Oracle Financial Services Market Risk

User Guide

Release 8.0.2.0.0

August 2016

Contents

1 Introduction

Oracle Financial Services Market Risk estimates the market risk of a portfolio through the estimation of loss-distribution based risk measures such as VaR, CVaR, Component VaR, Marginal VaR, Incremental VaR, and so on. It covers estimation of risk arising out of movements of multiple risk factors like interest rates, equity prices, commodity prices and exchange rates.

Oracle Financial Services Market Risk, Release 8.0.2.0.0, serves the following additional functionalities to the product:

- Enhanced instrument coverage
- Calculation of Implied volatility for instrument pricing
- Calculation of additional risk measures - Marginal and Incremental VaR
- Calculation of mean reversion rate and speed
- Calculation of Option Greeks
- Impact of corporate action
- Use of GARCH (1.1) for volatility computation
- Calculation of Modified Duration

In addition, it also renders use of Oracle Financial Services Modeling framework for stress testing of market risk estimates.

1.1. Purpose

The objective of this document is to provide a detailed procedure for working on Oracle Financial Services Market Risk 8.0.2.0.0. The specifications include details on installation, loading, user interface inputs, execution, and the outputs reported. It enables the user of the document to understand and use Oracle Financial Services Market Risk 8.0.2.0.0 product effectively.

The target audiences for the following User Guide are:-

- Intended User (Customer)
- Functional Engineering Group
- Product Management Group
- SQA
- Project Manager Team
- Senior Management

1.2 Scope

Oracle Financial Services Market Risk is concerned with the estimation of market risk for the portfolios held by the bank. These portfolios may belong to the trading book or the banking book.

Oracle Financial Services Market Risk enables a bank to estimate the market risk of a portfolio based on its underlying positions, through the estimation of risk measures such as Value-at-Risk, Conditional Value-at-Risk and so on. It also enables a bank to carry out Stress Testing and Back Testing procedures for validation.

Risk measures based on VaR have multiple applications; the scope of Oracle Financial Services Market Risk is not only restricted to Regulatory Reporting but also extends to the internal reporting needs of the bank. Oracle Financial Services Market Risk supports the estimation of market risk of user-defined portfolios covering a wide range of instruments.

The scope of Market Risk, Release 8.0.2.0.0, will be restricted to the testing following areas:

- Analytic Method
- Cash flows Estimation and mapping
- Back testing
- Constant Maturity Function
- Daily Pricing
- Historical Simulation
- Incremental VaR
- Mean Reversion Rate
- Monte Carlo Simulation
- Scenario VaR Calculation
- Stress Testing
- VaR Model Pricing
- Volatility Model
- Zero Coupon Yield Curve
- Functional Verification
- Performance Issues

2 Installing the Solution

Once the OFSAAI Infrastructure has been loaded, the Market Risk solution has to be loaded. *To install Oracle Financial Services Market Risk, refer to the Oracle Market Risk Solution Installer Manual.*

2.1 *Model Upload*

In order to carry out the Model Upload click **Unified Metadata Manager** on the left pane of the OFSAAI Infrastructure. Under that click **Import Model** to open the **Business Model Upload** screen. Choose the type of Upload as **New Upload**. Enter the Erwin XML File Path and click **Upload** and the model will get uploaded.

2.2 *Loading the data*

The uploading of data involves the loading of all the Stage tables. The Stage tables that have to be loaded are:

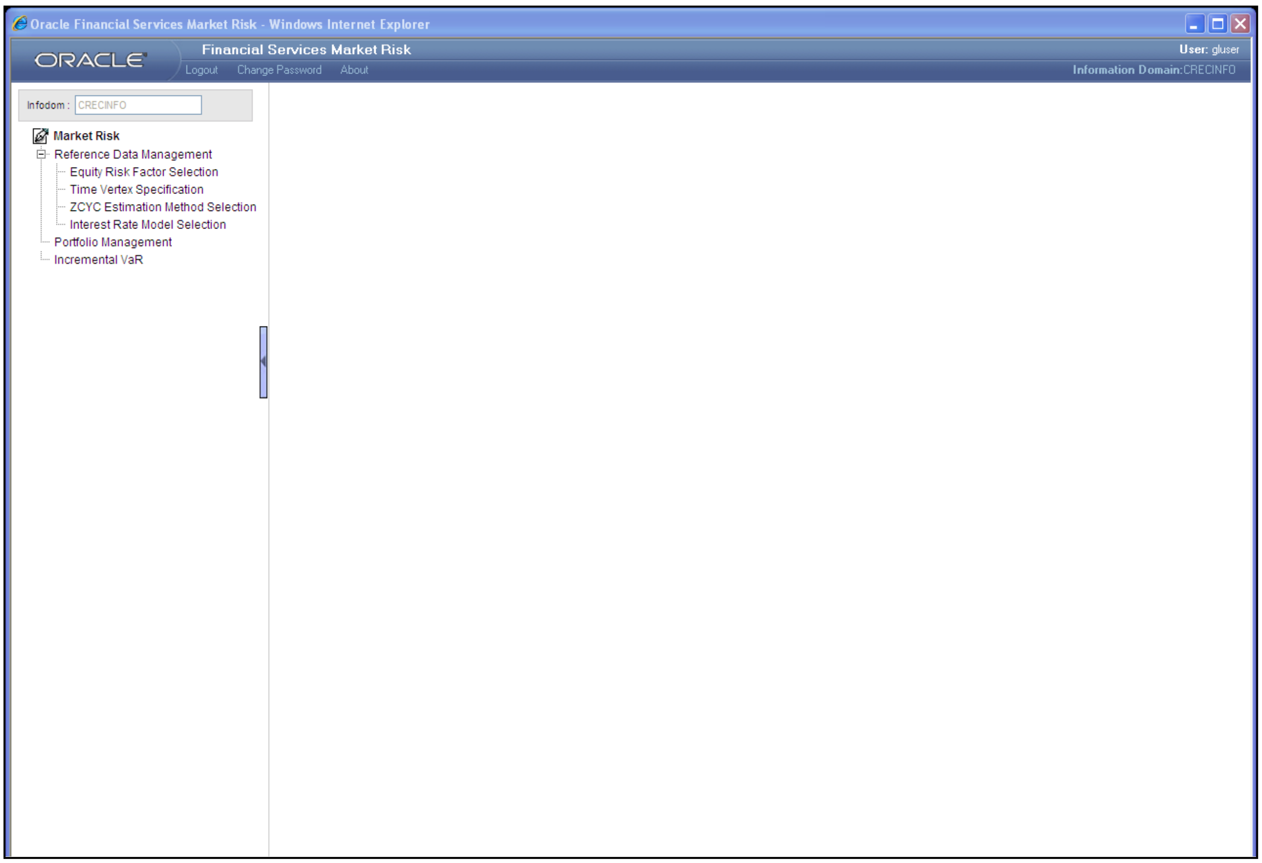
- stg_dim_bank_instrument_type
- stg_dim_commodity
- stg_dim_instrument_contract
- stg_dim_mr_asset
- stg_dim_stock_index
- stg_equity_corporate_actions
- stg_fct_bank_positions
- stg_fct_cds_spreads
- stg_interest_rate_parameters
- stg_mkt_instrument_contract
- stg_mr_risk_factor_statistics
- stg_commodity_future_curve
- stg_fct_equity_indices
- stg_fct_instrument_schedule
- stg_fct_funds_composition
- stg_fct_obligors_details
- stg_fct_portfolio_data
- stg_fct_yield_curve

You have to run the Slowly Changing Dimensions (SCDs) to populate the required DIM and FCT tables.

3 Oracle Financial Services Market Risk Solution UI and Process Description

Oracle Financial Services Market Risk, Release 8.0.2.0.0, estimates the market risk of a portfolio through the estimation of loss-distribution based risk measures such as VaR, CVaR, Component VaR, Marginal VaR, Incremental VaR, and so on. It covers estimation of risk arising out of movements of multiple risk factors like interest rates, equity prices, commodity prices and exchange rates.

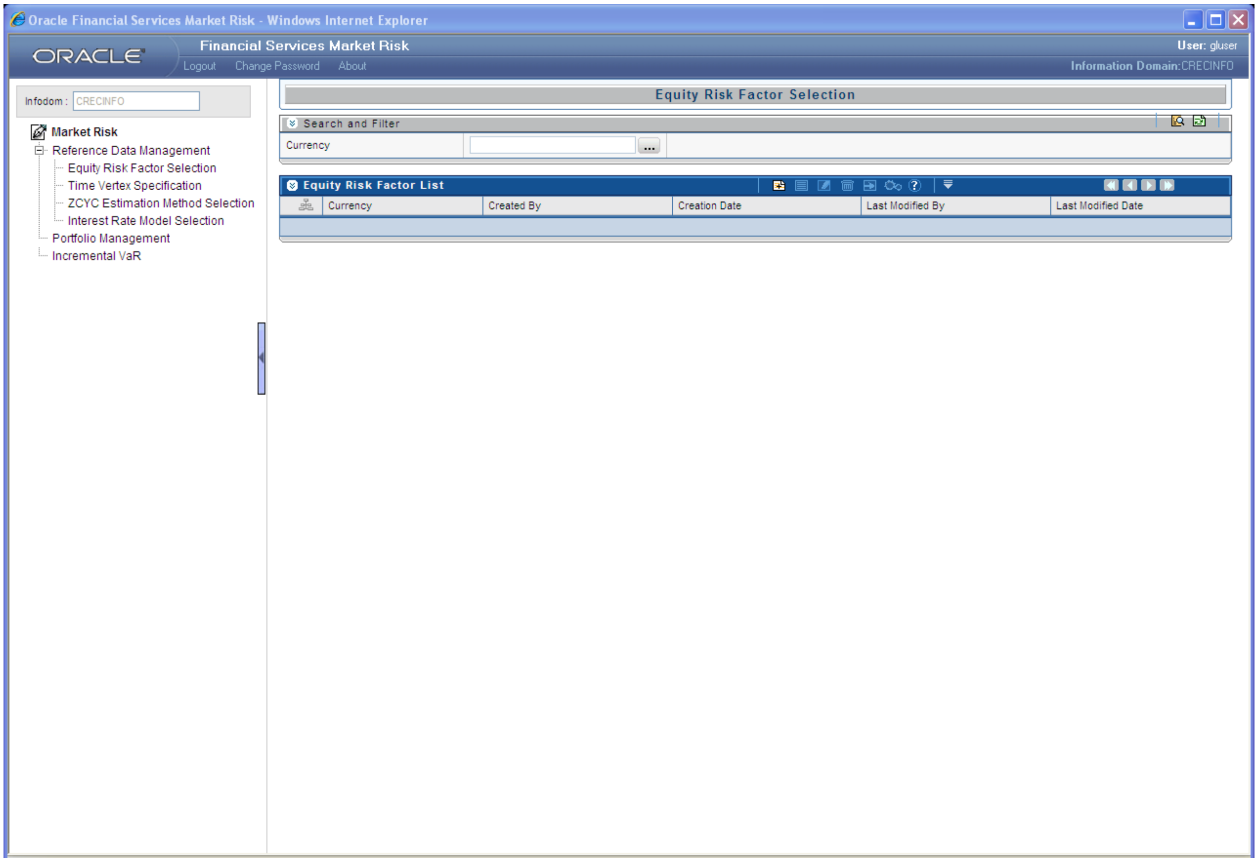
Once you have accessed the Oracle Financial Services Analytical Application Infrastructure (OFSAAI) product, click Market Risk which is present on the left-hand side (LHS) of the screen. The Oracle Financial Services Market Risk Display Screen shows the list of modules related to Market Risk Solution on the left hand side (LHS) corner.



Oracle Market Risk Display Screen

3.1 *Equity Risk Factor Selection*

The first screen that comes up after clicking Equity Risk Factor Selection is the Equity Risk Factor Selection Display Screen. It displays the list of equity risk factors that are already defined in a particular currency. In this screen, all equity risk factors which are specific to you will be displayed corresponding to a particular currency.



Equity Risk Factor Selection Display Screen

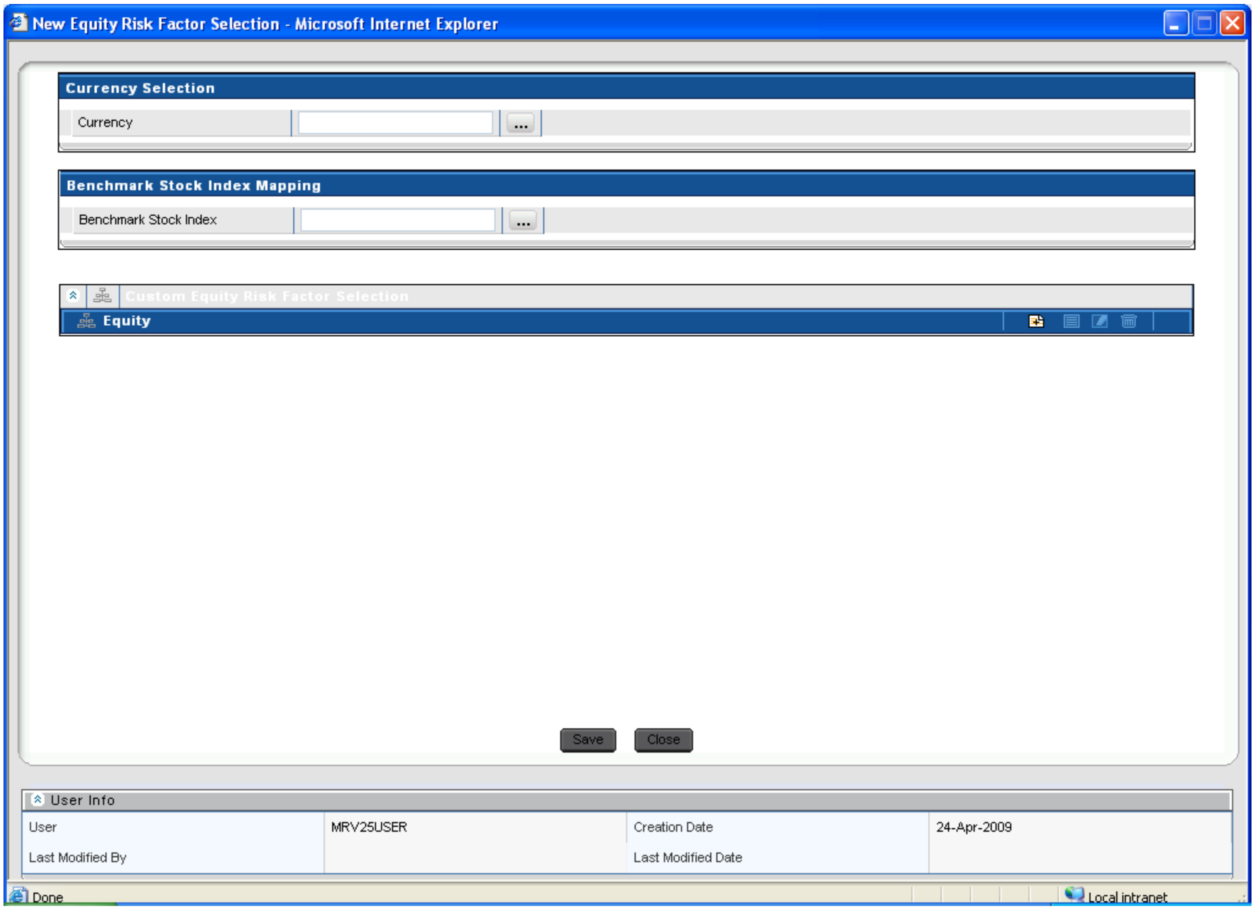
The screen also gives the search option for finding or filtering the risk factor on the basis of currency selected from the currency browser. A particular currency can be entered or selected ... from the currency browser in order to filter the search.

Once the selection is made from the currency browser all the Equity risk factors denominated in that particular currency is displayed.

3.1.1 Equity Risk Factor Add Screen

In order to add or define a new Equity Risk Factor, click the Add button in the Equity Risk Factor Screen. The following selection needs to be made:

- Currency – A single currency needs to be selected from the currency browser.
- Benchmark Stock Index – The indices corresponding to the selected currency will display in the benchmark stock index browser. A single Benchmark Stock Index needs to be selected from the browser.
- Custom Equity Risk Factor Selection – It will display all the custom equities denominated in the selected currency in equity browser. You are authorized to make multiple selections or deletions of custom equities.

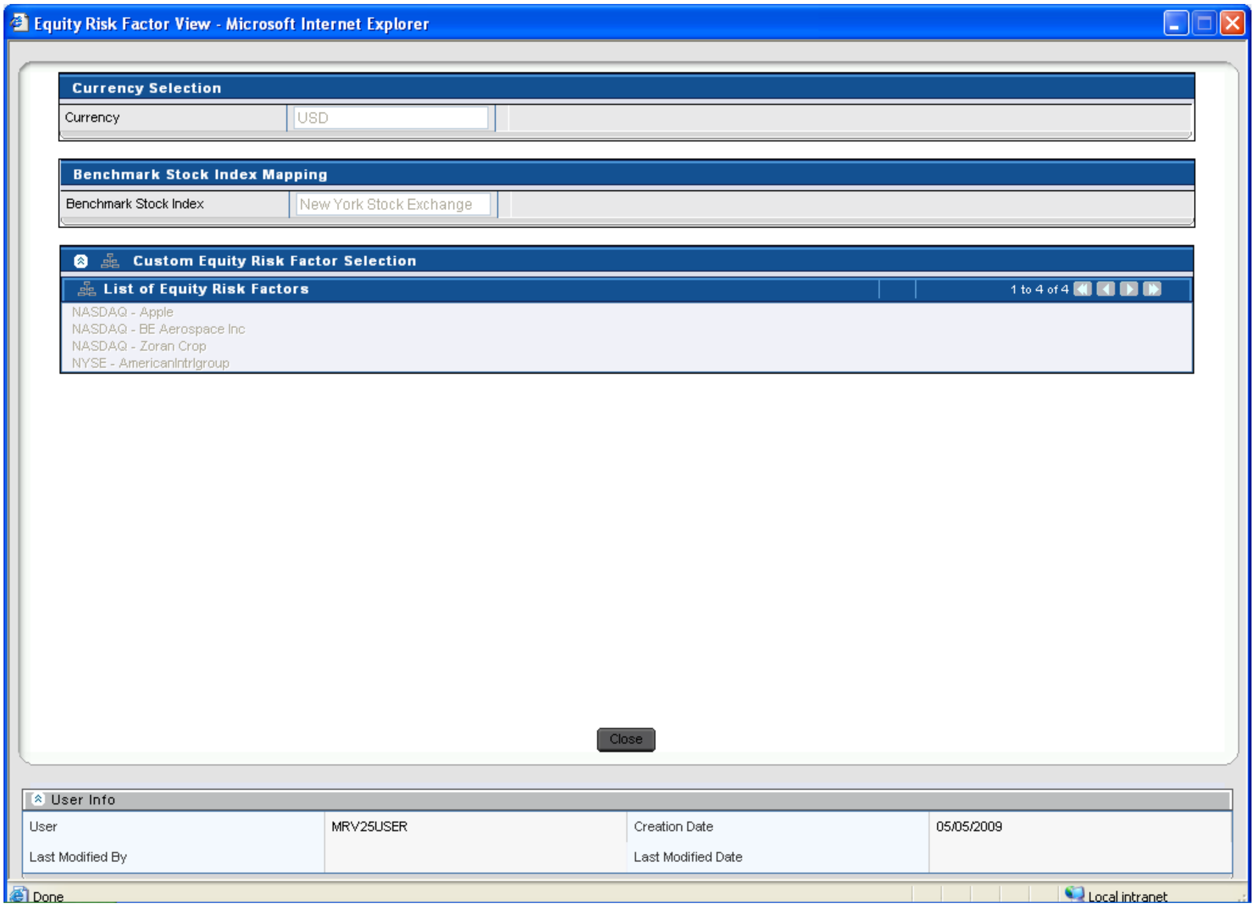


Equity Risk Factor Selection Add Screen

Benchmark stock index mapping and custom equities selection are editable under this screen. Once an Equity Risk Factor is defined under this screen it cannot be deleted.

3.1.2 Equity Risk Factor View Screen

To view an existing Equity Risk Factor, click the View button  which is present in the Equity Risk Factor Screen. In order to View, first select an existing record by activating the select button , then click the View button  present on the right hand corner of the Equity Risk Factor Screen. The chosen Equity risk factor will be in view mode and cannot be edited.

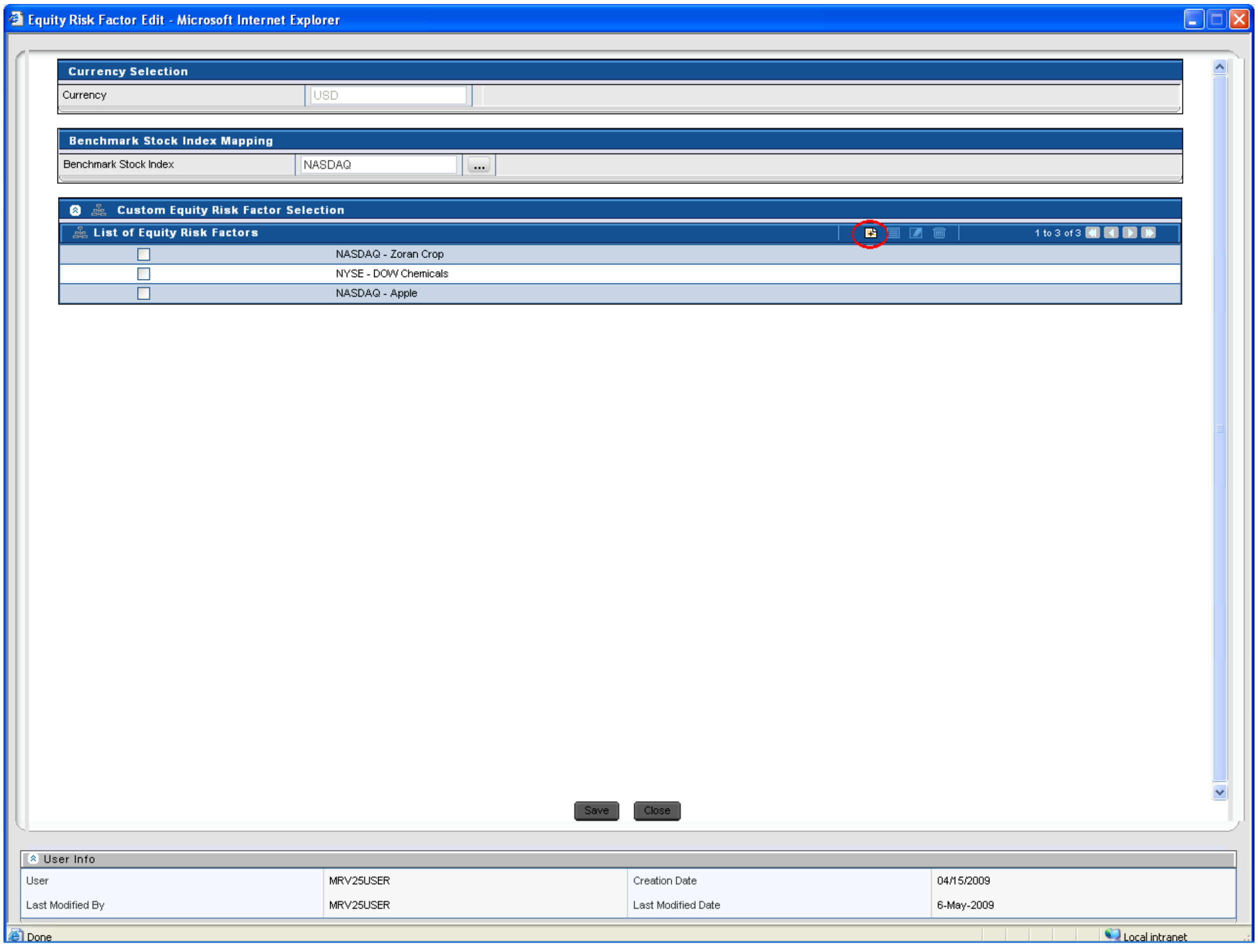


Equity Risk Factor Selection View Screen

3.1.3 Equity Risk Factor Edit Screen

To edit Equity Risk Factor, first select single currency that needs to be edited by clicking the select button , then click the Edit button present at the right hand corner of the Equity Risk Factor Screen. Under the Edit screen you can change the Benchmark Stock Index for that particular currency, and can also add or delete the Equity Risk Factors as per the requirements.

To add the Equity Risk Factors in the Edit screen click the add button in the Equity Risk Factor Edit Screen. To delete the Equity Risk Factor first you need to select a particular custom equity which needs to be deleted, by clicking the select button , then click the delete button to delete a selected Custom Equity. Once the changes are made, the screen needs to be saved using the Save button displayed at the end of the page.



Equity Risk Factor Selection Edit Screen

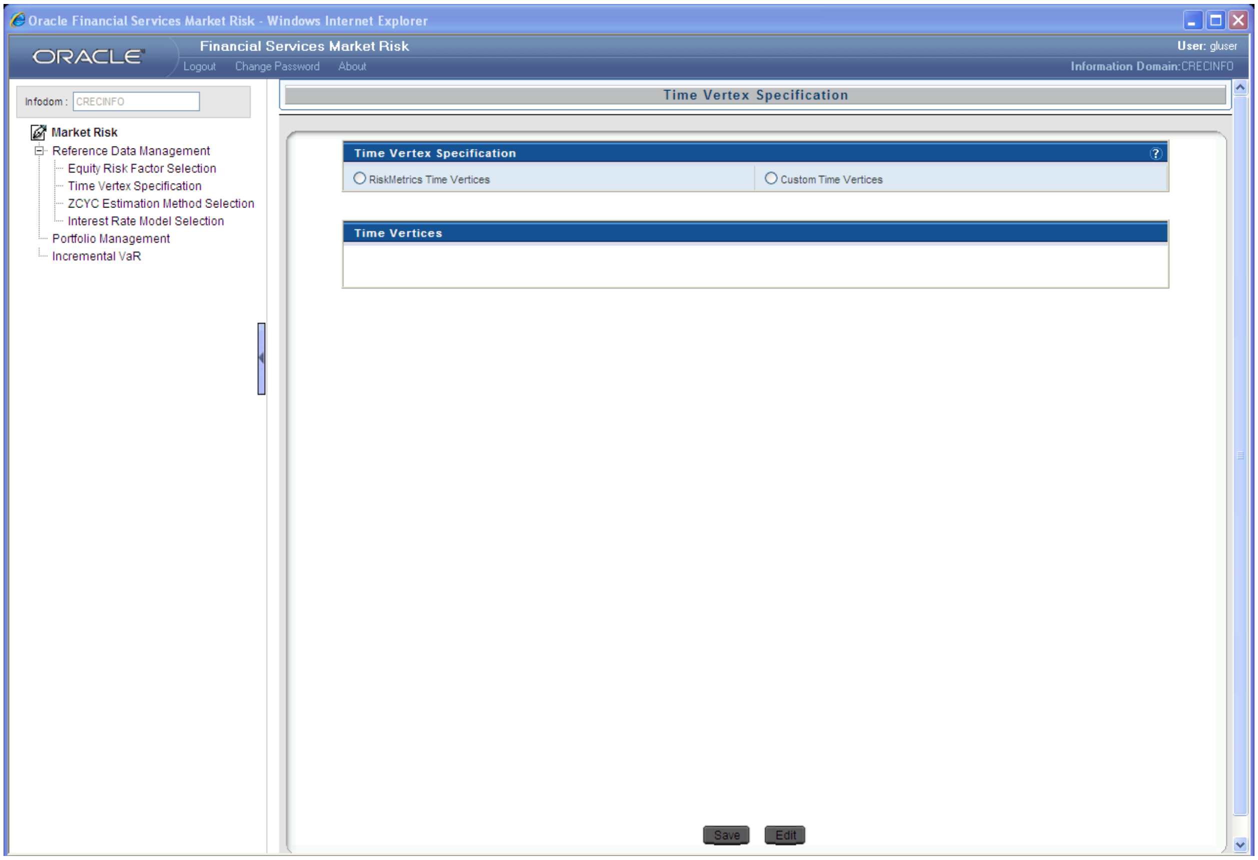
3.2 *Time Vertex Specification*

This particular screen provides the choice of selecting the time vertex for all the risk factors. One of the following time vertexes needs to be selected:

- Risk Metrics Time vertices
- Custom Time vertices

3.2.1 Risk Metrics Time vertices

The risk matrices time vertex screen is the default display screen for the time vertex specification screen. The risk matrices are the standard time vertices which are not allowed to be edited. It specifies the time on 18 standard time vertices following the specific time unit that is, days, month, and year.



Time Vertex Specification – Risk Matrices Screen

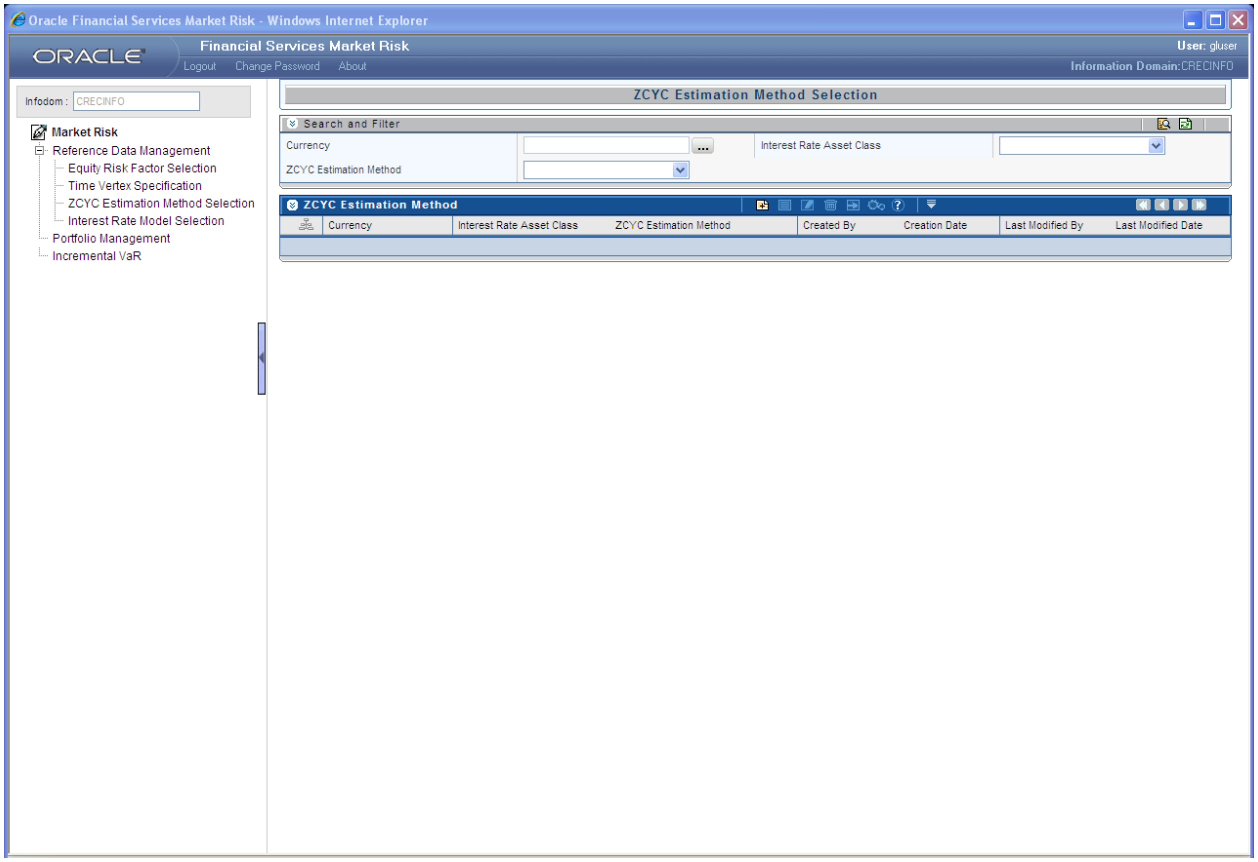
3.2.2 Custom Time vertices

As per the specification, you can change the standard time vertex to customized time vertex. The custom time vertices need to be entered on the basis of maturity and time unit. The first time vertex is always spot which cannot be edited. These custom time vertices should be specified in the ascending order and they are editable. Apart from the default 16 rows provided for entering custom time vertex. You can add new rows to the custom time vertices screen and provide the additional input data.

3.3 *ZCYC Estimation Method Selection*

Zero Coupon Yield Curve is selected for each and every interest rate for asset class and currency combination. The ZCYC Estimation Method Selection must be preceded by Time Vertex Specification. This screen is divided into 2 sections:

- Interest Rate Selection
- ZCYC Method selection



ZCYC Estimation Method Selection Display Screen

The screen also gives the option for searching or filtering the ZCYC estimation method selection on the basis of currency, Interest Rate Asset Class and ZCYC Estimation Method. The search can be done by selecting any one or more parameters from the above 3 and then by clicking the search button. A particular currency can be entered or selected ... from the currency browser or a particular Interest Rate Asset Class can be selected from the drop down or a particular ZCYC method can be selected from the drop down in order to filter the search.

Once the selection is made from the currency browser all the ZCYC Estimation Method defined in that particular currency is displayed.

Once the selection is made from Interest Rate Asset Class dropdown it displays all the ZCYC Estimation Method defined in that Asset Class.

Once the selection is made from Interest Rate Asset Class drop down, it displays all the ZCYC Estimation Methods defined in that Asset Class.

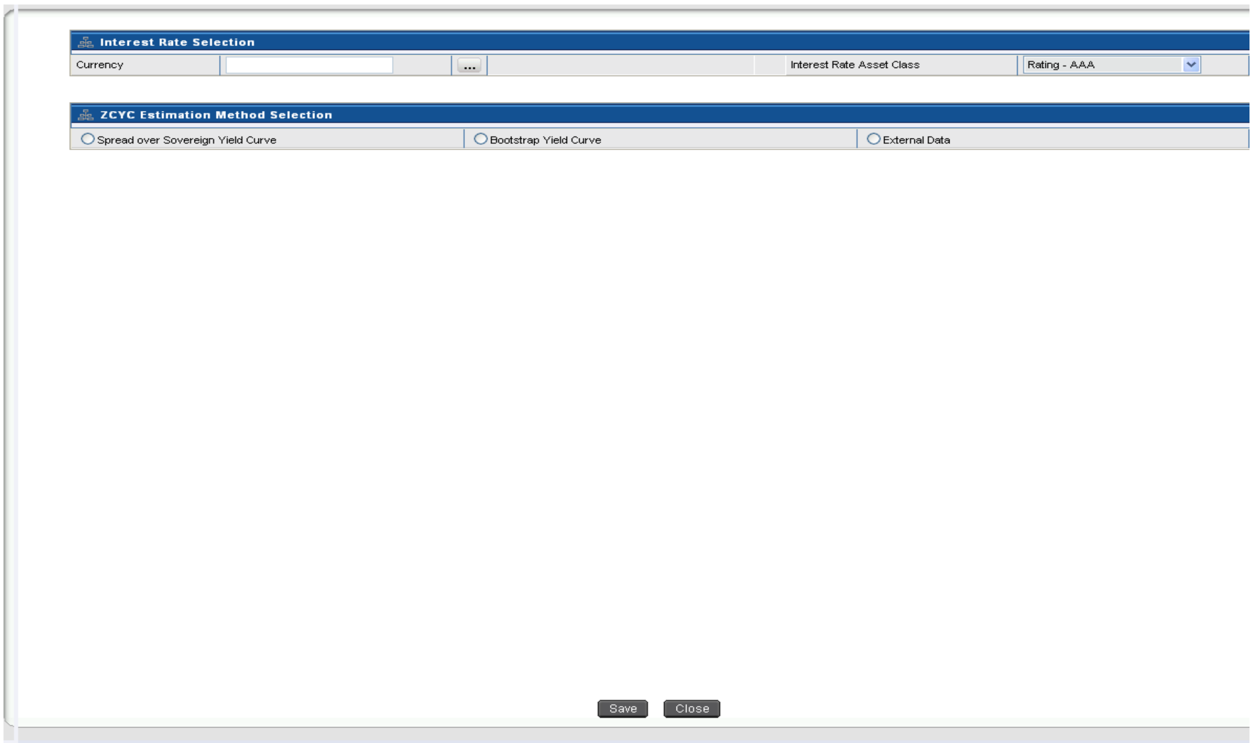
3.3.1 ZCYC Estimation Method Selection Add Screen

In order to add or define a new ZCYC Estimation Method, click the Add button in the ZCYC Estimation Method Display Screen.

- Currency Selection – The currency browser will display all available currencies for selection. A single currency needs to be selected from the currency browser, multiple selection of currency is not allowed.
- Interest Rate Asset Class – The Interest Rate Asset Class drop down list will display all the interest rates defined in the currency selected. A single asset class needs to be selected from the drop down. The Available Interest Rate Asset Classes are AAA / AA / A / BBB / BB / B / CCC / D / Government Agency / Money Market / Sovereign / Swap.

- ZCYC Estimation Method Selection – There are 3 methods available for ZCYC estimation:
  - Spread Over Sovereign
  - Bootstrap Yield Curve
  - External Data

From the above 3 methods, a single method needs to be selected for the defined currency- interest rate combination.

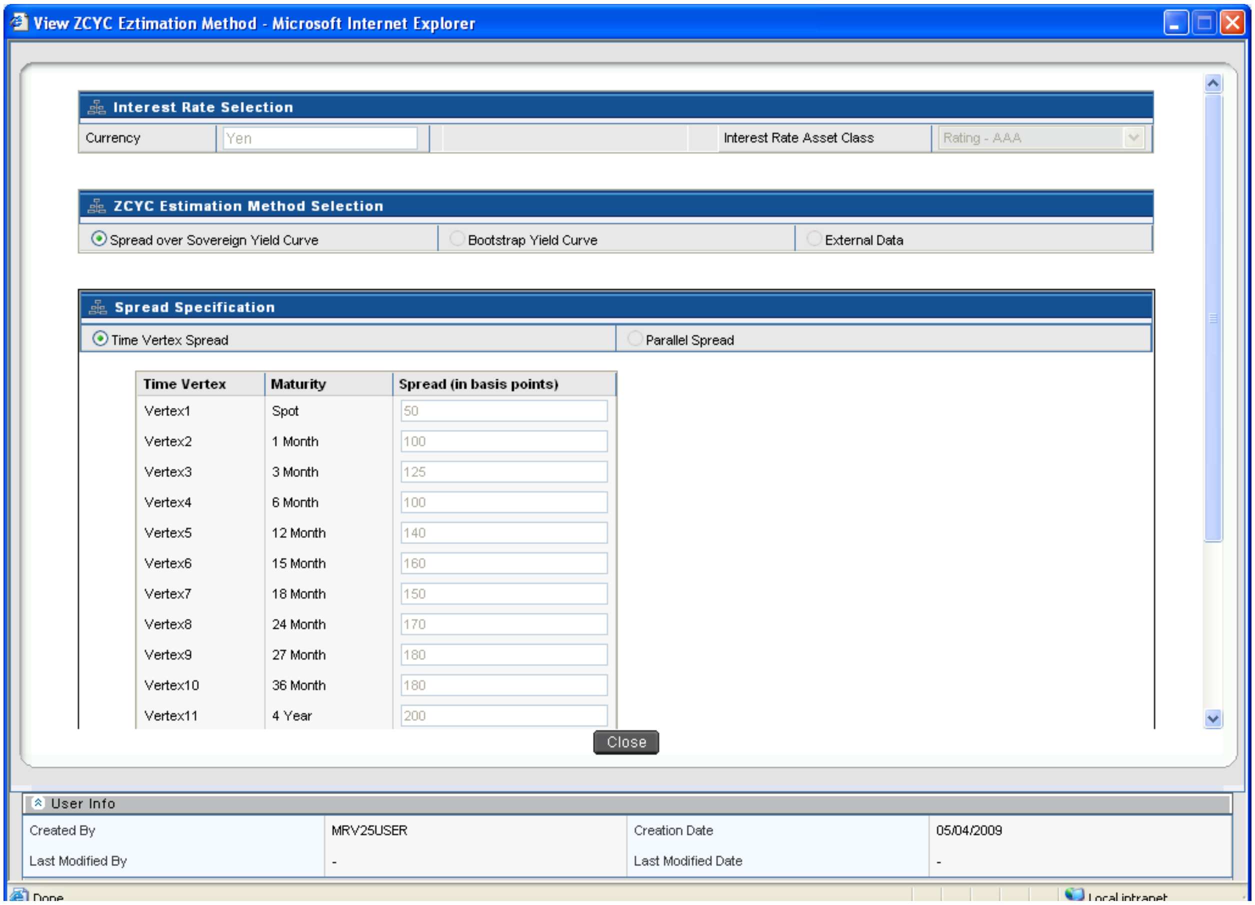


ZCYC Estimation Method Selection Add Screen

3.3.2 ZCYC Estimation Method Selection View Screen

To view an existing ZCYC Estimation Method, click the View button which is present as the ZCYC Estimation Method.

In order to View, first select an existing record by activating the select button , then click the View button present on the right hand corner of the ZCYC Estimation Method. The chosen ZCYC Estimation Method will be displayed in view mode and it cannot be edited.

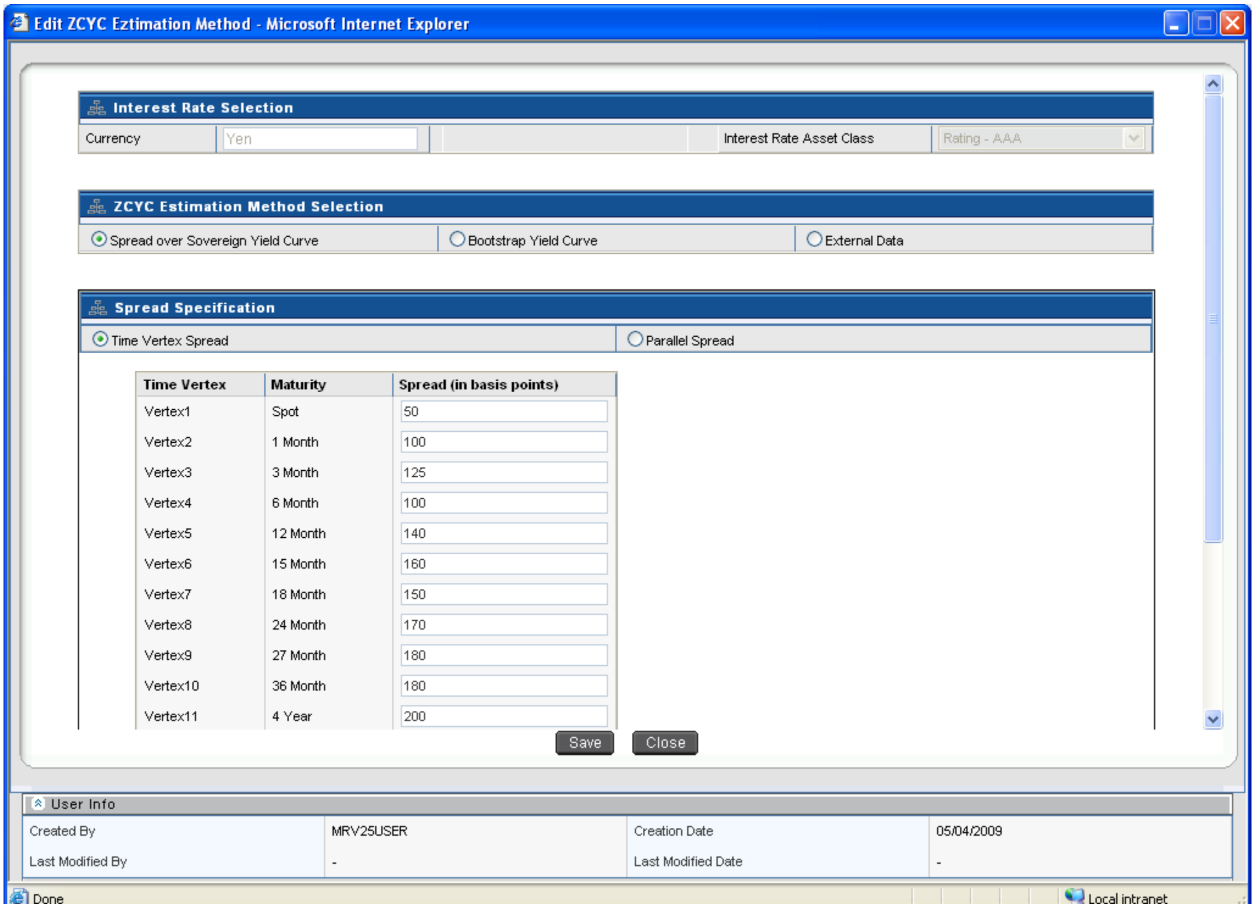


ZCYC Estimation Method Selection View Screen

3.3.3 ZCYC Estimation Method Selection Edit Screen

In order to edit ZCYC Estimation Method, first select a defined estimation method that needs to be edited by clicking the select button, then click the Edit button present at the right hand corner of the ZCYC Estimation Method Screen. Under Edit screen you can only modify ZCYC Estimation Method Selection; the changes can only be done to the previously defined ZCYC Estimation Method.

The Interest Rate Selection part cannot be edited or changed. You are free to change the estimation method from spread over sovereign to any other (Bootstrap or External Data) or can change the defined spread specification from time vertex spread to parallel spread. Once the changes are made, the screen needs to be saved using the Save button displayed at the end of the page.



ZCYC Estimation Method Selection Edit Screen

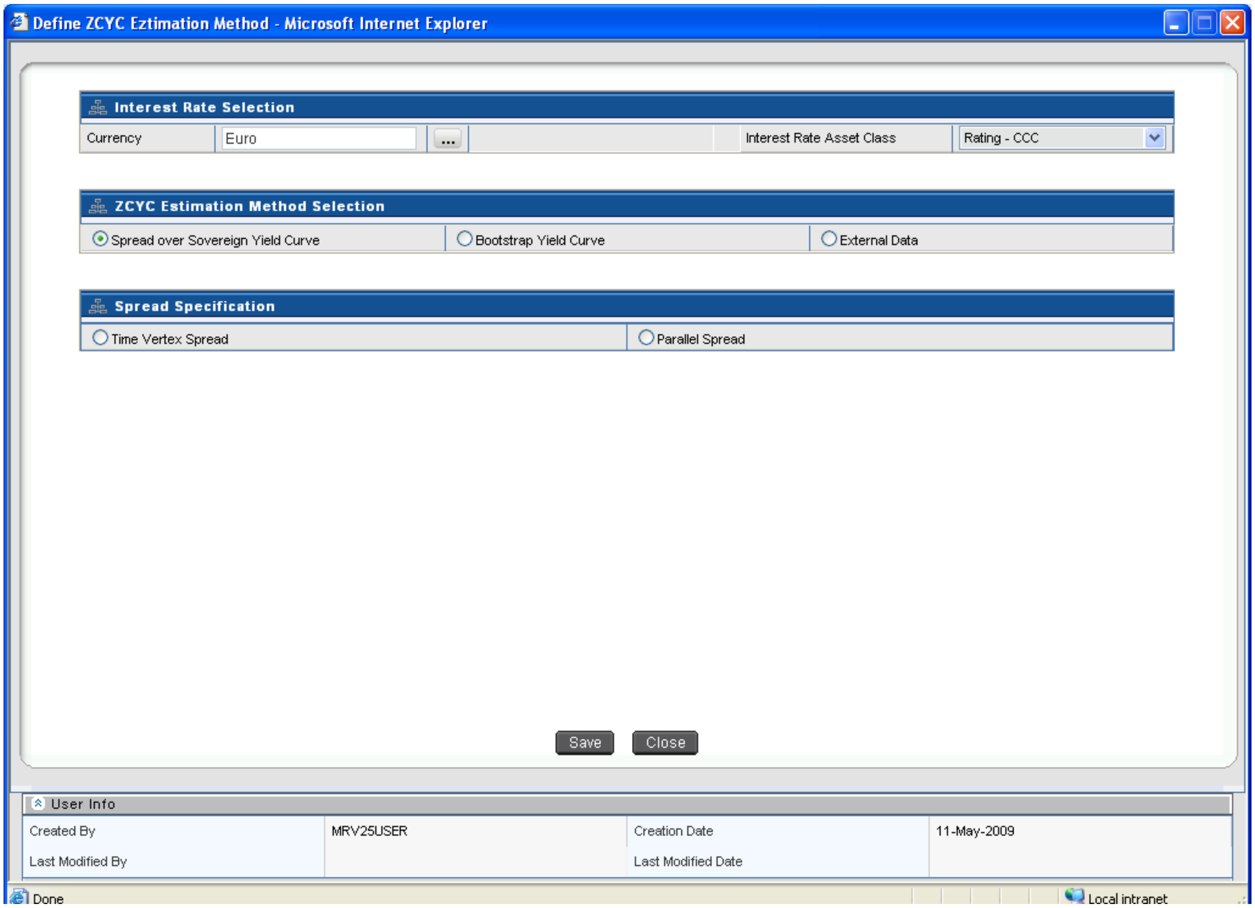
3.3.4 Spread Over Sovereign

The first method is spread over sovereign; once this is selected further selection needs to be made from:

- Time vertex spread
- Parallel Spread

It specifies the type of spread to be applied to the sovereign yield curve. These spreads can be applied only to the standard time vertex.

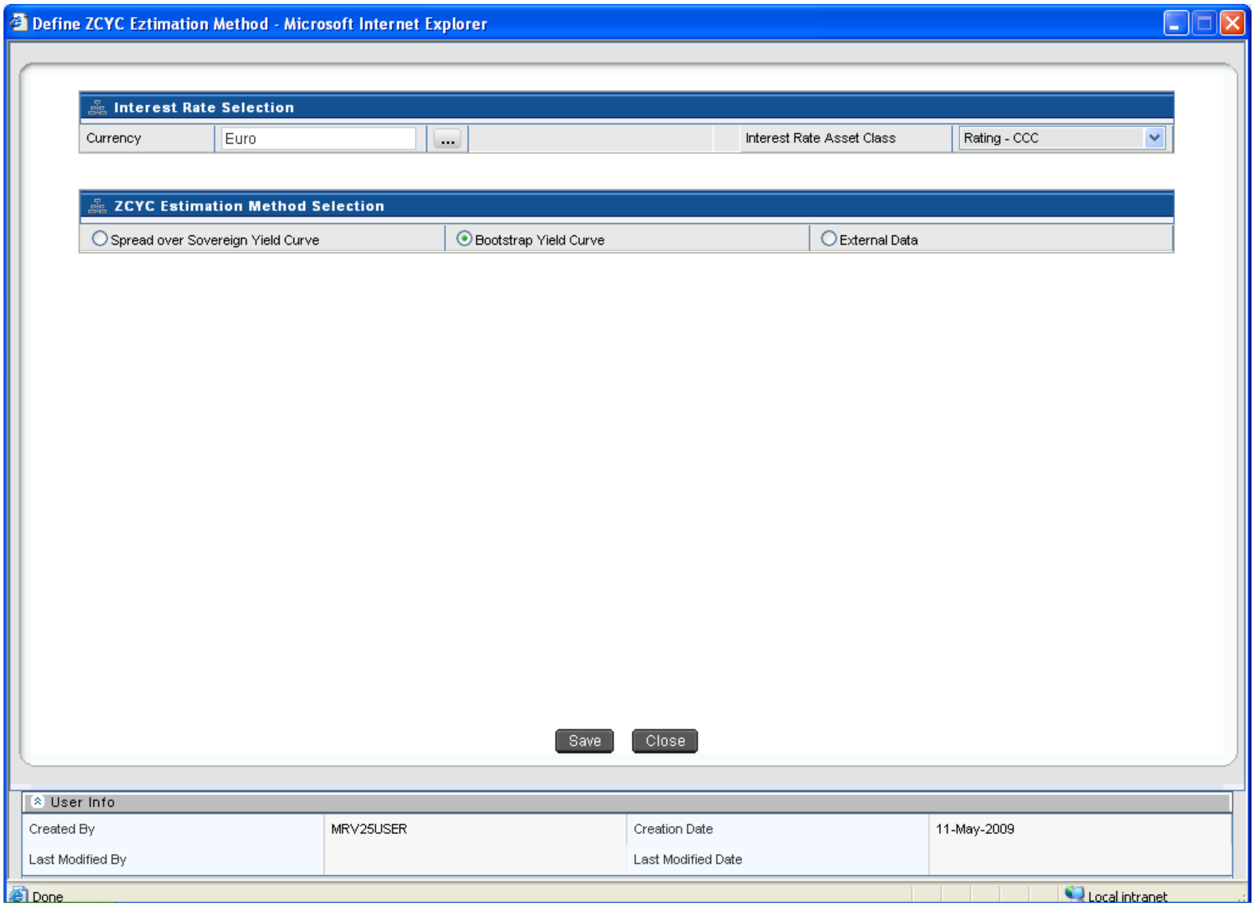
- Time vertex spread - Under time vertex spread, multiple spread value needs to be inserted for each standard time vertex. The spread value will be in basis points.
- Parallel spread – A single value needs to be inserted which will be applied to all time standard vertices.



ZCYC Estimation Method Selection - Spread Over Sovereign Screen

3.3.5 Bootstrap Yield Curve

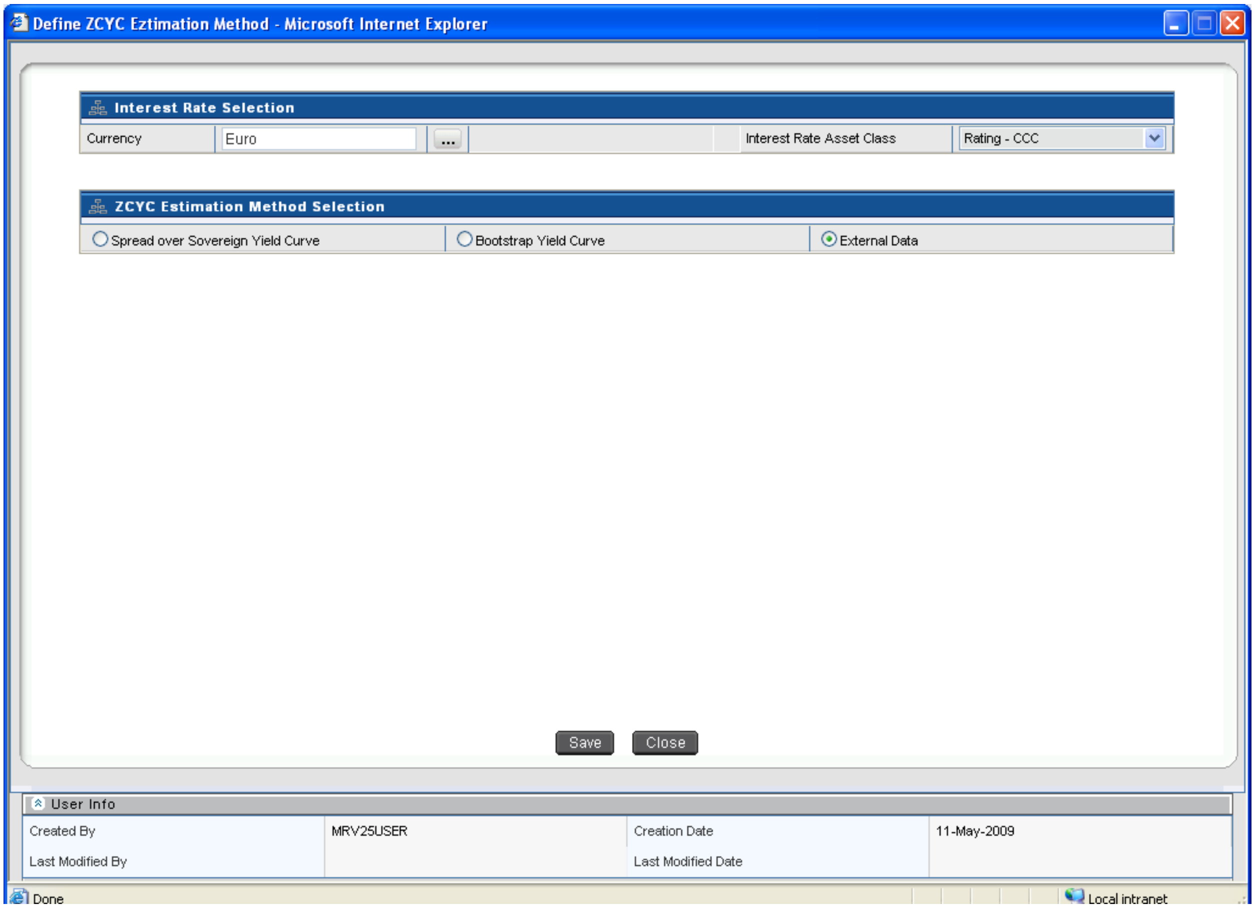
Spread specification is not applicable if the Bootstrap Yield Curve is selected. Sovereign and Money Market Asset Classes are always estimated using a bootstrapping procedure or obtained as a download. On selection of either of these Interest Rate Asset Classes, Spread over Sovereign Yield Curve icon will get de-activated.



ZCYC Estimation Method Selection - Bootstrap Yield Curve Screen

3.3.6 External Data

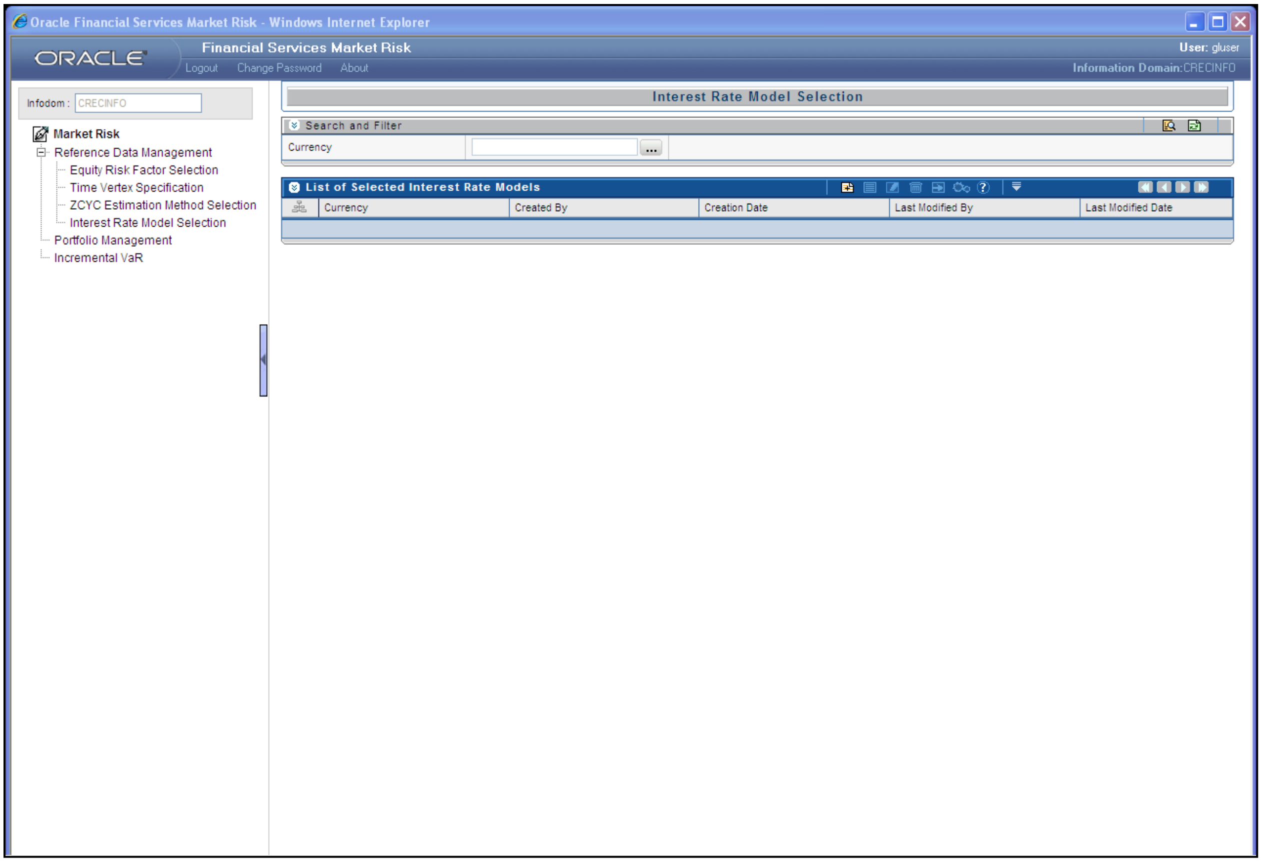
You can provide Zero Coupon Yield Curve as a download by selecting the External Data. Spread specification is not applicable if the external data is selected.



ZCYC Estimation Method Selection - External Data Screen

3.4 *Interest Rate Model Selection*

Under this screen, an interest rate model needs to be mapped for each currency-interest rate combination. If a Zero Coupon Yield Curve Estimation Method has not been specified for all the Interest Rate Asset Classes in a particular currency, then that currency should not appear for selection in the Currency Browser.

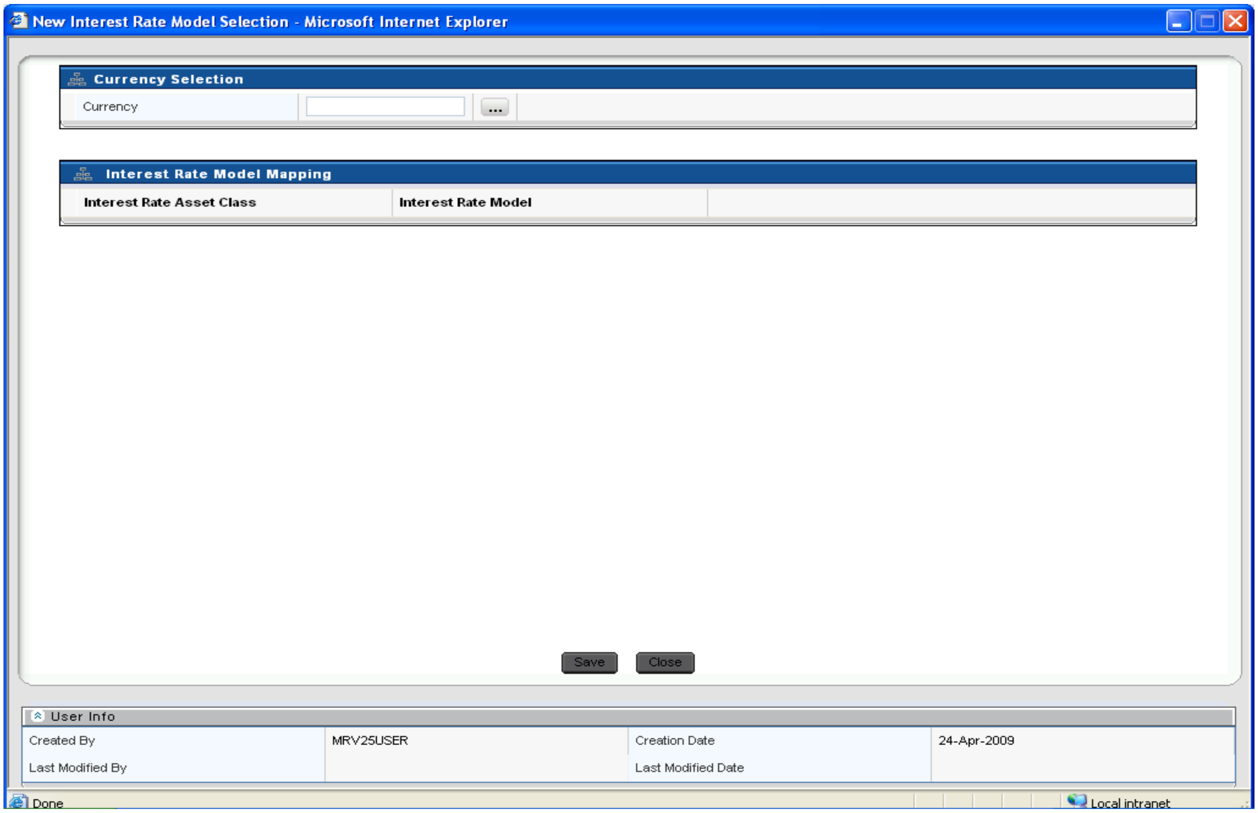


Interest Rate Model Selection Display Screen

3.4.1 Interest Rate Model Add Screen

In order to add or define a new Interest Rate Model, click the Add button  in the Interest Rate Model Screen:

- Currency Selection – From the currency browser a single currency needs to be selected. Multiple selections are not allowed. Once a particular currency selected, then all the interest rates available in that currency will be displayed.
- Interest Rate Model Mapping – For each Interest Rate Asset Class, one Interest Rate Model needs to be selected from the following:
  - Black Model
  - Hull White Model
  - Ho-lee Model
  - Ornstein Uhlenback Model



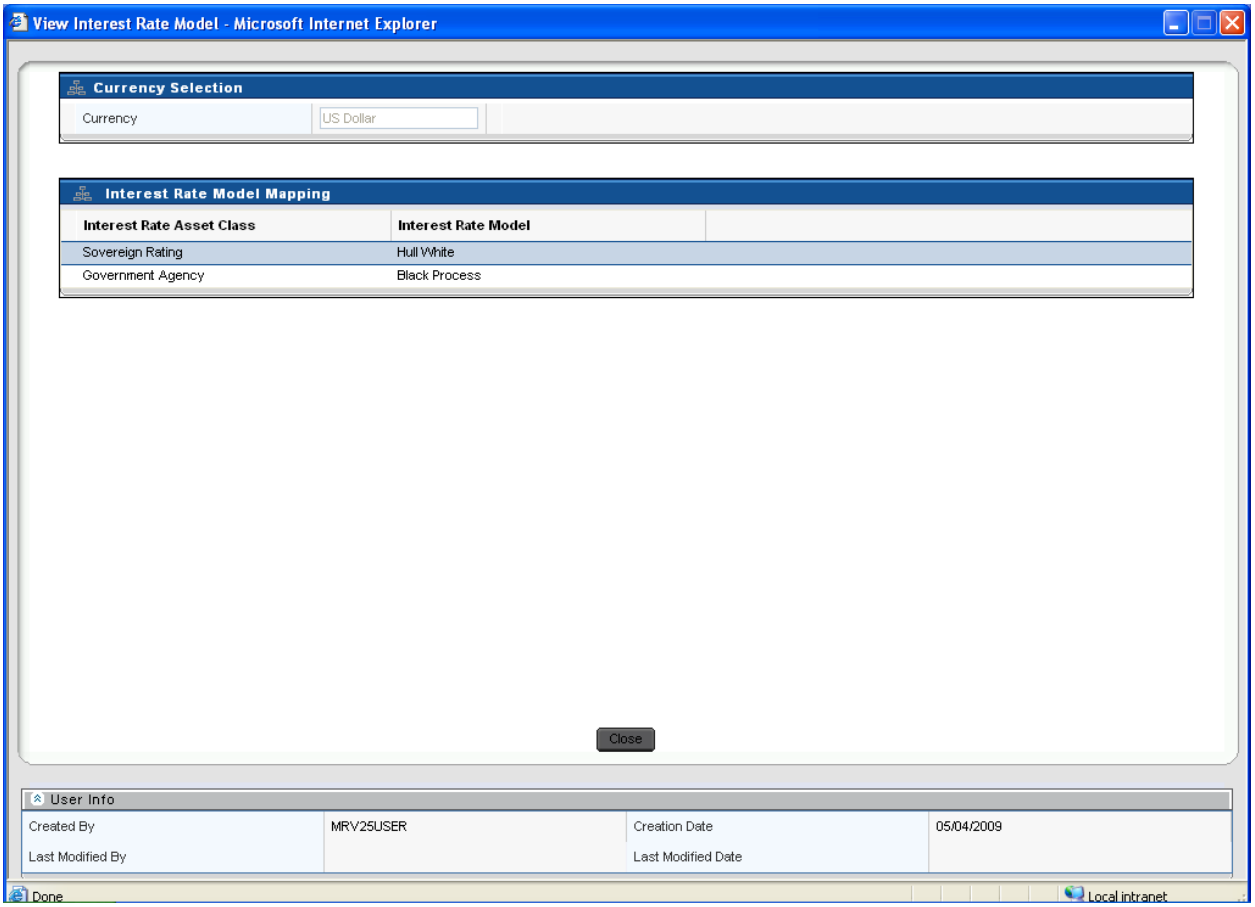
Interest Rate Model Selection Add Screen

Once a model is defined for a particular interest rate-currency combination it can be edited and a different model can be selected. The selection will not be allowed to save unless an interest rate model is mapped to every Interest Rate Asset Class for the selected currency.

If spread over sovereign yield curve is specified for any Currency – Interest Rate Asset Class combination, then a separate Interest Rate Model is not allowed to be selected for that combination.

3.4.2 Interest Rate Model Selection View Screen

To view an existing Interest Rate Model, click the View button which is present on the right hand corner of the Interest Rate Model Selection Screen. In order to View, first select an existing record by activating the select button , then click the View button present on the right hand corner of the screen. The chosen Interest Rate Model will be displayed in view mode and it cannot be edited.

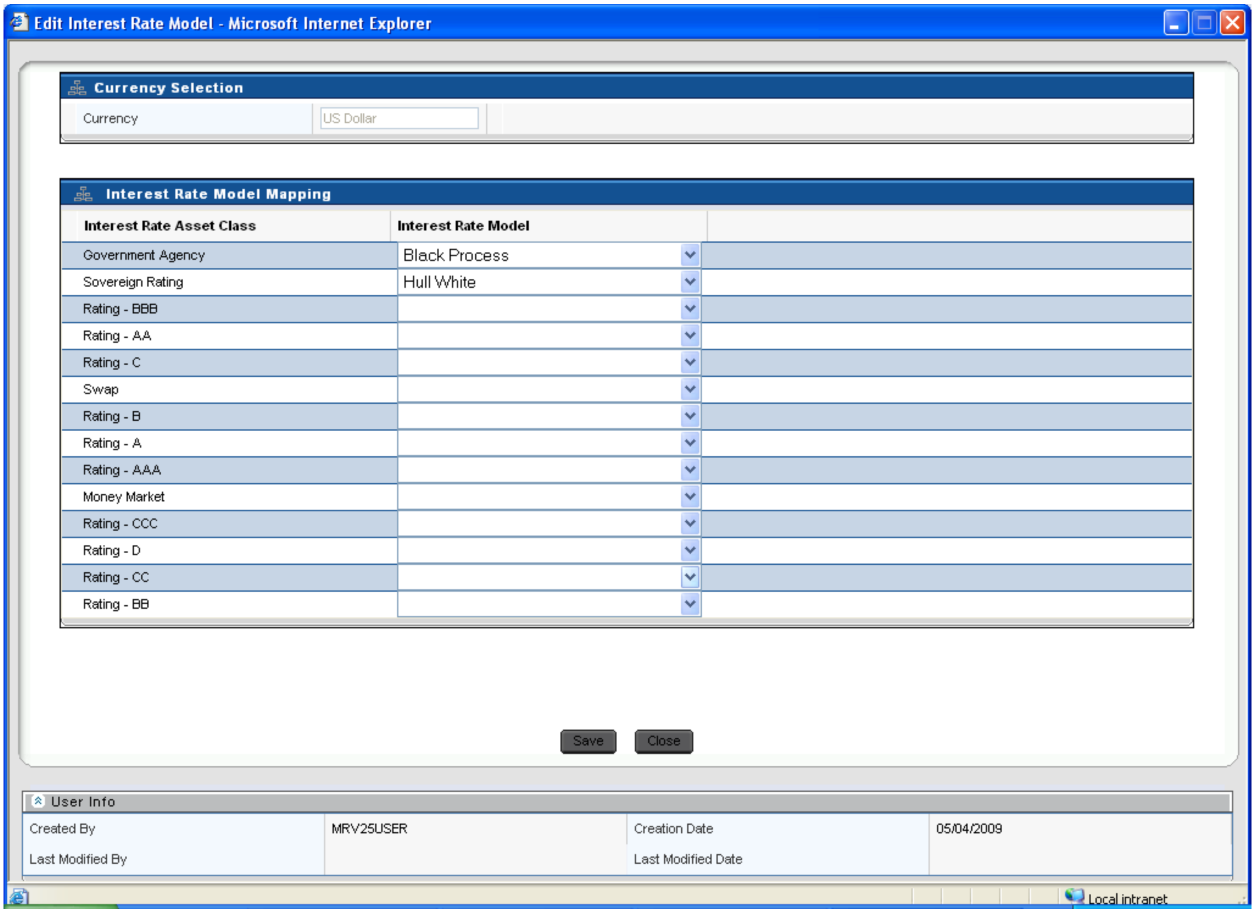


Interest Rate Model Selection View Screen

3.4.3 Interest Rate Model Edit Screen

In order to edit an Interest Rate Model, first select a defined Interest Rate model that needs to be edited by clicking the select button , then click the Edit button present at the right hand corner of the Interest Rate Model Selection Screen. Under Edit screen you can only add or modify the already defined models for a particular Asset Class.

The currency once defined cannot be edited. You are free to change the model from any one to the other model. Once the changes are made the screen needs to be saved using the Save button displayed at the end of the page.



Interest Rate Model Selection Edit Screen

3.5 *Correlation Mapping*

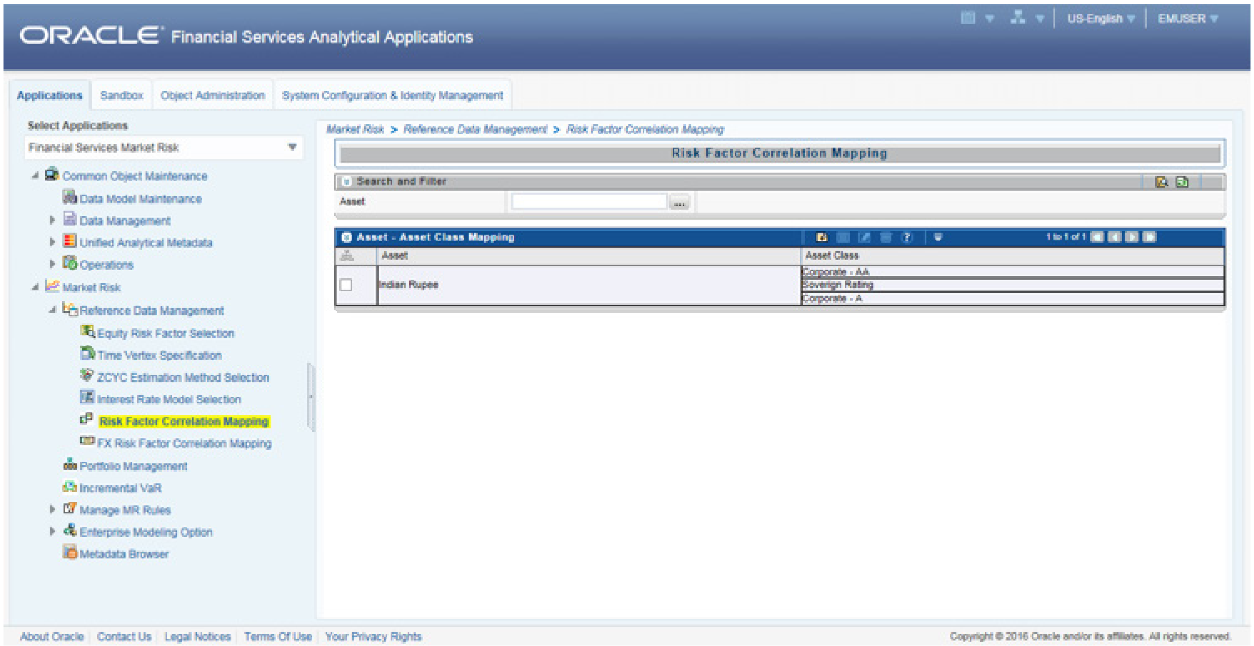
Risk Factor Correlation mapping and FX Risk Factor Correlation Mapping are one time configuration user interface. In this screen you need to setup the risk factors to be considered for computing correlation. Correlation matrix is used in VaR computation, therefore you should select all the risk factors which are part of the portfolio.

3.5.1 Risk Factor Correlation Mapping

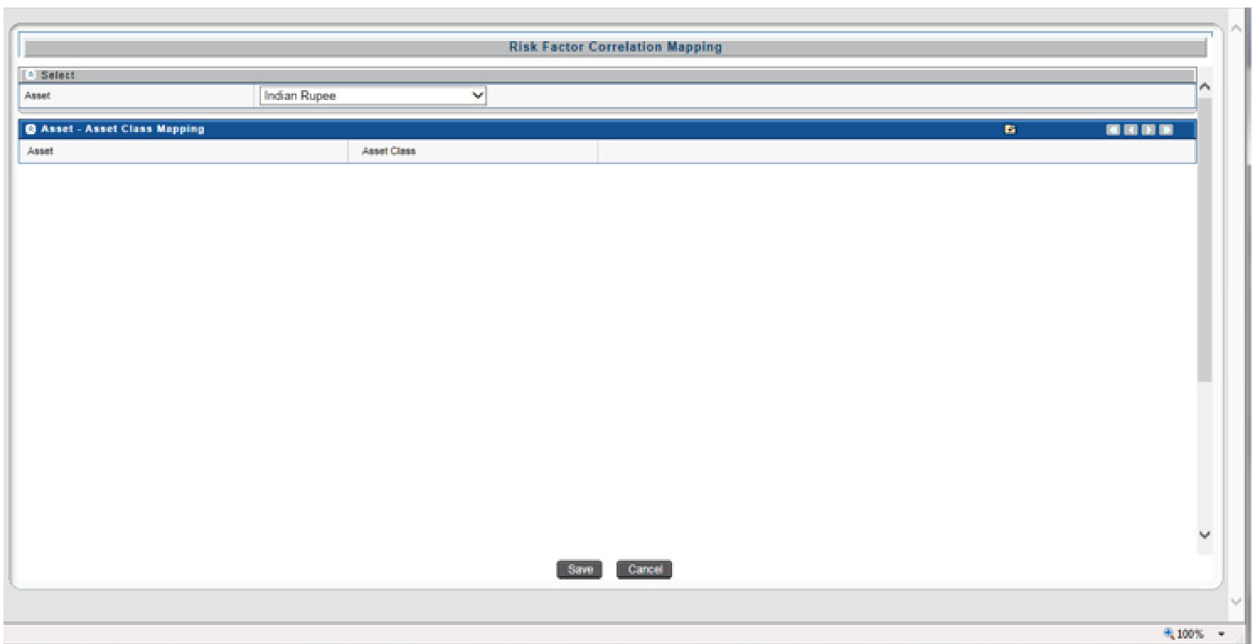
Risk Factor correlation mapping allows you to select the risk factors applicable to portfolio based on asset and asset class combination. Follow the below steps to add a risk factor:

1. Click Risk Factor Correlation Mapping. The summary screen displays the list of selected risk factors.

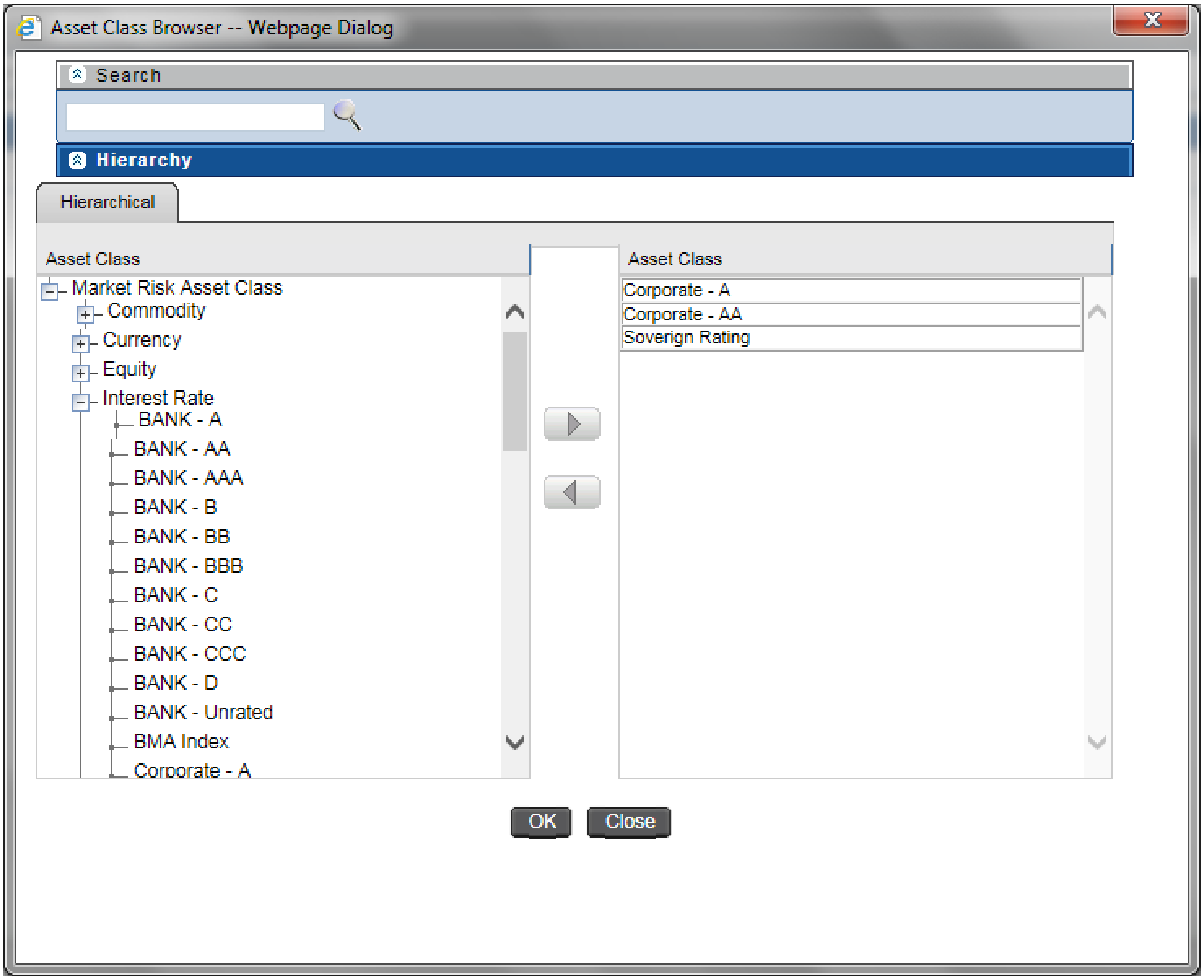
2. Click Add icon to add the risk factor



3. Select Asset of risk factor.



4. Click the Add icon to select all Asset Classes applicable for the selected asset.



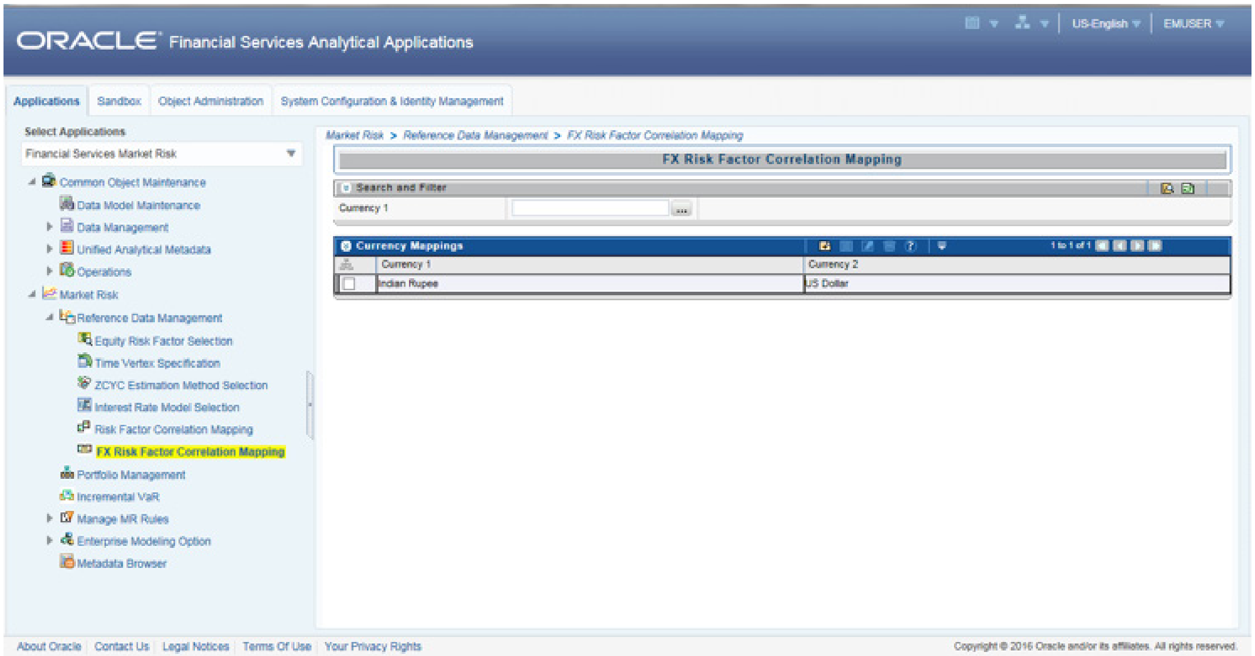
5. Click OK to save the mapping

3.5.2 FX Risk Factor Correlation Mapping

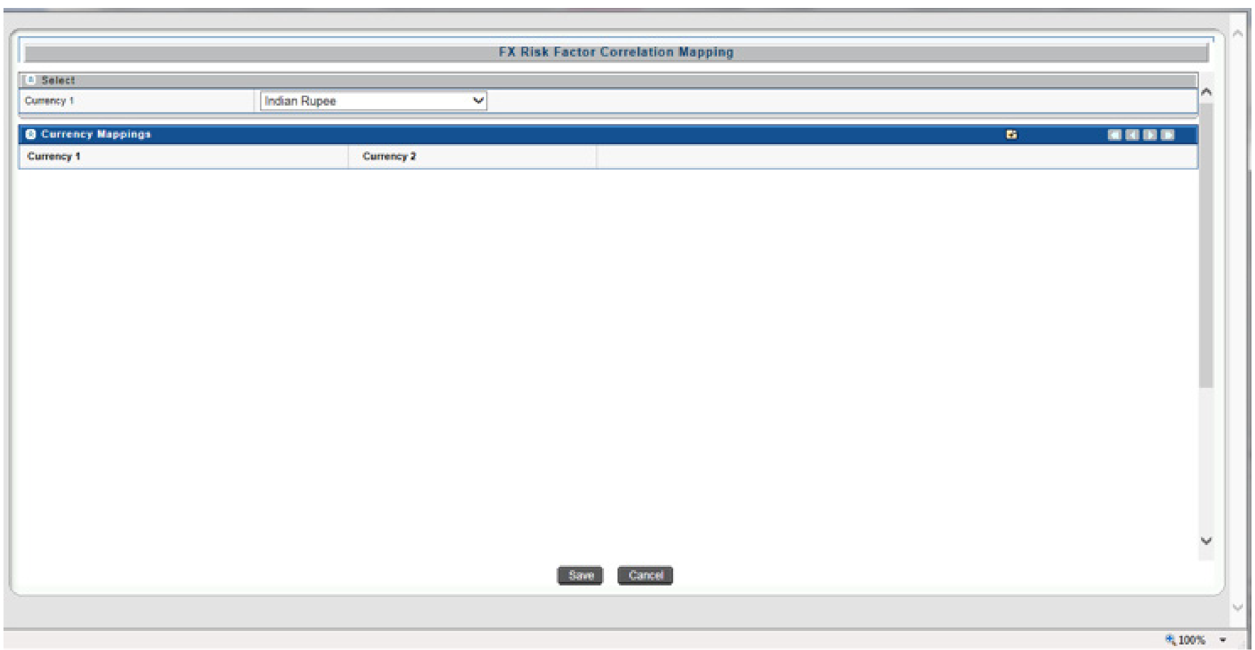
FX Risk Factor correlation mapping allows you to select the risk factors applicable to Forex instrument based on Currency. You can select the pair of currency applicable as risk factor for forex instrument in portfolio. Follow the below steps to add a risk factor:

1. Click FX Risk Factor Correlation Mapping. The summary screen with list of selected risk factor is displayed.

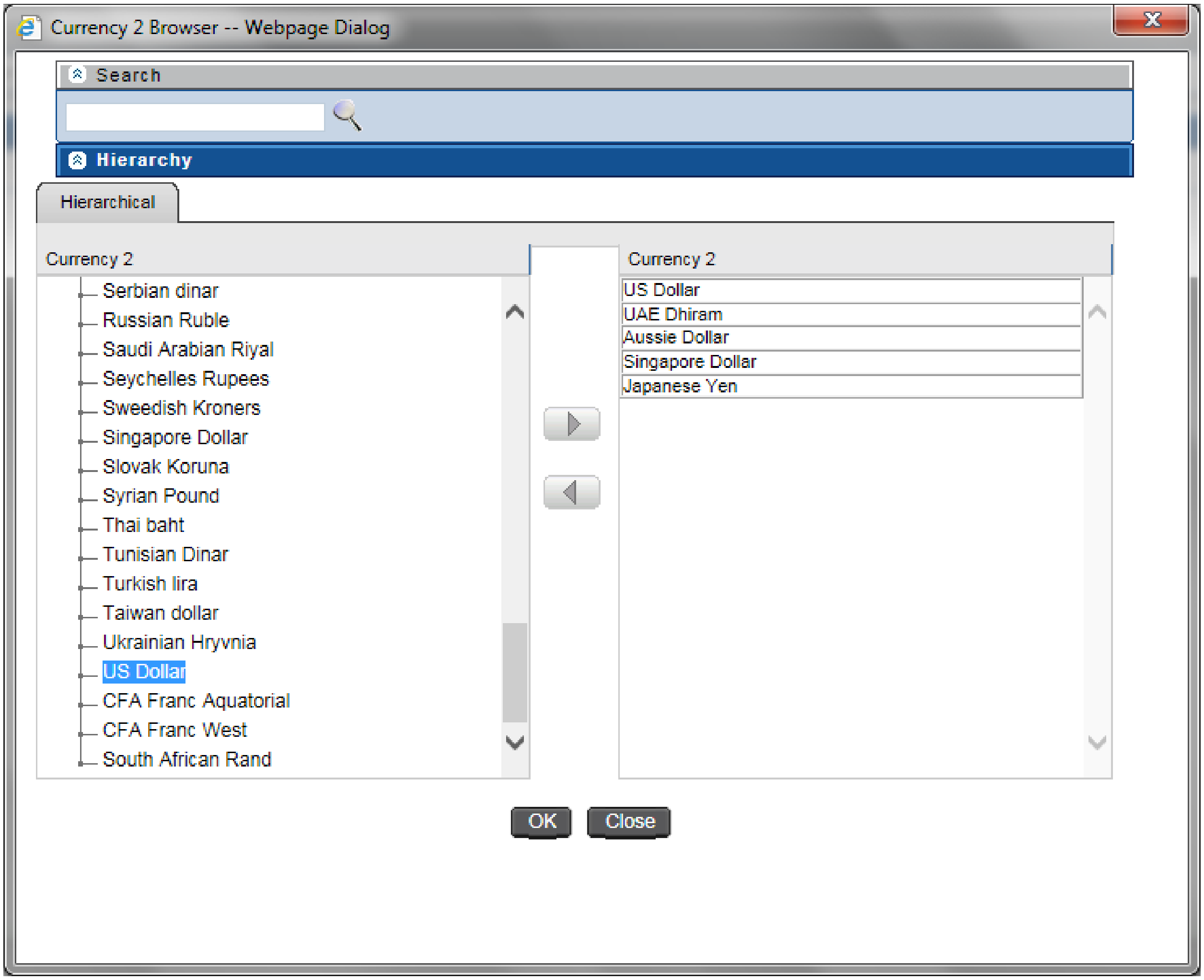
2. Click Add icon to add the risk factor.



3. Select Currency 1. It denotes the first currency in currency pairs of forex instruments.



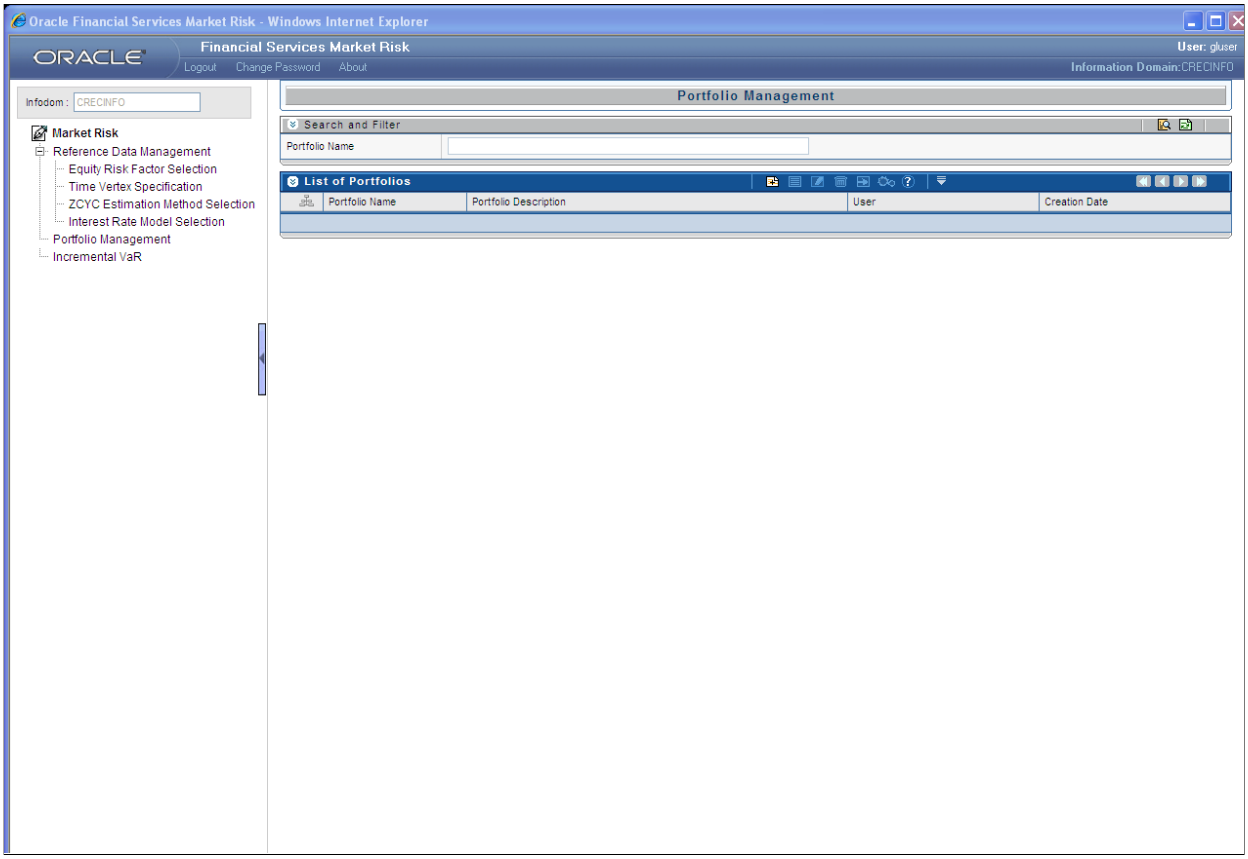
4. Click the Add icon to select all the Currency 2 applicable for the selected Currency 1. Currency 2 denotes the second currency in currency pair of forex instruments.



5. Click OK to save the mapping

3.6. *Portfolio Management*

Under this screen, a portfolio needs to be defined on the basis of multiple dimensions. A portfolio will be a combination of currency, MR asset class, Line of business, Trading Desk, Legal Reporting, Bank Instrument Type, Market Risk Instrument Type, Counterparty, Market Risk Asset and MR Bank Asset Class. A portfolio will be defined on 1 or more dimensions along with one or more leaf nodes. Once a portfolio is defined it can be deleted but it cannot be edited.



Portfolio Management Display Screen

3.6.1 Portfolio Management Add Screen

In order to add or define a new Portfolio Management, click the Add button in the Portfolio Management Screen.

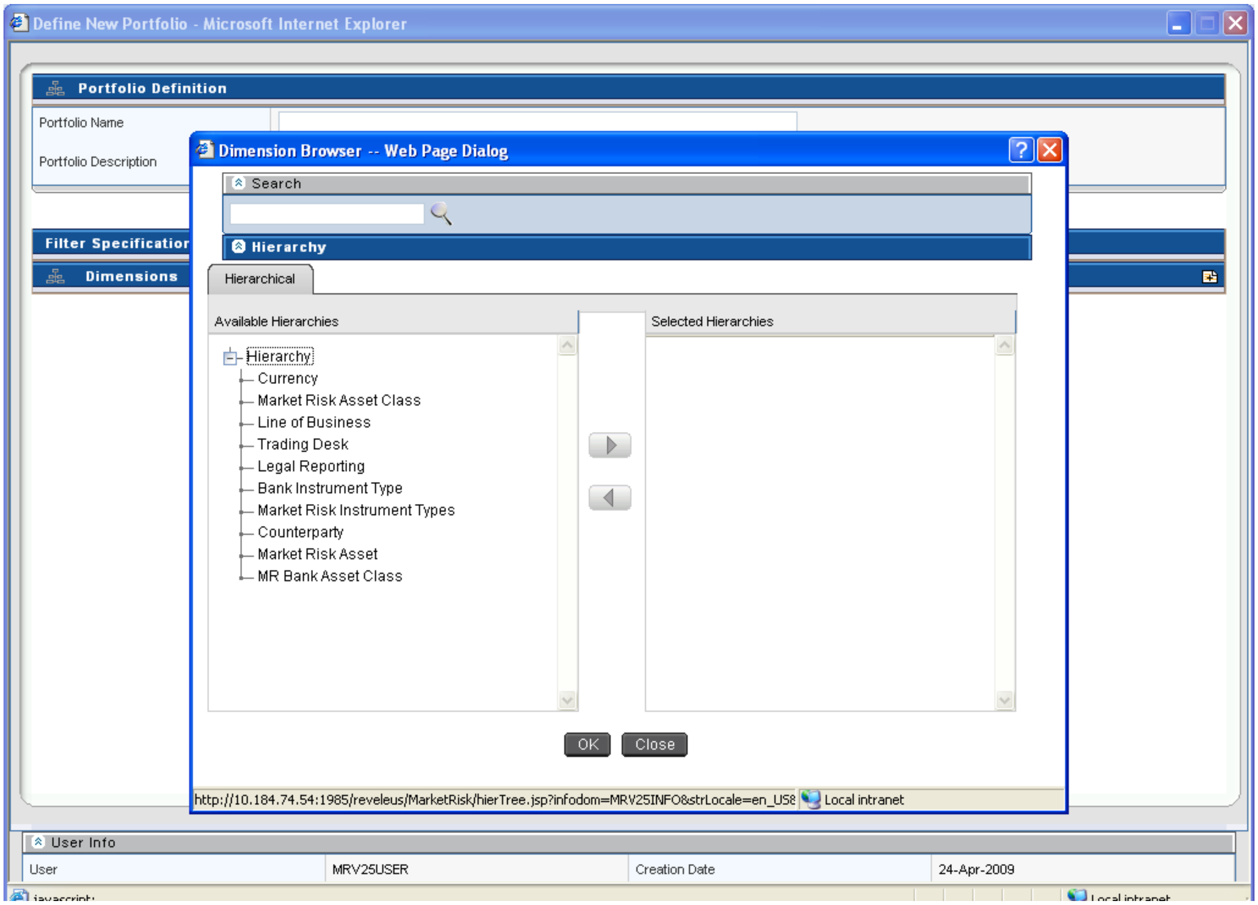
- Portfolio Name – Give an appropriate portfolio name.
- Portfolio Description – Describe the portfolio in brief.
- Dimensions – In order to add the dimensions to the portfolio, click the Add button in the Filter Specification section in Portfolio Management Add Screen.
- Once you click the add button, Dimension Hierarchy Browser will open.

A portfolio is a combination of one or more following dimensions:

- Currency
- Market Risk Asset Class
- Line of Business
- Trading Desk
- Legal Reporting
- Bank Instrument Type
- Market Risk Instrument Types
- Counterparty
- Market Risk Asset

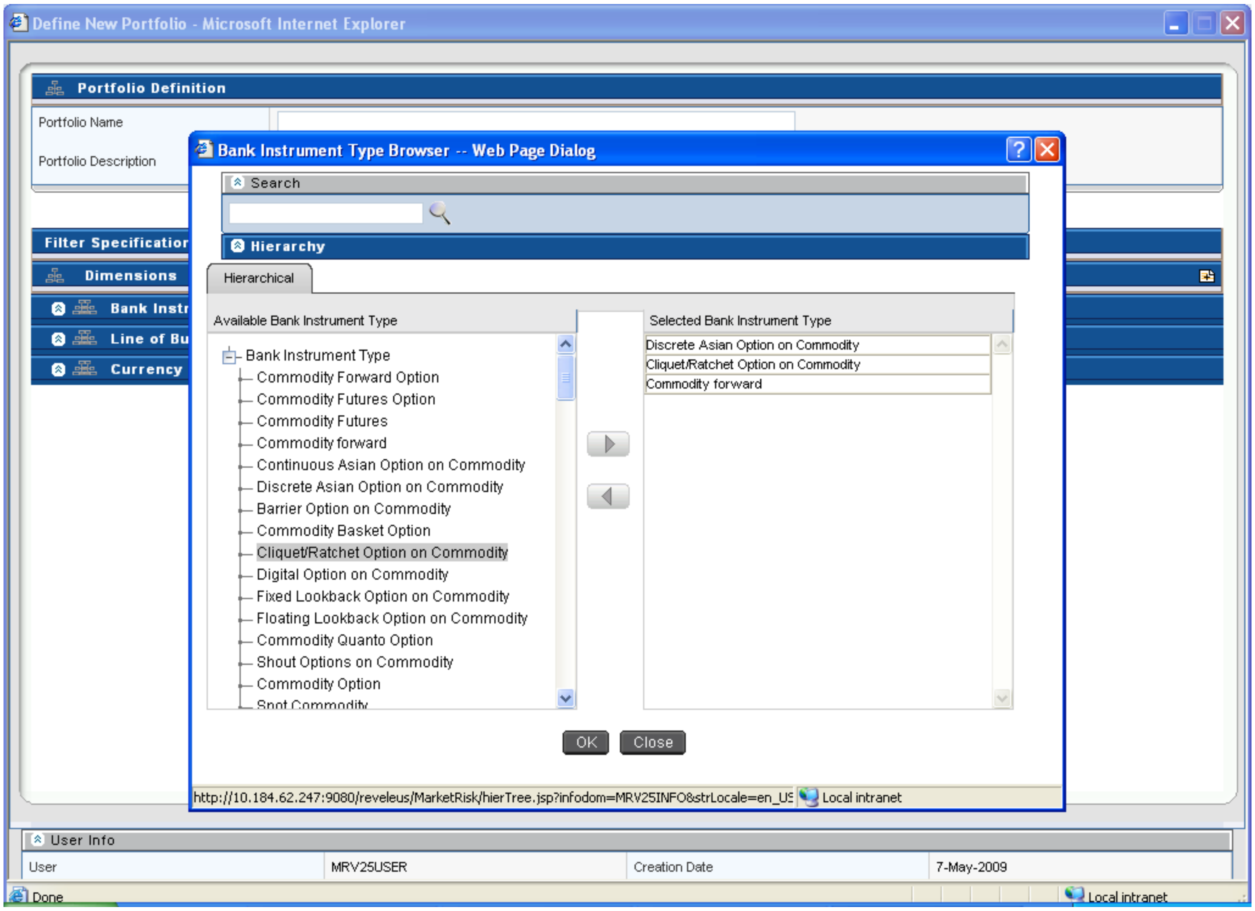
- MR Bank Asset Class

The dimensions for defining a portfolio are configurable as per your preference. Accordingly, a position may belong to more than one portfolio. You may define a portfolio as a combination of multiple levels under each dimension.



Portfolio Management Add Screen

Under each dimension, one or multiple nodes can be selected. A combination of different dimensions and different nodes make a unique portfolio. Once the dimensions are selected from the **Dimension** browser, depending upon the selection leaf nodes of each dimension needs to be selected. For example: from **Bank Instrument Type** Browser, you need to select one or more instruments which need to be included in a particular portfolio.

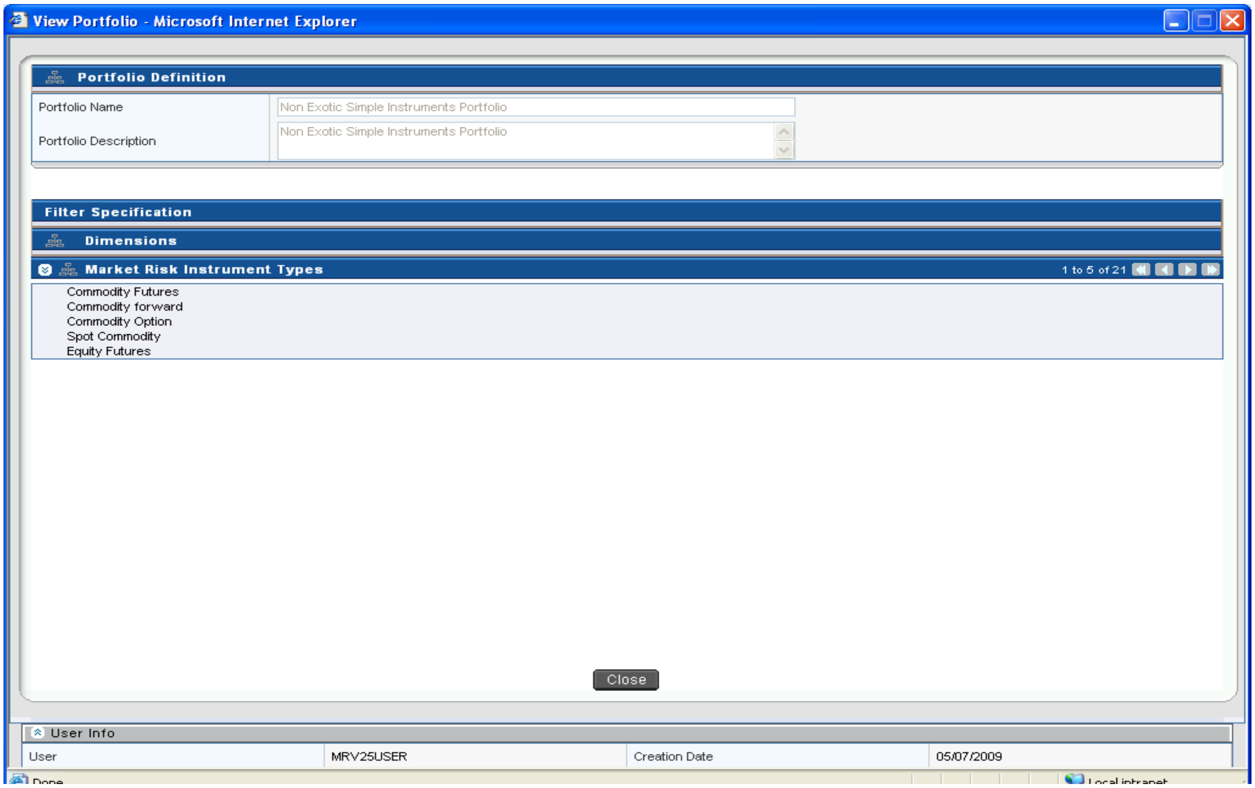


Portfolio Management Dimensions Screen- Bank Instrument Type Browser

3.6.2. Portfolio Management View Screen

The portfolio management view screen is displayed in the view mode. To view an existing Portfolio, click the View button which is present on the right hand side (RHS) corner of the Portfolio Management Screen.

In order to View, first select an existing record by activating the select button, then click the View button present on the RHS corner of the screen. The chosen portfolio will be displayed in view mode and it cannot be edited.



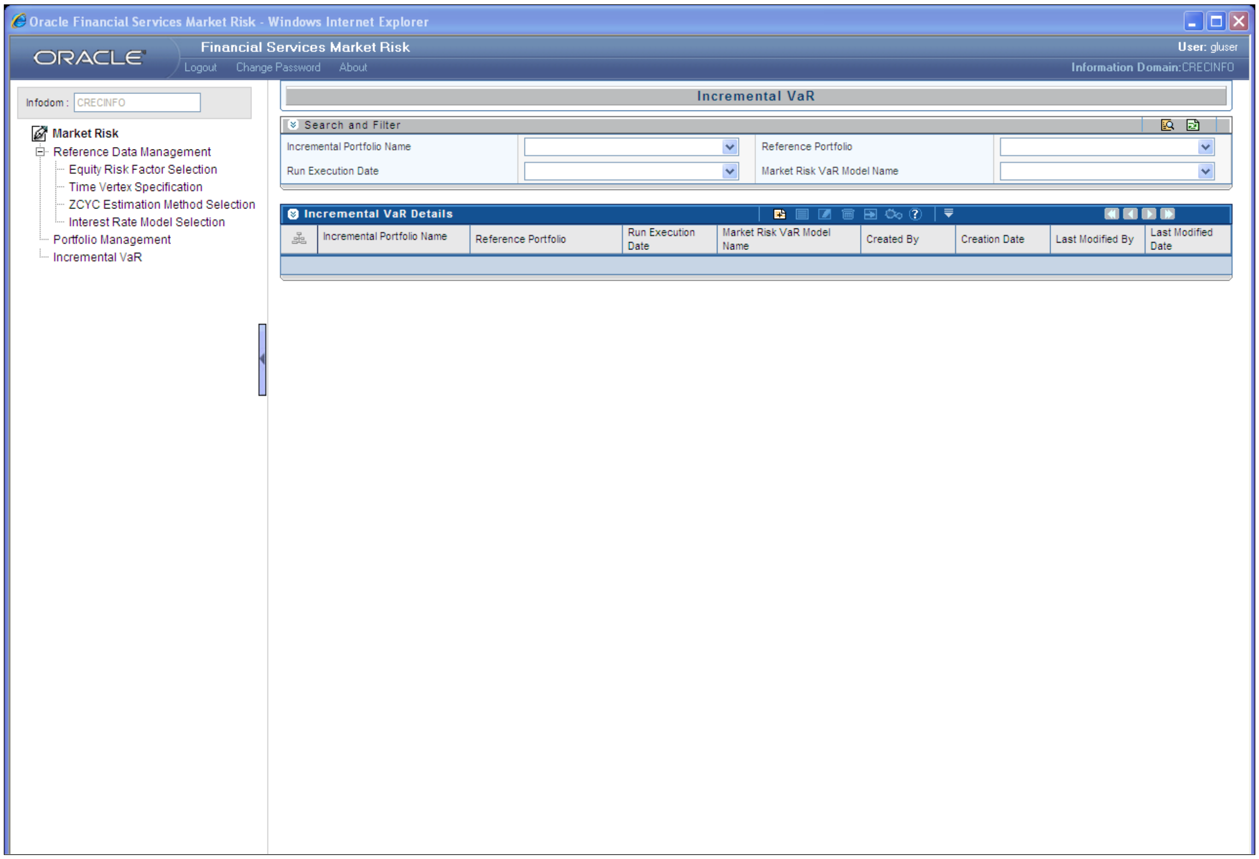
Portfolio Management View Screen

3.6.3 Portfolio Management Delete Screen

In order to delete a particular portfolio, first select an existing record by activating the select button, and then click the delete button present on the RHS corner of the screen. The selected portfolio will get deleted, a multiple deletion is not allowed under this screen.

3.7 Incremental VaR

Incremental VaR is calculated for all portfolios which are previously defined under portfolio management screen and for which risk measures have been calculated. An incremental portfolio is defined based on the following parameters: reference portfolio, execution date, VaR model and instruments. Position specific details like number of units and position type are required for each instrument mapped to the portfolio.

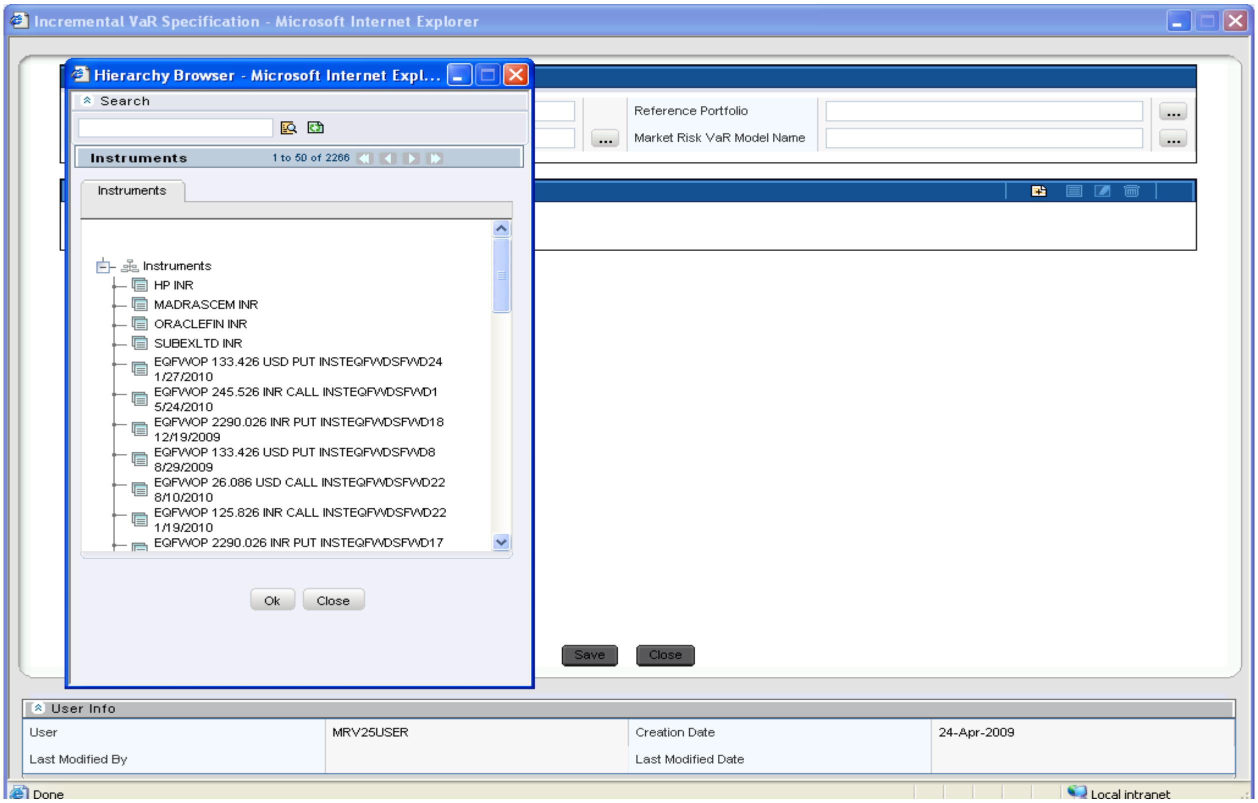


Incremental VaR Display Screen

3.7.1 Incremental VaR Add Screen

In order to add or define a new Incremental VaR portfolio, click the Add button in the Incremental VaR Screen.

- Incremental Portfolio Name - Give an appropriate incremental portfolio name.
- Run Execution Date – Select an appropriate Run Execution date from the calendar browser which will be the fic mis date for you.
- Reference Portfolio - For a specific incremental portfolio, single existing portfolio can be selected along with multiple instruments mapped to it from the hierarchy browser.
- Market Risk VaR Model Name – Select single market risk VaR model name from the **market risk VaR model hierarchy** browser to which this particular Incremental VaR model will be mapped.
- Position Specifications – In order to select position specifications, click the Add button situated on the RHS corner of the **Position Specifications** section in the **Incremental VaR** screen. Multiple instruments mapped to the portfolio can be selected from the hierarchy browser but only one instrument at a time can be selected. The following parameters of each instrument need to be specified for the purpose of computing incremental VaR:
  - Units
  - Position Type

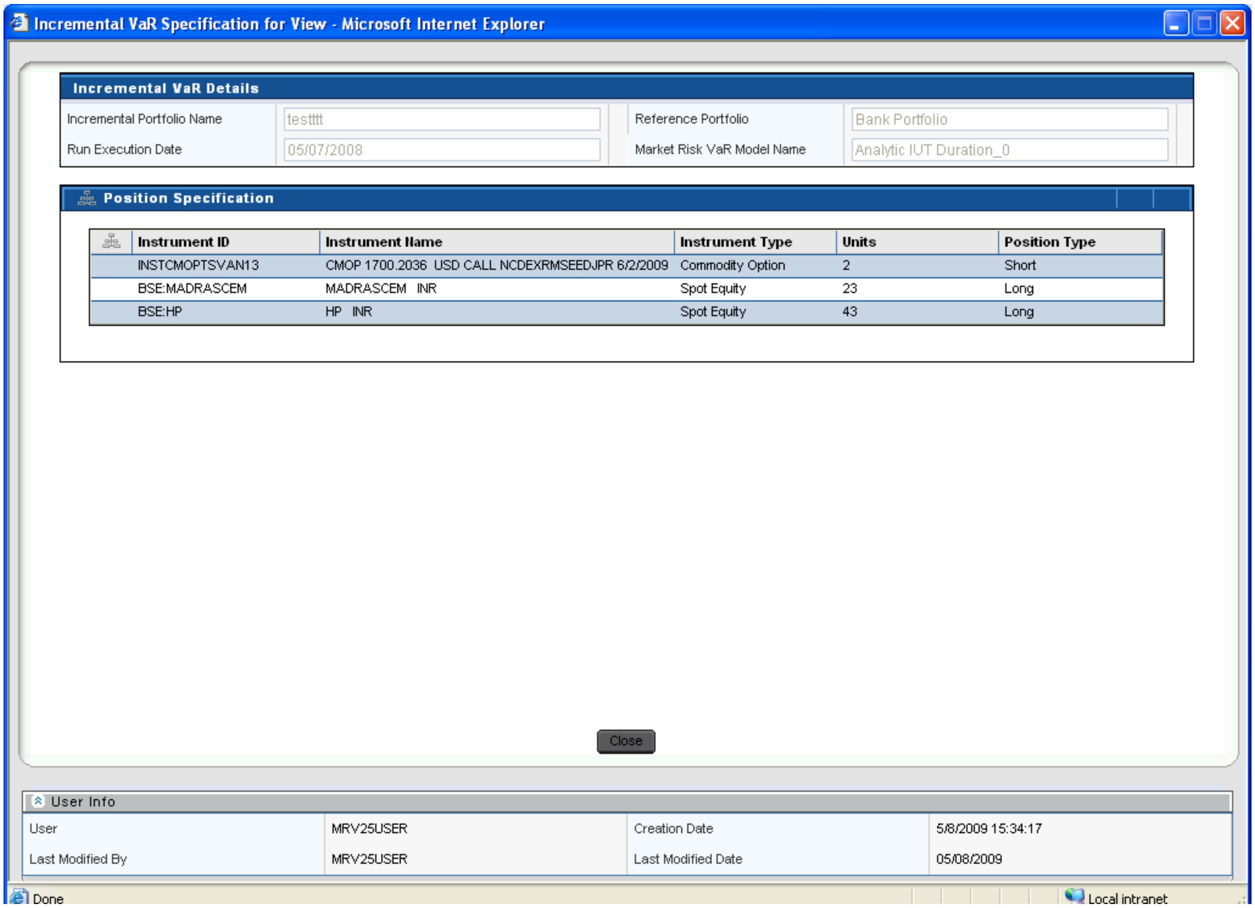


Incremental VaR Add Screen

3.7.2 Incremental VaR View Screen

The Incremental VaR view screen is displayed in the view mode. To view an existing defined Incremental VaR Portfolio, click the View button which is present on the RHS corner of the Incremental VaR Screen.

In order to View, first select an existing record by activating the select button, then click the View button present on the RHS corner of the screen. The chosen Incremental VaR Portfolio is displayed and it cannot be edited.

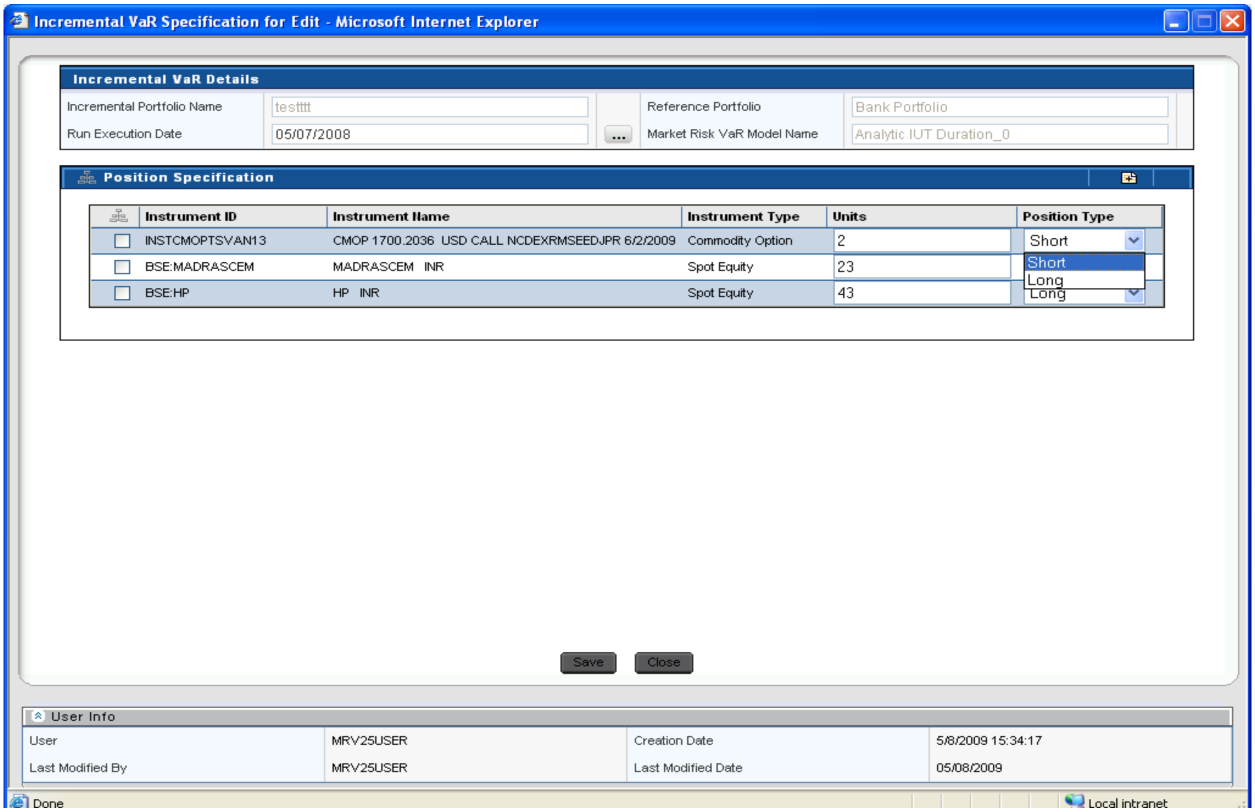


Incremental VaR View Screen

3.7.3 Incremental VaR Edit Screen

In order to edit an Incremental VaR screen, first select a defined Incremental VaR portfolio that needs to be edited by clicking the select button , then click the Edit button present at the RHS corner of the Incremental VaR Display Screen. Under Edit screen, you can change the execution date and check for incremental VaR. All the dimensions under position specification column can be edited or deleted for a given Incremental VaR portfolio.

The reference portfolio and VaR model name once defined cannot be edited. You are free to make changes to the number of units and position type for a particular instrument mapped to the defined portfolio. Once the changes are made, the screen needs to be saved using the **Save** button displayed at the end of the page.



Incremental VaR Edit Screen

3.8 Process Description

Following is the description of processes in Market Risk version 8.0.2.0.0:

Process Name	Rule Name	Description
Positions Data Population	POSITIONS DATA POPULATION	This module loads the positions data from stage table to FACT table if positions data is given as download
Market Data Population	MARKET DATA POPULATION	This module loads the market data from stage table to FACT table if market data is given as download
Commodity Future Curve Population	COMMODITY FUTURE CURVE POPULATION	This module loads the commodity future curve from stage table to FACT table if commodity future curve is given as download
Equity Corporate Actions Data Population	CORPORATE ACTIONS DATA POPULATION	This module loads the corporate action data from Stage table to FACT table
Instruments Obligors Data Population	OBLIGORS DATA POPULATION	This module loads the obligors details from stage table to FACT table
Instruments Schedule Data Population	INSTRUMENT SCHEDULE POPULATION	This module loads the Instruments Schedule from stage table to FACT table
MR VaR Data Preparation	Currency and Interest Rate Instruments Re-classification	This module does the Instrument Reclassification of instruments with risk factor type as Currency and Interest Rate
MR VaR Data Preparation	Commodity and Equity Instruments Re-classification	This module does the Instrument Reclassification of instruments with risk factor type as Commodity and Equity.
MR VaR Data Preparation	Currency Asset Re-Classification	This module does the reclassification of all the instrument with risk factor type as Currency

Process Name	Rule Name	Description
MR VaR Data Preparation	Commodity Asset Re-Classification	This set of modules does the Reclassification of Asset Class
MR VaR Data Preparation	Asset Re-classification for Quanto Options	This set of modules does the Reclassification of Asset Class
MR VaR Data Preparation	Sovereign Asset Class Re-Classification	This set of modules does the Reclassification of Asset Class
MR VaR Data Preparation	Asset Class Classification - Simple Derivatives on Sovereign	This set of modules does the Reclassification of Asset Class
MR VaR Data Preparation	Asset Class Classification Compound Derivatives on Sovereign	This set of modules does the Reclassification of Asset Class
MR VaR Data Preparation	Asset Class Reclassification	This set of modules does the Reclassification of Asset Class
MR VaR Data Preparation	Asset Class Reclassification based on Rating	This set of modules does the Reclassification of Asset Class
MR VaR Data Preparation	Asset Class Classification on Rating for Simple Derivatives	This set of modules does the Reclassification of Asset Class
MR VaR Data Preparation	Asset Class Classification on Rating for Compound Derivative	This set of modules does the Reclassification of Asset Class
MR VaR Data Preparation	Asset Class Reclassification for Equity	This set of modules does the Reclassification of Asset Class
MR VaR Data Preparation	Asset Class Reclassification for Simple Equity Derivatives	This set of modules does the Reclassification of Asset Class
MR VaR Data Preparation	Asset Class Reclassification for Compound Equity Derivatives	This set of modules does the Reclassification of Asset Class
MR VaR Data Preparation	Asset Class Reclassification for CDS	This set of modules does the Reclassification of Asset Class
MR VaR Data Preparation	Asset Class Reclassification for Convertible Bonds	This set of modules does the Reclassification of Asset Class
MR VaR Data Preparation	POSITION DATA POPULATION	This module loads the Position Data of Instruments from stage table to FACT table.
MR VaR Data Preparation	MARKET INSTRUMENT DATA POPULATION	This module loads the Instrument Parameter from stage table to FACT table.
MR VaR Data Preparation	EQUITY INDEX DATA POPULATION	This module loads the Equity Index Data from stage Table to FACT Table.
MR VaR Data Preparation	PORTFOLIO DATA POPULATION	This module loads the Portfolio data like VaR Limit and Actual P&L from Stage Table to FACT Table.
MR VaR Data Preparation	YIELD CURVE POPULATION	This module loads the Yield Curve Data from stage table to FACT Table for all the Rating and Currency combinations for which you have selected the download option.
MR VaR Data Preparation	CDS SPREAD POPULATION	This module loads the CDS Spread data from stage Table to FACT Table.
MR VaR Data Preparation	Interpolate_CDS_Spreads	This module maps the given CDS spread to the standard time vertices as specified by you. If the standard time vertices are not in the downloaded CDS Spread then spread values are interpolated for the intermediate time vertices.
MR VaR Data Preparation	Pop_Correlation_AC	This module populates the Funds and Benchmark Codes as Asset Class, this module is purely for calculation purposes where correlation between Benchmark Codes, Funds and

Process Name	Rule Name	Description
		Risk Factors is required for Calculating of VaR and other Risk Measures.
MR VaR Data Preparation	RISK FACTOR STATISTICS POPULATION	This module loads the Variance, Co-variance, Mean and Correlation Data between all the Risk Factors from stage table to FACT table. This module will be useful if you want to give the Variance, Co-variance, Mean and Correlation data as download.
MR VaR Data Preparation	RunningAccCalc	This module calculates the Running Accumulator for Asian Option and updates the value for the corresponding instrument.
MR VaR Data Preparation	ZCYCEstimation	This module calculates the Yield Curve for all the Rating and Currency combinations for which you have selected either Bootstrap method or choose to apply spread over Sovereign Yield Term Structure.
MR VaR Data Preparation	CMFEstimation	This module calculates the Commodity Future Curve using all the Commodity futures traded in the market.
Interest Rate Mean Reversion Estimation	IRMeanReversion	This module calculates the Mean Reversion Rate for Interest Rate instrument
Risk Factor Volatility Correlation Estimation	EWMA 0.94	This module first fetches the historical data of all the Risk Factors given by you and applies the corporate action if available to the equities. Once the corporate action has been applied then the module will check for the missing value and fill up the missing values using the method as selected by you. Thereafter, the module calculates the Variance, Co-variance, Mean, and Correlation for all the Risk Factors.
Pricing OTC Instruments	OTCPricing	This module uses the output of Risk Factor Volatility Correlation Estimation Module and calculates the price of all the OTC Instruments available with the bank. Along with the price calculation, module also calculates the Greeks for all the option instruments and Modified Duration for all the bonds.
Market Risk VaR Estimation	Analytic Model / Historical Model / Monte Carlo Model	This module calculates the Risk Measures like VaR, CVaR for the model as defined by you.
Market Risk VaR Estimation	Simulated_PL_Bucketing	This module buckets the P&L distribution as generated in Monte Carlo or Historical VaR Estimation Methodology for plotting the curve of P&L distribution.
MR Incremental VaR Estimation	MRIncrementalVaR	This module calculates the Incremental VaR of the position defined by you added in the selected portfolio.

Table 1: Process Description

3.9 Examining Results

Creating and viewing of reports are described in detail in the Active Portal User Manual. In order to examine results, you have to check in the corresponding tables. After execution is completed, check the T2T logs and the Run-Rule logs. It can be found out from the log files whether the execution is a success or failed. Errors will be displayed in the same log files. The logs will also mention the name of the table in which the Output is populated. You have to access the particular table to view the results.

The final outputs can also be viewed in the **Reports** section. This can be accessed by clicking **Information Delivery** on the left pane of the OFSAAI Infrastructure. Under that click **Insight** and then click **Viewer** to view all the reports.

Annexure A: GENERATING DOWNLOAD SPECIFICATIONS

Data Model for Market Risk Release 8.0.2.0.0 is available on customer request as an ERwin file.

Download Specifications can be extracted from this model. Refer the whitepaper present in OTN for more details.

Annexure B: Market Risk Reports

The reports which form part of the Market Risk dashboard are grouped into the following subject areas based on their functionality:

- Risk Measures
- Cash Flows
- Component VaR - Analytic Method
- Component VaR - Simulation Method
- Marginal & Incremental VaR
- Greeks
- Stress & Back Testing
- Comparison Across Portfolios
- Comparison Across VaR Models
- Market Analysis

5.1 *Risk Measures Subject Area*

The following reports are displayed as part of the Risk Measures subject area:

- Combined Alert
- Portfolio Value Across Time
- Profit and Loss Distribution
- Risk Estimation Static
- Risk Measure Report
- Risk Measures Across Time

Combined Alert

Dashboard Page Name	Risk Measures
Report Name	Combined Alert
Dashboard Name	Market Risk
Page Level Filters	Date, Portfolio, Market Risk VaR Model
Report Level Filters	0
Report Description	Reveleus Market Risk Dashboard displays the following Alerts: • Limit Alert Limit Alert is displayed when the VaR estimate of a portfolio under a given Market Risk VaR Model exceeds the VaR Limit specified. • Hypothetical P&L Alert Hypothetical P&L Alert is displayed when the Hypothetical Loss of a portfolio exceeds the VaR estimate. The Alerts are displayed for all portfolios under all Market Risk VaR Models to which they are mapped for the selected date.

Portfolio Value Across Time

Dashboard Page Name	Risk Measures
Report Name	Portfolio Value Across Time
Dashboard Name	Market Risk
Page Level Filters	Date, Portfolio, Market Risk VaR Model
Report Level Filters	0
Report Description	Portfolio Value across Time is a 3-axis chart for a trailing period of 30 business days on a daily time-step basis. The graph has the date on the horizontal axis, Portfolio Value on the left-side vertical axis and the VaR % of Portfolio Value on the right-side vertical axis.

Profit and Loss Distribution

Dashboard Page Name	Risk Measures
Report Name	Profit and Loss Distribution
Dashboard Name	Market Risk
Page Level Filters	Date, Portfolio, Market Risk VaR Model
Report Level Filters	0
Report Description	Profit and Loss Distribution is a graphical display of the Profit & Loss Distribution under the Simulation Methods to Risk Measure Estimation. The graph has the P&L values on the horizontal axis and the frequency of the P&L values on the vertical axis. The P&L values are bucketed into equal-width buckets in order to estimate the frequency. The graph is a stacked column graph where the data falling within the 10% mark, 20% mark, 30% mark and 40%-70% is displayed in a different color.

Risk Estimation Static

Dashboard Page Name	Risk Measures
Report Name	Risk Estimation Static
Dashboard Name	Market Risk
Page Level Filters	Date, Portfolio, Market Risk VaR Model
Report Level Filters	0
Report Description	On selection of page level filters parameters of selected Market Risk VaR Model are displayed. Details displayed are Risk Measure Estimation Method, Confidence Level, Reporting Currency and Horizon (in days).

Risk Measure Report

Dashboard Page Name	Risk Measures
Report Name	Risk Measure Report
Dashboard Name	Market Risk
Page Level Filters	Date, Portfolio, Market Risk VaR Model
Report Level Filters	0
Report Description	Report displays the risk measures for the selected portfolio and VaR model. The following risk measures are reported in a tabular format: i. Value-at-Risk ii. Conditional Value-at-Risk iii. Current Portfolio Value iv. Simulated Portfolio Value v. VaR % of Current Portfolio Value vi. Portfolio VaR Limit

Risk Measures Across Time

Dashboard Page Name	Risk Measures
Report Name	Risk Measures Across Time
Dashboard Name	Market Risk
Page Level Filters	Date, Portfolio, Market Risk VaR Model
Report Level Filters	0
Report Description	Risk Measures across Time is a 2-axis chart for a trailing period of 30 business days on a daily time-step basis. The graph has the date on the horizontal axis and the VaR, CVaR and Portfolio VaR Limit values on the vertical axis.

5.2 *Cash Flows Subject Area*

The following reports are displayed as part of the Cash Flows subject area:

- Aggregate Cash Flow Map
- Allocated Cash Flow Report
- Cash Flow by Asset
- Cash Flow by Asset Class
- Risk Estimation Method

Aggregate Cash Flow Map

Dashboard Page Name	Cash Flows
Report Name	Aggregate Cash Flow Map
Dashboard Name	Market Risk
Page Level Filters	Date, Portfolio, Market Risk VaR Model
Report Level Filters	0
Report Description	Aggregate Cash Flow Map is a 2-dimensional surface chart which has the Asset Class – Maturity on the x-axis, the cash flows on the y-axis and the Asset indicated as stacked.

Allocated Cash Flow Report

Dashboard Page Name	Cash Flows
Report Name	Allocated Cash Flow Report
Dashboard Name	Market Risk
Page Level Filters	Date, Portfolio, Market Risk VaR Model
Report Level Filters	0
Report Description	Allocated Cash Flow Report is a report displaying the cash flows of each Asset – Asset Class – Maturity vertex in a tabular format.

Cash Flow by Asset

Dashboard Page Name	Cash Flows
Report Name	Cash Flow by Asset
Dashboard Name	Market Risk
Page Level Filters	Date, Portfolio, Market Risk VaR Model
Report Level Filters	0
Report Description	Cash Flow Map by Asset is a 2-axis chart which has the Asset on the horizontal axis and the cash flows on the vertical axis.
Drill-through On	On selection of a particular bar, the cash flows from each Asset Class – Maturity in the selected Asset are displayed.

Cash Flow by Asset Class

Dashboard Page Name	Cash Flows
Report Name	Cash Flow by Asset Class
Dashboard Name	Market Risk
Page Level Filters	Date, Portfolio, Market Risk VaR Model
Report Level Filters	0
Report Description	Cash Flow Map by Asset Class is a 2-axis chart which has the Asset Class on the horizontal axis and the cash flows on the vertical axis. The cash flows of various maturities of an Asset Class are summed up and the aggregate cash flows from each Asset Class are displayed.

Risk Estimation Method

Dashboard Page Name	Cash Flows
Report Name	Risk Estimation Method
Dashboard Name	Market Risk
Page Level Filters	Date, Portfolio, Market Risk VaR Model
Report Level Filters	0
Report Description	On selection of page level filters parameters of selected Market Risk VaR Model are displayed. Details displayed are Risk Measure Estimation Method, Confidence Level, Reporting Currency and Horizon (in days).

5.3 *Component VaR - Analytic Method Subject Area*

The following reports are displayed as part of the Component VaR - Analytic Method subject area:

- Baseline Portfolio VaR
- Component VaR by Vertex
- Component VaR by Dimension
- Risk Estimation Method
- Top 10 Contributors to Portfolio VaR (by Vertex)

Baseline Portfolio VaR

Dashboard Page Name	Component VaR - Analytic Method
Report Name	Baseline Portfolio VaR
Dashboard Name	Market Risk
Page Level Filters	Date, Portfolio, Market Risk VaR Model
Report Level Filters	0
Report Description	The VaR of the selected portfolio under the Market Risk VaR Model selected is displayed.

Component VaR by Vertex

Dashboard Page Name	Component VaR - Analytic Method
Report Name	Component VaR by Vertex
Dashboard Name	Market Risk
Page Level Filters	Date, Portfolio, Market Risk VaR Model
Report Level Filters	0
Report Description	Component VaR by Vertex is a detailed report of the Component VaR of each Asset – Asset Class – Maturity vertex of the selected portfolio. It consists of the following: i. Asset ii. Asset Class – Maturity iii. Component VaR iv. % of Portfolio VaR v. Rank The ranking is done by displaying a different color for each Asset –Asset Class – Maturity vertex whose Component VaR falls within the following range: • Top 10% • 10% - 20% • 20% -30% • Others

Component VaR by Dimension

Dashboard Page Name	Component VaR - Analytic Method
Report Name	Component VaR by Dimension
Dashboard Name	Market Risk
Page Level Filters	Date, Portfolio, Market Risk VaR Model
Report Level Filters	0
Report Description	Component VaR by Dimension is a graphical report displaying the component VaR of each member of the selected dimension. The dimensions to be displayed are as follows: i. Asset ii. Asset Class
Drill-through On	Level 1Drill-through i. Asset Drill-through to the level of Component VaR of each maturity of each selected Asset (commodity only). ii. Asset Class a. Interest Rate/Commodity Asset Classes On selection of the interest rate or commodity section of the chart, the component VaR of each Maturity in the selected Asset Class is displayed. b. Equity/Currency Asset Classes On selection of the equity or currency section of the chart, the component VaR of each Maturity in the selected Asset Class is displayed.

	Level 2 Drill-through Only the Asset Class dimension has a 2-level drill-through. i. Interest Rate On selection of a particular maturity in the Level 1 drill-through chart, the component VaR of each Asset (currency) belonging to the selected Asset Class – Maturity combination is displayed. ii. Commodity On selection of a particular maturity in the Level 1 drill-through chart, the component VaR of each Asset (commodity) belonging to the selected Asset Class – Maturity combination is displayed. **Note**: All dimensions excluding Asset Class have only 1 level of drill-through. Also, the Asset Classes Currency and Equity do not have a second level drill-through.

Risk Estimation Method

Dashboard Page Name	Component VaR - Analytic Method
Report Name	Risk Estimation Method
Dashboard Name	Market Risk
Page Level Filters	Date, Portfolio, Market Risk VaR Model
Report Level Filters	0
Report Description	On selection of page level filters parameters of selected Market Risk VaR Model are displayed. Details displayed are Risk Measure Estimation Method, Confidence Level, Reporting Currency and Horizon (in days).

Top 10 Contributors to Portfolio VaR (by Vertex)

Dashboard Page Name	Component VaR - Analytic Method
Report Name	Top 10 Contributors to Portfolio VaR (by Vertex)
Dashboard Name	Market Risk
Page Level Filters	Date, Portfolio, Market Risk VaR Model
Report Level Filters	0
Report Description	This is a graphical report of the 10 Asset – Asset Class – Maturity vertices which have the highest Component VaR.

5.4 *Component VaR - Simulation Method Subject Area*

The following reports are displayed as part of the Component VaR - Simulation Method subject area:

- Component VaR by Dimension
- Risk Estimation Method
- Top 10 Contributors to Portfolio VaR (by Instrument)

Component VaR by Dimension

Dashboard Page Name	Component VaR - Simulation Method
Report Name	Component VaR by Dimension
Dashboard Name	Market Risk
Page Level Filters	Date, Portfolio, Market Risk VaR Model
Report Level Filters	0
Report Description	Component VaR by Dimension is a graphical report displaying the component VaR of each member of the selected dimension. The dimensions to be displayed are as follows: i. Asset ii. Asset Class iii. Counterparty iv. Currency v. Instrument Type vi. Legal Entity vii. Line of Business viii. Trading Desk
Drill-through On	Level 1Drill-through i. Asset Drill-through to the level of Component VaR of each maturity of each selected Asset (commodity only). ii. Asset Class a. Interest Rate/Commodity Asset Classes On selection of the interest rate or commodity section of the chart, the component VaR of each Maturity in the selected Asset Class is displayed. b. Equity/Currency Asset Classes On selection of the equity or currency section of the chart, the component VaR of each Maturity in the selected Asset Class is displayed. iii. Instrument Type On selection of a particular instrument type, the component VaR of each instrument of the selected instrument type is displayed. iv. Trading Desk On selection of a particular trading desk, the component VaR of each trader belonging to the selected trading desk is displayed. **Note**: There is no drill-through for the dimensions Counterparty, Currency, Legal Entity and Line of Business. Level 2 Drill-through Only the Asset Class dimension has a 2-level drill-through. i. Interest Rate On selection of a particular maturity in the Level 1 drill-through chart, the component VaR of each Asset (currency) belonging to the

	selected Asset Class – Maturity combination is displayed. ii. Commodity On selection of a particular maturity in the Level 1 drill-through chart, the component VaR of each Asset (commodity) belonging to the selected Asset Class – Maturity combination is displayed. **Note**: All dimensions excluding Asset Class have only 1 level of drill-through. Also, the Asset Classes Currency and Equity do not have a second level drill-through.

Risk Estimation Method

Dashboard Page Name	Component VaR - Analytic Method
Report Name	Risk Estimation Method
Dashboard Name	Market Risk
Page Level Filters	Date, Portfolio, Market Risk VaR Model
Report Level Filters	0
Report Description	On selection of page level filters parameters of selected Market Risk VaR Model are displayed. Details displayed are Risk Measure Estimation Method, Confidence Level, Reporting Currency and Horizon (in days).

Top 10 Contributors to Portfolio VaR (by Instrument)

Dashboard Page Name	Component VaR - Analytic Method
Report Name	Top 10 Contributors to Portfolio VaR (by Instrument)
Dashboard Name	Market Risk
Page Level Filters	Date, Portfolio, Market Risk VaR Model
Report Level Filters	0
Report Description	This is a graphical report of the 10 Instruments which have the highest Component VaR.

5.5 *Marginal & Incremental VaR Subject Area*

The following reports are displayed as part of the Marginal & Incremental VaR subject area:

- Incremental VaR
- Marginal VaR by Vertex
- Risk Estimation Method
- Top 10 Marginal VaR Contributors (by Vertex)

Incremental VaR

Dashboard Page Name	Marginal & Incremental VaR
Report Name	Incremental VaR
Dashboard Name	Market Risk
Page Level Filters	Date, Portfolio, Market Risk VaR Model
Report Level Filters	0
Report Description	This is a tabular report displaying information related to incremental VaR. Following are the information that are displayed in tabular format: • Incremental Portfolio VaR • Portfolio VaR limit • Limit utilization as incremental VaR percentage • Baseline portfolio VaR • Percentage Increase in portfolio VaR • Limit utilization as baseline portfolio percentage

Marginal VaR by Vertex

Dashboard Page Name	Marginal & Incremental VaR
Report Name	Marginal VaR by Vertex
Dashboard Name	Market Risk
Page Level Filters	Date, Portfolio, Market Risk VaR Model
Report Level Filters	0
Report Description	This is tabular report displaying marginal VaR by Asset - Asset Class and Maturity. Additionally it also displays the ranking among the given rows. Following is the information that is displayed: • Asset • Asset Class Maturity • Marginal VaR • Rank

Risk Estimation Method

Dashboard Page Name	Marginal & Incremental VaR
Report Name	Risk Estimation Method
Dashboard Name	Market Risk
Page Level Filters	Date, Portfolio, Market Risk VaR Model
Report Level Filters	0
Report Description	On selection of page level filters parameters of selected Market Risk VaR Model are displayed. Details displayed are Risk Measure Estimation Method, Confidence Level, Reporting Currency and Horizon (in days).

Top 10 Marginal VaR Contributors (by Vertex)

Dashboard Page Name	Marginal & Incremental VaR
Report Name	Top 10 Marginal VaR Contributors (by Vertex)
Dashboard Name	Market Risk
Page Level Filters	Date, Portfolio, Market Risk VaR Model
Report Level Filters	0
Report Description	This is Graphical representation of top ten Marginal VaR. Top ten ranking of marginal VaR is done at Asset, Asset Class and Maturity granularity. X-axis displays Marginal VaR value and Y-axis displays Asset, Asset Class and Maturity.

5.6 Greeks

The following report is displayed as part of the Greeks subject area:

- Greeks of Option Instruments

Greeks of Option Instruments

Dashboard Page Name	Greeks
Report Name	Greeks of Option Instruments
Dashboard Name	Market Risk
Page Level Filters	Date, Portfolio, Volatility Model
Report Level Filters	0
Report Description	Report displays the greek values for option instrument in tabular format. Following measures are displayed for each Option Instrument: i. Delta ii. Gamma iii. Vega iv. Theta v. Rho

5.7 Stress & Back Testing

The following reports are displayed as part of the Stress & Back Testing subject area:

- Back Test Report
- Baseline Portfolio VaR
- P&L Comparison Report
- Loss across Stress Scenarios
- P&L Distribution under Stress Scenarios

- Risk Estimation Static
- Stress Testing Report

Back Test Report

Dashboard Page Name	Stress & Back Testing
Report Name	Back Test Report
Dashboard Name	Market Risk
Page Level Filters	Date, Portfolio, Market Risk VaR Model
Report Level Filters	0
Report Description	Back Test report is tabular report and displays the following back test measures: i. Number of Back Testing Days ii. Number of Exceptions iii. P-value iv. Critical value at 1% Significance Level v. Critical Value at 5% Significance Level vi. Loss Exception Deviation vii. Average Loss Duration (in days) viii. Loss Duration Deviation (in days)

Baseline Portfolio VaR

Dashboard Page Name	Stress & Back Testing
Report Name	Baseline Portfolio VaR
Dashboard Name	Market Risk
Page Level Filters	Date, Portfolio, Market Risk VaR Model
Report Level Filters	0
Report Description	The baseline VaR of the selected portfolio under the Market Risk VaR Model selected is displayed.

P&L Comparison Report

Dashboard Page Name	Stress & Back Testing
Report Name	P&L Comparison Report
Dashboard Name	Market Risk
Page Level Filters	Date, Portfolio, Market Risk VaR Model
Report Level Filters	0

Report Description	Hypothetical P&L Report is a 2-axis report which displays the hypothetical P&L and the VaR estimate under the selected Market Risk VaR Model across a trailing period of 30 business days. This graph has the date on the horizontal axis and the VaR and Hypothetical P&L on the vertical axis.

Loss across Stress Scenarios

Dashboard Page Name	Stress & Back Testing
Report Name	Loss across Stress Scenarios
Dashboard Name	Market Risk
Page Level Filters	Date, Portfolio, Market Risk VaR Model
Report Level Filters	0
Report Description	This is a 2-axis bar chart displaying the stressed loss under all the stress scenarios mapped to the selected Portfolio – Market Risk VaR Model combination. The graph has the stressed loss on the horizontal axis and the stress scenarios on the vertical axis.

P&L Distribution under Stress Scenarios

Dashboard Page Name	Stress & Back Testing
Report Name	P&L Distribution under Stress Scenarios
Dashboard Name	Market Risk
Page Level Filters	Date, Portfolio, Market Risk VaR Model
Report Level Filters	0
Report Description	Stressed P&L Distribution is a graphical display of the P&L Distribution under the selected stress scenario. The graph has the Stressed P&L values on the horizontal axis and the frequency of the P&L values on the vertical axis. The Stressed P&L values are bucketed into equal-width buckets in order to estimate the frequency. The graph is a stacked column graph where the data falling within the 10% mark, 20% mark, 30% mark and 30%-70% is displayed in a different color.

Risk Estimation Static

Dashboard Page Name	Stress & Back Testing
Report Name	Risk Estimation Static
Dashboard Name	Market Risk
Page Level Filters	Date, Portfolio, Market Risk VaR Model
Report Level Filters	0

Report Description	On selection of page level filters parameters of selected Market Risk VaR Model are displayed. Details displayed are Risk Measure Estimation Method, Confidence Level, Reporting Currency and Horizon (in days).

Stress Testing Report

Dashboard Page Name	Stress & Back Testing
Report Name	Stress Testing Report
Dashboard Name	Market Risk
Page Level Filters	Date, Portfolio, Market Risk VaR Model
Report Level Filters	0
Report Description	Stress Testing Report is tabular report which displays the stressed loss under each scenario mapped to the selected Portfolio.

5.8 Comparison Across Portfolios

The following reports are displayed as part of the Comparison Across Portfolios subject area:

- Back Test Report
- Risk Estimation Method
- Risk Measure Report
- Stress Testing Report

Back Test Report

Dashboard Page Name	Comparison Across Portfolios
Report Name	Back Test Report
Dashboard Name	Market Risk
Page Level Filters	Date, Market Risk VaR Model
Report Level Filters	0
Report Description	Back Test Report is tabular report which displays the back testing outputs for portfolio associated with Market Risk VaR Model. Number of Back Testing Days, the back test parameter of the selected Market Risk VaR Model, is displayed. In addition, the following back test measures are displayed for all the portfolios mapped to the selected Market Risk VaR Model: i. Number of Exceptions ii. P-value iii. Critical value at 1% Significance Level iv. Critical Value at 5% Significance Level v. Loss Exception Deviation vi. Average Loss Duration (in days) vii. vii. Loss Duration Deviation (in days)

Risk Estimation Method

Dashboard Page Name	Comparison Across Portfolios
Report Name	Risk Estimation Method
Dashboard Name	Market Risk
Page Level Filters	Date, Market Risk VaR Model
Report Level Filters	0
Report Description	On selection of page level filters parameters of selected Market Risk VaR Model are displayed. Details displayed are Risk Measure Estimation Method, Confidence Level, Reporting Currency and Horizon (in days).

Risk Measure Report

Dashboard Page Name	Comparison Across Portfolios
Report Name	Risk Measure Report
Dashboard Name	Market Risk
Page Level Filters	Date, Market Risk VaR Model
Report Level Filters	0
Report Description	Risk Measure Report is tabular report which displays the VaR Model outputs for portfolio. Risk Measure Report displays the following risk measures, for all the portfolios which are mapped to the selected Market Risk VaR Model, in a tabular format: i. Value-at-Risk ii. Conditional Value-at-Risk iii. Current Portfolio Value iv. Simulated Portfolio Value v. VaR % of Current Portfolio Value vi. vi. Portfolio VaR Limit

Stress Testing Report

Dashboard Page Name	Comparison Across Portfolios
Report Name	Stress Testing Report
Dashboard Name	Market Risk
Page Level Filters	Date, Market Risk VaR Model
Report Level Filters	Stress Scenario
Report Description	Stress Testing Report displays stressed loss of all portfolios, mapped to the selected Market Risk VaR Model, in a tabular format. A list of all the stress scenarios defined are available for selection.

5.9 Comparison Across VaR Models

The following reports are displayed as part of the Comparison Across VaR Models subject area:

- Back Test Report
- Risk Measure Report
- Stress Testing Report

Back Test Report

Dashboard Page Name	Comparison Across VaR Models
Report Name	Back Test Report
Dashboard Name	Market Risk
Page Level Filters	Date, Portfolio
Report Level Filters	0
Report Description	Back Test Report is tabular report which displays the back testing outputs for portfolio associated with Market Risk VaR Model. Number of Back Testing Days, the back test parameter of the selected Market Risk VaR Model, is displayed. In addition, the following back test measures are displayed for all the portfolios mapped to the selected Market Risk VaR Model: i. Number of Exceptions ii. P-value iii. Critical value at 1% Significance Level iv. Critical Value at 5% Significance Level v. Loss Exception Deviation vi. Average Loss Duration (in days) vii. Loss Duration Deviation (in days)

Risk Measure Report

Dashboard Page Name	Comparison Across VaR Models
Report Name	Risk Measure Report
Dashboard Name	Market Risk
Page Level Filters	Date, Portfolio
Report Level Filters	0
Report Description	Risk Measure Report is tabular report which displays the VaR Model outputs for portfolio. Risk Measure Report displays the following risk measures, for all the portfolios which are mapped to the selected Market Risk VaR Model, in a tabular format: i. Value-at-Risk ii. Conditional Value-at-Risk iii. Current Portfolio Value iv. Simulated Portfolio Value

	v. VaR % of Current Portfolio Value vi. Portfolio VaR Limit

Stress Testing Report

Dashboard Page Name	Comparison Across VaR Models
Report Name	Stress Testing Report
Dashboard Name	Market Risk
Page Level Filters	Date, Portfolio
Report Level Filters	Stress Scenario
Report Description	Stress Testing Report displays stressed loss of all portfolios, mapped to the selected Market Risk VaR Model, in a tabular format. A list of all the stress scenarios defined is available for selection.

5.10 Market Analysis

The following reports are displayed as part of the Market Analysis subject area:

- Commodity Prices
- Exchange Rates
- Stock Index Values
- Interest Rates

Commodity Prices

Dashboard Page Name	Market Analysis
Report Name	Commodity Prices
Dashboard Name	Market Risk
Page Level Filters	Date
Report Level Filters	Commodity
Report Description	On selection of a particular commodity, its spot price is displayed for a trailing period of 90 business days. The chart has the date on the horizontal axis and the commodity prices on the vertical axis.

Exchange Rates

Dashboard Page Name	Market Analysis
Report Name	Exchange Rates
Dashboard Name	Market Risk
Page Level Filters	Date

Report Level Filters	Currency
Report Description	On selection of a particular currency, the following exchange rates are displayed for a trailing period of 90 business days: i. GBP – Selected Currency ii. USD – Selected Currency iii. EUR - Selected Currency iv. JPY - Selected Currency The chart has the date on the horizontal axis and the exchange rates on the vertical axis.

Stock Index Values

Dashboard Page Name	Market Analysis
Report Name	Stock Index Values
Dashboard Name	Market Risk
Page Level Filters	Date
Report Level Filters	Stock
Report Description	This section has 2 reports: i. Index Value across Time On selection of a particular stock index, its value across a trailing period of 90 business days is displayed. The chart has the date on the horizontal axis and the index values on the vertical axis. List of all available stock indices is displayed for selection. ii. Values of Major Stock Indices The values of certain key indices are displayed in a tabular format with the following column headers: a. Stock Index b. Index Value The closing value of the stock index is displayed for the selected date. c. Change Change in the value of the index over the previous day's value is displayed. d. % Change The % change in the value of the index over the day's value is displayed.

Interest Rates

Dashboard Page Name	Market Analysis
Report Name	Interest Rates
Dashboard Name	Market Risk
Page Level Filters	Date
Report Level Filters	Currency

Report Description	This section has 2 charts which displays the interest rates for a given currency. i. Zero Coupon Yield Curve This is a 2-axis chart which displays the Zero Coupon Yield Curve of the Sovereign, Money Market and AAA Interest Rate Asset Classes. It has the maturity on the horizontal axis and the zero coupon rates on the vertical axis. ii. Interest Rate across Time On selection of a particular maturity, the zero coupon rates of the Sovereign, Money Market and AAA Interest Rate Asset Classes for the selected maturity is displayed for a trailing period of 90 business days. It has the date on the horizontal axis and the zero coupon rates for the selected maturity on the vertical axis. A list of all available maturities is displayed for selection.

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