **Select All** option by selecting the check box on the header row.

2. Select **Data Input Helper** .

3. From the **Data Input Helper** window, select method – **Grow by Amount** or some other appropriate method.

4. Select the term points from the **Available Columns** list and click **Add** or **Add All** to move the data to the **Selected Columns** list.

Figure: **Data Input Helper window**
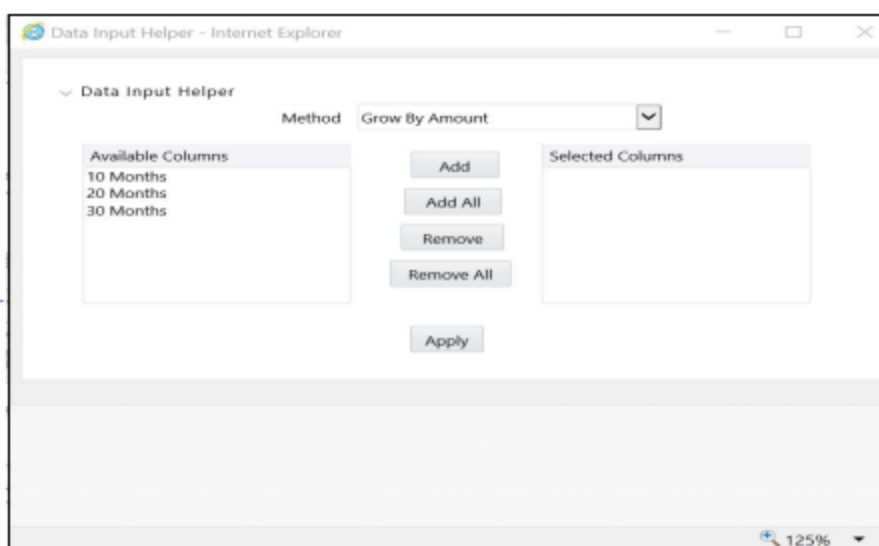
Based on the selected method, the list of Available Columns will vary. If Method is selected as **Increment By Months**, **Increment By Days**, or **Increment By Years**, then only the **Effective Date** option is displayed in the **Available Columns** list.

5. Click **Apply** to modify the **Start date** and enter the **Incremental Value**.

4.1.2.2.5   Parameters Tab

Fixed income instruments are used for forecasting and simulating the Cash Flows. The Cash Flow Engine needs interest rate models to simulate the evolution of interest rates. The Cash Flow Engine uses these models as part of the stochastic engine. You can enter the parameters for these models in the following ways:

- System-generated calculations through Parameter Estimation

- Direct input into the UI

- Excel Import

- UI entry through Data Input Helper methods

- Data Loader

Following interest rate models are available:

- Extended Vasicek

- Ho and Lee

- Merton

- Vasicek

Parameter Estimation

This section explains the procedure to calculate the estimated parameters.

Prerequisites

Installation of R and Oracle R Enterprise (ORE) is required to use the Term Structure Parameter Estimation functionality under Rate Management – Interest Rates, for computing term structure parameters.

For more information, see the [Oracle Financial Services Cash Flow Engine Application Pack](#) Installation and Configuration Guide.

Conditions for Parameter Estimation

If the following conditions are met, you can calculate parameters for any Term Structure Model for a given Effective Date, based on your relative look back term and a sufficient number of observations (available historical rates) for the IRC. If you rerun with a different look-back term, it will overwrite the existing parameters for the selected Term Structure Model on that IRC's Effective Date.

- Term point: Underlying historical rates must be available for a 30-Day or 1-Month term point.

- Minimum Number of historical rates: A total of at least 10 historical rates (observations) are required, on appropriate look-back dates.

- Lookback Dates: Historical rates must be available on dates looking back from the Parameter's Effective Date (the End Date), in 30-day intervals moving backward from End Date to Start Date, for a minimum of 10 intervals.

For example: If the first rate's Effective Date is 1 Jan. 2013, then the second rate's date must be 2 Dec. 2012 (1 Jan. 2013, 30 days = 2 Dec. 2012), and so on. If a rate is not found for the required date, the engine looks for a rate within the neighborhood of 5 days up or down (therefore a total range of 10 days), searching iteratively starting with Date -1, then Date +1, through Date +5, then Date -5. The next rate lookup would be 60 days before the End Date, and so on.

The minimum relative term for all lookbacks must be at least 300 Days (that is, to accommodate a minimum of ten 30-day intervals). Using the above logic, if a rate is not found for the lookup date (or date within the neighboring range), an error will be logged in FSI_PROCESS_ERRORS with ID_Number to identify the Interest Rate Code, and the parameter estimation Engine will exit.

To define the Parameter Estimation, follow these steps:

Figure: **Parameters Tab on Interest Rate Code window**

1. To edit or recalculate the existing Parameters, enter the **Effective Date Range** filter.

   The following icons are available here:

   ▪ Add ➕

   ▪ Delete 🗑

   ▪ Data Input Helper

   ▪ Refresh 🔄

   ▪ Excel Export or Import

2. Default parameters for the **Extended Vasicek Model** are displayed for one Effective Date (the System Date on which the Interest Rate Code was created). You can edit these parameters or add new parameters using the **Add**. Use the **Refresh** to return to existing Parameters.

NOTE	Steps 3 and 4 are applicable only if you are Adding or Editing Parameters.

   To add or edit the parameters, use the **Data Input Helper** or **Excel Import or Export**.

   For more information, see the Excel Import or Export and Data Loader sections.

3. Enter the Effective Date. Here, the Effective Date cannot be greater than the Current System Date.

4. Select the Model from the Term Structure Model drop-down list. Effective Date and Term Structure Model combination must be unique within this IRC.

5. The following term structure models are utilized in stochastic modeling of interest rates in OFS FTP and OFS CFE:

   - Extended Vasicek
   - Ho and Lee
   - Merton
   - Vasicek

6. The following parameters needed by the models:

Table 5: List of supported parameters for Models Term structure models in Interest Rate

Model	Parameter 1	Parameter 2	Parameter 3
Extended Vasicek	Volatility	Mean Reversion Speed	
Ho and Lee	Volatility		
Merton	Volatility		
Vasicek	Volatility	Mean Reversion Speed	Long Run Rate

7. Values for Long Run Rate and Volatility are in percentages.

   For example, a Long Run Rate of 5% is displayed as 5.000. To maintain the integrity of data, Rate Management restricts the accepted input values. The valid range and the default setting for each parameter.

Table: Valid Rang and Default Values of Interest Rate Parameters

Parameter	Valid Range	Default Value
Volatility	0% to 500%	0.01
Mean reversion speed	0.00 to 500	0.0

Parameter	Valid Range	Default Value
Long run rate	0.00% to 500%	0.0

8. The **Rate Data Source** indicates if you have directly entered Parameters through the UI. You can calculate the Parameters to display system-generated values.

9. Select the **Calculate** to view the **Term Structures Parameter Estimation** window.

10. If you are directly entering the Parameters, then enter values appropriate to the Model, then click **Apply** else click **Calculate**.

11. End Date is auto-populated with Effective Date. Enter the Relative Term with Multiplier to define the rate look-back period.

12. The Term or Multiplier value must be at least 300 Days.

13. Start Date is automatically updated after entering a Relative Term.

14. Click **Calculate Number of Observations** to confirm the number of rates found for appropriate dates within the Relative Term. If there are at least 10 observations, then the **Estimate** option will become active.

15. Click **Estimate** to calculate the parameters and store them in the Historical Parameters table (FSI_IRC_TS_PARAM_HIST). A confirmation message is displayed. Click **Ok**. The calculation will complete and you will be directed back to the **Parameters** tab.

16. Similar to the validation used for direct input from the UI, if any of the calculated parameters are outside of the valid range, the Engine displays an error message.

Delete parameters by selecting one or more rows and then clicking **Delete** 🗑 . For more information on term structure models and stochastic processing, see the Oracle Financial Services Funds Transfer Pricing User Guide, Oracle Financial Services Cash Flow Engine (OFSALM) User Guide, and Oracle Financial Services Analytical Applications Cash Flow Engine Reference Guide.

4.1.2.2.6 Hybrid Term Structure Tab

Hybrid Term Structures allows you to specify the following three types of Hybrid yield curves:

- Spread
- Moving Average
- Merge

NOTE	**Minimum and Maximum Hybrid IRC types** from the **Hybrid IRC type** selection is intended for future enhancement and must be ignored in the current release.
	The **Parameters** and **Hybrid Term Structure** tabs are disabled if the **Volatility Curve** is checked.

Hybrid yield curves are built up from either one or more standard yield curves. When you add, modify, or delete any historical rate data from a standard yield curve, the data associated with any related hybrid yield curve must be updated. After defining, the Hybrid yield curves can be used like any other interest rate curve in the system. You can reference these curves within the OFSAA application business rules that allow the selection of an Interest Rate Code.

Figure: **Hybrid Curve tab on Interest Rate Code window**
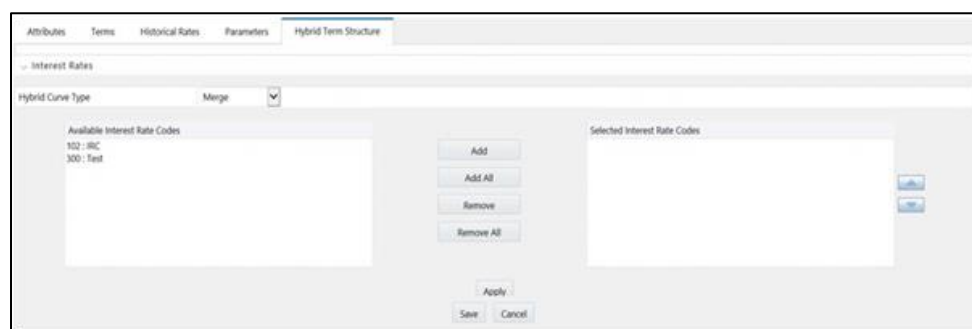
Table 7: Hybrid Curve tab to create a new Interest Rate Code – Fields and Descriptions

Fields	Description
Hybrid Curve Type	**Spread**
	A Spread hybrid yield curve is defined as the difference between two standard yield curves. The **Spread** type of hybrid yield curve is useful in establishing liquidity risk or basis risk yield curves.
	Moving Average
	Moving average hybrid yield curves represent moving average data of a single underlying standard yield curve. These curves are used in Funds Transfer Pricing.
	Merge
	Merge hybrid yield curves represent a blending of two or more underlying yield curves. In constructing a **Merge** type of hybrid yield

Fields	Description
	curve, specify the percentage weighting applied to each of the underlying standard hybrid yield curves.

4.1.2.2.7   Define a Hybrid Curve

To define a hybrid curve, follow these steps:

1. Select the Source Type as Hybrid in the Hybrid Term Structure tab, and then select the Hybrid Curve Type (Spread, Moving Average, or Merge).

2. Select the Interest Rate Codes for the hybrid type and click Apply.

4.1.2.2.8   Generate Historical Rates

After a hybrid curve is defined, generate the Historical Rates as far back as the rate source curves allow. The Generate Frequency determines the frequency of the historical rates populated with the Generate function. If you select the Generate Frequency as monthly, it generates month-end values only. If you select daily, it generates the maximum number of historical values.

To generate the rates, follow these steps:

1. Select the interpolation method as **Linear, Cubic,** or **Quartic**.

2. Select the **Generate Frequency** (**Daily, Weekly, Bi-Weekly,** or **Monthly**) and enter the Specific Date Range (From Date and To Date).

3. Click **Generate**. The rates will be populated and you will be directed to the **Historical Rates** tab to view the results.

   If Hybrid Curve Type is selected as Moving Average, then select the Moving Average Term in Days, Months, or Years.

Automate (Schedule) the Generate Rates Action in Hybrid IRCs

The generation of the Hybrid IRC rates is available within the Hybrid IRC of **Rate Management** UI. As a manual process, you can additionally schedule a Run through an ICC Batch process or through a Simplified Batch process.

If you are running Generate Rates through the UI, then provide the following three parameters:

1. Interest Rate Code: For example, you are in edit mode for a particular Hybrid IRC, execute the Generate Rates option. So, the IRC is implied.

2. FROM DATE: this is the start date of the generate rates process.

3. TO DATE: this is the date to which hybrid rates will be computed.

When generating Hybrid Rates through a batch (ICC or Simplified), specify **ALL** in the Parameter list to generate rates for all Hybrid IRCs. Or, a list of IRCs can be specified with comma-separated values within quotes.

'IRC_Code1, IRC_Code2, IRC_Code3' and so on

NOTE	Use **ALL** in the Parameter list for all IRCs.

The **TO DATE** is determined based on the Effective Date specified for the Batch and the **FROM DATE** for each IRC is determined by referring to the last (maximum) effective date in the current historical rates table +1 day.

There is one exception to the calculated **FROM DATE**. In cases where a new Hybrid IRC is generating rates for the first time, the minimum **Effective Date** from the Parent IRC is used as the **FROM DATE**.

NOTE	Hybrid Rates generated by the Generate Rates procedure are written to the FSI_IRC_RATE_HIST table. Outputs from the procedure can be verified within the Interest Rates UI or by querying this table directly.

Topics:

- Dependent Tables

- Prerequisites to running - Hybrid IRC batches

- Batch Creation and Running Batches

- Viewing Log Messages

Dependent Tables

The following table describes the details of the Dependent Tables.

Table 8: **List of Dependent Tables**

Table Name	Description
FSI_IRCS	Holds header information of all Interest Rate Codes.

Table Name	Description
FSI_IRC_HYBRID_STRUCT_WEIGHT	Holds the Hybrid IRCs' - Interest Rate Term, Interest Rate Term Mult, and Rate Weightage. It is the child Table of FSI_IRCS.
FSI_IRC_RATE_HIST	This Output table holds calculated rates for the Hybrid IRCs, as well as all historical rates for non-hybrid IRCs input through the Interest Rates UI or loaded directly using the interest rates data loader program.
FSI_MESSAGE_LOG	Holds error log information.
DATE_TASK_MASTER	Located in the Config Schema. This table must have a seeded date for IRC_HYBRID_SCHEDULER DT.
DATE_TASK_STEP_PRECEDENCE	Similar to DATE_TASK_MASTER, this table must also have an entry for IRC_HYBRID_SCHEDULER DT

Prerequisites to Running Hybrid IRC Batches

- The function FN_FSI_IRC_HYBRID_SCHEDULER must be in **Compiled** status in the Atomic schema. Sometimes, the functions created in the Database can be in an invalid state due to some issues (by the installer), so use the **Compile** option in the Database to get them in a valid state.

- You can create the ICC batch using the **IRC_HYBRID_SCHEDULER** rule name, which is seeded with the installation.

- Hybrid IRC rates are calculated based on their underlying standard IRC rates, which are also stored in the FSI_IRC_RATE_HIST table. Historical Rates must already exist for all parent and dependent IRCs for the relevant effective date range.

> **NOTE** Seeded data related to Batch information must be present in the DATE_TASK_MASTER and DATE_TASK_STEP_PRECEDENCE tables in the Config schema.

4.1.3   Batch Creation

There are two methods for creating and running the batch processes, ICC Batch and Simplified Batch. The following section describes how to set up and run the Hybrid Rate Generation using both approaches.

For more information, see the Oracle Financial Services Analytical Applications Infrastructure User Guide.

4.1.3.1   Running Hybrid Rate Generation using ICC Batch:

1. Navigate to Common Object Maintenance, select Operations, and then select Batch Maintenance. Click Create Batch.

2. Enter the following details in the Batch Maintenance window:

   ▪ Component = "Transform Data"

   ▪ Rule Name = "IRC_HYBRID_SCHEDULER"

   ▪ Parameter List = 'IRC_Code'

NOTE	Use 'ALL' in the Parameter list to use all IRCs.

3. Save the batch.

4. Navigate to **Common Object Maintenance** and select **Operations**, and then select **Batch Execution.**

5. Search the Batch created under **Batch Maintenance** and select it.

6. Enter the **Information Date** for the batch.

7. Click **Execute Batch**

To schedule a future Hybrid Rate Generation Batch Process, or to schedule the Hybrid Rate Generation Batch Process on a recurring basis, do the following:

1. Navigate to Common Object Maintenance and select Operations, and then select Batch Scheduler.

2. Search the Batch to schedule and select it.

3. Click New Schedule or Existing Schedule:

NOTE	An **Existing Schedule** can be selected only if there are existing scheduled batches to view.

4. If **New Schedule** is selected, the **New Schedule** details appear. Enter the Scheduled Task Name.

5. To schedule the Hybrid Rate Generation on a recurring basis, select **Daily, Weekly, Monthly,** or **Adhoc**.

6. In the **Schedule Task** pane, enter **Start Date** and **End Date** in the Date field.

7. In the Run Time field, enter the time for the next validation to be run.

8. Click **Save** to set the schedule as specified or **Cancel** to drop your changes.

    Any error messages or warnings generated during the Hybrid Rate Generation process that is displayed in the View Log.

For more information, see the Oracle Financial Services Analytical Applications Infrastructure User Guide.

4.1.3.2   Running Hybrid Rate Generation using Simplified Batch

To run Hybrid Rate Generation using Simplified Batch, follow these steps:

1. Navigate to Common Object Maintenance and select Operations, and then select Simplified Batch.

2. Click **Add**.

3. From the Task Details block, click Select Task. In the Task Selection window, select Task Type as Transform Data. Click Search. In the Task Selector, select the IRC_HYBRID_SCHEDULER and click Ok.

4. Enter the Parameters and click Save.

5. In the Simplified Batch Summary page, search the Hybrid Rate Generation batch and select it. Click the Run icon.

6. Click Yes to confirm you want to continue, enter a date (this will be your TO DATE), and click Ok to continue. A confirmation message is displayed.

7. Click Ok. When the batch is complete, navigate to Operations and select View Log to view the processing log.

Any error messages or warnings are accessible from the View Log window.

> **NOTE**   Simplified Batch does not provide access to logs for Transform Data tasks.

For more information, see the Oracle Financial Services Analytical Applications Infrastructure User Guide.

4.1.4   Viewing Log Messages

Any error messages or warnings generated during the rate generation batch are displayed in the **Log Information** window. To access this window:

1. Navigate to the Operations menu and select View Log.

2. Enter search criteria as Data Transformation and related Batch ID

3. Select the Task ID to view the log information

You can additionally query the FSI_MESSAGE_LOG table directly to view the error log details.

For more information, see the Oracle Financial Services Analytical Applications Infrastructure User Guide.

4.2   Currency

Financial institutions transact business in more than one currency. Transacting business in multiple currencies demands functional capabilities for multi-currency accounting and currency rate management.

OFSAA Rate Management's Currency module supports the definitions and maintenance of currencies. Currency definitions are fundamental to the definition of both interest rate yield curves and currency exchange rates. A key attribute of every yield curve is the currency with which it is associated, and currency exchange rates can only be established between defined currencies. OFSAA Rate Management provides a comprehensive list of ISO-defined currencies; you can also define and add your user-defined currencies.

To view the Interest Rate Code Summary page, navigate to **Common Object Maintenance** and select **Rate Management**, and then select **Currency**. This page displays a comprehensive list of more than 170 seeded ISO currency codes.

Figure: **Currency Summary page**

4.2.1   Searching for Currency

A Search pane is provided to search for currencies by Name, Currency (by ISO currency code), Status, or Reporting Currency.

To search the currency, follow these steps:

1. Enter the search criteria and click **Search**.

2. Click the **Reset** to remove the search criteria you can have specified and refreshes the window.

3. The search results are displayed in a tabular format containing all of the currencies that meet to search criteria. The Currency summary pane offers several icons to perform different functions when a currency is selected.

Table 9: Currency – Icons and Descriptions

Fields	Description
Add ✚	Click **Add** to begin the process of adding a new currency. The **Add** icon is disabled if any rows in the pane have been selected.
Edit ✎	Select a single row out of the pane to enable the **Edit**. Click the **Edit** icon to modify an existing currency. The **Edit** icon is only enabled when a single currency has been selected. You can control the number of rows to display on the page by selecting the **Pagination Options** icon from the action bar.
Delete 🗑	Select one or more rows out of the pane to enable the **Delete** icon. Click the **Delete** icon deletes the currency or currencies you have selected.
Check Dependencies 🖳🖳	Select a currency and then click the **Check Dependencies** icon to generate a report on all rules that utilize your selected currency. The **Check Dependencies** icon is only enabled when a single currency has been selected.

4. The Currencies window contains all of the currencies that meet the search criteria. The **Currencies Summary** page has several icons to perform different functions when a currency is selected.

To select a currency, select the check box in the first column of the pane. More than one currency can be selected at a time but this will cause some of the icons to become disabled. Select a check box a second time deselects the currency.

Select or deselect all of the currencies in the Summary page by selecting the check box in the upper left-hand corner of the Summary page directly to the left of the Code column header.

The following table provides the currency details based on the search criteria:

Table: Currency Summary page- Columns and Descriptions

Columns	Description
Code	For seeded currencies, these are ISO Currency Codes. For user-defined currencies, these can be any pure character string (no numbers) up to a length of 3 characters.
Currency Name	For seeded currencies, these are ISO Currency Codes. For user-defined currencies, these can be any string up to a length of 40 characters.
Reference Interest Rate Code	Reference Interest Rate Code is the Interest Rate Code with which currency is associated with forecasting purposes. Define multiple yield curves each of which has the same Reference Currency, but a currency can only have one Reference Interest Rate Code.
Reporting Currency	A reporting currency is an active currency to which balances in other currencies can be consolidated to facilitate reporting. Balances in reporting currencies can be, in turn, consolidated to the functional currency. For example, an American multinational bank might consolidate its holdings in Asian currencies to the Japanese yen (Reporting Currency) and its balances in European currencies to the Euro (Reporting Currency) after which it might consolidate these reporting currencies to the U.S. dollar (Functional Currency).
Status	The status of any currency can be either Active or Inactive. You must Activate a currency before doing the followings: 1. Define that currency as a Reference Currency for a yield curve (For more information, see the Reference Currency section in the Interest Rates Details window.) 2. Enter Exchange Rate data for a currency (For more information, see the Currency Rates section.) 3. Define Forecast Rates for that currency within OFS CFE (For more information, see the Forecast Rates section)

4.2.2 Editing Currencies

To edit a currency, select a currency, click **Edit** . You can not modify any currency Code value. You can modify the Currency Name, Reference Interest Rate Code, Reporting Currency value (Yes or No), and the currency's Status (Active or Inactive).

You can not inactivate any currency that is:

- Defined as the Reference Currency for any yield curve

- Associated with any exchange rate data

- Utilized within any Forecast Rates rule within OFSAA Asset/Liability Management

After completing the edits, click **Save.**

4.2.3 Adding Currencies

To add a currency, follow these steps:

- The first row in the Currencies window is an empty row that is ready for you to edit as a new currency. Select this empty row, click **Edit**, and generate the new currency.

      or

- Generate a new currency by clicking on the **Add**. This generates another empty row at the top of the Currencies window to edit purpose.

4.2.4 Deleting Currencies

Select one or more currencies and then click **Delete**. You can not delete any currencies that are utilized elsewhere in the system.

4.3 Currency Rates

OFSAA Rate Management's Currency Rates module uses the currencies defined and activated in the Currency module to support the creation and maintenance of historical exchange rates. Currency exchange rates are utilized in:

- OFSAA Funds Transfer Pricing **Ledger Migration** processes (see the Oracle Financial Services Analytical Applications Funds Transfer Pricing User Guide)

- OFSAA Asset Liability Management **Currency Consolidation** process (see the Oracle Financial Services Analytical Applications Asset Liability Management (OFSALM) User Guide)

- OFSAA Profitability Management multi-currency allocations (see the Oracle Financial Services Analytical Applications Profitability Management (OFSPM) User Guide)

- OFSAA Hedge Management and IFRS Valuations (see the Oracle Hedge Management and IFRS User Guide)

To view the Currency Rate, navigate to **Common Object Maintenance** and select **Rate Management**, and then select **Currency Rates**. In this window, you can manage historical exchange rates between currencies.

For CFE, FTP, and PFT, **From Currency** defaults to the Initial Currency selection from the Assumption Management defaults in the active **Application Preferences** window. You can select another **From Currency** from the drop-down list that displays all Active currencies.

4.3.1 Preparing to Work with Exchange Rate Data

To view, edit, or delete the exchange rate data, you must enter **To Currency** value. With the **From Currency**, the **To Currency** drop-down list displays only Active currencies.

After selecting a **To Currency** value, select a value for Rate Type as **Floating Rate** or **Fixed Rate** (the default selection is Floating Rate). After selecting a **To Currency** value, a second pane is displayed as **Floating Currency Rates** (if you have chosen a Rate Type of Floating Rate) or **Fixed Currency Rates** (if you have chosen a Rate Type of Fixed Rate).

- Floating Rates

  Floating exchange rates, such as those between the US Dollar (USD), the Pound Sterling (GBP), the Japanese Yen (JPY), and the Euro (EUR), are market-driven and can change from day-to-day, hour-to-hour, or minute-to-minute.

- Fixed Rates

  Some countries, especially smaller countries or countries that have experienced significant inflation in the recent past, can wish to "*peg*" their currency to a larger, more stable currency such as the US Dollar, Japanese Yen, or Euro.

4.3.2   Adding Exchange Rate Data

After you have specified a value for To Currency, the Floating Currency Rates section appears. To define a Fixed Rate relationship, select the **Fixed Rate** Type and replace the **Floating Currency Rates** with the **Fixed Currency Rates**.

Both Currency Rates panes initially display a single blank row followed by the most recent month's exchange rate data (if any such exchange rate data already exists). To enter a single new exchange rate data point, enter data into the blank row, and click **Save**.

Table1: List of columns on Currency Rate window

Fields	Description
Effective Date	Directly enter a date or select the **Calendar** [icon] icon to choose an effective date for your new exchange rate data point.
	Rate Management stores the historical exchange rate data. You cannot enter exchange rate data for dates greater than the current date. For more information regarding rate forecasts and the relationship between historical exchange rates for forecasted exchange rates, see the Forecast Rate Scenarios. If you have gaps in the historical exchange rate data, any OFS Analytical Application that needs to perform a rate translation function will fall back to the most recent date for which exchange rate data exists. For example, if an OFS Analytical Application needs to translate a rate from USD to EUR for February 22, 2010 and the latest available USD to EUR rate data in the Rate Management database is February 11, 2010, then the application will utilize the exchange rate for February 11, 2010.
Status	Status is a read-only display that is updated after the Currency Rates Validation has been run.
Data Source Code	The **Data Source Code** is displayed read-only and indicates whether the rates were input through the UI or the data loader.

Fields	Description
Currency Exchange Rate	For both Floating Rates and Fixed Rates, units of the From Currency are converted to one unit of the To Currency. See Table2 for example.

Table2: **Example of one Currency to another Currency Conversion**

From Currency	To Currency	Approximate Rate
USD – US Dollar	GBP—Pound Sterling	1.50
USD – US Dollar	EUR – Euro	1.36
USD – US Dollar	JPY – Japanese Yen	0.01105

4.3.3 Adding Multiple Exchange Rates

Click **Add** ✚ to add additional blank rows to enter the additional Effective Dates and Exchange Rates. After adding the multiple new exchange rates, click **Save**.

4.3.4 Editing Exchange Rate Data

Select the check box on the left-hand side of any row to enable the **Edit** 🖉 icon. After clicking **Edit**, the row becomes active to edit the Effective Date and (or) the Exchange Rate. Click **Save** to save the changes.

4.3.5 Viewing Exchange Rate Data

By default, both the **Floating Currency Rates** pane and the **Fixed Currency Rates** pane display the most recent month of historical exchange rate data. You can control the amount of data displayed by selecting a different value from the **Effective Date Range** drop-down list in the **Currency Selection** window.

Click the **View** 🔳 icon to a specific range of effective dates by modifying the **From Date**, **To Date**, or both dates within the **Currency Rates** window.

4.3.6 Deleting Exchange Rate Data

Select one or more check boxes on the left-hand side of any row to enable the **Delete** 🗑 icon. After clicking **Delete**, a confirmation message is displayed. Click **Ok**.

4.3.7   Data Loader

The **Data Loader**   icon executes a function to import historical Currency rates for all defined Currencies. For more information on setting up the automated process, see the Oracle Financial Services Analytical Applications Data Model Utilities User Guide.

To execute a data load, click the **Data Loader** icon. A warning message is displayed *Upload all available Currency Rates?*

> **NOTE**   Click the **Data Loader** icon to execute all the currency rates.

4.3.8   Excel Import/Export

The Excel Import/Export functionality is used to add or edit historical exchange rates.

> **NOTE**   To export exchange rates, **Enable visual style and in webpages** option in Internet Explorer must be enabled. Otherwise, it can show an error message.

4.3.9   Currency Exchange Rate Validation

4.3.9.1   Overview of Currency Rate Validation

Exchange Rate Validation has the following features:

- Movement of historical exchange rates to the Currency Direct Access table.
- Calculation of inverse exchange rates for reporting currencies.
- Calculation of triangulated exchange rates where possible.

> **NOTE**   This feature is equivalent to the Rate Validation capability in OFSA 4.5 Rate Manager.

4.3.9.2   Features of Exchange Rate Validation

The goal of exchange rate validation is to ensure that exchange rates from all active currencies to all reporting currencies are available for processing in the OFSAA applications. Some of these rates can come from the validated direct input, others are calculated based on relationships with other rates. To support triangulation, all fixed

exchange rates are available for all currencies that make up a exchange that needs to be triangulated. Also, a direct exchange rate between each Child currency and each reporting currency is calculated and supplied to support quick access to exchange rates. If a Child currency is a Reporting Currency, then Exchange Rates are calculated for all currencies having an exchange relationship with the Parent currency.

4.3.9.3   Currency Rate Validation

1.   Load currency rates through the Rate Management or using the **Historical Rate Data Loader**. The initial status is **Not Yet Validated**.

2.   Execute the Currency Rate Validation engine.

3.   Navigate to **Operations** and select **Batch Maintenance**, and then click **Create Batch.**

   ▪   Component = "Transform Data"

   ▪   Rule Name = "Rate_Validation"

   ▪   Parameter List (Required) = FROM_DATE and TO_DATE, for example, '20110101', '20110131'

   After completion of the validation process, the status in the **currency Rates** window changes to **valid** or **Invalid** (in case there is an issue).

4.   View both input and calculated results in the FSI_EXCHNG_RATE_DIRECT_ACCESS table. The OFSAA processing engine reads this table for sourcing historical exchange rates.

NOTE	Executing Rate Validation is a required step when a multi-currency setup is enabled. All of the OFSAA processing engines require exchange rates to be validated through this process to convert results from base currency to a selected reporting currency. If exchange rate validation is not run or required exchange rates are not available, the engines will use default exchange rates = 1.

4.3.9.4   Validating Exchange Rate Relationships

You must run the exchange rate validation process after adding or modifying exchange rate data. Run the process immediately or schedule one or more to be run in the future.

Each exchange rate has one of the following statuses:

Table: Details of exchange rates

Status	Description
Not Yet Validated	The exchange rate has been input or loaded but not yet validated
Valid	The exchange rate has been validated.
Invalid	The exchange rate has violated one or more acceptance rules.

Only exchange rates in **Valid** status are available for processing and they are not subject to future validation unless you edit them. The Rate Validation status is displayed in the **Currency Rates** window of the Rate Management.

4.3.9.4.1 Exchange Rate Validation Criteria

In the rate validation process, all exchange rate relationships in the database are examined for compliance with the following criteria. Error messages and warnings are displayed if one or more criteria are not met. For more information, see the Viewing Log Messages.

1. If a currency is defined as a Child in a fixed exchange relationship then it must not be in any floating (standard) exchange rate relationship at the same time. Consequently, all floating exchange rates to or from the Child currency must be defined through the Parent currency. If this criterion is not met then the following message is displayed: Invalid fixed relationship—Child currency exists in a standard exchange rate within the same time period.

2. A Child currency within a fixed relationship must not be a Child currency in any other fixed relationship during the same time period. If this criterion is not met then the following message is displayed: *Invalid fixed relationship—Child currency already exists in a fixed relationship for the same time period*.

3. A circular relationship must not exist. In other words, a Child currency cannot link back to its Parent in any other fixed-rate relationship within the same time period. If it does, then the following message is displayed: *Invalid fixed relationship creates a circular relationship with other fixed exchange rates*.

4. Regarding new floating (standard) exchange rates, From and To currencies must not exist as Child currencies within any fixed exchange rate relationships. If this criterion is not met then the following message is displayed: *From/To/Both currency(ies) in the new exchange rate already exist in a fixed relationship for the same time period*.

5. If any exchange rate is equal to 0, then a warning message is displayed. Generally speaking, 0 is a valid value. You can use it, for example, to designate an exchange rate with a currency of a country that no longer exists.

If two exchange rate relationships fail to meet these criteria then both of them will be labeled Invalid. (Exception, if one of the relationships is already in **Valid** status, then the other one will be labeled Invalid.) For example, if a currency is defined as a Child in a fixed

rate relationship and is also defined as being in a floating relationship at the same time, then both fixed and floating rates for that currency will be labeled Invalid.

If there are both direct and inverse floating exchange rates defined for any two currencies (in other words, one currency is both a To and a From currency in relation to the other), then both relationships will be marked Valid.

4.3.9.5   Running an Exchange Rate Validation

You can run a validation immediately or schedule one or more for later. The validation status is displayed in the **Currency Rates** window of the Rate Management.

4.3.9.5.1   Running a Validation Immediately

Execute the exchange rate validation using the **Currency Rates Validation** option.

Figure: Currency Rate Validation window

To execute the exchange rate validation, follow these steps:

1. Select a check box on the left-hand side of any row to enable the **Currency Rates Validation** icon.

2. Click **Currency Rates Validation.**

3. To execute exchange rate validation from the Currency Rates window, the following two options are available:

   ▪ Specify Dates: After selecting this option, a **Select Dates** pane is displayed to enter or verify the FROM_DATE and TO_DATE parameters. These dates will be passed to the batch for execution.

   ▪ FROM_DATE: This defaults to the date of last rate validation.

   ▪ TO_DATE: This defaults to the current date.

- ▪ Validate For All Dates: Select this option to validate all the rates irrespective of dates.

> | **NOTE** | This option will replace all of the validated exchange rate history and can be a time-consuming process depending on the amount of history available to be processed. |

You can execute rate validation using a **Simplified Batch** or the **ICC Batch** window. You can also launch it from the Currency Rates UI (Currency Rates Validation tool bar).

To run the validation using the Simplified Batch, follow these steps:

4. Click Common Object Maintenance and select Operations, and select Simplified Batch, and then click Add.

5. From the Task Details block, click Select Task. In the Task Selection window, choose Task Type as Transform Data. Click Search. In the Task Selector window, select the Rate_Validation and click **Ok**.

6. Back in the Simplified Batch Definition window, enter the optional parameters to specify the From and To dates, using the format **YYYYMMDD**, **YYYYMMDD**.

7. From_Date and To_Date must not be the same value. Set From_Date equal to the last rate validation date and To_Date to the current date. This will ensure that the Effective To Date for the prior record is set correctly.

8. Click **Save.**

9. In the **Simplified Batch Summary** page, search for and select your batch, then click **Run**.

10. Click **Yes** to confirm you want to continue, enter a **Date** and click **Ok** to continue.

11. You will receive a message that it has been successfully launched.

12. Click **Ok.** When the batch is complete, optionally navigate to **Operations** and select **View Log** to view the processing log.

13. Any error messages or warnings are displayed in View Log. For more information, see Viewing the Messages.

14. Simplified Batch does not yet provide access to logs for Transform Data tasks.

For more information, see the Oracle Financial Services Analytical Applications Infrastructure User Guide.

To run the validation using the ICC Batch Framework, follow these steps:

1. Navigate to **Operations** and select **Batch Maintenance**, and then click **Add** to create a new batch.

2. Search for the above batch, and select it.

3. In the **Task Details** block (tool-bar), click **Add**. In the **Task Selection** window, choose **Task Type** as **Transform Data**. Click **Search**. In the **Task Selector**, select the **Rate_Validation** task and click **Ok**.

4. Back in the Task definition window, select the **Rule Name** as **Rate_Validation** and enter the optional parameters to specify the From and To dates, using the format **YYYYMMDD,YYYYMMDD**.

5. From_Date and To_Date must not be the same value. Set From_Date equal to the last rate validation date and To_Date to the current date. This will ensure that the Effective To Date for the prior record is set correctly.

6. Click **Save**.

7. Navigate to **Operations** and select **Batch Execution**. Search your batch and select it. Enter **Information Date** and click **Execute Batch**.

8. Click **Ok**. A message is displayed stating Batch triggered successfully, also displaying the Batch Run ID.

9. Click **Ok**.

10. To view rates, query the database table FSI_EXCHNG_RATE_DIRECT_ACCESS after the run is complete.

   ▪ FSI_EXCHNG_RATE_DIRECT_ACCESS: This output table holds the valid currency codes and their exchange rate with respect to the reporting currency for a period of time say **From Date** value to optional **To Date** value. When Exchange Rate Validation runs, if data already exists for the selected date range, the Rate Validation package will overwrite the existing values. If no dates are given, the Rate Validation package truncates this table and re-loads data for the entire historical date range. The following describes the structure of the FSI_EXCHNG_RATE_DIRECT_ACCESS table:

Table: Column details of FSI_EXCHNG_RATE_DIRECT_ACCESS table

Column Name	Nullable	Data Type
FROM_CURRENCY_CD	Not Null	varchar2(15)
TO_CURRENCY_CD	Not Null	varchar2(15)
EFFECTIVE_FROM_DATE	Not Null	Date
EFFECTIVE_TO_DATE	Not Null	Date
EXCHANGE_RATE	Not Null	Number(15,9)
EXCHANGE_RATE_CONVERT_TYPE_CD	Not Null	Number(5)
EXCHANGE_RATE_CONV_FORMULA	Not Null	Number(15)

11. When the batch is complete, navigate to **Operations** and select **View Log** to view the processing log. Any error messages or warnings are displayed in View Log. For more information, see Viewing the Messages.

For more information, see the Oracle Financial Services Analytical Applications Infrastructure User Guide.

4.3.9.5.2 Scheduling One or More Validations

To schedule a future validation, or to schedule validations on a recurring basis, follow these steps:

1. Navigate to **Operations** and select **Batch Scheduler**. The **Batch Scheduler** window appears.

2. In the **Batch Name** pane, select the **Scheduled Batch ID.** An unchecked box means that no validation is scheduled to run.

3. Select New Schedule or Existing Schedule.

   ▪ The Existing Schedule can be selected only if there are existing schedule batches to view.

   ▪ If New Schedule is selected, the **New Schedule** pane appears. Enter the **Scheduled Task Name**.

4. To schedule the validation on a recurring basis, select **Daily, Weekly, Monthly,** or **Adhoc**.

5. In the Schedule Task pane, enter the Start Date and End Date in the Date field.

6. In the Run Time field, enter the time for the next validation to be run.

7. Click **Save** to set the schedule as specified or Cancel to drop your changes.

Any error messages or warnings generated during the validation process are displayed in the View Log. For more information, see Viewing the Messages.

For more information, see the Oracle Financial Services Analytical Applications Infrastructure User Guide.

4.3.9.6   Viewing the Messages

Any error messages or warnings generated during the exchange rate validation process are displayed in the **Log Information** window.

To view the messages, follow these steps:

1. Navigate to Operations and select View Log.

2. Click the **Task ID**. The **Log Information** window will display.

These exception messages can also be seen in the FSI_MESSAGE_LOG table with the help of the batch_id which was used during execution.

5 Holiday Calendar

This chapter discusses the procedure to create a Holiday Calendar and generate a list of the weekend and holiday dates. Individual applications may consume the Holiday Calendar events in different ways. For more information, see the application-specific User Guides and the Cash Flow Engine Reference Guide.

Topics:

- Overview of Holiday Calendars
- Searching for a Holiday Calendar
- Creating a Holiday Calendar
- Executing Holiday Calendar
- Holiday Exceptions

5.1 Overview of Holiday Calendars

A Holiday is a day designated as having special significance for which individuals, a government, or some religious groups have deemed that observance is warranted and thus no business is carried on this day. The Holiday Calendar code can range from 1 to 99999.

The procedure for working with and managing a Holiday Calendar is similar to that of other OFSAA business rules. It includes the following steps:

- Searching for a Holiday Calendar.
- Viewing and Updating a Holiday Calendar.
- Copying a Holiday Calendar.
- Deleting a Holiday Calendar.
- Check Dependencies in the Holiday Calendar definitions.
- Refresh the Holiday Calendar summary page.

5.2 Searching for a Holiday Calendar

Search for a Holiday Calendar to perform any of the following tasks:

- View
- Edit
- Copy
- Delete
- Check Dependencies
- Refresh

Figure: Holiday Calendar Summary Page

Prerequisites

Predefined Holiday Calendar

To search for a new Holiday Calendar rule, follow these steps:

1. Navigate to the Holiday Calendar Summary page. This page holds all Holiday Calendars and related functionality. You can navigate to other pages relating to the Holiday Calendar from this page.

2. Enter the name of the Holiday Calendar and click Search.

   Only Holiday Calendars that match the search criteria are displayed.

NOTE	You can control the number of rows to display on-screen by selecting the **Pagination** icons from the action bar.

5.3   Creating a Holiday Calendar

You create Holiday Calendars to capture holidays for a given date range for any organization. It is possible to create and use multiple Holiday Calendars.

To create a new Holiday Calendar rule, follow these steps:

1. Navigate to the Holiday Calendar summary page.

2. Click Add ✚ . The Holiday Calendar Details page is displayed.

Figure: Holiday Calendar Definition page

3. Enter a code value for the new Holiday Calendar.

4. The code, is a numeric identifier for the Holiday Calendar. The code value must be a number between 1 and 99999. The code value you assign to the new Holiday Calendar must be unique.

5. Enter the name and a brief description for the Holiday Calendar.

6. The name you assign to the Holiday Calendar must be unique. The name can hold a maximum of 30 characters.

7. In the Holiday Properties grid, select not more than two weekend days. Then choose the Holiday Period. The Holiday Period can be defined for a range of up to 40 years less than the current date and 40 years greater than the current date, totally spanning a maximum of 80 years.

8. In the Holiday Details grid, define the Holiday details for any period within the holiday range defined in step 6. Two types of holidays can be defined: Fixed and Moving.

9. A fixed holiday is deemed as a holiday for every year in the holiday period, for that particular day.

Example

25th December – Christmas, is a fixed holiday.

NOTE	To define a fixed holiday, input the holiday date for the first occurrence in the date range. For example, if your Date Range runs from 01-JAN-2000 to 31-DEC-2050, you should input the fixed holiday, Christmas, as 25-DEC-2000. The Holiday Calendar procedure will populate all subsequent 25-DEC entries in the holiday list table (`FSI_HOLIDAY_LIST`). A HOLIDAY_TYPE code = 0 is a Fixed type holiday, code = 1 is a Moving type holiday, and code = 2 is a weekend.
	The Holiday Calendar procedure will also ensure that holiday and weekend entries are not duplicated. For example, if weekends are defined as Saturday/Sunday and Christmas falls on a weekend day, there will be only one entry in the `FSI_HOLIDAY_LIST` table. The `PREVIOUS_WORKINGDAY` and `NEXT_WORKINGDAY` fields designate the valid prior and following working days, respectively. A moving holiday is deemed as a holiday only for that particular date and year, and not for every year in the holiday period. All occurrences of a moving holiday must be input manually.
	For example, 10th April 2020 is a moving holiday for Good Friday.

10. Once the Holiday Calendar definition is saved, its status in the Holiday Calendar Summary page is marked as defined.

11. A Holiday Calendar created can also be deleted. Select one or more check boxes of Holiday Calendar definitions and click **Delete** 🗑 .

5.3.1 Excel Import and Export

Excel Import and Export functionality is used for adding or editing Holiday Calendar definitions.

5.4 Executing Holiday Calendar

Execute a Holiday Calendar definition to generate calendar dates listing the various types of holidays for a given holiday period.

Prerequisites

Predefined Rules

To execute the Holiday Calendar, follow these steps:

1. Navigate to the **Holiday Calendar** summary page.

2. Search for a rule.

3. Select a Holiday Calendar and Click the **Generate Calendar Dates** icon to execute the selected Holiday Calendar. Holiday list for holiday ID #1 generated successfully message appears (where #1 is the Holiday Calendar code). The holiday list can be confirmed by querying the FSI_HOLIDAY_LIST table.

4. The status of a Holiday Calendar where holiday dates have been generated displays as Processed in the status column in the summary page.

   In case you do not want to Generate Calendar dates immediately, you can select that particular Holiday Calendar anytime later from the summary page with its status defined, and then click the **Generate Calendar Dates** icon to execute the selected Holiday Calendar.

   The generated holiday list is no longer valid if

   a. There is a change in the definition of the Holiday Calendar.

   b. There is any update or modification to the Holiday Exceptions defined for that holiday calendar.

In such a case, you will get a message "*This Holiday Calendar has been modified, Please generate the holiday list again*" and the Holiday Calendar state will be changed to Defined until the holiday list is regenerated with the new definition.

5.5   Holiday Exceptions

You can specify exceptions to holidays. As a prerequisite, a Holiday Calendar should have been properly defined and the status of the Holiday Calendar on the summary page should be Processed. Generating the holiday list will populate the holidays (weekends, fixed, and moving) along with the working days. Then the **Show Exceptions** button is enabled on the detail page. Any changes in the holiday definition will disable the **Show Exceptions** button. The user must generate the holiday list again to define or view the exceptions.

1. Click Show Exceptions in the Holiday Exceptions pane. The Holiday Exceptions window opens.

2. The search block in the Exceptions page has the following fields:

   ▪ From and To - Denotes the range of years which is a subset out of the holiday list generated, for which exceptions are required to be defined.

   ▪ Fixed Holidays – You can filter the list of holidays by the type of Fixed Holidays.

   ▪ Moving Holidays – You can filter the list of holidays by the type of Moving Holidays.

   ▪ Holiday Date – For a particular known holiday date, exceptions can be defined.

   ▪ All Exceptions - This check box when selected lists all the exceptions, if already defined, for the holidays within the From, To Date range.

3. The search result gives the list of all holidays based on the selection of the above search criteria fields.

4. In the Holiday Exceptions pane, there are two types of exceptions that can be defined: Not a holiday and Shift to.

5. Any holiday can be marked as not a holiday, in which case that day is removed from the Holiday List. If you select Not a Holiday from the Exception Type drop-down, then the Shift to date field is disabled.

6. Spring earlier considered as a holiday in the Holiday Calendar can be marked as Not a Holiday in the Holiday Exceptions window. You can write your comments or remarks in the Notes next to the Exception Type drop-down list.

7. Any holiday can be shifted to another day, in which case the earlier declared holiday is removed from the Holiday List, while the shifted today is included as a holiday.

6   Application Preferences

This chapter discusses the procedure to define and maintain the CFE Application Preference settings.

Application Preferences allow Administrators and End Users to establish default values, manage other core application parameters that affect the way business rules are created and the way Cash Flow Processes are run.

To update the Cash Flow Engine Application Preferences, follow these steps:

1.   Navigate to the Cash Flow Application Preferences page.

2.   Input values for all the Cash Flow Engine Application Preference items as described in Table

If you are the application administrator, define default values for the **All User** group by making the appropriate selection from the **Show Preference For**, drop list at the top of the page. Pay particular attention to the **Is Editable** status and determine which items require administrative control and which items non-administrative users can set for themselves.

The following table describes each of the Cash Flow Engine Preference items

Form fields to define the Application Preference settings for CFE application

Term	Description
Show Preferences For	• Administrator: If you have Administrator privileges, you can define preferences for the **All User** group and their individual account, which may be the same or different from the **All User** settings. The Administrator can also designate the **All Use**r preferences as Editable or Non-editable on a row by row basis. If the individual preference is selected as **is Editable**, then End Users can update or override the Administrator's default value for their own individual account. If the **is Editable** box is deselected, then End Users cannot change the default for their individual account. • End-User: If you do not have administrator privileges, then certain preference items are pre-set by the administrator, and you may not be allowed to change the value. All Application Preference settings are displayed, regardless of the access privilege.
Active for Master Maintenance	If you have more than one application available on their LHS menu, then you must designate Application Preferences from one of the applications as **Active for Master Maintenance**. Certain preferences such as the default folder and read/write access setting are referenced by items within Master Maintenance based on this selection.
As of Date	All processes reference this date at runtime to determine the data to include in the process. The As-of-Date value you set in Application Preferences applies to interactive job execution (that is, when you choose to execute a rule directly from a Summary window). For batch processing, the As-of-Date is derived from the Information Date.
Show Execution Parameters	If this option is selected, a pop-up window appears whenever you execute a process interactively from a Summary window. Within this pop-up window, you may confirm or modify your run execution parameters (As-of-Date and Legal Entity).
Runtime Parameters	Displays the Runtime parameter details.
Legal Entity	Similar to As-of-Date, all processes reference Legal Entity at run time to determine the data to include in the process. The value of the Legal Entity you set in Application Preferences applies to interactive job execution (that is, when you choose to execute a process directly from a Summary window) and batch processing. **NOTE**: Legal Entity is designed to support implementations that require multi-entity or multi-tenant functionality. For details, see Appendix: Multi-Entity. If your implementation does not require this functionality,

Term	Description
	you may utilize the Default Legal Entity in all your processes. Default implies -1 code. The default value for the Legal Entity dimension column in the instrument table is -1
Disable Legal Entity	If the **Disable Legal Entity** check box in the application preferences screen is checked, then Legal Entity is no longer a run-time parameter. On disabling Legal Entity, the user should edit the already defined Variable Allocation rules and modify the value of Legal Entity dimension in all applicable tabs (Source, Driver, and Outputs) in the allocation specification screen. This is an optional parameter.
Folder Name	This parameter allows you to define the default folder selection. The folder selection for all rule types is defaulted to this selection within the summary page search window and when creating a new rule. This selection acts as the starting value for convenience only and users can change to any other available value at their discretion.
Access Type	This parameter allows you to set the default access type. Selections include Read / Write and Read Only. This selection acts as the starting value for convenience only and users can change at their discretion.
Initial Currency Selection (**Business Rule Currency**)	This parameter allows you to select the starting currency to be displayed within all business rules. This selection is made for convenience and can be changed within all business rules at the users' discretion.
Product Dimension	Oracle CFE requires users to declare one of the "Product Type" dimensions as the CFE Product dimension. The model is seeded with the possible selections as follows: • Product • Common COA • GL Account Users must always select 'Product' in CFE preferences. Common COA and GL Account are not used by CFE but by other EPM applications. It is suggested that Admin may select 'Product' and make this field non-editable so that individual users cannot modify it.
Default Product Hierarchy	The list of values for Default Product Hierarchy is based on the Default Product Dimension selection. The hierarchy selected here is a default hierarchy selection in all business rules that support node-level assumptions. This selection acts as the starting value for convenience only and users can change at their discretion within each business rule.

Term	Description
Hierarchy Members Navigation Size	This parameter allows you to specify the maximum number of members that a parent node within a Hierarchy or Assumption Browser can show at a given time. When you expand a branch in a Hierarchy or Assumption Browser and the number of members in that branch exceeds the specified Navigation Size, it provides "More" and "Previous" options to enable you to navigate through the member list. Recommended values for Navigation Size are 50 to 100. Higher value settings could impact screen refresh performance. The UI allows you to enter a value up to 10000.

3. Select **Apply** to confirm the changes.

4. Select the **Reset** to default option if you would like to clear all previously applied inputs and return to the original default state.

7   Global Preferences

Clicking Global Preferences invokes the Global Preferences screen. Global Preferences items are used to configure your user interface. Here, you set your default application language and date format, and your desired Pagination Records. Pagination Records determine how many rows are displayed on summary screens. If you select Pagination Records to be 25 records, then any screen displaying results in a tabular format displays a maximum of 25 records. To see the next set of 25 records, you can use the Next VCR button.

Global Preferences			?
⌄Display			
Show Preferences for	CFEUSER ⌄		
⌄Display			
Property Name	**Property Value**		**Is Editable**
Default Application Language	US-English ⌄		☑
Date Format	MM/dd/yyyy ⌄		☑
Pagination Records	5		☑
⌄Ledger			
Property Name	**Property Value**		
Functional Currency	US Dollar		
Signage	Natural Signage		
	Apply Cancel Reset to Default		

Functional Currency and Signage are installation-time parameters that may not be reset in Global Preferences. Cash Flow Engine does not use these two parameters.

Functional Currency is **the currency of the primary economic environment in which an entity conducts its business**. For details on signage, see the Oracle Financial Services Analytical Applications Profitability Management User Guide.

Normally, you can set preferences for yourself, but if you are logged in as an Administrator, you can set Global Preferences for All Users. When setting preferences for All Users, you can restrict the non-Administrators to change a Global Preference item by deselecting the **Is Editable** check box. If a preference item is defined as **not editable**, a user who is not an Administrator inherits the value of the preference item that his Administrator has set for him and he does not have the permission to change it for himself.

8   Common Rule Management Tasks

The rule management tasks that are common to business rules in this and other OFSAA applications are as follows.

This section focuses on the rule management tasks that are common across all rules in this application.

The procedures for carrying out these tasks are the same for each rule type, except for rule-specific steps explicitly stated in the rule-specific documentation.

> **NOTE**   You can perform these tasks from the Summary page for the rule type with which you are working. Depending on the rule type, some tasks might not be available.

Topics

- Rule Summary Page
- Searching for Rules
- Creating Rules
- Viewing and Editing Rules
- Copying Rules
- Deleting Rules
- Dependency Checking

8.1   Rule Summary Page

The Rule summary page is the gateway to all rules and related functionality of the application. From there, you can navigate to other related pages. On the header of the Rule summary page, you can perform simple queries on Folder, Rule Name, and in many cases, the dimension upon which the rule is based.

For example, the following table shows the Rule Summary page components of the Payment Pattern Rule.

Table   List of key terms used in Common Rule Summary page

Name	Description
Folder	Filter the rules under the folder. The default value must be set in Application Preferences.
(Rule) Name	You can specify all or part of a rule name. For example, if you want to see only those Rules which start with 'A' – Enter A in the text field.

Name	Description
Dimension	The default value must be set in Application Preferences.
Search	Initiates rule search based on specified criteria.
Reset	Restores default search criteria.
Add	Initiates the Data or Ledger Loader rule creation process
(Rule) Name	Hover over this to show the rule description and in some cases also displays the unique system ID number.
Created By	Shows who created the Rule version.
Creation Date	Shows when the Rule was created.
Last Modified By	Shows who last modified the rule.
Last Modified Date	Shows when the rule was last modified.
View	Opens the selected rule in read-only mode.
Edit	Opens the selected rule in edit mode.
Delete	Deletes the selected Rule.
Copy	Initiates the process for copying rules.
Run	Initiates the process for running Rules.
Pagination Options	Indicates the number of rows to display per page in the summary table. The default value must be set in Global Preferences.

8.2   Searching for Rules

Search for a business rule to perform any of the following tasks:

- **Update, Copy, Delete,** or **Run** existing rules.
- Define methodologies for products or define other processing assumptions.

To search for a rule, follow these steps:

1. Navigate to the **Rule Summary** page for the appropriate rule type.

2. Select the folder from the **Rule Summary** page in which the rule is stored.

3. (Optional) Enter the name of the rule.

4. Click the **Search** button.
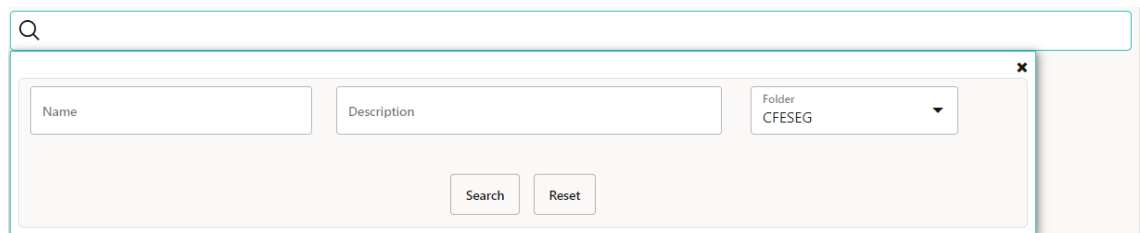
Only rules that match the search criteria are displayed.

To search for a rule in Cash Flow Process, Cash Flow, and Forecast Rate windows, follow these steps:

1. Navigate to the **Rule Summary** page for the appropriate rule type.

2. Click in the Search area $\mathcal{Q}$.

3. Enter Rule name, description, or select folder, and then click Search.

4. When you click Search, depending upon the search criteria, this filters, and displays the relevant search combination parameters under the Rule Summary as a list.

8.3   Creating Rules

You create a rule to specify the way you want a particular task or business process to be carried out by the application. Creating a rule is a process in which you specify the properties for the rule itself.

To create a new rule, follow these steps:

1. Navigate to the **Rule Summary** page of the Rule you want to create. Every rule has a separate Summary page.

2. Click **Add** ✚ to display the **Rule Definition** page.

3. Enter a name for the rule. The name of a rule must be unique within the selected folder for each rule type.

4. Select the folder in which you want to store the rule.

5. (Optional) Enter a description for the rule.

6. Select the required access for other users.

7. Click **Apply** or **Save**, depending on the rule type.

8. Specify any other properties or options that may apply to the rule that you are creating.

To create a new rule/process in Cash Flow Process, Cash Flow, and Forecast Rate windows, follow these steps:

1. Navigate to the **Rule Summary** page of the Rule you want to create. Every rule has a separate Summary page.

2. Click **Add** to display the Rule Definition page.

3. Enter a name for the rule.

The name of a rule must be unique within the selected folder for each rule type.

4. Select the folder in which you want to store the rule.

5. (Optional) Enter a description for the rule.

6. Select the required access for other users.

7. Click **Apply** or **Save**, depending on the rule type.

8. Specify any other properties or options that may apply to the rule that you are creating.

8.4 Viewing and Editing Rules

You can view existing rules, and you can edit existing rules, provided you have read/write privileges.

To view and edit a rule, follow these steps:

1. Navigate to the **Rule Summary** page of the rule you want to update.

2. Search for a Rule. For further information, see the <u>Searching for Rules</u> section.

3. Select the appropriate rule and click **Edit** to open the rule you want to update.

4. Update the Name or Description.

5. Click **Apply** or **Save**, depending on the rule type.

To view and edit a rule in Cash Flow Process, Cash Flow, and Forecast Rate windows, follow these steps:

1. Navigate to the **Rule Summary** page of the rule you want to update.

2. Search for a Rule. For further information, see the <u>Searching for Rules</u> section.

3. Click ⋯ in the **Action** column and select **View/Edit** to open the rule you want to update.

4. Update the rule details.

5. Click **Apply** or **Save**, depending on the rule type.

8.5   Copying Rules

You can copy rules to avoid having to enter data multiple times. This saves time and effort and also reduces mistakes.

To copy a rule, follow these steps:

1. Navigate to the **Rule Summary** page of the rule you want to copy.

2. Search for a Rule.
   For more information, see the <u>Searching for Rules</u> section.

3. Select the appropriate rule and click **Copy** to duplicate the rule.

4. Select a folder where you want to save the rule copy.

5. Enter a unique name for the new rule.

   (Optional) Enter a brief description of the rule.

6. Select the access type.

7. Click the **Save** button.

To copy a rule in Cash Flow Process, Cash Flow, and Forecast Rate windows, follow these steps:

1. Navigate to the **Rule Summary** page of the rule you want to copy.

2. Search for a Rule.
   For more information, see the <u>Searching for Rules</u> section.

3. Click ⋯ in the **Action** column and select **Save As** to duplicate the rule.

4. Select a folder where you want to save the rule copy.

5. Enter a unique name for the new rule.

   Optional) Enter a brief description of the rule.

6. Select the access type.

7. Click the **Save** button.

8.6   Deleting Rules

You can delete rules that are no longer required.

> **NOTE** A rule cannot be retrieved after deletion.

Restrictions on deleting rules are:

- You cannot delete rules if you have only Read privileges. Only users with read/write privileges and rule owners can delete rules.

- You cannot delete a rule that has a dependency.

To delete a rule, follow these steps:

1. Navigate to the **Rule Summary** page of the Rule you want to delete.

2. Search for a Rule.
    For more information, see the Searching for Rules section.

3. Select the appropriate Rule and click **Delete** 🗑 .

For more information, see the Overview of Common Rule Management Tasks section.

To delete a rule in Cash Flow Process, Cash Flow, and Forecast Rate windows, follow these steps:

1. Navigate to the **Rule Summary** page of the Rule you want to delete.

2. Search for a Rule.
    For more information, see the Searching for Rules section.

3. Click ••• in the **Action** column and select **Delete**.

8.7   Dependency Checking

You can check dependencies for rules to know where a particular rule, dimension, member, attribute, IRC has been used. This also prevents accidental deletion of rules having dependencies.

To check the dependency of a rule, follow these steps:

1. Navigate to the **Rule Summar**y page of the Rule you want to check dependencies.

2. Search for a rule. For further information, see the Searching for Rules section.

3. Select the appropriate rule or rules and click **Check Dependencies** 🖳🖳 corresponding to the rule that you want to check for.

> **NOTE**   You can select more than one rule at a time to check dependencies.

The Dependency Information window opens containing the following information: Child Object Name, Child Object Type, Folder, Parent Object Name, Parent Object Type, and Folder.

For example, if a Product Characteristics rule 'A' which has been used in a static deterministic process 'P' is checked for dependencies, then the following information is displayed in the Dependency Information window.

Child object Name –A

Child Object Type – Product Characteristics

Folder – The folder name in which A resides

Parent Object Name - P

Parent Object Type – Static Deterministic Process

Folder - The folder name in which P resides

> **NOTE**   You cannot delete a child object which has dependencies. A message is displayed: *Dependencies found. Cannot delete*.
>
> To delete the child, you must first delete the outermost parent object which uses the child.

To check the dependency of a rule in Cash Flow Process, Cash Flow, and Forecast Rate windows, follow these steps:

1. Navigate to the **Rule Summar**y page of the Rule you want to check dependencies.

2. Search for a rule. For further information, see the Searching for Rules section.

3. Click ⋯ in the **Action** column and select **Dependency Check** to the rule that you want to check for.

9 User Defined Payment Patterns

User defined payment patterns allow you to define custom repayment patterns for products in your portfolio. You can include a payment pattern while generating cash flows by entering the payment pattern code as the amortization type code for the instrument. The Payment Pattern code can range from 1000 to 69999.

This chapter describes the procedure for capturing instrument payment patterns that are too complex to be accommodated in the standard fields of Instrument tables.

The procedure for working with and managing Payment Patterns is, similar to that of other Oracle assumption rules.

Topics

- Searching for Payment Patterns
- Creating Payment Patterns
- Viewing and Editing Payment Patterns
- Copying Payment Patterns
- Deleting Payment Patterns

9.1 Search for Payment Patterns

Search for a payment pattern to perform any of the following tasks:

- View
- Edit
- Copy
- Delete
- Check Dependencies

To search for payment patterns, do the following:

1. Navigate to the Payment Pattern summary page. This page is the gateway to all payment patterns and related functionality. You can navigate to other pages relating to payment patterns from this page.

2. Enter the search criteria. Code or description of the Pattern

3. Click the **Search** icon.

Only patterns that match the search criteria are displayed.

You can control the number of rows to display on-screen by selecting the "Pagination Options" icon from the action bar.

9.2   Create Payment Patterns

You create payment patterns to capture the repayment behavior of instruments that are too complex to be accommodated through the use of the standard instrument table fields.

To create the payment pattern, do the following:

1. Navigate to the Payment Pattern summary page.

2. Click **Add** ✚ . The Add Payment Pattern page is displayed.

3. Enter a code value for the new payment pattern.

> | **NOTE** | The code, also known as an amortization type code, is a numeric internal identifier for the payment pattern. The code value must be a number between 1000 and 69999. The code value you assign to the new pattern must be unique. Also, the code must be mapped to the appropriate instrument records (AMRT_TYPE_CD and PMT_PATTERN_CD (applicable to CFE only) field) to connect the instrument to the appropriate pattern. |
> | --- | --- |

4. Enter a brief description for the pattern.

5. Select the Payment Pattern Type: Absolute, Relative, or Split.

6. Define the Payment Pattern Term Specifications for payment phases.

    The selection of the payment pattern type made in the previous step determines the information you must provide to successfully define that pattern type. See:

    ▪   Defining Absolute Payment Patterns

    ▪   Defining Relative Payment Patterns

    ▪   Defining Split Payment Patterns

> | **NOTE** | The Payment Pattern Details page displays the specifications associated with the Absolute Payment Pattern Type, which is the default Payment Pattern Type value. Should you decide to change this value for any of the other two alternatives, Relative or Split, the system will refresh the payment specifications corresponding to the new Pattern Type. Although you can change your selection of the Pattern Type at any point in this procedure, sometimes this might cause loss of data related to any prior selection. |
> | --- | --- |

9.2.1   Define Absolute Payment Patterns

Absolute payment patterns are commonly used for instruments that are on a seasonal schedule, such as agricultural or construction loans that require special payment handling based on months or seasons.

When working with absolute payment patterns, it is sufficient to define payments for one calendar year. Once the term exceeds a year, the payment schedule will loop until the instrument matures.

To define absolute payment pattern, do the following:

1. Select the Payment Type from the drop-down list: Conventional, Level Principal, or Non-Amortizing. The Payment Type determines the type of information required to successfully define the Payment Phase.

2. Define the Payment Phases. A Payment Phase is a set of payment characteristics that defines the timeline of the instrument's amortization.

3. Define the following parameters:

   ▪ **Month**: This drop-down list allows you to select the month of the payment phase being defined.

   ▪ **Day**: Used to specify the day of the month the payment is due.

4. Select the **Payment Method**. The available Payment Methods depend on the Payment Type. For more information, see: Relation between Payment Method and Payment Types. Payment Methods do not apply to the Non-Amortizing Payment Type.

   ▪ Enter the Value for the Payment Method you selected in the previous step for applicable Payment Types.

   If you selected the Interest Only Payment Method in the previous step, the Value field does not apply.

5. Click **Add Another Row** to add additional Payment Phases to the Pattern and click **Delete** corresponding to the rows you want to delete.

NOTE	A Payment Pattern must have at least one valid Payment Phase to be successfully defined. The system raises a warning if you try to save a Payment Pattern with an incomplete Payment Phase. You can define up to 365 Payment Phases for each Payment Pattern.

6. Click **Save**.

The Payment Pattern is saved and the Payment Pattern summary page is displayed.

NOTE	When a detail instrument using an Absolute Payment Pattern is processed for Remaining Term cash flow processing, the Next Payment Date is internally calculated to determine which Payment Phase should be used. The calculated Next Payment Date is only used for this purpose. The Next Payment Date stored on the Instrument record in the

> Instrument table is always the date used for processing the initial payment.

The following table describes the relationship between Payment Phase properties and Payment Types.

Table: Relationship between Payment Phase Properties and Payment Types

	Level Principal	Non-Amortizing	Conventional
Month	Yes	Yes	Yes
Day	Yes	Yes	Yes
Payment Method	Yes		Yes
Value	Yes		Yes

The following table describes the relationship between Payment Method and Payment Types.

Table: Relationship between Payment Methods and Payment Types

Payment Method	Level Principal	Non-Amortizing	Conventional
Percentage of Original Balance	Yes		
Percentage of Current Balance	Yes		
Percentage of Original Payment	Yes		Yes
Percentage of Current Payment	Yes		Yes
Absolute Payment	Yes		Yes

Payment Method	Level Principal	Non-Amortizing	Conventional
Interest Only	Yes		Yes

9.2.1.1   Define Relative Payment Patterns

You create Relative Payment patterns for instruments that have irregular scheduled payments.

To define a relative payment pattern, follow these steps:

1. In the **Payment Patterns** page, select **Relative** as the Pattern Type.

2. Select a relevant **Payment Type** from the following options:

   ▪ Conventional

   ▪ Level Principal

   ▪ Non-Amortizing

   The payment type determines the available characteristics for defining the payment amount.

3. Define the Payment Phase.

   The payment type determines the type of information required to successfully define the payment phase. For more details, see: Relation between Payment Phase Attributes and Payment Types.

4. Enter the **Frequency** for each payment phase.

5. Select the appropriate **Multiplier** for each payment phase from the following options:

   ▪ Days

   ▪ Months

   ▪ Years

6. Enter the number of times each Payment Phase should be repeated in the **Repeat** column.

7. Select the Payment Method.

   The available payment methods depend on the payment type. For more details, see Relation between Payment Method and Payment Types. Payment Methods do not apply to the Non-Amortizing Payment Type.

8. Type the **Value** for the Payment Method you selected in the previous step for applicable Payment Types.

9. Click **Add Another Row** to add additional Payment Phases to the Pattern and click Delete corresponding to the rows you want to delete.

| TIP | A Payment Pattern must have at least one valid Payment Phase to be successfully defined. The system raises a warning if you try to save a Payment Pattern with an incomplete Payment Phase. You can define up to 365 Payment Phases for each Payment Pattern. |

10. Click **Apply**.

   The payment pattern is saved and the Payment Pattern home page is displayed.

11. You can use the **Move Up** and **Move Down** icons to move the Payment Phases up or down. Also, you can click the **Delete** icon to delete a row.

   Any empty rows are ignored and not saved with the payment pattern.

| NOTE | It is not necessary to set up relative payment patterns for the complete term of an instrument. The payment pattern automatically repeats until the maturity date. Suppose a payment pattern is created to make monthly payments for the first year and quarterly payments for the next three years. If you apply this pattern to an instrument record with an original term of five years, the payment pattern wraps around and the fifth year is scheduled for monthly payments. |
| | An easy way to set up payment patterns for instruments with varying original terms is to use the repeat value of 999 in the last row of the payment pattern. For example, a payment pattern that pays monthly for the first year and quarterly thereafter, can be set up with two rows. The first row shows 12 payments in one month. The second row shows 999 payments in three months. When this payment pattern is processed it repeats the three-month payment frequency until the maturity date is reached. |

The following table describes the relationship between payment phase attributes and payment types.

Table: Relationship between Payment Phases and Payment Types

Payment Phase Attributes	Payment Types: Level Principal	Payment Types: Non-Amortizing	Payment Types: Conventional
Frequency	Yes	Yes	Yes

Payment Phase Attributes	Payment Types: Level Principal	Payment Types: Non-Amortizing	Payment Types: Conventional
Multiplier	Yes	Yes	Yes
Repeat	Yes	Yes	Yes
Payment Method	Yes		Yes
Value	Yes		Yes

9.2.2   Defining Split Payment Patterns

You use a Split payment pattern for financial instruments that make principal payments along with two concurrent amortization schedules. Split patterns may be a combination of Absolute and Relative Payment Patterns for example, and contain multiple sets of payment phases under a single amortization code. These patterns could further use a combination of Conventional, Level Principal, and Non-Amortizing Payment Types.

To define a split payment pattern, follow these steps:

1. In the Payment Pattern details page, select **Split** as the Payment Pattern Type. The Create Term Specifications page is displayed.

2. Select the required Pattern Type for each leg.

    ▪ Absolute

    ▪ Relative

3. Enter the Percent value to indicate the percentage weight of the timeline being defined for the individual payment phases (each row). The sum of the percentage weights must total 100%.

4. Select the Payment Type for each Payment Phase or Split.

TIP	The payment pattern term specifications for different payment phases or splits vary depending on whether you select the Absolute or Relative Pattern Type. You can define the term specifications for the splits following the steps described previously for defining payment phases for these patterns. See:
	• Define Absolute Payment Patterns
	• Define Relative Payment Patterns

5. Select one of the legs and then select **Apply** to define pattern details for the leg.

6. Click **Save**.

The Split payment pattern is saved and the Payment Pattern summary page is displayed.

9.2.3 Excel Import/Export

Excel import/export functionality is used for adding/editing split payment pattern information. For more details, refer Excel Import/Export.

9.3 Viewing and Editing Payment Pattern

You can view existing Payment patterns, and you can edit existing rules, provided you have read/write privileges.

To view and edit a Payment pattern, follow these steps:

1. Navigate to the **Payment Pattern Rule Summary** page of the pattern you want to update.

2. Search for a pattern. For further information, see the <u>Searching for Rules</u> section.

3. Select the appropriate rule and click **Edit** 📝 to open the pattern you want to update.

4. Update the Name or Description.

5. Click **Apply** or **Save**, depending on the pattern type.

9.4 Copying Payment Pattern

You can copy patterns to avoid having to enter data multiple times. This saves time and effort and also reduces mistakes.

To copy a Payment pattern, follow these steps:

1. Navigate to the **Payment Pattern Rule Summary** page of the pattern you want to copy.

2. Search for a pattern.
   For more information, see the <u>Searching for Rules</u> section.

3. Select the appropriate rule and click **Copy** 🗗 to duplicate the pattern.

4. Select a folder where you want to save the rule copy.

5. Enter a unique name for the new pattern.

   (Optional) Enter a brief description of the rule.

6. Select the access type.

7. Click the **Save** button.

9.5 Deleting Payment Pattern

You can delete patterns that are no longer required.

> **NOTE**   A pattern cannot be retrieved after deletion.

Restrictions on deleting patterns are:

- You cannot delete patterns if you have only Read privileges. Only users with read/write privileges and pattern owners can delete patterns.

- You cannot delete a pattern that has a dependency.

To delete a Payment Pattern, follow these steps:

1. Navigate to the **Payment Pattern Rule Summary** page of the pattern you want to delete.

2. Search for a pattern.
   For more information, see the Searching for Rules section.

3. Select the appropriate pattern and click **Delete** 🗑 .

9.6 Payment Pattern Data Loader

The Payment Pattern Loader provides the ability to load bulk payment pattern definitions through a back end procedure. This Loader reads the stage table data, does data quality checks on the same, and load them into FSI_PAYMENT_PATTERN and FSI_PAYMENT_PATTERN_EVENT tables, if the stage table data is valid. For more information on setting up the automated process, see Oracle Financial Services Analytical Applications Data Model Utilities User Guide.

1. To execute the Data loader process, click the Data Loader icon on the Payment Pattern Summary window.

2. A warning message will appear: "Upload all available Payment Pattern?" Click "Yes". A confirmation message will display.

   The process will load all of the data included in the staging tables as defined in the Data Model Utilities User Guide.

   Note:

   The sum of the percent values of all splits must add up to 100.

10   User Defined Behavior Patterns

User defined behavior patterns allow you to define principal amortization schedules and replicating portfolio characteristics for non-maturity products in your portfolio. You can utilize a behavior pattern while generating cash flows (for use in CFE, FTP, BSP, and ALM) by entering the behavior pattern code as the amortization type code (AMRT_TYPE_CD) for the relevant instrument records.

In many cases, particularly for CFE processing, the "non-maturity" instruments will be aggregated or summarized balances.

The Behavior Pattern codes can range from 70000 to 99999.

Topics:

- Searching for Behavior Pattern
- Creating Behavior Pattern
- Viewing and Editing Behavior Patterns
- Copying Behavior Patterns
- Deleting Behavior Patterns

10.1   Searching for Behavior Patterns

Search for a behavior pattern to perform any of the following tasks:

- View
- Edit
- Copy
- Delete
- Check Dependencies

To search the behavior pattern, follow these steps:

1. Navigate to the **Behavior Pattern Summary** page. This page is the gateway to all behavior patterns and related functionality. You can navigate to other pages relating to behavior patterns from this page.

2. Enter the search criteria.

3. Enter the code or name of the Pattern.

4. Click the **Search** 🔍 icon.

5. The search results are displayed in a table containing all of the behavior patterns that meet the search criteria. The **Behavior Pattern Summary** page offers several

icons that allow you to perform different functions when a behavior pattern is selected.

6. To select a behavior pattern, select a check box in the first column of the table. More than one behavior pattern can be selected at a time, but this disables some of the icons.

   You can select or deselect all the behavior patterns in the Summary page by selecting the check box in the upper left-hand corner of the Summary table directly to the left of the Code column header.

10.2   Creating Behavior Patterns

User defined behavior patterns allow you to define principal amortization patterns for non-maturity products in your portfolio. You can include a behavior pattern while generating cash flows by entering the behavior pattern code as the amortization type code for the instrument(s). In many cases, particularly for CFE processing, the " non-maturity" instruments will be aggregated or summarized balances. The Behavior Pattern code can range from 70000 to 99999.

Note: In case of FTP, depending on the Transfer Pricing method, the Behavior Pattern mapped to the individual instrument records (amrt_type_cd), may or may not be used. For cash flow TP methods, the engine will read the Behavior Pattern from the instrument record. For Tractor, Caterpillar, and Weighted Average Perpetual methods, the Behavior Pattern is assigned directly within the TP Rule at a Product / Currency level and hence, the TP engine will not refer to the Behavior Pattern assigned to the individual instrument records for these methods.

The procedure for working with and managing Behavior Patterns is similar to that of other Oracle Cash Flow Engine assumption rules.

You create behavior patterns to capture the principal run-off behavior of product types that do not have contractual maturities.

To create a behavior pattern, perform the following:

1. Navigate to the Behavior Pattern summary page.

2. Click **Add** ✚ to display the Behavior Pattern details page.

3. Enter a **Code** for the new behavior pattern.

NOTE	The code, also known as an amortization type code, is a numeric identifier for the behavior pattern. The code value must be a number between 70000 and 99999. The code value you assign to the new pattern must be unique. Also, the code must be mapped to the appropriate instrument records, (AMRT_TYPE_CD and BEHAVIOUR_PATTERN_CD (applicable to CFE only) field) to connect the instrument to the appropriate pattern.

4. Enter the **Name** and a **Description** for the pattern.

5. Select the Behavior Pattern Type from the following options:

   ▪ Non Maturity

   ▪ Non Performing

   ▪ Devolvement and Recovery.

NOTE	The Replicating Portfolio option is enabled only for the Non-Maturity Behavior Pattern. This option should be selected only when defining a Behavior Pattern for use in Funds Transfer Pricing – Tractor TP Method. Replicating Portfolio Behavior Pattern codes should not be mapped to instrument records (amrt_type_cd) and will not be available for selection in any UI other than Tractor TP Method.

6. Define the Behavior Pattern Term Specifications for maturity branches.

7. The selection of the Behavior Pattern type made in the previous step determines the information you must provide to successfully define that pattern type. See:

   ▪ Defining Non-Maturity Behavior Patterns

   ▪ Defining Non-Maturity Behavior Patterns (for Tractor TP Method use)

   ▪ Defining Non-Performing Behavior Patterns

   ▪ Defining Devolvement and Recovery Behavior Patterns

NOTE	The Behavior Pattern details page above, displays the specifications associated with the Non-Maturity Pattern Type. Should you change this value for one of the other two alternatives, Non Performing or Devolvement and Recovery, the system will refresh the payment specifications section corresponding to the new Pattern Type. Although you can change your selection of the Pattern Type at any point in this procedure, sometimes this might result in loss of data related to any prior selection.

10.2.1 Defining Non-Maturity Behavior Patterns

Non Maturity behavior patterns are commonly used for deposit products like checking, savings, and money market accounts as well as for credit card accounts. These account types are similar in that they do not have contractual cash flows because customers have the option to deposit or withdraw any amount at any time (up to any established limits).

When working with non-maturity behavior patterns, your percentage weights, assigned to maturity terms must add up to 100%.

To define a non-maturity behavior pattern, follow these steps:

1. In the Behavior Pattern details page, select Non Maturity as the Behavior Pattern Type.

2. Enter or select the following details:

   ▪ **Tenor**: Used to specify the maturity term for the particular row. That is, if "1 Day" is defined, then the applicable percentage of the balance will runoff (mature) on the As of Date + 1 Day.

   ▪ **Multiplier**: The unit of time applied to the Tenor. The choices are:

      — Days

      — Months

      — Years

   ▪ **Percentage:** The relative amount of the principal balance that will mature on the date specified by the Tenor + Multiplier. The percentage amounts must add to 100%.

   ▪ **Allocation Input Type**: This field allows you to select the Amount or Percentage when defining the volume for each maturity tier.

   ▪ **Type**: This allows you to classify the runoff based on the appropriate type. If you select Percentage under 'Allocation Input Type', this allows you to select Core or Volatile. When Amount 'Allocation Input Type' is selected, only Core amounts are allowed to be entered. The TP engine calculates the Volatile amount internally based on the sum of the portfolio balance less the sum of the core amounts. i.e. 100% of the portfolio balance is accounted for as either core or volatile.

   > **NOTE** There is no difference in behavior from a cash flow perspective, but the runoff amount will be written to a principal runoff financial element corresponding to the selected Runoff Type.

3. Click **Add** ✛ to add additional payment strips to the Pattern. After defining the initial strip as **Volatile**, subsequent strips are typically classified as Core with varying maturity terms assigned.

4. You can also use the Excel import/export feature to add the behavior pattern information. For more information, see Excel import/export feature.

5. You may want to utilize the Data Input Helper to copy from a row where you have already defined the Pattern definition or apply a fixed value down the page. For more information, see Data Input Helper feature.

6. To delete a row, select the check box corresponding to the row you want to remove and click the **Delete** icon.

7. Click **Save**.

The Behavior Pattern is saved and the Behavior Pattern summary page is displayed.

10.2.2 Defining Non-Maturity Behavior Patterns (for Tractor TP Method use)

Note: This section is applicable only for FTP application.

The Tractor Transfer Pricing Method utilizes a replicating portfolio concept. Replicating Portfolio's are a special type of Non-Maturity Behavior Pattern and are created and managed through the Non-Maturity Behavior Pattern UI.

Through the replicating portfolio UI, users can define one or more core balance amounts. Users assign a term to each core and generate balance strips at any granularity (e.g. typically daily or monthly, depending on the frequency of the transfer pricing process). To maintain the portfolio over time, users must roll and re-balance the portfolio to update the volatile plug amount and if needed re-balance the core amount.

To define a non-maturity behavior pattern for Tractor TP method use, follow these steps:

1. In the Behavior Pattern details page, select Non Maturity as the Behavior Pattern Type.

2. Enter the following details:

Table: Key Terms used in the Behavior Pattern Details page

Term	Description
Core Allocation Input	This drop-down is a mandatory selection. The drop-down values are Amount and Percentage.
Core Allocation	The amount that is apportioned to each core. The Allocation amount in absolute or percentage for each strip is automatically determined (when Strip Tenor is "Days", or "Months") by evenly spreading the defined Core Amount across the number of strips for the portfolio. When Strip Tenor is "At Maturity", the entire amount is placed at the maximum term, determined by the inputs for "Term " and "Multiplier". If the user selects 'Amount' in the Core Allocation Input drop-down, then the 'Core Allocation' text box accepts values from 0.0000 to 9,999,999,999.9999. If the user selects 'Percentage' in the Core Allocation Input drop-down, then the 'Core Allocation' text box accepts only a percentage value between 0.0000 and 100.0000.
Tenor	Used to specify the maturity term for the portfolio. This term defines the maximum term for the initial strip balance and the rollover term for each rollover strip. When you manually select or schedule the replicating portfolio process, the Org term of the volatile strip is calculated. Replicating Portfolio generates the volatile strips that set the ORG_TERM equal to the Period between Maturity date and Origination date.

Term	Description
Multiplier	The unit of time applied to the Tenor. The choices are: • Days • Months • Years
Type	For replicating portfolio, the type has defaulted to the core. The Volatile strip is generated automatically as a reconciling plug entry to balance the portfolio. The term of the plug entry is defaulted to 1 Day, unless a holiday calendar is used, in which case the volatile amount maturity can be extended to the next business day.
Strip Tenor	Indicates the frequency of the strips generated for the portfolio. Available options are "Days", "Months" or "At Maturity". For example, if "Days" is selected, strips will be generated for each day from the as-of-date to the maturity term. If "At Maturity" is selected, a single strip will be generated and the balance will be placed at the maturity term.
Source Balance Selection	The source balance selection allows the user to define the source Instrument Table (or Ledger Table) and product / currency against which the core balance will be reconciled. The difference between the core balance and the actual instrument balance will determine the amount of the Volatile Plug strip for the current period.
Balance Type	The Balance type allows you to select the type of Balance. It can be either Average Balance or Ending Balance. This option will be enabled if the Source Balance is selected as **Management Ledger**.
Enable Holiday Calendar	Replicating Portfolio's allow users to enable a holiday calendar. If this option is selected, portfolio strips will not be generated on weekends or holidays. Also, during rollover of maturing strips new maturity dates will be adjusted to ensure maturities fall only on working days.
Holiday Calendar Code	The holiday calendar code allows users to select the applicable holiday calendar.
Holiday Calendar Rolling Convention	The rolling convention within replicating portfolios defaulted to the next business day. Related to this method is an additional date adjustment to ensure that only one core strip falls on a single date. We refer to this secondary adjustment as an exclusive business day convention.
Default Portfolio Roll Frequency	The default portfolio roll frequency option allows you to set the default rolling frequency of replicating the portfolio.
Merge Delta Strips on Re-balancing	If the Merge Delta Strips on the Re-balancing option is enabled, then the core strips will be merged during the rebalancing.

Term	Description
Generate the Portfolio	After initially creating (and saving) the replicating portfolio definition, users should Generate the Portfolio. This action launches a background process that generates the strip records for the portfolio. Before running this process be mindful of the As-of-date defined in your Application Preferences, as this date will be used as the initial Origination Date for the newly created strips.
	If % is selected as the Core Allocation Input type, the procedure will read the current period balance (CUR_BOOK_BAL or Ending Balance), for the selected "Product Member" (from Source Balance selection) and determine the Required Core Amount based on the resulting Balance x Core %. This applies to both Management Ledger (Ending Balance) and Instrument table (CUR_BOOK_BAL).
Roll the Portfolio	Each period (day or month), users will need to roll the portfolio forward. The new as-of-date for the portfolio will be determined based on the existing as-of-date plus the default roll frequency. As a general rule, users should update their as-of-date in application preferences before running the Roll Portfolio Process.
Re-balance the Portfolio	After rolling the portfolio, users will need to re-balance the portfolio. There are two options provided for re-balancing:
	Plug to Volatile Strip: This option should be selected when no changes to the core allocation have been made. This process will compare the current period source balance with the current portfolio strip balance. The difference will be posted to the new volatile strip.
	The **Plug to Volatile Strip** Re-balance method will not be relevant when the Core input type is % as the portfolio balance will change with every new as-of-date and new balancing/delta strips will be required to re-balance the portfolio.
	Rebalance Core Strips: This option should be selected only when users have modified the Core Allocation or when the Core input type is %. If the Core Allocation has increased or decreased, balancing strips will be generated for each tenor to bring the core strip balance back in line with the Core Allocation Balance. This process will additionally run the Plug to Volatile process to create the plug strip.
View the Portfolio	This option allows you to view the portfolio strips.

This table describes various fields on the Behavior Pattern Details page. You can enter or select the relevant details to populate the screen to define the Non-maturity Behavior Patterns for the Tractor TP Method used.

3. Make your required selections in the Source Balance Selection section.

4. Click **Add Core** (one or more) to input the core amount, associated maturity term, and strip frequency.

5. To delete a row, select the check box corresponding to the row you want to remove and click **Delete**.

6. Click **Save**.

   The Behavior Pattern is saved and the Behavior Pattern summary page is displayed.

7. Return to the Behavior Pattern / Replicating Portfolio in EDIT mode and execute the portfolio maintenance activities, including:

   ▪ Generate Portfolio

   ▪ Roll Portfolio

   ▪ Rebalance Portfolio

   ▪ View Portfolio

NOTE	Once the Replicating Portfolio is generated and the volatile plug has been updated for the current period, it is ready for processing by the FTP Engine. FTP Processes utilizing the Tractor TP Method should not be run until all Replicating Portfolio's have been updated.

10.2.2.1 Export and Import Replicating Portfolio Data in Excel

There is an option through the Replicating Portfolio > View Portfolio UI to manually edit existing portfolio strips through Export and Import of the active Strip Data. The following screenshot illustrates the functionality:

- The Export option works against the entire active portfolio. For example, a user can currently filter on a specific CORE # or look at results for all Core's. Additionally, the selection of Strips can span multiple pages, for example - as seen in the preceding screenshot, 1-20 of 71. In this example, all 71 active strips are exported to Excel.

- The import function will replace LL existing "Active" strips.

- The strip data being imported is validated to confirm that all required data is included. If the data is not complete, for example, it does not provide information for Core #, Strip Type, As of Date, Maturity Date, Tenor, Multiplier, Allocation (or Amount), then a warning message is given indicating that "The selected data is incomplete and cannot be imported. Please re-check the data and try again." The portfolio can also be edited directly on the view portfolio screen after new strips have been imported.

- When you click the Strip Source option, the status column in the summary table shows the tagged strip records that have been created by the system or manually. You can edit these tags for strips that are manually created or existing strips after exporting them into Excel.

10.2.2.2 Scheduling Replicating Portfolio Actions

In addition to using the "Roll Portfolio" and "Re-balance Portfolio" button options in the Replicating Portfolio UI or the "Merge Portfolio" option, users can batch and schedule these functions through a Simplified Batch or ICC Batch process.

There are three seeded tasks listed under the Transform Data task type for scheduling these actions:

- Roll_Portfolio
- Rebalance_Portfolio
- Merge_Portfolio

To open the Simplified Batch process screen, from the LHS menu, select **Common Object Maintenance**, select **Operations**, and then select **Simplified Batch** to open the **Simplified Batch** process page. This page is the gateway for defining the batch processes for behavior pattern batch process and related functionality.

The following screenshot illustrates these tasks selected within a Simplified Batch process.

The following parameters are required for each task:

Roll Portfolio

- **Run ID**: when running via ICC batch and Simplified batch process, this parameter can be passed as ''
- **Process ID**: when running via ICC batch and Simplified batch process, this parameter can be passed as ''
- **Execution ID**: when running via ICC batch and Simplified batch process, this parameter can be passed as ''
- **Run Surrogate Key**: when running via ICC batch and Simplified batch process, this parameter can be passed as ''
- **Pattern Code**: for example, '70001'
- **Application ID**: for example, 'TP' (this is a static value)
- **FTP User**: for example, 'TP USER 1'

These parameters would appear as follows in the simplified batch parameter input block:

'','','','','70001','TP','TP USER 1'

When executing from the Run Rule Framework, the user does not have to pass the Run ID, Process ID, Execution ID, and Run Surrogate Key, as the framework itself passes these values along with the Batch ID and MISDATE. The parameters would appear as follows:

"70001","TP","TP USER 1"

Re-balance Portfolio

- **Run ID**: when running via ICC batch and Simplified batch process, this parameter can be passed as ''

- **Process ID**: when running via ICC batch and Simplified batch process, this parameter can be passed as ''

- **Execution ID**: when running via ICC batch and Simplified batch process, this parameter can be passed as ''

- **Run Surrogate Key**: when running via ICC batch and Simplified batch process, this parameter can be passed as ''

- **Pattern Code**: for example, '70001'

- **Re-balance type**: for example, '1' (plug to volatile) or '2' (rebalance core strips)

- **FTP User**: for example, 'TP USER 1'

- **Application ID**: for example, 'TP' (this is a static value)

These parameters would appear as follows in the simplified batch parameter input block:

'','','','', '70001', '1', 'TP USER 1', 'TP'

When executing from the Run Rule Framework, the user does not have to pass the Run ID, Process ID, Execution ID, and Run Surrogate Key, as the framework itself passes these values along with the Batch ID and MISDATE. The parameters would appear as follows:

"70001","1","TP USER 1","TP"

Merge Portfolio

- **Run ID**: when running via ICC batch and Simplified batch process, this parameter can be passed as ''

- **Process ID**: when running via ICC batch and Simplified batch process, this parameter can be passed as ''

- **Execution ID**: when running via ICC batch and Simplified batch process, this parameter can be passed as ''

- **Run Surrogate Key**: when running via ICC batch and Simplified batch process, this parameter can be passed as ''

- **Pattern Code**: for example, '70001'

- **FTP User**: for example, 'TP USER 1'

- **Application ID**: for example, 'TP' (this is a static value)

When to merge (roll versus rebalance): when running via ICC batch and Simplified batch process, this parameter should always be 'N'

Maturity date identifying maturing strips to be merged on roll: when running via ICC batch and Simplified batch process, this parameter should always be ''

These parameters would appear as follows in the simplified batch parameter input block:

'','','','','70001', 'TP USER 1', 'TP', 'N', ''

When executing from the Run Rule Framework, the user does not have to pass the Run ID, Process ID, Execution ID, and Run Surrogate Key, as the framework itself passes these values along with the Batch ID and MISDATE. The parameters would appear as follows:

"70001","TP USER 1","TP","N",""

10.2.3 Defining Non-Performing Behavior Patterns

Non Performing behavior patterns are commonly used for balances that are classified as non-earning assets. These balances are typically sourced from the management ledger as aggregate balances. Users can assign expected maturity profiles to these balances classifying them into appropriate categories of Sub Standard, Doubtful, or Loss.

To define the non-performing behavior patterns, follow these steps:

1. In the Behavior Pattern details page, select Non Performing as the Behavior Pattern Type.

2. Enter the **Code**, **Name**, and **Description** for the Behavior Pattern.

3. Click the **Add** icon to open the **Non-Performing Behavior Patterns Summary** page.

4. Enter/select the following details:

   - **Tenor**: Specify the maturity tenor for the first maturity strip. For example, if "1 Day" is defined, then the applicable percentage of the balance will runoff (mature) on the As of Date + 1 Day.

   - **Multiplier**: The unit of time applied to the Tenor. The choices are:
     - Days
     - Months
     - Years

   - **Percentage**: The relative amount of the principal balance that will mature on the date specified by the Tenor + Multiplier. The percentage amounts can exceed 100% for non-performing patterns.

   - **Runoff Type**: This allows you to classify the runoff based on the appropriate type. The options are:
     — Substandard

— Doubtful

— Loss

NOTE	There is no difference in behavior from a cash flow perspective, but the runoff amount will be written to a principal runoff financial element corresponding to the selected Runoff Type.

5. Click **Add** to add additional payment strips to the Pattern and define appropriate assumptions for each strip.

6. To delete a row, select the check box corresponding to the row(s) you want to remove and click the **Delete** icon

7. Click **Save**.

The Behavior Pattern is saved and the Behavior Pattern summary page is displayed.

10.2.4   Defining Devolvement and Recovery Behavior Patterns

Devolvement and Recovery behavior patterns are commonly used for estimating cash flows associated with Letters of Credit and Guarantees. These product types are typically categorized as off-balance-sheet accounts. Users can assign expected maturity profiles to the related balances classifying them into appropriate categories of Sight Devolvement and Sight Recovery or Usance Devolvement and Usance Recovery. Sight Devolvement and Recovery are the most common types.

To define the Devolvement and Recovery behavior patterns, follow these steps:

1. In the Behavior Pattern details page, select Devolvement and Recovery as the Behavior Pattern Type.

2. Enter the **Code**, **Name**, and **Description** for the Behavior Pattern.

3. Click the **Add** icon to open the **Devolvement and Recovery Behavior Patterns** summary page.

4. Enter/select the following details:

   ▪ **Tenor**: Specify the maturity tenor for the first maturity strip. For example, if "1 Day" is defined, then the applicable percentage of the balance will runoff (mature) on the As of Date + 1 Day.

   ▪ **Multiplier**: The unit of time applied to the Tenor. The choices are:

     — Days

     — Months

     — Years

- **Percentage**: The relative amount of the principal balance that will mature on the date specified by the Tenor + Multiplier. The percentage amounts can exceed 100% for devolvement and recovery patterns.

- **Runoff Type**: This allows you to classify the runoff based on the appropriate type. The options are:

  — **Sight Devolvement**: indicates the Beneficiary is paid as soon as the Paying Bank has determined that all necessary documents are in order. This is the preferred approach.

  — **Sight Recovery**

  — **Usance**: is a period of time which can be between 30 and 180 days after the bill of lading date.

  — **Usance Recovery**

NOTE	There is no difference in behavior from a cash flow perspective, but the runoff amount will be written to a principal runoff financial element corresponding to the selected Runoff Type.

5. Click the **Add** icon to add additional payment strips to the Pattern and define appropriate assumptions for each strip.

6. To delete a row, select the check box corresponding to the row(s) you want to remove and click **Delete** 🗑 .

7. Click **Save**.

The Behavior Pattern is saved and the Behavior Pattern summary page is displayed.

The Behavior Pattern is saved and the **Behavior Pattern Summary** page is displayed.

This release includes a facility that enables the automatic load of behavior patterns. There is a Behavior Pattern Loader Utility that helps to automatically load model output records from `STG_BEHAVIOUR_PATTERN` into `FSI_BEHAVIOUR_PATTERN_MASTER` and `FSI_BEHAVIOUR_PATTERN_DETAIL`. The utility first performs a sanity check on all records as per business requirements and only moves records that pass these checks. In the case of non-maturing behavior pattern, only non-replicating portfolio patterns can be loaded through this utility. For more information, see the Data Model Utilities User Guide.

10.3 Viewing and Editing Behavior Patterns

You can view existing Behavior Pattern, and you can edit existing rules, provided you have read/write privileges.

To view and edit a Behavior Pattern, follow these steps:

1. Navigate to the **Behavior Pattern Summary** page of the pattern you want to update.

2. Search for a pattern. For further information, see the Searching for Rules section.

3. Select the appropriate pattern and click **Edit** ✏️ to open the pattern you want to update.

4. Update the Name or Description.

5. Click **Apply** or **Save**, depending on the pattern type.

10.4 Copying Behavior Patterns

You can copy patterns to avoid having to enter data multiple times. This saves time and effort and also reduces mistakes.

To copy a Behavior Pattern, follow these steps:

1. Navigate to the **Behavior Pattern Summary** page of the pattern you want to copy.

2. Search for a pattern.
   For more information, see the Searching for Rules section.

3. Select the appropriate pattern and click **Copy** 🗐 to duplicate the pattern.

4. Select a folder where you want to save the pattern copy.

5. Enter a unique name for the new pattern.

    (Optional) Enter a brief description of the pattern.

6. Select the access type.

7. Click the **Save** button.

10.5 Deleting Behavior Patterns

You can delete patterns that are no longer required.

> **NOTE**   A rule cannot be retrieved after deletion.

 Restrictions on deleting patterns are:

- You cannot delete patterns if you have only Read privileges. Only users with read/write privileges and pattern owners can delete rules.

- You cannot delete a pattern that has a dependency.

To delete a Behavior Pattern, follow these steps:

1. Navigate to the **Behavior Pattern Summary** page of the pattern you want to delete.

2. Search for a pattern.
   For more information, see the <u>Searching for Rules</u> section.

3. Select the appropriate pattern and click **Delete** 🗑 .

11 User Defined Repricing Patterns

User defined repricing patterns provide a mechanism to capture instrument repricing patterns that are too complex to be accommodated through the use of the standard account table fields.

The procedure for working with and managing repricing patterns is, similar to that of other Oracle business rules.

Topics

- Searching for Repricing Patterns

- Creating a Repricing Pattern

- Viewing and Editing Repricing Patterns

- Copying Repricing Patterns

- Deleting Repricing Patterns

11.1 Searching for Repricing Patterns

Search for a repricing pattern to perform any of the following tasks:

- View

- Edit

- Copy

- Delete

- Check Dependencies

Prerequisites

Predefined repricing patterns

To search the repricing patterns, do the following:

1. Navigate to the **Repricing Pattern Summary** page. This page is the gateway to all repricing patterns and related functionality. You can navigate to other pages relating to repricing patterns from this point.

2. Enter the search criteria.

3. Enter the code or description of the pattern.

4. Select the Search   .

Only patterns that match the search criteria are displayed.

11.2   Creating Repricing Patterns

You create Repricing patterns to capture the repricing behavior of instruments whose rates change according to complex schedules.

To create the repricing patterns, do the following:

1. Navigate to the Repricing Pattern summary page.

2. Click **Add** ✚ .

    The Add Repricing Pattern page is displayed.

3. Type a code value for the new Repricing Pattern.

    The code is a numeric internal identifier for the repricing pattern. The code value must be a number between 500 and 4999 and the code value you assign to the new pattern must be unique. Also, the code must be mapped to the appropriate instrument records (ADJUSTABLE_TYPE_CD and REPRICE_PATTERN_CD (applicable to CFE only) field) to connect the instrument to the appropriate pattern.

4. Type a brief description for the pattern.

5. Select the Repricing Pattern Type: Absolute or Relative.

    The selection of the repricing pattern type determines the fields that are displayed in the Repricing Events table and the information you must provide to successfully define that pattern type. See:

    - Defining Absolute Repricing Patterns

    - Defining Relative Repricing Patterns

The Add Repricing Pattern page displays the parameters associated with the Absolute repricing pattern type, which is the default repricing pattern type value. If you change this value to Relative, the system refreshes the repricing specifications corresponding to the new pattern type, and any data entered previously is lost. However, a warning message is displayed when you change the pattern type. The data is discarded only after your confirmation.

11.2.1   Defining Absolute Repricing Patterns

The Absolute repricing pattern is used for instruments that are date dependent. Each specific date is a separate event. You need to enter the month and day for each event, except for the initial event.

To define absolute repricing pattern, do the following:

1. Select Pattern Type as **Absolute**. This screen allows you to do the following:

    - **Add Row**: This allows you to add one or more repricing events.

    - **Delete**: This allows you to delete specific rows in the Repricing Events table.

2. Click **Add Event**.

3. Enter the following details:

   - **Month**: In conjunction with the Day field, this drop-down menu, allows you to specify a unique month-day combination for a repricing event.

   - **Day**: In conjunction with the Month drop-down menu, this field allows you to specify a unique month-day combination for a repricing event.

4. Select the Repricing Type: **Flat** or **Indexed**.

   The default is Flat. If you select Indexed, the system automatically changes the fields available for entry. See Indexed Repricing.

   You can change your selection of the repricing type at any point in this process. Sometimes it may cause a loss of data.

   - **Flat Rate**: A Flat rate is a specific rate—it is directly input. For more information, see User Defined Repricing Event.

   To define a Flat Rate Event, select the check box for the event you are going to define and select the **Define** button. Notice the bottom half of the screen refreshes, displaying the required inputs. Complete the following steps on the Add Repricing Events page:

5. Select Balance Tier option:

   - **None**: If selected, the Balance Tiered pricing is not applied.

   - **Current Balance**: Users can define balance tiers and associate different rates with the corresponding balance tier level.

6. Specify the required month-day combination for the event. You cannot specify a month-day combination for the first event as this row is reserved for the initial period.

7. Enter the Net Rate.

8. Enter the Gross Rate.

9. Enter the Transfer Rate.

   > **NOTE** You must enter a valid value for at least one of these rate fields.

10. Click **Apply**.

    The Event summary Page is displayed. Note the status indicator has changed from Red to Green indicating that details for the event have been defined. At this point, you have the option of defining additional events or saving. To add an additional event, repeat Click **Add Event**. If you want to save the repricing pattern and events, advance to the next step.

Repricing Event is Indexed Repricing

An Indexed rate is a set of parameters used to calculate a rate.

If you select **Repricing Event** as **Indexed Repricing**, to define the absolute repricing pattern, do the following:

1. Select the check box for the event you are going to define and select the **Define** button. Notice the bottom half of the screen refreshes, displaying the required inputs. Complete the following steps on the Add Repricing Events page:

2. Select the check box above each column that you want to include in the repricing event

3. Select a Balance Tier option:

    ▪ **None**: The Balance Tiered pricing is not applied.

    ▪ **Current Balance**: The users can define balance tiers and associate different rates with the corresponding balance tier level.

4. Select the **Interest Rate Code**.

5. Select the **Transfer Interest Rate Code**.

6. Enter the **Net Margin**.

7. Enter the **Yield Curve Term** and select the appropriate **Multiplier**.

8. Enter the **Gross Margin**.

9. Enter the **FTP Margin**.

10. Enter the **Rate Cap Life**.

11. Enter the **Rate Floor Life**.

12. Enter the **Rate Set Lag** and select the appropriate **Multiplier**.

13. Click **Apply**. The Event Summary page is displayed.

    At this point, you have the option of defining additional events or saving. To add an additional event, repeat Click **Add Event**. If you want to save the repricing pattern and events, advance to the next step.

14. Click **Save** at the bottom of the page.

    The repricing pattern is saved and the Repricing Pattern summary page is displayed.

11.2.2 Defining Relative Repricing Patterns

The Relative repricing pattern is used for instruments where the repricing is determined by the elapsed time since origination. Defining a Relative repricing pattern involves the definition of a series of repricing events applicable to a specific repricing pattern code. You need to specify the length of each repricing period and the number of times that event should occur before calculating the next event in the pattern.

The steps to create relative repricing patterns are similar to creating absolute repricing patterns.

The only difference is that the fields in the Repricing Events table are different.

Select Pattern Type as **Relative**. This page allows you to do the following:

- **Add**: This allows you to Add one or more repricing events.

- **Move Up**: This allows you to move a particular row up by one position. This action for the first and second rows is not active.

- **Move Down**: This allows you to move a particular row down by one position. This action for the first and last rows is not active.

- **Delete**: This allows you to delete specific rows in the Repricing Events table. You need to specify the following parameters in the Repricing Events table for a Relative repricing pattern:

- **Frequency**: In conjunction with the Multiplier drop-down menu, this field allows you to specify how often repricing occurs.

- **Multiplier**: The unit of time applied to the frequency. The choices are:

  - Days

  - Months

  - Years

- **Repeat**: This allows you to specify the number of times a repricing event should be repeated.

- **Repricing Type**: A drop-down list, it displays the repricing type, Flat rate or Indexed rate, associated with a particular event.

After defining the above details, click **Define**. The Event summary Page is displayed. Note the status indicator turns from Red to Green indicating that details for the event have been defined.

11.3 Viewing and Editing Repricing Pattern

You can view existing Repricing Pattern, and you can edit existing patterns, provided you have read/write privileges.

To view and edit a Repricing Pattern, follow these steps:

1. Navigate to the **Repricing Pattern Summary** page of the pattern you want to update.

2. Search for a pattern. For further information, see the <u>Searching for Rules</u> section.

3. Select the appropriate pattern and click **Edit** to open the pattern you want to update.

4. Update the Name or Description.

5. Click **Apply** or **Save**, depending on the pattern type.

11.4 Copying Repricing Pattern

You can copy patterns to avoid having to enter data multiple times. This saves time and effort and also reduces mistakes.

To copy a Repricing Pattern, follow these steps:

1. Navigate to the **Repricing Pattern Summary** page of the pattern you want to copy.

2. Search for a pattern.
   For more information, see the Searching for Rules section.

3. Select the appropriate pattern and click **Copy** to duplicate the pattern.

4. Select a folder where you want to save the pattern copy.

5. Enter a unique name for the new pattern.

   (Optional) Enter a brief description of the pattern.

6. Select the access type.

7. Click the **Save** button.

11.5 Deleting Repricing Pattern

You can delete patterns that are no longer required.

> **NOTE**   A pattern cannot be retrieved after deletion.

Restrictions on deleting patterns are:

- You cannot delete patterns if you have only Read privileges. Only users with read/write privileges and pattern owners can delete patterns.

- You cannot delete a pattern that has a dependency.

To delete a Repricing Pattern, follow these steps:

1. Navigate to the **Repricing Pattern Summary** page of the pattern you want to delete.

2. Search for a pattern.
   For more information, see the Searching for Rules section.

3. Select the appropriate pattern and click **Delete** .

12 Behavior Pattern Rule

This chapter describes the procedure for working with and managing the Behavior Pattern rules.

Topics

- Overview of Behavior Pattern Rules
- Creating Behavior Pattern Rules
- Defining Behavior Pattern Rule
- Defining a Behavior Pattern Rule: An Example

12.1 Overview of Behavior Pattern Rules

The Behavior Patterns (BP) functionality works similarly to amortization types. The Behavior Pattern code is assigned at the detail instrument level, and these designations are evaluated by the cash flow engine (CFE) for calculations. However, Behavior Patterns are portfolio level property rather than instrument level. Generally, a bank processes aggregated data for non-maturing products. In this case, the Behavior Pattern is assigned effectively at the portfolio level. If you are using CFE with any other application (for example BSP, FTP, and PFT), then data is required at the instrument level and BP is also assigned accordingly.

In this case, you must track the changes to Behavior Patterns and assign appropriate codes to affected instruments. Due to this, only one BP can be used by the CFE in the CFE processes for current business. If you want to model multiple types of BP under varying scenarios, then you can use a Behavior Pattern Rule.

The Behavior Pattern Rule UI allows you to group Behavior Pattern codes (behavioral assumptions) together in a set at the Product/Currency level which then can be rotated to select a value on a combination. You can select which behavior assumption pattern to use and the underlying Behavior Pattern in that set will affect the data on processing

For more information, see the Creating Behavior Pattern Rules section.

The procedure for working with and managing the Behavior Pattern Rule is similar to that of other assumption rules. It includes the following steps:

- Searching for Behavior Pattern rules. For more information, see the Searching for Rules section.
- Creating Behavior Pattern Rules., For more information, see the Creating Rules section.
- Viewing and Editing Behavior Pattern rules. For more information, see the Viewing and Editing Rules section.
- Copying Behavior Pattern rules. For more information, see the Copying Rules section.

- Deleting Behavior Pattern rules. For more information, see the Deleting Rules section.

12.2   Creating Behavior Pattern Rules

You create behavior pattern rules to capture the principal run-off behavior of product types that do not have contractual maturities.

To create a Behavior Pattern rule, follow these steps:

1. Navigate to the **Behavior Pattern Rule** page.

2. The **Behavior Pattern Rule Summary** page is displayed. Click **Add ✚ .**

3. Complete standard steps for this procedure.

For more information, see the Overview of Common Rule Management Tasks section.

NOTE	In addition to the standard steps for creating Rules, the procedure for creating a Behavior Pattern Rule involves one extra step. After Standard Step, you need to select a product hierarchy. For more information, see the Overview of Common Rule Management Tasks section. You can define methodologies at any level of the hierarchical product dimension. The Hierarchical Relationship between nodes allows the inheritance of methodologies from parent nodes to child nodes.
	Oracle Cash Flow Engine provides you with the option to copy, in total or selectively, the product assumptions contained within CFE business Rules from one currency to another currency or a set of currencies or from one product to another product or a set of products.

12.3   Defining Behavior Pattern Rule

The definition of a Behavior Pattern rule is part of the Create or Edit Behavior Pattern rule process. When you click Save in the Create Behavior Pattern Rule process, the rule is saved and the **Behavior Pattern Rule Summary** page is displayed.

However, Behavior Pattern assumptions have not yet been defined for any of your products at this point. Typically, you would start defining your Behavior Pattern assumptions for product-currency combinations before clicking Save.

Defining Behavior Pattern Rule Using Node Level Assumptions

Node Level Assumptions allow you to define assumptions at any level of the Product dimension Hierarchy. The Product dimension supports a hierarchical representation of

your chart of accounts, so you can take advantage of the parent-child relationships defined for the various nodes of your product hierarchies while defining rules. Children of parent nodes on a hierarchy automatically inherit the assumptions defined for the parent nodes. However, assumptions explicitly defined for a child take precedence over those at the parent level.

You must perform basic steps for creating or editing a Behavior Pattern rule before defining the Behavior Pattern rule.

From the Assumption Browser screen, select the product or products and the currency for which you want to define a Behavior Pattern or Patterns and select **Add** ✚ to launch the **Behavior Pattern Details** window.

NOTE	Using the default currency to setup assumptions can save data input time. At run time, the calculation engine uses assumptions explicitly defined for a product currency combination. If assumptions are not defined for a currency, the engine uses the assumptions defined for the product and the default currency. If the assumptions are the same across some or all currencies for a specific product, you can input assumptions for the default currency. Be careful using this option on screens where an Interest Rate.

12.4   Defining a Behavior Pattern Rule: An Example

To create a Behavior Pattern rule, enter the following details in the Behavior Pattern Rule window:

1. From the Behavior Pattern Rule window, select the following.

   - Currency (US Dollar)

   - Name

   - Description

   - Folder

   - Access Type

2. From the **Assumption Browser**, select a product from the **Hierarchy Browser**. Select **Add** ✚ to open the **Assumption Details** page.
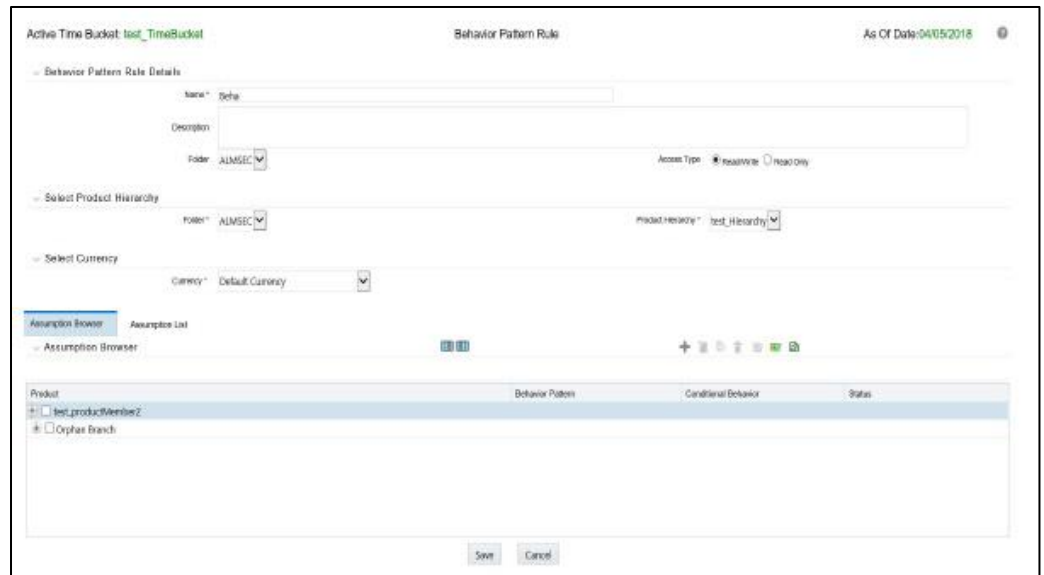
3. Select a pattern from the **Behavior Pattern Selector**. Here, the **Behavior Pattern** drop-down list shows the list of existing Behavior Patterns.

Figure: Behavior Pattern Rule window

NOTE	Only Non-Maturing Behavior Pattern types are available. For more information, see the User Defined Behavior Patterns.

For more information, see the User Defined Behavior Patterns section. You can select only one Behavior Pattern at a time.

4. Click **Apply**.

13   Prepayment Rules

This module describes the procedure for working with and managing Prepayment rules.

Topics

- Overview of Prepayment Rules
- Creating Prepayment Rules
- Defining Prepayment Methodologies
- Defining Early Redemption Assumptions
- Associating Conditional Assumptions with Prepayment Rules

13.1   Overview of Prepayment Rules

Prepayment rules allow you to specify methodologies to model the loan prepayment and deposit early redemption behavior of products in your portfolio and quantify the associated prepayment risk in monetary terms. For more information, see Defining Prepayment Methodologies section.

The procedure for working with and managing the Prepayment rule is similar to that of other assumption rules. It includes the following steps:

- Searching for Prepayment rules.
- Creating Prepayment Rules
- Viewing and Editing Prepayment rules.
- Copying Prepayment rules.
- Deleting Prepayment rules.

As part of creating and updating Prepayment rules, you can also define prepayment methodologies for all relevant product/currency combinations. For more information, see the following sections:

- Defining Prepayment Methodologies
- Defining the Constant Prepayment Method
- Defining the Prepayment Model Method
- Defining the PSA Prepayment Method
- Defining the Arctangent Calculation Method
- Associating Conditional Assumptions with Prepayment Rules

Oracle Cash Flow Engine provides you with the option to copy, in total or selectively, the product assumptions contained within the Prepayment rules from one currency to another currency or a set of currencies or from one product to another product or a set of

products. For more information, see Associating Conditional Assumptions with Prepayment Rules section.

13.1.1 Creating Prepayment Rules

You create a Prepayment rule to define prepayment assumptions for new products.

1. Navigate to the Prepayment rule summary page.

2. Complete standard steps for this procedure.

NOTE	In addition to the standard steps for creating rules, the procedure for creating a Prepayment rule involves one extra step. After Standard Step 6, you can select a product hierarchy. You can define methodologies at any level of the hierarchical product dimension. The hierarchical relationship between the nodes allows the inheritance of methodologies from parent nodes to child nodes.

13.1.2 Defining Prepayment Methodologies

The assignment of prepayment assumptions is part of the Create or Edit Prepayment rule process where assumptions about loan prepayments or deposit early redemptions are made for product-currency combinations. When you click Save in the Create Prepayment rules process, the rule is saved and the Prepayment rule Summary page is displayed. However, prepayment assumptions have not yet been defined for any of your products at this point. Typically, you would start defining your prepayment assumptions for product-currency combinations before clicking Save.

The Prepayment rule supports the definition of prepayment assumptions for combinations of two dimensions: Product and Currency.

Once you have created a Prepayment rule, you can assign prepayment methodologies to product-currency combinations in either of the following two ways:

*   By creating a conditional assumption using conditional logic. For more information, see Associating Conditional Assumptions with Prepayment Rules section.

*   Directly on the Prepayment methodology page, as described here.

13.1.3 Defining Prepayments Using Node Level Assumptions

Node Level Assumptions allow you to define assumptions at any level of the Product dimension Hierarchy. The Product dimension supports a hierarchical representation of your chart of accounts, so you can take advantage of the parent-child relationships defined for the various nodes of your product hierarchies while defining rules. Children of parent nodes on a hierarchy automatically inherit the assumptions defined for the parent

nodes. However, assumptions directly defined for a child take precedence over those at the parent level.

Prerequisites

Performing basic steps for creating or editing a Prepayment rule.

Procedure

This table describes key terms used for this procedure.

Term	Description
Calculation Method	The method used to model prepayment behavior of instruments. Oracle Cash Flow Engine provides four prepayment calculation methods: Constant, Prepayment Model, PSA, and Arctangent.
Cash Flow Treatment	Allows you to specify one of the following two ways in which prepayments are made. • **Refinance**: This is the most commonly used option. Select refinance to keep payment amounts after prepayment consistent with a portfolio-based assumption. This reduces the scheduled payment amount on each loan and maintains the same maturity term. • **Curtailment**: Select curtailment to change the periodic payment amounts due. The prepayments are treated as accelerated payments, with a payoff earlier than the originally scheduled term.
Market Rate	The market rate is defined as the sum of the Index (the yield curve rate as described by the Interest Rate Code) and the Spread (the difference between the customer rate and market rate).
Associated Term	Allows you to define the term for the point on the yield curve selected in the Market Rate definition that will be used in obtaining the market rate. • **Remaining Term**: The number of months remaining until the instrument matures. • **Reprice Frequency**: The frequency with which the instrument reprices. This defaults to the original term for a fixed-rate instrument. • **Original Term**: The number of months that was the originally scheduled life of the instrument.

Term	Description
Prepayment Rate Definition	This table allows you to specify the constant annual prepayment rate, or the associated factors, that you want to apply to the instruments having origination dates in a particular date range.
Seasonality	This table allows you to specify seasonality adjustments. Seasonality refers to changes in prepayments that occur predictably at given times of the year.
	Seasonality adjustments are based on financial histories and experiences, and should be modeled when you expect the amount of prepayments made for certain types of instruments to increase or decrease in certain months.
	The default value for seasonality factors is 1, which indicates that no seasonality adjustment is made for a month. Changing the seasonality factors is optional. You can change the seasonality factors for none, one, or multiple months.
	To make seasonality adjustments, you need to enter a value between 0.00 and 99.9999 for the seasonality factors associated with each month. Seasonality factors less than 1 mean that prepayments are decreased for a particular month. Seasonality factors greater than 1 indicate that prepayments are increased for a particular month.

1. Navigate to the Prepayment assumption details page by selecting a currency and one or more products from the hierarchy.

2. Select a Calculation Method, Constant, Prepayment Model, PSA, or Arctangent.

   > **NOTE** The default value for the Calculation Method drop-down list is Constant. If you select "Do not calculate" as the calculation method, no prepayment assumptions will be assigned to the particular product-currency combination. This is a particularly useful option when using node-level assumptions because it allows you to exclude a particular child from inheriting a parent assumption.

3. Select a Cash Flow Treatment type, Refinance or Curtailment.

   Refinance is the most commonly used method.

4. Define the parameters and annual prepayment rates for the selected calculation method: Constant, Prepayment Model, PSA or Arctangent.

> | **NOTE** | The parameters displayed on the Prepayment methodology page vary depending on the calculation method (Constant, Prepayment Model, PSA, or Arctangent) that you have selected. For more information, see: |
> | --- | --- |
>
> - [Defining the Constant Prepayment Method](#)
> - [Defining the Prepayment Model Method](#)
> - [Defining the PSA Prepayment Method](#)
> - [Defining the Arctangent Calculation Method](#)

5. Click **Apply**.

The *Assumption Browser Definition* page is displayed.

At this point you can:

- Continue defining additional methodologies for other product-currency combinations by repeating the above procedure.

- Complete the process by clicking **Save**.

When you click Save, the prepayment assumptions are saved and the Prepayment rule summary page is displayed.

> | **NOTE** | Oracle Cash Flow Engine provides you with the option to copy, in total or selectively, the product assumptions contained within the Prepayment rules from one currency to another currency or a set of currencies or from one product to another product or set of products. For more information, see [Associating Conditional Assumptions with Prepayment Rules](#). |
> | --- | --- |

13.1.4   Defining the Constant Prepayment Method

Use this procedure to define prepayment assumptions using the Constant Prepayment method.

Prerequisites

Performing basic steps for creating or updating a Prepayment rule.

Procedure

Users also have two options for determining the timing of the Constant Prepayment assumption. The options include:

- Use Payment Dates: This is the default option. If this option is selected, then Constant Prepayment runoff will occur on scheduled payment dates only.

- User Defined Prepayment Tenors: If this option is selected, users can specify any runoff timing. For example, users might choose to define the prepayment to the runoff on the first day of the forecast.

The above options will be available only for Asset Instrument types.

To define constant prepayment within the Prepayment Rule, follow the steps given in below sections:

- Use Payment Dates

- User Defined Prepayment Tenors

13.1.4.1 Use Payment Dates

1. Select the **Use Payment Dates** option.

2. Select the Start Origination Date using the date picker. Alternatively, you can enter the Start Origination Date in the space provided.

NOTE	The first cell in the Start Origination Date column and all of the cells in the End Origination Date column are read-only. This ensures that all possible origination dates have to support reference values when Prepayment assumption lookups occur.
	Each row in the End Origination Date column is filled in by the system when you click Add Row or save the rule.
	The first Start Origination Date (in row 1) has a default value of January 1, 1900. When you enter a Start Origination Date in the next row, the system inserts a date that is a day before the previous End Origination Date field.

3. Enter the annual prepayment rate percent that you want to apply to the instruments having origination dates in a particular Start Origination-End Origination Date range.

4. The Percent column represents the actual annualized prepayment percentage that the system uses to generate the principal runoff during the cash flow calculations.

5. Click Add Row to add additional rows and click the corresponding Delete icon to delete a row.

6. You can add as many rows in this table as you require. However, you need to enter relevant parameters for each new row.

7. You can also use the Excel import/export feature to add the Prepayment rate information.

8. You can use the Data Input Helper feature. For more information, refer to Data Input Helper.

9. Define Seasonality assumptions as required to model date-specific adjustments to the annual prepayment rate. Inputs act as a multiplier, For Example, an input of 2 will double the prepayment rate in the indicated month.

13.1.5 User Defined Prepayment Tenors

1. Select the User Defined Prepayment Tenors option. This option allows you to specify the term and multiplier to the prepayment date for the particular row.

2. You can calculate the prepayment rate based on Current/Reducing Balance and Annual/De-annual Prepayment Rate. Select the Balance Type as Current Balance or Reducing Balance.

3. If the Balance Type is selected as Current Balance, then the prepayment amount will be calculated using CUR_PAR_BAL on As of Date. That is, without reducing the balance by any payment/prepayment that may have occurred between as of the date and prepayment date.

4. If the Balance Type is selected as Reducing Balance, then the prepayment amount will be calculated using balance as on Prepayment Date. That is, after reducing the CUR_PAR_BAL by any payment/prepayment that may have occurred between as of date and prepayment date.

5. Select the Prepayment Rate Type as **Annual Prepayment Rate De-annual Prepayment Rate**.

6. When the Annual Prepayment Rate is selected then the prepayment rate entered in the screen is directly used. In the other case, the rate entered in the screen is de-annualized before calculating the prepayment amount.

7. Enter the Start Origination Date and End Origination Date ranges, add additional ranges as required using the Add Row button.

8. Enter the term to runoff tenor and multiplier for each of the date ranges.

9. Enter the annual prepayment rate percent for each of the date ranges.

10. Enter 'Repeat' if you want the same prepayment to occurs multiple times. By default, it is set to 1.

11. Click Add Row to add additional runoff % rows and click the corresponding Delete icon to delete a row.

12. Define Seasonality assumptions as required to model date specific adjustments to the annual prepayment rate. Inputs act as a multiplier, for example, an input of 2 will double the prepayment rate in the indicated month.

13.1.6 Defining the Prepayment Model Method

Use this procedure to define prepayment assumptions using the Prepayment Model Calculation method.

Prerequisites

- Performing basic steps for creating or updating a Prepayment rule

- Creating Prepayment Model rule

Procedure

1. Define the source for the Market Rate by Selecting an Index (Interest Rate Code) from the list of values.

2. Enter the Spread. The spread is added to the rate from the underlying interest rate curve to determine the market rate.

3. Select an Associated Term: Remaining Term, Reprice Frequency, or Original Term.

4. Specify the Prepayment Model parameters.

   - Select the Start Origination Date using the date picker. Alternatively, you can enter the Start Origination Date in the space provided.

   - Enter the Coefficient (if needed) by which the Prepayment Rate should be multiplied.

   This multiple is applied to the instruments for which the origination date lies in the range defined in the Start Origination Date-End Origination Date fields.

   - Select a predefined prepayment model from the Prepayment model Rule list of values. Click the View Details icon to preview the selected Prepayment Model.

   - The system uses the prepayment model assumptions to calculate the prepayment amounts for each period. You need to associate a prepayment model for every Start Origination-End Origination Date range.

   - Click Add Another Row to add additional rows and click the corresponding Delete to delete a row.

   - You can add as many rows in this model as you require. However, you need to enter relevant parameters for each new row.

   You can also use the Excel import/export feature to add the Prepayment rate information.

5. Define Seasonality assumptions as required to model date specific adjustments to the annual prepayment rate. Inputs act as a multiplier, for example, an input of 2 will double the prepayment rate in the indicated month.

13.1.7 Defining the PSA Prepayment Method

Use this procedure to define prepayment assumptions using the PSA Prepayment method.

Prerequisites

Performing basic steps for creating or updating a Prepayment rule.

Procedure

1. Select the Start Origination Date using the date picker. Alternatively, you can enter the Start Origination Date in the space provided.

   The first cell in the Start Origination Date column and all of the cells in the End Origination Date column are read-only. This ensures that all possible origination dates have supporting reference values when Prepayment assumption lookups occur. Each row in the End Origination Date column is filled in by the system when you click Add Row or save the rule.

   The first Start Origination Date (in row 1) has a default value of January 1, 1900. When you enter a Start Origination Date in the next row, the system inserts a date that is a day before the previous End Origination Date field.

2. Enter the PSA speed that you want to apply to the instruments having origination dates in a particular Start Origination-End Origination Date range. The PSA method is based on a standard PSA curve. You can view the seeded model by selecting the **View Details** icon.

3. The default value is 100 PSA and inputs can range from 0 to 1667.

4. Click **Add Row** to add additional rows and click the corresponding Delete icon to delete a row. You can add as many rows in this table as you require. However, you need to enter relevant parameters for each new row.

5. You can also use the Excel import/export feature to add the Prepayment rate information.

6. Define Seasonality assumptions as required to model date specific adjustments to the annual prepayment rate. Inputs act as a multiplier, For example, an input of 2 will double the prepayment rate in the indicated month.

13.1.8   Defining the Arctangent Calculation Method

Use this procedure to define prepayment assumptions using the Arctangent Calculation method.

Prerequisites

Performing basic steps for creating or updating a Prepayment rule.

Procedure

1. Define the source for the Market Rate by Selecting an Index (Interest Rate Code) from the list of values.

2. Enter the Spread.

3. The spread is added to the rate from the underlying interest rate curve to determine the market rate.

4. Select an Associated Term: Original Term, Reprice Frequency, or Remaining Term.

5. Specify the Arctangent Argument table parameters.

6. Select the Start Origination Date using the date picker. Alternatively, you can enter the Start Origination Date in the space provided.

7. Enter the values for the Arctangent parameters (columns K1 through K4) for each Start Origination Date in the table. The valid range for each parameter is -99.9999 to 99.9999.

8. Click **Add Another Row.**

9. You can add as many rows in this table as you require. However, you need to enter relevant parameters for each new row.

10. You can also use the Excel import/export feature to add the Prepayment rate information.

11. Define the Seasonality assumptions as required to model date specific adjustments to the annual prepayment rate. Inputs act as a multiplier, For example, an input of 2 will double the prepayment rate in the indicated month.

13.1.9   Defining Early Redemption Assumptions

If you are working with deposit products, it is possible to define Early Redemption assumptions within the Prepayment Rule. While defining assumptions, the Prepayment rule will consider whether or not the product is an asset or liability (based on the account type attribute defined in dimension member management). If the product is an asset, then the Prepayments tab will be active in the prepayment assumption detail page. If the product is a liability, then the Early Redemption tab will be active.

Prerequisites

- Performing basic steps for creating or updating a Prepayment rule.

- To define Early Redemption assumptions, the account type for the selected product must be a Liability.

Procedure

The procedure for defining Early Redemptions is the same as noted above for prepayments, with two exceptions:

- The list of Calculation Methods is limited to Constant and Prepayment Models

- The range definitions are based on Maturity Date ranges of the instruments rather than Origination Date ranges

Users also have two options for determining the timing of the early redemption assumption. Options include:

- Use Payment Dates: This is the default option. If selected early redemption runoff will occur on scheduled payment dates only.

- User Defined Redemption Tenors: If selected, users can specify any runoff timing. For example, users might choose to define the early redemption to a runoff on the first day of the forecast.

To define Early Redemptions within the Prepayment Rule, follow the steps given below:

13.1.9.1   Use Payment Dates

1.   Select the **Use Payment Date**s option.

2.   Enter the Start Maturity and End Maturity Dates.

3.   The first cell in the Start Maturity Date column and all of the cells in the End Maturity Date column are read-only. This ensures that all possible Maturity dates have supporting reference values when Prepayment assumption lookups occur. Each row in the End Maturity Date column is filled in by the system when you click Add Row or save the rule. The first Start Maturity Date (in row 1) has a default value of January 1, 1900. When you enter a Start Maturity Date in the next row, the system inserts a date that is a day before the previous End Maturity Date field.

4.   Enter the annual prepayment rate percent that you want to apply to the instruments having origination dates in a particular Start Maturity-End Maturity Date range.

5.   The Percent column represents the actual annualized prepayment percentage that the system uses to generate the principal runoff during the cash flow calculations.

6.   Click Add Row to add additional rows and click the corresponding Delete icon to delete a row.

7.   You can add as many rows in this table as you require. However, you need to enter relevant parameters for each new row.

8.   You can use the Data Input Helper feature. For more information, see the Data Loader section.

9.   You can also use the Excel import/export feature to add the Prepayment rate information. For more details, see Excel Import/Export section.

13.1.9.2   User Defined Redemption Tenors

1.   Select the **User Defined Redemption Tenors** option. This option allows you to specify the term to runoff for the particular row.

2.   Enter the Start Maturity and End Maturity date ranges, add additional ranges as required using the Add Row button.

3.   You can calculate the prepayment rate based on Current/Reducing Balance and Annual/De-annual Prepayment Rate. Select the Balance Type as Current Balance or Reducing Balance.

4.   If the Balance Type is selected as Current Balance, then the prepayment amount will be calculated using CUR_PAR_BAL on As of Date. That is, without reducing the balance by any payment/prepayment that may have occurred between as of date and prepayment date.

5.   If the Balance Type is selected as Reducing Balance, then the prepayment amount will be calculated using balance as on Prepayment Date. That is, after reducing the

CUR_PAR_BAL by any payment/prepayment that may have occurred between as of date and prepayment date.

6. Select the Prepayment Rate Type as Annual Prepayment Rate Or De-annual Prepayment Rate.

7. When the Annual Prepayment Rate is selected then the prepayment rate entered in the screen is directly used. In the other case, the rate entered in the screen is de-annualized before calculating the prepayment amount.

8. Enter the Start Origination Date and End Origination Date ranges, add additional ranges as required using the Add Row button.

9. Enter the term to runoff tenor and multiplier for each of the date ranges.

10. Enter the early redemption runoff percentage for each of the date ranges.

11. Enter 'Repeat' if you want the same prepayment to occurs multiple times. By default, it is set to 1.

12. Click Add Row Delete.

13. Define Seasonality assumptions as required to model date specific adjustments to the annual prepayment rate or early redemption rate. Inputs act as a multiplier, for example, an input of 2 will double the runoff rate in the indicated month.

13.2 Associating Conditional Assumptions with Prepayment Rules

Note: OFSCE does not support use of conditional assumptions. This is a future functionality under development.

Oracle Cash Flow Engine extends the setup and maintenance of assumptions by allowing users to integrate conditional logic (optional) into the setup of, prepayment methods. You can define prepayment methodologies using IF-THEN-ELSE logic based on the underlying characteristics of your financial instruments, such as dates, rates, balances, and code values. The Conditional Assumption UI is accessed from the Assumption Browser by selecting the Conditional Assumption icon.

The conditional logic is defined through the use of Data Filters and/or Maps. These existing objects provide the building blocks for defining Conditional logic. For example, each Data Filter can provide the logic for a specific condition. In the example below, the where clause is "Adjustable Type Code = 'Adjustable Rate'". This type of Data Filter can be selected within the Conditional Assumption UI.

Similarly, a Mapper object provides the necessary reference to one or more hierarchies, when dimension / hierarchy data is needed to define conditional logic. In the example below, this map refers to a hierarchy created on the Organization Unit dimension.

NOTE	Maps are accessed from the Infrastructure (HOME) page. You can find them at the following path:
	Navigate to Common Object Maintenance, select Unified Analytical Metadata, then select Map Maintenance.

To create a map, use the following steps:

1. Navigate to **Map Maintenance**.

2. Select icon to create a new Map.

3. On the left-hand side, select one or more hierarchies that were enabled in the initial step.

4. Fill in the required information, that is Name, Effective Dates, and Entity Name.

5. Click the **Save** button.

6. From the **Map Maintenance** summary page, select the Map and the icon for " Mapper Maintenance".

Here, you will see the hierarchy and all parent/child relationships.

The range of product attributes supported for conditional assumptions and available for use within Data Filters is determined by columns that are part of the "Portfolio" definition. The "Portfolio" table class is seeded with the installation and can be extended to include user defined columns.

For more information on adding user defined columns to the Portfolio table class, see Data Model Utilities Guide.

When using mappers, Conditional Assumptions can be attached to any level of the hierarchy, allowing assumptions to be inherited from parent nodes by child nodes.

For example, you can use the Org Unit column to drive the assignment of Transfer Pricing Methods for all members of a particular Organization. You can create one Conditional Assumption to convey the entire Transfer Pricing Methodology logic and attach it to the top-level node of the Org Unit hierarchy. All nodes below the top-level node will inherit the same Transfer Pricing assumption.

The logic included in a Conditional Assumption determines the specific Transfer Pricing method, Prepayment assumption or Adjustment Rule system will that assign to each individual instrument record at run time.

The Conditional Assumption screen allows users to select explicit conditions (from Data Filters and/or Maps) and apply methods and rule selections to each condition directly. The Filter Conditions are processed engine in the order that they appear on the screen. As soon as a condition is satisfied, the related assumption is applied.

If an instrument record does not meet any of the conditions, then the rule logic reverts to the standard assumption that is directly assigned to the Product / Currency combination. In the example below, you can see that Fed Funds has both a direct assignment and a conditional assumption. If the condition is not met, the "Fixed Rate" assumption (ELSE

condition) will be applied. In the case of Reverse Repo's, there is only a Conditional Assumption. In the absence of an ELSE assumption, the engine will use the conditional assumption in all cases for the Product/Currency pair. To avoid this, users should define the Standard/Else assumption with appropriate input.

Conditional Assumptions can be applied only to detailed account records (data stored in the Instrument Tables).

14   Prepayment Models

This module describes the procedure to build prepayment models using Prepayment Model Rules.

Topics:

- [Overview of Prepayment Models](#)
- [Creating Prepayment Models](#)
- [Editing Prepayment Models](#)
- [Prepayment Rate Data Loader](#)

14.1   Overview of Prepayment Models

The Prepayment Model rule allows you to build custom prepayment models. These prepayment models can be referenced by a Prepayment Rule to model prepayment behavior of instruments based on a range of instrument level attributes.

The procedure for working with and managing Prepayment Models is similar to that of other assumption rules. It includes the following steps:

- Searching for Prepayment Models. For more information, see the Searching for Rules section.
- Creating Prepayment Models, For more information, see the [Creating Rules](#) section.
- Viewing and Editing Prepayment Models, For more information, see the [Viewing and Editing Rules](#) section.
- Copying Prepayment Models. For more information, see the [Copying Rules](#) section.
- Deleting Prepayment Models. For more information, see the [Deleting Rules](#) section.
- Loading Prepayment Models through a staging table. For more information, see the [Prepayment Rate Data Loader](#) section.

14.2   Creating Prepayment Models

Creating a Prepayment Model comprises the following sub procedures:

1. Creating Prepayment Models
2. Defining the structure of the prepayment model
3. Assigning Node Values

This table describes key terms used for this procedure.

Table: Fields to create Prepayment Model

Term	Description
Dimension	Influences the prepayment behavior of an instrument. You can build a prepayment model using up to three prepayment dimensions. Each dimension maps to an attribute of the underlying transaction (For example, age/term or rate and so on) so the cash flow engine can apply a different prepayment rate based on the specific characteristics of the record.
Lookup method	Used to calculate prepayment rates for the prepayment dimension values that do not fall exactly on the defined pre-payment dimension nodes. Oracle Asset Liability Management offers the following lookup methods: • **Interpolation**: Under this method, the prepayment rates are determined by calculating an exact value on an axis. This method assumes that prepayment speeds change on a straight-line basis between the two nodes and calculates accordingly • **Range**: Under this method, the prepayment rates are determined by calculating a range of values on an axis. This method assumes that the prepayment speed will remain the same for the entire range. The following example explains the differences between these two lookup methods. The following lists show the age and corresponding prepayment rates of instruments. **Age** 12 24 36 60 **Prepayment Rates** 5 10 15 20 Under the Interpolation method, the prepayment speeds increase gradually. In this example, the Interpolated prepayment rate of an instrument aged 30 months is 12.5%. This is exactly halfway between the 10% and 15% rate. However, the Range method, the Prepayment speeds increase in steps. Using the Range method, the prepayment rate is 10%, as this rate percentage would apply to the range from 24 months to 35.9999 months.

Term	Description
Nodes	Exact points for each dimension where attribute information has been defined.
Prepayment Rate Calculation	Select Manual, Integrated Model, or External models. For more information, see the Prepayment Rate Calculation section. Note: Only 'Manual' option is available to in CFE.

1. Navigate to the **Prepayment Model** summary page.

2. Complete standard steps for this procedure. For more information, see Creating Rules section.

3. In case of ALM/FTP/BSP, select prepayment rate calculation which could either be manual, integrated or external model.

14.2.1 Defining the Structure of the Prepayment Model

The Prepayment Model consists of the Prepayment Dimensions and the Bucket Values for these Dimensions which you select on this page. To define the prepayment model structure, you can select a maximum of three prepayment dimensions. Once the dimensions and the number of buckets (tiers) are defined, you need to assign values to the buckets.

Follow the steps mentioned in Manual section of Prepayment Model Calculation.

14.2.2   Prepayment Rate Calculation

Select Manual, Integrated Model, or external models. For Manual mode, You can choose any Prepayment dimension (max. three), define buckets, bucket values and finally explicitly populate prepayment rate matrix. For Integrated Model, prepayment dimension, used in Model would be auto populated as per the selected model. For external mode, you need to define the equation which would later be used for prepayment rate calculations.

14.2.2.1   Manual

Using Manual method, you can select maximum of three prepayment dimension and assign prepayment rates manually to selected dimension.

> **NOTE**   You can use the analogy of a three dimensional table to understand how to deal with the prepayment dimensions. The first dimension you select would resemble the row (X-axis). The second dimension would act as the column (Y-axis). The final third dimension will be the page (Z-axis).

Below are the steps for Manual method

1. Select the first Dimension.

2. Select a lookup method for that Dimension.

3. Enter the number of Buckets for the Dimension.

4. This number may vary from dimension to dimension.

5. If required, repeat the previous three steps for up to two additional Dimensions.

6. Click **Apply**.

   The *Define Dimensions* page is refreshed. You can now assign the bucket values for each dimension. At this point, you can also modify the structure of the table, if required.

   Modifying the Table Structure

   - To add more buckets to a particular Dimension, update the number of buckets for the Dimension and click **Apply**.

   - To delete buckets from a particular Dimension, reduce the number of buckets to the desired value and click **Apply**.

> **NOTE**   There are certain restrictions while defining Dimensions:
> - You must select the Dimension type for a row and define the values for that dimension.
> - You cannot define the second (row) dimension until you have defined the first (row) dimension. Similarly, the third dimension cannot be defined until you have defined the first two dimensions.

7. Assign values for each of the buckets.
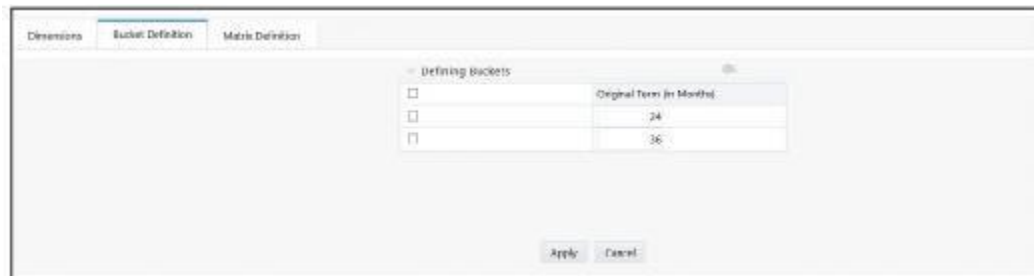
8. Click **Apply**.

   The Prepayment Model, Prepayment Dimensions, and Buckets are saved.

9. Enter the Prepayment Rates in the Prepayment Model.

   Bucket values for the row and column dimensions are displayed as a table, while the bucket values for the page dimensions (if selected) are shown in the drop down list.
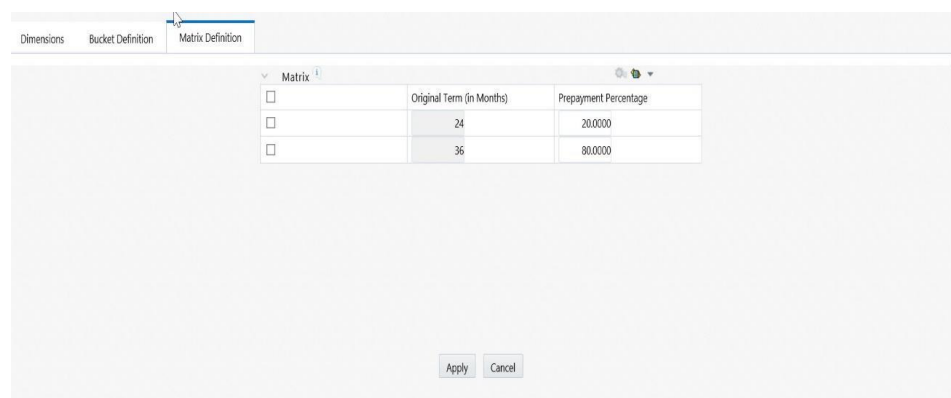
10. Repeat the process for all bucket values of the page driver. To change the bucket value along the page driver, select the

required value from the drop-down list.

> **NOTE** Bucket values will be displayed in the drop-down list only if you selected three drivers.

11. Click **Apply**. The Prepayment Rates are saved and the Prepayment Model Rule summary page is displayed.

14.2.3   Integrated Model

Note: This section is not applicable for CFE.

In Integrated Model option, User has the option to select one of the already saved/confirmed Models. For more information on how Model is defined, please check (a link to chapter: Prepayment Model analysis)

Below steps details how Integrated Model can be used.

1. Select Integrated Model name from Model Name drop-down list. You can click Model Search to search an Integrated Model. You can filter models based on product and currency.
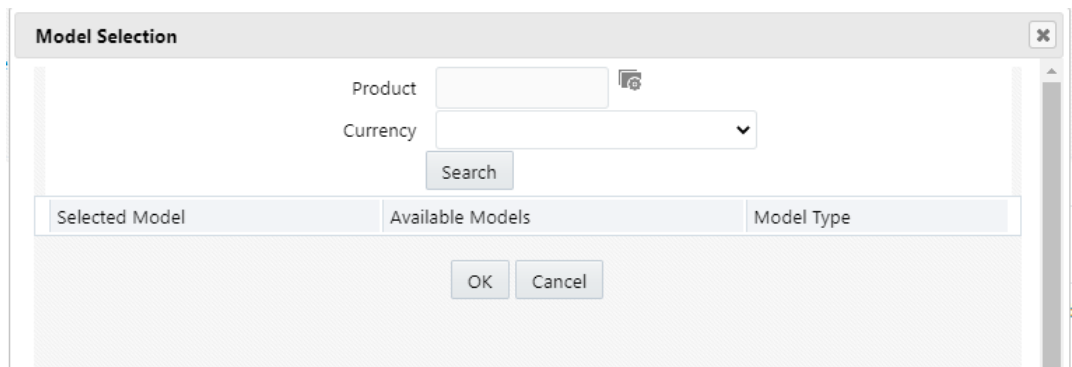
2. Click Apply after selecting Model.

3. Model dimensions would be locked out based on the selected model. Still you need to select lookup method and buckets for each dimension.

4. Define the bucket values for each model dimension.

5. In this mode, prepayment rates would be auto calculated based on the selected model and buckets definition for each dimension. As shown in below screen, click 'Apply' to populate prepayment rate matrix. If user would like, one can still edit the values for few cells in prepayment matrix and 'Save'.

   Note: User needs to click on Apply on each page level to save Prepayment rate displayed on that page.

6. In case, model has calculated negative prepayment rate for few cells based on bucket values, you would not be able save the prepayment matrix until all the

Operator	Coefficient	Dimension	Power
+	2	Intercept	Disabled
+	1.5	Original Term	2
+	3	Rate Diff	2

negative values has been manually updated by the user; as only zero or positive prepayment rates are allowed.

7. A 'Reset' button is given, in case user changed a few cellsand didn't click apply/save on that page. You can still get the model calculated prepayment rates back again after pressing 'Reset'.

14.2.4 External Model

When you select External Model, Define Equation button will get activated to use external prepayment model. This is useful, when you want to do prepayment modelling outside OFSAA and use the model equation to calculate prepayment rates. Following screen would appear to define the model equation:

1 Define the Dimensions and click Define Equation.

8. Define the equation.

For Example:

Equation becomes:

2 + 1.5 * original Term ^ 2 + 3 * Rate Diff ^ 2

NOTE	Before defining equation, you must select dimensions and accordingly dimensions dropdown will display values along with **Intercept**. For example, if you have already chosen Original term and Rate Difference as dimensions, then Dimension drop-down list would displays the following three values:
	• Intercept
	• Original Term
	• Rate Difference
	Following mathematical operators are available: +, -, /and *. After defining all coefficients, Power, operators , click Equation to get the model equation. A confirmation message is displayed. Click Ok to use the same for prepayment rate calculations.
	You can add new row for each term using Add ✚. Multiple rows can be added using Add Multiple Rows 🔳 .

9. Click Apply on Define Equation window. Click Cancel to navigate back to Prepayment Matrix Screen window.

   Once buckets are defined for final prepayment matrix, matrix would be auto populated.

10. Click Apply to save the final prepayment rates matrix as per your defined buckets.

11. In case, model has calculated negative prepayment rate for few cells based on bucket values, you would not be able save the prepayment matrix until all the negative values has been manually updated by the user; as only zero or positive prepayment rates are allowed.

12. A 'Reset' button is given, in case user changed a few cells and didn't click apply/save on that page. You can still get the model calculated prepayment rates back again after pressing 'Reset'.

14.3   Editing Prepayment Models

As part of editing Prepayment models, you can modify Prepayment rates and the structure of the Prepayment Model. You can also modify the lookup methods (Range or

Interpolation), the number of Buckets, and the actual values of the Buckets. However, if you update the dimensions your previously entered prepayment rate data may be lost.

> **NOTE**   Predefined Prepayment Models are the Prerequisites.

To edit an existing Prepayment Model, perform these steps:

1. Search for the Prepayment Model, which you want to edit. For more information, refer to Searching for Rules section.

2. Select the check box next to the Prepayment Model and select the **Edit.** The Prepayment Model opens in Edit mode.

3. Modify the Prepayment Rates in the table as required.

4. Click Update Dimensions Values. The **Update Dimensions** page is displayed.

   a. Update the structure as required.

      — To add more Nodes to a particular Dimension, update the number of Nodes for the Dimension and click Go.

      — To delete Nodes from a particular Dimension, click the delete icon corresponding to the Node.

   > **NOTE**   Nodes cannot be deleted by reducing their numbers. Also, all Nodes cannot be deleted and at least one Node must exist in each Dimension.

      — To change the method of a particular Dimension, select the required method from the corresponding list.

      — To change the value of a Node, update the value in the corresponding field.

   b. Click Apply.

   The **Prepayment Model summary** page is displayed.

5. Once the basic structure of the prepayment model has been created, prepayment rates can be added to, or modified for, each of the bucket values along the chosen dimensions. Use this procedure to add or edit annual prepayment rates in the prepayment model.

   a. Search for the Prepayment Model, for which you want to define prepayment rates. For more information, see the Searching for Rules section.

   b. Select the check box next to the Prepayment Model and select the Edit icon.

      The Prepayment rate input page is displayed.

   c. Enter the Prepayment Rates in the Prepayment Model for the required dimensions.

Node values for the row and column dimension are displayed as a table on the Prepayment rate input, while the node values for page dimension (if selected) are shown in the drop-down list.

d.   Repeat the process for all node values of the page dimension. To change the node value along the page dimension, select the required node value from the drop-down list.

> **NOTE**   Node values will be displayed in the drop-down list only if you selected three dimensions. If prepayment rates are left blank for any of the dimensions, prepayment rates are assumed to be zero.

6.   Click Apply. The table with updated prepayment rates is saved.

7.   Click Save. All updates to the Prepayment Model are saved and the Prepayment Model summary page is displayed.

> **NOTE**   In case of ALM/FTP/BSP, you can edit Prepayment Rate Calculation.
>
> As part of editing Prepayment Rate Calculation, you can change the Prepayment Rate Calculation and the structure of the Prepayment Model. When you change the Prepayment Rate Calculation, a confirmation message is displayed.
>
> Select the Prepayment Rate Calculation model from Prepayment Rate Calculation drop-down list.
>
> - If you select Prepayment Rate Calculation as Manual, you can edit Dimensions, Bucket Definition, and Market Definition.
> - If you select Prepayment Rate Calculation as Integrated, follow the instructions mentioned in Using Integrated Model section.
> - If you select Prepayment Rate Calculation as External, follow the instructions mentioned in Using External Model section.

14.4   Excel Import/Export

Excel import/export functionality is used for adding/editing prepayment rate information. For more details, refer to Excel Import/Export.

14.5   Prepayment Rate Data Loader

The Prepayment Rate Loader procedure populates prepayment model rates in OFSAA metadata tables from staging tables. This loader program can be used to update the prepayment model rates on a periodic basis. For more information on setting up the automated process, see the Data Model Utilities User Guide.

To execute the Data loader process, click the Data Loader icon on the Prepayment Models rule bar. The process will load all of the data included in the staging tables as defined in the Data Model Utilities User Guide.

15   Forecast Rates Scenarios

Forecast Rate scenario assumptions allow you to define future interest rates, future economic indicators, future currency exchange rates, future interest rate volatility, and also select behavior pattern rule for cash flow calculation. Interest rate forecasts are used to project cash flows, including pricing new business, repricing existing business, calculating prepayments, and determining discount methods. Interest rate volatility forecast are used for option valuation. Economic Indicator forecasts are used to calculate cash flow for inflation-indexed instruments, included in behavioral modeling and scenario or stress analysis. Currency exchange rate forecasts are used to account for the effects of currency fluctuations on income.

Note: Interest rate volatility surface and currency exchange rates are not applicable to Cash Flow Engine. They are used by Asset Liability Management

The Forecast Rate assumptions use interest rate, volatility, economic indicator, and currency codes defined in Rate Management, including all the Active and Reporting currencies and the primary, or functional, currency at your institution. For information on how to define Interest Rates, Volatility Surface, Economic Indicators, and Currency Exchange Rates, see the Rate Management section.

This module describes how to create a Forecast Rates assumption rule to forecast cash flows and, if you work with multiple currencies, to model relationships between interest rates and exchange rates.

Topics

- Overview of Forecast Rates Rule
- Creating Forecast Rate Rule
- Defining Interest Rate Forecast
- Behavior Pattern Rule Mapping

15.1   Overview of Forecast Rates Rule

The Forecast Rate rule summary page allows you to perform the following tasks:

- Searching for Forecast Rates.
- Viewing and Updating Forecast Rates.
- Copying Forecast Rates.
- Perform dependency check.
- Deleting Forecast Rates.

Figure: Forecast Rates Summary page
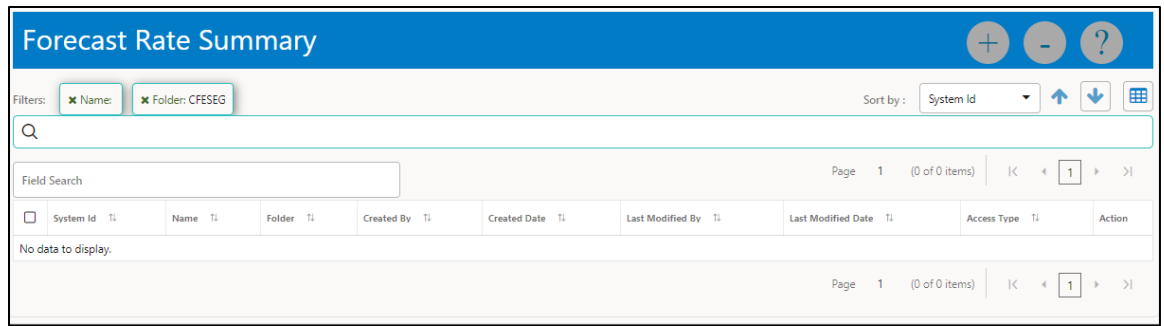
The definitions based on the search criteria are listed under List of Forecast Rates. This is the search section that contains multiple parameters. You can specify one or multiple search criteria in this section. When you click Search, depending upon the search criteria, these filters display the relevant search combination parameters under the Forecast Rate Summary as a list.
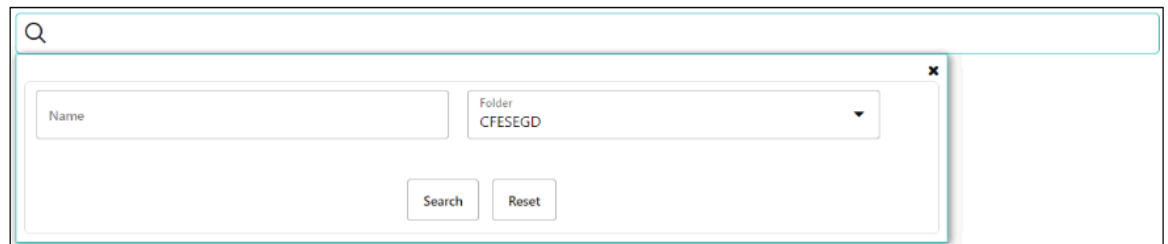
The displayed list can be further reduced by typing the value in the Filed Search box.

The Forecast Rate Summary table displays the following columns.

Table: Forecast Rate rule summary– Fields and Descriptions

Column	Description
System ID	Displays the System ID of Forecast Rate rule.
Name	Displays the Forecast Rate rule's short name.
Folder	Displays the Folder name where the Forecast Rate rule is saved.
Created By	Displays the Name of the user who created the Forecast Rate rule.
Created Date	Displays the Date and Time when Forecast Rate was created.
Last Modified By	Displays the Name of the user who last modified the Forecast Rate rule.
Last Modified Date	Displays the Date and Time when Forecast Rate was modified last.
Access Type	Displays the access type of rule. It can be Read-Only or Read/Write.

Column	Description
Action	Displays the list of actions that can be performed on the Forecast Rate rule. For more information, see Forecast rule – Icons and Descriptions.

The Action column on the Forecast Rate Summary page offers several actions that allow you to perform different functions. The following actions are available for the Forecast Rate rule.

Table: Forecast Rate rule – Icons and Descriptions

Fields	Description
Add	Click **Add** ⊕ icon at the top right of the summary page to build a new Forecast Rate rule.
Multiple Delete	Select one or more rules in the table and then click the (-) icon at the top right of the summary page to delete more than one rule at the same time.
View/Edit	Click ••• in the **Action** column and select **View/Edit** to view or edit the contents of a Forecast Rate rule in read/write format. Depending on user privileges the rule will open in either View or Edit mode.
Save As	Click ••• in the **Action** column and select **Save As** to create a copy of an existing Forecast Rate rule.
Delete	Click ••• in the **Action** column and select **Delete** to delete an existing Forecast Rate rule.
Dependency Check	Click ••• in the **Action** column and select **Dependency Check** to generate a report on all rules that utilize your selected Forecast Rate.
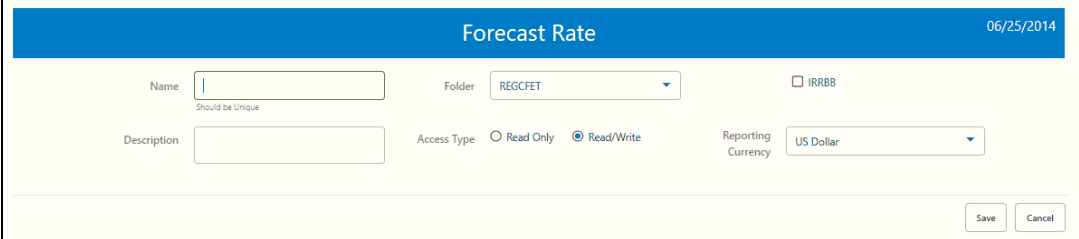
For more information, see the following sections:

- Creating Forecast Rate Rule
- Defining Interest Rate Forecast
- Behavior Pattern Mapping

15.2   Creating Forecast Rate Rule

To navigate to the **Forecast Rate** window, click **Cash Flow Engine** and click **Assumption Specification**, and then select **Forecast Rates**.

1. Click icon from the top of the **Forecast Rate** summary page.

2. Enter the following Details.

Parameter	Description
Name	Enter the name of the Forecast Rate rule.
Description	Enter the description of the Forecast Rate rule. This is an optional field.
Folder	Select the Folder where the Forecast Rate rule needs to be saved.
Access Type	Select the Access Type as Read-Only or Read/Write.
IRRBB	Select this checkbox if any scenario in the Forecast Rate rule is used as an IRRBB Standardized or Enhanced approach scenario.
Reporting Currency	Currencies that were marked as 'Reporting Currency' in Rate Management appear for selection here. Select one reporting currency. When you select a currency other than the reporting currency, the options under Currency Forecast Method provide several ways to model relationships between exchange rates and interest rates.

3. Click **Save**, if you want to save the Forecast Rate and update it later.

15.3   Defining Interest Rate Forecast

The IRCs for all active currencies (and reporting currencies, a subset of the active currencies) are listed under Interest Rate Curve section. The options under Interest Rate Code Forecast Method provide multiple ways to model the effects on portfolio cash flows due to interest rate changes.
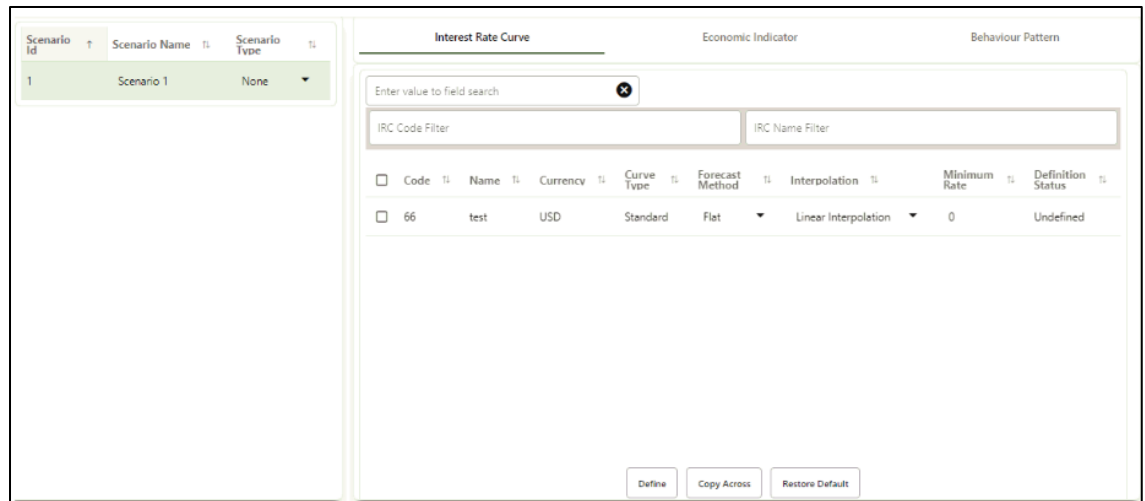
You can define Interest Rate Forecast for the following methods:

Method	Description
Flat	Forecast no change in the interest rate for all dates beginning with the as-of date.
Direct Input	Type interest rates directly for any modeling period or interest rate term.

The following Interpolation Methods are available.

Method	Description
Linear Interpolation	Linear interpolation uses linear yield curve smoothing. Linear yield curves are continuous but not smooth; at each knot point, there is a kink in the yield curve. You may not want to use a linear yield curve with a model that assumes the existence of a continuous forward rate curve, due to the nonlinear and discontinuous knot points of a linear yield curve.
Cubic Spline of Yields	A cubic spline is a series of third-degree polynomials that have the form: $$y = a + bx + cx^2 + dx^3$$ These polynomials are used to connect the dots formed by observable data. The polynomials are constrained so they fit together smoothly at each knot point (the observable data point.) This means that the slope and the rate of change in the slope with respect to time to maturity have to be equal for each polynomial at the knot point where they join. If this is not true,

Method	Description
	there is a kink in the yield curve and they are continuous but not differentiable.
	Two more constraints make the cubic spline curve unique. The first restricts the zero-maturity yield to equal the 1-day interest rate. The second restricts the yield curve at the longest maturity to be either straight (y"=0) or flat (y'=0).
Quartic Spline	Quartic interpolation requires a minimum of 4 knot points. The quartic interpolation equation can be represented as:
	$Y = a + bX + cX^2 + dX^3 + eX^4$
	The end knot points satisfy equations for one curve and all intermediate points satisfy two curves. Therefore, in a scenario with a minimum number of knot points, there are 6 equations. For n number of knot points, the number of equations is 2n-2. If n is the number of points to be interpolated, the order of the matrix to be formed is 5*(n-1) x 5*(n-1). The matrix is formed according to the following logic:
	The second derivative at the endpoints and the first derivative of the last point is Zero. At the points other than the endpoints, the value of the first derivatives, second derivatives, and the third derivatives of the function are equal.

In looking up the Forecast Rates, the Cash Flow Engine (where necessary) performs an interpolation between yield curve term points. For example, in determining a three-month rate from a yield curve that contains only a one-month rate and a six-month rate, the Cash Flow Engine performs an interpolation to determine the implied three-month rate. The **Interpolation** method used is defined by the selected interpolation method for the Interest Rate Curve.

You can generate the forecast rates for 360 calendar months starting from As of Date.

- Flat Method:

  a. Select Interest Rate Code using corresponding checkbox and select Forecast Method as Flat.

  b. Select the **Interpolation** method.

  c. Input Minimum Rate, if required.

  d. Click Define. The status of the Interest Rate Code is changed to Defined.

- Direct Input

  a. Select Interest Rate Code using corresponding checkbox and select Forecast Method as Direct Input.

    b. Select the **Interpolation** method.

    c. Input Minimum Rate, if required.

    d. Click Define. The Direct Input window is displayed:

    e. Enter data and click Apply.

    f. The status of the Interest Rate Code is changed to Defined.

    Use the **Excel Import or Export** feature to add the interest rates.

15.4 Behavior Pattern Rule Mapping

The **Behavior Pattern Rule Mapping** drop-down list shows the list of existing Behavior Pattern Rule. Select any behavior pattern rule to map with the current forecast scenario. To map a Behavior pattern to all the forecast scenarios, use the **Apply to All Scenarios** check box. For more information about the Behavior Pattern Rule, see the Behavior Pattern Rule section.

1. Navigate to the **Behavior Pattern Rule** section. Select Behavior Pattern Rule from **BP Rule To Be Applied To Current Scenario** drop-down list. Enable **Apply to All Scenarios** check box if you want to apply the selected Behavior Pattern Rule to all scenarios.

2. Click **Apply**.

16   Cash Flow Processing

This module discusses the procedure for creating and executing the Cash Flow Process. When all the required assumptions are defined, CFE Processing performs the calculation and generates a result set.

Topics

- Overview of Cash Flow Processing
- Creating Cash Flow Process
- Executing Cash Flow Process
- View Cash Flow Process log

16.1   Overview of Cash Flow Processing

The cash flow process allows you to perform the following tasks:

- Determine the data that you want to process.
- Submit to the CFE processing engine the modelling horizon for which you want to calculate cash flows.
- Specify the prepayment rule, forecast rate, and other assumptions to be used in the process.
- Define the output preferences.
- Execute the Cash Flow process and generate results.

The Cash Flow Process summary page allows you to do the following:

- Create a new process.
- Searching for Cash Flow processes. For more information, see the Searching for Rules section.
- Viewing and Updating Cash Flow processes. For more information, see the Viewing and Editing Rules section.
- Copying Cash Flow processes. For more information, see the Copying Rules section.
- Deleting Cash Flow processes. For more information, see the Deleting Rules section.
- Execute process.
- View Execution Details.

Figure: Cash Flow Process Summary page
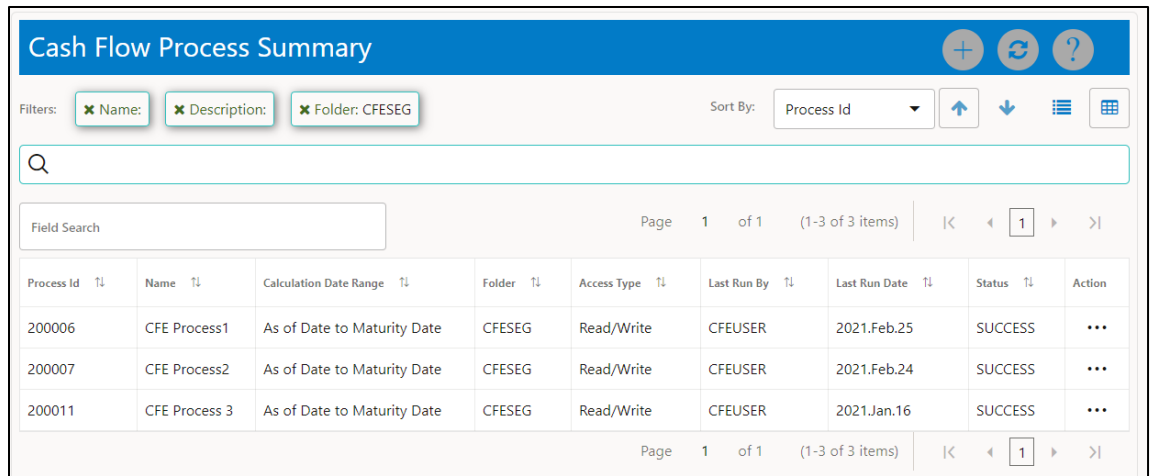
The definitions based on the search criteria are listed under the List of Cash Flow Process. This is the search section that contains multiple parameters. You can specify one or multiple search criteria in this section. When you click Search, depending upon the search criteria, this filters and displays the relevant search combination parameters under the Cash Flow Process Summary as a list.
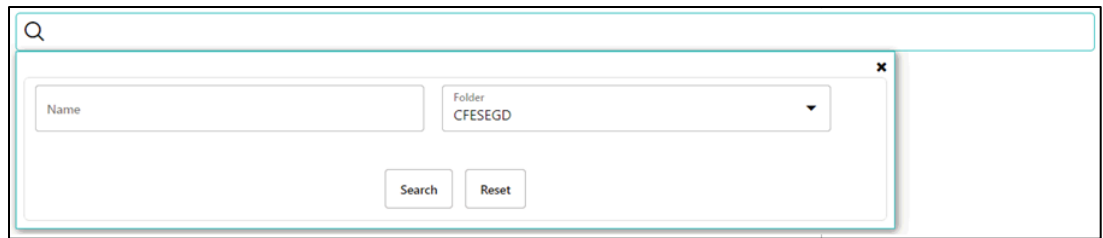
The Cash Flow Process Summary window displays the following columns.

Table: Cash Flow Process rule – Fields and Descriptions

Column	Description
Process ID	Displays the Process ID of Cash Flow Process rule.
Name	Displays the Cash Flow Process rule's short name.
Calculation Date Range	Displays the calculation date range for which process is defined.
Folder	Displays the Folder name where the Cash Flow Process rule is saved.
Access Type	Displays the access type of rule. It can be Read-Only or Read/Write.
Last Run By	Displays the Name of the user who last runs the Cash Flow Edit rule.
Last Run Date	Displays the Date and Time when Cash Flow Process was run last.
Status	Displays the status of the rule.

Column	Description
Action	Displays the list of actions that can be performed on the Cash Flow Process rule. For more information, see [Cash Flow Process rule – Icons and Descriptions](#).

The Action column on the Cash Flow Process Summary page offers several actions that allow you to perform different functions. The following actions are available for the Cash Flow Process rule.

Table: Cash Flow Process rule – Icons and Descriptions

Fields	Description
Add	Click **Add** ⊕ icon to build a new Cash Flow Process rule.
View/Edit	Click ••• in the **Action** column and select **View/Edit** to view or edit the contents of a Cash Flow Process rule in read/write format.
Save As	Click ••• in the **Action** column and select **Save As** to create a copy of an existing Cash Flow Process rule.
Delete	Click ••• in the **Action** column and select **Delete** to delete an existing Cash Flow Process rule.
Execute	Click ••• in the **Action** column and select **Execute** to execute an existing Cash Flow Process rule. After clicking **Execute**, the Run Parameter Execution window is displayed. Select As of Date (Execution Date) and Legal Entity, and then click **Run**. For more information, see Executing Cash Flow Process section.
Execute Details	Click ••• in the **Action** column and select **Execute Details** to view execution details of the Cash Flow Process rule.

For more information, see the following sections:

- [Creating Cash Flow Processes](#)
- [Executing Cash Flow Processes](#)

16.2 Creating Cash Flow Process

To create a new Cash Flow process, perform the following steps:

1. Navigate to the **Cash Flow Process Summary** page.

2. Click **Add** ⊕. The **Create Cash Flow Process** page is displayed.

Figure: Creating Cash Flow Process

3. Enter the details shown in the following table.

Table: List of process details used for Creating Cash Flow Process

Parameter	Description
Name	Enter the name of the Cash Flow Process rule.
Description	Enter the description of the Cash Flow Process rule.
Folder	Select the Folder where the Cash Flow Process needs to be saved.
Access Type	Select the Access Type as Read-Only or Read/Write.

4. Click **Apply** to navigate to the Source Data section.

5. Enter the Source Data details shown in the following table.

Table: List of Source Data details used for Creating Cash Flow Process

Parameter	Description
Data Source	This field allows you to select the Instrument tables that must be included in a Cash Flow process.
Data Filter Folder	Select the Folder from which you want to apply Data Filter.
Data Filter	This field allows you to select a subset of data for processing by selecting a filter that was previously created.

6. Click **Apply** to navigate to the **Calculation Elements** section.

7. Enter the Calculation Elements shown in the following table.

Table: List of Calculation Elements details used for Creating Cash Flow Process

Parameter	Description
Calculation Date Range	Select the time horizon for which you want to perform the cash flow calculation. This has the following options: • As of Date to Maturity Date: Calculation is performed between As of Date and Maturity Date of the instrument. • As of Date to Next Reprice Date: Calculation is performed between As of Date and Next Repricing Date of the instrument. • Origination Date to Maturity Date: Calculation is performed between Origination Date to Maturity Date of the instrument. • Last Reprice Date to Next Reprice Date: Calculation is performed between Last Reprice Date to Next Reprice Date of the instrument. For more information, see the Cash Flow Engine Data Dictionary Guide.
Prepaymen t Rule	Select the Prepayment Rule you want to be applied during cash flow calculation. See Prepayment Rule, to set up prepayment methods. This is an optional step.

Parameter	Description
Forecast Rate Scenario	Select the Forecast Rates rule you want to be applied to the process. See Forecast Rate Scenarios to set up rate scenarios. This is an optional step and enabled only when the calculation data range is 'As of Date to Maturity Date'.
Enable Holiday Calendar	Select Yes or No from **Enable Holiday Calendar** drop-down list. No is selected by default. If this is selected as Yes, then cash flow dates falling on a holiday get adjusted as per defined conventions. You can also select the holiday calculation option, calendar, and business day convention at the product-currency level.
Amortization of Premiums and Discounts	Determines the method used for amortizing the premiums and discounts. This has the following options: • **Do not Calculate:** The default value for the Calculation Method drop-down list is **Do not calculate**. In this case, cash flow for premium/discount does not get calculated even when Deferred Balance is given with instrument data. • **Amortize on Payment Dates:** Select this option if you want to calculate premiums and discounts on Payment Dates. • **Amortize on User Defined Dates**: Select this option if you want to calculate premiums and discounts on user-defined dates instead of payment dates. After selecting this option, perform these steps: a. Click **Add** ⊕ next to **Selected Dates** field. b. Add one or more dates on which you want to amortize premium/discount using **Calendar** 📅 and click **Add to Selection**.

Parameter	Description
Product Hierarchy Folder	You can specify some processing parameters at product-currency combination. To do product hierarchy is used. Select the Folder from the **Product Hierarchy Folde**r list and Product Hierarchy on which you want to specify parameters: 1. Click **Add** ➕ next to the **Product Hierarchy** field. 2. Select one or more products using the corresponding check-box and click **Done**.

8. Click **Add** to add the defined calculation elements for processing**.** The list of product is displayed with the following details:

Parameter	Description
Product	Shows the selected product details.
Currency	Shows the currency of the selected product.
Include Accrued Interest	Yes or No status of Include Accrued Interest. The basis on which the interest accrual on an account is calculated.
Interest Credited	Yes or No status of Interest Credited. This option shows the interest payments to be capitalized as principal on simple or non-amortizing instruments.

Parameter	Description
Model With Gross Rates	If the institution has outsourced loan serving rights for some of the assets (most typically mortgages), the rates paid by customers on those assets (gross rates) are greater than the rates received by the bank (net rates). For these instruments, both a net and gross rate is calculated within the cash flow engine and both gross and net rate financial elements are the output. The gross rate is used for prepayment and amortization calculations. The net rate is used for income simulation and the calculation of retained earnings in the auto-balancing process.
Holiday Calculation option	This option includes the same holiday calendar definition as in the Shift Dates Only option, but it also takes one additional step to recalculate the interest payment amount (and interest accruals) based on the actual number of days in the (adjusted) payment period. The instrument records use the payment frequency (term and multiplier) and the re-price frequency (term and multiplier) in association with the next/last payment date and next/last re-pricing date to determine when the cash flow will post. The CFE logic is enhanced to acknowledge holiday dates and re-compute the payment/interest amount given the change in days. Also, the engine gets back on the scheduled track of payment events after a holiday event occurs in one (or many sequential) events.
Holiday Calendar	Shows the status of the Holiday Calendar
Holiday Rolling Convention	The default value is Unadjusted and is enabled, only when Holiday Calendar is selected. This can have the following values: • Actual/Un-adjusted: Payment on an actual day, even if it is a non-business day. • Following Business Day: The payment date is rolled to the next business day. • Modified following business day*: The payment date is rolled to the next business day unless doing so would cause the payment to be in the next calendar month, in which case the payment date is rolled to the previous business day. • Previous business day: The payment date is rolled to the previous business day. • Modified previous business day*: The payment date is rolled to the previous business day unless doing so would cause the payment to be in the previous calendar month,

Parameter	Description
	in which case the payment date is rolled to the next business day • Many institutions have month-end accounting procedures to use this.

9. Click **Apply** to navigate to the **Output Preferences** section.

10. Enter the **Output Preferences** details shown in the following table.

Table: List of Output Preferences details used for Creating Cash Flow Process

Parameter	Description
Forecast Interest Rates	Select the Interest Rate Curves for which you want the engine to write forecasted interest rates in the database table

11. Click Apply to navigate to the **Freeze Process** section.

12. Verify the changes and click **Save**.

16.3 Executing Cash Flow Process

The Execute option formulates and executes the CFE processing request and generates results.

Prerequisites

Predefined Cash Flow Process

To execute the cash flow process, follow these steps:

1. Navigate to the **Cash Flow Process** summary page.

2. Search for a rule.

3. Click ••• in the **Action** column and select Execute to execute an existing Cash Flow Process rule. The **Run Parameter Execution** window is displayed.

Select the As of Date (Execution Date) and Legal Entity, and then click Run.

4. The **Cash Flow Process Run Confirmation** page is displayed. The status of the process is displayed in the **Status** column. After completion of the process, you can navigate to the Execution Details page by selecting the **Execution Details** option under the **Action** column. From the **Execution Details**, you can access a report that provides details of any cash flow errors that were identified by the process.

16.4 View Cash Flow Process Log

To view the cash flow edit errors, warnings, and info, navigate to ftpshare/logs folder and view CashFlowProcessExecution.log and ForecastRatesServicesExecution.log files.

You can view the log using Batch Monitor also. To view the logs from Batch Monitor, follow these steps:

1. Navigate to Common Object Maintenance, select Operations, and then select Batch Monitor.

2. Select the Batch Run ID.

3. View the Task Details of CashFlowEditsExecution.

4. Click View Log.

16.4.1 Cash Flow Process Errors

NOTE	• Error: Engine does not process, however sometimes default value can get used for calculations. • Warning: Engine may use the default value or given wrong data for calculation, results may be incorrect. • Info: Does not impact any processing but results may not be as expected.

The following table stores the processing error messages generated by the engine:

Table: List of Error Codes for Cash Flow Process

Error Code	Error Type	Error Message
300	Functionality Not Implemented	Error
301	Invalid Data	Error
302	Principal Cash Flow Not Handled for this Amortization Type	Warning
303	Invalid record: Account Number is mandatory	Error
304	Invalid value for Adjustable Type, Fixed Rate used	Warning
305	Invalid value for amortization term, Number of months between Origination and maturity date used	Warning

Error Code	Error Type	Error Message
306	Invalid value for amortization term multiplier, Months (M) used	Warning
307	Invalid value for Instrument Type; Loan Contracts (180) used	Warning
308	Invalid value for original term; Number of months between Origination and maturity date used	Warning
309	Invalid value for original term multiplier; Months (M) used	Warning
310	Missing or invalid data version number. Default value 1 used	Warning
311	Invalid value for Model with Gross Rates, account processed with net interest rate	Warning
312	Invalid value for Interest Capitalization Indicator, account processed without interest capitalization	Warning
313	Invalid value for Include Accrued Interest in cash flow, account processed without using given accrued interest. Accrued Interest > 0 but not used	Warning
314	Invalid value for Amortization Type; processed as simple interest or non-amortizing	Warning
315	Invalid record: End of Period Principal Balance (CUR_PAR_BAL) is zero or missing; Account not processed	Error
316	Invalid record: Accrued Interest Net <> 0 and (Last_payment_date < As_of_date) for Behavior pattern record. Accrued interest may be overstated	Warning
317	Original Principal Balance is zero/negative or missing; End of Period Principal Balance (CUR_PAR_BAL) used	Warning
318	Invalid record: Behavior Type Code is mandatory	Warning
319	Invalid record: Calculation date range is mandatory	Error
320	Invalid record: As of Date is mandatory	Warning
321	Invalid record: Origination date is mandatory	Error
322	Invalid record: Maturity date is mandatory; Account not processed;	Warning

Error Code	Error Type	Error Message
323	Issue date cannot be greater than As-of-date; As-of-date used	Error
324	Issue date can not be greater than origination date; Origination date used	Error
325	Issue date not given; Origination date used	Warning
326	Remaining Number of Payments is 1 but Next Payment Date and Maturity Date are different. Payment processed on Maturity Date	Warning
327	Invalid value for accrual basis; Processed using 30/360	Warning
328	Invalid value of net interest rate; Processed using 0% interest rate	Warning
329	Invalid value for compounding basis; Processed as simple interest	Warning
330	Model with Gross Rates Indicator is GROSS but gross interest rate is not given; Processed using net interest rate	Warning
331	Current Payment cannot be less than 0; 0 used;	Warning
332	Invalid Last Interest Payment date; "Next Interest Payment Date minus Interest payment frequency" used.	Warning
333	Invalid next interest payment date; "Origination date + 1" or "As-of-date + 1" used.	Warning
334	Invalid original interest payment date; "Origination date + Interest Payment frequency" used.	Warning
335	Invalid value for interest payment frequency; Number of months between Origination and maturity date used;	Warning
336	Invalid value for interest payment frequency multiplier; Months (M) used;	Warning
337	Invalid value for Remaining Number of Payments; Default value 1 used;	Warning
338	Invalid Last Interest Payment date; "Origination Date" used.	Warning
339	Invalid Last Principal Payment date; "Next Principal Payment Date minus Principal payment frequency" used	Warning

Error Code	Error Type	Error Message
340	Invalid Last Principal Payment date; "Origination Date" used.	Warning
341	Invalid Last Principal Payment date; Last Interest Payment Date used for conventional amortization types	Warning
342	Invalid next principal payment date; "Origination date + 1" or "As-of-date + 1" used	Warning
343	Invalid Next Principal Payment date; Next Interest Payment Date used for conventional amortization types	Warning
344	Invalid original principal payment date; "Origination date + Interest Payment frequency" used.	Warning
345	Invalid Original Principal Payment date; Original Interest Payment Date used for conventional amortization types	Warning
346	Invalid value for principal payment frequency; Number of months between Origination and maturity date used;	Warning
347	Invalid value for principal payment frequency; Interest Payment Frequency used for conventional amortization types	Warning
348	Invalid value for interest payment frequency multiplier; Months (M) used;	Warning
349	Invalid value for interest payment frequency multiplier; Interest Payment Frequency Multiplier used for conventional amortization types	Warning
350	Invalid Account Type, Account type defaults to Earning Assets.	Warning
351	Invalid record: Payment type and/or amount is mandatory	Warning
352	Invalid record: Payment Date is mandatory	Warning
353	Invalid record: Payment type is Principal and Interest but Total Amount (TOT_AMOUNT) is missing	Error
354	Invalid record: Payment type is Principal Only but Principal Payment Amount (PRIN_AMOUNT) is missing	Error

Error Code	Error Type	Error Message
355	Invalid record: Payment type is Interest Only but Interest Payment Amount (INT_AMOUNT) is missing.	Error
356	Invalid payment pattern: Payment Pattern Sub Type is not given	Error
357	Invalid payment pattern: Payment Pattern Payment Type is not given	Error
358	Invalid payment pattern: Payment event id is not given	Error
359	Invalid payment pattern: Pattern type or sub type is Relative but frequency multiplier is not given	Error
360	Invalid payment pattern: Pattern type is Absolute but event month is not given	Warning
361	Invalid payment pattern: Pattern payment method is not given	Error
362	Invalid payment pattern: Payment Pattern Type is not given	Error
363	Invalid payment type code in payment pattern: Payment Type 300 (interest only) used;	Error
364	Invalid payment pattern: Pattern type or sub type is Relative but frequency is not given	Error
365	Invalid payment pattern: Pattern type is Absolute but event day is not given	Error
366	Invalid payment pattern: Pattern type is Split but split id is not given	Warning
367	Invalid payment pattern: Pattern type is Split but percentage of split is not given	Error
368	Invalid payment pattern: Pattern type or sub type is Relative but payment event repeat is not given	Error
369	Invalid payment pattern: Pattern Events not given	Error
370	Invalid value for holiday calculation option; processed as Shift Dates.	Error
371	Holiday Calculation Option can only be Recalculate when accrual basis is B/252	Error

Error Code	Error Type	Error Message
372	Invalid value for holiday calendar code; Holiday adjustment not applied or details from process level parameters used;	Error
373	Holiday Calendar Code is mandatory when accrual basis is B/252. Holiday details from process level parameters or A/A used.	Warning
374	Invalid value for holiday rolling convention; Holiday adjustment not applied;	Warning
375	Holiday Rolling Convention Code is mandatory when accrual basis is B/252. Following business day used.	Warning
376	Reprice frequency is > 0 and calculation date range is last reprice to next reprice date but balance on last reprice date is not available; Processed using End of Period Principal Balance;	Warning
377	Invalid value for margin type code; Default value RATE (0) used;	Warning
378	Invalid value for net margin code; Default value NRSG (0) used;	Warning
379	Invalid value for next reprice date; Default value Origination date + 1 or As-of-date + 1 used;	Warning
380	Invalid value for last reprice date; Default value Next Reprice Date minus Reprice Frequency used;	Warning
381	Warning: Negative Amortization Equalization Frequency cannot be negative; 0 used.	Warning
382	Warning: Invalid Negative Amortization Equalization Frequency Multiplier; Months used.	Warning
383	Warning: Negative Amortization Payment Change Frequency cannot be negative; 0 used.	Warning
384	Warning: Invalid Negative Amortization Payment Change Frequency Multiplier; Months used.	Warning
385	Warning: Negative Amortization Limit value does not fall in a valid range 0-200; 0 used.	Warning
386	Warning: Negative Amortization Equalization date is less than origination date (future origination) or less than the as-of-date (past origination); Next Reprice Date used.	Warning

Error Code	Error Type	Error Message
387	Warning: Negative Amortization Equalization date is less than origination date (future origination) or less than the as-of-date (past origination); Next Reprice Date used.	Warning
388	Warning: Negative Amortization Payment Adjustment date is less than origination date (future origination) or less than the as-of-date (past origination); Next Reprice Date used.	Warning
389	Warning: Negative Amortization Payment Adjustment date is less than origination date (future origination) or less than the as-of-date (past origination); Next Reprice Date used.	Warning
390	Warning: Negative Amortization payment change limit cannot be negative; Limit not applied.	Warning
391	Maturity date of account is different from highest payment date in schedule; Dates from schedule used;	Warning
392	Remaining Number of Payments given with account is different from count of payment dates after as of date in schedule; Dates from schedule used;	Warning
393	Invalid value for next reprice date for a teaser instrument; Value derived by rolling forward Teaser End Date with Repricing Frequency;	Warning
394	Invalid record: Maturity date is prior to As of date; Account not processed;	Warning
395	Invalid record: Maturity date is prior to Origination date; Account not processed;	Warning
396	Invalid record: Payment dates in schedule are prior to As of date; Account not processed;	Warning
397	Principal balance is not zero but maturity date is prior to as of date; Maturity date defaulted to As of date + 1	Warning
398	Principal balance is not zero but maturity date is prior to origination date; Maturity date defaulted to As of date + 1	Warning
399	Next reprice date is after maturity date; Defaulted to maturity date;	Warning
400	Invalid value for last reprice date; Default value Origination Date used;	Warning

Error Code	Error Type	Error Message
401	Invalid value for Adjustable Type; Calculation date range is AOD to NRD or LRD to NRD but adjustable Type of account is Fixed. Account not processed.	Warning
402	Adjustable Type of account is Floating or Other Adjustable but repricing frequency multiplier is not given or is not valid; Months (M) used;	Warning
403	Adjustable Type of account is Floating or Other Adjustable but Interest Rate Code is not given or is not valid; Processed with Interest Rate Code 0.	Warning
404	Adjustable Type of account is Floating or Other Adjustable but repricing frequency is not given or is not valid; Processed with fixed interest rate.	Warning
405	Adjustable Type of account is repricing pattern but repricing pattern code is not given or is not valid; Processed with fixed interest rate.	Warning
406	Interest timing type not given; Interest In Arrears used;	Warning
407	Interest timing type cannot be advance when amortization is conventional type; Interest In Arrears used;	Warning
408	Amortization Type of account is payment pattern but pattern code is not given or is not valid; Processed as non-amortizing instrument.	Warning
409	Accrual basis is B/252 but holiday adjustment is not enabled. A/A used.	Warning
410	Amortization Type of account is payment schedule but schedule data is not given; Processed as non-amortizing account.	Warning
411	Invalid value for next reprice date for a teaser instrument; Value derived by rolling forward Teaser End Date with Repricing Frequency;	Warning
412	Invalid value for last reprice date for a teaser instrument; Value derived by rolling forward Teaser End Date with Repricing Frequency;	Warning
413	Teaser End Date is after Maturity Date; Value defaulted to Maturity Date;	Warning
414	Teaser End Date is before Origination Date; Value defaulted to Origination Date;	Warning

Error Code	Error Type	Error Message
415	Invalid Mortgage Offset Account Expected Balance as Expected Balance (MOA_EXPECTED_BAL) is empty or <= 0, Processed as normal instrument.	Warning
416	Invalid Mortgage Offset Account Expected Balance Growth Percentage (MOA_EXPECTED_BAL_GROWTH_PCT), Processed with default value of 0.	Warning
417	Invalid Mortgage Offset Account Expected Balance on last reprice date (MOA_LRD_OFFSET_BAL), Processed using default value as MOA_EXPECTED_BAL	Warning
418	Invalid Mortgage Offset Account Minimum Balance (MOA_MIN_BAL), Processed with default value of 0.	Warning
419	Invalid Mortgage Offset Percent (MOA_OFFSET_PERCENT), Processed with default value of 100	Warning
420	Invalid Mortgage Offset Account Original Expected Balance (MOA_ORG_OFFSET_BAL),but since calculation date range is Origination to Maturity, Processed as normal instrument.	Warning
421	Invalid Mortgage Offset Account Original Expected Balance (MOA_ORG_OFFSET_BAL). but since calculation date range is other than Origination to Maturity, Process account with considering the mortgage offset account as Original Expected Balance doesnt impact on MOA calculations.	Warning
422	One or more required inputs are missing for factors calculation using arc tangent method	Warning
423	Cannot generate prepayment factors dates if PaymentDates are not provided	Warning
424	Cannot generate early redemption dates if PaymentDates are not provided	Warning
425	user tenor rules are not defined in prepayment meta data	Warning
426	conditions are not satisfied to apply early redemption on user defined tenors	Warning
427	Cannot generate prepayment factors dates if PaymentDates are not provided;	Warning

Error Code	Error Type	Error Message
428	Behavior pattern is not applicable when calculation data range is Origination to Maturity. Generated cash flows from As of date to maturity	Warning
429	Behavior pattern is not applicable when calculation data range is Last Reprice to Next Reprice Date. Generated cash flows from As of date to Next Reprice Date	Warning
430	Maturity Date < Max Date of Pattern, Maturity Date set to Max Tenor of behavior pattern	Warning
431	Invalid value for Behavior Sub Type of account having devolvement & recovery or non-performing behavior type; Account not processed;	Error
432	Invalid value for devolvement status of account; Account not processed;	Error
433	Devolvement amount cannot be negative when devolvement status of account is devolved; Default value of 0 used;	Error
434	Invalid value for Behavior Type of account; Processed using behavior type from pattern definition.	Warning
435	Invalid behavior pattern: Behavior Type is not given or is incorrect; Behavior pattern not used; Processed as non-amortizing instrument;	Warning
436	Invalid behavior pattern: Behavior Sub Type is not given or is incorrect; Behavior pattern not used; Processed as non-amortizing instrument;	Warning
437	Invalid behavior pattern: Tenor multiplier is not given; Processed as non-amortizing instrument;	Error
438	Invalid behavior pattern: Tenor is not given; Processed as non-amortizing instrument;	Error
439	Invalid behavior pattern: Percentage is not given; Processed as non-amortizing instrument;	Error
440	Invalid behavior pattern: Sequence is not given; Processed as non-amortizing instrument;	Error
441	Behavior Type definition is inconsistent between the Behavior Pattern and BEHAVIOR_TYPE_CD of account. Defaulted to the Behavior Type specified in the Behavior Pattern.	Warning

Error Code	Error Type	Error Message
442	Interest in advance is not supported for behavior patterns, defaulting to Interest in Arrears	Warning
443	No prepayment parameter is found for payment date	Warning
444	Cannot generate early redemption prepayment rates if payment dates are not provided or calculation method is not Constant	Warning
445	Invalid value for Exchange of Principal flag for Off-balance sheet product; Processed with No Exchange of Principal	Warning
446	Invalid value for Exchange of Principal flag for Off-balance sheet product; Processed with Leg Type 0	Warning
447	Invalid value for Minimum Balance for Amortizing Swap; Processed with value 0	Warning
448	Invalid value for purchase sale logic of Off-balance sheet product; Processed as sold contract (1)	Warning
449	Invalid value for swap classification code; Processed as generic swap (0)	Warning
450	Invalid Last Reprice Date for Forward Rate Agreement; Processed using Origination Date	Warning
451	Invalid Repricing Frequency Multiplier for Forward Rate Agreement; Processed using Original Term Multiplier	Warning
452	Invalid Next Reprice Date for Forward Rate Agreement; Processed using Origination Date;	Warning
453	Invalid Repricing Frequency for Forward Rate Agreement; Processed using Original Term;	Warning
454	Invalid Exchange of Principal flag for Forward Rate Agreement; Processed using No Exchange of Principal	Warning
455	Invalid Interest Timing Type for Forward Rate Agreement; Processed as Interest in advance	Warning
456	Invalid Adjustable Type for Forward Rate Agreement; Processed as Other Adjustable (250);	Warning
457	Invalid Origination Date for Forward Rate Agreement; Processed with value As of Date + 1;	Warning

Error Code	Error Type	Error Message
458	Invalid Maturity Date for Forward Rate Agreement; Processed using Origination Date + Original Term;	Warning
459	Invalid Remaining Number of Payments for Forward Rate Agreement; Processed using 1	Warning
460	Invalid Next Interest Payment Date for Forward Rate Agreement; Processed using Origination Date	Warning
461	Invalid Next Principal Payment Date for Forward Rate Agreement; Processed using Origination Date	Warning
462	Invalid Original Interest Payment Date for Forward Rate Agreement; Processed using Origination Date	Warning
463	Invalid Original Principal Payment Date for Forward Rate Agreement; Processed using Origination Date	Warning
464	Invalid Last Interest Payment Date for Forward Rate Agreement; Processed using Origination Date;	Warning
465	Invalid Interest Payment Frequency for Forward Rate Agreement; Processed using Original Term	Warning
466	Invalid Interest Payment Frequency Multiplier for Forward Rate Agreement; Processed using Original Term Multiplier	Warning
467	Invalid Principal Payment Frequency for Forward Rate Agreement; Processed using Original Term	Warning
468	Invalid Principal Payment Frequency Multiplier for Forward Rate Agreement; Processed using Original Term Multiplier	Warning
469	Invalid Amortization Type for Forward Rate Agreement; Processed as non-amortizing (700) instrument;	Warning
470	Invalid value for Exchange of Principal flag for Foreign Exchange instrument; Processed with Exchange of Principal;	Warning
471	Invalid Amortization Type for Foreign Exchange instrument; Processed as non-amortizing (700) instrument;	Warning

Error Code	Error Type	Error Message
472	Invalid Adjustable Type for Foreign Exchange instrument; Processed as Fixed;	Warning
473	Invalid Interest Timing Type for Foreign Exchange instrument; Processed as Interest in arrears;	Warning
474	Invalid current gross interest rate for Foreign Exchange instrument; Processed with no interest;	Warning
475	Invalid current net interest rate for Foreign Exchange instrument; Processed with no interest;	Warning
476	Invalid remaining number of payments for Foreign Exchange Contract; Processed with 1 remaining payment;	Warning
477	Invalid Next Interest Payment Date for Foreign exchange contract; Processed using Maturity Date;	Warning
478	Invalid Next Principal Payment Date for Foreign exchange contract; Processed using Maturity Date;	Warning
479	Invalid Original Interest Payment Date for Foreign exchange contract; Processed using Maturity Date;	Warning
480	Invalid Original Principal Payment Date for Foreign exchange contract; Processed using Maturity Date;	Warning
481	Invalid Next Reprice Date for Foreign exchange contract; Processed using Maturity Date;	Warning
482	Invalid Repricing Frequency for Foreign Exchange Contract; Processed using Original Term;	Warning
483	Invalid Repricing Frequency Multiplier for Foreign Exchange Contract; Processed using Original Term Multiplier;	Warning
484	Invalid Interest Payment Frequency for Foreign Exchange Contract; Processed using Original Term;	Warning
485	Invalid Interest Payment Frequency Multiplier for Foreign Exchange Contract; Processed using Original Term Multiplier;	Warning

Error Code	Error Type	Error Message
486	Invalid Principal Payment Frequency for Foreign Exchange Contract; Processed using Original Term;	Warning
487	Invalid Principal Payment Frequency Multiplier for Foreign Exchange Contract; Processed using Original Term Multiplier;	Warning
488	Invalid Last Interest Payment Date for Foreign Exchange Contract; Processed using Origination Date;	Warning
489	Invalid Last Reprice Date for Foreign Exchange Contract; Processed using Origination Date;	Warning
490	Invalid End of Period Principal Balance for Foreign Exchange Swap; Processed using no balance;	Warning
491	Invalid Original Principal Balance for Foreign Exchange Swap; Processed using no balance;	Warning
492	Invalid value for next reprice date for a teaser instrument; Defaulted to Teaser End Date;	Warning
493	Repricing pattern can not be used for teaser instrument;	Warning
494	Interest timing type cannot be advance when conventional payment pattern is used, Interest In Arrears used as default;	Warning
495	Interest timing type cannot be advance when Account Type is Other Asset or Other Liabilities or Non-Interest Income or Non-Interest Expense or Interest Income or Interest Expense, Interest In Arrears used as default;	Warning
496	Last interest payment date cannot be before Origination Date; Default value Origination Date used;	Warning
497	Last principal payment date cannot be before Origination Date; Default value Origination Date used;	Warning
498	Invalid amortization type for Other Asset-Liability; Processed as Non-amortizing instrument;	Warning
499	Invalid current net interest rate for Other Asset-Liability; Processed without interest and default as 0;	Warning

Error Code	Error Type	Error Message
500	Invalid current gross interest rate for Other Asset-Liability; Processed without interest and default as 0;	Warning
501	Invalid adjustable type for Other Asset-Liability; Processed as fixed rate;	Warning
502	Interest timing type cannot be advance when adjustable type is floating rate, Interest In Arrears used as default;	Warning
503	Repricing pattern code is empty;	Warning
504	Adjustable Type of account is Repricing Pattern but Repricing Pattern definition not given. Processed as Other Adjustable (250);	Warning
505	Repricing Pattern Type Code is invalid in repricing pattern definition. Account not processed;	Error
506	Repricing Pattern Events UDS is empty	Error
507	Event Sequence number is invalid in repricing pattern definition. Account not processed;	Error
508	Repricing Method Code is invalid in repricing pattern definition. Account not processed;	Error
509	Balance Tier Type Code is invalid in repricing pattern definition. Account not processed;	Error
510	Event Day is invalid in absolute repricing pattern definition. Account not processed;	Error
511	Event Month is invalid in absolute repricing pattern definition. Account not processed;	Error
512	Repricing Pattern EventsDetail UDS is empty	Error
513	Event Detail Sequence number is invalid in repricing pattern definition. Account not processed;	Error
514	Repricing method is Indexed but Interest Rate Code is not given in repricing pattern definition. Account not processed;	Warning
515	Event Frequency is invalid in relative repricing pattern definition. Value assumed to be 1 Month;	Warning
516	Event Frequency Multiplier is invalid in relative repricing pattern definition. Value assumed to be 1 Month;	Warning

Error Code	Error Type	Error Message
517	Event Repeat Times is invalid in relative repricing pattern definition. Value assumed to be 1;	Warning
518	Adjustable type code of account is 300 but corresponding data of balance tiers and rate is not available; Processed with fixed interest rate;	Warning
519	Invalid amortization type for an account with Balance Tier Interest Rate; Processed as non-amortization instrument;	Warning
520	Adjustable type of tier cannot be Floating Rate if Interest Timing Type of account is Advance; Processed as Interest in Arrears;	Warning
521	Adjustable type code of account is 300 but corresponding adjustable type of balance tiers is invalid; Processed tier with fixed interest rate;	Warning
522	Adjustable type code of balance tier is 250 but next reprice date, last reprice date or reprice frequency are missing; Processed tier with fixed interest rate;	Warning
523	Sum of current balances of all tiers of account is different from current par balance of account;	Warning
524	Current balance of tiers of account is not given; Account not processed;	Error
525	Sum of original par balances of all tiers of account is different from original par balance of account;	Warning
526	Original par balance of tier not given; End of Period Principal Balance used;	Warning
527	Invalid Contract Currency Pay for Foreign Exchange Swap;	Warning
528	Invalid Original Payment Amount Pay for Foreign Exchange Swap;	Warning
529	Invalid Contract Currency Receive for Foreign Exchange Swap;	Warning
530	Invalid Original Payment Amount Receive for Foreign Exchange Swap;	Warning
531	Invalid Exchange Rate Start for Foreign Exchange Swap;	Warning
532	Invalid Receive CCY for Foreign Exchange Swap;	Warning

Error Code	Error Type	Error Message
533	Invalid Receive Leg Amount for Foreign Exchange Swap;	Warning
534	Invalid Pay CCY for Foreign Exchange Swap;	Warning
535	Invalid Pay Leg Amount for Foreign Exchange Swap;	Warning
536	Invalid Exchange Rate End for Foreign Exchange Swap;	Warning
537	Interest timing type cannot be advance when interest is capitalized; Interest In Arrears used;	Warning
538	Amortization type of Interest Rate Option can only be Non amortizing (700) or Level principal (820); Processed as Non amortizing instrument;	Warning
539	Binary Rate of Interest Rate Option cannot be less than zero; Processed without binary rate;	Warning
540	Invalid Interest Calculation Type for Interest Rate Option; Processed with default calculation type;	Warning
541	Functionality not implemented for Interest Calculation Types Numeric Average, Geometric Average, Range Calculation and Binary Range; Processed with default calculation type;	Warning
542	Adjustable Type of Interest Rate Option can only be Other Adjustable (250);	Warning
543	Next Reprice Date of Interest Rate Option must be same as Next Interest Payment Date;	Warning
544	Last Reprice Date of Interest Rate Option must be same as Last Interest Payment Date;	Warning
545	Reprice frequency of Interest Rate Option must be same as Interest Payment Frequency;	Warning
546	Reprice Frequency Multiplier of Interest Rate Option must be same as Interest Payment Frequency Multiplier;	Warning
547	Adjustable type code for Rule of 78s instrument can only be fixed rate;	Warning
548	Interest Timing Type of Rule of 78s instrument can only Interest in Arrears;	Warning
549	Interest payment frequency of Rule of 78s instrument must be 1 month;	Warning

Error Code	Error Type	Error Message
550	Interest payment frequency multiplier of Rule of 78s instrument must be in Months;	Warning
551	Principal payment frequency of Rule of 78s instrument must be 1 month;	Warning
552	Principal payment frequency multiplier of Rule of 78s instrument must be in Months;	Warning
553	Last Interest and Principal payment date of Rule of 78s instrument must be same; Set Last Principal Payment Date = Last Interest Payment Date	Warning
554	Next Interest and Principal payment date of Rule of 78s instrument must be same; Set Next Principal Payment Date = Next Interest Payment Date	Warning
555	Original Interest and Principal payment date of Rule of 78s instrument must be same; Set Original Principal Payment Date = Original Interest Payment Date	Warning
556	Original Principal Balance of Rule of 78s instrument must be higher than End of Period Principal Balance;	Warning
557	Original Term Multiplier of Rule of 78s instrument must be in months;	Warning
558	Original Term of Rule of 78s instrument must be in months; Number of months between Origination and maturity date used;	Warning
559	Current Payment Amount of Rule of 78s instrument must not be zero;	Warning
560	Original Payment Amount of Rule of 78s instrument must not be zero;	Warning
561	Remaining Number of Payments is different from number of months between Last Interest Payment Date and Maturity Date; Cash flows may have error;	Warning
562	Interest timing type can be Set in Arrears only when calculation date range is As of date to Maturity; Interest In Arrears used;	Warning
563	Amortization type of instrument can only be Simple Interest when embedded option is applied; Processed as non-amortizing instrument with embedded option;	Warning

Error Code	Error Type	Error Message
564	Invalid Option Exercise Type; Processed as instrument without embedded option;	Warning
565	Option start date is required for American options, As of date used;	Warning
566	Invalid Option Type; Processed as instrument without embedded option;	Warning
567	Invalid Option Strike Type Code; Processed as instrument without embedded option;	Warning
568	Invalid Option Rate Lookup Code, Remaining Term used;	Warning
569	Rate lookup code for fixed rate instrument cannot be reprice frequency, Remaining Term used;	Warning
570	Invalid Option Strike Interest Rate Code; Processed as instrument without embedded option;	Warning
571	Option expiry date must be between As-of-date and Maturity date, Processed using Maturity Date as Expiry Date;	Warning
572	Option Strike Value not given for embedded option, Strike price 100 used;	Warning
573	Option Strike Value not given for embedded option, Strike rate set same as current net interest rate;	Warning
574	Embedded options schedule not given for Bermudan option, Processed as instrument without embedded option;	Warning
575	Option expiry date not given for Bermudan option in schedule; Processed as instrument without embedded option;	Warning
576	Option expiry date must not be after Maturity date, Processed using Maturity Date as Expiry Date;	Warning
577	Option Strike Value not given for embedded option, Strike price 100 used;	Warning
578	Option Strike Value not given for embedded option, Strike rate set same as current net interest rate;	Warning

Error Code	Error Type	Error Message
579	Either Embedded Option Flag is Not Y or Invalid Option decision type, where instrument is Earning Asset or Interest Bearing Liabilities;	Warning
580	Invalid Index Adjustment Type. Processed without inflation-adjustment;	Warning
581	Account Index History not been given for inflation adjusted instrument. Processed without inflation-adjustment;	Error
582	Base Index Value not been given for inflation adjusted instrument. Processed without inflation-adjustment;	Error
583	Invalid Capital Protection Category for inflation indexed instrument. Processed with floor of 1;	Warning
584	Capital Protection Category for inflation indexed instrument is Max during life but Max Index Value is invalid; Processed with Capital Protection Category as Floor or 1;	Warning
585	Invalid Option decision type, where Embedded Option Flag is enabled, Processed as instrument without embedded option;	Warning
586	Invalid Account Type, for embedded option, Processed as instrument without embedded option	Warning
587	Invalid DiscountMethod Sys Id, for embedded option, Processed as instrument without embedded option;	Warning
588	Invalid value for Amortization Method for Premiums and Discounts; Level Yield method used	Warning
589	Batch size is empty	Warning
590	Request ID is empty	Warning
591	Invalid Interest rate code	Warning

17   Cash Flow Edits

This module discusses the procedure for validating and cleansing your Instrument table data before you process it to generate cash flow-based results.

Topics

- Overview of Cash Flow Edit Process

- Creating Cash Flow Edit Process

- Executing Cash Flow Edit Process

- View Cash Flow Edit Process Execution Details

17.1   Overview of Cash Flow Edit Process

The cash Flow Edit process allows you to verify the accuracy and check the completeness of your Instrument table data.

The procedure for working with and managing a Cash Flow Edit process is similar to that of the Oracle Cash Flow Engine processes. Cash Flow Edits summary page allows you to do the following:

- Creating a new Cash Flow process

- Searching for Cash Flow Edit processes. For more information, see the Searching for Rules section.

- Viewing and Updating Cash Flow Edit processes. For more information, see the Viewing and Editing Rules section.

- Copying Cash Flow Edit processes. For more information, see the Copying Rules section.

- Deleting Cash Flow Edit processes. For more information, see the Deleting Rules section.

- Execute Cash Flow Edit Process

- View Cash Flow Edit Process Execution Details

Figure: Cash Flow Edit Summary page
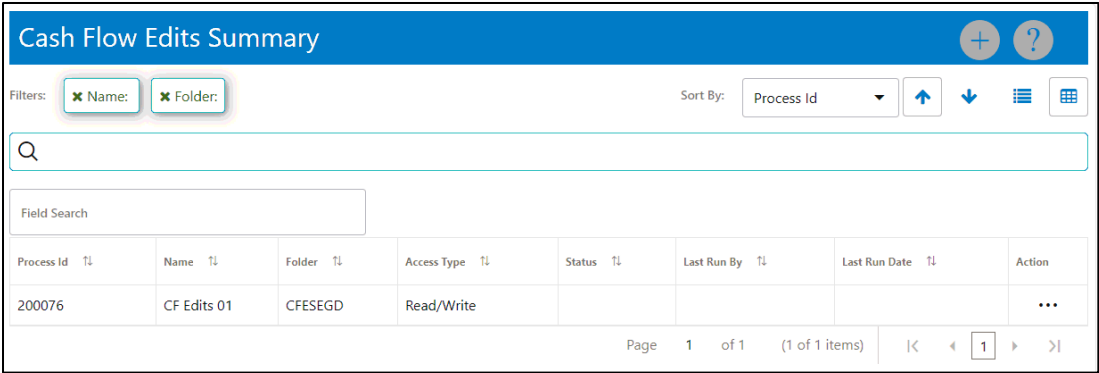
The definitions based on the search criteria are listed under List of Cash Flow Edits. This is the search section that contains multiple parameters. You can specify one or multiple search criteria in this section. When you click Search, depending upon the search criteria, this filters and displays the relevant search combination parameters under the Cash Flow Edits Summary as a list.
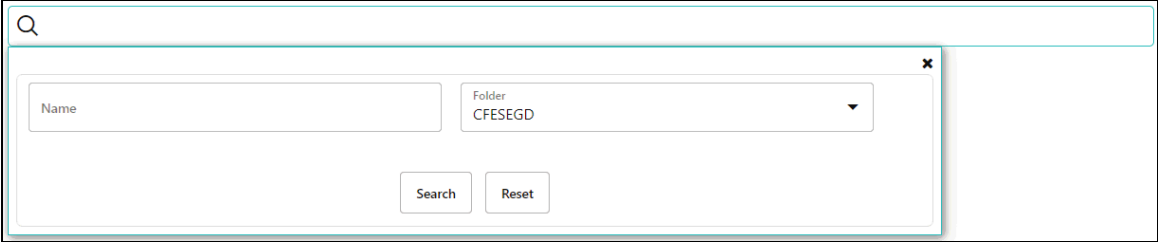
The Cash Flow Edits Summary window displays the following columns.

Table: Cash Flow Edits rule – Fields and Descriptions

Column	Description
Process ID	Displays the Process ID of Cash Flow Edit rule
Name	Displays the Cash Flow Edit rule's short name.
Folder	Displays the Folder name where Cash Flow Edit rule is saved.
Access Type	Displays the access type of rule. It can be Read-Only or Read/Write.
Status	Displays the status of the rule.
Last Run By	Displays the Name of the user who last runs the Cash Flow Edit rule.
Last Run Date	Displays the Date and Time when Cash Flow Edit was run last.
Action	Displays the list of actions that can be performed on the Cash Flow Edit rule. For more information, see Cash Flow Edit rule – Icons and Descriptions.

The Action column on Cash Flow Edits Summary page offers several actions that allow you to perform different functions. The following actions are available for the Cash Flow Edit rule.

Table: Cash Flow Edit rule – Icons and Descriptions

Fields	Description
Add	Click **Add** ⊕ icon to build a new Cash Flow Edit rule.
View/Edit	Click ⋯ in the **Action** column and select **View/Edit** to view or edit the contents of a Cash Flow Edit rule in read/write format.
Save As	Click ⋯ in the **Action** column and select **Save As** to create a copy of an existing Cash Flow Edit rule.
Delete	Click ⋯ in the **Action** column and select **Delete** to delete an existing Cash Flow Edit rule.
Execute	Click ⋯ in the **Action** column and select **Execute** to execute an existing Cash Flow Edit rule. After clicking **Execute**, the Run Parameter Execution window is displayed. Select As of Date (Execution Date) and Legal Entity, and then click **Run**. For more information, see Executing Cash Flow Edit Processes section.
Execute Details	Click ⋯ in the **Action** column and select **Execute Details** to view execution details of the Cash Flow Edit rule.

You must create and run Cash Flow Edit processes on your Instrument table data before you submit cash flow engine based rules for processing.

For more information, see the following sections:

- Creating Cash Flow Edit Processes
- Executing Cash Flow Edit Processes

17.2 Creating Cash Flow Edit Process

Creating a Cash Flow Edit process is a one-step process. You define both the attributes that uniquely describe a particular Cash Flow Edit process and the data to be validated or cleansed by that process on the Create Cash Flow Edit process page.

1. Navigate to the **Cash Flow Edits Summary** page.

2. Click **Add** ⊕. The **Create Cash Flow Edits Process** page is displayed.

Figure: Cash Flow Edit of CFE Processing

3. Enter the process details shown in the following table.

Table: List of process details used for Creating Cash Flow Edit Process

Parameter	Description
Name	Enter the name of the Cash Flow Edit rule.
Description	Enter the description of the Cash Flow Edit rule.
Preview Mode	Selecting this parameter allows you to view the results of running a Cash Flow Edit process before the system updates the underlying records in the Instrument tables. The default value of this parameter is checked.
Folder	Enter the Folder details where Cash Flow Edit rule needs to be saved.
Access Type	Select the Access Type as Read-Only or Read/Write.

4. Click **Apply** to navigate to Cash Flow Edit Rules section.
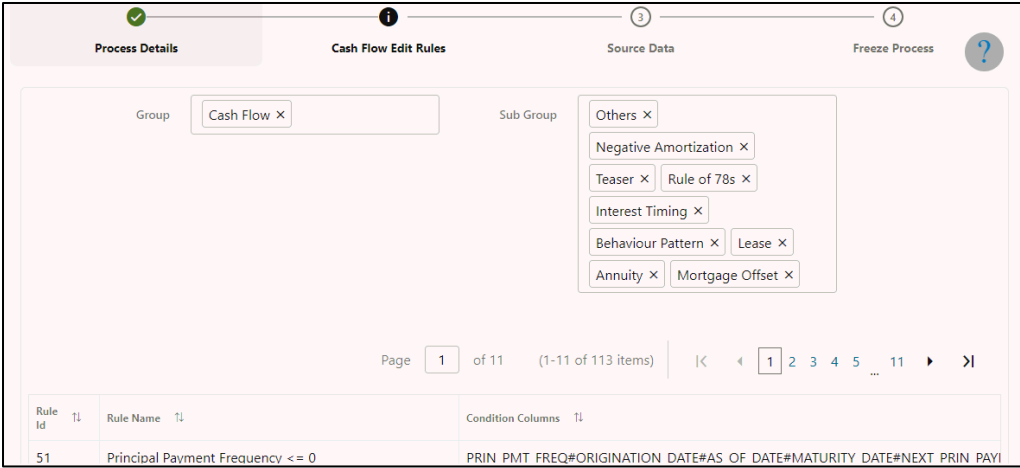
5. Enter the Cash Flow Edit details shown in the following table.

Table: List of Cash Flow Edit details used for Creating Cash Flow Edit Process

Parameter	Description
Group	Select the group of Cash Flow Edit Rules that you want to include in the process. For example, Cash Flow
Sub Group	Select the sub group of Cash Flow Edit Rules that you want to include in the process. The value of this field varies based on the selected Group. The list of Rule Ids with conditions is displayed.

Detail of rules for the selected group and sub-group are listed on the screen for reference.

6. Click **Apply** to navigate to the Source Data section.
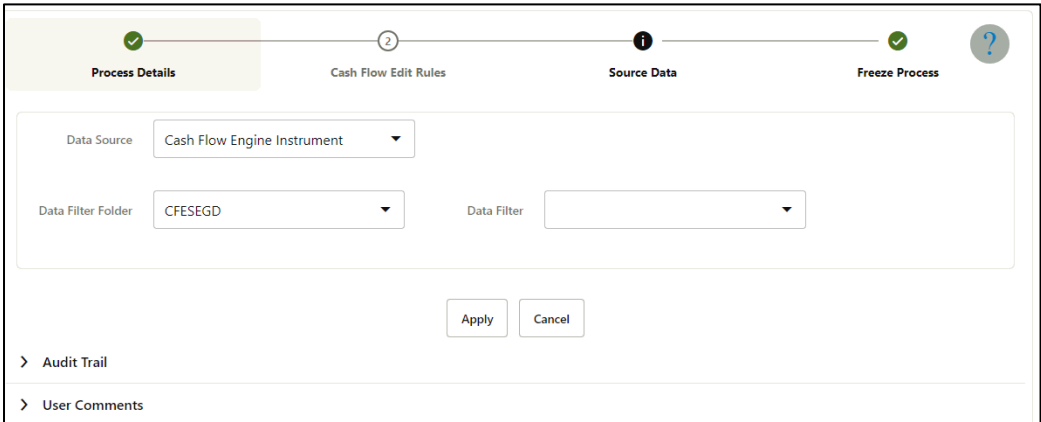
7. Enter the Source Data details shown in the following table.

Table: List of Source Data details used for Creating Cash Flow Edit Process

Parameter	Description
Data Source	This field allows you to select the Instrument tables that must be included in a Cash Flow Edit process.
Data Filter Folder	Select the Folder from which you want to apply Data Filter
Data Filter	This field allows you to select a subset of data for processing by selecting a filter that was previously created.

Note: To select FX Contracts instrument tables from the **Data Source** drop-down, do Setup Master Configurations. Insert the records into the setup master table as mentioned below:

V_COMPONENT_CODE	V_COMPONENT_DESC	V_COMPONENT_VALUE	Description
CFE_EDITS_TABLE	Cash Flow Engine Instrument	FSI_D_CFE_INSTRUMENTS	This is used to display source table name in Cash Flow Edits screen. V_COMPONENT_DESC contains logical name to be displayed in screen while V_COMPONENT_VALUE contains physical name of table in database. To add more than one table use "~" as separator. **Example:** V_COMPONENT_DESC can be "Cash Flow Engine Instrument~Custom Table" and V_COMPONENT_VALUE can be "FSI_D_CFE_INSTRUMENTS~FSI_D_CUSTOM_TABLE".
CFE_EDITS_BATCH_SIZE	Instrument Count to Process in Single batch	1000	This is to set Instrument Count to Process in Single batch

CFE_EDITS_CALLAB LES_SIZE	Callables Count to Execute the Cash Flow Edits Process	8	This is to set Callables Count to Execute the Cash Flow Edits
CFE_EDITS_FLUSH_ BATCH_SIZE	Save or Update Records Flush Batch Size	500	This is to set Flush Batch Size for Save or Update Records

8. Click **Apply** to navigate to the Freeze Process section. Click Save on the Freeze Process window after verifying all the details.
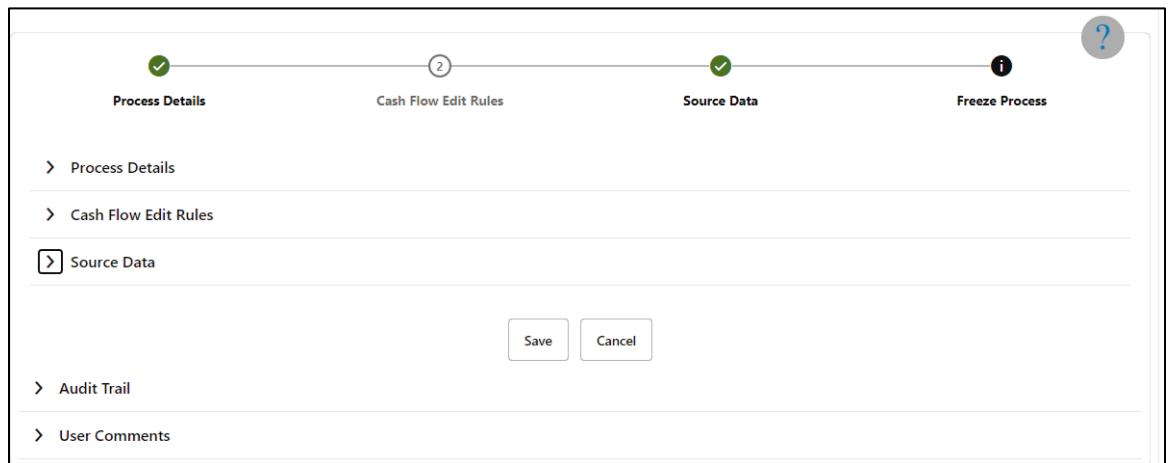
9. The Cash Flow Edits process is saved and the Summary page is displayed.

17.3 Executing Cash Flow Edit Process

Execute a Cash Flow Edit process to check the accuracy and the completeness of your Instrument table data. When run in Preview mode, you can view the results of running a Cash Flow Edits process by querying the `FSI_CFE_MESSAGES_MLS` table for generated errors before the system updates the underlying records in the Instrument tables.

To execute the cash flow edits process, follow these steps:

1. Navigate to the **Cash Flow Edits Summary** page.

2. Search for a rule.

3. Click ⋯ in the **Action** column and select **Execute** to execute an existing Cash Flow Edit rule. The Run Parameter Execution window is displayed.

Select the As of Date (Execution Date) and Legal Entity, and then click Run.

4. The **Cash Flow Edits Run Confirmation** page is displayed. The status of the process is displayed in the **Status** column. After completion of the process, you can navigate to the Execution Details page by selecting the **Execution Details** option under the **Action** column

| NOTE | You can view the results of running a Cash Flow Edits rule before the system updates the underlying records in the Instrument tables, provided you selected Preview Mode while defining it. If the rule runs in Preview Mode, query the FSI_CFE_MESSAGES_MLS table for any generated errors. |

17.4 View Cash Flow Edit Process Log

To view the cash flow edit errors, warnings, and info, navigate to ftpshare/logs folder and view the CashFlowEditsProcessExecution.log file.

You can view the log using Batch Monitor also. To view the logs from Batch Monitor, follow these steps:

1. Navigate to Common Object Maintenance, select Operations, and then select Batch Monitor.

2. Select the Batch Run ID.

3. View the Task Details of CashFlowEditsExecution.

4. Click View Log.

17.4.1   Cash Flow Edit Process Errors

NOTE	• Error: Engine does not process, however sometimes default value can get used for calculations. • Warning: Engine may use the default value or given wrong data for calculation, results may be incorrect. • Info: Does not impact any processing but results may not be as expected.

The table stores error messages generated by the engine.

Error Code	Error Condition	Error Description	Assignment	Warning	Error Level	Edit Priority
2	(AMRT_TYPE_CD <> 700 OR (amrt_type_cd = 700 AND amrt_term <> 0)) AND (CASE amrt_term_mult WHEN 'Y' THEN amrt_term * 365 WHEN 'M' THEN amrt_term * 30.41667 ELSE amrt_term END) < (CASE org_term_mult WHEN 'Y' THEN org_term * 365 WHEN 'M' THEN org_term * 30.41667 ELSE 30.41667 ELSE	Amortization term can only be equal to zero on Non-Amortizing instruments	AMRT_TERM = ORG_TERM and AMRT_TERM_MULT = ORG_TERM_MULT	Original Term > Amortizatio n Term	Warning	

Error Code	Error Condition	Error Description	Assignment	Warning	Error Level	Edit Priority
	org_term END) THEN 'P' ELSE 'F' END					
3	(ORIGINATION_DATE < AS_OF_DATE and CUR_PAR_BAL is not NULL and ORG_PAR_BAL is not NULL and CUR_PAR_BAL = ORG_PAR_BAL)	Instrument has originated in past but Current Par Balance and Original Par Balance are equal		Current Par Balance = Original Par Balance	Warning	
4	(ORIGINATION_DATE < AS_OF_DATE and DEFERRED_CUR_BAL is not NULL and DEFERRED_ORG_BAL is not NULL and DEFERRED_CUR_BAL = DEFERRED_ORG_BAL)	Instrument has originated in past but Deferred Current Balance and Deferred Original Balance are equal		Deferred Current Balance = Deferred Original Balance	Warning	
5	(CUR_GROSS_RATE is NULL or CUR_GROSS_RATE < 0)	Current gross rate is negative		Current Gross Rate < 0	Info	
6	(CUR_NET_RATE is NULL or CUR_NET_RATE < 0)	Current net rate is negative		Current Net Rate < 0	Info	
7	(ACCRUAL_BASIS_CD is NULL or ACCRUAL_BASIS_CD <1 or ACCRUAL_BASIS_CD >7)	Accrual basis code must be between 1 and 7 inclusively	ACCRUAL_BASIS_CD = 3	Invalid Accrual Basis	Warning	

Error Code	Error Condition	Error Description	Assignment	Warning	Error Level	Edit Priority
8	(AMRT_TYPE_CD is NULL or AMRT_TYPE_CD not in (100, 400, 600, 700, 710, 800, 801, 802, 820, 840, 850, 10, 20))	Amortization type must be a valid OFSAA code	AMRT_TYPE_CD = 700	Invalid Amortization Type	Warning	
9	(AMRT_TYPE_CD = 20 and (PMT_PATTERN_CD is null or PMT_PATTERN_CD <= 0))	Amortization type is Payment Pattern but Payment Pattern Code is invalid	AMRT_TYPE_CD = 700	Invalid Payment Pattern	Warning	
10	(AMRT_TYPE_CD = 20 and PMT_PATTERN_CD is not null and PMT_PATTERN_CD > 0 and PMT_PATTERN_CD not in (select AMRT_TYPE_CD from fsi_payment_pattern))	Amortization type is Payment Pattern but Payment Pattern definition does not exist	AMRT_TYPE_CD = 700	Invalid Payment Pattern	Warning	
11	(AMRT_TYPE_CD = 10 and (BEHAVIOUR_PATTERN_CD is null or BEHAVIOUR_PATTERN_CD <= 0))	Amortization type is Behaviour Pattern but Behaviour Pattern Code is invalid	AMRT_TYPE_CD = 700	Invalid Behaviour Pattern	Warning	
12	(AMRT_TYPE_CD = 10 and BEHAVIOUR_PATTERN_CD is not NULL and BEHAVIOUR_PATTERN_CD > 0 and BEHAVIOUR_PATTERN_CD not in (select PATTERN_CD	Amortization type is Behaviour Pattern but Behaviour Pattern definition does not exist	AMRT_TYPE_CD = 700	Invalid Behaviour Pattern	Warning	

Error Code	Error Condition	Error Description	Assignment	Warning	Error Level	Edit Priority
	from fsi_behaviour_pattern_master))					
13	(AMRT_TYPE_CD in (800, 801, 802) and NOT EXISTS (select 1 from FSI_D_Payment_Schedule WHERE FSI_D_Payment_Schedule.ID_NUMBER=SOURCE_TABLE.ID_NUMBER AND FSI_D_Payment_Schedule.IDENTITY_CODE = SOURCE_TABLE.IDENTITY_CODE AND FSI_D_Payment_Schedule.INSTRUMENT_TYPE_CD = SOURCE_TABLE.INSTRUMENT_TYPE_CD))	Cannot find record with matching ID Number, Identity Code and Instrument Type Code in Payment Schedule table	AMRT_TYPE_CD = 700	Invalid Payment schedule data	Warning	
14	(AMRT_TYPE_CD in (800, 801, 802) and ORIGINATION_DATE > (select max(PAYMENT_DATE) from FSI_D_Payment_Schedule WHERE FSI_D_Payment_Schedule.ID_NUMBER=SOURCE_TABLE.ID_NUMBER AND FSI_D_Payment_Schedule.IDENTITY_CODE = SOURCE_TABLE.I	Origination Date is greater than highest date in Payment Schedule	AMRT_TYPE_CD = 700	Invalid Payment schedule data	Warning	

Error Code	Error Condition	Error Description	Assignment	Warning	Error Level	Edit Priority
	DENTITY_CODE AND FSI_D_Payment_Schedule.INSTRUMENT_TYPE_CD = SOURCE_TABLE.INSTRUMENT_TYPE_CD))					
15	(AMRT_TERM_MULT is NULL or AMRT_TERM_MULT not in ('D', 'M', 'Y'))	Amortization term multiplier must be D, M, or Y	AMRT_TERM_MULT = M	Invalid Amortization Term Multiplier	Warning	
16	(AMRT_TYPE_CD = 600 AND (NEG_AMRT_EQ_MULT is NULL or NEG_AMRT_EQ_MULT not in ('D', 'M', 'Y')))	Negative Amortization Equalization Frequency multiplier must be D, M, or Y	NEG_AMRT_EQ_MULT = M	Invalid Negative Amortization Equalization Frequency Multiplier	Warning	
17	(AMRT_TYPE_CD = 600 and (NEG_AMRT_LIMIT is NULL or NEG_AMRT_LIMIT >=200 or NEG_AMRT_LIMIT < 0))	Negative Amortization limit value does not fall in a valid range (0 to 200), Applicable to Negative amortization instruments only	NEG_AMRT_LIMIT = 0	Invalid Negative Amortization Limit	Warning	
18	(ORG_TERM_MULT is NULL or ORG_TERM_MULT not in ('D', 'M', 'Y'))	Original term multiplier must be D, M, or Y	ORG_TERM_MULT= M	Invalid Original Term Multiplier	Warning	
19	(AMRT_TYPE_CD = 600 and (NEG_AMRT_PMT_CHG_FREQ is NULL or	Payment Change Frequency cannot be negative, Applicable to Negative	NEG_AMRT_PMT_CHG_FREQ = 0	Invalid Negative Amortization Payment Change Frequency	Warning	

Error Code	Error Condition	Error Description	Assignment	Warning	Error Level	Edit Priority
	NEG_AMRT_PMT_CHG_FREQ < 0))	amortization instruments only				
20	(AMRT_TYPE_CD = 600 and (NEG_AMRT_PMT_CHG_FREQ_MULT is NULL or NEG_AMRT_PMT_CHG_FREQ_MULT not in ('D', 'M', 'Y')))	Negative Amortization Payment Change Frequency Multiplier must be D, M, or Y	NEG_AMRT_PMT_CHG_FREQ_MULT = M	Invalid Negative Amortization Payment Change Frequency Multiplier	Warning	
21	(INT_PMT_FREQ_MULT is NULL or INT_PMT_FREQ_MULT not in ('D', 'M', 'Y'))	Interest Payment frequency multiplier must be D, M, or Y	INT_PMT_FREQ_MULT = M	Invalid Interest Payment Frequency Multiplier	Warning	
22	(PRIN_PMT_FREQ_MULT is NULL or PRIN_PMT_FREQ_MULT not in ('D', 'M', 'Y'))	Principal Payment frequency multiplier must be D, M, or Y	PRIN_PMT_FREQ_MULT = M	Invalid Principal Payment Frequency Multiplier	Warning	
23	(RATE_CHG_RND_CD is NULL or RATE_CHG_RND_CD < 0 or RATE_CHG_RND_CD > 4)	Rate change round code must be between 0 and 4	RATE_CHG_RND_CD = 0	Invalid Rate Change Rounding Code	Warning	
24	(ADJUSTABLE_TYPE_CD > 0 and (RATE_SET_LAG_MULT is NULL or RATE_SET_LAG_MULT not in ('D', 'M', 'Y')))	Rate Set Lag Multiplier must be D, M, or Y	RATE_SET_LAG_MULT = M	Invalid Rate Set Lag Multiplier	Warning	
25	(ADJUSTABLE_TYPE_CD > 0 and (REPRICE_FREQ_	Repricing Frequency Multiplier must be D, M, or Y	REPRICE_FREQ_MULT = M	Invalid Repricing Frequency Multiplier	Warning	

Error Code	Error Condition	Error Description	Assignment	Warning	Error Level	Edit Priority
	MULT is NULL or REPRICE_FREQ_ MULT not in ('D', 'M', 'Y')))					
26	(RATE_CHG_RND _FAC is NULL or RATE_CHG_RND _FAC < 0 or RATE_CHG_RND _FAC > 1)	Rate change round factor must be between 0 and 1	RATE_CHG_RND_FA C = 0	Invalid Rate Change Rounding Factor	Warning	
27	(MATURITY_DAT E < NEXT_INT_PAY MENT_DATE)	Maturity date cannot be before the next interest payment date	MATURITY_DATE = (CASE PRIN_PMT_FREQ_M ULT WHEN 'Y' THEN ADD_MONTHS(NEX T_PRIN_PAYMENT_ DATE, ((REMAIN_NO_PMT S -1)* PRIN_PMT_FREQ * 12)) WHEN 'M' THEN ADD_MONTHS(NEX T_PRIN_PAYMENT_ DATE, ((REMAIN_NO_PMT S -1)* PRIN_PMT_FREQ)) ELSE NEXT_PRIN_PAYME NT_DATE + ((REMAIN_NO_PMT S -1)* PRIN_PMT_FREQ) END)	Maturity Date < Next Interest Payment Date	Warning	

Error Code	Error Condition	Error Description	Assignment	Warning	Error Level	Edit Priority
28	(MATURITY_DATE < NEXT_PRIN_PAYMENT_DATE)	Maturity date cannot be before the next principal payment date	MATURITY_DATE = (CASE PRIN_PMT_FREQ_MULT WHEN 'Y' THEN ADD_MONTHS(NEXT_PRIN_PAYMENT_DATE, ((REMAIN_NO_PMTS -1)* PRIN_PMT_FREQ * 12)) WHEN 'M' THEN ADD_MONTHS(NEXT_PRIN_PAYMENT_DATE, ((REMAIN_NO_PMTS -1)* PRIN_PMT_FREQ)) ELSE NEXT_PRIN_PAYMENT_DATE + ((REMAIN_NO_PMTS -1)* PRIN_PMT_FREQ) END)	Maturity Date < Next Principal Payment Date	Warning	
29	(AMRT_TYPE_CD = 600 and (NEG_AMRT_EQ_FREQ is NULL or NEG_AMRT_EQ_FREQ < 0))	Negative amortization equalization frequency cannot be negative, Applicable to Negative amortization instruments only	NEG_AMRT_EQ_FREQ = 0	Negative Amortization Equalization Frequency < 0	Warning	
30	(AMRT_TYPE_CD = 600 and NEG_AMRT_EQ_FREQ is not null and NEG_AMRT_EQ_FREQ > 0 and NEG_AMRT_EQ_DATE <= greatest(ORIGINATION_DATE, AS_OF_DATE))	Negative Amortization equalization date is less than origination date (future origination) or less than the as-of-date (past origination), Applicable to Negative	NEG_AMRT_EQ_DATE = NEXT_REPRICE_DATE	Negative Amortization Equalization Date < Origination Date or As of Date	Warning	

Error Code	Error Condition	Error Description	Assignment	Warning	Error Level	Edit Priority
		Amortization instruments only				
32	(AMRT_TYPE_CD = 600 and NEG_AMRT_EQ_FREQ is not NULL and NEG_AMRT_EQ_FREQ > 0 and NEG_AMRT_EQ_DATE > MATURITY_DATE)	Next interest payment date is less than as-of-date (past origination case), As of Date can not be greater than the origination date and greater than the next payment date.	NEG_AMRT_EQ_DATE = NEXT_REPRICE_DATE	Negative Amortization Equalization Date > Maturity Date	Warning	
31	(AS_OF_DATE > ORIGINATION_DATE and AS_OF_DATE >= NEXT_INT_PAYMENT_DATE)	Negative Amortization equalization date is after Maturity Date, Applicable to Negative Amortization instruments only	NEXT_INT_PAYMENT_DATE = AS_OF_DATE + 1	Next Interest Payment Date < As of Date	Warning	
33	(AS_OF_DATE > ORIGINATION_DATE and AS_OF_DATE >= NEXT_PRIN_PAYMENT_DATE)	Next principal payment date is less than as-of-date (past origination case), As of Date can not be greater than the origination date and greater than the next payment date.	NEXT_PRIN_PAYMENT_DATE= AS_OF_DATE + 1	Next Principal Payment Date < As of Date	Warning	
34	(ORIGINATION_DATE >= AS_OF_DATE	Next interest payment date is less than origination	NEXT_INT_PAYMENT_DATE = ORIGINATION_DATE + 1	Next Interest Payment Date <	Warning	

Error Code	Error Condition	Error Description	Assignment	Warning	Error Level	Edit Priority
	and ORIGINATION_DATE >= NEXT_INT_PAYMENT_DATE)	date (future origination case)		Origination Date		
35	(ORIGINATION_DATE >= AS_OF_DATE and ORIGINATION_DATE >= NEXT_PRIN_PAYMENT_DATE)	Next principal payment date is less than origination date (future origination case)	NEXT_PRIN_PAYMENT_DATE= ORIGINATION_DATE + 1	Next Principal Payment Date < Origination Date	Warning	
36	(ORIGINATION_DATE <= AS_OF_DATE and NEXT_REPRICE_DATE <= AS_OF_DATE and REPRICE_FREQ > 0)	Next repricing date is less than as-of-date (past origination case)	NEXT_REPRICE_DATE = AS_OF_DATE + 1	Next Reprice Date < As of Date	Warning	
37	(ORIGINATION_DATE > AS_OF_DATE and NEXT_REPRICE_DATE < ORIGINATION_DATE and REPRICE_FREQ > 0)	Next repricing date is less than the origination date (future origination case)	NEXT_REPRICE_DATE = ORIGINATION_DATE + 1	Next Reprice Date < Origination Date	Warning	
38	(AMRT_TYPE_CD = 600 and (ORG_PAYMENT_AMT is NULL or ORG_PAYMENT_AMT = 0) and NEG_AMRT_PMT_DECR_LIFE > 0)	Payment decrease life is expressed as a percent of a original payment, Applicable to negative amortization instruments only	NEG_AMRT_PMT_DECR_LIFE = 0	Original Payment Amount = 0 and Negative Amortization Payment Decrease Limit (Life) <> 0	Warning	

Error Code	Error Condition	Error Description	Assignment	Warning	Error Level	Edit Priority
39	(AMRT_TYPE_CD = 600 and (ORG_PAYMENT _AMT is NULL or ORG_PAYMENT_ AMT = 0) and NEG_AMRT_PMT _INCR_LIFE > 0)	Payment increase life is expressed as a percent of a original payment, Applicable to negative amortization instruments only	NEG_AMRT_PMT_I NCR_LIFE = 0	Original Payment Amount = 0 and Negative Amortizatio n Payment Increase Limit (Life) <> 0	Warning	
40	(ORG_TERM = 0 OR ORG_TERM <> (CASE ORG_TERM_MU LT WHEN 'Y' THEN MONTHS_BETW EEN(MATURITY_ DATE, ORIGINATION_D ATE)*12 WHEN 'M' THEN MONTHS_BETW EEN(MATURITY_ DATE, ORIGINATION_D ATE) ELSE (MATURITY_DAT E - ORIGINATION_D ATE) END))	Original term should equal the time between the origination date and the maturity date	ORG_TERM#ORG_T ERM_MULT = MONTHS_BETWEE N(MATURITY_DATE , RIGINATION_DATE) #	Original Term <> Maturity Date - Orgination Date	Warning	
41	(ORIGINATION_D ATE is NULL or ORIGINATION_D ATE < '1-Aug-1950' or ORIGINATION_D ATE > '1-Aug-2099')	Origination date must be acceptable	ORIGINATION_DAT E = 1-Jan-50	Origination date < 01/01/1950	Warning	
42	(INT_PMT_FREQ > (CASE INT_PMT_FREQ_ MULT WHEN 'Y' THEN MONTHS_BETW EEN(MATURITY_ DATE,	Interest Payment frequency cannot be greater than original term	INT_PMT_FREQ#IN T_PMT_FREQ_MUL T = MONTHS_BETWEE N(MATURITY_DATE , ORIGINATION_DAT E)#	Interest Payment Freq > Original Term	Warning	

Error Code	Error Condition	Error Description	Assignment	Warning	Error Level	Edit Priority
	ORIGINATION_DATE)*12 WHEN 'M' THEN MONTHS_BETWEEN(MATURITY_DATE, ORIGINATION_DATE) ELSE (MATURITY_DATE - ORIGINATION_DATE) END))					
43	(PRIN_PMT_FREQ >(CASE PRIN_PMT_FREQ_MULT WHEN 'Y' THEN MONTHS_BETWEEN(MATURITY_DATE, ORIGINATION_DATE)*12 WHEN 'M' THEN MONTHS_BETWEEN(MATURITY_DATE, ORIGINATION_DATE) ELSE (MATURITY_DATE - ORIGINATION_DATE) END))	Principal Payment frequency cannot be greater than original term	PRIN_PMT_FREQ#PRIN_PMT_FREQ_MULT= MONTHS_BETWEEN(MATURITY_DATE, ORIGINATION_DATE)#	Principal Payment Freq > Original Term	Warning	
44	((CUR_PAYMENT is NULL or CUR_PAYMENT < 0 and CUR_PAR_BAL > 0) or (CUR_PAYMENT > 0 and CUR_PAR_BAL < 0))	Current payment and current par balance can not have opposite signs	CUR_PAYMENT = 0	Current Payment and Current Par Balance have opposite signs	Warning	

Error Code	Error Condition	Error Description	Assignment	Warning	Error Level	Edit Priority
45	(AMRT_TYPE_CD = 600 and NEG_AMRT_PMT_CHG_FREQ > 0 and AS_OF_DATE > NEG_AMRT_PMT_ADJUST_DATE)	Negative Amortization Payment Adjustment Date is less than the as-of-date (past origination), Applicable to negative amortization instruments only	NEG_AMRT_PMT_ADJUST_DATE=NEXT_REPRICE_DATE	Negative Amortization Payment Adjustment Date < As of Date	Warning	
46	(AMRT_TYPE_CD = 600 and NEG_AMRT_PMT_CHG_FREQ > 0 and AS_OF_DATE < NEG_AMRT_PMT_ADJUST_DATE and NEG_AMRT_PMT_ADJUST_DATE < ORIGINATION_DATE)	Negative Amortization Payment adjustment date is less than origination date (future origination), Applicable to negative amortization instruments only	NEG_AMRT_PMT_ADJUST_DATE=NEXT_REPRICE_DATE	Negative Amortization Payment Adjustment Date < Origination Date	Warning	
47	((INT_PMT_FREQ is NULL or INT_PMT_FREQ <= 0) and ((ORIGINATION_DATE <= AS_OF_DATE and MATURITY_DATE > AS_OF_DATE) or (ORIGINATION_DATE > AS_OF_DATE and MATURITY_DATE > ORIGINATION_DATE)))	Interest Payment frequency is less than or equal to zero, and both maturity date and origination date are valid dates and can be used to calculate payment frequency.	NEXT_INT_PAYMENT_DATE#ORG_TERM#ORG_TERM_MULT#INT_PMT_FREQ#INT_PMT_FREQ_MULT#REMAIN_NO_PMTS=MATURITY_DATE#MONTHS_BETWEEN(MATURITY_DATE, ORIGINATION_DATE)##MONTHS_BETWEEN(MATURITY_DATE, ORIGINATION_DATE)##	Interest Payment Frequency <= 0	Warning	

Error Code	Error Condition	Error Description	Assignment	Warning	Error Level	Edit Priority
48	((PRIN_PMT_FREQ is NULL or PRIN_PMT_FREQ <= 0) and ((ORIGINATION_DATE <= AS_OF_DATE and MATURITY_DATE > AS_OF_DATE) or (ORIGINATION_DATE > AS_OF_DATE and MATURITY_DATE > ORIGINATION_DATE)))	Principal Payment frequency is less than or equal to zero, and both maturity date and origination date are valid dates and can be used to calculate payment frequency.	NEXT_PRIN_PAYMENT_DATE#ORG_TERM#ORG_TERM_MULT#PRIN_PMT_FREQ#PRIN_PMT_FREQ_MULT#REMAIN_NO_PMTS=MATURITY_DATE#MONTHS_BETWEEN(MATURITY_DATE, ORIGINATION_DATE)##MONTHS_BETWEEN(MATURITY_DATE, ORIGINATION_DATE)##	Principal Payment Frequency <= 0	Warning	
49	((INT_PMT_FREQ is NULL or INT_PMT_FREQ <= 0) and ((ORIGINATION_DATE <= AS_OF_DATE and MATURITY_DATE <= AS_OF_DATE and NEXT_INT_PAYMENT_DATE > AS_OF_DATE) or (ORIGINATION_DATE > AS_OF_DATE AND MATURITY_DATE < ORIGINATION_DATE and NEXT_INT_PAYMENT_DATE > ORIGINATION_DATE)))	Interest payment frequency is less than or equal to zero and maturity date is invalid, but next interest payment date can be used to calculate a valid payment frequency	MATURITY_DATE#ORG_TERM#ORG_TERM_MULT#INT_PMT_FREQ#INT_PMT_FREQ_MULT#REMAIN_NO_PMTS=NEXT_INT_PAYMENT_DATE#MONTHS_BETWEEN(MATURITY_DATE, ORIGINATION_DATE)##MONTHS_BETWEEN(MATURITY_DATE, ORIGINATION_DATE)##	Interest Payment Frequency <= 0	Warning	

Error Code	Error Condition	Error Description	Assignment	Warning	Error Level	Edit Priority
50	((PRIN_PMT_FREQ is NULL or PRIN_PMT_FREQ <= 0) and ((ORIGINATION_DATE <= AS_OF_DATE and MATURITY_DATE <= AS_OF_DATE and NEXT_PRIN_PAYMENT_DATE > AS_OF_DATE) or (ORIGINATION_DATE > AS_OF_DATE AND MATURITY_DATE < ORIGINATION_DATE and NEXT_PRIN_PAYMENT_DATE > ORIGINATION_DATE)))	Principal payment frequency is less than or equal to zero and maturity date is invalid, but next interest payment date can be used to calculate a valid payment frequency	MATURITY_DATE#ORG_TERM#ORG_TERM_MULT#PRIN_PMT_FREQ#PRIN_PMT_FREQ_MULT#REMAIN_NO_PMTS=NEXT_PRIN_PAYMENT_DATE#MONTHS_BETWEEN(MATURITY_DATE, ORIGINATION_DATE)##MONTHS_BETWEEN(MATURITY_DATE, ORIGINATION_DATE)##	Principal Payment Frequency <= 0	Warning	
51	((INT_PMT_FREQ is NULL or INT_PMT_FREQ <= 0) and ((ORIGINATION_DATE <= AS_OF_DATE and MATURITY_DATE <= AS_OF_DATE and NEXT_INT_PAYMENT_DATE <= AS_OF_DATE) or (ORIGINATION_DATE > AS_OF_DATE AND MATURITY_DAT	Interest payment frequency is less than or equal to zero and all dates which can be used to calculate payment frequency are in the past	MATURITY_DATE#NEXT_INT_PAYMENT_DATE#ORG_TERM#ORG_TERM_MULT#INT_PMT_FREQ#INT_PMT_FREQ_MULT#REMAIN_NO_PMTS=AS_OF_DATE + 1#AS_OF_DATE + 1#MONTHS_BETWEEN(MATURITY_DATE, ORIGINATION_DATE)##MONTHS_BETWEEN(MATURITY_DATE, ORIGINATION_DATE)##	Interest Payment Frequency <= 0	Warning	

Error Code	Error Condition	Error Description	Assignment	Warning	Error Level	Edit Priority
	E < ORIGINATION_DATE and NEXT_INT_PAYMENT_DATE < ORIGINATION_DATE)))					
52	((PRIN_PMT_FREQ is NULL or PRIN_PMT_FREQ <= 0) and ((ORIGINATION_DATE <= AS_OF_DATE and MATURITY_DATE <= AS_OF_DATE and NEXT_PRIN_PAYMENT_DATE <= AS_OF_DATE) or (ORIGINATION_DATE > AS_OF_DATE AND MATURITY_DATE < ORIGINATION_DATE and NEXT_PRIN_PAYMENT_DATE < ORIGINATION_DATE)))	Principal payment frequency is less than or equal to zero and all dates which can be used to calculate payment frequency are in the past	MATURITY_DATE#NEXT_PRIN_PAYMENT_DATE#ORG_TERM#ORG_TERM_MULT#PRIN_PMT_FREQ#PRIN_PMT_FREQ_MULT#REMAIN_NO_PMTS=AS_OF_DATE + 1#AS_OF_DATE + 1#MONTHS_BETWEEN(MATURITY_DATE, ORIGINATION_DATE)##MONTHS_BETWEEN(MATURITY_DATE, ORIGINATION_DATE)##	Principal Payment Frequency <= 0	Warning	
53	(AMRT_TYPE_CD = 600 and (NEG_AMRT_PMT_INCR_CYCLE is NULL or NEG_AMRT_PMT	Negative Amortization Payment increase limit (cycle) cannot be less than zero,	NEG_AMRT_PMT_INCR_CYCLE=0	Negative Amortization Payment Increase Limit (Cycle) < 0	Warning	

Error Code	Error Condition	Error Description	Assignment	Warning	Error Level	Edit Priority
	_INCR_CYCLE < 0))	Applicable to negative amortization instruments only				
54	(RATE_CAP_LIFE < CUR_GROSS_RATE and RATE_CAP_LIFE <> 0 and CUR_GROSS_RATE <> 0 and TEASER_END_DATE < AS_OF_DATE)	Current gross rate is greater than the rate cap life	RATE_CAP_LIFE=CUR_GROSS_RATE	Rate Cap Life < Current Gross Interest Rate	Info	
55	(RATE_CAP_LIFE < CUR_NET_RATE and RATE_CAP_LIFE <> 0)	Current net rate is greater than the rate cap		Rate Cap Life < Current Net Interest Rate	Info	
56	(RATE_CHG_MIN is NULL or RATE_CHG_MIN < 0)	Minimum rate change can not be negative	RATE_CHG_MIN=0	Rate Change Minimum < 0	Warning	
57	(RATE_DECR_CYCLE is NULL or RATE_DECR_CYCLE < 0)	Rate decrease limit (cycle) must not be negative	RATE_DECR_CYCLE=0	Rate Decrease Limit (Cycle) < 0	Warning	
58	(RATE_FLOOR_LIFE > CUR_GROSS_RATE and CUR_GROSS_RATE <> 0 and TEASER_END_DATE < AS_OF_DATE)	Current gross rate is less than the rate floor		Rate Floor Life > Currrent Gross Interest Rate	Info	
59	(RATE_FLOOR_LIFE > CUR_NET_RATE)	Rate floor life must not be greater than the current net rate	RATE_FLOOR_LIFE=CUR_GROSS_RATE	Rate Floor Life > Currrent Net Interest Rate	Info	

Error Code	Error Condition	Error Description	Assignment	Warning	Error Level	Edit Priority
60	(RATE_INCR_CYCLE is NULL or RATE_INCR_CYCLE < 0)	Rate increase limit (cycle) can not be less than 0	RATE_INCR_CYCLE =0	Rate Increase Limit (Cycle) < 0	Warning	
61	(REMAIN_NO_PMTS is NULL or REMAIN_NO_PMTS < 1)	There has to be at least 1 payment left	REMAIN_NO_PMTS =1	Remaining Number of Payments < 1	Warning	
62	(ADJUSTABLE_TYPE_CD > 0 and (RATE_SET_LAG is NULL or RATE_SET_LAG < 0))	Rate set lag cannot be negative	RATE_SET_LAG=0	Rate Set Lag < 0	Warning	
63	(TEASER_END_DATE < ORIGINATION_DATE)	Teaser End Date cannot be before Origination Date	TEASER_END_DATE =ORIGINATION_DATE	Teaser End Date < Origination Date	Warning	
64	(TEASER_END_DATE > MATURITY_DATE)	Teaser End Date cannot be after Maturity Date	TEASER_END_DATE =MATURITY_DATE	Teaser End Date > Maturity Date	Warning	
65	(AMRT_TYPE_CD = 710 and ORG_PAR_BAL < CUR_PAR_BAL)	Original balance on Rule of 78's instruments should be greater than current balance		Orginal Par Balance < Current Par Balance	Info	
66	(AMRT_TYPE_CD = 600 and (REPRICE_FREQ is NULL or REPRICE_FREQ = 0))	Reprice Frequency cannot be zero for Adjustable Negative Amortization instrument		Adjustable Negative Amortization instrument has Reprice Frequency = 0	Info	

Error Code	Error Condition	Error Description	Assignment	Warning	Error Level	Edit Priority
67	(REPRICE_FREQ <> 0 and LAST_REPRICE_DATE > NEXT_REPRICE_DATE)	Last repricing date is greater than next repricing date	LAST_REPRICE_DATE=(CASE REPRICE_FREQ_MULT WHEN 'Y' THEN ADD_MONTHS(NEXT_REPRICE_DATE, -REPRICE_FREQ*12) WHEN 'M' THEN ADD_MONTHS(NEXT_REPRICE_DATE, -REPRICE_FREQ) ELSE NEXT_REPRICE_DATE - REPRICE_FREQ END)	Last Reprice Date > Next Reprice Date	Warning	
68	(ADJUSTABLE_TYPE_CD in (50, 250) and (INTEREST_RATE_CD is NULL or INTEREST_RATE_CD <= 0))	Interest rate code must be valid for adjustable rate instruments	ADJUSTABLE_TYPE_CD=0	Adjustable Rate instrument has invalid Interest Rate Code	Warning	
69	(ADJUSTABLE_TYPE_CD > 0 and INTEREST_RATE_CD > 0 and exists (select 1 from fsi_ircs where fsi_ircs.interest_rate_cd = SOURCE_TABLE.interest_rate_cd and fsi_ircs.volatility_curve_flg > 0))	Interest rate code of instrument is not an yield curve. Repricing attributes will be ignored and processed as fixed interest rate;	ADJUSTABLE_TYPE_CD=0	Invalid Interest Rate Code. Curve Type is not Interest Rate Curve	Warning	
70	(NET_MARGIN_CD is NULL or NET_MARGIN_CD not in (0, 1))	Valid net margin codes are 0 or 1.	NET_MARGIN_CD= 0	Invalid Net Margin Code	Warning	
71	(AMRT_TYPE_CD = 600 and (NEG_AMRT_PMT_DECR_CYCLE is NULL or	Payment Decrease Limit (Cycle) cannot be less than zero. Applicable to	NEG_AMRT_PMT_DECR_CYCLE=0	Negative Amortization Payment Decrease Limit (Cycle) = 0	Warning	

Error Code	Error Condition	Error Description	Assignment	Warning	Error Level	Edit Priority
	NEG_AMRT_PMT_DECR_CYCLE < 0))	negative amortization instruments only				
72	(AMRT_TYPE_CD = 600 and (NEG_AMRT_PMT_DECR_LIFE is NULL or NEG_AMRT_PMT_DECR_LIFE < 0))	Payment Decrease Limit (Life) cannot be less than zero. Applicable to negative amortization instruments only	NEG_AMRT_PMT_DECR_LIFE=0	Negative Amortization Payment Decrease Limit (Life) = 0	Warning	
73	(AMRT_TYPE_CD = 600 and NEG_AMRT_PMT_DECR_LIFE <> 0 and CUR_PAYMENT < ORG_PAYMENT_AMT * (1 - NEG_AMRT_PMT_DECR_LIFE/100))	Current payment is less than the minimum payment amount. Applicable to negative amortization instruments only		Current Payment is less than Life Pay Floor	Info	
74	(AMRT_TYPE_CD = 600 and (NEG_AMRT_PMT_INCR_LIFE is NULL or NEG_AMRT_PMT_INCR_LIFE < 0))	Payment Increase Limit (Life) cannot be less than zero. Applicable to negative amortization instruments only	NEG_AMRT_PMT_INCR_LIFE=0	Negative Amortization Payment Increase Limit (Life) = 0	Warning	
75	(AMRT_TYPE_CD = 600 and NEG_AMRT_PMT_INCR_LIFE <> 0 and CUR_PAYMENT > ORG_PAYMENT_AMT * (1 + NEG_AMRT_PMT_INCR_LIFE/100))	Current payment is greater than the maximum payment amount. Applicable to negative amortization instruments only		Current Payment is greater than Life Pay Cap	Info	

Error Code	Error Condition	Error Description	Assignment	Warning	Error Level	Edit Priority
76	(ISSUE_DATE > ORIGINATION_DATE)	Issue date can not be greater than origination date	ISSUE_DATE=ORIGINATION_DATE	Issue Date > Origination Date	Warning	
77	(REPRICE_FREQ is NULL or REPRICE_FREQ < 0)	Repricing frequency must not be negative	REPRICE_FREQ=0	Reprice Frequency < 0	Warning	
78	(AMRT_TYPE_CD = 710 and REPRICE_FREQ <> 0)	Rule of 78's instruments are implicitly fixed rate.	REPRICE_FREQ=0	Amortization type is Rule of 78's but Reprice Frequency is not 0	Warning	
79	(ORG_PAR_BAL = 0 and (REPRICE_FREQ is NULL or REPRICE_FREQ = 0))	For transfer pricing of fixed rate instruments, the original balance should be populated.		Original Par Balance is 0 for a fixed rate instrument	Info	
80	(REPRICE_FREQ <> 0 and TEASER_END_DATE > ORIGINATION_DATE and TEASER_END_DATE > AS_OF_DATE and NEXT_REPRICE_DATE > TEASER_END_DATE)	Next repricing date is greater than teaser end date.	NEXT_REPRICE_DATE=TEASER_END_DATE	Next Reprice Date > Teaser End Date	Warning	
81	(ADJUSTABLE_TYPE_CD <> 0 and (LRD_BALANCE is NULL or LRD_BALANCE = 0))	The balance as of the last repricing date cannot be equal to 0	LRD_BALANCE=CUR_PAR_BAL	Balance on Last Reprice Date = 0	Warning	
82	(ADJUSTABLE_TYPE_CD <> 0 and (LAST_REPRICE_DATE < ISSUE_DATE or	Transfer pricing will not occur when the last repricing date is less than the issue	LAST_REPRICE_DATE=ORIGINATION_DATE	Last Reprice Date < Issue/Origination Date	Info	

Error Code	Error Condition	Error Description	Assignment	Warning	Error Level	Edit Priority
	LAST_REPRICE_ DATE < ORIGINATION_D ATE))	date and origination date				
83	(ADJUSTABLE_T YPE_CD = 0 and REPRICE_FREQ > 0)	Repricing frequency and adjustable type code are inconsistent	REPRICE_FREQ=0	Reprice Frequency > 0 for fixed rate instrument	Info	
84	(ADJUSTABLE_T YPE_CD <> 0 and (REPRICE_FREQ is NULL or REPRICE_FREQ = 0))	Repricing frequency and adjustable type code are inconsistent		Adjustable Type is not fixed but Reprice Frequency is 0	Info	
85	(AMRT_TYPE_CD = 710 and ADJUSTABLE_T YPE_CD <> 0)	Rule of 78's instrument should only have a Fixed adjustable type code.	ADJUSTABLE_TYPE _CD=0	Amortizatio n type is Rule of 78's but Adjustable Type is not fixed	Warning	
86	(AMRT_TYPE_CD = 600 and ADJUSTABLE_T YPE_CD = 0)	Negative amortization instruments cannot have fixed adjustable type code	AMRT_TYPE_CD=10 0	Adjustable Type is fixed rate for Negative amortizatio n instrument	Info	
87	(LAST_INT_PAY MENT_DATE > NEXT_INT_PAY MENT_DATE and INT_PMT_FREQ > 0)	Last interest payment date is greater than next interest payment date and can be calculated using interest payment frequency	LAST_INT_PAYMEN T_DATE=(CASE INT_PMT_FREQ_MU LT WHEN 'Y' THEN ADD_MONTHS(NEX T_INT_PAYMENT_D ATE, - INT_PMT_FREQ*12) WHEN 'M' THEN ADD_MONTHS(NEX T_INT_PAYMENT_D ATE, - INT_PMT_FREQ) ELSE NEXT_INT_PAYMEN T_DATE -		Warning	

Error Code	Error Condition	Error Description	Assignment	Warning	Error Level	Edit Priority
			INT_PMT_FREQ END)			
88	(LAST_INT_PAYMENT_DATE > NEXT_INT_PAYMENT_DATE and (INT_PMT_FREQ is NULL or INT_PMT_FREQ <= 0))	Last interest payment date is greater than next interest payment date, but cannot be calculated using interest payment frequency.	LAST_INT_PAYMENT_DATE=ORIGINATION_DATE		Warning	
89	(LAST_PRIN_PAYMENT_DATE > NEXT_PRIN_PAYMENT_DATE and PRIN_PMT_FREQ > 0)	Last principal payment date is greater than next principal payment date and can be calculated using principal payment frequency	LAST_PRIN_PAYMENT_DATE=(CASE PRIN_PMT_FREQ_MULT WHEN 'Y' THEN ADD_MONTHS(NEXT_PRIN_PAYMENT_DATE, -PRIN_PMT_FREQ*12) WHEN 'M' THEN ADD_MONTHS(NEXT_PRIN_PAYMENT_DATE, -PRIN_PMT_FREQ) ELSE NEXT_PRIN_PAYMENT_DATE - PRIN_PMT_FREQ END)		Warning	
90	(LAST_PRIN_PAYMENT_DATE > NEXT_PRIN_PAYMENT_DATE and (PRIN_PMT_FREQ is NULL or PRIN_PMT_FREQ <= 0))	Last principal payment date is greater than next principal payment date, but cannot be calculated using principal	LAST_PRIN_PAYMENT_DATE=ORIGINATION_DATE	Last principal payment date > Next principal payment date	Warning	

Error Code	Error Condition	Error Description	Assignment	Warning	Error Level	Edit Priority
		payment frequency.				
91	(LAST_INT_PAYMENT_DATE < ORIGINATION_DATE)	Last interest payment date cannot be less than the origination date	LAST_INT_PAYMENT_DATE=ORIGINATION_DATE	Last Interest Payment Date < Origination Date	Warning	
92	(LAST_PRIN_PAYMENT_DATE < ORIGINATION_DATE)	Last principal payment date cannot be less than the origination date	LAST_PRIN_PAYMENT_DATE=ORIGINATION_DATE	Last Principal Payment Date < Origination Date	Warning	
93	(LAST_INT_PAYMENT_DATE > AS_OF_DATE and ORIGINATION_DATE <= AS_OF_DATE)	Last interest payment date cannot be greater than the as-of-date if the instrument originated in the past.	LAST_INT_PAYMENT_DATE=AS_OF_DATE	Last interest payment date > As of Date	Warning	
94	(LAST_PRIN_PAYMENT_DATE > AS_OF_DATE and ORIGINATION_DATE <= AS_OF_DATE)	Last principal payment date cannot be greater than the as-of-date if the instrument originated in the past.	LAST_PRIN_PAYMENT_DATE=AS_OF_DATE	Last principal payment date > As of Date	Warning	
95	(INTEREST_TIMING_TYPE_CD = 2 and AMRT_TYPE_CD in (100, 400, 600, 710, 800, 840, 850))	Interest type can only be arrears for conventionally amortizing instruments.	INTEREST_TIMING_TYPE_CD=1	Amortization Type is conventional but interest timing is Advance	Warning	
96	(INTEREST_TIMING_TYPE_CD is NULL or INTEREST_TIMIN	Interest type must be a valid OFSAA code.	INTEREST_TIMING_TYPE_CD=1	Invalid interest timing type	Warning	

Error Code	Error Condition	Error Description	Assignment	Warning	Error Level	Edit Priority
	G_TYPE_CD not in (1, 2, 3))					
97	(COMPOUND_BASIS_CD is NULL or COMPOUND_BASIS_CD not in (110, 120, 130, 140, 150, 160, 170))	Compounding basis code must be a valid OFSAA code	COMPOUND_BASIS_CD=160	Invalid Compounding Basis Code	Warning	
98	(ACCRUAL_BASIS_CD IN (1, 4, 5) and (INT_PMT_FREQ_MULT = 'D' or AMRT_TYPE_CD in (800,801, 802)))	Accrual basis code cannot have a 30 day month assumption on instruments defined by a payment schedule	ACCRUAL_BASIS_CD=3	Amortization Type / Accrual Basis Error	Warning	
99	(ACCRUAL_BASIS_CD = 7 and (HOLIDAY_CALENDAR_CODE is NULL or HOLIDAY_CALENDAR_CODE <=0 or HOLIDAY_CALC_OPTION_CD is NULL or HOLIDAY_CALC_OPTION_CD not in (1, 2) or HOLIDAY_ROLLING_CONVENTION_CD is NULL or HOLIDAY_ROLLING_CONVENTION_CD not in (2,3,4,5)))	Holiday calendar must be give when using Business/252 accrual basis		Holiday calendar not given for B/252 accrual basis	Info	
100	(AMRT_TYPE_CD = 10 and BEHAVIOUR_TYPE_CD is NULL)	Behaviour Type Code is Null, defaulted to 1 (Non-Maturity)	BEHAVIOUR_TYPE_CD=1	Behaviour Type Code is Null	Warning	

Error Code	Error Condition	Error Description	Assignment	Warning	Error Level	Edit Priority
101	(AMRT_TYPE_CD = 10 and BEHAVIOUR_TYPE_CD not in (1,2,3))	Behaviour Type Code is invalid, defaulted to 1 (Non-Maturity)	BEHAVIOUR_TYPE_CD=1	Invalid Behaviour Type Code	Warning	
102	(AMRT_TYPE_CD = 10 and BEHAVIOUR_TYPE_CD = 2 and (BEHAVIOUR_SUB_TYPE_CD is NULL or BEHAVIOUR_SUB_TYPE_CD not in (201, 202, 203)))	Behaviour Sub Type should be 201 or 202 or 203 when Behaviour Type is Non-Performing	BEHAVIOUR_SUB_TYPE_CD=201	Invalid Behavior Sub Type Code	Warning	
103	(AMRT_TYPE_CD = 10 and BEHAVIOUR_TYPE_CD = 3 and (BEHAVIOUR_SUB_TYPE_CD is NULL or BEHAVIOUR_SUB_TYPE_CD not in (305, 306)))	Behaviour Sub Type should be 305 or 306 when Behaviour Type is Devolvement and Recovery	BEHAVIOUR_SUB_TYPE_CD=305	Invalid Behavior Sub Type Code	Warning	
104	(AMRT_TYPE_CD = 840 and RESIDUAL_AMOUNT < 0)	Residual Amount cannot be less than 0 for Lease instrument	RESIDUAL_AMOUNT=0	Invalid Residual Amount for Lease instrument	Warning	
105	(AMRT_TYPE_CD = 840 and RESIDUAL_AMOUNT > CUR_PAR_BAL)	Residual Amount cannot be higher than Current Par Balance for Lease instrument	RESIDUAL_AMOUNT=0	Invalid Residual Amount for Lease instrument	Warning	
106	(AMRT_TYPE_CD = 850 and MATURITY_AMOUNT > 0 and ADJUSTABLE_TYPE_CD > 0)	Annuity instrument with maturity amount must have fixed interest rate	ADJUSTABLE_TYPE_CD=0	Invalid Adjustable Type for Annuity with Maturity Amount	Warning	

Error Code	Error Condition	Error Description	Assignment	Warning	Error Level	Edit Priority
107	(MOA_EXPECTED_BAL > 0 and (MOA_OFFSET_PERCENT is NULL or MOA_OFFSET_PERCENT < 0))	Expected balance is greater than 0 but offset percentage is less than 0	MOA_OFFSET_PERCENT=0	Invalid offset percent	Warning	
108	((MOA_EXPECTED_BAL * MOA_OFFSET_PERCENT/100) > CUR_PAR_BAL)	Calculated Offset Balance is higher than Current Par Balance		Calculated Offset Balance > Current Par Balance	Info	
109	(ADJUSTABLE_TYPE_CD = 10 and (REPRICE_PATTERN_CD is NULL or REPRICE_PATTERN_CD <= 0))	Invalid reprice pattern code given for instrument	ADJUSTABLE_TYPE_CD=0	Invalid reprice pattern code	Warning	
110	(ADJUSTABLE_TYPE_CD = 10 and REPRICE_PATTERN_CD > 0 and REPRICE_PATTERN_CD not in (select ADJUSTABLE_TYPE_CD from fsi_reprice_pattern))	Invalid reprice pattern code given for instrument	ADJUSTABLE_TYPE_CD=0	Invalid reprice pattern code	Warning	
111	(ADJUSTABLE_TYPE_CD = 0 and (ORG_PAYMENT_AMT is NULL or ORG_PAYMENT_AMT <= 0))	Original payment amount is required for fixed-rate instruments	ORG_PAYMENT_AMT=CUR_PAYMENT	Invalid Original Payment Amount	Warning	
112	(PERCENT_SOLD < 0 or PERCENT_SOLD > 99)	Percent Sold must be greater than or equal to zero and less than 100	PERCENT_SOLD=0	Invalid Percent Sold	Warning	

Error Code	Error Condition	Error Description	Assignment	Warning	Error Level	Edit Priority
113	(CUR_PAR_BAL is NULL or CUR_PAR_BAL = 0)	Instruments with Current Par Balance zero are not processed.		Current Par Balance = 0	Warning	
114	(EMBEDDED_OPTIONS_FLG = 1 and AMRT_TYPE_CD <> 700)	Embedded option is supported only for non-amortizing instrument	EMBEDDED_OPTIONS_FLG=0	Invalid embedded options flag	Warning	
115	(ADJUSTABLE_TYPE_CD = 0 and TP_EFFECTIVE_DATE > ORIGINATION_DATE)	TP Effective Date must not be after Origination Date for fixed rate instrument		Invalid TP Effective Date	Info	
116	(ADJUSTABLE_TYPE_CD = 0 and TP_EFFECTIVE_DATE < ORIGINATION_DATE)	TP Effective Date must not be before Origination Date for fixed rate instrument		Invalid TP Effective Date	Info	
117	(ADJUSTABLE_TYPE_CD > 0 and TP_EFFECTIVE_DATE > LAST_REPRICE_DATE)	TP Effective Date must not be after Last Reprice Date for non-fixed rate instrument		Invalid TP Effective Date	Info	
118	(ADJUSTABLE_TYPE_CD > 0 and TP_EFFECTIVE_DATE <= NEXT_REPRICE_DATE)	TP Effective Date must not equal to Next Reprice Date for non-fixed rate instrument		Invalid TP Effective Date	Info	
119	(TP_EFFECTIVE_DATE is not NULL and TP_EFFECTIVE_DATE < '01-JAN-1970')	TP Effective Date is before '01-JAN-1970'	TP_EFFECTIVE_DATE=ORIGINATION_DATE	Invalid TP Effective Date	Info	
120	(TP_EFFECTIVE_DATE >	TP Effective Date is after maturity date	TP_EFFECTIVE_DATE=ORIGINATION_DATE	Invalid TP Effective Date	Info	

Error Code, Error Condition, Error Description, Assignment, Warning, Error Level, Edit Priority.

Error Code	Error Condition	Error Description	Assignment	Warning	Error Level	Edit Priority
	MATURITY_DATE)					
121	(ADJUSTABLE_TYPE_CD = 0 and ADJ_EFFECTIVE_DATE > ORIGINATION_DATE)	Adjustment Effective Date must not be after Origination Date for fixed rate instrument		Invalid Adjustment Effective Date	Info	
122	(ADJUSTABLE_TYPE_CD = 0 and ADJ_EFFECTIVE_DATE < ORIGINATION_DATE)	Adjustment Effective Date must not be before Origination Date for fixed rate instrument		Invalid Adjustment Effective Date	Info	
123	(ADJUSTABLE_TYPE_CD > 0 and ADJ_EFFECTIVE_DATE > LAST_REPRICE_DATE)	Adjustment Effective Date must not be after Last Reprice Date for non-fixed rate instrument		Invalid Adjustment Effective Date	Info	
124	(ADJUSTABLE_TYPE_CD > 0 and ADJ_EFFECTIVE_DATE <= NEXT_REPRICE_DATE)	Adjustment Effective Date must not equal to Next Reprice Date for non-fixed rate instrument		Invalid Adjustment Effective Date	Info	
125	(ADJ_EFFECTIVE_DATE is not NULL and ADJ_EFFECTIVE_DATE < '01-JAN-1970')	Adjustment Effective Date is before '01-JAN-1970'	ADJ_EFFECTIVE_DATE=ORIGINATION_DATE	Invalid Adjustment Effective Date	Info	
126	(ADJ_EFFECTIVE_DATE > MATURITY_DATE)	Adjustment Effective Date is after maturity date	ADJ_EFFECTIVE_DATE=ORIGINATION_DATE	Invalid Adjustment Effective Date	Info	

18   Archive-Restore

This chapter describes the details of Command-line Migration.

Topics:

- [Command-line Migration](#)
- [Command-line Migration Utility](#)

18.1   Command-line Migration

Using the Command-line utility, you can migrate (export or import) CFE metadata objects to different OFSAA environments. You can specify one or more objects within an object type or multiple object types.

During the migration process, `FSI_IRCS.CREATED_DATE` and `FSI_IRCS.CREATED_BY` fields get overwritten with the migration date and the user respectively which runs the migration.

For the list of objects that can be migrated, see [Table](#).

18.2   Command-line Migration Utility

CFE uses the same utility that is used by the OFSAA Infrastructure. For more details, see the *Migrate Objects* section in the [Oracle Financial Services Analytical Applications Infrastructure User Guide.](#)

18.2.1   Supported Objects

[Table](#) describes each of the Cash Flow Engine Preference objects.

Table: List of Supported Objects in CFE Application for command-line migration utility

Object Name	Object Type ID	Support for the wild card (Select all option)	Support for implicit Dependency	Object Code	Remarks
Application Preferences	201	No	No	CONFIG	The entire data set is exported and replaced in the target. No validation and its dependency objects are not handled.
Holiday Calendar	815	Yes	Yes	User-defined unique code	
Interest Rates	801	Yes	Yes	User-defined unique code	Historical rates from FSI_IR-CRATE_HIS_T table are not migrated.
Currency rates	803	No	No		Currency rates are not supported.
Currencies	802	Yes	No	User-defined currency code	
Filter	1	No	Yes	System generated code	
Payment patterns	809	Yes	Yes	User-defined unique code	
Repricing Patterns	808	Yes	Yes	User-defined unique code	

Object Name	Object Type ID	Support for the wild card (Select all option)	Support for implicit Dependency	Object Code	Remarks
Behavior Patterns	807	Yes	Yes	User-defined unique code	

Behavior Pattern Rule	314	Yes	Yes	System generated code	
Prepayment Rules	300	Yes	Yes	System generated code	
Prepayment Models	312	Yes	Yes	System generated code	
Forecast Rate Scenarios	11003	Yes	Yes	System generated code	
Cash Flow Engine Process	11001	Yes	Yes	System generated code	
Cash Flow Edits	11002	Yes	Yes	System generated code	

NOTE	The following is the list of Desupported Objects in Archive-Restore:
	Hierarchy Attribute
	The Object must be explicitly exported before migrating any rule which uses Currencies.

18.3   Input Values for OBJECTMIGRATION.xml

Table shows the list of Input Attributes of the OBJECTMIGRATION.XML file.

Table: List of Input Attributes of OBJECTMIGRATION.XML file

Object Name	Object Type Id	Input value in OBJECTMIGRATION.XML for the wild card	Input value in OBJECT_MIGRATION.xml for Object Code
Application Preferences	201	<OBJECT Code="CONFIG" Type="201"/>	<OBJECT Code="CONFIG" Type="201"/>
Interest Rates	801		<OBJECT Code="User defined unique code" Type="801"/>
Currency Rates	803		<OBJECT Code="System generated code" Type="803"/>
Currencies	802		<OBJECT Code="User defined unique code" Type="802"/>
Filter	1		<OBJECT Code="System generated code" Type="1"/>
Payment Patterns	809		<OBJECT Code="User defined unique code" Type="809/>
Repricing Patterns	808		<OBJECT Code="User defined unique code" Type="808"/>
Behavior Patterns	807		<OBJECT Code="User defined unique code" Type="807"/>

Object Name	Object Type Id	Input value in OBJECTMIGRATION.XML for the wild card	Input value in OBJECT_MIGRATION.xml for Object Code
Prepayment Rules	300		<OBJECT Code="System generated code" Type="300"/>
Prepayment Models	312		<OBJECT Code="System generated code" Type="312"/>
Forecast Rate Scenarios	11003		<OBJECT Code="System generated code" Type="11003"/>
Cash Flow Engine Process	11001		<OBJECT Code="System generated code" Type="11001"/>
Cash Flow Edits	11002		<OBJECT Code="System generated code" Type="11002"/>

Logging Details

1. `$FIC_HOME /utility/Migration/logs/offline_migration.log`
2. `<War_deployed_location>/logs /FUSIONSUBSYSTEMSService.log`

19   Standard Navigation Paths

This section provides information to navigate through the pages referred to in this guide. Oracle Financial Services Cash Flow navigation paths are displayed in the List of Navigation Paths. Access all these pages through the CFE Administrator or CFE Analyst responsibility.

Table: List of Navigation Paths for Oracle Financial Services Cash Flow Application

Page	Navigation Path
Application Preferences	Select Cash Flow Engine menu and select Application Preferences
Behavior Pattern Home	Select Cash Flow Engine menu, select CFE Maintenance, and then select Patterns. Navigate to Behavior Patterns.
Payment Pattern Home	Select Cash Flow Engine menu, select CFE Maintenance, and then select Patterns. Navigate to Payment Patterns .
Repricing Pattern Home	Select Cash Flow Engine menu, select CFE Maintenance , and then select Patterns. Navigate to Repricing Patterns.
Interest Rate Code Home	Select Common Object Maintenance, select Rate Management, and then select Interest Rates.
Currency Rates Home	Select Common Object Maintenance, select Rate Management, and then select Currency Rates
Currencies Home	Select Common Object Maintenance, select Rate Management, and then select Currencies.
Prepayment Rule Home	Select Cash Flow Engine menu and select Prepayments
Prepayment Models Home	Select Cash Flow Engine menu and select Prepayment Models
Forecast Rates	Select Cash Flow Engine menu, select CFE Assumption Specification, and then select Forecast Rates
CFE Processing Home	Select Cash Flow Engine menu, select CFE Assumption Specification, and then select Forecast Assumptions. Select Rate Dependency Patterns
Cash Flow Edits Process	Select Cash Flow Engine menu, select CFE Processing and then select Cash Flow Edits

OFSAA Support

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