Nasdaq Calypso

Bilateral Margin User Guide
ISDA SIMM and Schedule

Version 18

Revision 6.0

April 2025

Approved

Document History

Revision	Published	Summary of Changes
1.0	February 2024	First revision for version 18.
2.0	June 2024	Updates for version 18 monthly release – Added support for CDS Index Option and Risk_CreditVol
3.0	October 2024	Updates for version 18 monthly release – Added ISDA SIMM library version 2.7
4.0	November 2024	Updates for version 18 monthly release – Added domain "MarginInput.ScheduleDuration", ARCHIVE_MARGIN scheduled task.
5.0	March 2025	Updates for version 18 monthly release - Added new attribute "Threshold Groups" for MARGIN_CALCULATOR scheduled task and updated user interface screenshots.
6.0	April 2025	Updates for version 18 monthly release - Added new attribute "Trade IM" for MARGIN_CALCULATOR scheduled task.

This document describes how to install, configure, and run Bilateral Margin for non-cleared trades, to meet UMR compliance

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1. Bilateral Margin Overview

Global markets continue to rapidly evolve in response to advances in technology, product development, and the increased demands of market regulation. It is critical in today's environment that financial institutions, asset managers, and traders can efficiently analyze their regulatory exposure, both cross- asset and multi-currency, to ascertain their regulatory requirements in the capital markets. These sophisticated requirements, especially in regard to the Basel Committee on Banking Supervision (BCBS) and the International Organization of Securities Commissions (IOSCO) Uncleared Margin Rules (UMR), demand a robust and scalable software solution for firms to assess their investments and portfolios accurately in real-time.

ISDA has created a working group with firms and is developing to implement industry solutions to aid compliance, including standard initial margin (IM) documentation, and the ISDA Standard Initial Margin Model (ISDA SIMM). With this recommended best practice implementation of margin for uncleared trades and consistency across jurisdictions, most firms will implement the ISDA SIMM certified solution for their portfolios which include non-cleared bilateral trades. The Calypso Bilateral Margin solution provides for the Calypso client this capability with a robust, end to front, framework which is certified and licensed by the ISDA.

To address these requirements, the process for UMR (Uncleared Margin Rules) compliance has been developed. It is an end-to-end integrated solution which provides our clients the capability to achieve BCBS and IOSCO UMR compliance with an ISDA licensed proven solution. Additionally, UMR solution is integrated with the Collateral Management platform enabling clients to minimize collateral costs across their portfolio. The UMR solution incorporates simple user-friendly interfaces for efficiently displaying the data required for UMR compliance and Collateral Management. The architecture of the UMR solution and Collateral Manager leverages the valuation methodology incorporated in the Front Office and Official P&L solutions for full cross-application consistency regarding performance and risk management.

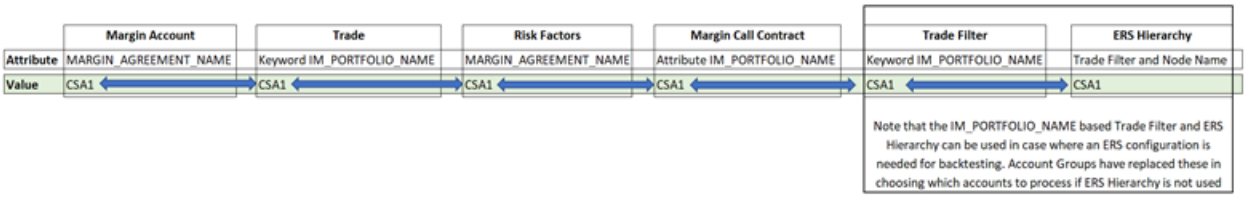
The end-to-end process for UMR (Uncleared Margin Rules) compliance from a margin perspective can be summarized as follows:

The process for using the margin module is as follows:

Each part of the process can be done in the following areas of Calypso:

Steps	Calypso features	In WebUI
Onboard accounts and regulators	MARGIN INPUT ST (Import Mode)	Account page Regulator page
Calculate Risk Factors	MARGIN INPUT ST (Calculate Mode)	
Import Risk Factors	MARGIN INPUT ST (Import Mode)	Risk factor page
Calculate the Margin Amounts	MARGIN_CALCULATOR Scheduled Task	
Generate Margin output and CRIF file	MARGIN INPUT ST (Export Mode)	Exposures page
Run What-if	Pricing Sheet	What-if Page
Monitor activity and results		Dashboard
Investigate imported RF		Risk Factor page
Margin Decomposition		Exposure page

Whether calculating risk factors from trades in Calypso or importing the risk factors, the setup must match across all items within a margin account. The diagram below shows which attributes are needed to match to link everything together to calculate IM.



1.1 Supported Products

- Swap
- Swaption
- Cap/Floor
- Cancellable Swap
- Inflation Swap
- FXNDF

- CDS
- CDSIndex
- CDSIndexOption
- FX Option *
- Structured Product *
- Equity Derivatives *
- Commodity Derivatives *

* Products are supported if they can be priced and are supported in the sensitivity analysis.

1.2 Supported Risk Types

CALCULATE MODE

- Risk_IRCurve
- Risk_IRVol
- Risk_XccyBasis
- Risk_Inflation
- Risk_InflationVol
- Risk_FX
- Risk_FXVol
- Risk_CreditQ
- Risk_CreditVol
- Risk_Equity
- Risk_EquityVol
- Risk_Commodity
- Risk_CommodityVol
- Notional *
- PV *

IMPORT RISK FACTORS MODE

- Risk_IRCurve
- Risk_XccyBasis

- Risk_Inflation
- Risk_IRVol
- Risk_InflationVol
- Risk_FX
- Risk_FXVol
- Risk_CreditQ
- Risk_CreditVol
- Risk_BaseCorr
- Risk_CreditNonQ
- Risk_CreditVolNonQ
- Risk_Equity
- Risk_EquityVol
- Risk_Commodity
- Risk_CommodityVol
- Notional *
- PV *

EXPORT MODE

- Risk_IRCurve
- Risk_XccyBasis
- Risk_Inflation
- Risk_IRVol
- Risk_InflationVol
- Risk_FX
- Risk_FXVol
- Risk_CreditQ
- Risk_CreditVol
- Risk_BaseCorr
- Risk_CreditNonQ
- Risk_CreditVolNonQ
- Risk_Equity
- Risk_EquityVol

- Risk_Commodity
- Risk_CommodityVol
- Notional *
- PV *

* Risk types are used in Schedule methodology

2. Bilateral Margin Setup

2.1 Access Permissions

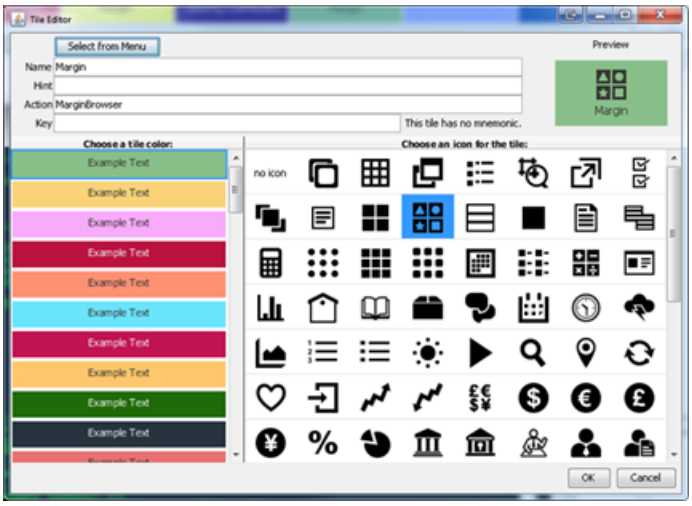
To use the functions of the UMR solution, users must have the following permissions added to one of their groups:

- MARGIN_USERRole – Permission to log in and view information
- MARGIN_ADMINRole – Permission to save information
- MARGIN_READERRole – Permission to retrieve information
- CORE_SERVICE_MANAGERRole – Permission to access FX Rates
- CORE_SERVICE_USERRole – Permission to access FX Rates
- MARGIN_WEBUIRole – Grants access to the UMR Margin Web UI. Should be used paired with previous roles.

The detailed permissions for each role are the following:

		Margin User		Margin Admin		Margin Reader	
Navigation Page	**Function**	**Read**	**Write**	**Read**	**Write**	**Read**	**Write**
Admin	Calculation Sets	x		x	x	x	
	Account Group	x		x	x	x	
	Exposure monitoring	x		x	x	x	
	Product Class Mapping	x		x	x	x	
	Risk Factor Sources	x		x	x	x	
	Threshold Monitoring	x		x	x	x	
Risk Inputs	Upload Risk Factors	x	x	x	x	x	
Reference Data	Margin Account	x		x	x	x	
	Group Thresholds	x		x	x	x	
	Regulators	x		x	x	x	
Initial Margin	Exposures	x		x	x	x	
	Threshold Monitoring	x		x	x	x	
	Simulation UI	x	x	x	x	x	x
	What-IF	x	x	x	x	x	x
Dashboard	Dashboard	x	x	x	x	x	

The Web UI browser can be opened from the Calypso menus once the following menu action is added to a specific button: `MarginBrowser`.

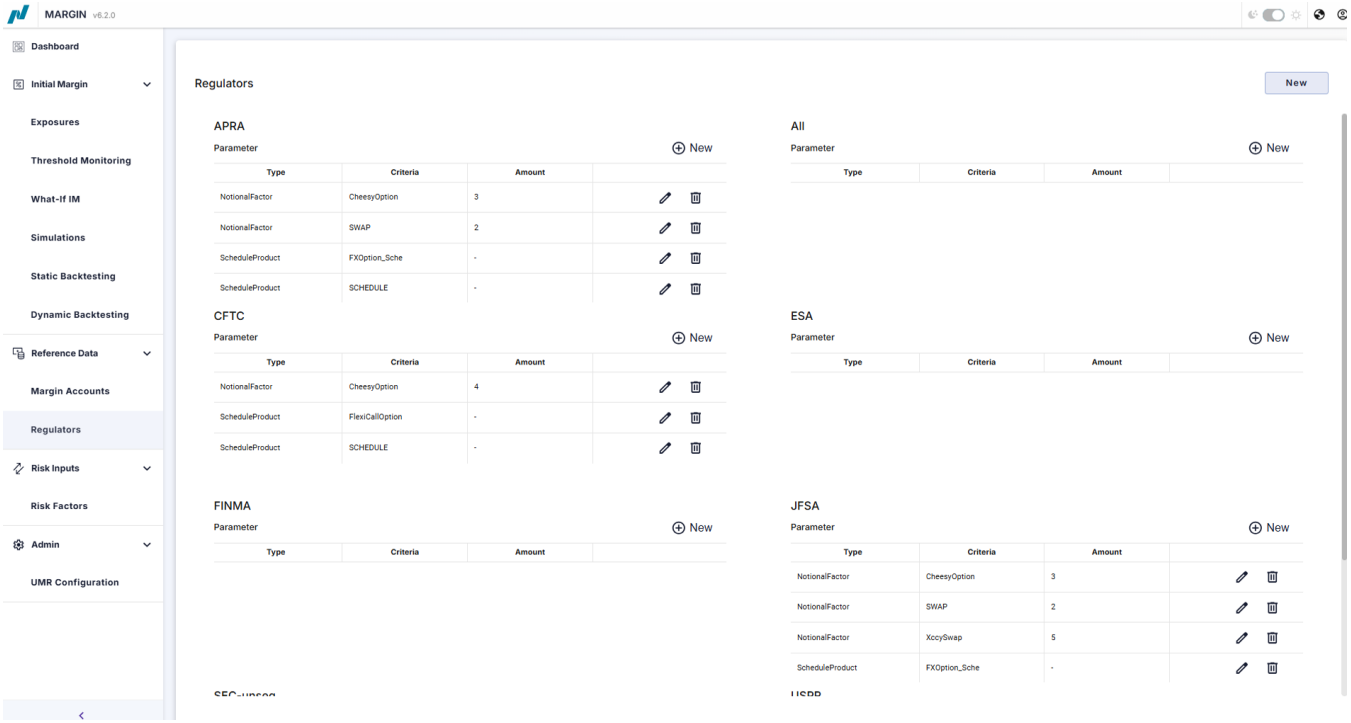


2.2 Regulator Setup

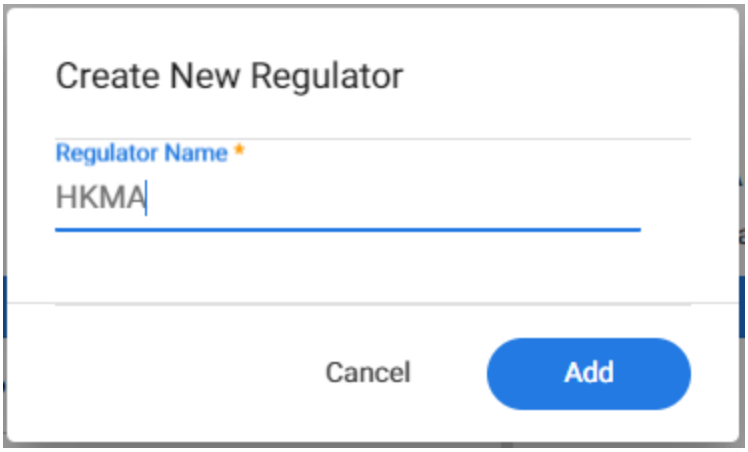
Regulatory parameters are stored in the Regulators page. They will be applied by default for any compliant accounts. Account specific regulatory parameters can be additionally defined at account level. If a parameter exists in the “Regulators” section but not on the account, the account will inherit the values defined at the regulator level. Regulators can be defined through UI or uploading account file.

Define Regulator via UI

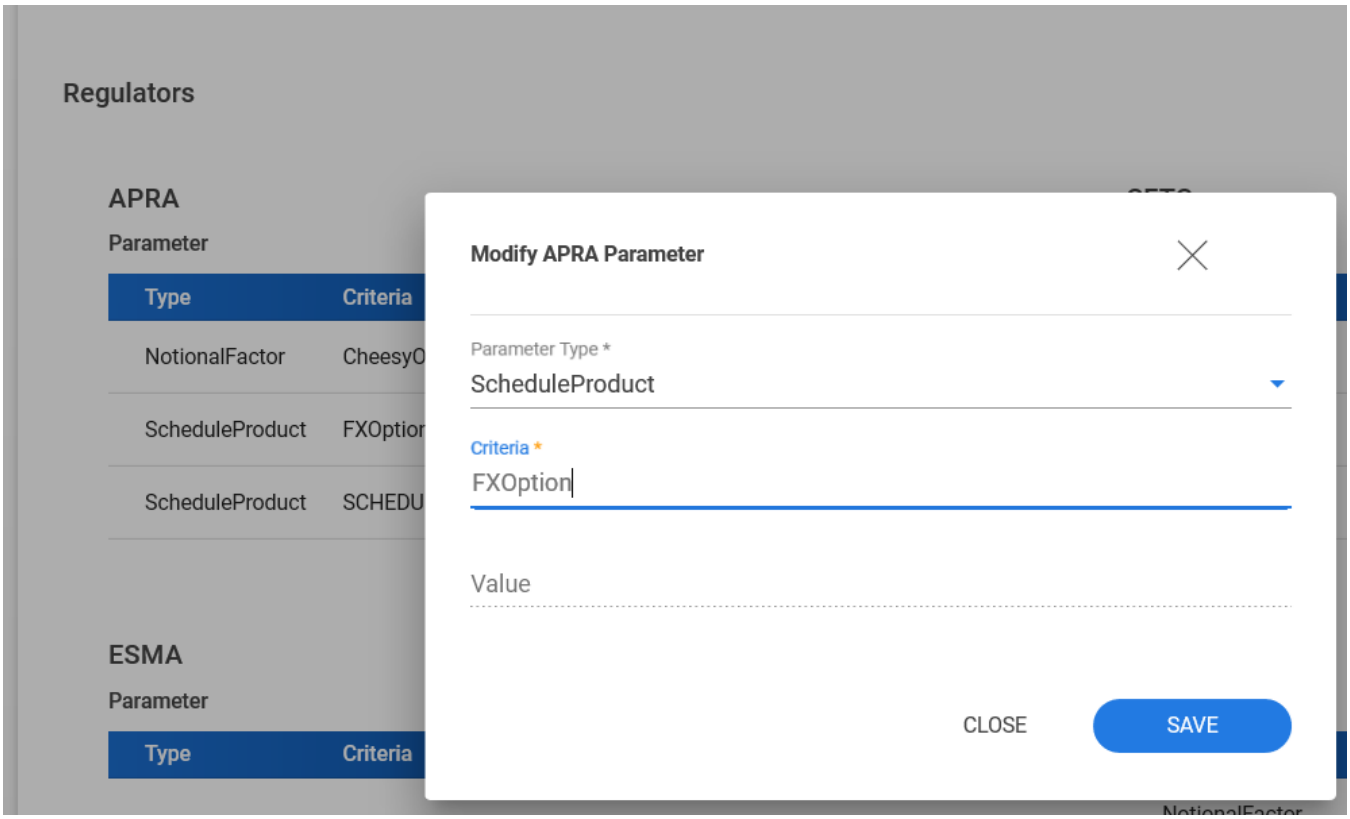
In Regulators page, user can create a new regulator by clicking the New icon on the top, and add and edit parameters under each regulator.



Adding new regulator:



Editing Regulator Information:



Upload Regulator from Account File

Regulator definition with generic parameters or account specific parameters can also be defined in account csv file with other account information. User can run MARGIN_INPUT scheduled task to import this file or upload the file in Margin Accounts UI page.

In account file, the column COLLECT_REGULATIONS includes the regulators for receive direction and POST_REGULATORS for pay. List of regulators of receive and pay can be different.

To define regulators for each margin account, regulators are required for RISK_TYPE Param_Regulation. When margin account is symmetric, same margin currency for pay and receive, regulators are required in the same row. When margin account is asymmetric, different margin currencies for pay and receive, regulators are defined in two rows per direction.

To define global regulator parameters, MARGIN_AGREEMENT_NAME column is blank and all accounts which are applicable to the regulators will apply these global parameters automatically. Global parameters are displayed in Regulators page as well as in margin account details, and it can be edited in Regulators page or by uploading modified account file.

To define account specific regulator parameters, MARGIN_AGREEMENT_NAME must be defined and it only applicable to this account. Account specific parameters are displayed in margin account details, and user can edit it directly without impacting global ones.

See below an example of uploading account file with regulators and parameters.

TRADE_ID	UTI	MARGIN_A	THRESHOLD_GROU	ACCOUNT_	IM_MODE	RISK_TYPE	QUALIFIER	BUCKET	LABEL1	LABEL2	AMOUNT	CURRENCY	AMOUNT_SOURCE	PRODUCT_	END_DATE	COLLECT_REGULATIONS	POST_REGULATIO	WARNING_LEVEL
		CSA1	ThresholdGroup1	MarginGroup1		Param_Regulation	CSA In Place				5.00E+07	USD				APRA,CFTC,JFSA	APRA,CFTC,JFSA	
		CSA2	ThresholdGroup2	MarginGroup1		Param_Regulation	Pre-CSA				5.00E+07	USD				APRA	APRA	
		CSA3	ThresholdGroup1	MarginGroup2		Param_Regulation	CSA In Place				5.00E+07	GBP				APRA	APRA,JFSA	
		CSA4	ThresholdGroup2	MarginGroup2		Param_Regulation	Pre-CSA					GBP				CFTC,APRA	JFSA	
		CSA5		MarginGroup3		Param_Regulation	CSA In Place					USD				CFTC,JFSA	APRA	
		CSA_ASY		MarginGroup3		Param_Regulation	CSA In Place					USD					APRA	
		CSA_ASY		MarginGroup3		Param_Regulation	CSA In Place					EUR				CFTC,JFSA		
						Param_Schedule-Product	FXOption									APRA,JFSA	APRA,JFSA	
						Param_AddOnFixedAmount					1000	USD				APRA	APRA	
						Param_LocalRegSIMM	CDSWP									ESA,JFSA,USPR	ESA,JFSA,USPR	
						Param_AddOnNotionalFactor	Swap				2					APRA	APRA	
						Param_ProductClassMultiplier	RatesFX				1.1					CFTC	CFTC	
		CSA1				Param_Schedule-Product	Swaption									APRA,JFSA	APRA,JFSA	
		CSA1				Param_ProductClassMultiplier	Equity				1.1					CFTC	CFTC	
		CSA3				Param_AddOnNotionalFactor	Swap				3					CFTC	CFTC	
		CSA3				Param_AddOnFixedAmount					1000	GBP				JFSA	JFSA	
		CSA3				Param_Schedule-Product	CDSWP									APRA	APRA	

Regulators are defined at account

Global Parameters

Account Specific Parameters

Regulators and their global parameters

APRA

Parameter

New

Type	Criteria	Amount
FixedAmount	USD	1,000
NotionalFactor	Swap	2
ScheduleProduct	FXOption	-

ESA

Parameter

New

Type	Criteria	Amount
LocalRegSIMM	CDSWP	-

CFTC

Parameter

New

Type	Criteria	Amount
Multiplier	RatesFX	1.1

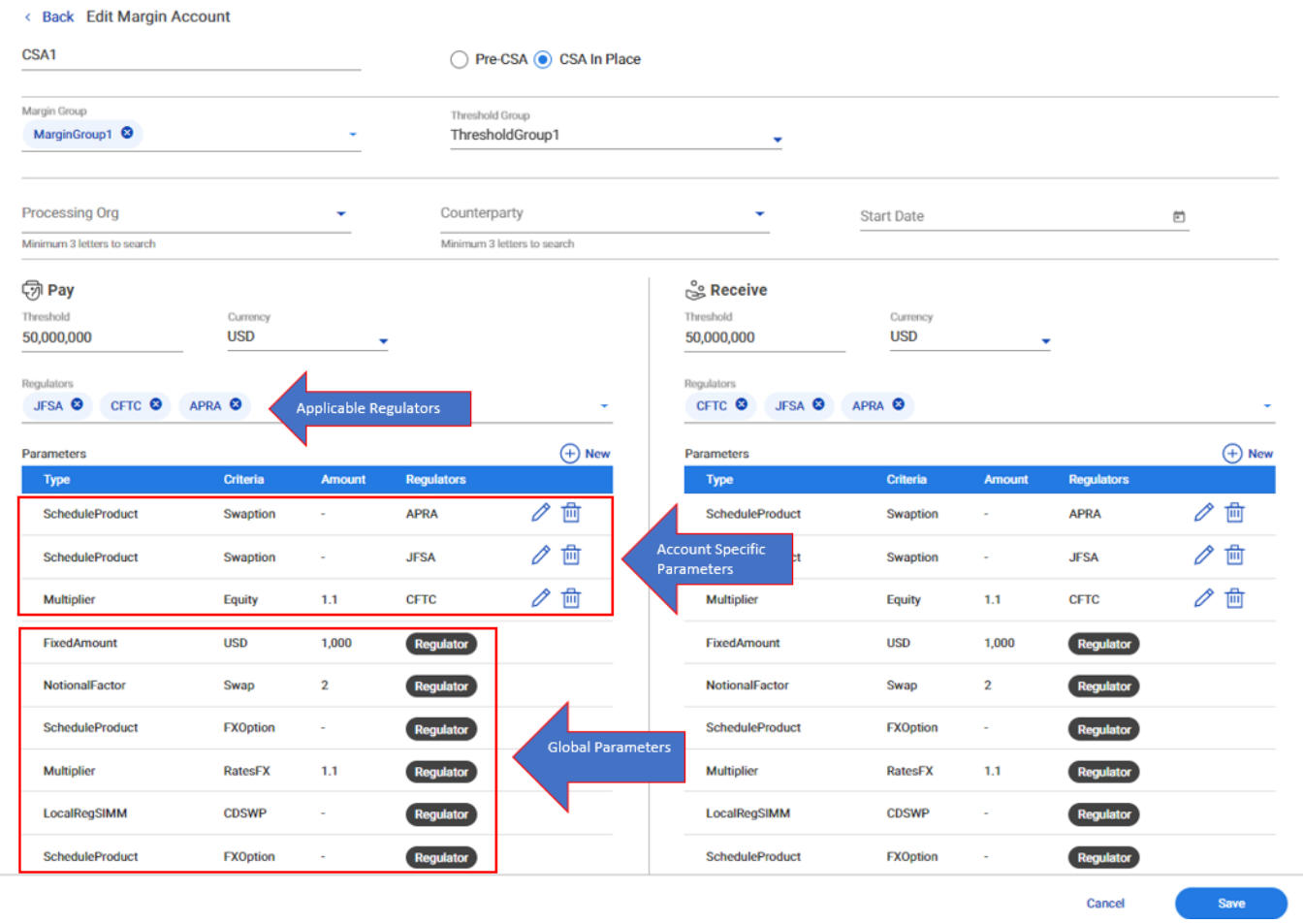
JFSA

Parameter

New

Type	Criteria	Amount
LocalRegSIMM	CDSWP	-
ScheduleProduct	FXOption	-

Margin account details display the same information.



Except for Param_Regulation, all other parameters are optional. Here is the list of supported values.

- Param_AddOnNotionalFactor – percentage add-on for a product name specified in the qualifier column. Use Amount column as percentage add-on. For example, 5 means “5% of notional”. It is used to calculate the IM add-on in ‘Additional IM’ column.

MARGIN_AGR	THRESH	ACCOU	IM_MODE	RISK_TYPE	QUALIFIER	BUCKET	LABEL1	LABEL	AMOUNT	CURRENC	AMOU	SOURC	PROD	END_D	COLLECT_REGULATIONS	POST_REGULATIO
				Param_AddOnNotionalFactor	Swap				2						APRA	APRA
CSA3				Param_AddOnNotionalFactor	Swap				3						CFTC	CFTC

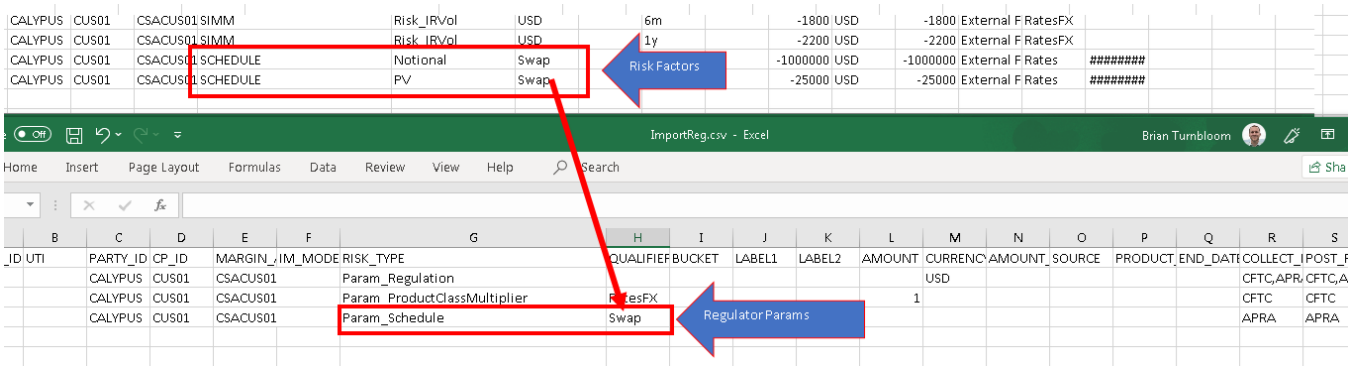
- Param_AddOnFixedAmount - the amount of the fixed add-on in terms of currency units is provided in the amount column. It is used to calculate the IM add-on in ‘Additional IM’ column.

MARGIN_AGR	THRESH	ACCOU	IM_MODE	RISK_TYPE	QUALIFIER	BUCKET	LABEL1	LABEL	AMOUNT	CURRENC	AMOU	SOURC	PROD	END_D	COLLECT_REGULATIONS	POST_REGULATIO
				Param_AddOnFixedAmount					1000	USD					APRA	APRA

- Param_ProductClassMultiplier – scale factor to calculate IM add-on for a certain product class (RatesFX, Credit, Equity, Commodity) specified in the qualifier column. For example, 1.1 means "multiply by 1.1".

MARGIN_AGR	THRESH	ACCOU	IM_MODE	RISK_TYPE	QUALIFIER	BUCKET	LABEL1	LABEL	AMOUNT	CURRENC	AMOU	SOURC	PROD	END_D	COLLECT_REGULATIONS	POST_REGULATIO
				Param_ProductClassMultiplier	RatesFX				1.1						CFTC	CFTC

- **Param_Schedule-Product** - defines the product types for which Schedule margin is required. This product type name must match the Qualifier from the Schedule input of risk factors. Note that by default, SIMM methodology will be applied.



CALYPUS	CUS01	CSACUS01	SIMM		Risk_IRVol	USD		6m		-1800	USD	-1800	External F	RatesFX						
CALYPUS	CUS01	CSACUS01	SIMM		Risk_IRVol	USD		1y		-2200	USD	-2200	External F	RatesFX						
CALYPUS	CUS01	CSACUS01	SCHEDULE		Notional	Swap				-1000000	USD	-1000000	External F	Rates	########					
CALYPUS	CUS01	CSACUS01	SCHEDULE		PV	Swap				-25000	USD	-25000	External F	Rates	########					

	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S
_ID	UTI	PARTY_ID	CP_ID	MARGIN_/	IM_MODE	RISK_TYPE	QUALIFIER	BUCKET	LABEL1	LABEL2	AMOUNT	CURRENC	AMOUNT_	SOURCE	PRODUCT_	END_DATE	COLLECT_I	POST_F
		CALYPUS	CUS01	CSACUS01		Param_Regulation						USD					CFTC,APR/	CFTC,A
		CALYPUS	CUS01	CSACUS01		Param_ProductClassMultiplier	RatesFX				1						CFTC	CFTC
		CALYPUS	CUS01	CSACUS01		Param_Schedule	Swap										APRA	APRA

- **Param_LocalRegSIMM** – defines the product types to be included in SIMM calculation for a specific regulator. When importing regulators, the product type can be specified in the 'Qualifier' column for a certain account where the risk type is Param_LocalRegSIMM and the regulators that we want to include in the IM calculation are mentioned in the regulator columns.

Once the regulators are imported, when we import/calculate trade sensitivities, the trades for the above-mentioned products where risk type is Param_LocalRegSIMM will only be included in the regulators specified for that product type. All other trades will be included for all regulators. When Param_LocalRegSIMM is updated for a certain product to a different regulator, the existing regulator records will be terminated and new record for the new regulator will be created.

The Margin Input file is expected to include Schedule Margin data and the product type as Qualifier as before.

Examples of *LocalRegSIMM* parameter:

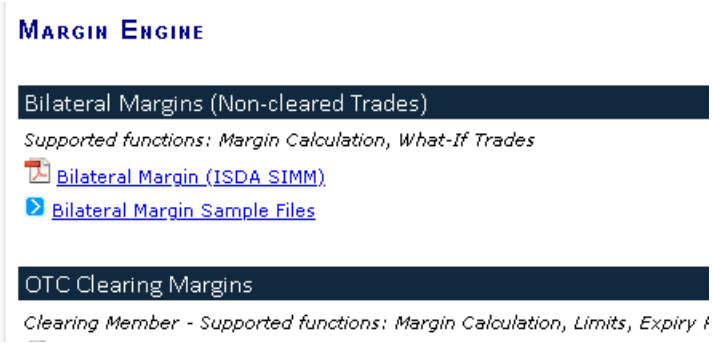
Below example shows under different global and account level parameter setup, same product type can be included in SIMM calculation for all regulators, SCHEDULE calculation for all regulators, SIMM and SCHEDULE for different regulators, and excluded from neither SIMM or SCHEDULE for all or certain regulators.

MARGIN_AG	ACCOUNT_(	RISK_TYPE	QUALIFIER	AMOUNT	CURRENCY	COLLECT_REGULATIONS	POST_REGULATIONS
		Param_LocalRegSIMM	FXO_ASIAN			APRA,CFTC,ESA,FINMA,HKMA,JFSA,MAS,OSFI,SANT,SEC,USPR	APRA,CFTC,ESA,FINMA,HKMA,JFSA,MAS,OSFI,SANT,SEC,USPR
CSA1	Group1	Param_Regulation	Pre-CSA		USD	APRA,ESA,JFSA,USPR	APRA,ESA,JFSA,USPR
CSA1		Param_LocalRegSIMM	EQOVA			APRA,FINMA,HKMA,JFSA,KFSC,OSFI,RBI,SANT,SEC	APRA,FINMA,HKMA,JFSA,KFSC,OSFI,RBI,SANT,SEC
CSA2	Group1	Param_Regulation	Pre-CSA		EUR	CFTC,ESA	CFTC,ESA
CSA2		Param_LocalRegSIMM	EQOVA			HKMA,APRA,SEC,OSFI,KFSC,JFSA,SANT,RBI,FINMA	JFSA,OSFI,SEC,HKMA,APRA,SANT,FINMA,RBI,KFSC
CSA3	Group1	Param_Regulation	Pre-CSA		GBP	APRA,ESA,USPR	ESA,USPR
CSA3		Param_Schedule-Product	CDSWP			APRA,ESA,USPR	ESA,USPR
CSA3		Param_Schedule-Product	EQOVA			ESA	ESA

- **SIMM calculation for all regulators** - FXO_ASIAN is defined at global LocalRegSIMM parameter for all regulators. Hence SIMM risk factors of FXO_ASIAN trades are saved for any margin account. Any product types which are not specifically defined in accounts are SIMM by default cross all regulators.
- **SCHEDULE calculation for all regulators** - For account CSA3, CDSWP is defined in Param_Schedule-Product for APRA, ESA and USPR, it's SCHEULE calculation for all defined regulators.
- **SIMM and SCHEDULE calculation for different regulators** - For account CSA3, EQOVA is defined in Param_ Schedule-Product only for ESA, it's SCHEDULE calculation for ESA and SIMM calculation for other regulators.

- **Neither SIMM nor SCHEDULE for all regulators** - For account CSA2, EQOVA is defined at account level LocalRegSIMM. By comparing the regulators list under Param_Regulation and Param_LocalRegSIMM, CFTC and ESA are not defined in Param_LocalRegSIMM. In this case, EQOVA trades are excluded from ALL regulators for CSA2, i.e. no risk factors will be included.
- **Neither SIMM nor SCHEDULE for certain regulators** - For account CSA1, EQOVA is defined at account level LocalRegSIMM. By comparing the regulators list under Param_Regulation and Param_LocalRegSIMM, APRA and JFSA are defined in both lists while ESA and USPR are only defined in Param_Regulation. In this case, EQOVA trade is SIMM under APRA and JFSA, and it's excluded from ESA and USPA.

See the sample import file for importing accounts and regulators on the Documentation Portal.



2.3 Margin Accounts Setup

The Margin accounts can be created and uploaded via the UI, and further edited via the UI, or can be uploaded via the MARGIN_INPUT scheduled task in IMPORT ACCOUNTS mode.

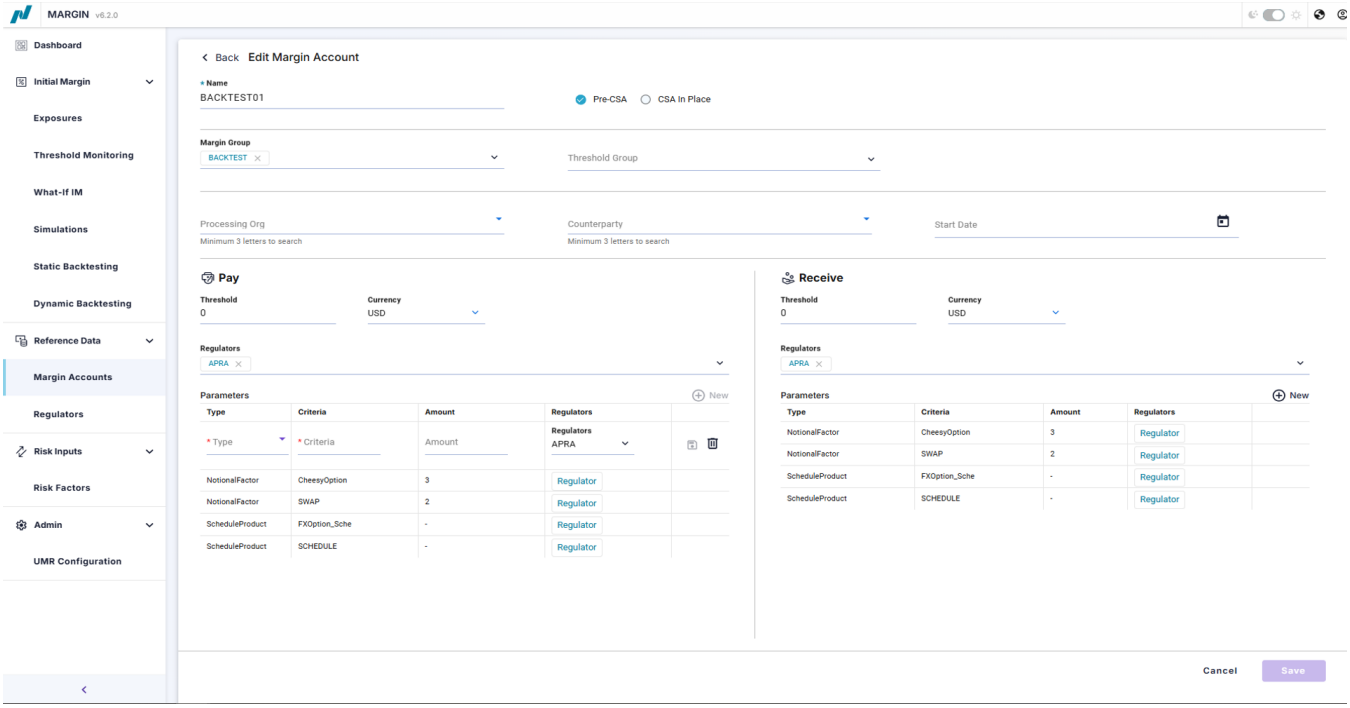
- Before importing of creating user need to have knowledge of :
  - the list of Margin accounts, i.e. the list of all CSA agreements subject to BCBS/IOSCO
  - for each account, review the regulator add-ons, multipliers, and product specific requirements

Each account should be uploaded with the associated regulator parameters.

Upload Accounts via UI

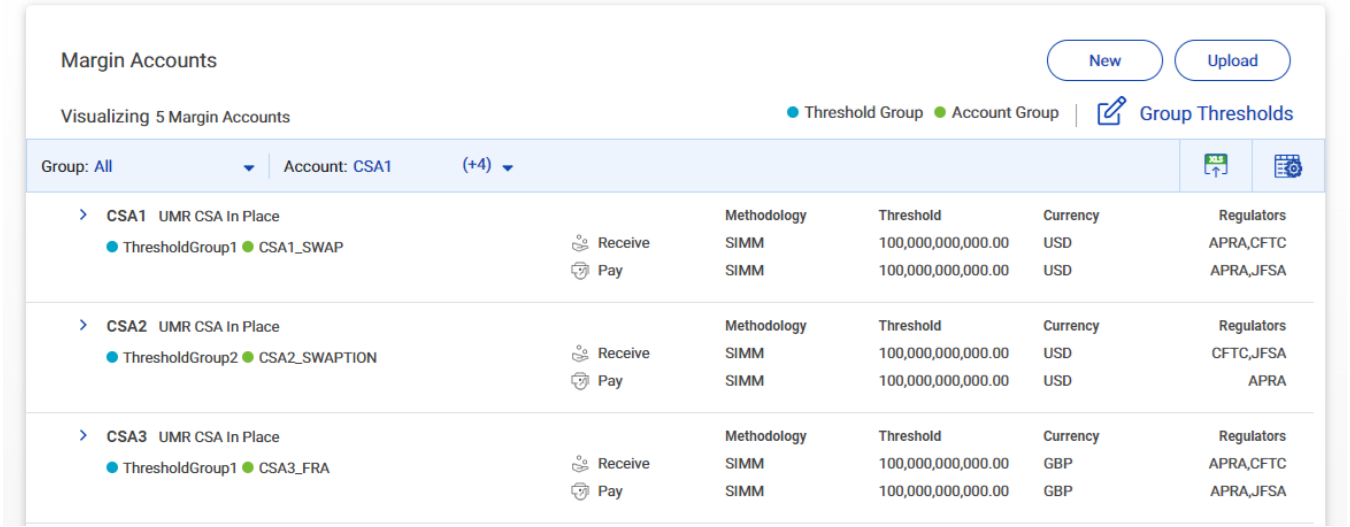
Open the *Onboarding New Account* file in the Bilateral Margin sample files folder and change the account names and parameters.

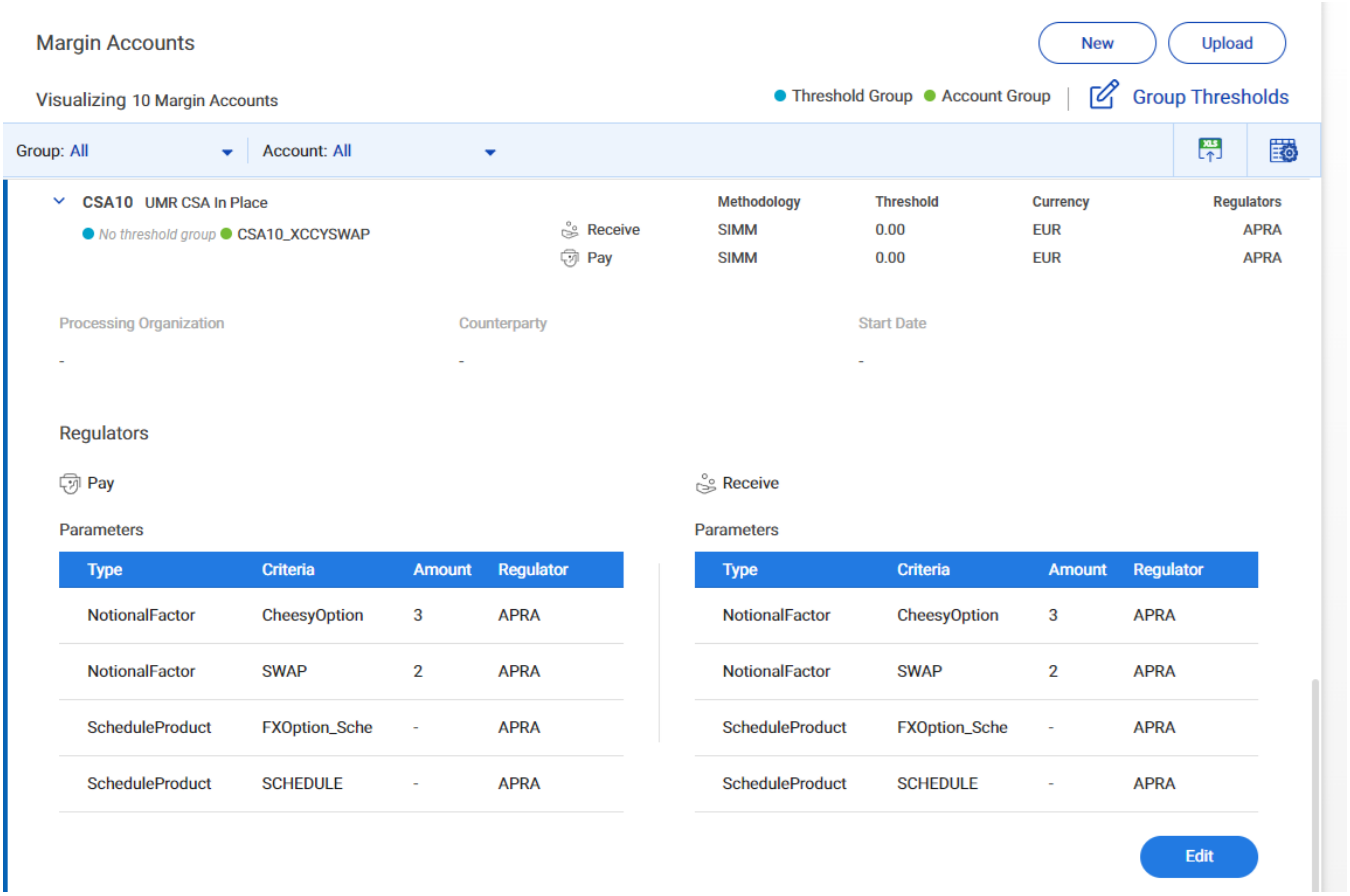
Upload the account file in the Margin Accounts page.



View Account Information

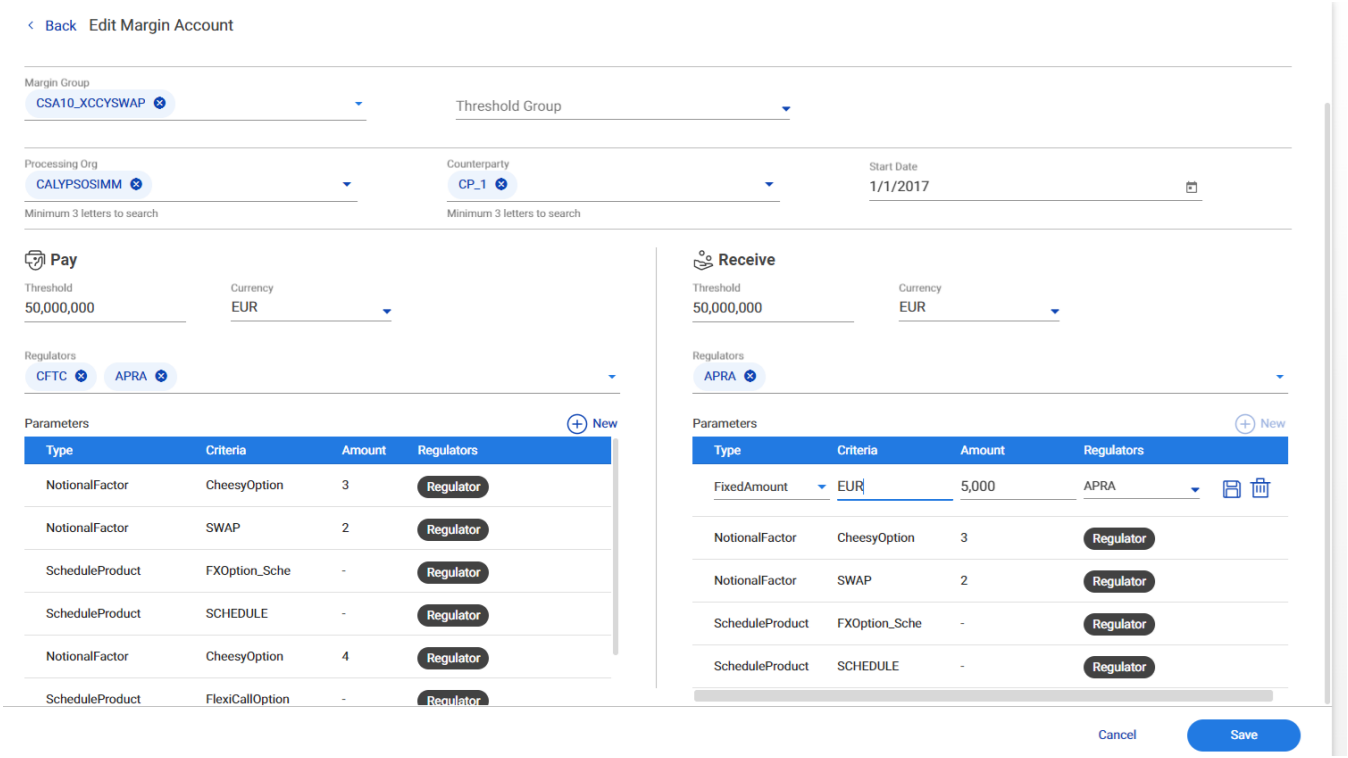
Click on the Account Name to view all the parameters for the selected account. The Account Group and Threshold Group information are also shown. The user can filter the accounts based on account name or account group name.

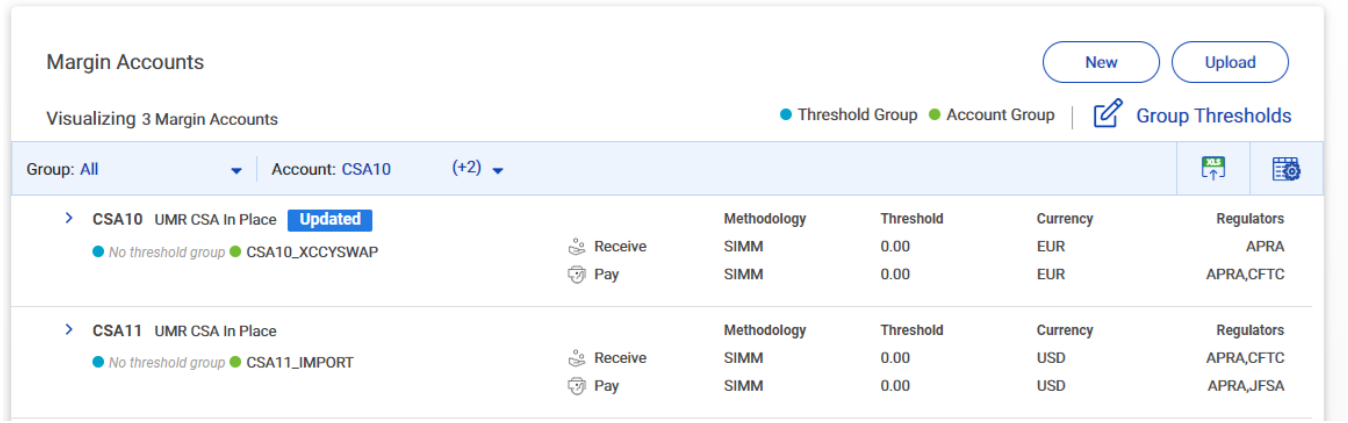




Edit Account Information

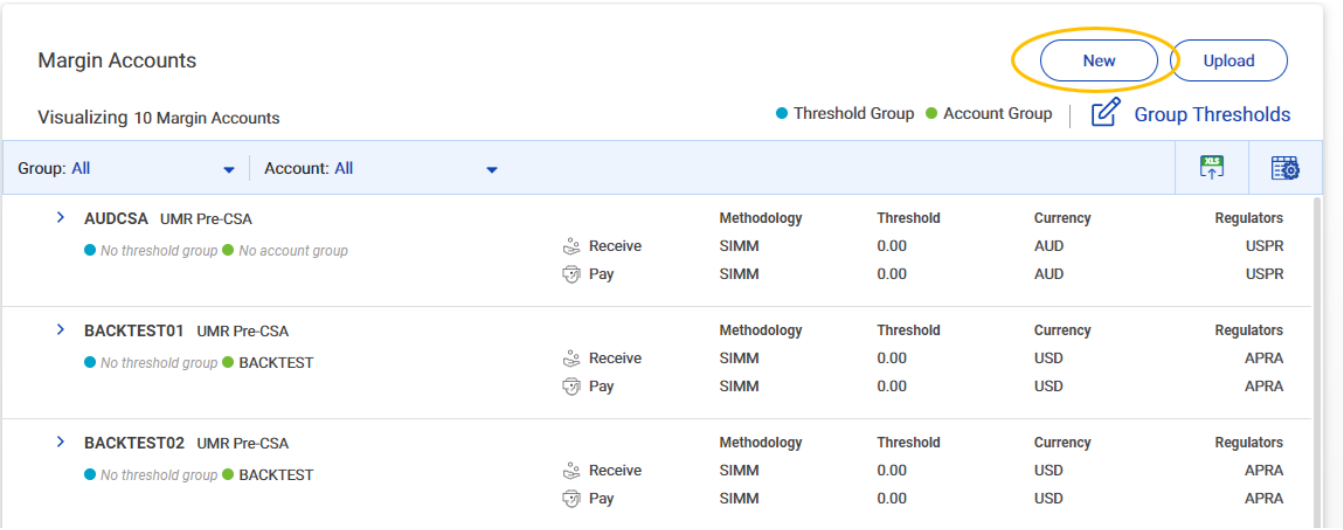
The user also has an option to edit the accounts using the 'Edit' button at the bottom. After editing and resaving, the account appears with an 'Updated' tag.





Create New Account via GUI

New margin accounts can be created from the Margin user interface using the New option shown below:

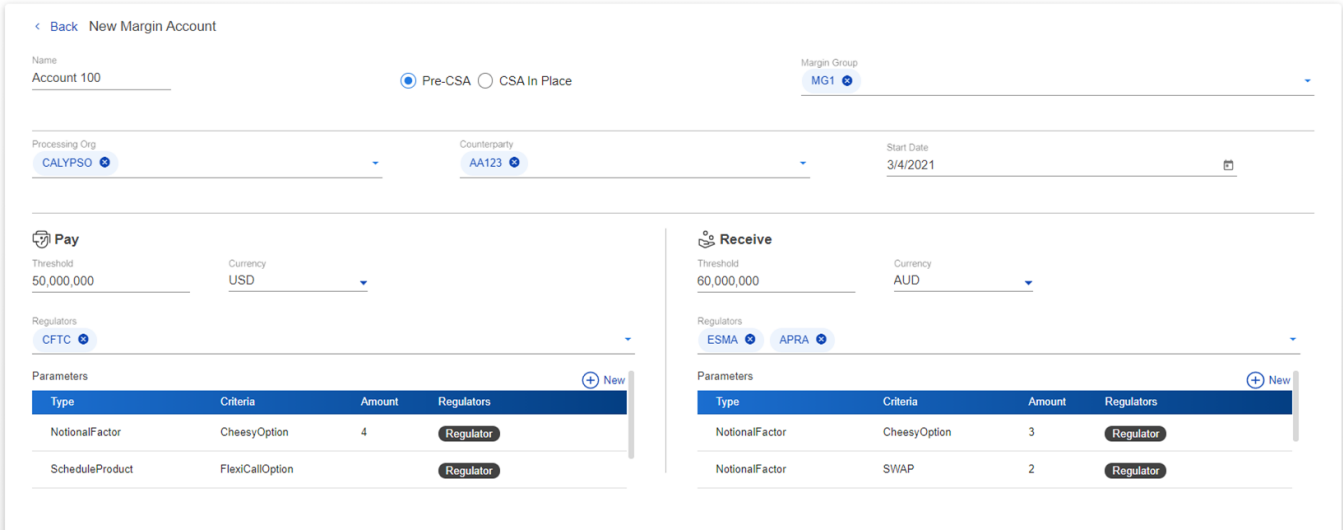


When the user clicks the New button, the screen below appears where the new account information can be entered and saved. The user can select the account name, whether it is Pre-CSA or CSA in Place and select the threshold, margin currency and regulator information. It also allows the users to create an asymmetric account by selecting different margin currency and regulator parameters for Pay and Receive directions.

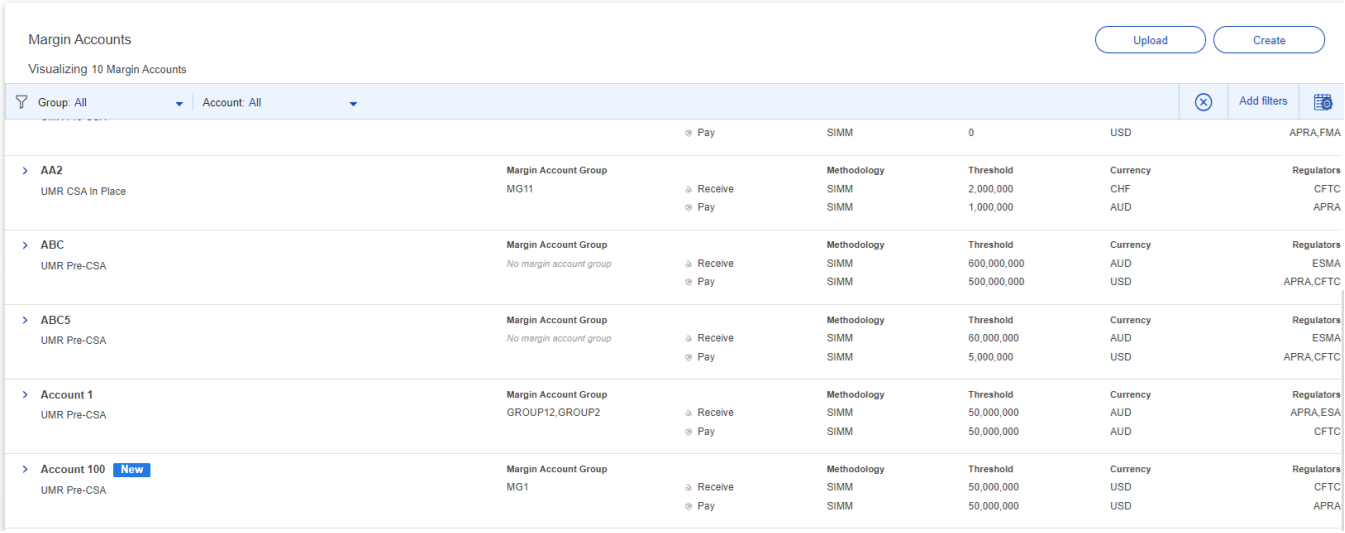
Once the user selects the regulators for a direction, the parameters already selected for those regulators are automatically added. The user can add more parameters by clicking on the *+New* option on the top.

When the account has been saved, the user is able to view the account under Margin Accounts in the Reference Data section. The accounts can also be edited as explained above.

In addition to the above fields, there are optional fields for PO, Counterparty and Start Date to support the UMR trade tagging as explained in the coming section Trade Keywords Tagging. The user can add a PO and counterparty that are valid legal entities defined in Calypso. These values are available for selection from a drop-down list.

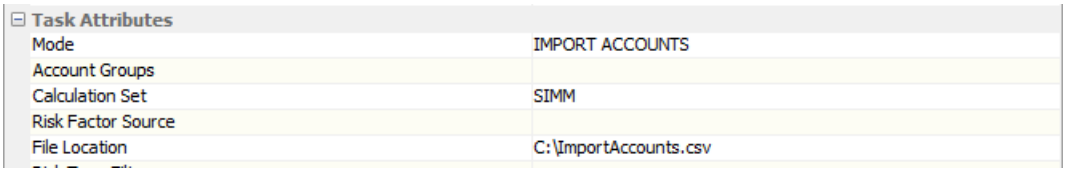


After saving a new account, it appears on the account page with a 'New' tag –



Import Accounts via Scheduled Task

It is possible to run the MARGIN_INPUT scheduled task in IMPORT ACCOUNTS mode to import the regulators for each margin agreement instead of using the UI.



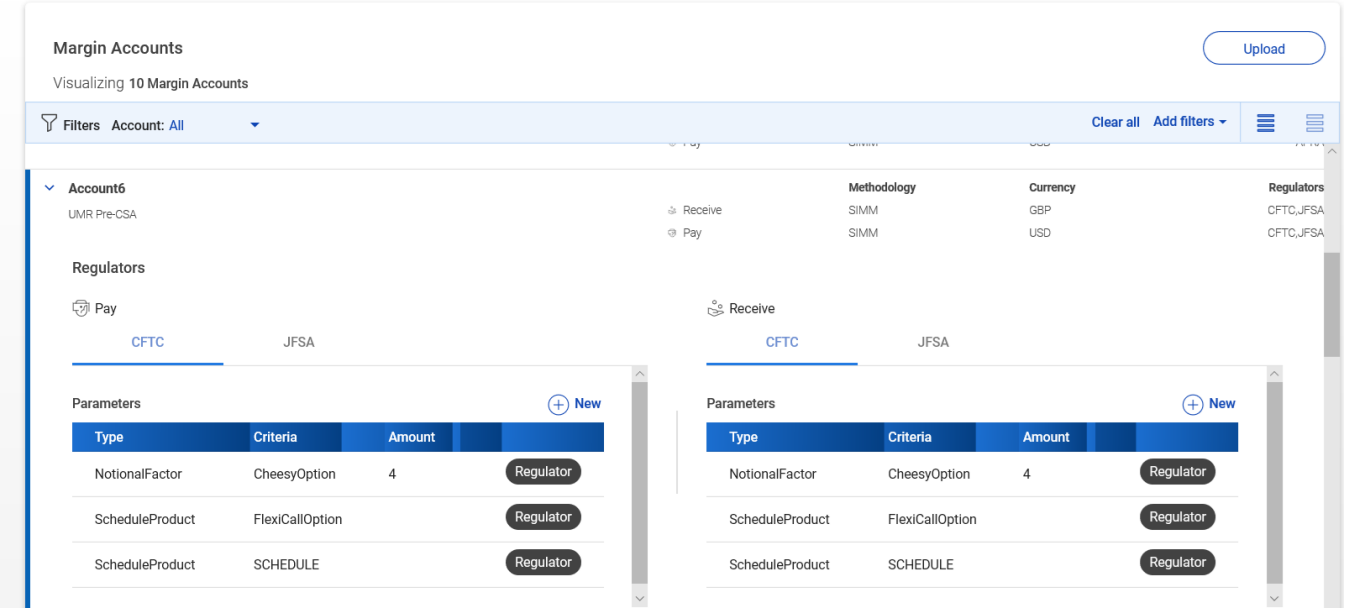
Asymmetric Margin

Calypso supports importing asymmetric contracts where the user can define different parameters for pay and receive directions. The regulator import file has separate rows for Post and Collect and the configuration below are supported at pay/receive level instead of margin account level.

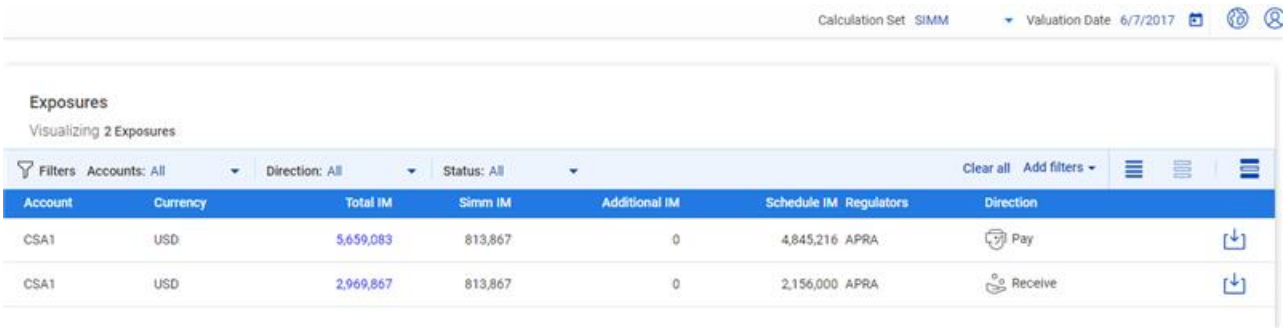
- Methodologies
- Currencies
- Multipliers / Add-Ons / Fixed Amounts

▶ Refer to the *ImportRegulators_Asymmetric.csv* and *ImportFrontOffice_Asymmetric.csv* files in the Bilateral Margin Sample Files folder to view how a different configuration is defined for different directions.

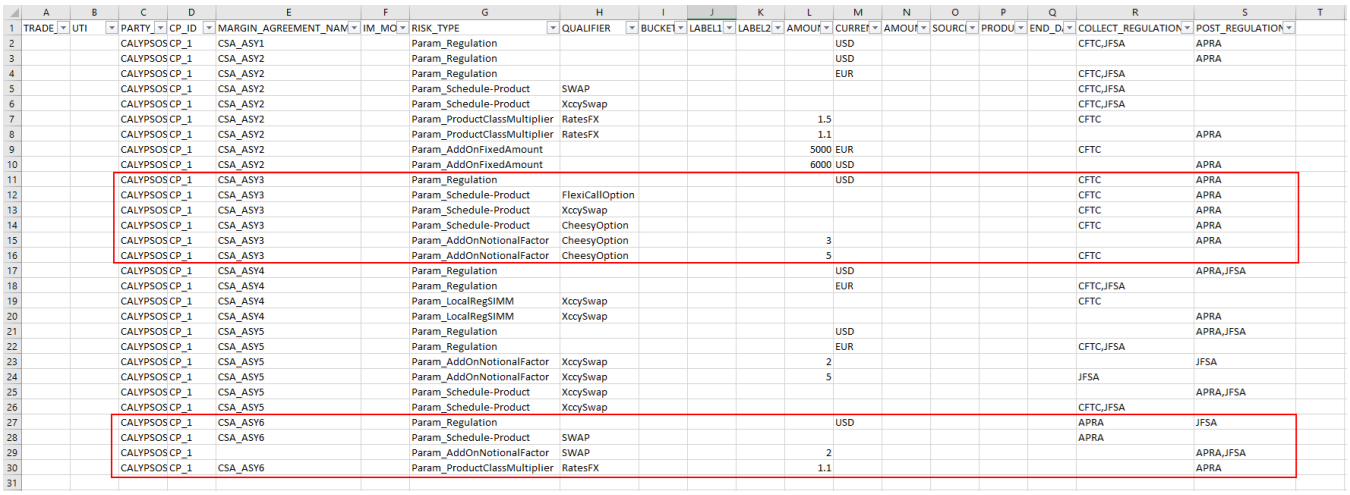
The account import can be done via Margin UI or the MARGIN_INPUT scheduled task. An example of an asymmetric contract imported via the Margin web UI is shown below.



After calculating margin, the IM results appear separately for Pay and Receive in the UI.



The clients have the flexibility to have the same or different parameters for Pay and Receive in the same import file. For example, if they do not have a symmetric configuration account, they can have a single row for Pay and Receive regulators, like in the example below for CSA_ASY3. If any account has different currencies for Pay and Receive, they can configure like CSA_ASY2 in the example below. If any account has the same currency for Pay and Receive but different methodologies, they can configure like CSA_ASY6 in the example below.



TRADE_	UTI	PARTY_	CP_ID	MARGIN_AGREEMENT_NAM	IM_MO	RISK_TYPE	QUALIFIER	BUCKET	LABEL1	LABEL2	AMOUI	CURRE	AMOUI	SOURC	PRODU	END_D	COLLECT_REGULATION	POST_REGULATION
		CALYPSOS	CP_1	CSA_ASY1		Param_Regulation						USD					CFTC,JFSA	APRA
		CALYPSOS	CP_1	CSA_ASY2		Param_Regulation						USD						APRA
		CALYPSOS	CP_1	CSA_ASY2		Param_Regulation						EUR					CFTC,JFSA	
		CALYPSOS	CP_1	CSA_ASY2		Param_Schedule-Product	SWAP										CFTC,JFSA	
		CALYPSOS	CP_1	CSA_ASY2		Param_Schedule-Product	XccySwap										CFTC,JFSA	
		CALYPSOS	CP_1	CSA_ASY2		Param_ProductClassMultiplier	RatesFX				1.5						CFTC	
		CALYPSOS	CP_1	CSA_ASY2		Param_ProductClassMultiplier	RatesFX				1.1							APRA
		CALYPSOS	CP_1	CSA_ASY2		Param_AddOnFixedAmount					5000	EUR					CFTC	
		CALYPSOS	CP_1	CSA_ASY2		Param_AddOnFixedAmount					6000	USD						APRA
		CALYPSOS	CP_1	CSA_ASY3		Param_Regulation						USD					CFTC	APRA
		CALYPSOS	CP_1	CSA_ASY3		Param_Schedule-Product	FlexiCallOption										CFTC	APRA
		CALYPSOS	CP_1	CSA_ASY3		Param_Schedule-Product	XccySwap										CFTC	APRA
		CALYPSOS	CP_1	CSA_ASY3		Param_Schedule-Product	CheesyOption										CFTC	APRA
		CALYPSOS	CP_1	CSA_ASY3		Param_AddOnNotionalFactor	CheesyOption				3							APRA
		CALYPSOS	CP_1	CSA_ASY3		Param_AddOnNotionalFactor	CheesyOption				5						CFTC	
		CALYPSOS	CP_1	CSA_ASY4		Param_Regulation						USD						APRA,JFSA
		CALYPSOS	CP_1	CSA_ASY4		Param_Regulation						EUR					CFTC,JFSA	
		CALYPSOS	CP_1	CSA_ASY4		Param_LocalRegSIMM	XccySwap										CFTC	
		CALYPSOS	CP_1	CSA_ASY4		Param_LocalRegSIMM	XccySwap											APRA
		CALYPSOS	CP_1	CSA_ASY5		Param_Regulation						USD						APRA,JFSA
		CALYPSOS	CP_1	CSA_ASY5		Param_Regulation						EUR					CFTC,JFSA	
		CALYPSOS	CP_1	CSA_ASY5		Param_AddOnNotionalFactor	XccySwap				2							JFSA
		CALYPSOS	CP_1	CSA_ASY5		Param_AddOnNotionalFactor	XccySwap				5						JFSA	
		CALYPSOS	CP_1	CSA_ASY5		Param_Schedule-Product	XccySwap											APRA,JFSA
		CALYPSOS	CP_1	CSA_ASY5		Param_Schedule-Product	XccySwap										CFTC,JFSA	
		CALYPSOS	CP_1	CSA_ASY6		Param_Regulation						USD					APRA	JFSA
		CALYPSOS	CP_1	CSA_ASY6		Param_Schedule-Product	SWAP										APRA	
		CALYPSOS	CP_1			Param_AddOnNotionalFactor	SWAP				2							APRA,JFSA
		CALYPSOS	CP_1	CSA_ASY6		Param_ProductClassMultiplier	RatesFX				1.1							APRA

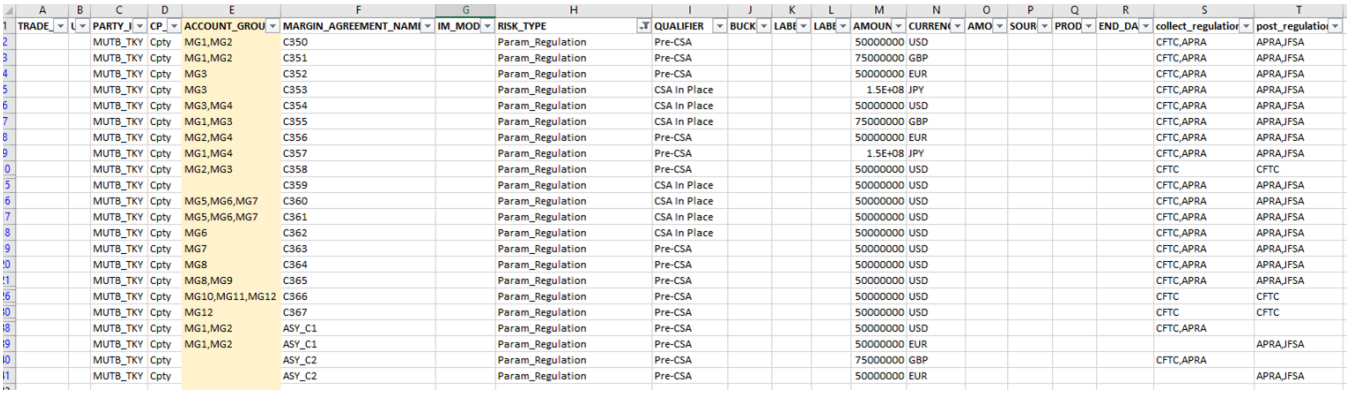
2.4 Account Groups

An Account Group is defined at the account level where each account is linked to one or more account groups. This account group is used in the MARGIN_INPUT and MARGIN_CALCULATOR scheduled tasks to define the scope of accounts.

The Market Risk Hierarchy has been replaced by Account Group and margin calculation has no dependency on ERS.

Note: Legacy Market Risk hierarchies are still supported.

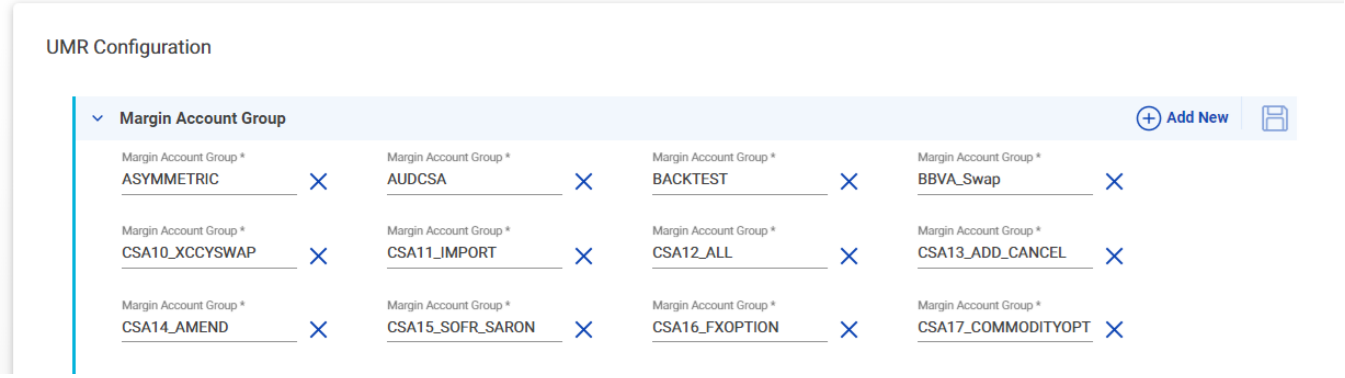
The Account Group can be defined via import of the account/regulator import file (sample below). A new column for Account_Group has been added to the account import .csv file. An account in the MARGIN_AGREEMENT_NAME column will be linked to one or more Account Groups in the corresponding ACCOUNT_GROUP column.



TRADE_	U	PARTY_I	CP_	ACCOUNT_GROU	MARGIN_AGREEMENT_NAME	IM_MOD	RISK_TYPE	T	QUALIFIER	BUCK	LABE	LABE	AMOUN	CURREN	AMO	SOUR	PROD	END_DA	collect_regulatio	post_regulatio
		MUTB_TKY	Cpty	MG1,MG2	C350		Param_Regulation		Pre-CSA				50000000	USD					CFTC,APRA	APRA,JFSA
		MUTB_TKY	Cpty	MG1,MG2	C351		Param_Regulation		Pre-CSA				75000000	GBP					CFTC,APRA	APRA,JFSA
		MUTB_TKY	Cpty	MG3	C352		Param_Regulation		Pre-CSA				50000000	EUR					CFTC,APRA	APRA,JFSA
		MUTB_TKY	Cpty	MG3	C353		Param_Regulation		CSA In Place				1.5E+08	JPY					CFTC,APRA	APRA,JFSA
		MUTB_TKY	Cpty	MG3,MG4	C354		Param_Regulation		CSA In Place				50000000	USD					CFTC,APRA	APRA,JFSA
		MUTB_TKY	Cpty	MG1,MG3	C355		Param_Regulation		CSA In Place				75000000	GBP					CFTC,APRA	APRA,JFSA
		MUTB_TKY	Cpty	MG2,MG4	C356		Param_Regulation		Pre-CSA				50000000	EUR					CFTC,APRA	APRA,JFSA
		MUTB_TKY	Cpty	MG1,MG4	C357		Param_Regulation		Pre-CSA				1.5E+08	JPY					CFTC,APRA	APRA,JFSA
		MUTB_TKY	Cpty	MG2,MG3	C358		Param_Regulation		Pre-CSA				50000000	USD					CFTC	CFTC
		MUTB_TKY	Cpty		C359		Param_Regulation		CSA In Place				50000000	USD					CFTC,APRA	APRA,JFSA
		MUTB_TKY	Cpty	MG5,MG6,MG7	C360		Param_Regulation		CSA In Place				50000000	USD					CFTC,APRA	APRA,JFSA
		MUTB_TKY	Cpty	MG5,MG6,MG7	C361		Param_Regulation		CSA In Place				50000000	USD					CFTC,APRA	APRA,JFSA
		MUTB_TKY	Cpty	MG6	C362		Param_Regulation		CSA In Place				50000000	USD					CFTC,APRA	APRA,JFSA
		MUTB_TKY	Cpty	MG7	C363		Param_Regulation		Pre-CSA				50000000	USD					CFTC,APRA	APRA,JFSA
		MUTB_TKY	Cpty	MG8	C364		Param_Regulation		Pre-CSA				50000000	USD					CFTC,APRA	APRA,JFSA
		MUTB_TKY	Cpty	MG8,MG9	C365		Param_Regulation		Pre-CSA				50000000	USD					CFTC,APRA	APRA,JFSA
		MUTB_TKY	Cpty	MG10,MG11,MG12	C366		Param_Regulation		Pre-CSA				50000000	USD					CFTC	CFTC
		MUTB_TKY	Cpty	MG12	C367		Param_Regulation		Pre-CSA				50000000	USD					CFTC	CFTC
		MUTB_TKY	Cpty	MG1,MG2	ASY_C1		Param_Regulation		Pre-CSA				50000000	USD					CFTC,APRA	
		MUTB_TKY	Cpty	MG1,MG2	ASY_C1		Param_Regulation		Pre-CSA				50000000	EUR						APRA,JFSA
		MUTB_TKY	Cpty		ASY_C2		Param_Regulation		Pre-CSA				75000000	GBP					CFTC,APRA	
		MUTB_TKY	Cpty		ASY_C2		Param_Regulation		Pre-CSA				50000000	EUR						APRA,JFSA

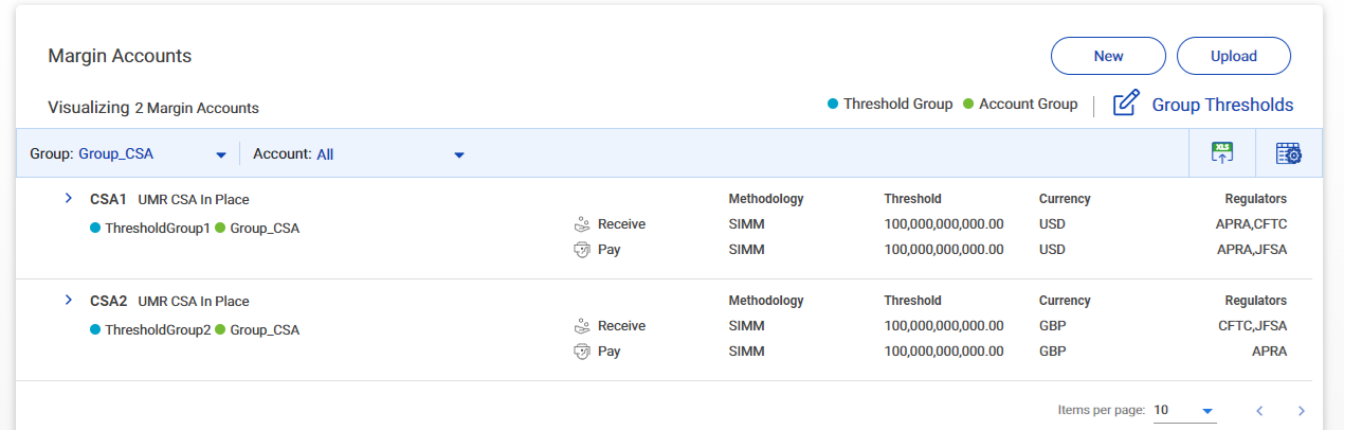
The ACCOUNT_GROUP column is a mandatory column. Account Group should be provided only for RISK_TYPE= Param_Regulation; if specified for other risk types, it will be ignored.

The Account Group can also be defined via UMR Configuration page in UI.

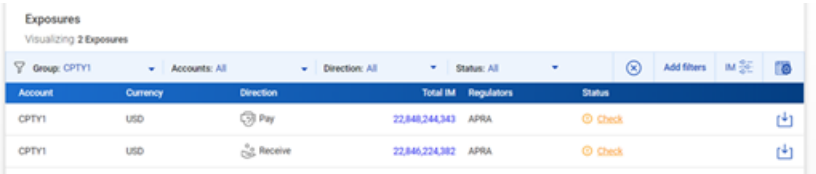


Once imported, users can view the Account Group in the Margin user interface.

Sample views:



Exposures filtered by Account Groups:

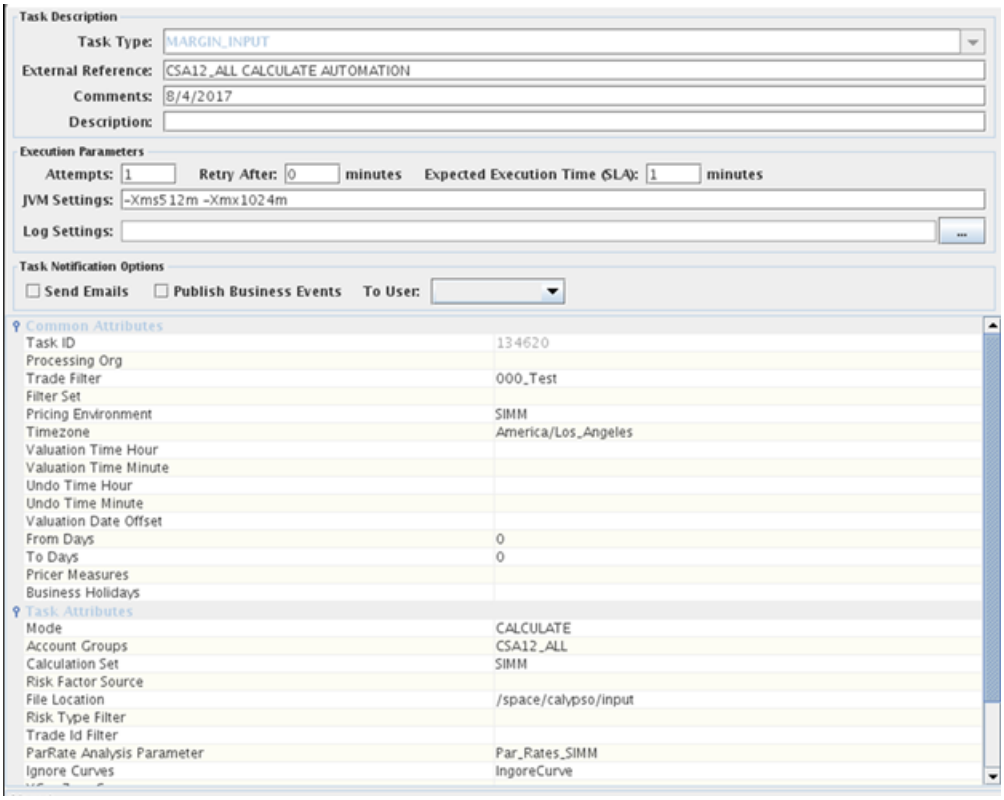


Migration Impact of Account Groups

- As part of the upgrade process, the Market Risk hierarchy names are copied to Account Group names and all accounts under an existing Market Risk hierarchy are copied to an Account Group with the same name.
- The Trade Filter is a mandatory attribute in the MARGIN_INPUT (Calculate mode) and MARGIN_CALCULATOR scheduled tasks with the Account Group feature. The trade filter is used to define the trade scope, i.e. trade

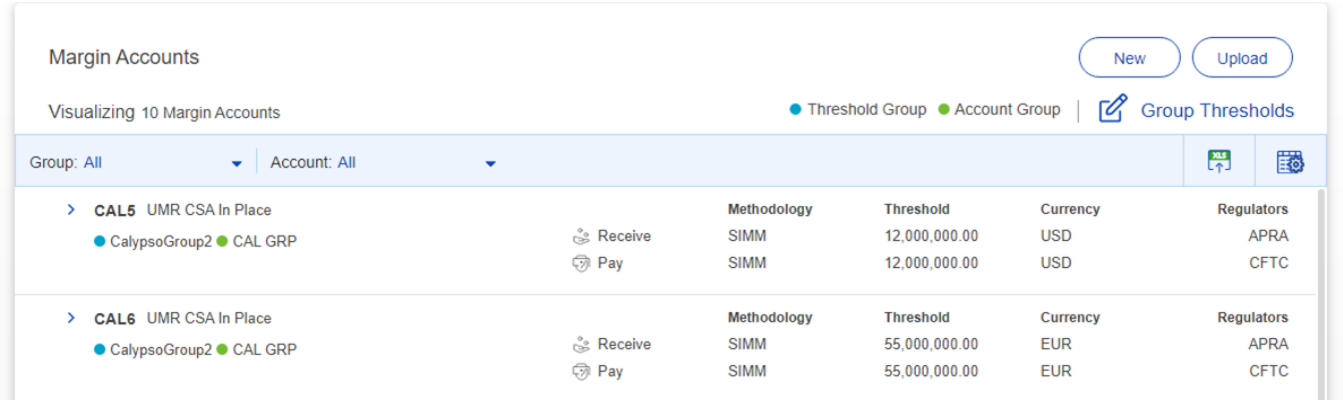
status and product type. The user does not need to define the account attributes in the trade filter. The scope of accounts comes from the ACCOUNT_GROUP attribute in the scheduled tasks.

- After migration, the MARGIN_INPUT (calculate mode) scheduled task does not have a Trade Filter defined. A trade filter needs to be added to use the account group approach. In the absence of a trade filter, the scheduled task falls back to use the Account Group name as the Market Risk hierarchy name to look for accounts defined in Market Risk nodes for calculation. Once the user has defined trade filters in the scheduled task, Market Risk will not be referenced.

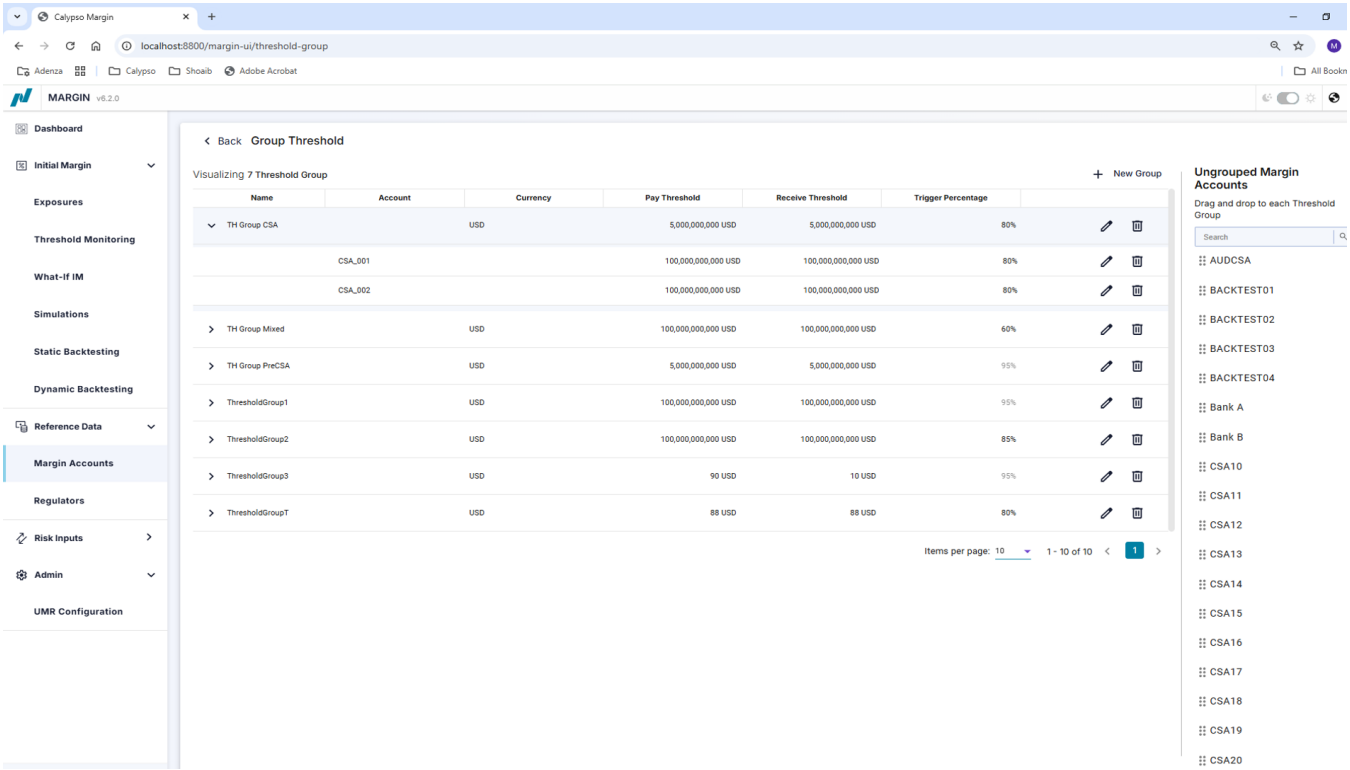


2.5 Threshold Groups

Within the Margin Accounts page, the button at the top right of the screen will take the user to the Group Threshold Definition. Once grouped, the Threshold Group for each account is shown on the accounts page as well.



Clicking the “New Group” button will expose a blank row at the top of the table. This row is the definition of the Threshold Group. The values here are independent of the margin accounts.

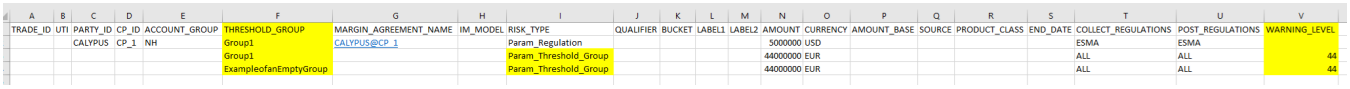


Once a Threshold Group is created, the user can drag and drop margin accounts from the list on the right into the account group. A margin account can only be part of one threshold group.

An Account Group can contain a combination of both Pre-CSA and CSA in Place accounts. The user can edit the account thresholds from this window as well.

It is not required that all accounts be part of a group. Any accounts that are not grouped will be reported as their own group in the threshold monitoring dashboard and excel export.

Group thresholds may also be uploaded with the account definitions. There are additional fields specifically for the group threshold monitoring.

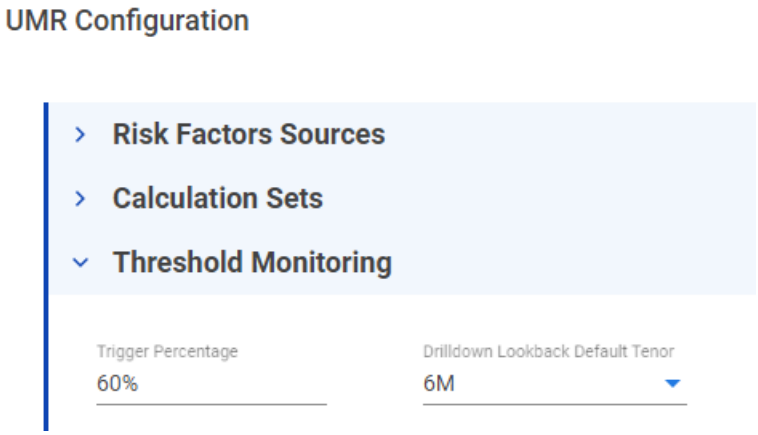


TRADE_ID	UTI	PARTY_ID	CP_ID	ACCOUNT_GROUP	THRESHOLD_GROUP	MARGIN_AGREEMENT_NAME	IM_MODEL	RISK_TYPE	QUALIFIER	BUCKET	LABEL1	LABEL2	AMOUNT	CURRENCY	AMOUNT_BASE	SOURCE	PRODUCT_CLASS	END_DATE	COLLECT_REGULATIONS	POST_REGULATIONS	WARNING_LEVEL
		CALYPUS	CP_1	NH	Group1	CALYPUS@CP_1		Param_Regulation					5000000	USD					ESMA	ESMA	
					Group1			Param_Threshold_Group					44000000	EUR					ALL	ALL	44
					ExampleofanEmptyGroup			Param_Threshold_Group					44000000	EUR					ALL	ALL	44

THRESHOLD_GROUP: For Account level rows (designated with Param_Regulation as the RISK_TYPE) this is the Threshold Group name to which the account will belong. For Group level rows (designated with Param_Threshold_Group as the RISK_TYPE) this is the name of the account group itself.

WARNING_LEVEL: This is the threshold warning or trigger percentage level. This field only applies to threshold group definitions (designated with Param_Threshold_Group as the RISK_TYPE).

Under **Admin > UMR Configuration** there is a section for threshold monitoring. This section has two options which affect the threshold monitoring dashboard. By configuring these two settings, Threshold Monitoring is enabled. Threshold calculation will not occur if these settings are not defined.



- Trigger Percentage – This is the percentage of the Threshold to be used to generate a trigger, or a point in which the user should be notified that a Pre-CSA account/group should start the negotiation process with their counterparty to put a real CSA in Place. Trigger = Threshold * Trigger Percentage
- Drilldown Lookback Default Tenor – This defines the default lookback period for the historical drilldown of the threshold monitoring. This is defined as a Tenor.

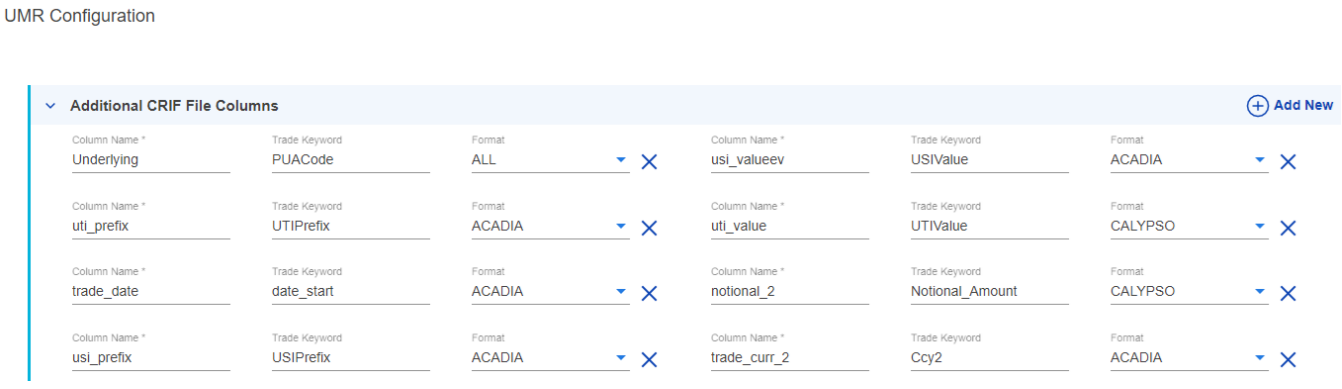
2.6 UMR Configuration in UI

This page includes the configuration below displayed in alphabetical order.

Calculation sets, margin account group and risk factor sources can be created here and will be available to the user on other pages. Backtesting can be configured here for hierarchies, currencies and parameters. Product class mapping will show all the hardcoded products in each product class and allow the user to add new custom products. This is explained in 'Product Class Mapping' section later in this user guide. Threshold monitoring and Exposure monitoring can also be configured from this page and the values saved here will be used to define the exposure and threshold monitoring statuses.

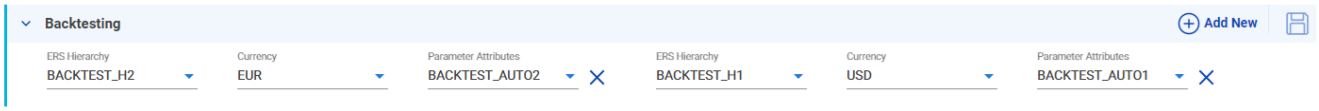
Additional CRIF File Column

This section can be used to define custom columns that will be output in the Calypso and Acadia risk factor exports. This is further explained in Set up in Risk Factor Export.



Backtesting

For static backtesting, the user can configure multiple Market Risk Hierarchy, currency and Market Risk parameter set combinations. This is further explained in Static Backtesting.



Calculation Sets

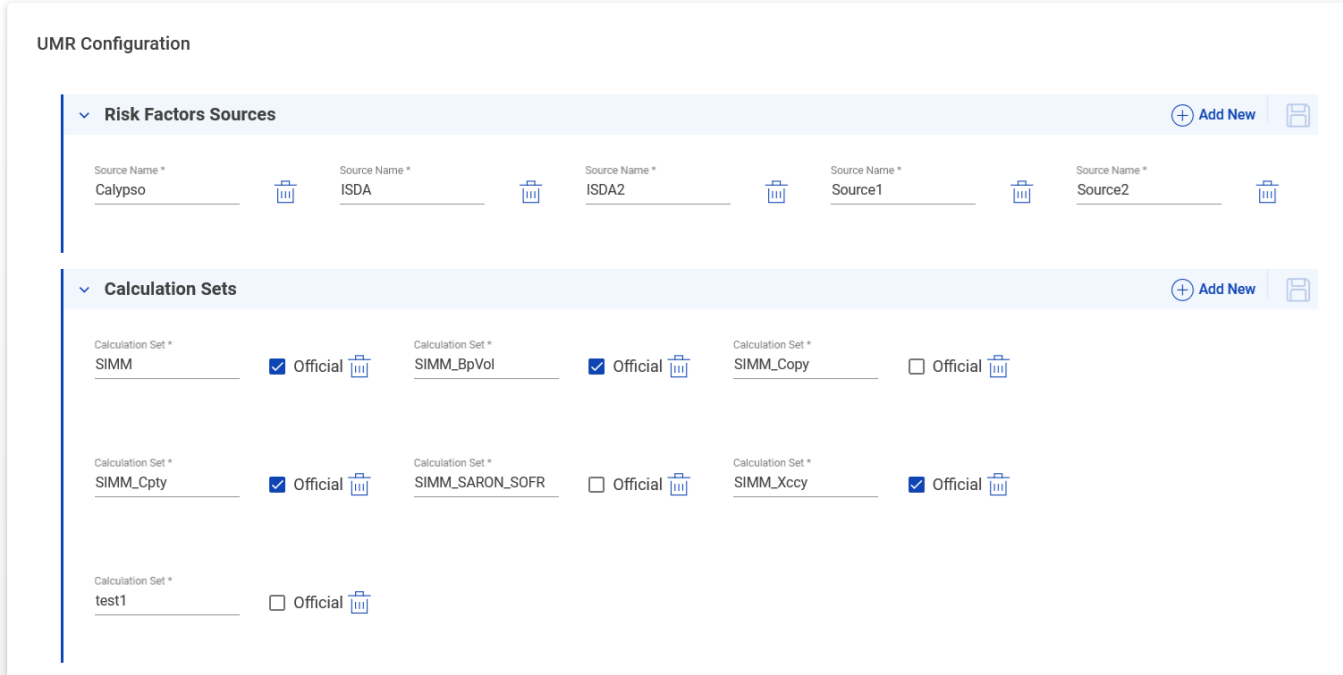
A calculation set is an instance of inputs and results for margin calculation. Calculation sets allow a user to store several separate sets of margin inputs (risk factors) and margin results for a single valuation date. In the margin UI, the user can navigate through the various calculation sets. The official IM exposure is stored under the official calculation set, and the feed to Collateral Manager.

There can be multiple Official calculation sets, but each margin account is linked to a unique Official Calculation Set.

An account is not programmatically linked to a calculation set. For each Margin Account, the user should only generate IM Exposure in ONE single official calculation set.

Several official calculation sets are required in the case of a global book with several end of days based on multiple quote sets and Pricing Environments.

Non-official calculation sets can be used for intraday simulation. They will not generate IM Exposure PL Marks.



Calculation set definition:

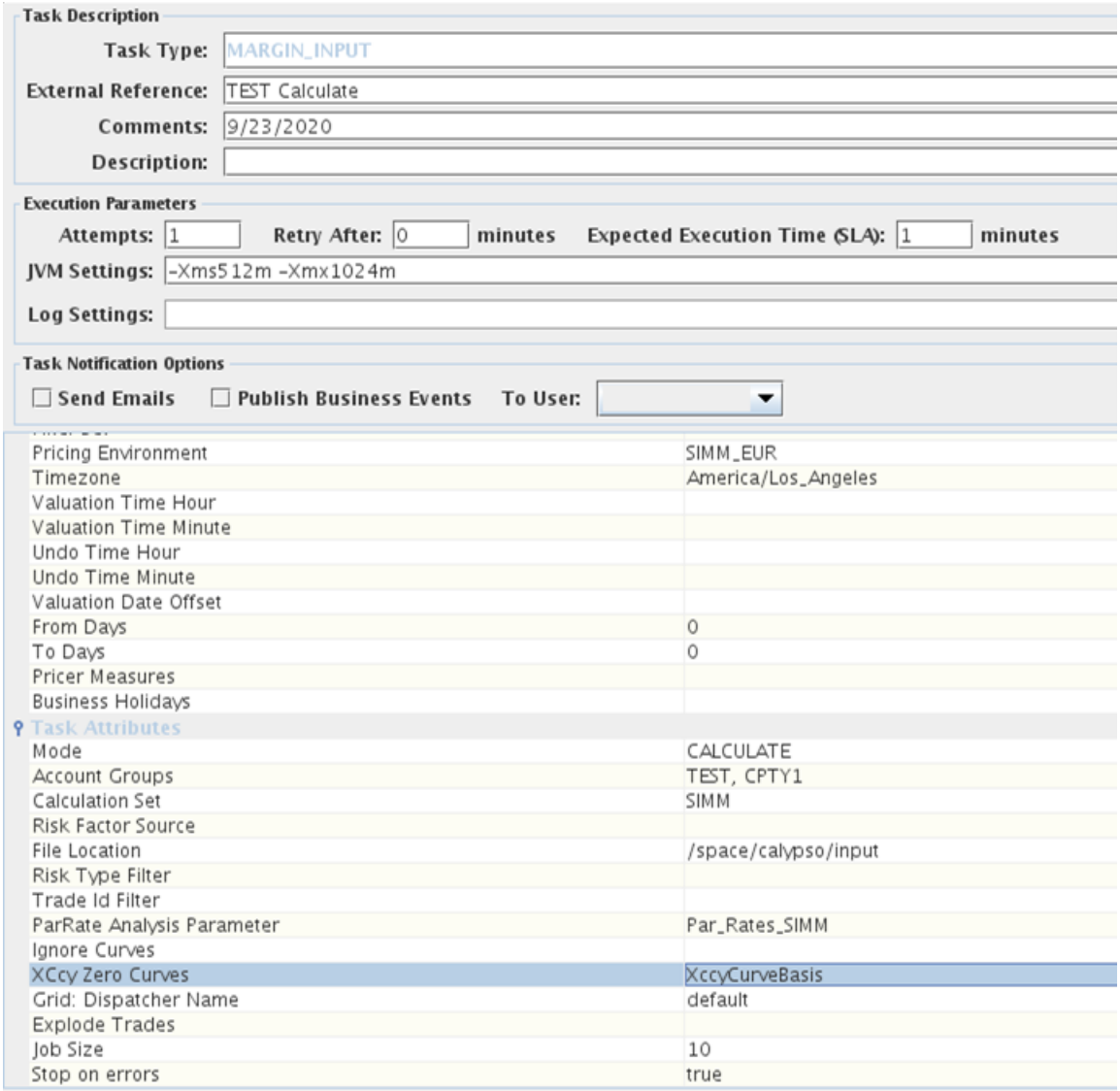
Name = String

Official flag = Yes/No

Upgrade Process - Calculation sets are automatically created via upgrade scripts, based on the Pricing Environment of the MARGIN_INPUT and MARGIN_CALCULATOR scheduled tasks.

Calculation sets are used in the MARGIN_INPUT scheduled task, MARGIN_CALCULATOR scheduled task and the Web UI.

The MARGIN_CALCULATOR ST will only generate Collateral Exposure Trades if the Calculation set is Official, the time horizon is 10D and account is CSA in Place.



Exposure Monitoring

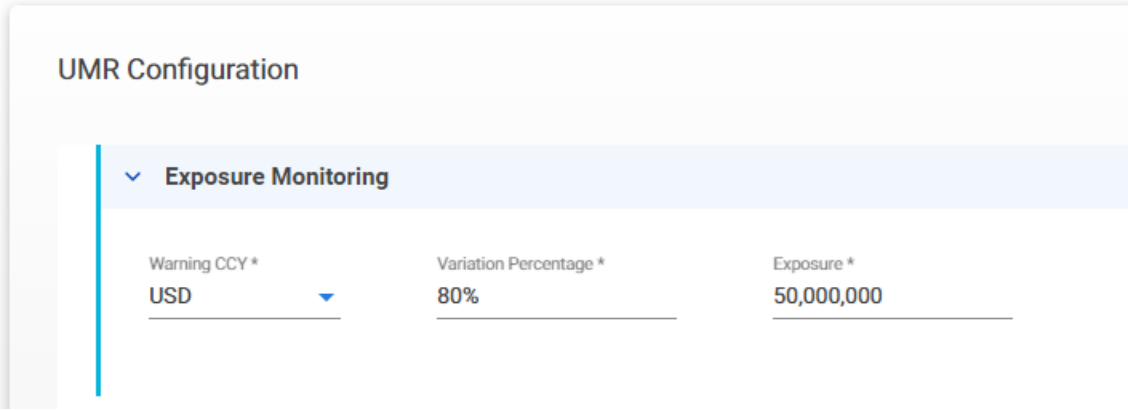
IM exposures are monitored by thresholds for exposure, variation percentage and warning currency defined in UMR Configuration page. This is further explained in Viewing Exposures.

Default Values:

Warning currency = USD

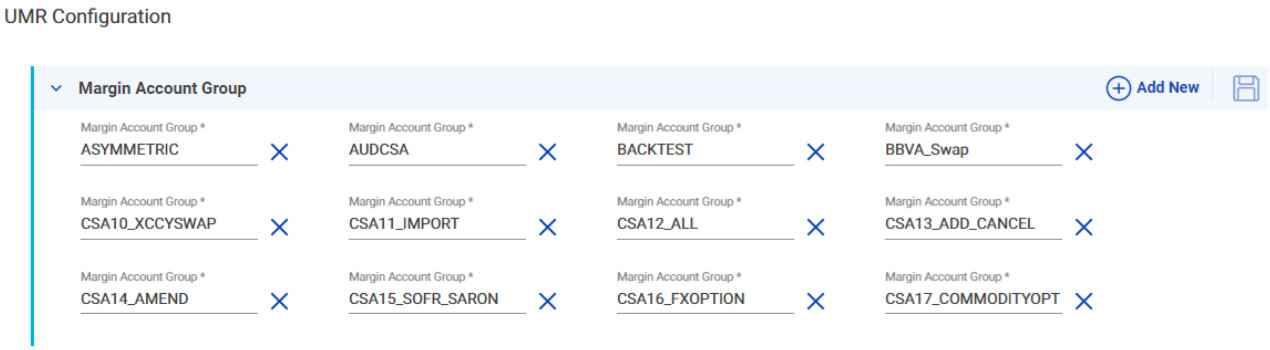
Variation Percentage = 20%

Exposure = 1,000,000,000



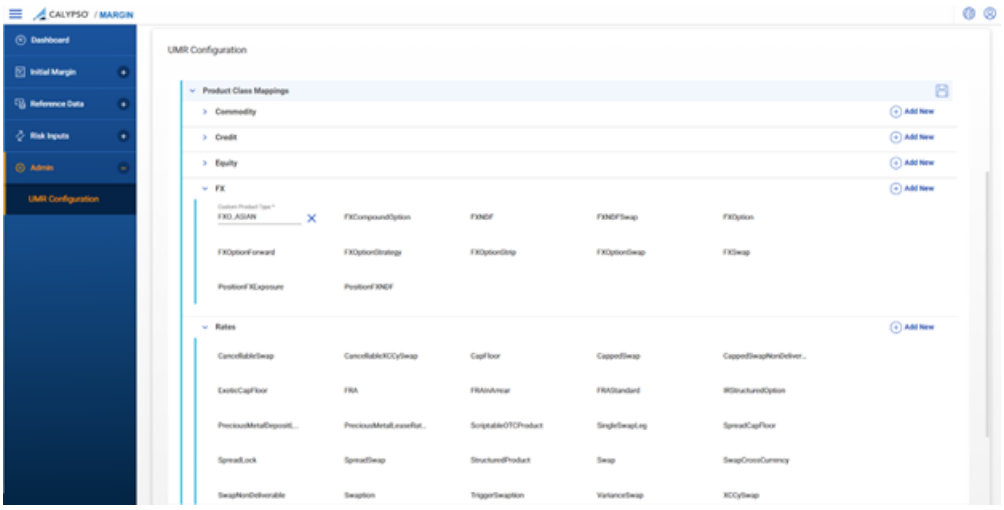
Margin Account Group

The Account Group can also be defined via UMR Configuration page in UI.



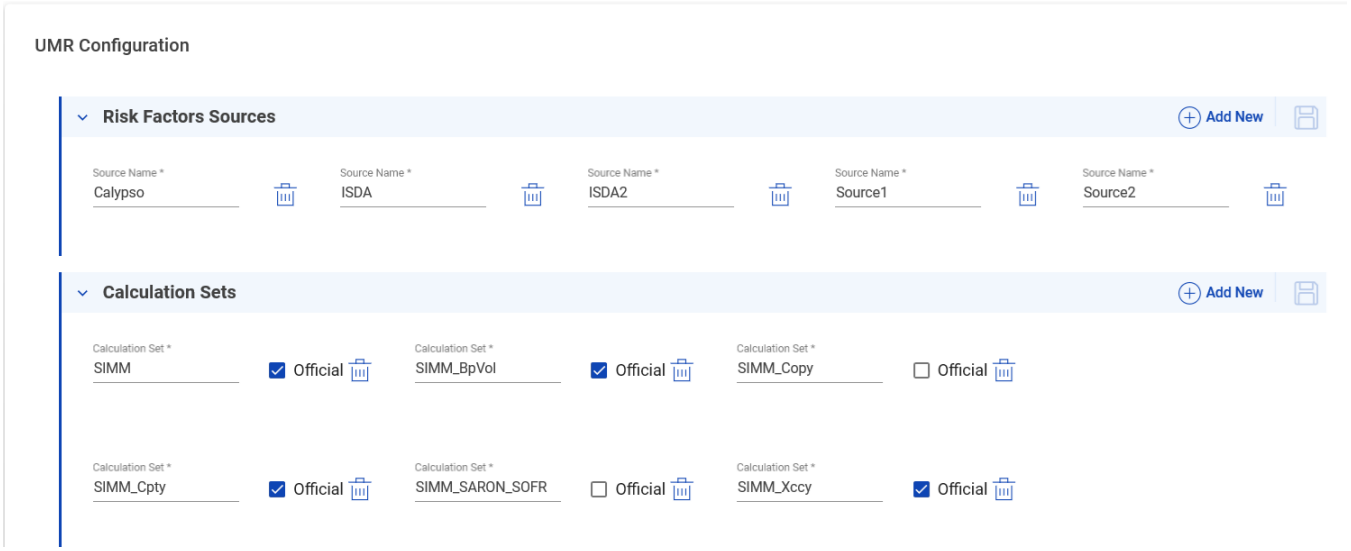
Product Class Mapping

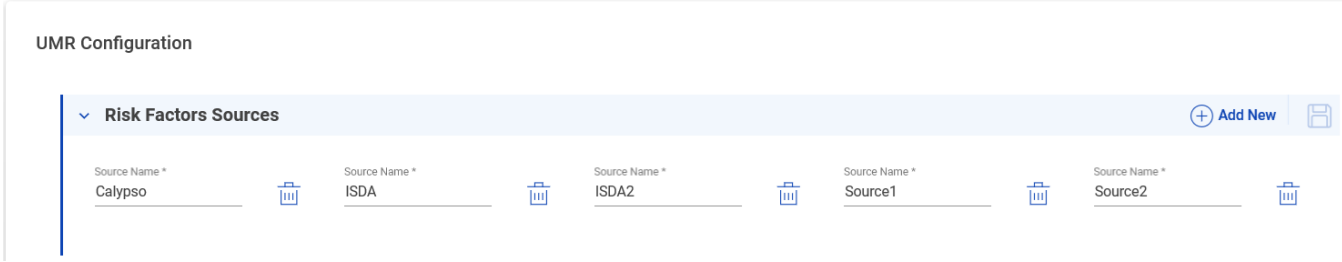
The product class mappings here show five product classes – Commodity, Credit, Equity, FX and Rates. User can add additional product mappings if product type is not included as default. This is further explained in IMPORT RISK FACTORS Mode.



Risk Factor Sources

Sources are defined for each source of risk factors. These are defined so that they may be monitored individually for the latest upload status and error checking. These are defined either manually in the User Interface or imported via risk factor file. If using Calypso as a source for calculating risk factors, then Calypso should be defined.

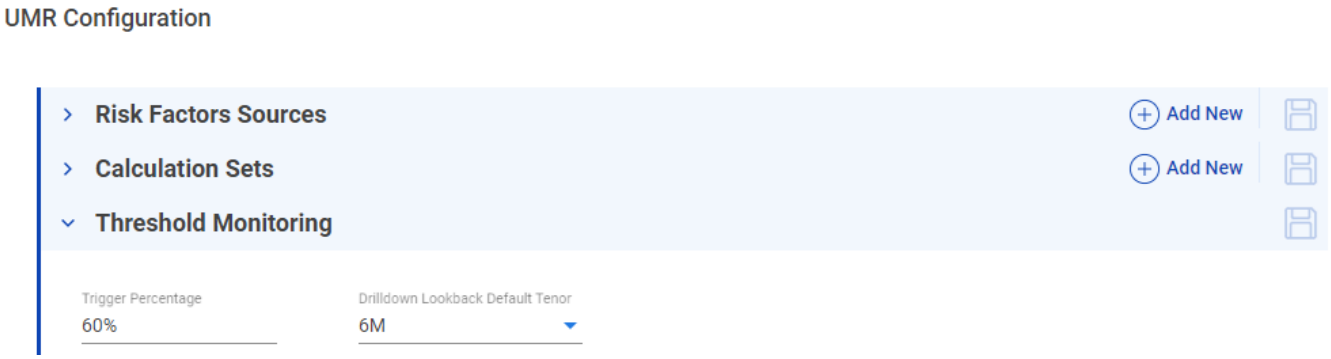




» Select “Add New” to add a new source.

Threshold Monitoring

This section has two options which affect the threshold monitoring dashboard. By configuring these two settings, Threshold Monitoring is enabled. Threshold calculation will not occur if these settings are not defined. This is further explained in Threshold Groups.



2.7 Trade Keywords & Trade Filters

2.7.1 Trade Keywords

Each trade needs to have a value in IM_PORTFOLIO_NAME and IM_MODEL trade keywords. A trade can only be associated with one value for each of the following (e.g., it is a one-to-one mapping):

IM_PORTFOLIO_NAME represents a Margin account name and therefore forms the netting set for which initial margin will be calculated.

IM_MODEL represents the margin model that will be used for the trade, this must be set to “SIMM”. This keyword does not determine whether the trade IM is calculated via SIMM or SCHEDULE, that is done via the Param_Schedule-Product on the margin account definition.

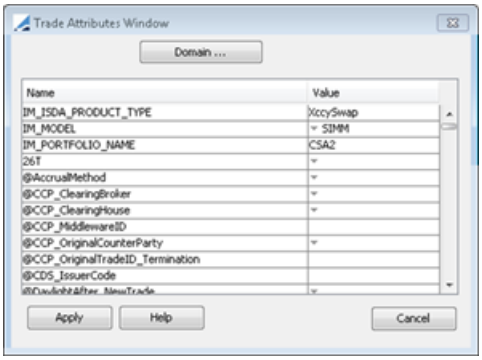
IM_ISDA_PRODUCT_TYPE is an optional field and represents what product type this will be treated as within the margin account parameters.

This keyword is used to trigger Schedule calculation when ISDA_PRODUCT_TYPE matches one of the Param_Schedule-Product values on the margin account. This is a free text field, and it does not have to be a Calypso product type. For example, the keyword IM_ISDA_PRODUCT_TYPE is set to XccySwap in the example below. So all trades that have Param_Schedule-Product Qualifier set to XccySwap, will use schedule methodology.

Example of account import file below with Param_Schedule-Product parameter:

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U
1	TRADE_ID	UTI	PARTY_ID	CP_ID	MARGIN_/	IM_MODE	RISK_TYPE	QUALIFIER	BUCKET	LABEL1	LABEL2	AMOUNT	CURRENC	AMOUNT_	SOURCE	PRODUCT_	END_DATE	COLLECT_	POST_REGULATIONS		
2			MUTB_TK	Cpty	BOA		Param_Regulation						USD					CFTC,APRA	APRA,JFSA		
3			MUTB_TK	Cpty	BOA		Param_Schedule-Product	XccySwap													

Example:



The IM_ISDA_PRODUCT_TYPE keyword is also used for assigning a product class to trades which are not covered in the existing product class mapping. This is further explained in section IMPORT RISK FACTORS Mode.

Same keyword is used when running MARGIN_INPUT in Calculate mode. The MARGIN_INPUT scheduled task will identify the product class based on the following criteria:

- Map the product family of the trade with the mapping list.
- If the product family is not found in the mapping, map the product type of trade with the product type mapping from user interface. The product class mapping in the user interface is explained later in this user guide.

2.7.2 Trade Filters

There are two use cases of how to define trade filters and run margin scheduled tasks to calculate risk factors and margin.

When user uses legacy Market Risk hierarchies, trade filters must be defined per margin account. When user uses account group, trade filter can be defined per margin account as well as globally cross margin accounts.

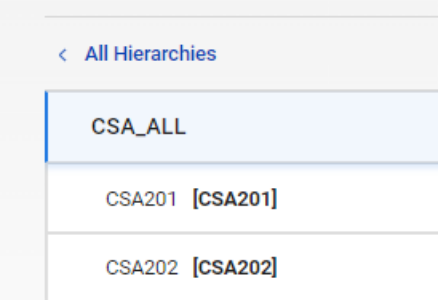
Trade Filters for Market Risk hierarchy

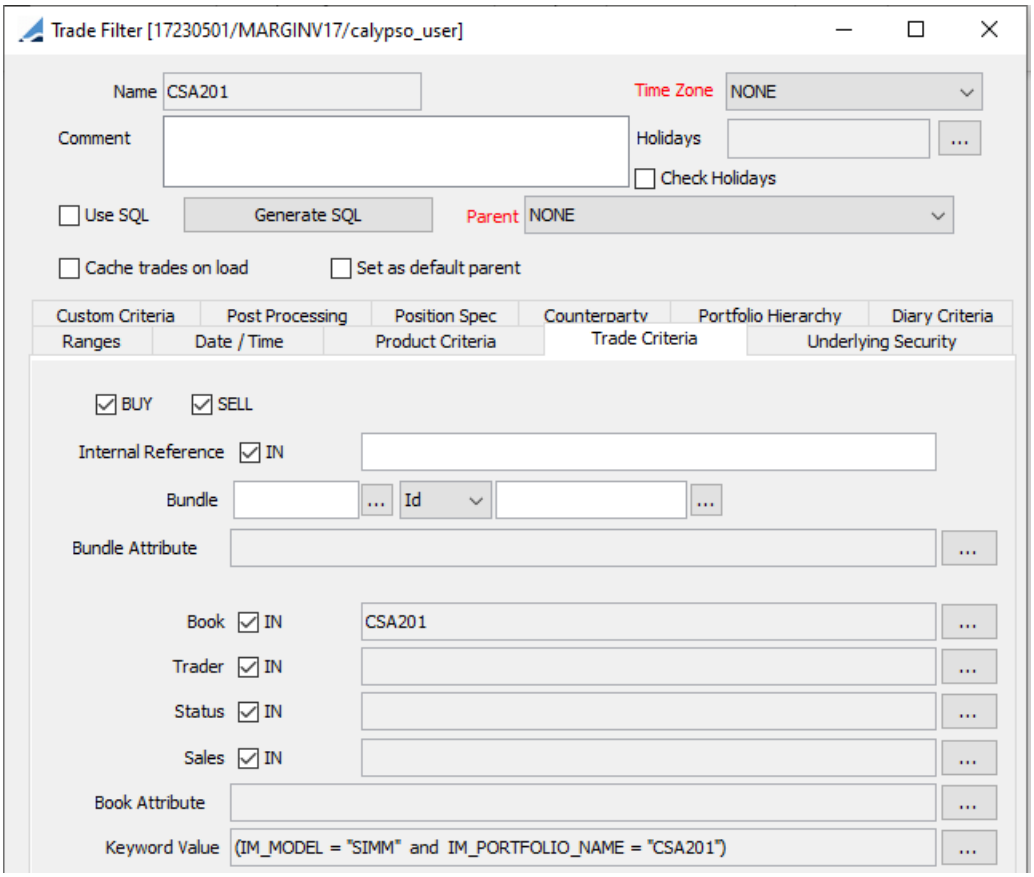
When using Market Risk hierarchy configuration, each hierarchy leaf stands for a margin account and trade filter must be created for each margin account (i.e. IM_PORFOLIO_NAME).

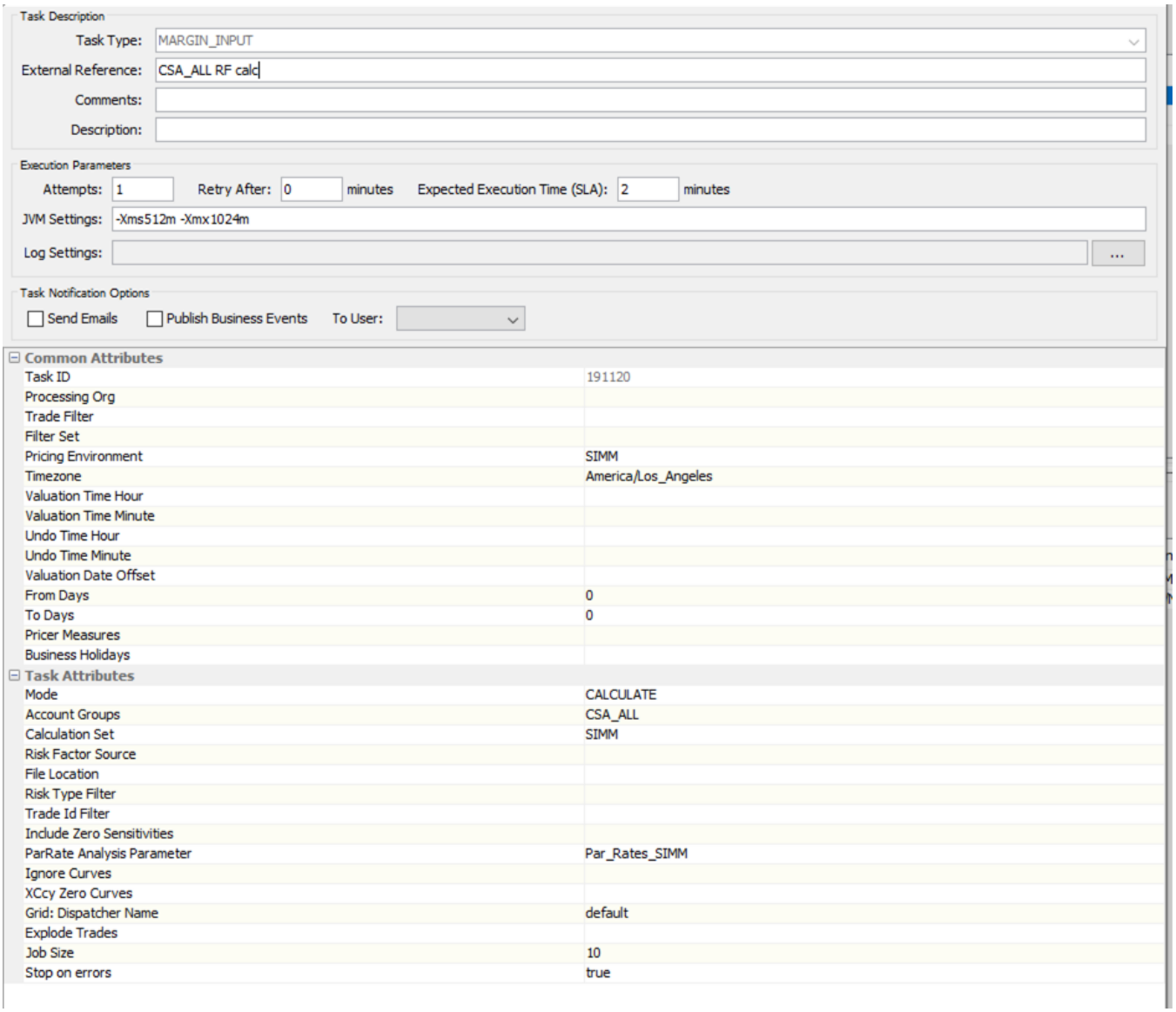
The trade filter criteria MUST contain the following two criteria (“IM_PORTFOLIO_NAME=XXX, and IM_MODEL = SIMM). Missing these two criteria will result in incorrect results and errors when the process is running.

When running MARGIN_INPUT and MARGIN_CALCULATOR scheduled tasks using Market Riskhierarchy, user must select Market Riskhierarchy name in attribute Account Groups and leave trade filter **empty**. In this case tasks will look at Market Risk hierarchy and find its trade filter to calculate results. If Market Riskhierarchy name is not in the list of account groups, user can add it in UMR configuration page.

Samples of Market Riskhierarchy, trade filter and MARGIN_INPUT scheduled task are shown below:


All Hierarchies
CSA_ALL
CSA201 [CSA201]
CSA202 [CSA202]


Trade Filter [17230501/MARGINV17/calypso_user]
Name CSA201
Time Zone NONE
Comment
Holidays
Check Holidays
Use SQL
Generate SQL
Parent NONE
Cache trades on load
Set as default parent
Custom Criteria
Post Processing
Position Spec
Counterparty
Portfolio Hierarchy
Diary Criteria
Ranges
Date / Time
Product Criteria
Trade Criteria
Underlying Security
BUY
SELL
Internal Reference IN
Bundle
Id
Bundle Attribute
Book IN CSA201
Trader IN
Status IN
Sales IN
Book Attribute
Keyword Value (IM_MODEL = "SIMM" and IM_PORTFOLIO_NAME = "CSA201")



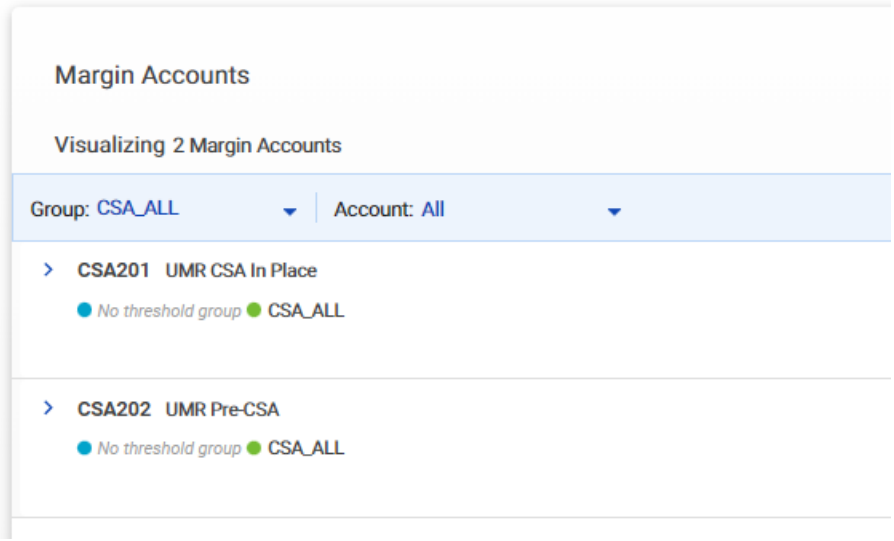
Trade Filters for Account Group

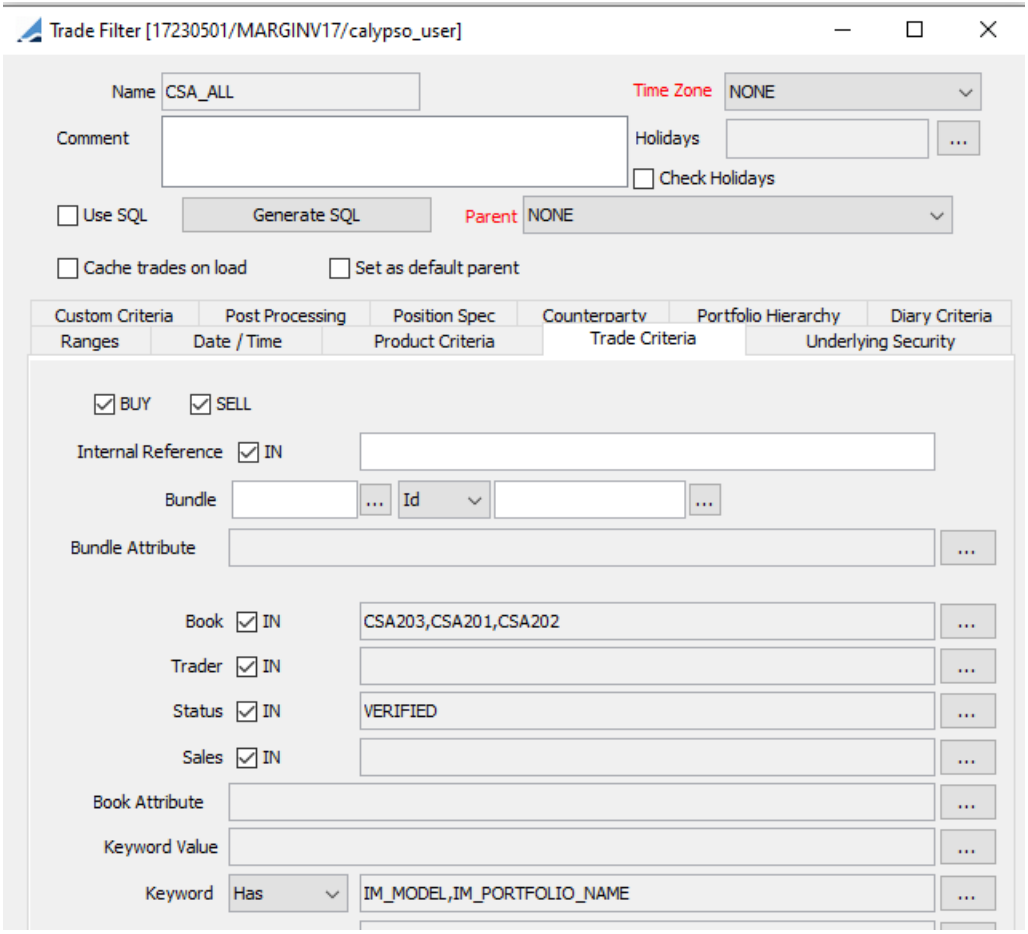
When using Account group configuration, trades in trade filter must have IM_PORTFOLIO_NAME keywords and values can be same or different. It may contain additional filtering like product type or trade status.

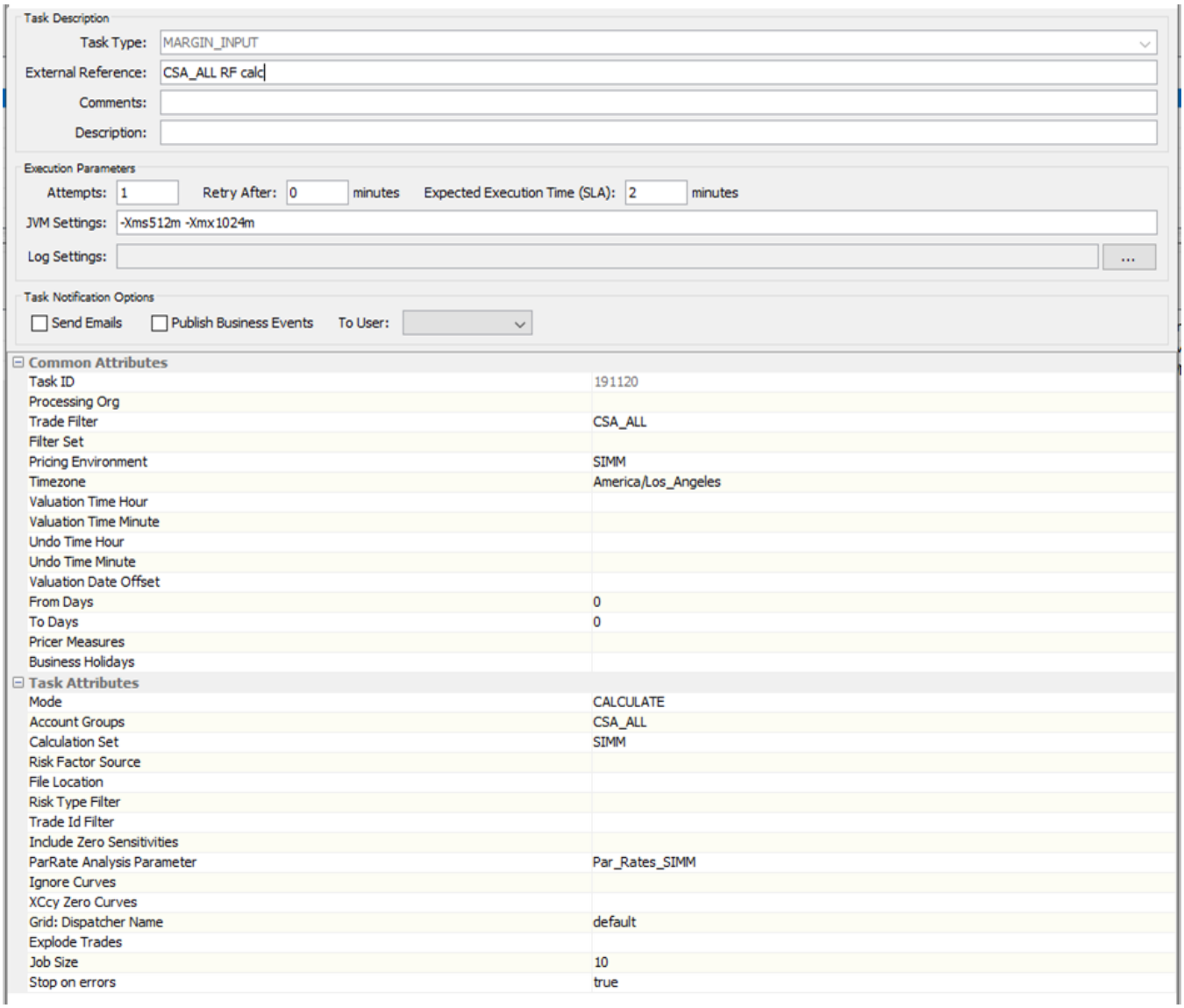
When running MARGIN_INPUT and MARGIN_CALCULATOR scheduled tasks using Account Groups, user must select account group name in attribute Account Groups and **must** define trade filter. In this case tasks will load trades of accounts from selected account groups to calculate. If account group name is not in the list of account groups, user can add it in UMR configuration page.

In example showed below, account group CSA_ALL has account CSA_201 and CSA_202, and trade filter contains trades with IM_PORTFOLIO_NAME CSA_201, CSA202 and CSA_203, results will be calculated for CSA_201 and CSA_202.

Samples of margin accounts, trade filter and MARGIN_INPUT scheduled task are shown below:




Trade Filter [17230501/MARGINV17/calypso_user]
Name CSA_ALL
Time Zone NONE
Comment
Holidays
Check Holidays
Use SQL
Generate SQL
Parent NONE
Cache trades on load
Set as default parent
Custom Criteria
Post Processing
Position Spec
Counterparty
Portfolio Hierarchy
Diary Criteria
Ranges
Date / Time
Product Criteria
Trade Criteria
Underlying Security
BUY
SELL
Internal Reference IN
Bundle
Id
Bundle Attribute
Book IN CSA203,CSA201,CSA202
Trader IN
Status IN VERIFIED
Sales IN
Book Attribute
Keyword Value
Keyword Has IM_MODEL,IM_PORTFOLIO_NAME



2.7.3 Trade Keywords Tagging

New or existing trades can be tagged with an IM_PORTFOLIO_NAME keyword.

To use the trade tagging, the following configuration is required:

- Add parameters to the Account definition
- Define Eligible Trade Tagging
- Review IM_ISDA_PRODUCT_TYPE keyword values
- Lifecycle Engine setup

Add Parameters to the Account Definition

The following columns need to be populated:

- counterparty (CP_ID)
- PO (PARTY_ID)
- Account start date (START_DATE)

The counterparty and PO defined in the file should be valid legal entities created in Calypso.

UTI	PARTY_ID	CP_ID	START_DATE	MARGIN_AGREEMENT_NAME	ACCOUNT_GROUP	IM_MODEL	RISK_TYPE	QUALIFIER	BUCKET	LABEL1	LABEL2	AMOUNT	CURRENCY	AMOUNT_BASE	COLLECT_REGULATIONS	PO
	CALYPSOSIMM	CP_1,CALYPSOSF	1/1/2020	CSA1	CSA1_SWAP		Param_Regulation	CSA In Place					USD		CFTC,APRA	API
	CALYPSOSIMM	CP_2		CSA2	CSA2_SWAP		Param_Regulation	CSA In Place					USD		CFTC,APRA	API

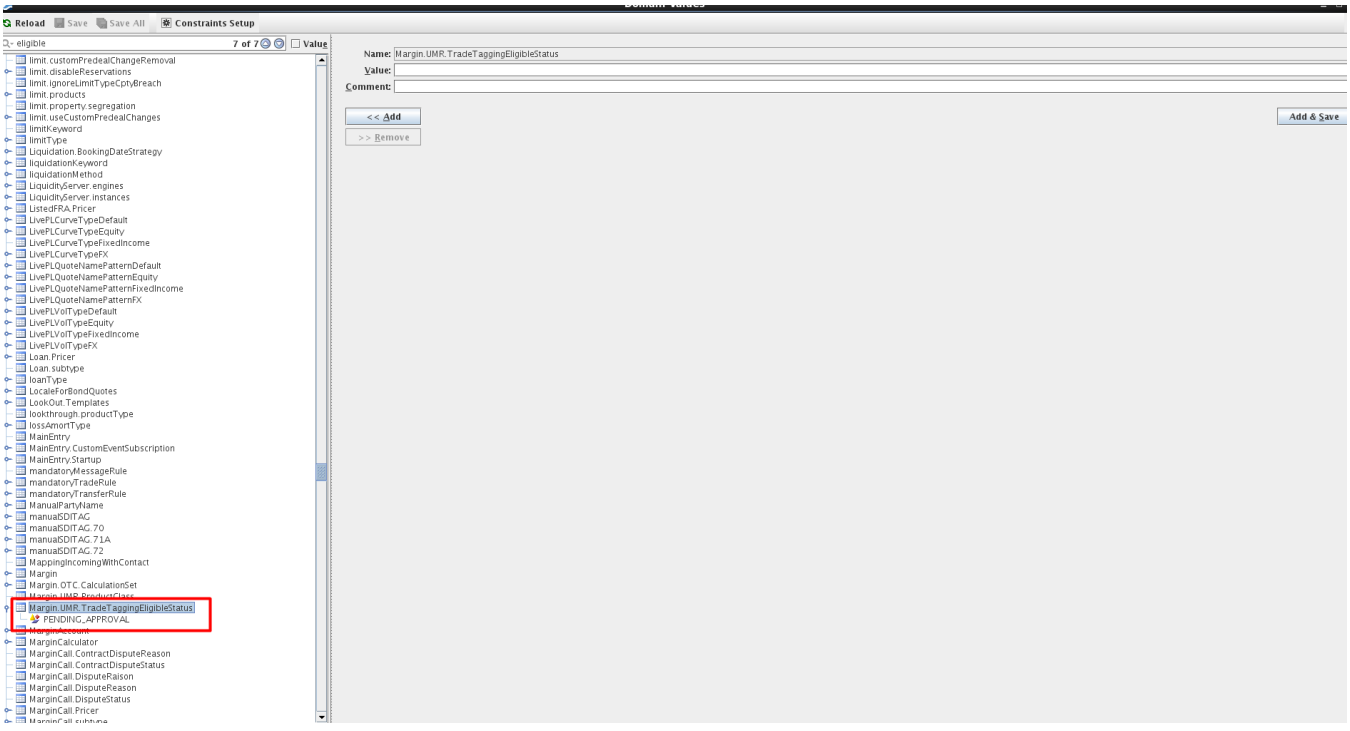
The account Start Date defines the trades in scope. Trades are tagged if the trade date is on or after the Start Date.

Define Eligible Status for Trade Tagging

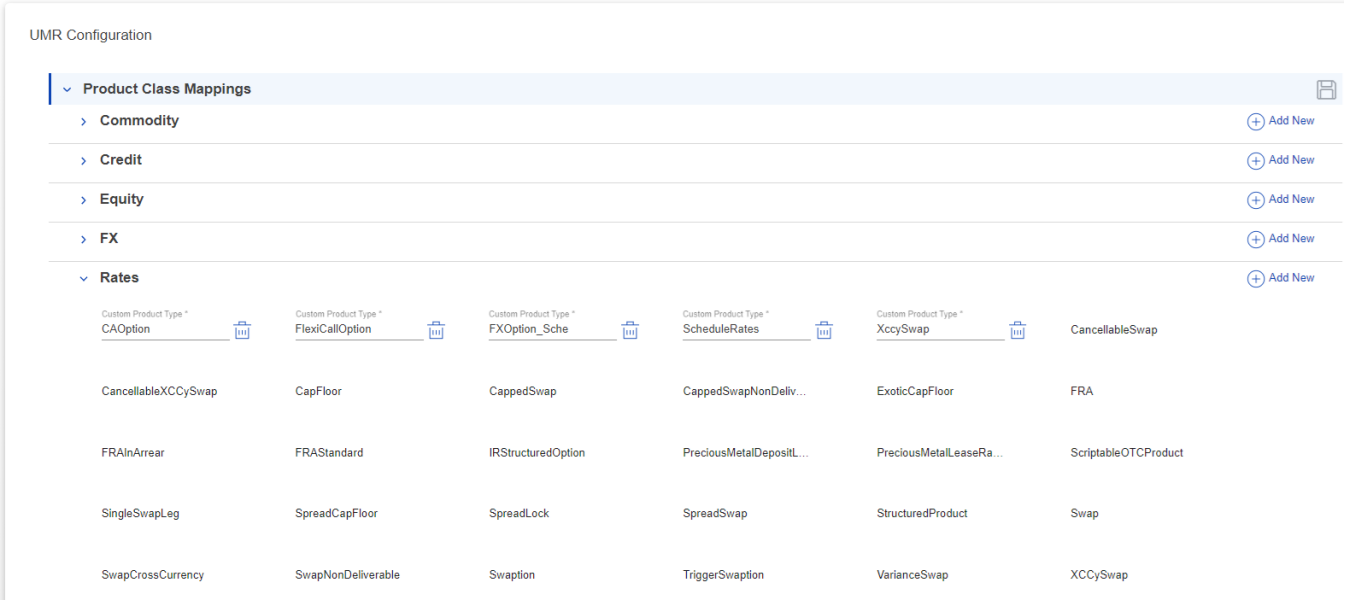
It is defined in the *Margin.UMR.TradeTaggingEligibleStatus* domain value.

The default trade status is 'Pending'. If the domain value is not set, then only trades in status 'Pending' will be tagged. If the domain value is set to a particular status, then only trades with that status will be tagged.

Trade tagging can be disabled for a single trade by setting the keyword "UMR_TAGGING" to "False".

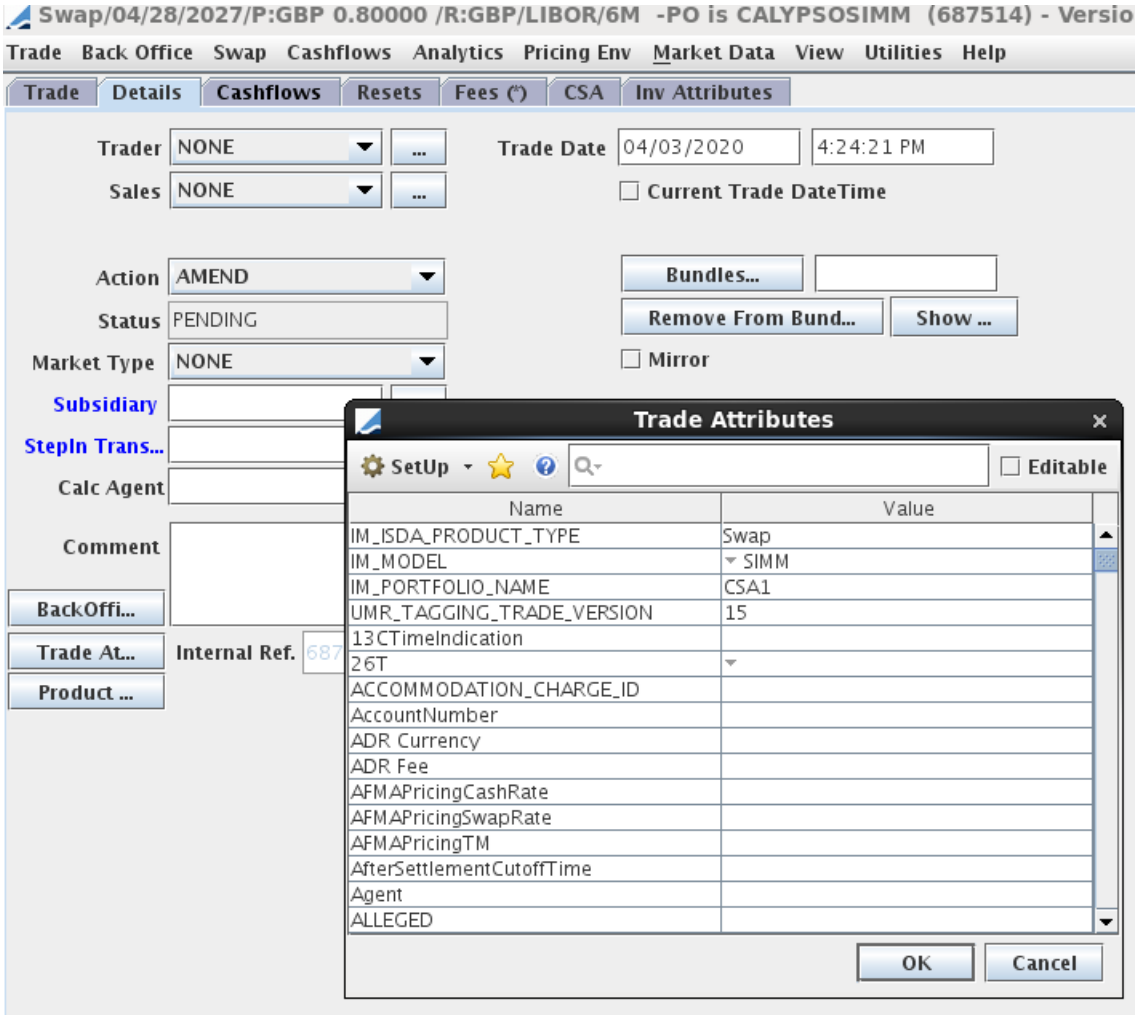


The keyword IM_ISDA_PRODUCT_TYPE needs to be defined in the trade and the value should be a valid product type defined in the product class mapping in the UMR configuration in Margin UI.



NOTE: The trade Counterparty and PO need to match the Counterparty and PO defined at the account level. If not, the trade tagging cannot be done.

The trade keyword UMR_TAGGING_TRADE_VERSION will show the version of the trade saved.



Novations & IBOR Migration

The trade tagging solution will automatically work with the out of the box novation and IBOR migration processes.

If a trade novation occurs after the UMR compliance date, then the trade becomes eligible for UMR calculation. For Novations, the keyword tagging process will look at the greater of the “LastNovationDate” keyword or the trade start date to compare against the start of the margin contract. Nothing is configured by the user; this is all done automatically through the novation lifecycle.

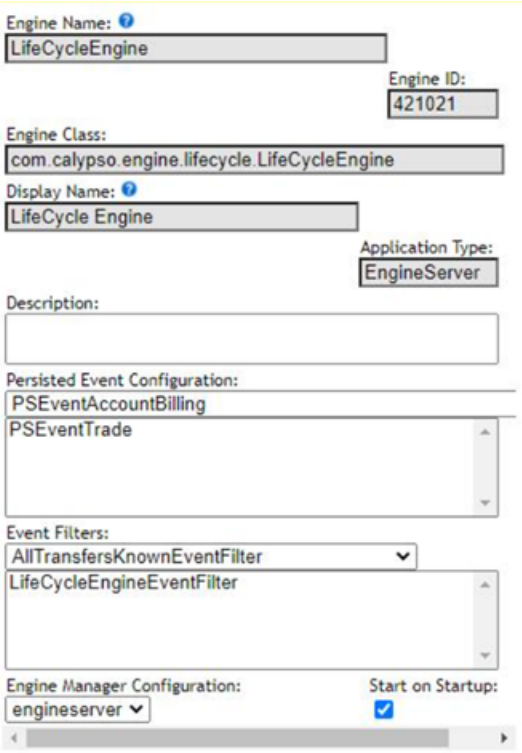
When a trade moves from an IBOR index to a replacement, the trade is then NOT eligible for UMR. To account for this the trade tagging process will look at keyword “TransferReason”. The out of the box calypso IBOR transition process will set this keyword to “RateIndex_Update”. When keyword “TransferReason” = RateIndex_Update, the UMR tagging will occur. Nothing is configured by the user; this is all done automatically through the RATEINDEX_UPDATE lifecycle.

Lifecycle Engine Setup

A LifeCycleHandler for UMR is available in the *lifeCycleEntityType* domain value to enable it in the LifeCycle engine. Lifecycle Engine needs to be added manually for the trade tagging to work. If trade tagging is not desired, this engine is not required.

This feature is not activated out-of-the-box. To activate the *UMR* Tagging, a domain value of UMR needs to be added in the *lifeCycleEntityType* domain. The LifeCycle Engine also needs to be configured.

You can configure the LifeCycle Engine using the Engine Manager in Web Admin.



2.8 Setup in Risk Factor Export

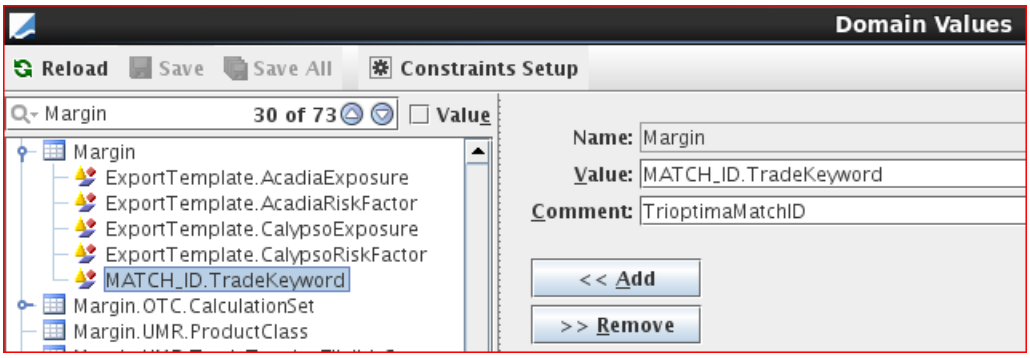
Match_ID in the Risk Factor Export

The column Match_ID can be populated when calculating risk factor, based on the 'Margin' domain value setup:

- Value: MATCHID.TradeKeyword
- Comment: keyword name

If this domain is not present or set to blank, then the Match_ID column is not populated.

Example:

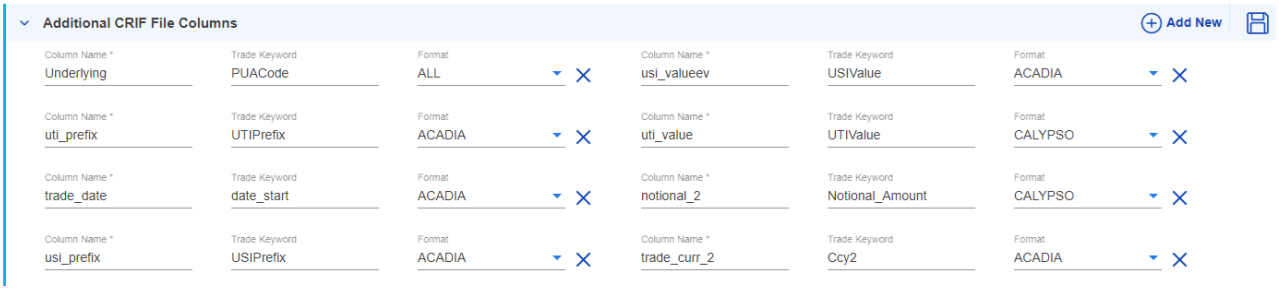


	A	B	C	D	E	F	G	H
1	trade_i	match_id	party_i	counter	portfoli	im_mo	end_da	risk_typ
35	632003	WXYZ	CALYPSOS	CP_1	CSA1	SIMM		Risk_IRCu
36	632003	WXYZ	CALYPSOS	CP_1	CSA1	SIMM		Risk_IRCu
37	632003	WXYZ	CALYPSOS	CP_1	CSA1	SIMM		Risk_IRCu
38	632003	WXYZ	CALYPSOS	CP_1	CSA1	SIMM		Risk_IRCu
39	632003	WXYZ	CALYPSOS	CP_1	CSA1	SIMM		Risk_IRCu
40	632003	WXYZ	CALYPSOS	CP_1	CSA1	SIMM		Risk_IRCu
41	632003	WXYZ	CALYPSOS	CP_1	CSA1	SIMM		Risk_IRCu
42	632003	WXYZ	CALYPSOS	CP_1	CSA1	SIMM		Risk_IRCu
43	632003	WXYZ	CALYPSOS	CP_1	CSA1	SIMM		Risk_IRCu

Additional Columns in the Risk Factor Export

As part of the UMR configuration, the section “Additional CRIF File Columns” can be used to define custom columns that will be output in the Calypso and Acadia risk factor exports.

UMR Configuration



These additional columns can be used for more accurate reconciliation and reporting.

The following parameters can be defined:

- Column Name: The name of the output Column (also can be used for importing risk factors)
- Trade Keyword: The calypso keyword name that maps to the column
- Format: ACADIA, CALYPSO or ALL.

When an additional column is configured, the system will automatically look up the trade keywords and populate the column for any risk factors from that trade in the risk factor export. Similarly, the user can then IMPORT risk factors with values in the defined column name. The final exported risk factors will homogenize keywords from calypso and imported column values.

If there is no keyword value or no imported column data, then the output column will be blank for the given trade.

2.9 Setup for Audit

The Audit mode can be set up for the Admin page (Calculation Sets, Margin Account Group, Exposure Monitoring, Product Class Mapping, Risk Factor Sources, additional CRIF file columns and Threshold Monitoring) and for the Reference Data (Margin Account, Group Threshold, Regulators). The following values need to be added to the domain "classAuditMode" as needed: *margin-simm*, *margin-manager*, *marginserver*.

- margin-simm and margin-manager – Audit records with this app name will be created only for v16.
- marginserver – In v17, both margin-simm and margin-manager are combined under marginserver. Audit records for margin will be created with the app name marginserver.

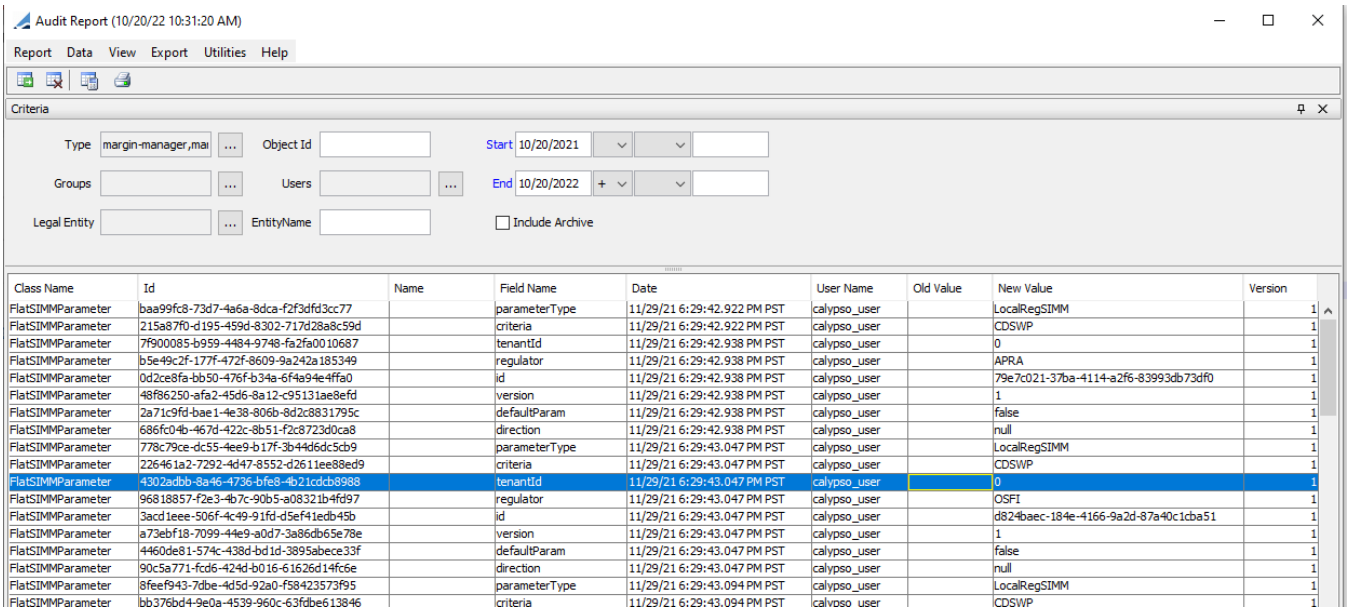
margin-simm and margin-manager can be configured in v17, only for backward compatibility support (such as for records created in v16).

For new records created in v17, marginserver should be added under the domain and configured under the audit report as filter criteria.

Below is a list of items mapped to margin-simm and margin-manager:

- margin-simm
  - cvscolumnconfig
  - riskfactorsource
  - calculationset
  - im-monitoring-config
- margin-manager
  - Margin Account
  - Account Group
  - Product mapping
  - Threshold-monitoring-config

Having selected audit types of margin-manager and/or margin-simm, the audit records for margin become visible in the Audit Report window.



2.10 Domain Values

Here is the list of domain names and values used in margin solution.

Domain Name	Domain Value	Domain Comment	Description
GENERATE_ALL_RF_SCHEDULE	true or false		Default value is true and all risk factors will be generated for Schedule trades
ISDASIMM.flipXccyBasisRisk.Currencies	Currency		
ISDASIMM.NonValidCurrency	blank or currency code	blank or currency code	To enable non-valid currency validation or conversion. Default value is blank/blank. This is further explained in CALCULATE Mode
ISDASIMM.treatIRCurveAsXccyBasis.Currencies	Currency		
lifeCycleEntityType	BackTesting		To enable UMR backtesting
lifeCycleEntityType	UMR		To enable UMR trade tagging

Domain Name	Domain Value	Domain Comment	Description
Margin	ExportTemplate.AcadiaExposure	Acadia IM file naming convention	Default value is MarginExporter-_-TIMEHORIZON-_-ACCOUNTGROUP-_-VALDATE This is further explained in Output File Names
Margin	ExportTemplate.AcadiaRiskFactor	Acadia CRIF file naming convention	Default value is ACCOUNTGROUP-IMRISK-_-VALDATE-_-ACADIA This is further explained in Output File Names
Margin	ExportTemplate.CalypsoExposure	Calypso IM file naming convention	Default value is MarginExporter-_-TIMEHORIZON-_-BilateralMargin_-TIMESTAMP This is further explained in Output File Names
Margin	ExportTemplate.CalypsoRiskFactor	Calypso CRIF file naming convention	Default value is ACCOUNTGROUP-IMRISK-_-VALDATE This is further explained in Output File Names
Margin	ExportTemplate.MarginAccount	Margin Account file naming convention.	Default value is MarginAccount-_-ACCOUNTGROUP-_-VALDATE This is further explained in Output File Names
Margin	ExportTemplate.MarginBackTes	Margin	Default value is

Domain Name	Domain Value	Domain Comment	Description
	ting	Backtesting file naming convention.	UMRBackTesting-_-ACCOUNTGROUP-_-VALDATE This is further explained in Output File Names
Margin	MATCH_ID.TradeKeyword	Keyword name	
Margin.PLMark.Optimization	true or false		When true, the performance for saving collateral exposures in MARGIN_CALCULATOR scheduled task is improved. Note - Error for single trade will result in failure of entire batch to save Collateral Exposures. By default, it is disabled (false).
Margin.UMR.TradeTaggingEligibleStatus	Trade Status		Used in trade tagging Default is PENDING if domain value is not defined
MarginEngine	SIMM_MARGIN_INPUT_ST_ID	Scheduled task IDs separated by commas	To define margin accounts to calculate what-if margin
MarginInput.AllowEmptyCRIF	true or false		Default value is false True to enable import a blank CRIF file or a file with headers but no rows
MarginInput.AnalysisParametersOverride	UseAlternateInterpolator	true or false	To enable UseAlternateInterpolator when calculating Risk factors. Default value is false

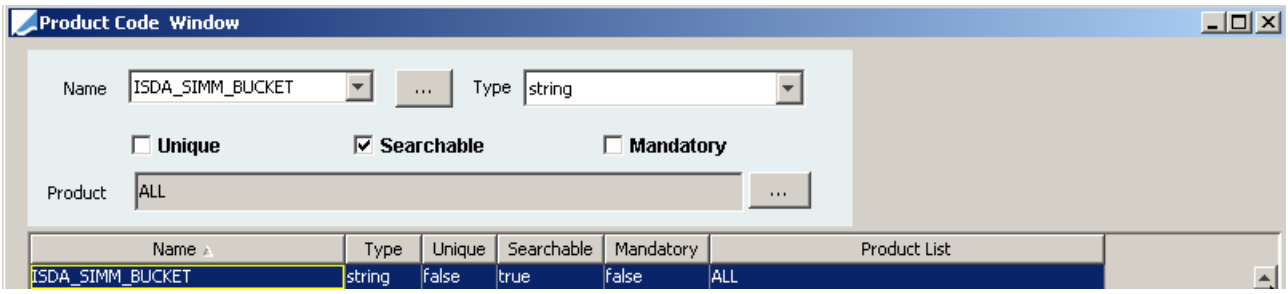
Domain Name	Domain Value	Domain Comment	Description
MarginInput.Inflation.Subtype	Product sub-type		
MarginInput.ProductFamily.Ignore	Product Family		To be ignored during risk factor calculation
MarginInput.RiskAnalysis.Parallelise	true or false		Default value is false
measuresForAdjustment	PM_SCHEDULE PM_SIMM		To enable PL marks of SIMM and SCHEDULE IM
MarginInput.ScheduleDuration	Swaption	Option/Underlying or blank	When comment is Option or blank, Swaption Expiry date will be used as “end_date” to calculate IM in Schedule methodology. Default behavior. When comment is Underlying, Swaption's Underlying maturity date will be used as “end_date” to calculate IM in Schedule methodology.

2.11 Product Data

The user is required to maintain an ISDA_SIMM_BUCKET product code for Credit and Equity.

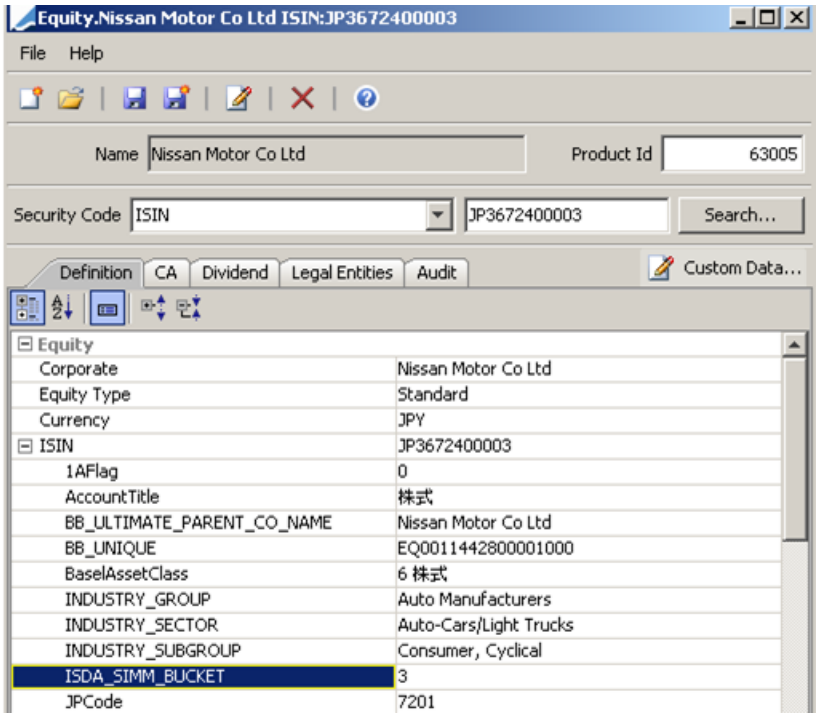
2.11.1 Equity

The user needs to configure Product Code *ISDA_SIMM_BUCKET* according to the configuration below:

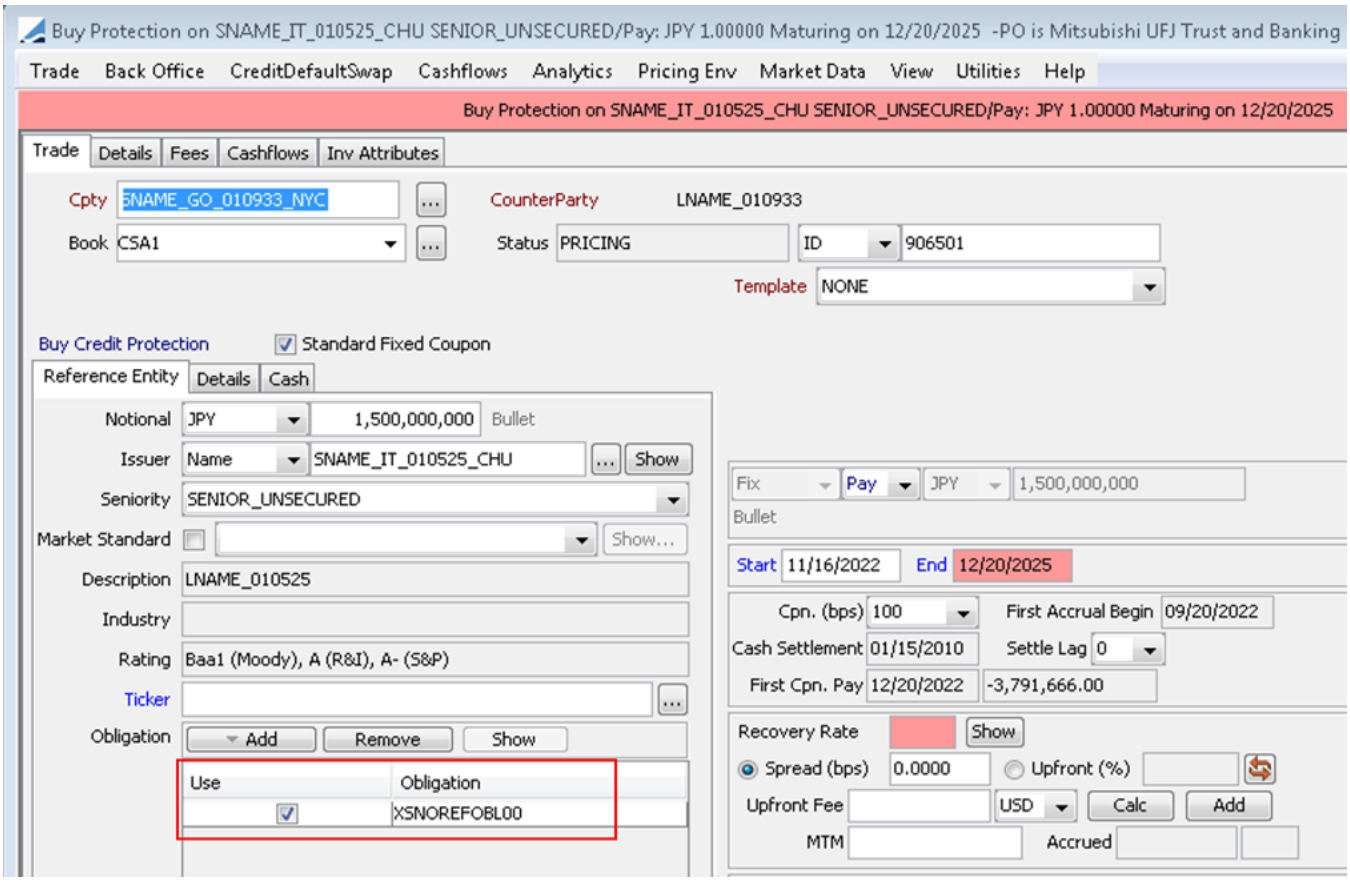


For each Equity product, the user needs to assign a valid ISDA_SIMM_BUCKET.

[1,2,3,4,5,6,7,8,9,10,11,Residual]



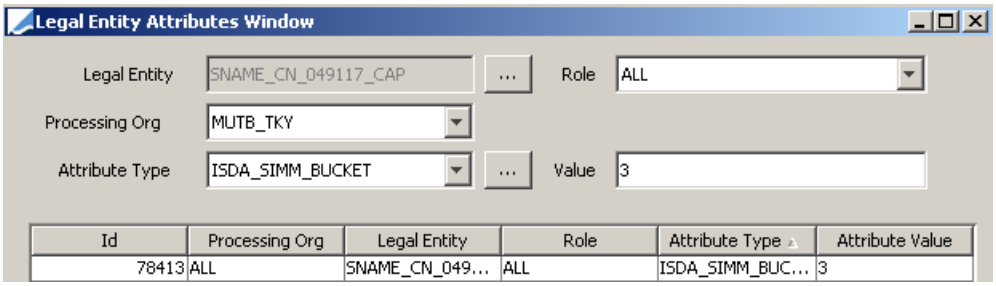
A valid ISIN is not mandatory for any product. If a trade has no valid ISIN, a dummy obligation can be defined in the trade screen as below and this dummy ISIN would be used as a qualifier.



2.11.2 Credit

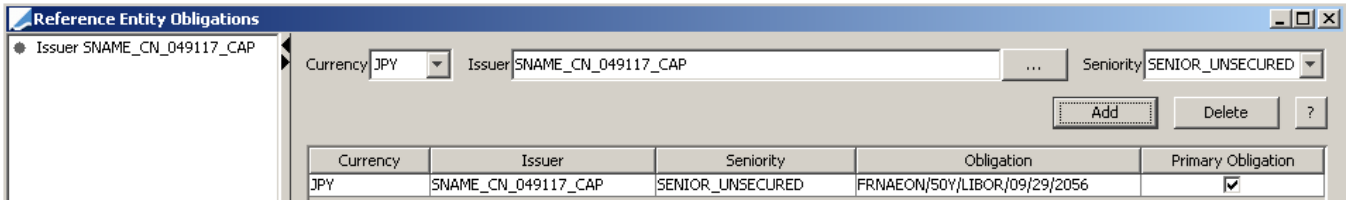
The user needs to configure the Legal Entity Attribute *ISDA_SIMM_BUCKET* with a valid ISDA bucket for Credit for each Issuer.

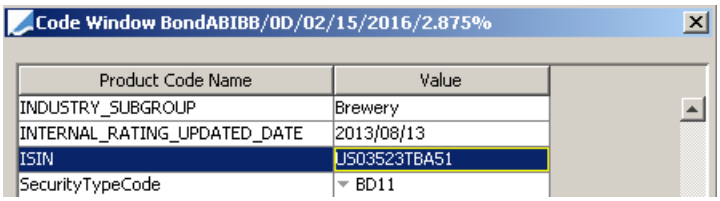
[1,2,3,4,5,6,7,8,9,10,11,12,Residual]



Note: The Processing Org Role must be ALL.

The user can maintain a PRIMARY REFERENCE OBLIGATION for each issuer and a valid ISIN for each obligation.

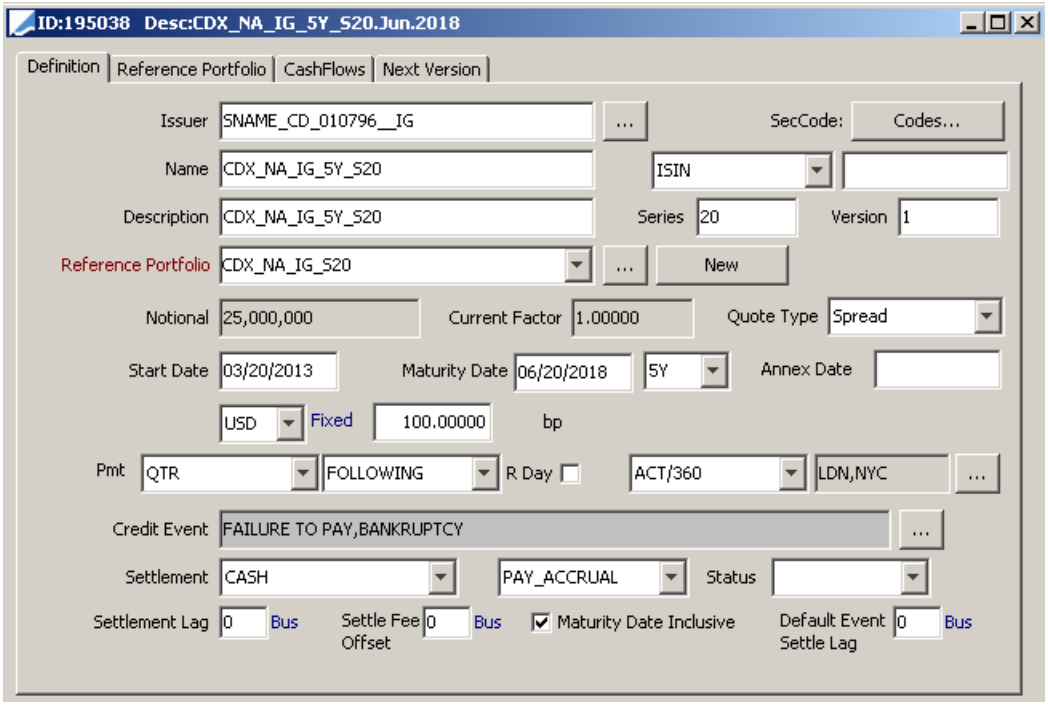


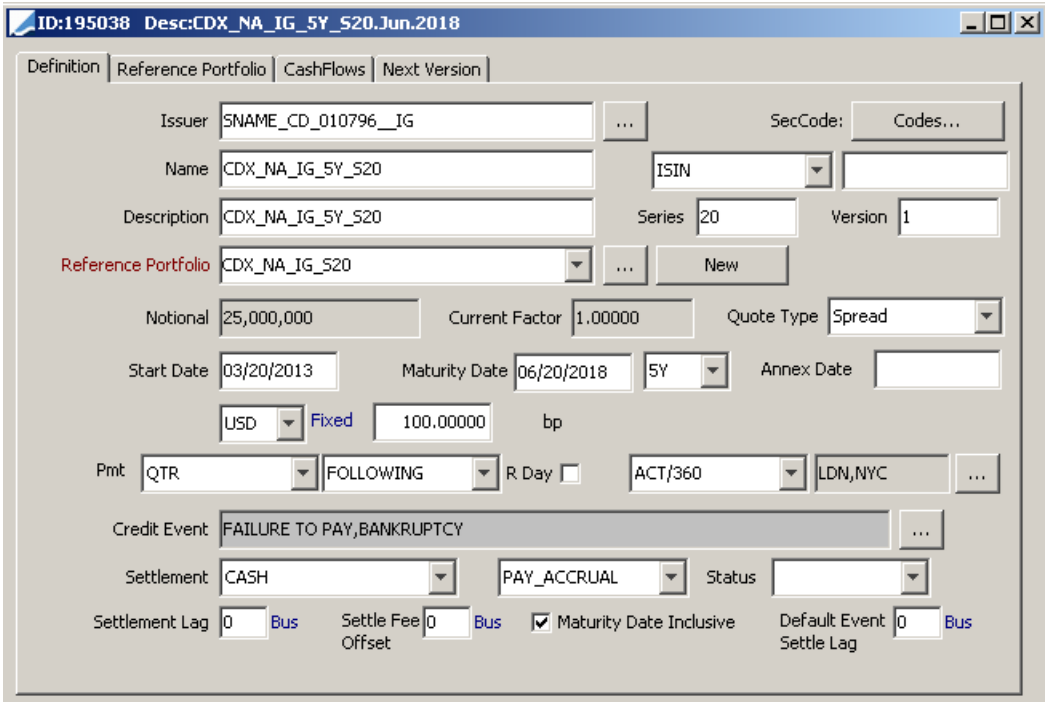


However, a valid ISIN is not mandatory. If a trade has no valid ISIN, a dummy obligation can be defined in the trade screen and this dummy ISIN would be used as a qualifier.

CDSIndex Definition

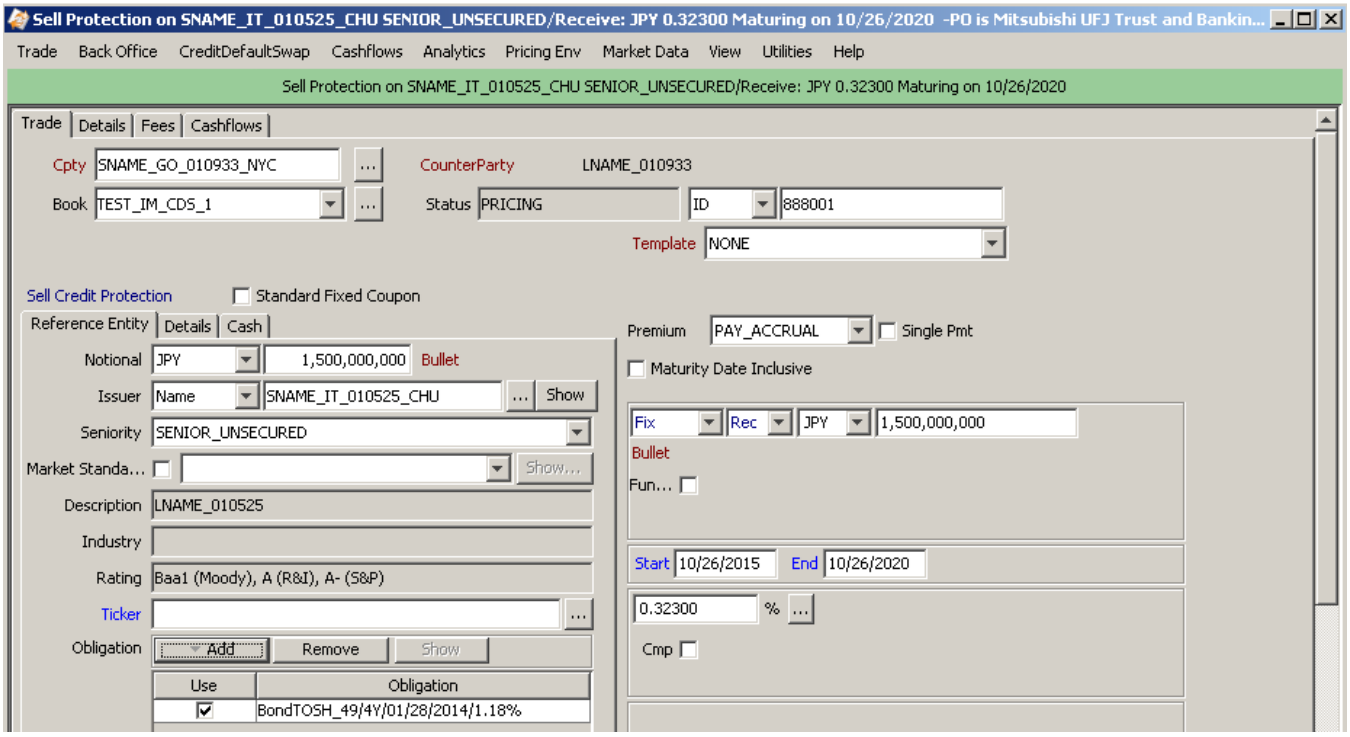
The user is required to maintain a valid CDSIndex Definition and reference basket.





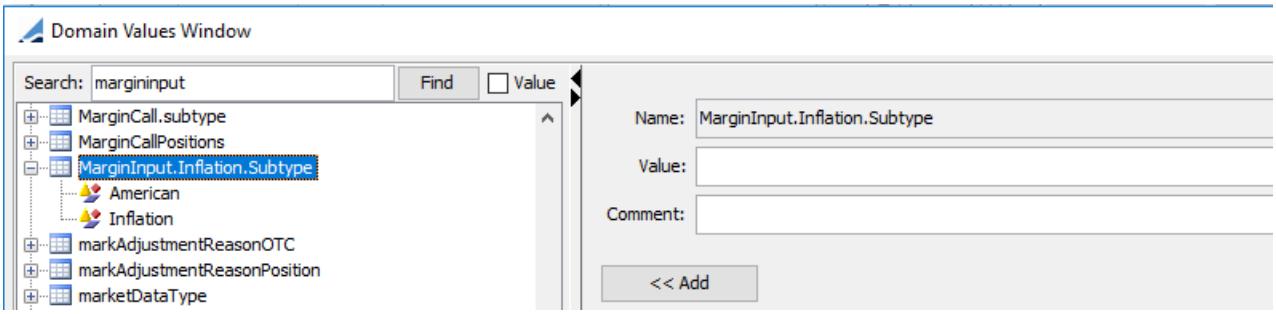
CreditDefaultSwap

The user should make sure Obligation is populated on the CreditDefaultSwap trade. If Primary Obligation is defined for the issuer, it will be automatically populated in the trade.

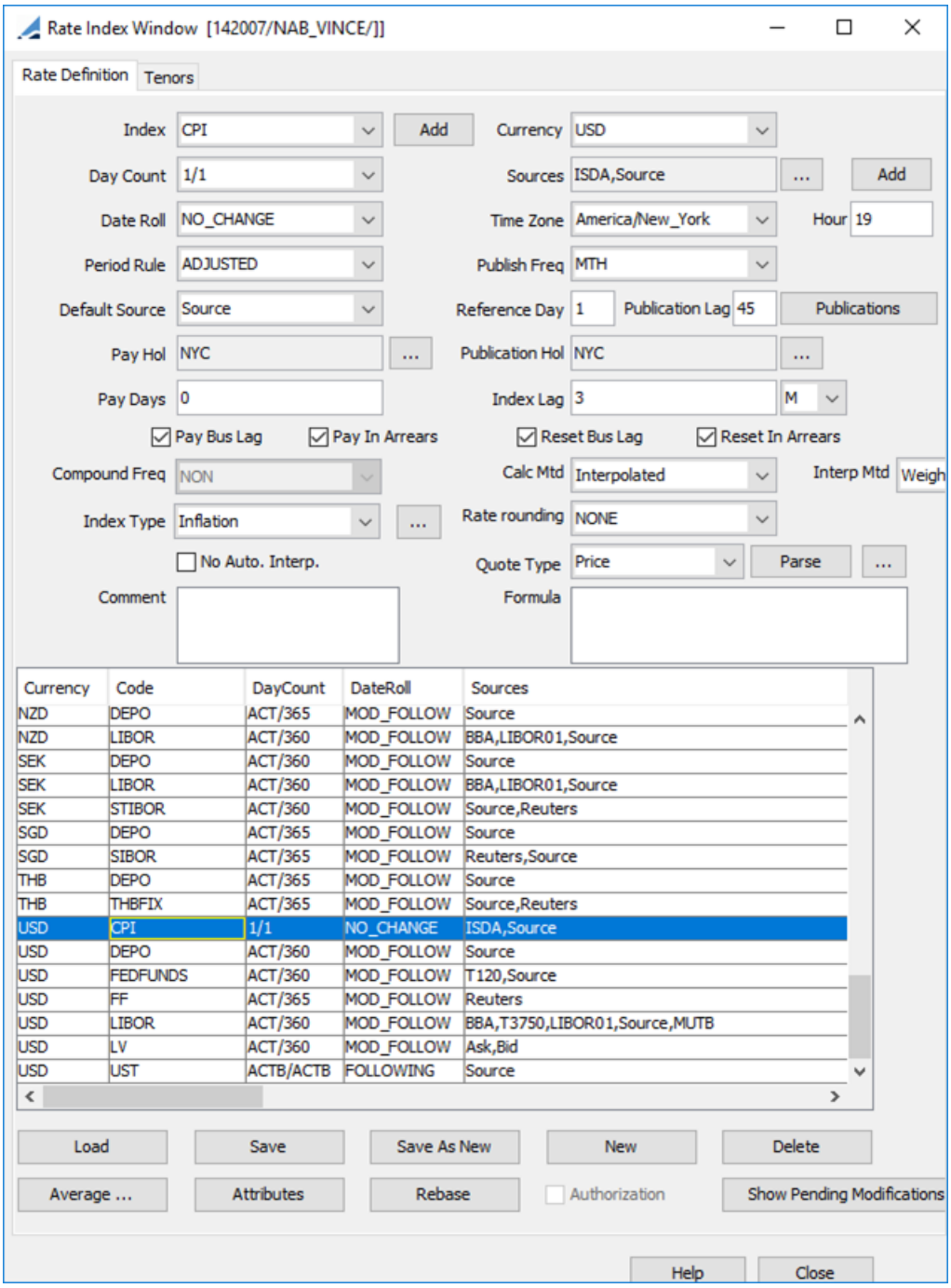


2.11.3 Inflation Swap

Inflation swaps are classified under product sub-types that can be defined in the domain *MarginInput.Inflation.Subtype* irrespective of the product type.



Apart from the product subtype, the market data should have an inflation index for the trade to be classified under the Inflation sub-type and to calculate InflationVol sensitivities. If the subtype is classified as *Inflation* in the domain values but the market data is using rates index instead, it will calculate IRVol and not inflationVol irrespective of the product sub-type. The index can be defined in the rates index window in Calypso. (Configuration > Interest Rates > Rate Interest Definition)



An example of the multi-sensitivity output for different indices being used for product subtype defined for Inflation is below.

Trade Id	Risk Exploded Trade Id	Product Id	Measures	Values	Underlier Currency	Underlier Name	Underlier Market Data Name	Product Subtype
891301	891301	318501	rateVega(Base)	67,096.70	USD	USD CPI 0D	USD CPI CAP_CAPATM	Inflation
891301	891301	318501	rateVega(Base)	85,257.12	USD	USD CPI 0D	USD CPI CAP_CAPATM	Inflation
-2	891401	318602	rateVega(Base)	13,419.34	USD	USD CPI 0D	USD CPI CAP_CAPATM	Inflation
-2	891401	318602	rateVega(Base)	24,977.72	USD	USD CPI 0D	USD CPI CAP_CAPATM	Inflation
-5	891401	318901	rateVega(Base)	11.27	USD	USD LIBOR 3M	@TK_USD_LIBOR_Swptn_VolSurf	American
-5	891401	318901	rateVega(Base)	73.53	USD	USD LIBOR 3M	@TK_USD_LIBOR_Swptn_VolSurf	American
-8	891501	318705	rateVega(Base)	3,448.47	USD	USD CPI 0D	USD CPI CAP_CAPATM	Inflation
891601	891601	318801	rateVega(Base)	1.03	USD	USD LIBOR 3M	@TK_USD_LIBOR_Swptn_VolSurf	American
891601	891601	318801	rateVega(Base)	10.61	USD	USD LIBOR 3M	@TK_USD_LIBOR_Swptn_VolSurf	American

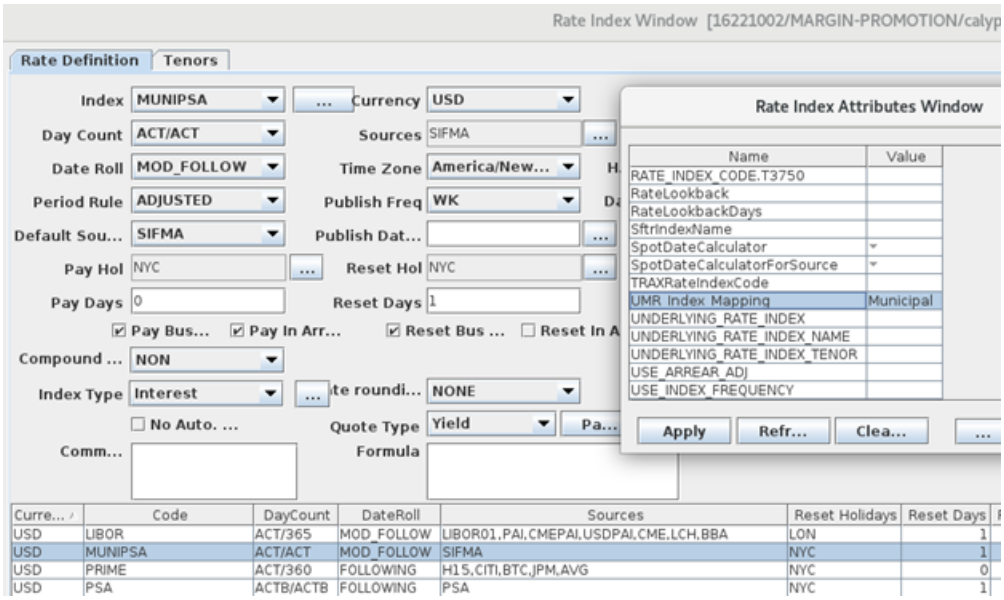
In the above case, trade 891301 has Vega with *Inflation* as subtype in MSA, and market data USD CPI CAP_CAPATM has inflation index CPI. So, this trade will have InflationVol sensitivities. While trade 891601 has Vega with *American* as subtype in MSA, and market data @TK_USD_LIBOR_Swptn_VolSurf has Rates index Libor. So, this trade will have IRVol sensitivities.

2.11.4 Interest Rate Index

Interest rate index mapping of Risk_IRCurve Label2 follows below rules.

- If index is PRIME, label2 is Prime
- If index is overnight index, label2 is OIS. Overnight index is one of below: FED,ONIA,TONAR,CORRA,TOIS,HONIX,MIBOR,MITOR,NZIONA,SIOR,SONAR,TORF
- If index is neither PRIME nor overnight index and tenor is either 1D or 0D, label2 is OIS
- If index is not PRIME, not overnight and not OIS, it tries to use the value of UMR_Index_Mapping attribute of Calypso Rate Index Defaults as label2
- Otherwise, label2 is Libor*

Example of mapping with UMR_Index_Mapping attribute:

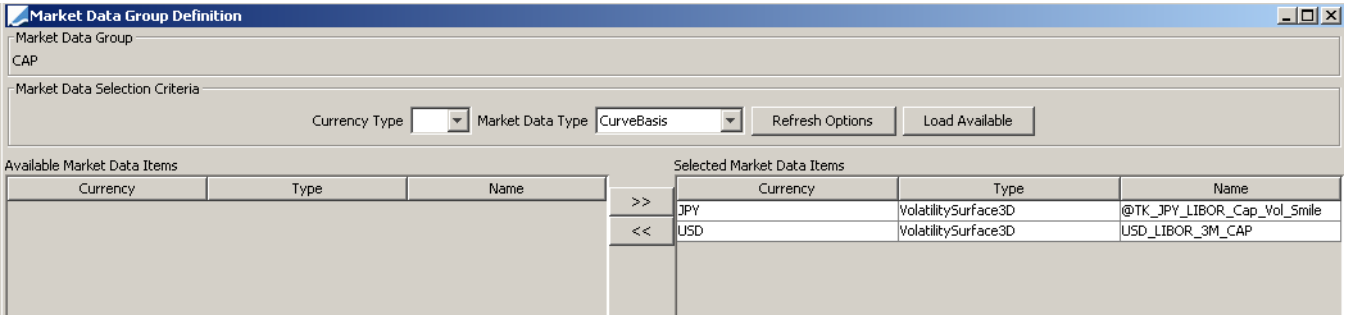


2.12 Market Data Groups

Market data groups are used in the following functionalities (within the context of ISDA SIMM Margin):

ParRate Analysis

- Scheduled task MARGIN_INPUT – Ignore Curves, XCcy Zero Curves
- Scheduled task CREATE_CAPATM_SURFACE – Surfaces
- Scheduled task CREATE_ATM_SURFACE - Surfaces
- The Market Data Group window is accessed using the menu action `marketdata.MarketDataGroupWindow`.



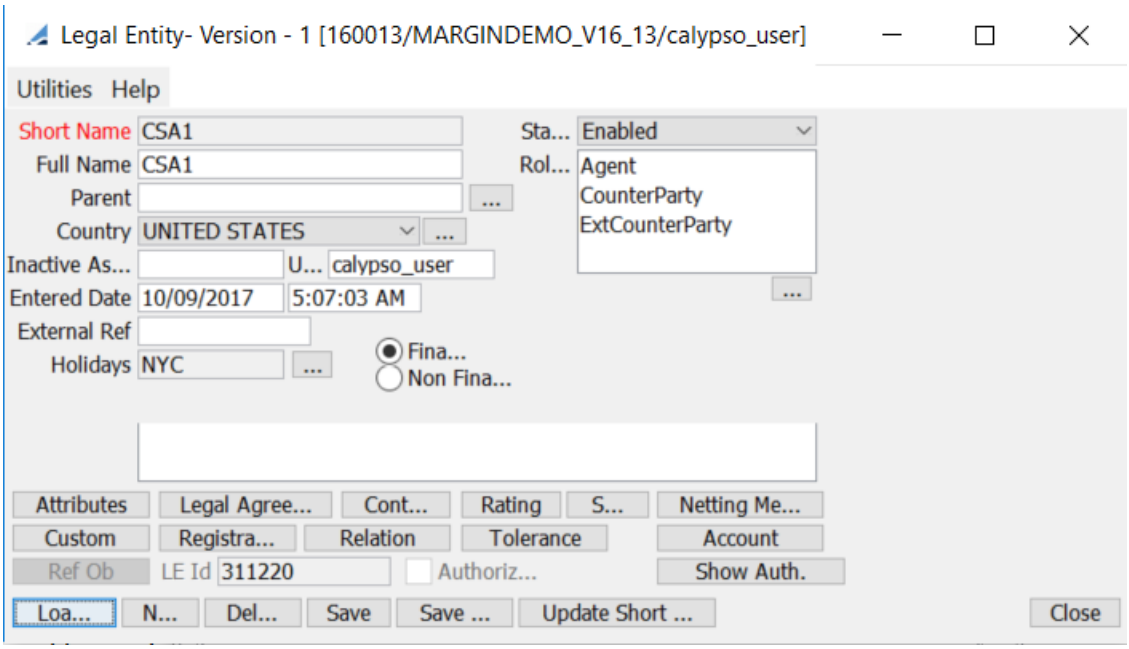
The user can select the currency and market data type of the market data items and click “Load Available”. The system will display the corresponding market data items on the left side of the window. The user can use the right arrow to move market data items into the right side of the window. Click “Save” or “Save as” to create/update a market data group.

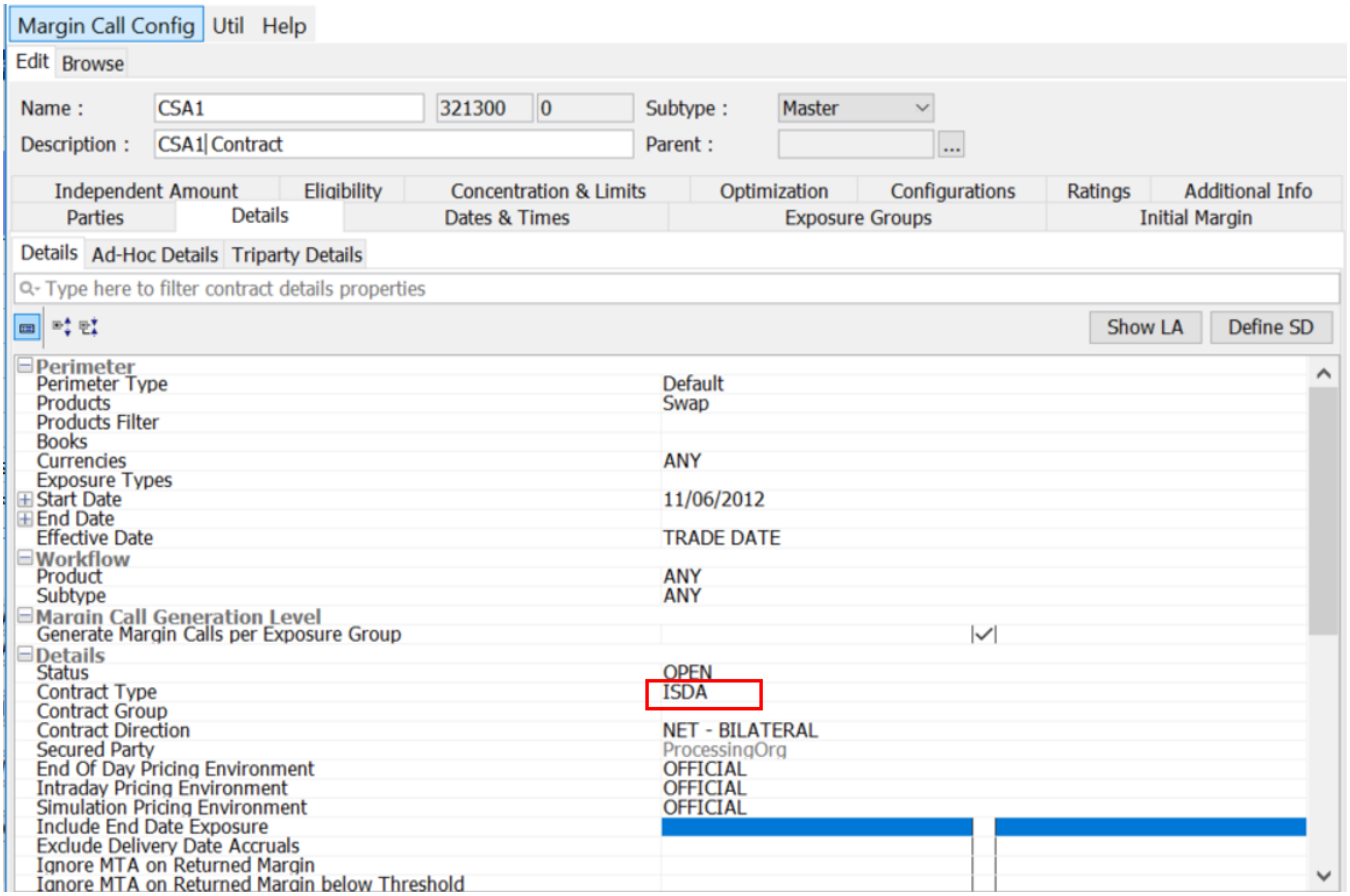
3. Bilateral Margin Collateral Setup

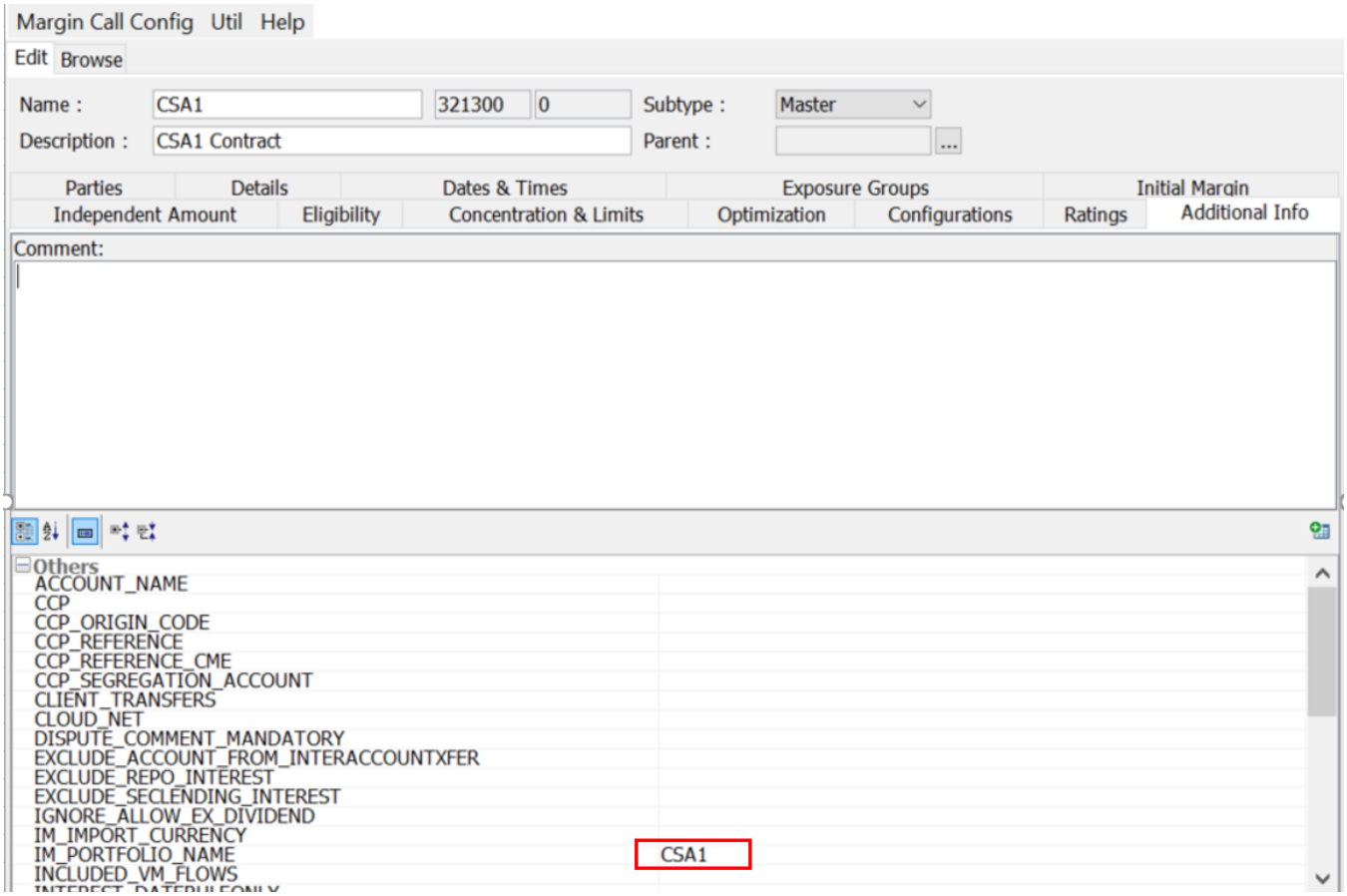
3.1 Margin Call Contract

If the margin calculation is to be used by the Calypso collateral solution, margin call contracts must be configured.

To manually generate CSA agreements in Calypso, the user needs to create legal entities for each CSA agreement and create a margin call contract for the counterparty with 'IM_PORTFOLIO_NAME' under 'Additional Attributes'. IM_PORTFOLIO_NAME must be set to the CSA name. The contract type of the margin call contract must be set to ISDA.




Margin Call Config
Util
Help
Edit
Browse
Name :
CSA1
321300
0
Subtype :
Master
Description :
CSA1 Contract
Parent :
Independent Amount
Eligibility
Concentration & Limits
Optimization
Configurations
Ratings
Additional Info
Parties
Details
Dates & Times
Exposure Groups
Initial Margin
Details
Ad-Hoc Details
Triparty Details
Type here to filter contract details properties
Show LA
Define SD
Perimeter
Perimeter Type
Default
Products
Swap
Products Filter
Books
Currencies
ANY
Exposure Types
Start Date
11/06/2012
End Date
Effective Date
TRADE DATE
Workflow
Product
ANY
Subtype
ANY
Margin Call Generation Level
Generate Margin Calls per Exposure Group
Details
Status
OPEN
Contract Type
ISDA
Contract Group
Contract Direction
NET - BILATERAL
Secured Party
ProcessingOrg
End Of Day Pricing Environment
OFFICIAL
Intraday Pricing Environment
OFFICIAL
Simulation Pricing Environment
OFFICIAL
Include End Date Exposure
Exclude Delivery Date Accruals
Ignore MTA on Returned Margin
Ignore MTA on Returned Margin below Threshold

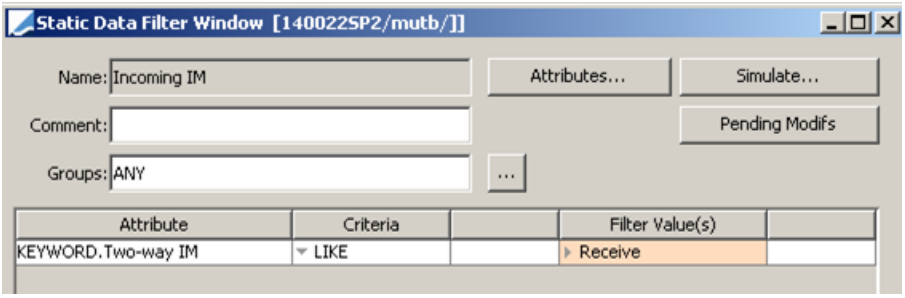


3.2 Exposure Group Configuration

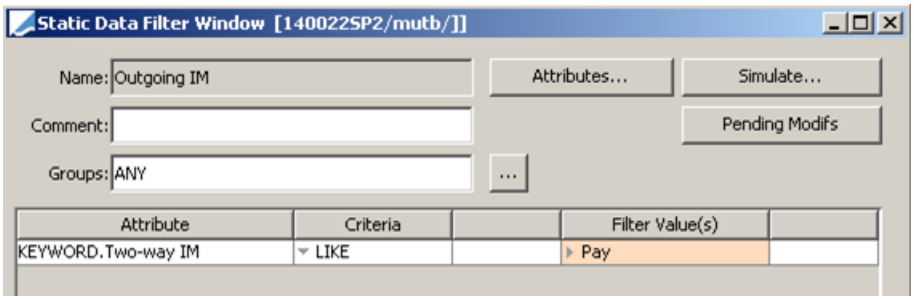
To support Two-way IM, the concept of the Exposure Group was created on the Margin Call contract. For details of how exposure groups work, please refer to the Collateral module documentation. Here we are just focusing on how to configure exposure groups to see the collateral exposure trades which are created by the scheduled task MARGIN_CALCULATOR.

User needs to define below static data filters for incoming IM and outgoing IM, then define them into exposure groups in margin call contract.

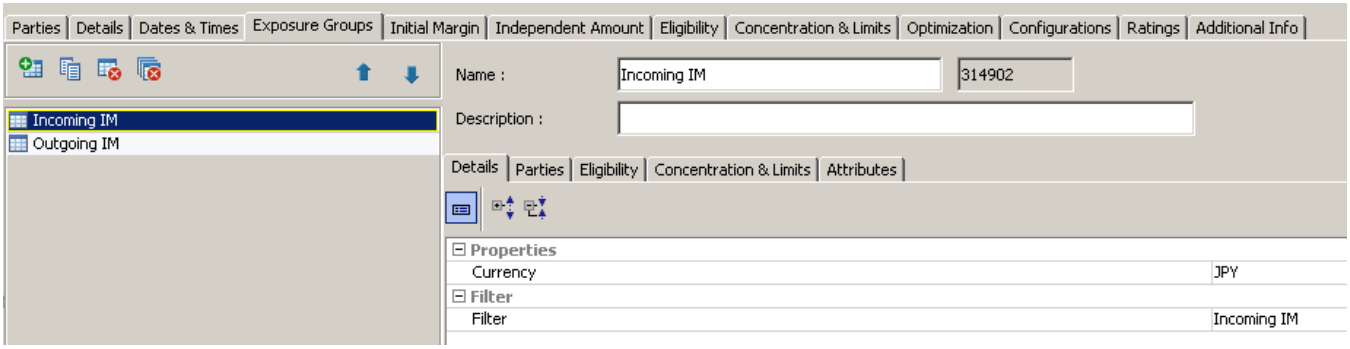
Static Data Filter - Incoming IM



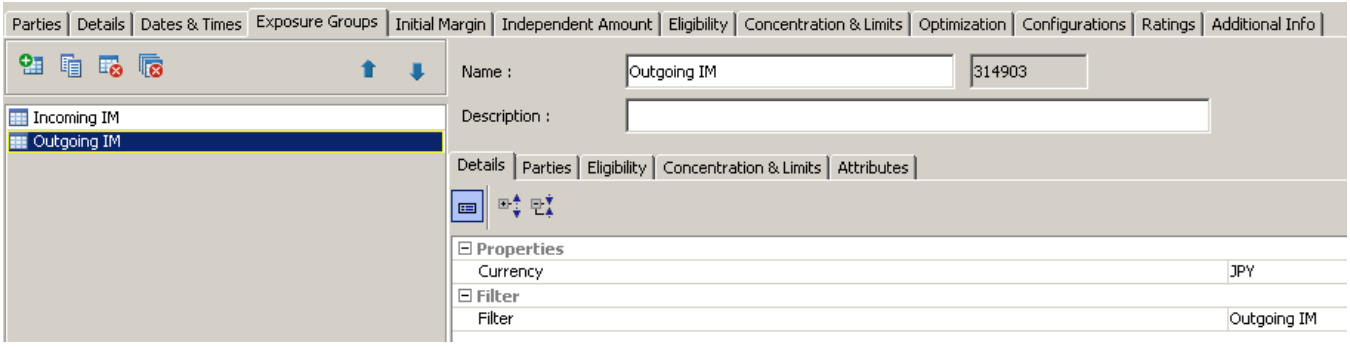
Static Data Filter - Outgoing IM



Exposure Groups - Incoming IM



Exposure Groups - Outgoing IM



4. Bilateral Margin Process

4.1 MARGIN_INPUT Scheduled Task

The MARGIN_INPUT scheduled task allows users to-

- Import/export accounts and regulators
- Calculate/import/export risk sensitivities
- Calculate IM

The user defined under CLIENTUSER is running the scheduled task and therefore needs proper permissions.

The configuration of the scheduled task is described below:

Attributes	Values
Pricing Environment	Pricing Env used for computation
Timezone	Timezone
Trade Filter	Trade filter is a mandatory field in Calculate mode in case of using margin group. The trade filter needs to define the trade status or product types in scope. The scope of accounts is defined by the Account Group. In calculate mode of using ERS hierarchy, the trade filter should leave as blank. This is further explained in Trade Filters
Undo Time Hour	Undo Time Hour – To roll back of trade population in CALCULATE mode
Undo Time Minute	Undo Time Minute – To roll back of trade population in CALCULATE mode
Mode	CALCULATE – To calculate Risk Factors for all risk dimensions. IMPORT RISK FACTORS – To import Risk Factors. IMPORT ACCOUNTS – To import margin accounts and regulator information. IMPORT SIMM BUCKETS – To import bucket tagging of crowdsourcing utilities. EXPORT – To export Risk Factors (i.e. CRIF file). EXPORT ACADIA – To export Risk Factors (i.e. CRIF file), in a format compatible with the Acadia reconciliation tool. EXPORT ACADIA MARGIN CCY – To export Risk Factors (i.e. CRIF file), in a format compatible with the Acadia reconciliation tool in margin currency. EXPORT ACCOUNTS – To export margin accounts and regulator information.
Risk Factor Source	If the attribute is empty, source will be retrieved from the risk file. If it is set, the source from the attribute will be used and when saving sensitivities, the source from the scheduled task will override

Attributes	Values
	the source from the file.
File Location	Mode = IMPORT RISK FACTORS/ IMPORT ACCOUNTS/ IMPORT SIMM BUCKETS - The full path of the CSV file. (e.g. c:\data\ir_risk.csv). The File Location attribute can add a valuation date placeholder. It also allows for the loading of a file that contains a valuation date in its name. For example, JPM_CRIF_WSS_|yyyy-mm-dd|.csv would allow JPM_CRIF_WSS_2020-06-21.csv to be loaded with the valuation date being 2020-06-21. Mode = CALCULATE - This field can be blank, or if it is not blank, it will not be used. Mode = EXPORT/EXPORT ACADIA/EXPORT ACADIA MARGIN CCY - The path where the CSV file will be saved (e.g. c:\data\)
Account Groups	The name of Account Groups for which the schedule task will be run. The scheduled task is run for all accounts under the selected account groups.
Calculation Set	Choose the Calculation Set for which the risk factors will be saved to or exported from.
ParRate Analysis Parameter	ParRate analysis parameters for CALCULATE mode. If Mode = IMPORT RISK FACTORS/IMPORT ACCOUNTS/EXPORT, this field can be blank, or if it is not blank, it will not be used.
Risk Type Filter	Type of sensitivity. Only used in Mode = IMPORT RISK FACTORS. Risk_IRCurve Risk_XccyBasis Risk_Inflation Risk_IRVol Risk_InflationVol Risk_FX Risk_FXVol Risk_CreditQ Risk_CreditVol Risk_BaseCorr Risk_Equity Risk_CreditNonQ Risk_CreditVolNonQ Risk_Equity Risk_EquityVol

Attributes	Values
	Risk_Commodity Risk_CommodityVol Notional Param_AddOnNotionalFactor Param_AddOnFixedAmount Param_Regulation Param_ProductClassMultiplier Param_Schedule-Product Param_LocalRegSIMM PV
Trade Id Filter	Optional filter only for IMPORT RISK FACTORS. It excludes trades with Id in this filter (Trade Ids should be comma separated with no space). Default is blank which will not exclude any trade.
Ignore Curves	A market data group that contains curves to be ignored. This attribute is only used in CALCULATE mode. The risk of zero curves in the selected market data group will be ignored. For example, user might want to ignore the risk from basis curves according to the requirement from ISDA.
Grid: Dispatcher Name	Dispatcher configuration. If dispatcher is specified, risk analysis will be run on dispatcher.
Explode Trades	Only for CALCULATE mode. If set to *true* multi-sensitivity analysis will explode the structured trade. For SCHEDULE model, if set to *true*, CA_NOTIONAL pricer measure is used instead of NOTIONAL for IM calculation. No configuration change required.
Job Size	If analysis is run on dispatcher, specify how many trades per job. If this is not set, default is 0.
Stop on errors	This attribute is not used.
Include Zero Sensitivities	Adds dummy zero sensitivity for trades having no sensitivity. Default is false. This field will be used when Mode is set to Calculate.
Xccy Zero Curves	A market data group that contains curves (zero) which sensitivities are categorized as Risk_XCcyBasis instead of Risk_IRCurve.

When import modes are used, the user needs to specify the file location. Data is persisted at trade level.

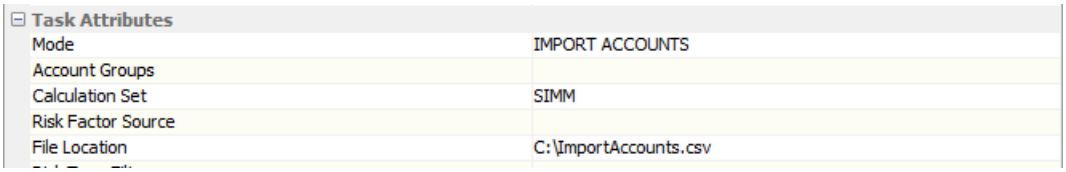
The scheduled task imports only the selected risk type. Calypso only maintains a single set of data per margin agreement for a given value date. Therefore, upon running CALCULATE or import modes, existing data will be deleted and replaced by the new data for a given value date.

When the user uses the EXPORT mode, the file location also needs to be specified. The risk type filter does not apply on EXPORT mode. All data is exported as of the value date time.

If the user decides to use a dispatcher while running the risk sensitivity calculation, the dispatcher name and job size should be specified.

4.1.1 IMPORT ACCOUNTS Mode

IMPORT ACCOUNTS mode imports accounts and regulators information, as well as margin account groups and threshold groups. This is further explained in Margin Accounts Setup.



Note 1: Import File Format

Column Name	Type	Required	Description
PARTY_ID	String	Optional	Own Legal Entity (Processing Org)
CP_ID	String	Optional	CounterParty Legal Entity
START_DATE	String	Optional	yyyy-MM-DD format
ACCOUNT_GROUP	String	Mandatory	Account Group name to which the margin agreement name belongs. Can be one or more (comma separated).
THRESHOLD_GROUP	String	Optional	Threshold Group name to which the margin agreement name belongs.
MARGIN_AGREEMENT_NAME	String	Mandatory	Margin Agreement Name
RISK_TYPE	String	Mandatory	Param_Regulation Param_AddOnNotionalFactor Param_AddOnFixedAmount Param_ProductClassMultiplier Param_Schedule-Product Param_LocalRegSIMM Param_Threshold_Group
QUALIFIER	String	Mandatory	CSA type for Param_Regulation: CSA In Place or Pre-CSA Product class for Param_ProductClassMultiplier: RatesFX, Equity, Credit or Commodity Product type for Param_Schedule-Product, Param_LocalRegSIMM and Param_AddOnNotionalFactor: string Not required for Param_AddOnFixedAmount and Param_Threshold_Group

Column Name	Type	Required	Description
AMOUNT	Double	Mandatory	Threshold amount for Param_Threshold_Group Threshold amount for Param_Regulation, optional Multiplier for Param_ProductClassMultiplier Factor for Param_AddOnNotionalFactor Fixed Amount for Param_AddOnFixedAmount Not required for Param_Schedule-Product
CURRENCY	String	Mandator	Required for Param_Regulation, Param_Threshold_Group and Param_AddOnFixedAmount
COLLECT_REGULATIONS	String	Mandatory	Regulators. Can be one or more (comma separated)
POST_REGULATIONS	String	Mandatory	Regulators. Can be one or more (comma separated)
WARNING_LEVEL	Double	Optional	Warning level percentage for Param_Threshold_Group, optional

Example of accounts import file.

MARGIN_	THRESHOLD_GROUP	ACCOUNT_GROUP	RISK_TYPE	QUALIFIER	AMOUNT	CURRENC	COLLECT_REGULATIONS	POST_REGULATIONS	WARNING_LEVEL	
CSA1	ThresholdGroup1	MarginGroup1	Param_Regulation	CSA In Place	5.00E+07	USD	APRA,CFTC,JFSA	APRA,CFTC,JFSA		
CSA2	ThresholdGroup2	MarginGroup1	Param_Regulation	Pre-CSA	5.00E+07	USD	APRA	APRA		
CSA3	ThresholdGroup1	MarginGroup2	Param_Regulation	CSA In Place	5.00E+07	GBP	APRA	APRA,JFSA		
CSA4	ThresholdGroup2	MarginGroup2	Param_Regulation	Pre-CSA		GBP	CFTC,APRA	JFSA		
CSA5		MarginGroup3	Param_Regulation	CSA In Place		USD	CFTC,JFSA	APRA		
CSA_ASY		MarginGroup3	Param_Regulation	CSA In Place		USD		APRA		
CSA_ASY		MarginGroup3	Param_Regulation	CSA In Place		EUR	CFTC,JFSA			
			Param_Schedule-Product	FXOption			APRA,JFSA	APRA,JFSA		
			Param_AddOnFixedAmount		1000	USD	APRA	APRA		
			Param_LocalRegSIMM	CDSWP			ESA,JFSA,USPR	ESA,JFSA,USPR		
			Param_AddOnNotionalFactor	Swap	2		APRA	APRA		
			Param_ProductClassMultiplier	RatesFX	1.1		CFTC	CFTC		
CSA1			Param_Schedule-Product	Swaption			APRA,JFSA	APRA,JFSA		
CSA1			Param_ProductClassMultiplier	Equity	1.1		CFTC	CFTC		
CSA3			Param_AddOnNotionalFactor	Swap	3		CFTC	CFTC		
CSA3			Param_AddOnFixedAmount		1000	GBP	JFSA	JFSA		
CSA3			Param_Schedule-Product	CDSWP			APRA	APRA		

4.1.2 IMPORT RISK FACTORS Mode

IMPORT RISK FACTORS mode imports risk factors from CRIF file.

In CRIF file, SIMM risk factors have Risk_Type starts with '*Risk_*' and IM_MODEL=SIMM. SCHEDULE risk factors have Risk_Type Notional and PV with IM_MODEL=SCHEDULE. All trades must have at least SCHEDULE risk factors. In most cases, trades have both SIMM and SCHEDULE risk factors.

The qualifier of SCHEDULE risk factors defines product type of the trades. While importing, SIMM and SCHEDULE risk factors are saved for different regulators based on accounts definition. This is further explained in Reference Data

The Amount_USD column can be empty. In that case, the system converts the amount in the Amount column into Amount_USD using the exchange rate from the quote set.

Note 1: Import File Format.

Column Name	Type	Required	Description
TRADE_ID	Integer	Mandatory	Trade ID
PARTY_ID	String	Mandatory	Own Legal Entity (Processing Org)
CP_ID	String	Mandatory	CounterParty Legal Entity
ACCOUNT_GROUP	String	Mandatory	Account Group name to which the margin agreement name belongs. Can be one or more (comma separated).
MARGIN_AGREEMENT_NAME	String	Mandatory	Margin Agreement Name
IM_MODEL	String	Mandatory	SIMM or SCHEDULE
END_DATE	String	Mandatory	Only required if IM_MODEL = Schedule, in the yyyy-MM-DD format. This value is mandatory for Schedule rows. If only SIMM risk factors are used, the user can input a dummy value for this field in the Schedule rows, such as 2021-01-01. (Do not use 0000-00-00.)
RISK_TYPE	String	Mandatory	Risk_IRCurve Risk_XCcyBasis Risk_Inflation Risk_IRVol Risk_InflationVol Risk_FX Risk_FXVol Risk_CreditQ Risk_CreditVol Risk_BaseCorr Risk_Equity Risk_CreditNonQ Risk_CreditVolNonQ

Column Name	Type	Required	Description
			Risk_Equity Risk_EquityVol Risk_Commodity Risk_CommodityVol Notional PV
QUALIFIER	String	Mandatory	Per ISDA definition for each Risk_TYPE
BUCKET	String	Mandatory	Per ISDA definition for each Risk_TYPE
LABEL1	String	Mandatory	Per ISDA definition for each Risk_TYPE
LABEL2	String	Mandatory	Per ISDA definition for each Risk_TYPE
AMOUNT	Double	Mandatory	The trade's sensitivity to the associated risk factor
CURRENCY	String	Mandatory	The currency in which the sensitivity AMOUNT is expressed
AMOUNT_USD	Double	Optional	If Amount_USD is not provided, system will convert Amount in CURRENCY into Amount_USD using the exchange rate from the quote set.
SOURCE	String	Mandatory	Source of the sensitivities
PRODUCT_CLASS	String	Mandatory	If IM_MODEL = SIMM • RatesFX • Credit • Equity • Commodity If IM_MODEL = Schedule • Rates • FX • Credit • Equity • Commodity • Other

Example of risk factors import file.

TRADE_ID	UTI	PARTY_ID	CP_ID	MARGIN_AGREE	IM_MODEL	RISK_TYPE	QUALIFIER	BUCKET	LABEL1	LABEL2	AMOUNT	CURRENCY	AMOUNT_USD	SOURCE	PRODUCT_CLASS	END_DATE
711028		CALYPSOSII	CP_1	CSA7	SIMM	Risk_FX	EUR				8216.0186	EUR	9037.620508	ISDA	Credit	
711028		CALYPSOSII	CP_1	CSA7	SIMM	Risk_IRCurve	EUR	1	3m	OIS	-1469.978	USD	-1469.977757	ISDA	Credit	
711028		CALYPSOSII	CP_1	CSA7	SIMM	Risk_IRCurve	EUR	1	2w	OIS	0.376631	EUR	0.414294125	ISDA	Credit	
711028		CALYPSOSII	CP_1	CSA7	SIMM	Risk_IRCurve	EUR	1	6m	OIS	0.2416323	EUR	0.265795582	ISDA	Credit	
711028		CALYPSOSII	CP_1	CSA7	SIMM	Risk_IRCurve	EUR	1	5y	OIS	0.2244335	EUR	0.24687688	ISDA	Credit	
711028		CALYPSOSII	CP_1	CSA7	SIMM	Risk_IRCurve	EUR	1	3y	OIS	13.67785	EUR	15.04563519	ISDA	Credit	
711028		CALYPSOSII	CP_1	CSA7	SIMM	Risk_IRCurve	EUR	1	1y	OIS	4.7448314	EUR	5.219314491	ISDA	Credit	
711028		CALYPSOSII	CP_1	CSA7	SIMM	Risk_IRCurve	EUR	1	10y	OIS	0.8174173	EUR	0.899159007	ISDA	Credit	
711028		CALYPSOSII	CP_1	CSA7	SIMM	Risk_IRCurve	EUR	1	1m	OIS	5.6034626	EUR	6.163808856	ISDA	Credit	
711028		CALYPSOSII	CP_1	CSA7	SIMM	Risk_IRCurve	EUR	1	2y	OIS	-0.311831	EUR	-0.34301419	ISDA	Credit	
711028		CALYPSOSII	CP_1	CSA7	SIMM	Risk_CreditQ	ISIN:FR0000570541	10	2y	EUR	-15000000	USD	-15000000	ISDA	Credit	
711028		CALYPSOSII	CP_1	CSA7	SIMM	Risk_CreditQ	ISIN:FR0000570541	10	1y	EUR	2.5860019	EUR	2.844602082	ISDA	Credit	
711028		CALYPSOSII	CP_1	CSA7	SIMM	Risk_CreditQ	ISIN:FR0000570541	10	3y	EUR	1.4285031	EUR	1.571353429	ISDA	Credit	
711028		CALYPSOSII	CP_1	CSA7	SIMM	Risk_CreditQ	ISIN:FR0000570541	10	10y	EUR	5.5896448	EUR	6.148609332	ISDA	Credit	
711028		CALYPSOSII	CP_1	CSA7	SIMM	Risk_CreditQ	ISIN:FR0000570541	10	5y	EUR	6269.3135	EUR	6896.244878	ISDA	Credit	
711028		CALYPSOSII	CP_1	CSA7	SCHEDULE	Notional	CreditDefaultSwap				-23000000	EUR	-25300000	ISDA	Credit	2030-11-02
711028		CALYPSOSII	CP_1	CSA7	SCHEDULE	PV	CreditDefaultSwap				-151900.5	EUR	-167090.5	ISDA	Credit	2030-11-02

Note 2: The following format validation has been implemented for the import modes. If any data is invalid, the scheduled task will log an error in the log.

Column Name	Validation
TRADE_ID	String
PARTY_ID	String
CP_ID	String
MARGIN_ AGREEMENT_ NAME	String
IM_MODE	SIMM or SCHEDULE
END_DATE	yyyy-MM-DD
RISK_TYPE	Risk_IRCurve Risk_XCcyBasis Risk_Inflation Risk_IRVol Risk_InflationVol Risk_FX Risk_FXVol Risk_CreditQ Risk_CreditVol Risk_BaseCorr Risk_CreditNonQ Risk_CreditVolNonQ Risk_Equity

Column Name	Validation
	Risk_EquityVol Risk_Commodity Risk_CommodityVol Notional PV
QUALIFIER	Risk_IRCurve, Risk_IRVol, Risk_FX - The ISO currency name, e.g., USD, EUR, SEK... Risk_FX - If Qualifier is equal to the base currency of the Pricing Env, the row is discarded and throws an exception. Risk_FXVol, Risk_CreditQ, Risk_Equity - String
BUCKET	Risk_IRCurve Bucket = [1,2,3] based on the volatility of the currency (Regular Volatility currency – Bucket 1, High volatility currency – Bucket 2, Low Volatility Currency – Bucket 3) Risk_IRVol & Risk_FX & Risk_FXVol Bucket = empty Risk_CreditQ, Risk_CreditVol Bucket = [1,2,3,4,5,6,7,8,9,10,11,12, Residual] Optional, the buckets in the import file will be retained. Risk_Equity, Risk_EquityVol Bucket = [1,2,3,4,5,6,7,8,9,10,11,12, Residual] Optional, the buckets in the import file will be retained. Risk_Inflation, Risk_XCcyBasis, Risk_IRVol, Risk_BaseCorr: Empty Risk_Commodity, Risk_CommodityVol Bucket = [1,2,3,4,5,6,7,8,9,10,11,12,13,14,15,16,17] The buckets in the import file will be retained. Risk_CreditNonQ, Risk_CreditVolNonQ Bucket = [1,2,3,4,5,6,7,8,9,10,11,12, Residual] Optional, the buckets in the import file will be retained.
LABEL1	Risk_IRCurve, Risk_IRVol, Risk_InflationVol: ISDA standard risk tenor [2w,1m,3m,6m,1y,2y,3y,5y,10y,15y,20y,30y] Risk_FX, Risk_Equity, Risk_Commodity, Risk_Inflation, Risk_XCcyBasis, isk_BaseCorr: Label1 = empty

Column Name	Validation
	Risk_EquityVol, Risk_FXVol, Risk_CommodityVol: ISDA standard vol-tenor [2w,1m,3m,6m,1y,2y,3y,5y,10y,15y,20y,30y] Risk_CreditQ ISDA standard tenor [1y,2y,3y,5y,10y]
LABEL2	Risk_IRCurve [Libor1m,Libor3m,Libor6m,Libor12m,OIS*,Prime,Municipal] Risk_CreditQ Risk_CreditVol “Sec” or “CCY” Risk_CreditNonQ, Risk_CreditVolNonQ - String Any other risk type Label2 is empty.
AMOUNT	Double
AMOUNT_ CURRENCY	The ISO currency name, e.g., USD, EUR, SEK... (use the list of currency defined in the system)
AMOUNT_USD	Double (can be empty)
PRODUCT_ CLASS	SIMM: RatesFX Credit Equity Commodity SCHEDULE: Rates FX Credit Equity Commodity Other
SOURCE	String

The validation is use case-insensitive for all String type validation (both column name and its expected values).

- If any validation fails, the scheduled task logs the column name and input value for which the data is invalid.

- The scheduled task MARGIN_INPUT would fail and throw an error if it does not find the required ISDA sub-curve name.

PRODUCT CLASS MAPPING

By default, ISDA SIMM product classes are mapped to Calypso product types:

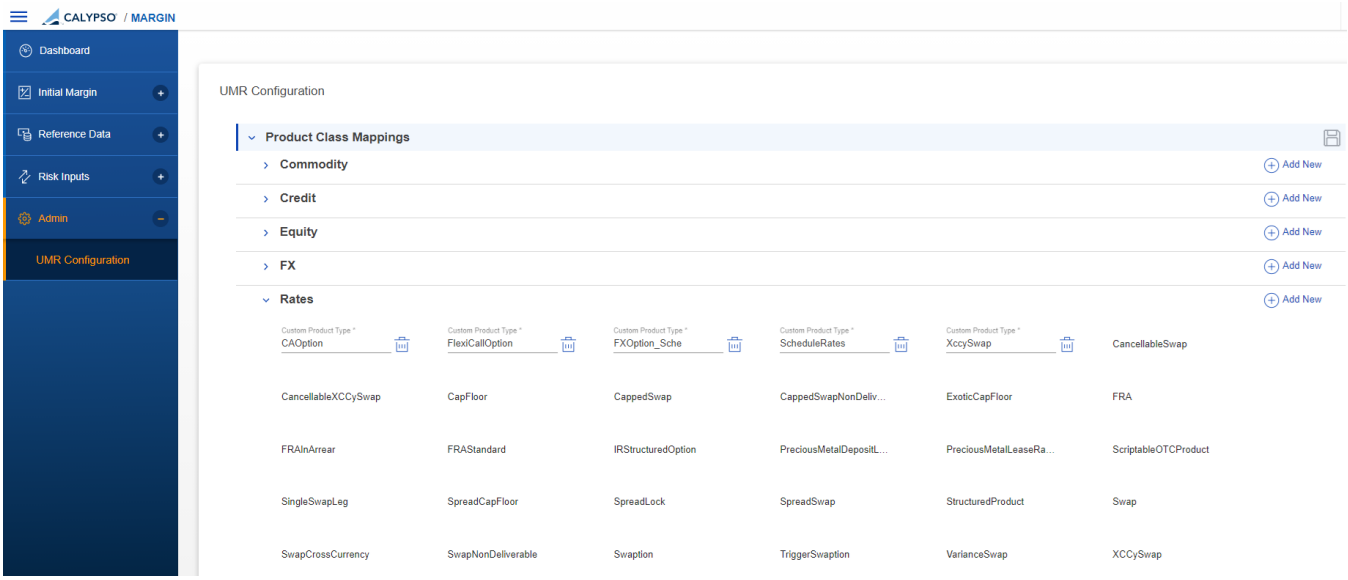
Product Class	Product Types
Commodity	Commodity
	CommodityCertificate
	CommodityForward
	CommodityIndexSwap
	CommodityOTCOption2
	CommoditySwap
	CommoditySwap2
	CommoditySwaption
	OTCCommodityOption
Credit	CancellableCDS
	CancellableCDSNthDefault
	CancellableCDSNthLoss
	CDSABSIndex
	CDSABSIndexTranche
	CDSIndex
	CDSIndexDefinition
	CDSIndexOption
	CDSIndexTranche
	CDSIndexTrancheOption
	CDSNthDefault
	CDSNthLoss
	ContingentCreditDefaultSwap
	CreditDefaultSwap
	CreditDefaultSwapABS
	CreditDefaultSwapLoan
	CreditDefaultSwaption
	ExtendibleCDS

Product Class	Product Types
	ExtendibleCDSNthDefault
	ExtendibleCDSNthLoss
	StructuredTranche
Equity	CFDConvertibleArbitrage
	CFDDirectional
	CFDPairTrading
	CFDRiskArbitrage
	EquityCliquetOption
	EquityForward
	EquityIndex
	EquityLinkedSwap
	EquityStructuredOption
	OTCEquityOption
	OTCEquityOptionVanilla
	PerformanceSwap
	PortfolioSwap
	PortfolioSwapPosition
	QuotableStructuredOption
	TotalReturnSwap
	TRSBasket
	VarianceOption
	VolatilityIndex
	Warrant
	WarrantIssuance
FX	FXCompoundOption
	FXNDF
	FXNDFSwap
	FXOption
	FXOptionForward
	FXOptionStrategy
	FXOptionStrip

Product Class	Product Types
	FXOptionSwap
	FXSwap
	PositionFXExposure
	PositionFXNDF
Rates	CancellableSwap
	CancellableXCCySwap
	CapFloor
	CappedSwap
	CappedSwapNonDeliverable
	ExoticCapFloor
	FRA
	FRAInArrear
	FRAStandard
	IRStructuredOption
	PreciousMetalDepositLease
	PreciousMetalLeaseRateSwap
	ScriptableOTCProduct
	SingleSwapLeg
	SpreadCapFloor
	SpreadLock
	SpreadSwap
	StructuredProduct
	Swap
	SwapCrossCurrency
	SwapNonDeliverable
	Swaption
	TriggerSwaption
	VarianceSwap
	XCCySwap

All these product types are now listed on the UMR Configuration page in the Margin user interface.

For any product type outside this list, the user can add the product type in the user interface. These products can be edited or deleted in the user interface. The hard-coded product types in the list above are not editable and can only be viewed. The user is not able to add a new custom product if its already in the list.



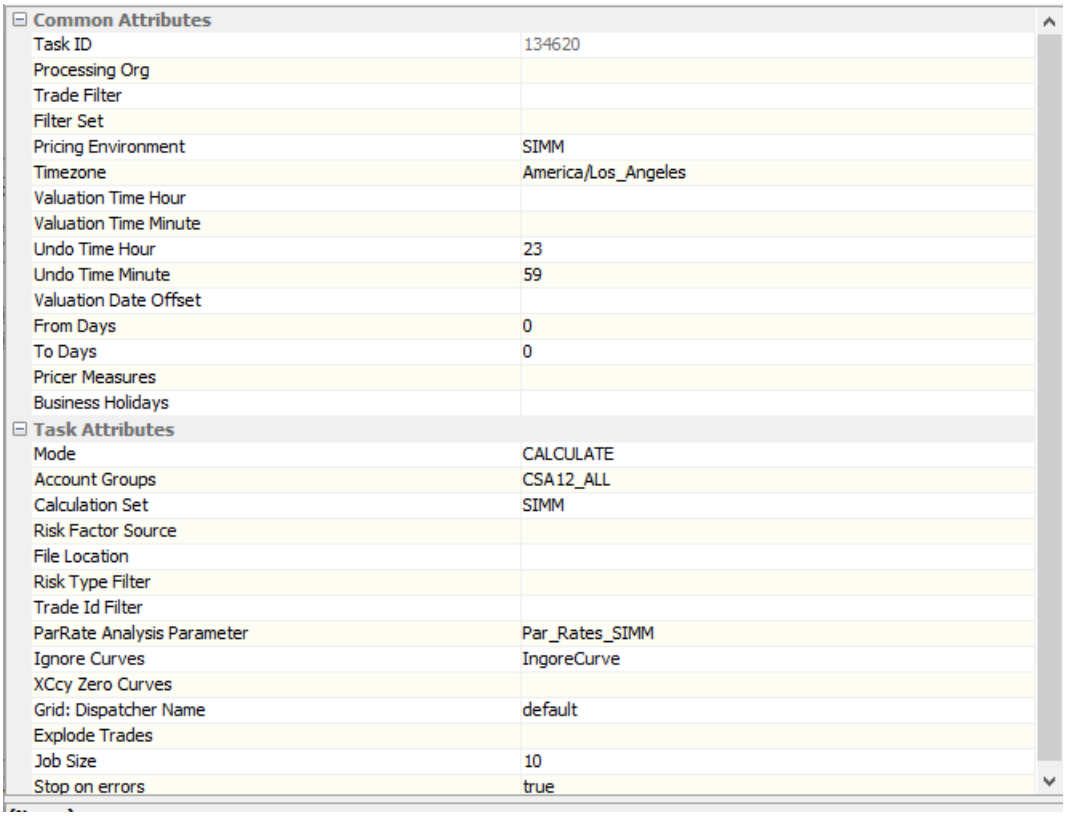
The product class mappings here show five product classes for SCHEDULE – Commodity, Credit, Equity, FX and Rates. The same product classes are used for SIMM as well. However, all products in FX and Rates defined here are assigned to product class 'RatesFX' for SIMM.

By default, Calypso will reject an attempt to import a blank CRIF file or a file with headers but no rows. To enable import of these files, set the domain MarginInput.AllowEmptyCRIF to *true*.

4.1.3 CALCULATE Mode

In CALCULATE mode, risk sensitivities are calculated for all the portfolios defined in the ERS hierarchy/Margin Groups using the pricing environment specified as of the valuation date time.

All trades must have a value in keyword IM_PORTFOLIO_NAME. If the value is empty, the scheduled task will fail. Before running, the user should ensure that all the market data required for pricing trades exist. If trades cannot be priced, the scheduled task will fail. The scheduled task calculates required risk sensitivity, transforms the data into ISDA format and persists the data for IM calculation. The user may use the export functionality to verify that the data persisted to the database.



Common Attributes	
Task ID	134620
Processing Org	
Trade Filter	
Filter Set	
Pricing Environment	SIMM
Timezone	America/Los_Angeles
Valuation Time Hour	
Valuation Time Minute	
Undo Time Hour	23
Undo Time Minute	59
Valuation Date Offset	
From Days	0
To Days	0
Pricer Measures	
Business Holidays	
Task Attributes	
Mode	CALCULATE
Account Groups	CSA12_ALL
Calculation Set	SIMM
Risk Factor Source	
File Location	
Risk Type Filter	
Trade Id Filter	
ParRate Analysis Parameter	Par_Rates_SIMM
Ignore Curves	IngoreCurve
XCcy Zero Curves	
Grid: Dispatcher Name	default
Explode Trades	
Job Size	10
Stop on errors	true

Mandatory Attributes:

- Mode is CALCULATE
- Pricing Environment
- Timezone
- Account Groups and Trade Filter. Trade filter is not required when using ERS hierarchy.
- Calculation Set
- ParRate Analysis Parameter.

Optional Attributes:

- Undo Time Hour and Undo Time Minute
- Ignore Curves
- XCcy Zero Curves
- Grid: Dispatcher Name
- Explode Trades
- Job Size

Domain Values

MarginInput.RiskAnalysis.Parallelise

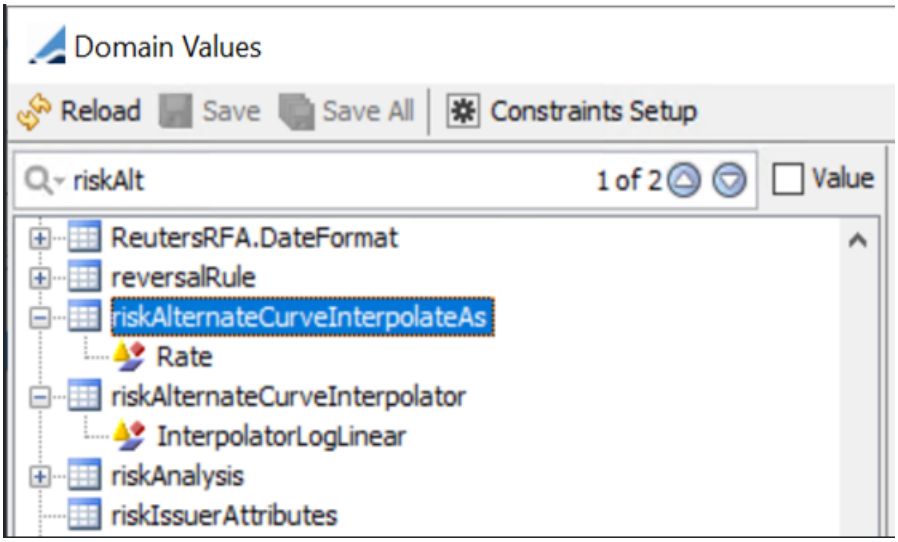
This domain value defaults to false.

When using the dispatcher/compute grid, and the new domain value is set to true, sensitivity analysis will be scheduled concurrently with scenario analysis (for IR_Vega). Assumes at least one margin specific market data set defined in Scenario Editor e.g. Vol_Rate_Pt_BpVol .

MarginInput.AnalysisParametersOverride

This domain value has a value named UseAlternateInterpolator (its comment defaults to false).

In some cases, MultiSensitivityAnalysis (MSA, launched by Margin_Input) could generate irrelevant (tenor greater than maturity) sensitivities. Set UseAlternateInterpolator of MarginInput.AnalysisParametersOverride to true will make MSA generate the expected results. Besides UseAlternateInterpolator, User will also need to set up riskAlternateCurveInterpolateAs and riskAlternateCurveInterpolator as shown in the following screenshot:



ISDASIMM.NonValidCurrency

This domain value will validate and convert non-valid currency risk factors in valid currency risk factors, while running MARGIN_INPUT scheduled task and uploading of risk factors from UI. By default, domain is set to blank/empty.

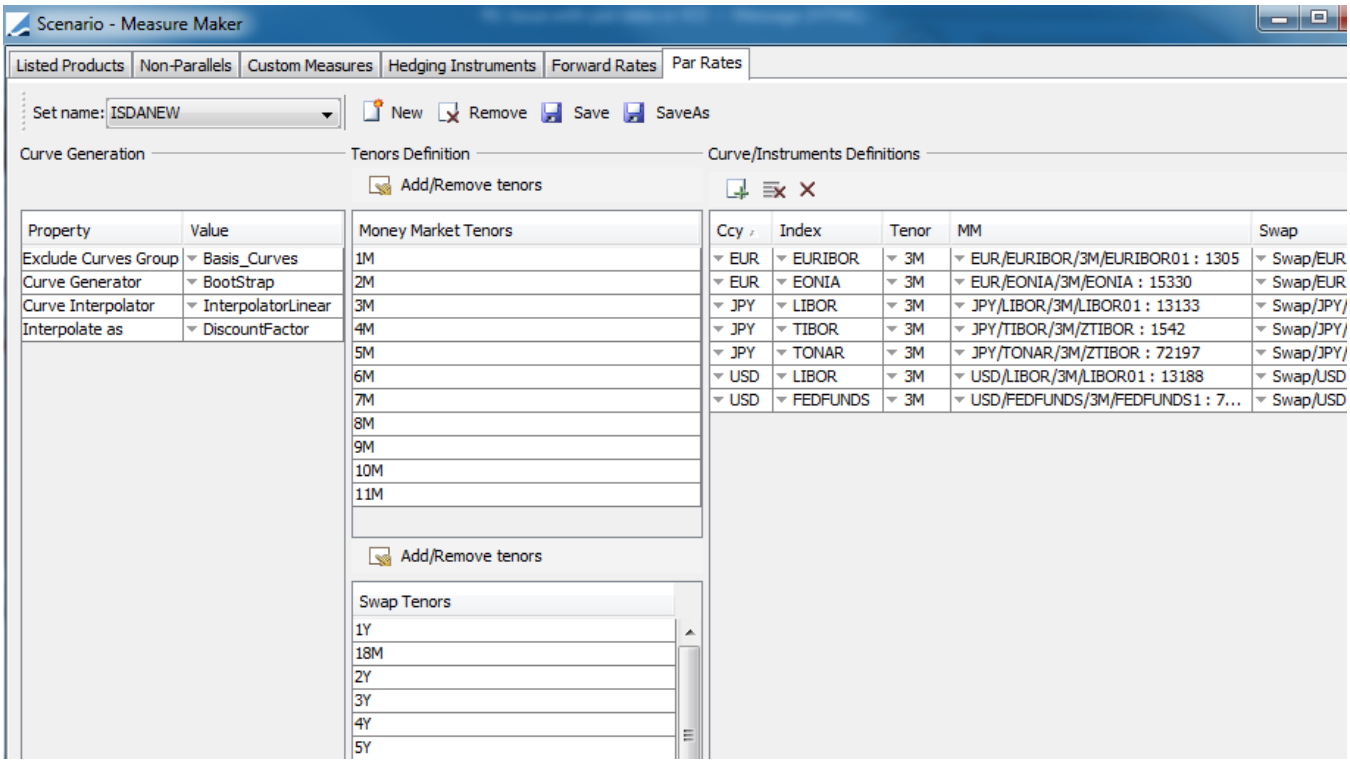
- Value = Blank, Comment = Blank - By default value will be blank/empty, this will generate risk factors without checking non-valid currency (default behavior)
- Value = Non-Valid Currency, Comment = Blank - If domain value has list of non-valid currencies in Value attribute, but Comment attribute is empty, risk factors for trades with non-valid currencies will not be generated and will be logged as warning in schedule task/Margin GUI.

- Value = Non-Valid Currency, Comment = Valid Currency- If domain value has list of non-valid currencies in Value attribute and Valid currency in Comment field risk factors with non-valid currencies will be converted to mapped valid currencies."

4.1.4 ParRate Analysis

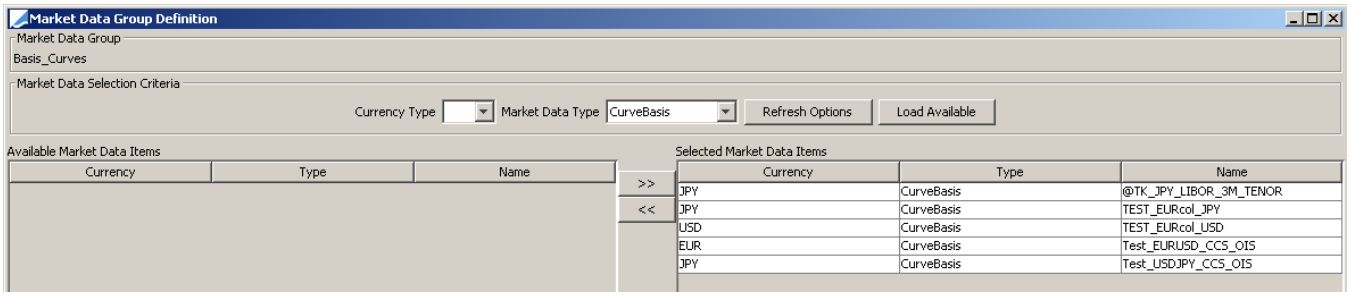
ParRate analysis is required for interest rate delta calculation, and it must be defined in MARGIN_INPUT scheduled task when mode is CALCULATE. User can define ParRate in Analysis Designer. This is used to create hard-coded MultiSensitivity analysis during task and calculate Risk_IRCurve results.

Sample ParRate analysis parameter:



NOTE: For ISDA-SIMM usage, the fields Index and Tenor should not be set to ANY, they should match those of the curves in the Pricing Environment that are meant to be replaced by ISDA-SIMM compliant curves. The MM and Swaps defined as instruments to build the ISDA-SIMM compliant curves should be consistent with these index and tenors. For example, if the Pricing Environment contains a EUR EURIBOR 3M curve and a EUR EURIBOR 6M curve, it is important that both curves are specifically mapped, because the EUR EURIBOR 3M curve that is ISDA-SIMM compliant needs to be built with EUR swaps EURIBOR 3M/fix while the EUR EURIBOR 6M curve needs to be built with EUR swaps EURIBOR 6M/fix. It is important that these two curves are each built with the right instruments.

Where Basis Curves market data group is defined as shown below:



The exclude group should contain all the rate curves that are part of the Pricing Environment, but not part of ISDA-SIMM Risk_IRCurve. For example, it should contain all the cross-currency basis curves, triangulation curves, CTD Collateral curves, etc.... These curves can be of any rate curve type: CurveZero, CurveBasis, CurveFXDerived, etc....

4.1.5 Scenario Rule for IR VegaCalculation

Scenario Rule of IR Vega is required for Risk_IRVol calculation. User can define market data sets for specific volatility surfaces in Scenario Editor, which are used to create hard-coded scenario analysis during task and calculate Risk_IRVol results.

Calculation Formula

Risk_IRVOL is calculated as below:

Risk_IRVOL = Vega x ATM Vol

The Vega is based on a Scenario rule output. As per the ISDA guidelines, it is based on 1% shift for log-normal volatility and 1bps for normal volatility.

The scenario rule is hard-coded and the user is not able to configure it. The user needs to select market data sets in the risk measure definition.

- The full Vol Surface for caps and swaptions need to be:

  (1) defined in the pricer config in usage 'VOL'

  (2) specified in the market data sets in scenario analysis
- The ATM vol for Cap/floors will be saved in usage 'SIMM'.

The 'SIMM' vol usage is used as a Vol input for cap/floors where Risk_IRVol = Vega* Vol.

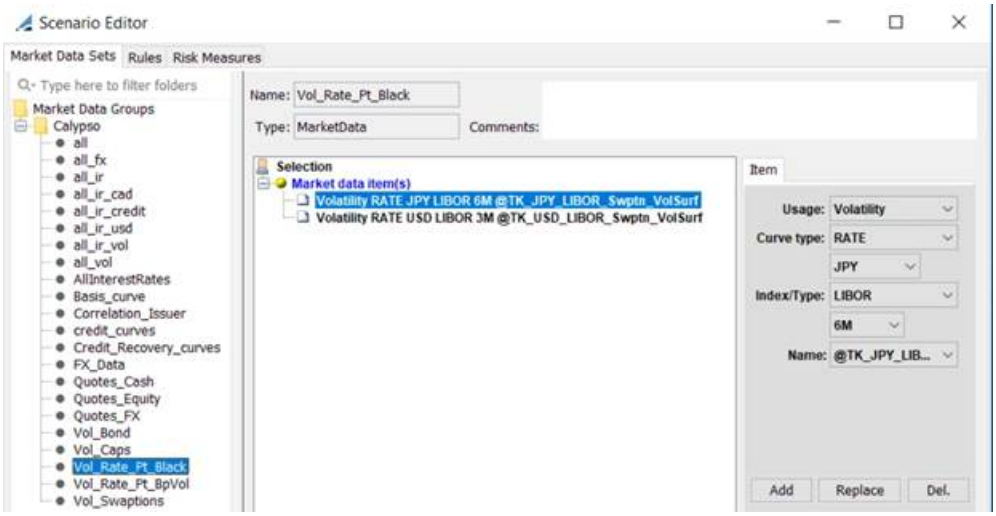
Scenario Editor Configuration of Market Data Sets

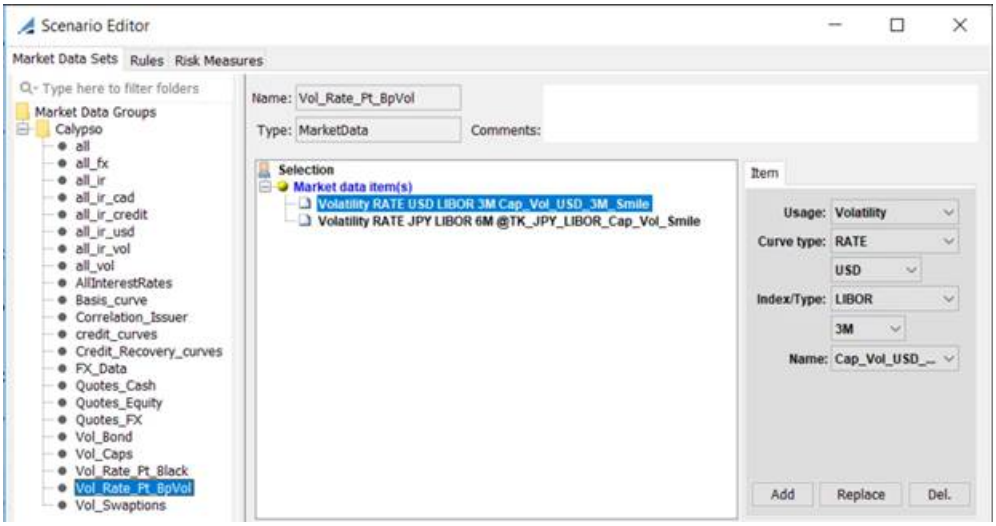
Separate market data sets need to be saved for each volatility type. Each market data needs to include the usage 'VOL', and the full surface vol for each product would be saved for each currency/ tenor.

Three different market data sets can be saved for:

- Black
- BpVol without shift adjustment
- BpVol with shift adjustment.

For caps if using BpVol surface, the user can use the market data set 'Vol_Rate_Pt_BpVol', if using BpVol surface for swaptions, the user can use the market data set 'Vol_Rate_Pt_Shift_Adj_BpVol' and if using black surface for either products, they can use the market data set 'Vol_Rate_Pt_Black'. If Vol surfaces use Offsets, user can use market data set 'Vol_Rate_Pt_BpVol' and 'Vol_Rate_Pt_Black' based on Vol Model.





In summary, the configuration would be as follows:

					The user must add the market data items to these system created market data sets	System Created. **DO NOT EDIT**		
Product	**Volatility Type**	**Surface Type**	**Quote Type**	**Usage**	**Market Data Set**	**Scenario Rule Applied**	**Scenario Shift Amount**	**Notes**
Cap/Floor	LogNormal	Full Surface	Yield	VOL	Vol_Rate_Pt_Black	vol_1per_Black	1%	The vol surface with either be Normal or Lognormal for Caps/Floors, only one is required
Cap/Floor	Normal	Full Surface	BpVol	VOL	Vol_Rate_Pt_BpVol	vol_1bp_Bp	1bp	The vol surface with either be Normal or Lognormal for Caps/Floors, only one is required
Swaption	Normal	Full Surface	BpVol	VOL	Vol_Rate_Pt_Shift_Adj_BpVol	vol_1bp_Shift_Adj_BpVol	1%	
Swaption	LogNormal	Full Surface	Yield	VOL	Vol_Rate_Pt_Black	vol_1per_Black	1%	

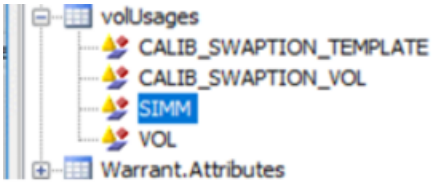
*If the user is using a CAPATM surface as usage VOL, then it should be defined under the Vol_Rate_Pt_Black market data set even if the source surface generator is BpVol. All CAPATM surface points are quoted in % and should be shifted 1%.

ATM Vol Surfaces

The ATM vol in the Risk_IRVOL formula is sourced from:

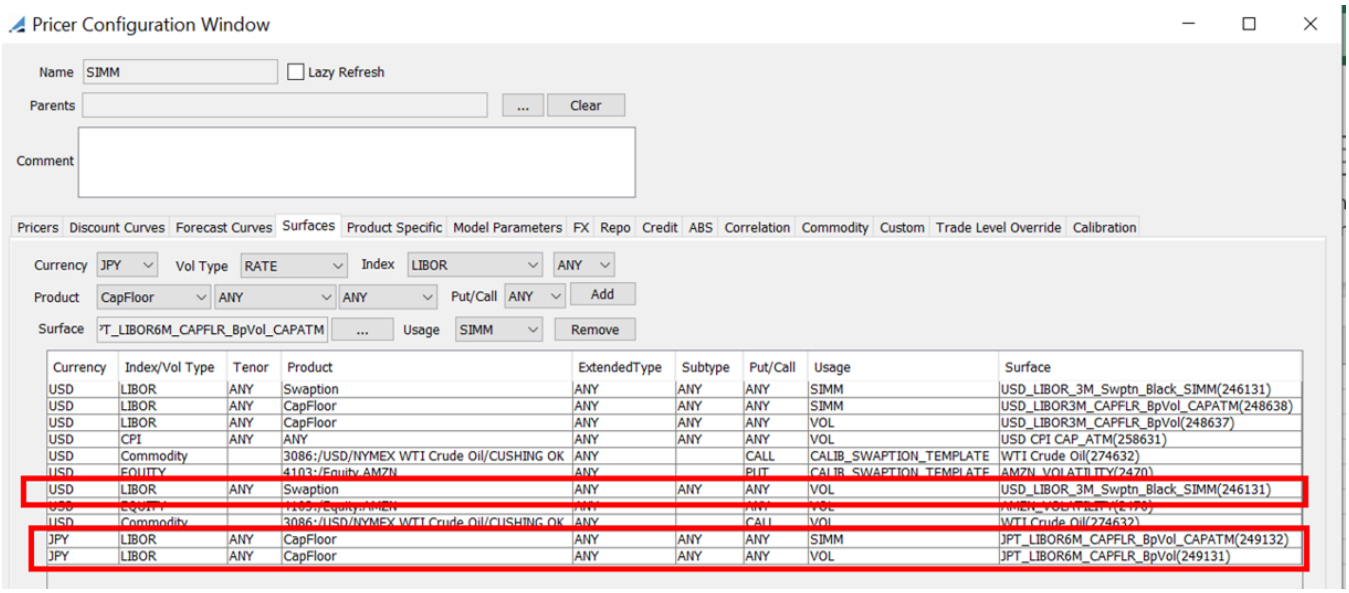
- for swaptions, of the vol surface saved in VOL usage of the pricer config. For BpVol surfaces, it comes from the MID_BpVol layer of the surface and for black, it comes from the points.
- for caps, from the 'SIMM' vol surface added to the same pricer configuration.

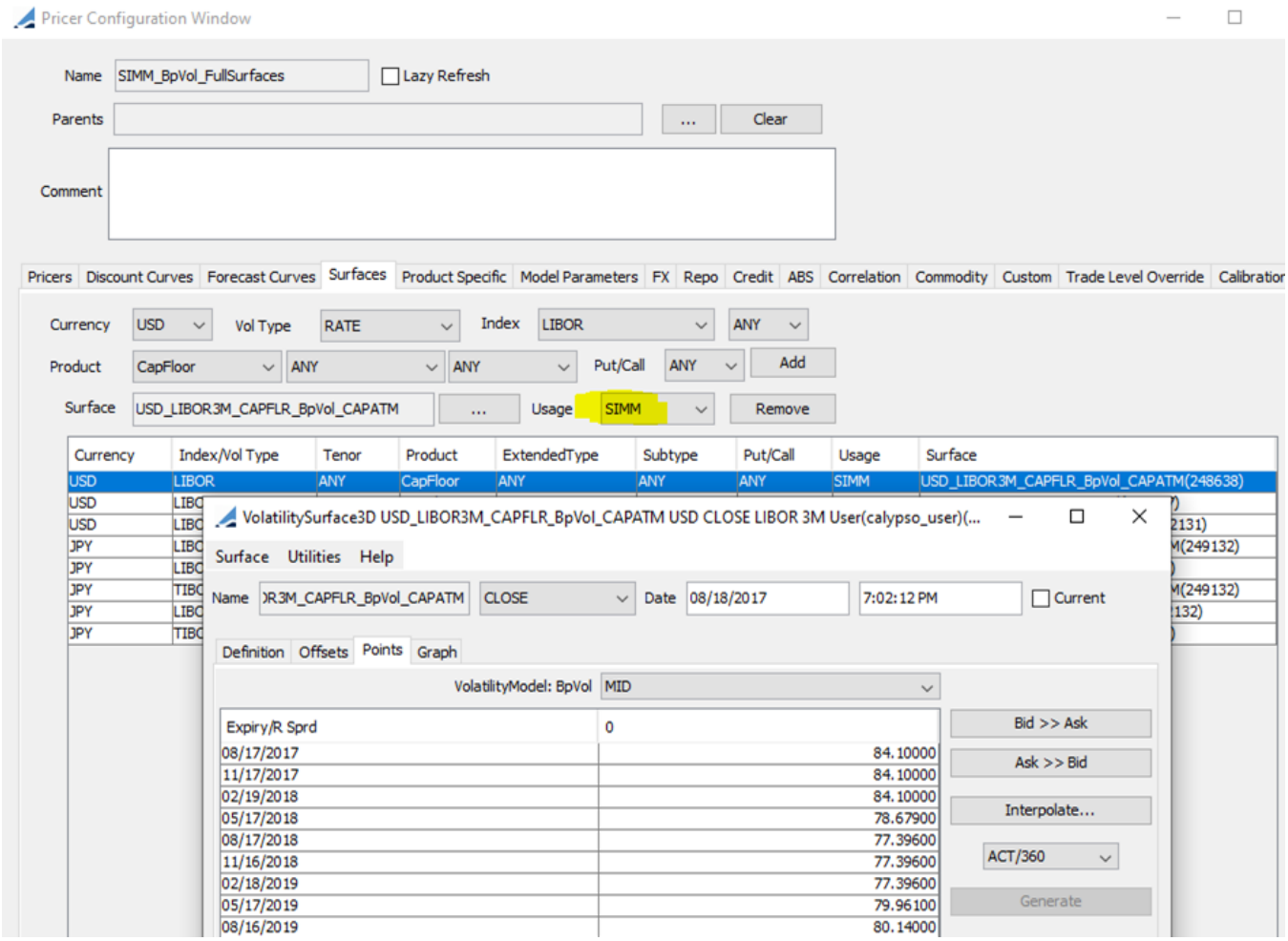
The below configuration is required to define this usage for the Caps ATM vol surface:



ATM Vol Surface for Caps will be saved in the same pricer config in usage 'SIMM'. If the ATM vol surface for CapFloors is not available in the pricer config with the SIMM usage, the scheduled task will fail and throw an error.

Example of pricer configuration:

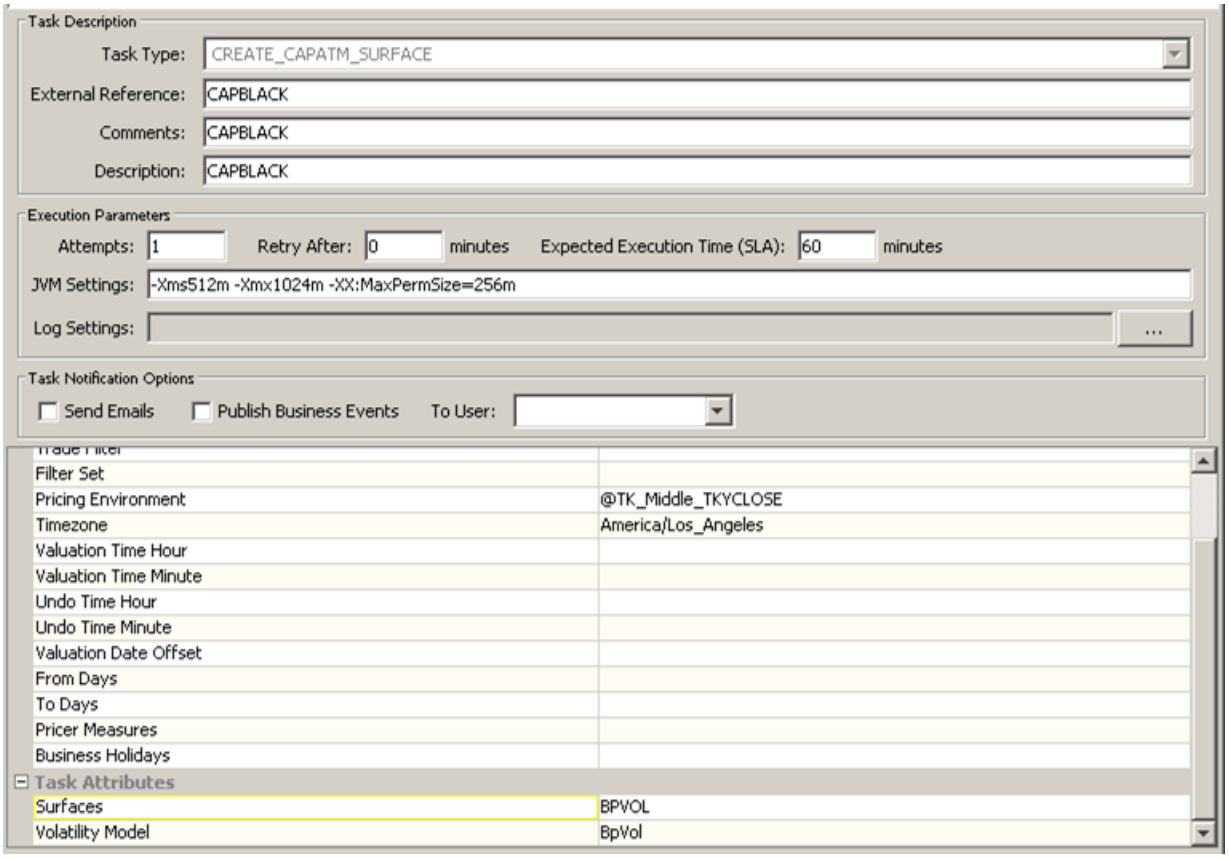

Pricer Configuration Window
Name SIMM
Lazy Refresh
Parents
Clear
Comment
Pricers Discount Curves Forecast Curves Surfaces Product Specific Model Parameters FX Repo Credit ABS Correlation Commodity Custom Trade Level Override Calibration
Currency JPY
Vol Type RATE
Index LIBOR
Product CapFloor
Put/Call
Add
Surface
Usage SIMM
Remove
Currency Index/Vol Type Tenor Product ExtendedType Subtype Put/Call Usage Surface
USD LIBOR ANY Swaption ANY ANY ANY SIMM USD_LIBOR_3M_Swptn_Black_SIMM(246131)
USD LIBOR ANY CapFloor ANY ANY ANY SIMM USD_LIBOR3M_CAPFLR_BpVol_CAPATM(248638)
USD LIBOR ANY CapFloor ANY ANY ANY VOL USD_LIBOR3M_CAPFLR_BpVol(248637)
USD CPI ANY ANY ANY ANY ANY VOL USD CPI CAP_ATM(258631)
USD Commodity 3086:/USD/NYMEX WTI Crude Oil/CUSHING OK ANY CALL CALIB_SWAPTION_TEMPLATE WTI Crude Oil(274632)
USD EQUITY 4103:/Equity/AMZN ANY PUT CALIB_SWAPTION_TEMPLATE AMZN_VOLATILITY(2470)
USD LIBOR ANY Swaption ANY ANY ANY VOL USD_LIBOR_3M_Swptn_Black_SIMM(246131)
USD EQUITY 4103:/Equity/AMZN ANY ANY VOL AMZN_VOLATILITY(2470)
USD Commodity 3086:/USD/NYMEX WTI Crude Oil/CUSHING OK ANY CALL VOL WTI Crude Oil(274632)
JPY LIBOR ANY CapFloor ANY ANY ANY SIMM JPT_LIBOR6M_CAPFLR_BpVol_CAPATM(249132)
JPY LIBOR ANY CapFloor ANY ANY ANY VOL JPT_LIBOR6M_CAPFLR_BpVol(249131)


Pricer Configuration Window
Name SIMM_BpVol_FullSurfaces
Lazy Refresh
Parents
Clear
Comment
Pricers Discount Curves Forecast Curves Surfaces Product Specific Model Parameters FX Repo Credit ABS Correlation Commodity Custom Trade Level Override Calibration
Currency USD
Vol Type RATE
Index LIBOR
Product CapFloor
Put/Call
Add
Surface USD_LIBOR3M_CAPFLR_BpVol_CAPATM
Usage SIMM
Remove
Currency Index/Vol Type Tenor Product ExtendedType Subtype Put/Call Usage Surface
USD LIBOR ANY CapFloor ANY ANY ANY SIMM USD_LIBOR3M_CAPFLR_BpVol_CAPATM(248638)
VolatilitySurface3D USD_LIBOR3M_CAPFLR_BpVol_CAPATM USD CLOSE LIBOR 3M User(calypso_user)(...
Surface Utilities Help
Name CLOSE
Date 08/18/2017
7:02:12 PM
Current
Definition Offsets Points Graph
VolatilityModel: BpVol MID
Expiry/R Sprd 0
08/17/2017 84.10000
11/17/2017 84.10000
02/19/2018 84.10000
05/17/2018 78.67900
08/17/2018 77.39600
11/16/2018 77.39600
02/18/2019 77.39600
05/17/2019 79.96100
08/16/2019 80.14000
Bid >> Ask
Ask >> Bid
Interpolate...
ACT/360
Generate

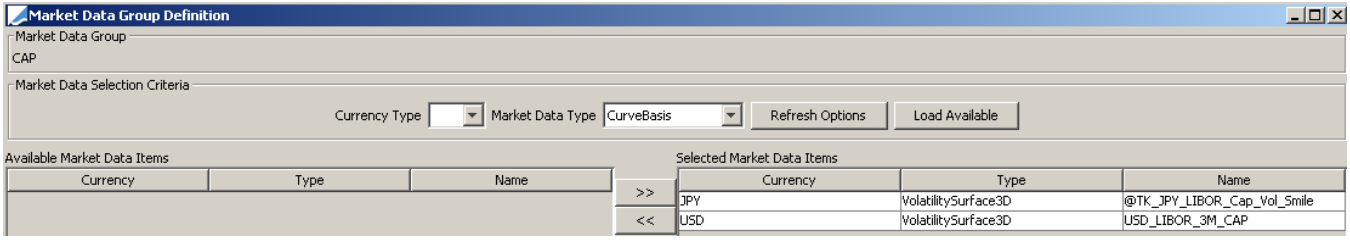
Scheduled Task CREATE_CAPATM_SURFACE

The scheduled task CREATE_CAPATM_SURFACE transforms a list of fixed strike interest rate cap volatility surfaces into relative strike (ATM) volatility surfaces. This allows users to meet the ISDA requirement for calculating interest rate Vega sensitivities with respect to the implied **at-the-money** volatility for interest rate cap instruments.

The configuration of the scheduled task is shown below.



The user only needs to select the market data group which contains all the fixed strike cap volatility surfaces for which the user wishes to transform into a relative strike, as well as the volatility model used in those surfaces. The scheduled task creates (update if there is an existing one) a corresponding relative strike volatility surface. Using the below example, in the market data group CAP there are two items, {@TK_JPY_LIBOR_Cap_Vol_Smile, USD_LIBOR_3M_CAP}.

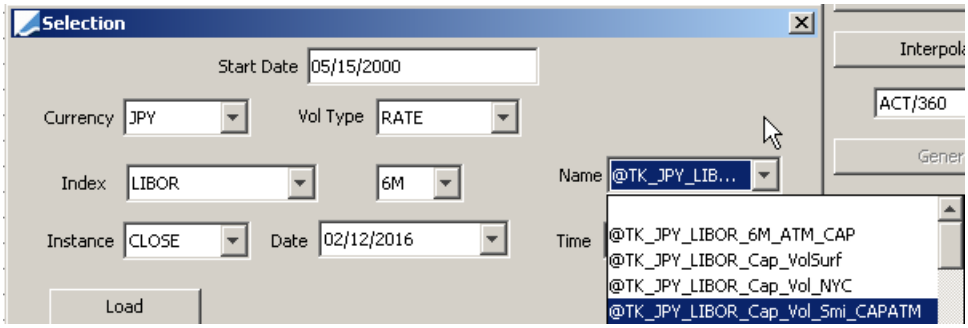


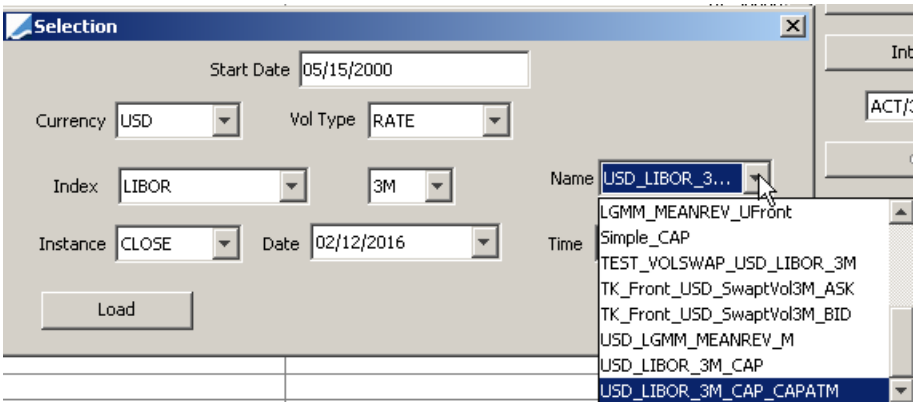
The scheduled task automatically creates/updates a relative strike volatility surfaces with the following naming convention: “original name”_CAPATM

This means that the scheduled task automatically adds *_CAPATM* into the original name and makes it the new name for the output surface.

Note that Calypso only allows a maximum length of 32 characters for the surface name. Therefore, if adding _ CAPATM makes the length of the new name more than 32 characters, the scheduled task will automatically truncate the name so that it fits within the maximum length.

Using the above example, the scheduled task creates/update the following surfaces:





The scheduled task expects existing surfaces prior to the value date on which the scheduled task is run. If there is no existing surface, the scheduled task will not create/update any new surface.

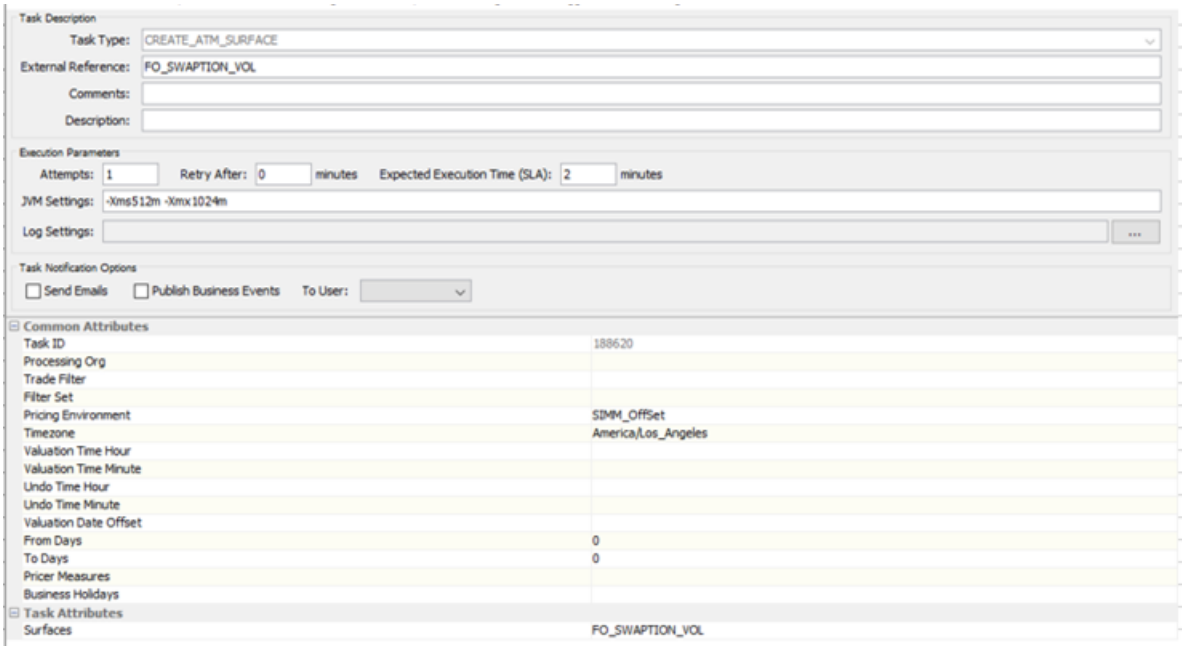
The user needs to assign the new surface into the pricing environment used by the scheduled task MARGIN_INPUT to generate the correct risk.

The resulting CAPTAM surface will be a surface that has points quoted in percent. Both Black and BPVol derived surfaces will be converted this way.

Scheduled Task CREATE_ATM_SURFACE

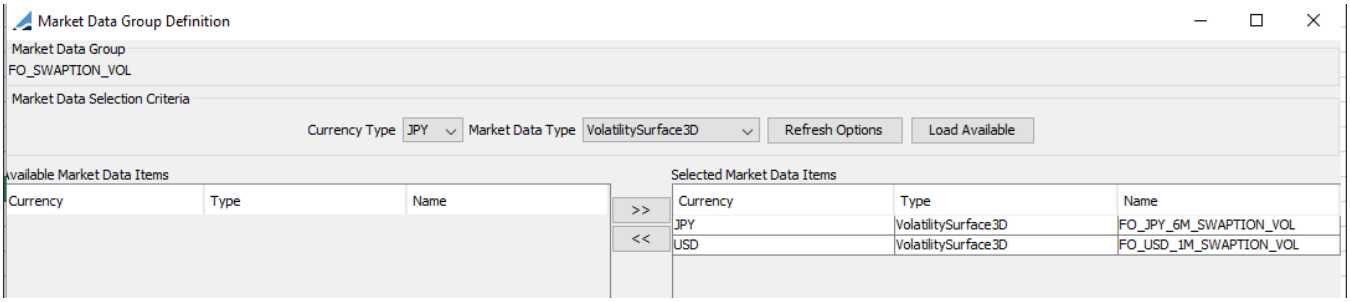
This scheduled task can be used when the Vega sensitivity/risk factor generation process is particularly computationally expensive e.g. for Bermudan swaption based trades.

The scheduled Task CREATE_ATM_SURFACE trims an offset-based volatility surface, by only keeping the ATM points (zero strike).



Select the market data group which contains all the volatility surfaces with offset strikes you wish to reduce to only ATM points (zero strike). The scheduled task creates a corresponding ATM (zero strike) surface or updates the surface if there is an existing one.

Using the below example, in the market data group FO__SWAPTION_VOL there are two items, FO_USD_1M_SWAPTION_VOL and FO_JPY_6M_SWAPTION_VOL.



The scheduled task automatically creates/updates an ATM only surface with the following naming convention: *"original name"_ATM*, meaning the scheduled task automatically adds *_ATM* into the original name and makes it the new name for the output surface.

Using the above example, the scheduled task creates/updates the following surfaces: FO_USD_1M_SWAPTION_VOL_ATM and FO_JPY_6M_SWAPTION_VOL_ATM.

New surface(s) need to be assigned in the pricing environment used by the scheduled task MARGIN_INPUT to generate the correct risk.

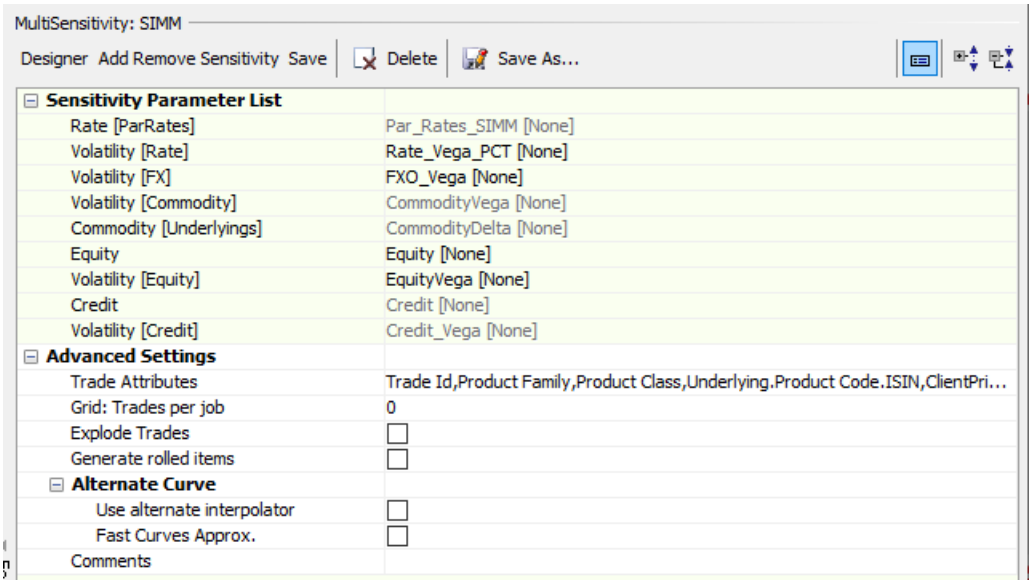
4.1.6 Risk Factor Validation

Users can use MultiSensitivity, Scenario and Pricing analysis to validate risk factor results from MARGIN_INPUT scheduled task.

Note that all the below analysis parameters except ParRate are hard coded in MARGIN_INPUT scheduled task, but can be replicated for validation purposes. The analysis parameters shown in this section are for informational purposes only.

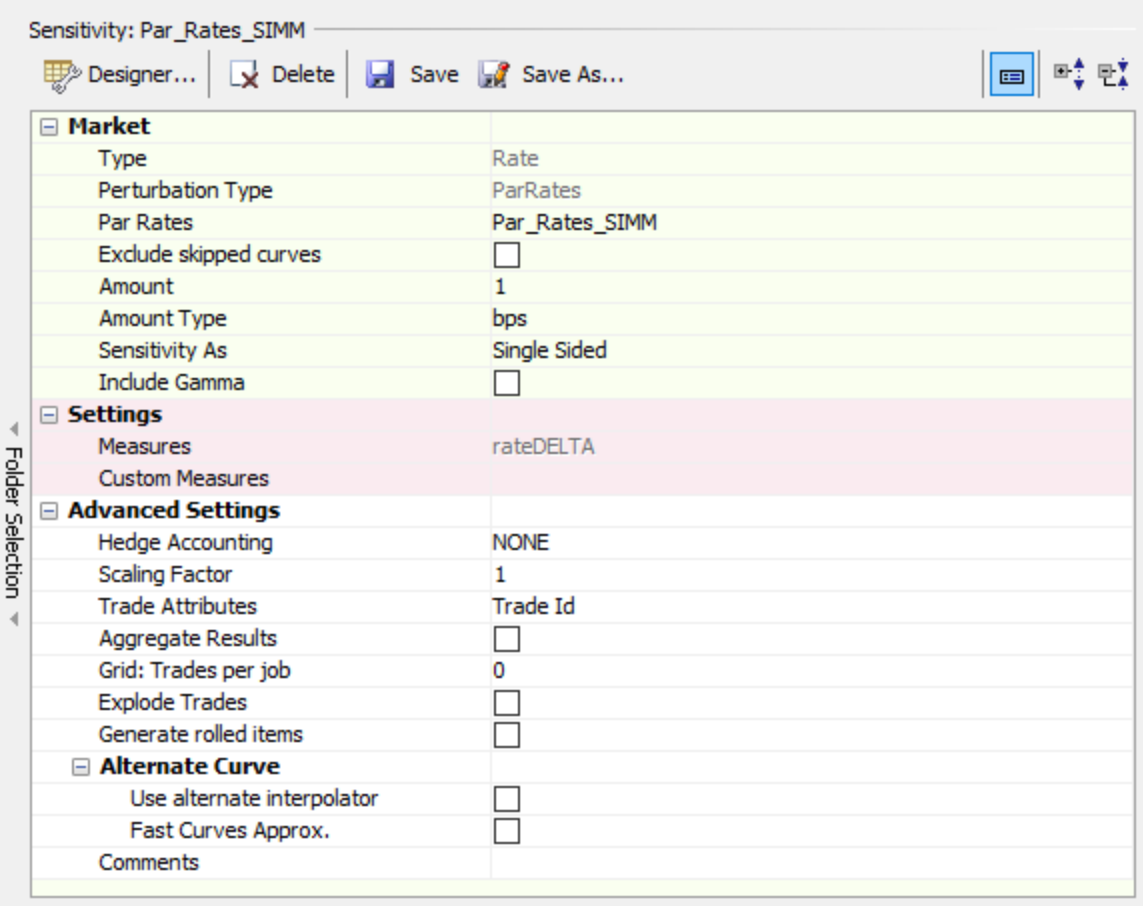
- MultiSensitivity analysis validates results of Risk_IRCurve, Risk_FX, Risk_FXVol, Risk_XCcyBasis, Risk_InflationVol, Risk_Equity, Risk_EquityVol, Risk_CreditQ, Risk_Commodity and Risk_CommodityVol.
- Scenario analysis validates results of Risk_IRVol.
- Pricing analysis validates results of Notional, PV and Risk_Inflation.

Example of MultiSensitivity:



Risk_IR Curve

Risk_IRCurve calculation can be simulated by using the following pre-defined ParRate sensitivity within MultiSensitivity.



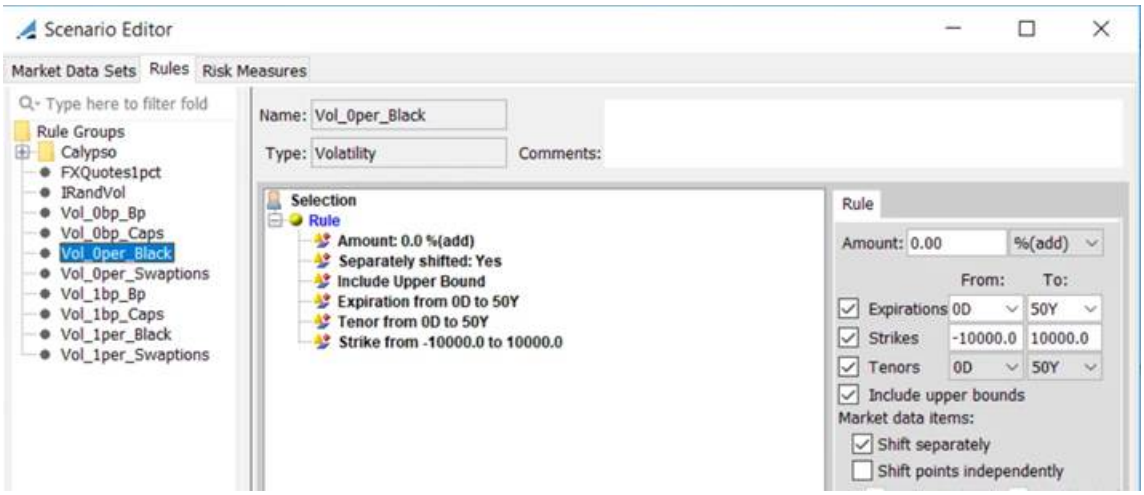
If Ignore Curves is defined, output results of curves defined in market data group are ignored.

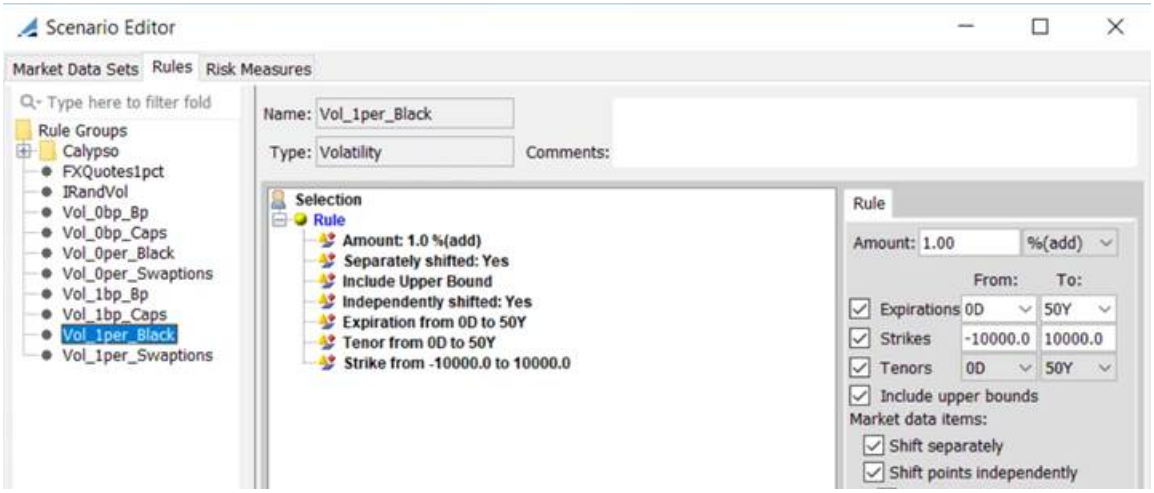
Risk_IRVol

Risk_IRVol will be calculated using the following pre-defined scenario rules and risk measures.

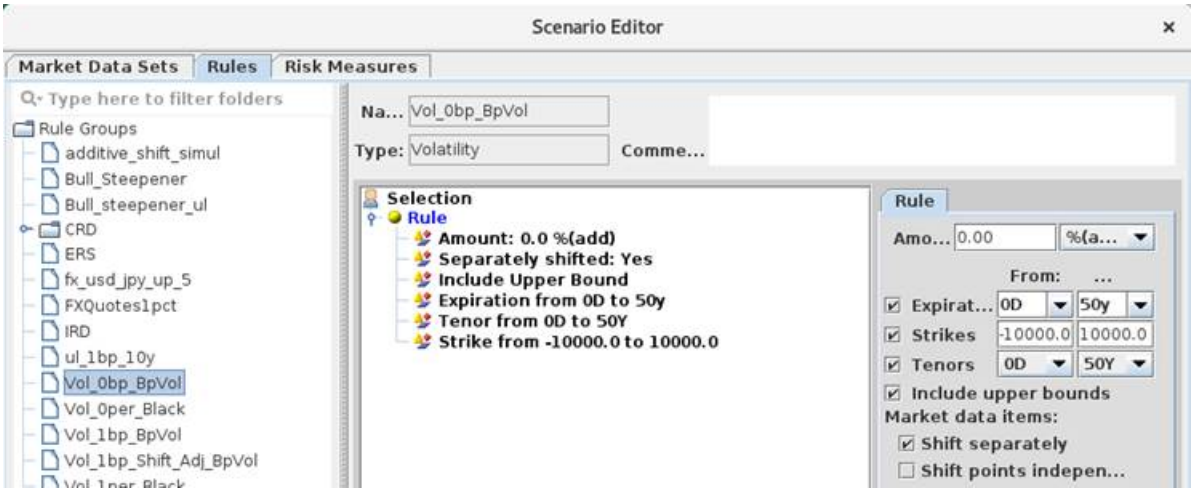
Scenario Rules: Scenario rule needs to be created for each volatility type separately if the rules are different. The shift applied to log-normal volatility with quote type 'Yield' is 1% and shift applied to normal volatility with quote type 'BpVol' is 1bps if no shift adjustment is applied. The shift applied to normal volatility with quote type 'BpVol' is 1% if shift adjustment is applied to MID_BpVol layer.

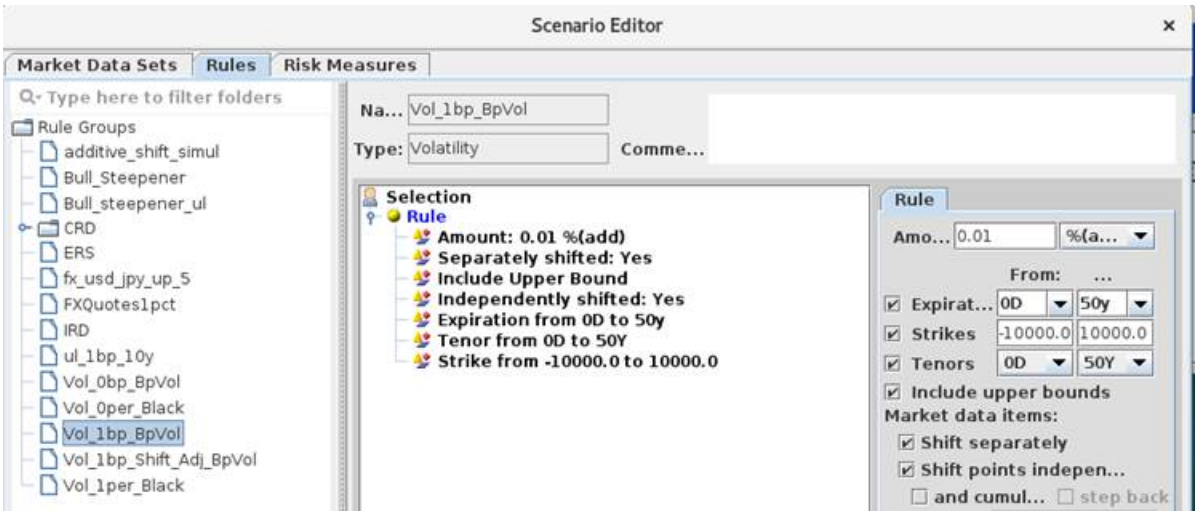
Scenario Rule for 1% shift in quote type 'Yield' for log-normal volatility



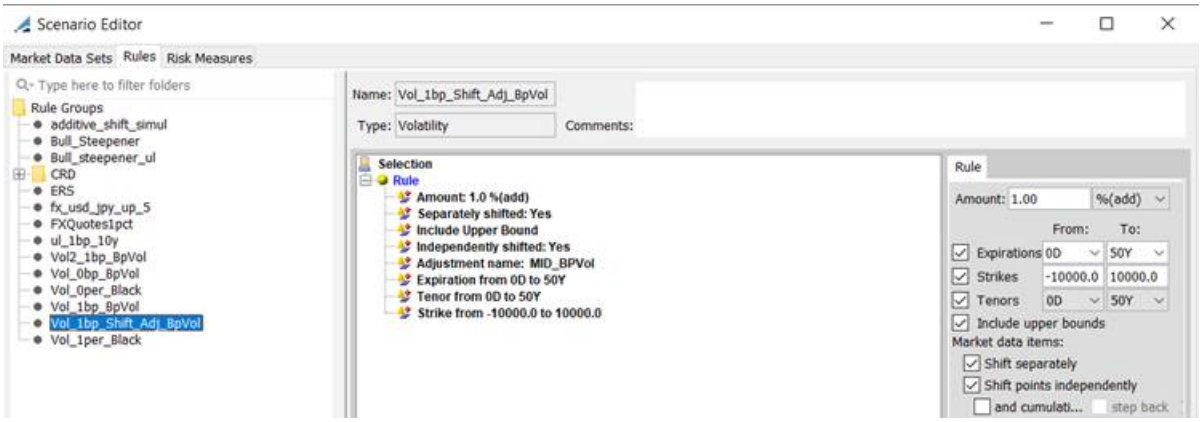


Scenario Rule for 1bp shift in quote type 'BpVol' for normal volatility:

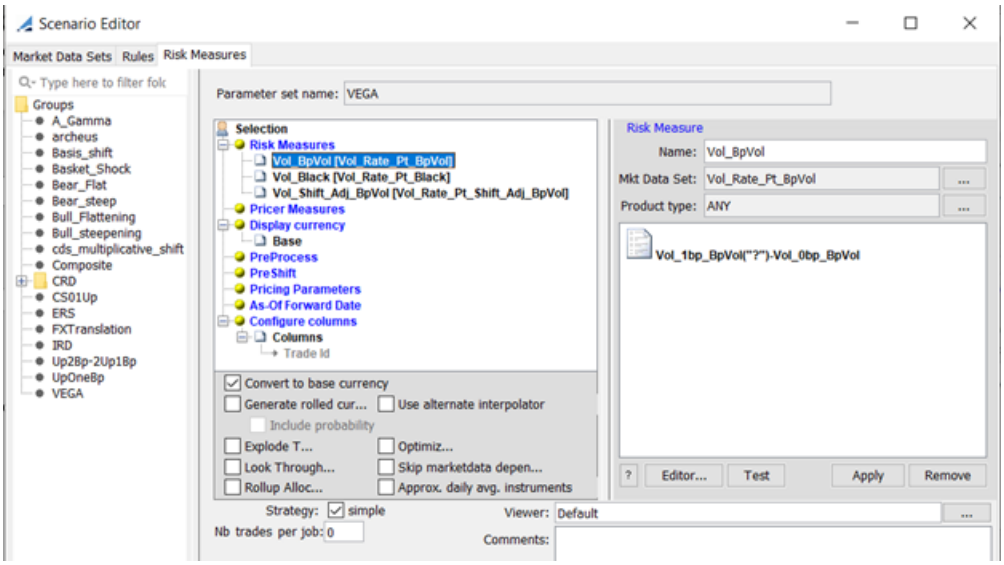


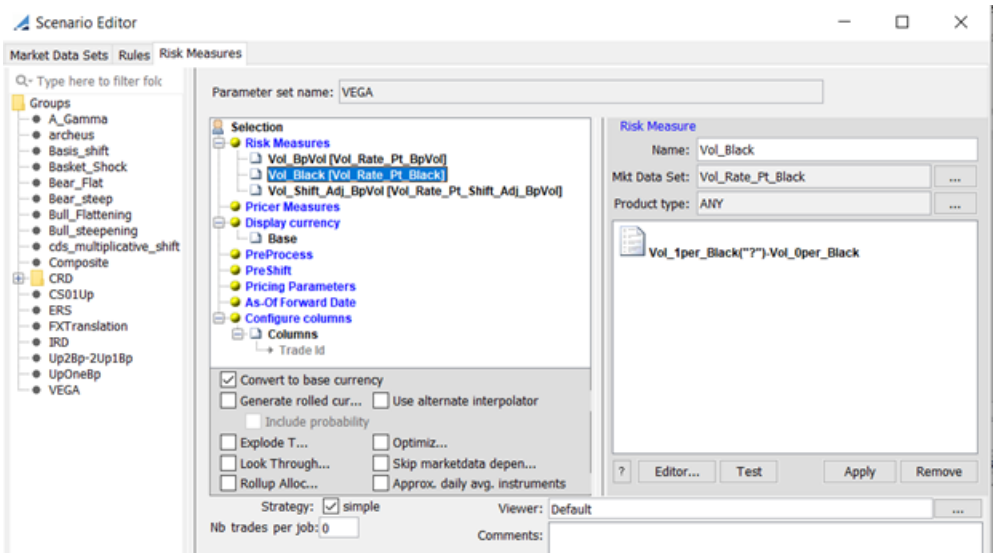


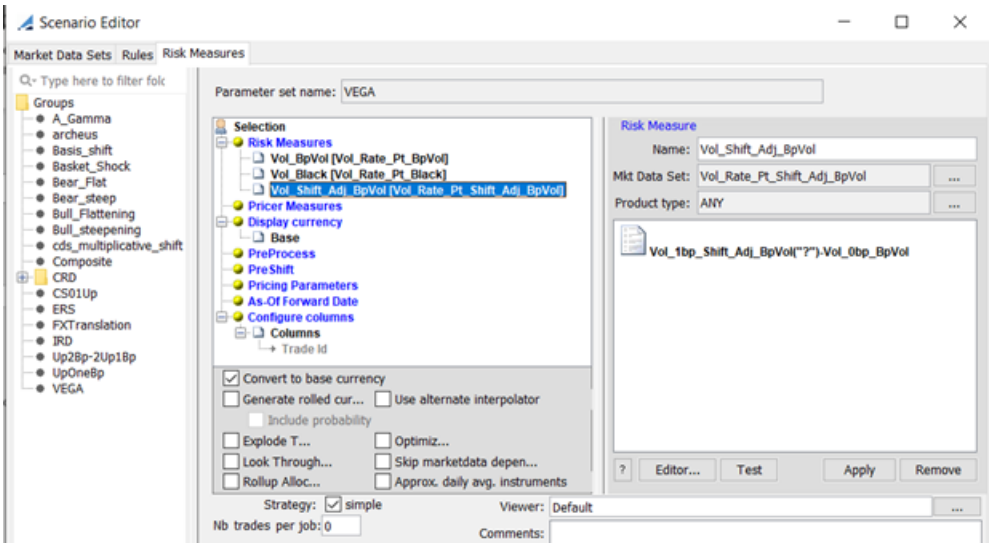
Scenario Rule for 1% shift in quote type 'BpVol' for normal volatility with shift adjustment:



Scenario formula for Vega calculation – The rules for all different volatility types can be selected into one scenario risk measure to calculate the Vega for a portfolio of multiple product types. Different rules can be selected for each volatility type based on selected market data sets.

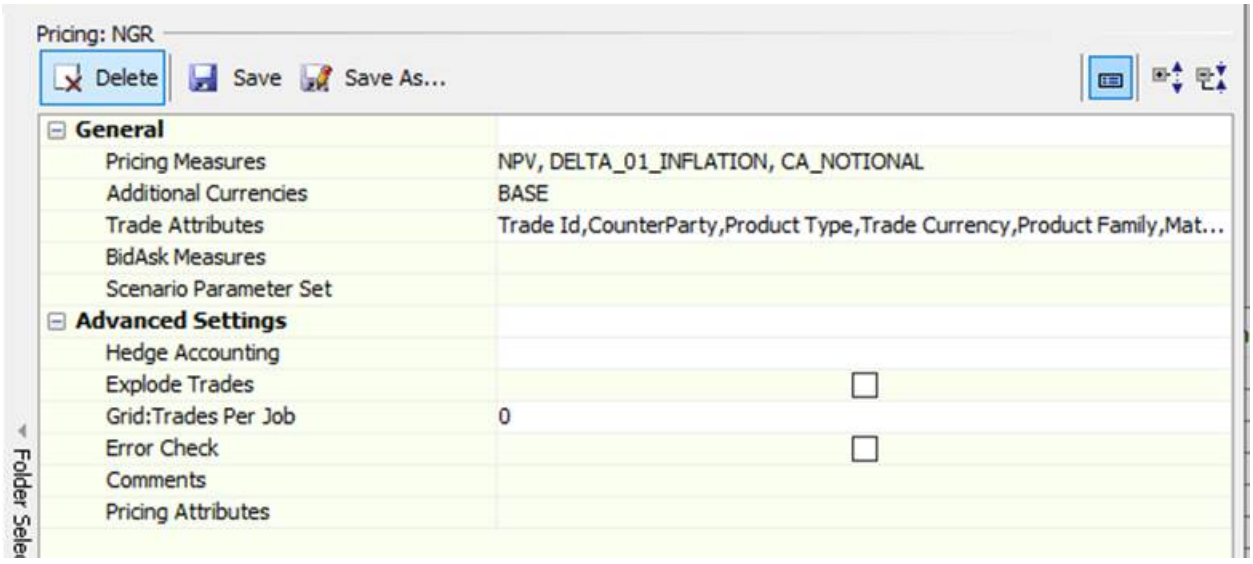

Scenario Editor
Market Data Sets
Rules
Risk Measures
Type here to filter folc
Groups
A_Gamma
archeus
Basis_shift
Basket_Shock
Bear_Flat
Bear_steep
Bull_Flattening
Bull_steepening
cds_multiplicative_shift
Composite
CRD
CS01Up
ERS
FXTranslation
IRD
Up2Bp-2Up1Bp
UpOneBp
VEGA
Parameter set name: VEGA
Selection
Risk Measures
Vol_BpVol [Vol_Rate_Pt_BpVol]
Vol_Black [Vol_Rate_Pt_Black]
Vol_Shift_Adj_BpVol [Vol_Rate_Pt_Shift_Adj_BpVol]
Pricer Measures
Display currency
Base
PreProcess
PreShift
Pricing Parameters
As-Of Forward Date
Configure columns
Columns
Trade Id
Convert to base currency
Generate rolled cur...
Use alternate interpolator
Include probability
Explode T...
Optimiz...
Look Through...
Skip marketdata depen...
Rollup Alloc...
Approx. daily avg. instruments
Strategy:
simple
Nb trades per job:
0
Viewer:
Default
Comments:
Risk Measure
Name:
Vol_BpVol
Mkt Data Set:
Vol_Rate_Pt_BpVol
Product type:
ANY
Vol_1bp_BpVol("?")-Vol_0bp_BpVol
?
Editor...
Test
Apply
Remove


Scenario Editor
Market Data Sets
Rules
Risk Measures
Type here to filter folc
Groups
A_Gamma
archeus
Basis_shift
Basket_Shock
Bear_Flat
Bear_steep
Bull_Flattening
Bull_steepening
cds_multiplicative_shift
Composite
CRD
CS01Up
ERS
FXTranslation
IRD
Up2Bp-2Up1Bp
UpOneBp
VEGA
Parameter set name: VEGA
Selection
Risk Measures
Vol_BpVol [Vol_Rate_Pt_BpVol]
Vol_Black [Vol_Rate_Pt_Black]
Vol_Shift_Adj_BpVol [Vol_Rate_Pt_Shift_Adj_BpVol]
Pricer Measures
Display currency
Base
PreProcess
PreShift
Pricing Parameters
As-Of Forward Date
Configure columns
Columns
Trade Id
Convert to base currency
Generate rolled cur...
Use alternate interpolator
Include probability
Explode T...
Optimiz...
Look Through...
Skip marketdata depen...
Rollup Alloc...
Approx. daily avg. instruments
Strategy:
simple
Nb trades per job:
0
Viewer:
Default
Comments:
Risk Measure
Name:
Vol_Black
Mkt Data Set:
Vol_Rate_Pt_Black
Product type:
ANY
Vol_1per_Black("?")-Vol_0per_Black
?
Editor...
Test
Apply
Remove



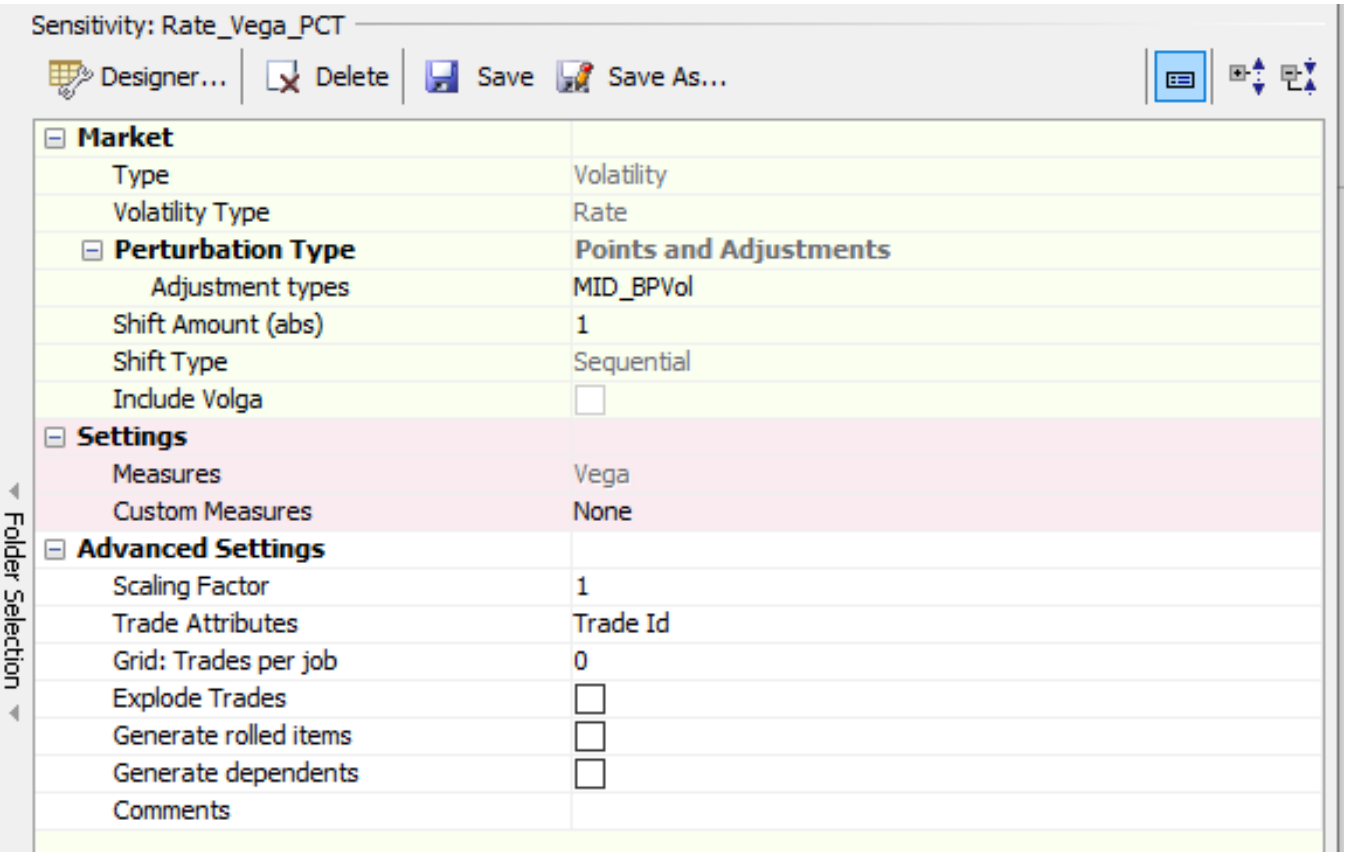
Risk_Inflation

Risk_Inflation will be calculated using the following pre-defined pricing analysis. Risk_Inflation results are from DELTA_01_INFLATION.



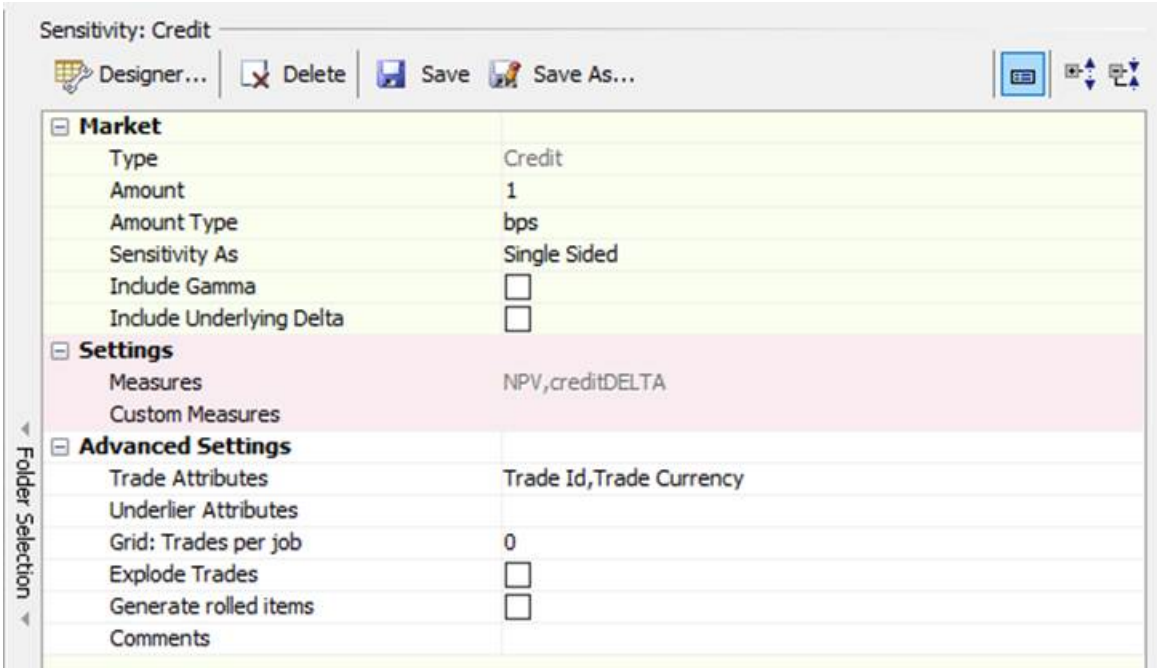
Risk_InflationVol

Risk_InflationVol will be calculated using the following pre-defined sensitivity analysis in case of Inflation Cap trades. Product sub-type needs to be added to the trade attribute to identify this type of trade. Previously, Risk_IRVol was calculated for vega results. After this change, Risk_InflationVol will be calculated.



Risk_CreditQ

Risk_CreditQ will be calculated using the following pre-defined Credit sensitivity analysis.

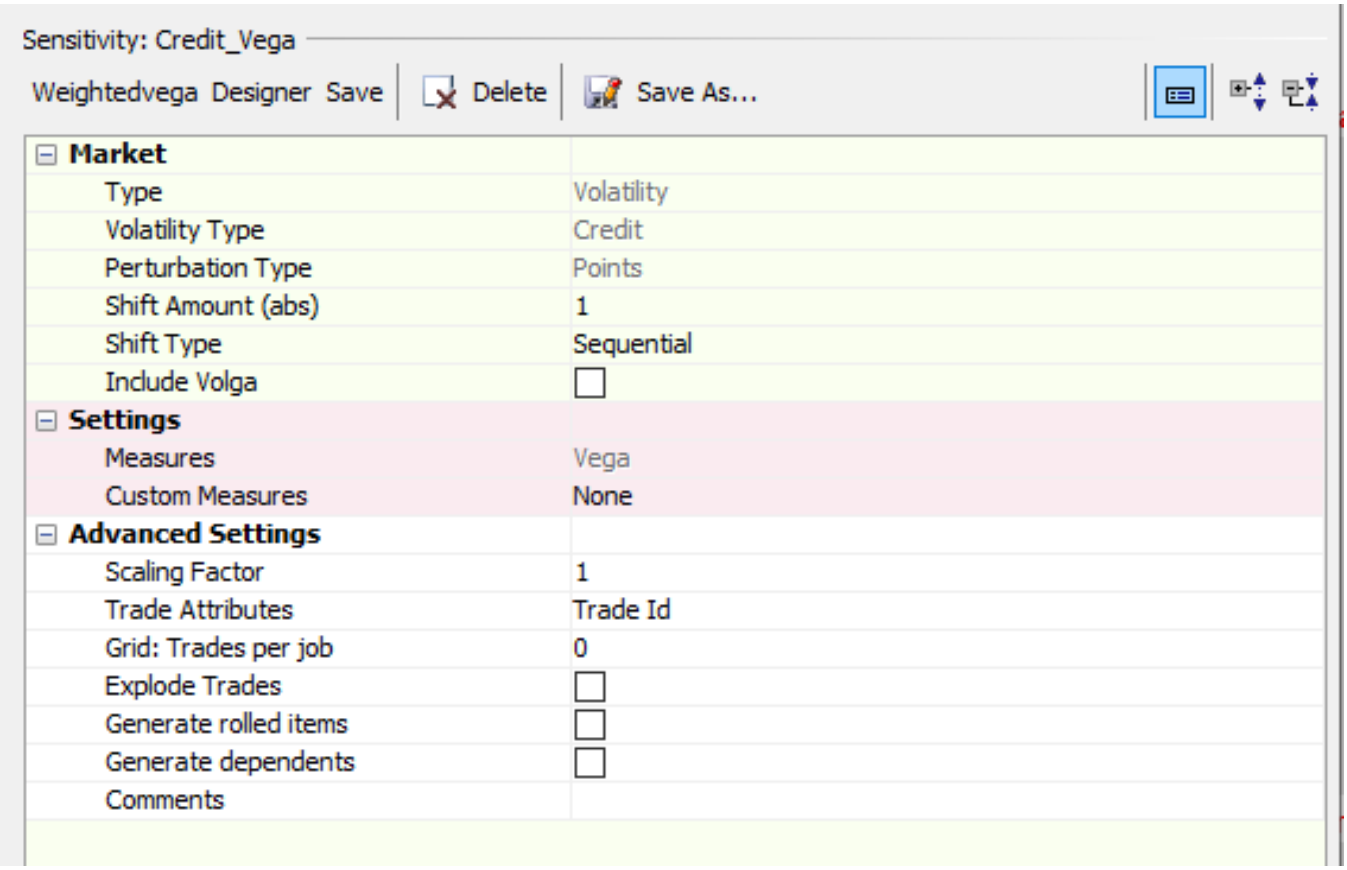


For CDSIndexOption trade, it is required to use pricer PricerCDSIndexOptionSingleCurve and multi-sensitivity analysis calculates credit delta at index level. Per ISDA requirement, Risk_CreditQ risk factors calculated by MARGIN_INPUT will break down index level value for each single name based on defined weights.

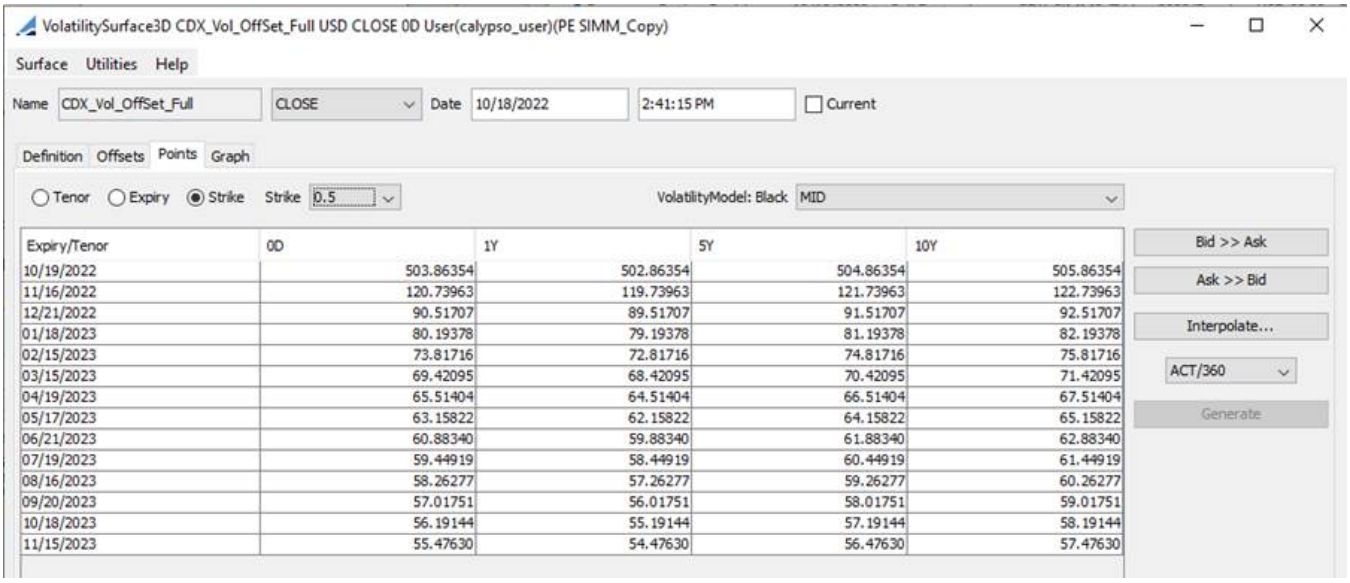
Risk_CreditVol

Risk_CreditVol = Vega * Vol. This is the same idea as Risk_IRVol calculation in current solution. There are two inputs: Vega from credit volatility sensitivity and vol points from vol surfaces which used to price the trade.

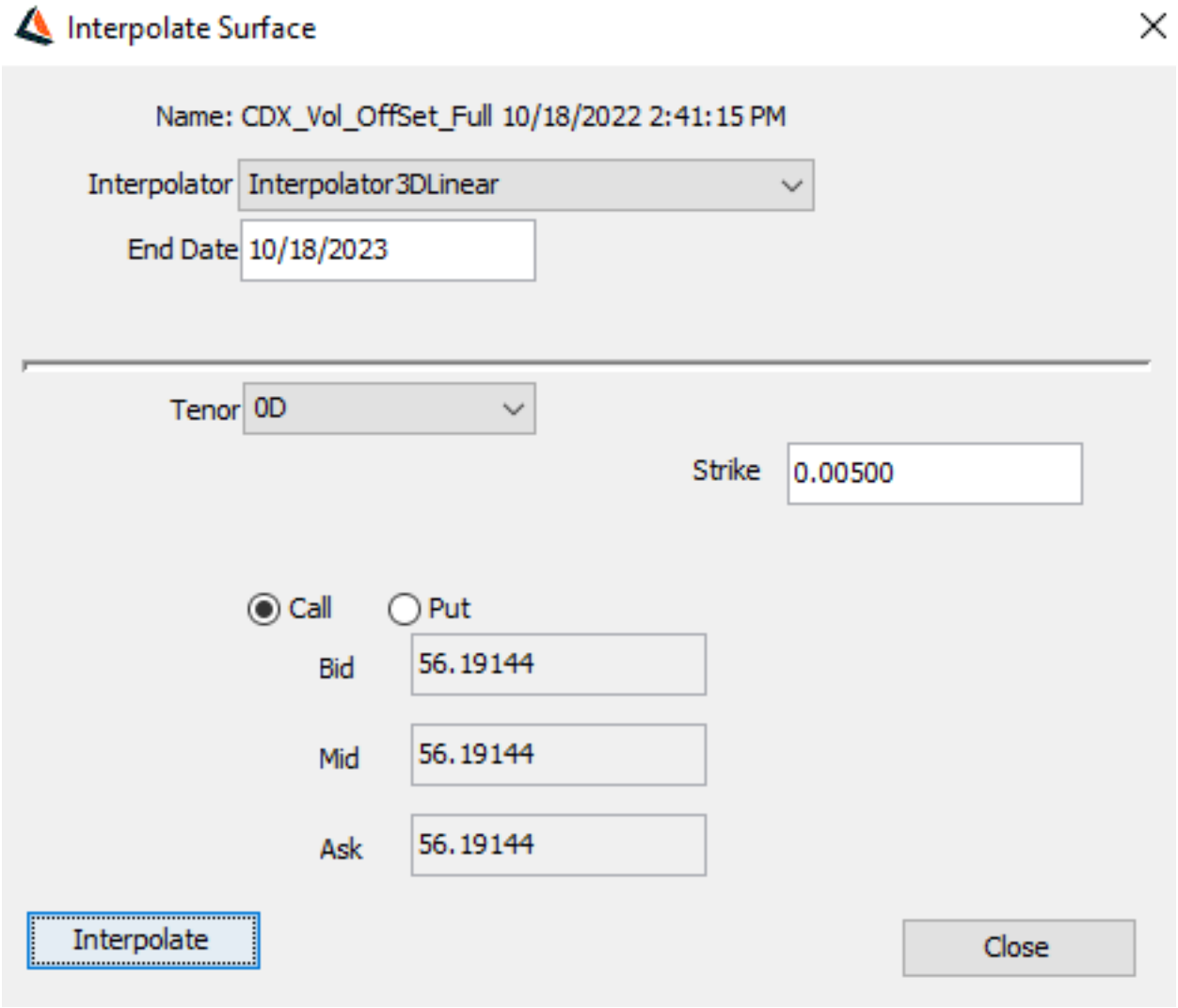
Credit vega will be calculated using the following pre-defined Credit sensitivity analysis.



Credit Vol points are derived from volatility surface used to price the trade, using same date, tenor and strike.



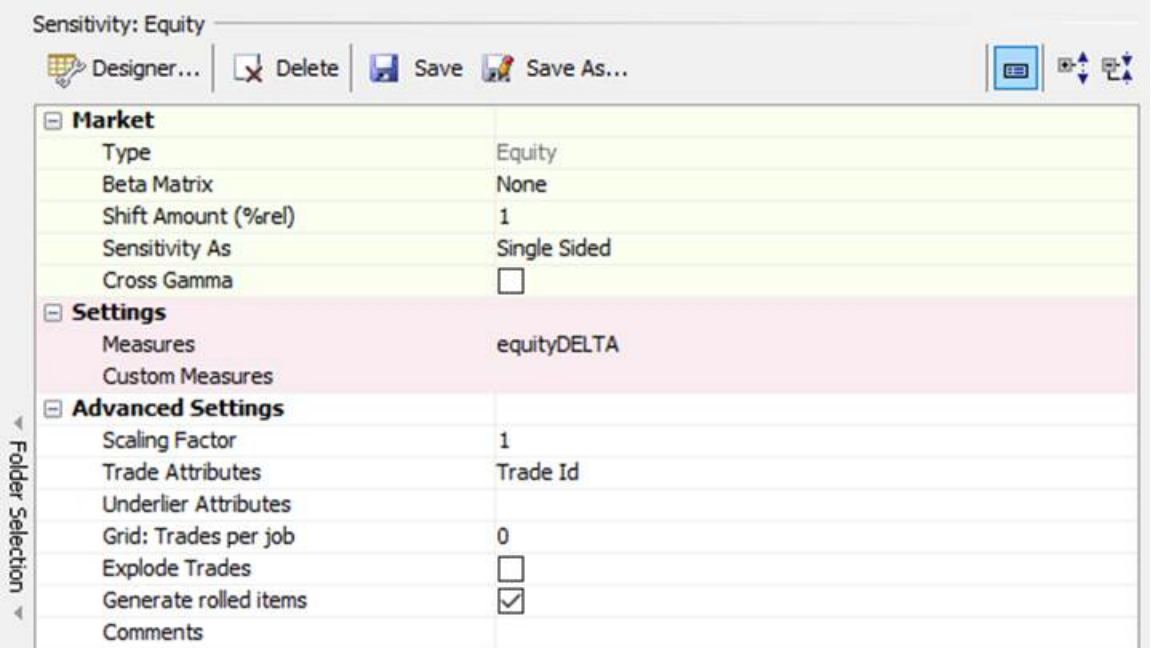
Expiry/Tenor	0D	1Y	5Y	10Y
10/19/2022	503.86354	502.86354	504.86354	505.86354
11/16/2022	120.73963	119.73963	121.73963	122.73963
12/21/2022	90.51707	89.51707	91.51707	92.51707
01/18/2023	80.19378	79.19378	81.19378	82.19378
02/15/2023	73.81716	72.81716	74.81716	75.81716
03/15/2023	69.42095	68.42095	70.42095	71.42095
04/19/2023	65.51404	64.51404	66.51404	67.51404
05/17/2023	63.15822	62.15822	64.15822	65.15822
06/21/2023	60.88340	59.88340	61.88340	62.88340
07/19/2023	59.44919	58.44919	60.44919	61.44919
08/16/2023	58.26277	57.26277	59.26277	60.26277
09/20/2023	57.01751	56.01751	58.01751	59.01751
10/18/2023	56.19144	55.19144	57.19144	58.19144
11/15/2023	55.47630	54.47630	56.47630	57.47630



For CDSIndexOption trade, it is required to use pricer PricerCDSIndexOptionSingleCurve and multi-sensitivity analysis calculates credit delta at index level. Per ISDA requirement, Risk_CreditVol risk factors calculated by MARGIN_INPUT will be at index level.

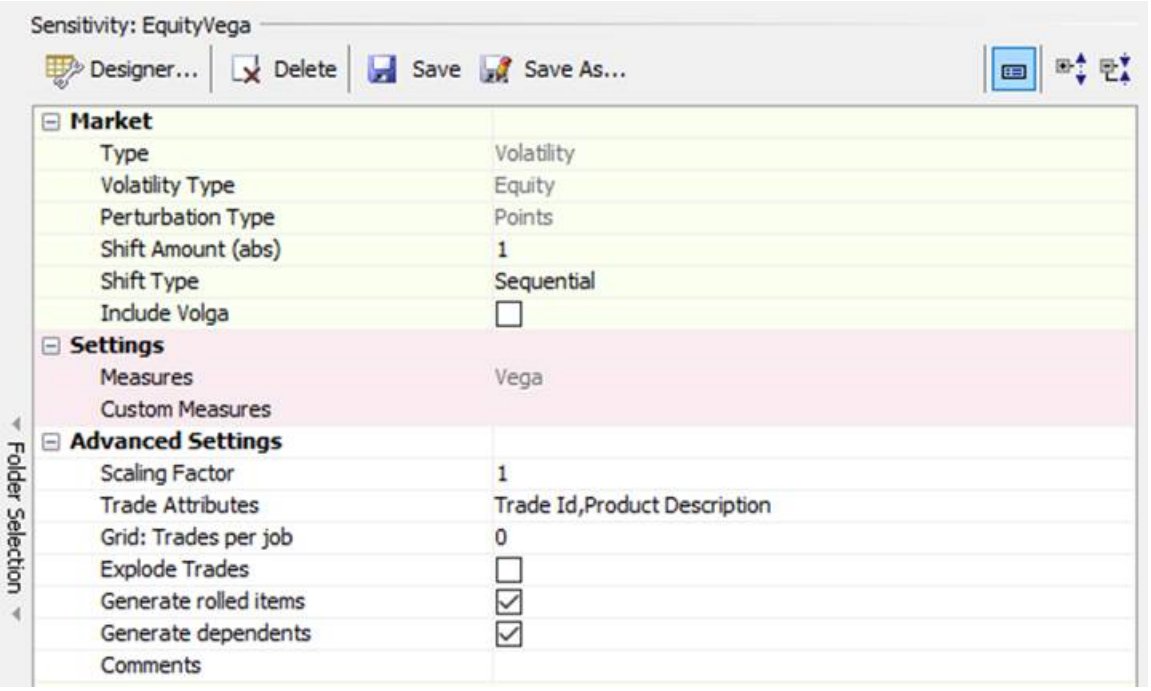
Risk_Equity

Risk_Equity will be calculated using the following pre-defined Equity sensitivity analysis.



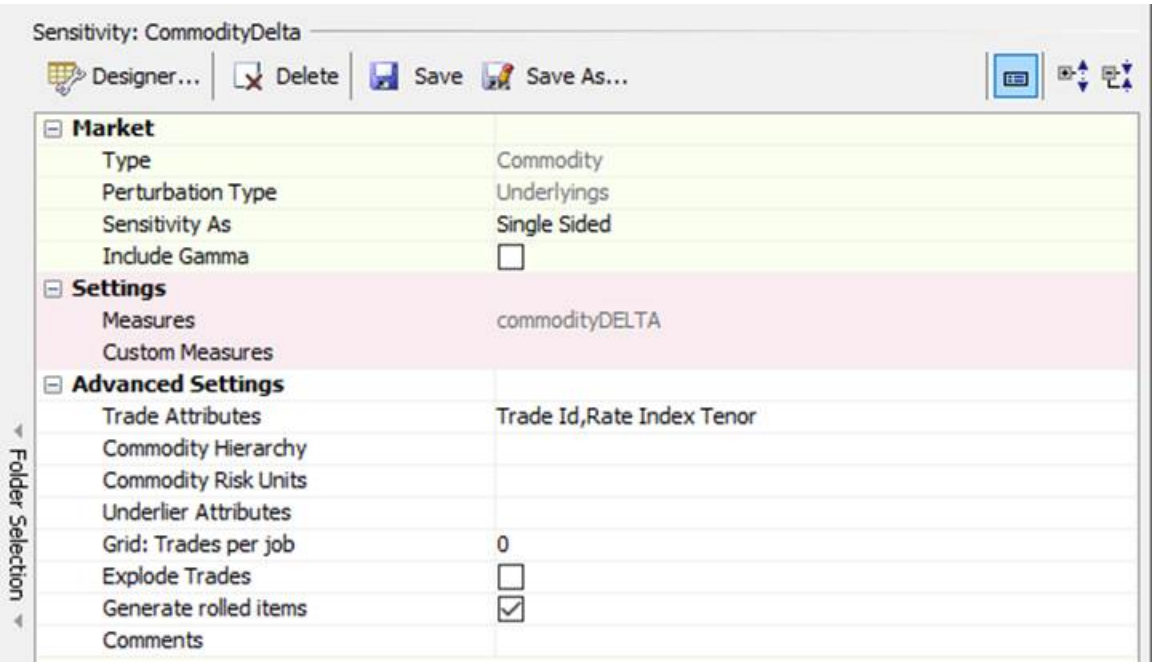
Risk_EquityVol

Risk_EquityVol will be calculated using the following pre-defined equity volatility sensitivity analysis.



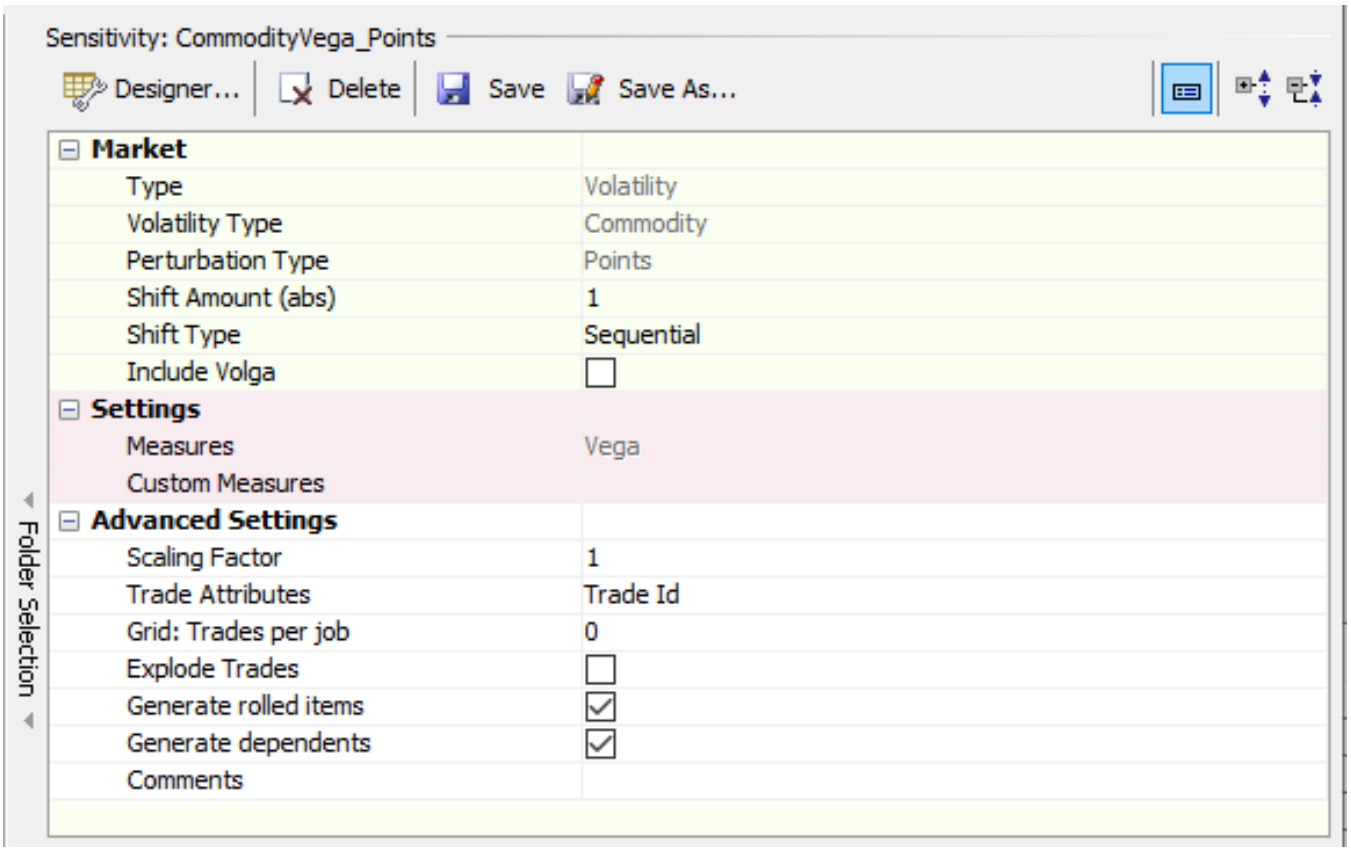
Risk_Commodity

Risk_Commodity will be calculated using the following pre-defined commodity sensitivity analysis.



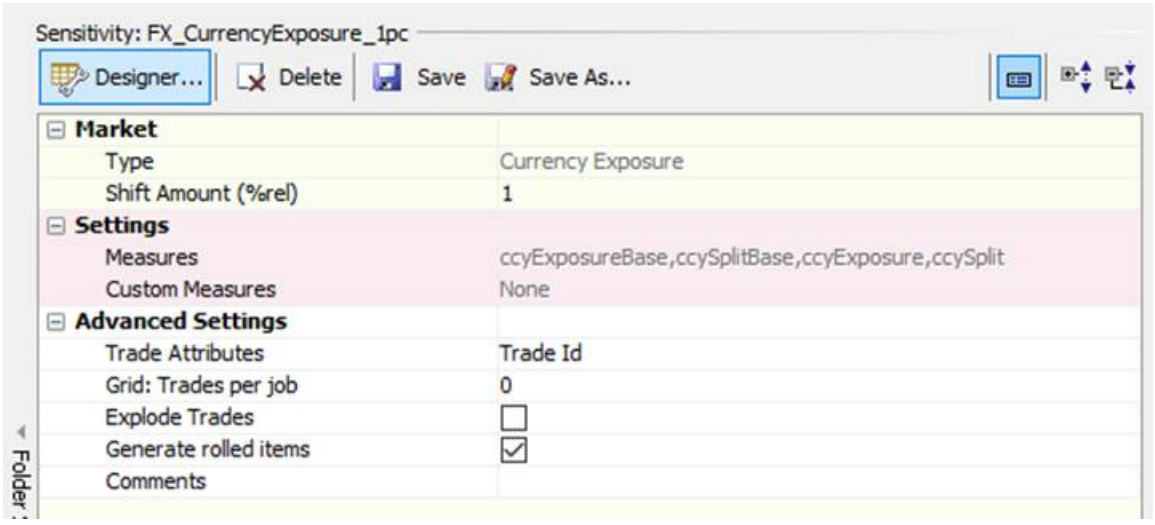
Risk_CommodityVol

Risk_CommodityVol will be calculated using the following pre-defined commodity volatility sensitivity analysis.



Risk_FX

Risk_FX is calculated using the currency exposure approach in sensitivity analysis. The Currency Exposure analysis generates complete FX risk including FX Delta and FX Translation Risk. The below sensitivity rule is used for calculation.

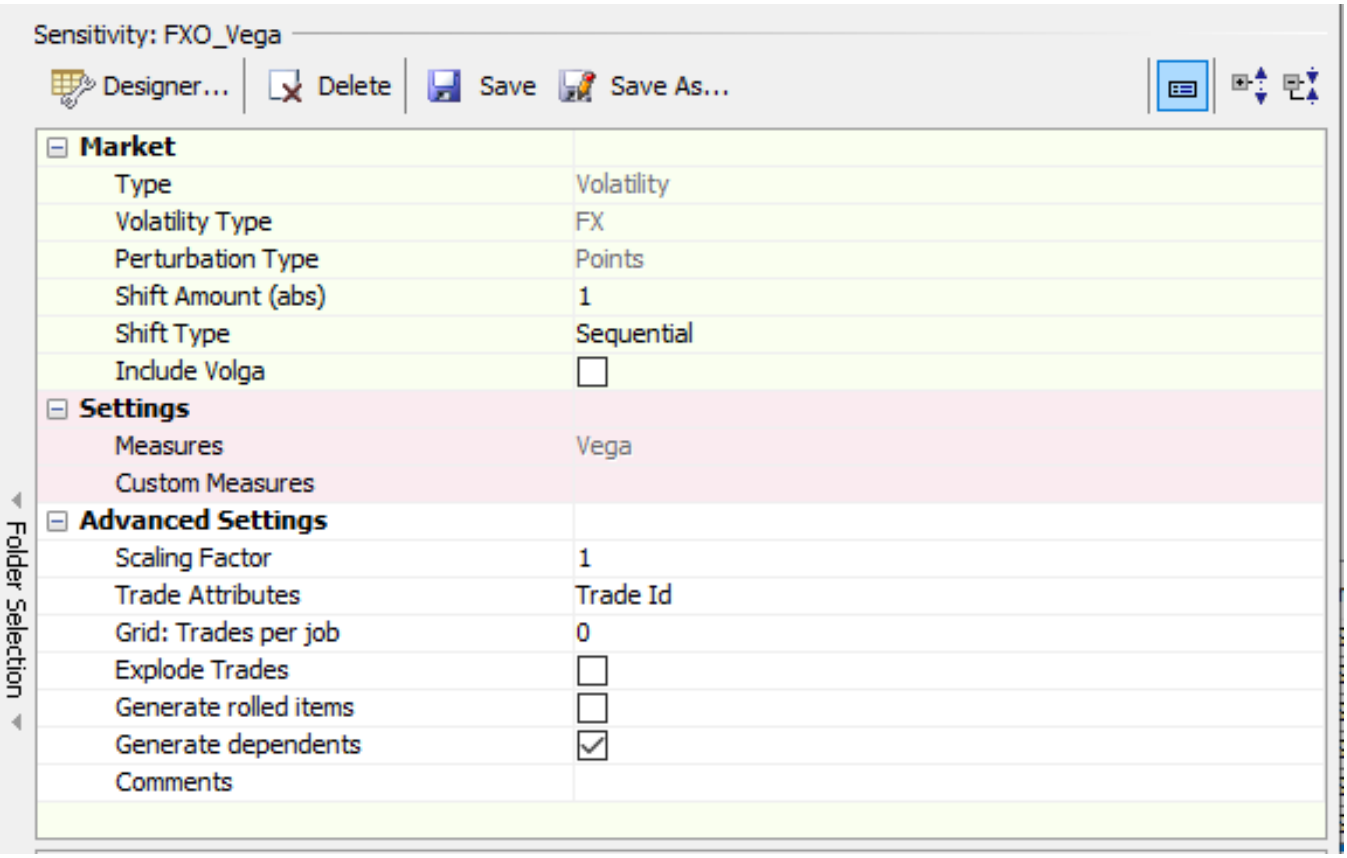


The results from column ccyExposureBase are used to populate the Amount column in CRIF file.

Note that the sensitivities that have a qualifier currency the same as the pricing env base currency are filtered out from the CRIF file. The sensitivities for a currency pair where none of the currencies match the trade currency, are also filtered out in the CRIF. The Risk_FX for each trade currency is reported as is in the CRIF file without flipping the sign.

Risk_FXVol

Risk_FXVol will be calculated using the following pre-defined FX volatility sensitivity analysis.

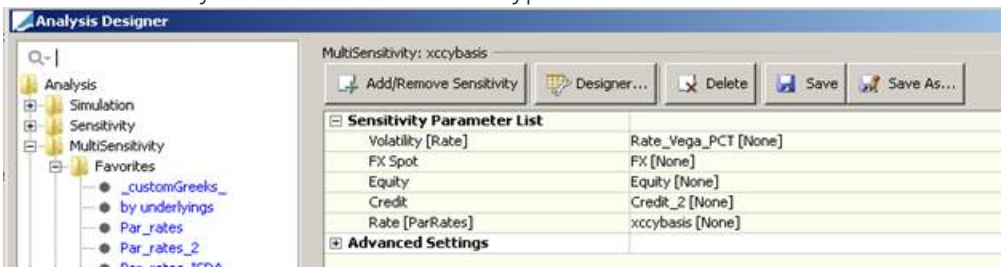


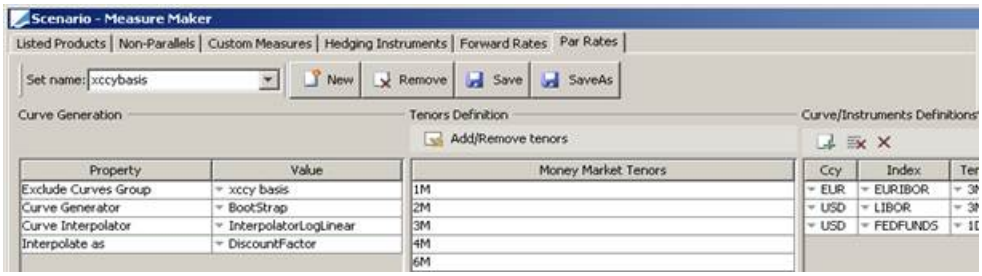
You can use the domain "MarginInput.FXVegaScalingFactor" to allow scaling of FXVega in multi sensitivity analysis.

If not set, FXVega uses scaling factor 1 when running sensitivities. You can set Value = <scaling factor> as needed. For example Value = 0.1.

Risk_XccyBasis

Risk_XCcyBasis will be calculated using same pre-defined ParRate sensitivity analysis, and results are from CurveBasisXCCy Underlier Market data Type.





Configurable Risk_XCcyBasis Calculation

In some markets, certain currencies are priced differently. To accommodate this difference, the user can configure a list of currencies that will be handled by this exception.

To allow users to change the list of currencies where Risk_IRCurve will be treated as Risk_XCcyBasis, the domain value *ISDASIMM.treatIRCurveAsXccyBasis.Currencies* should be used. For ISDA case "Quote is for fixed rate against USD Libor Flat", the desired currencies should be added to this domain.

For currencies where the sign of the risk will be flipped, the domain *ISDASIMM.flipXccyBasisRisk.Currencies* should be used. For ISDA case "Quote is non-USD Libor plus spread", the desired currencies should be added to this domain.

The only trigger for using the special logic is that the domain contains a list of currencies. If the domain is empty, no special logic will be applied to any currency.

Handling of Cross Currency Swaps:

The "NPV_EXCLUDE_PRINCIPAL" Pricer Parameter supports the following logic for FX Resettable Principal Cashflows in calculating NPV Pricer Measure for PricerSwap and PricerXCCySwap.

For "regular" cross currency swaps (Fixed Principal):

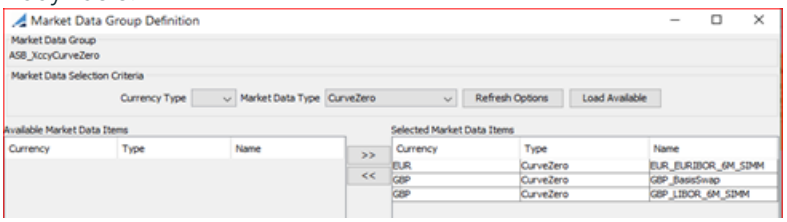
- All unsettled Principal cashflows are excluded from NPV calculation, resulting in an NPV that is simply the sum of discounted Interest cashflows only

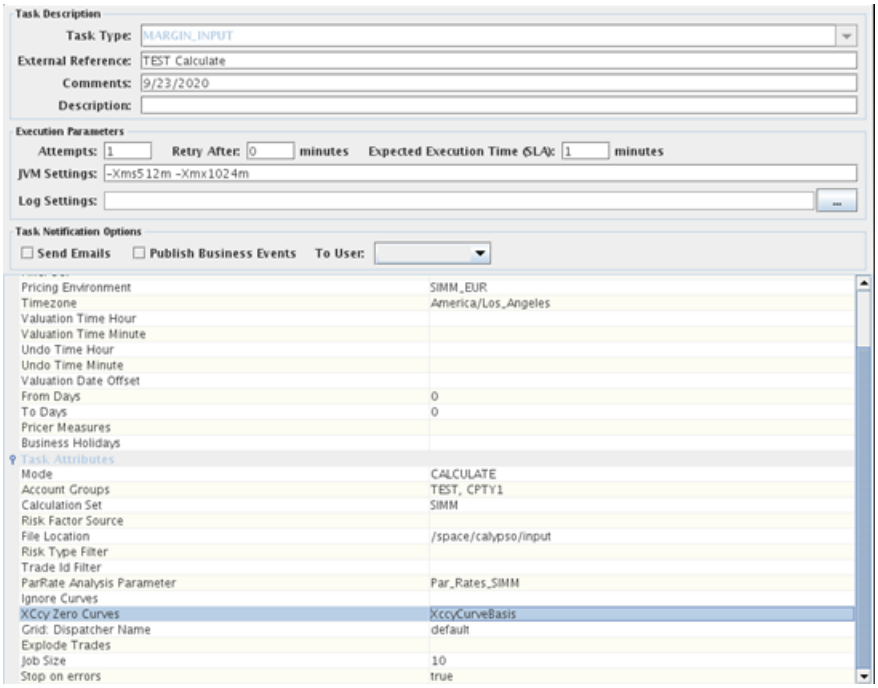
For MTM (FX-Adjusted) cross currency swaps (FX Resettable Principal):

- The system identifies MTM cross currency swap trades via a flag called “Prin Adj”.
- All Principal cashflows are included in the NPV until they are reset.
- MTM cross currency swaps will be considered as a series of single-period swaps, where the principal exchange cash flows of the single period swaps will be removed if the FX reset has been fixed.

Curve configuration for Risk_XCcyBasis

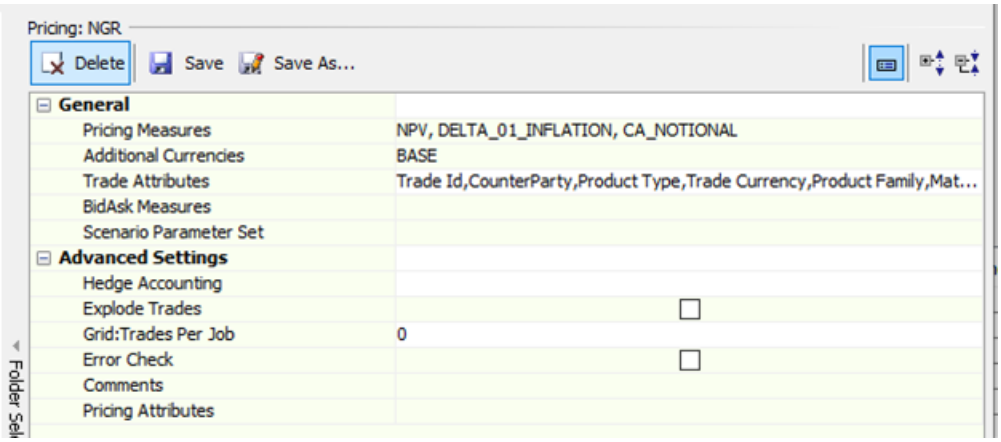
For basis curves using both Curve Zero and Curve Basis, the curves need to be saved in a market data group. This market data group can be selected in the MARGIN_INPUT scheduled task. The curves in the market data group selected in the *Xccy Zero curves* scheduled task attribute are used to generate the sensitivities for calculation of Risk XccyBasis.





Notional and PV

Notional and PV will be calculated using the following pre-defined pricing analysis. Notional results are from CA_NOTIONAL, and PV results are from NPV.



4.1.7 Risk Factor Enrichment

Tenor Normalization

Calypso permits a non-ISDA SIMM tenor on a risk factor input. Whether imported or calculated, risk factors which are non-standard will then be split into two risk factors and allocated to the two surrounding SIMM buckets using linear interpolation. These split risk factors will then be saved in the database.

The ISDA SIMM standard tenors per risk type are hardcoded and cannot be amended by a user. Tenor normalization is done automatically and there is no flag or setting controlled by the user.

Market Data Provider Crowdsourcing

To help facilitate the bucket tagging of certain instruments, market data providers (for example, ICE) provide crowdsourcing utilities which provide the bucket values each day for instruments. Calypso natively supports import of these files to be used for enriching the bucket field of risk factors. Note that crowdsourcing data requires a license and agreement through other vendors, not through Calypso.

For supported risk types, the risk factors may be uploaded or created without a bucket value. The bucket value will then be populated at the time of IM calculation or export using the imported values from crowdsourcing. For any risk factor that does have a bucket value, it will not be over-ridden by this process. This process does not check for correctness of existing buckets against the crowdsourced data. Note that if the user attempts to calculate IM with missing bucket information and no crowdsourcing data, the process will throw an error, as bucket data is required for IM calculation.

The supported Risk Types are:

- RiskEquity
- RiskCreditQ
- RiskCreditNQ

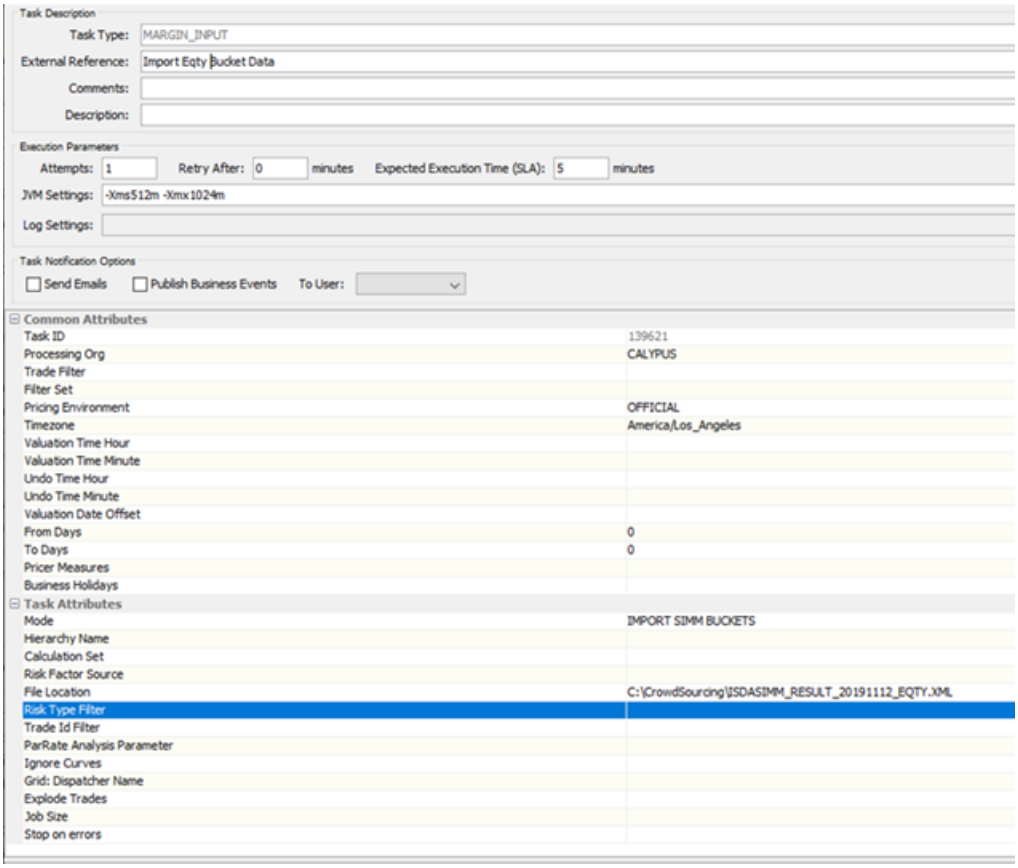
Commodity buckets need to be uploaded by the client and tagged as a product code.

Process

The crowdsourcing data is uploaded using the MARGIN_INPUT scheduled task in “IMPORT SIMM BUCKETS” mode.

When using this mode, a directory is provided in the “File Location” field which points to one of the enrichment xml files (no naming conventions are required). Crowdsourcing data comes in 1 file per risk type, so multiple IMPORT SIMM BUCKET type tasks will need to be created. It does not matter if the bucket data is imported before or after the risk factors, as it is an independent process.

Calculation Set and Risk Factor Source can be left empty in the scheduled task definition.



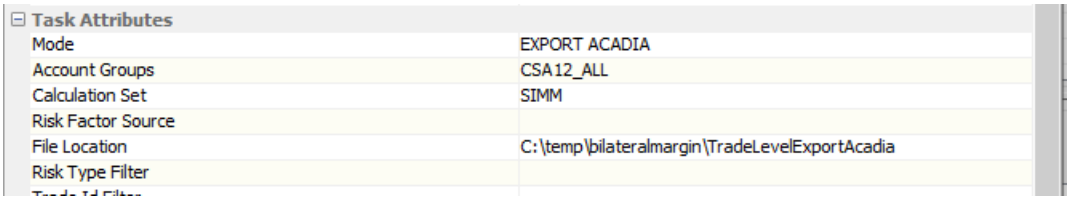
Once the files are uploaded, they are stored as a single set of bucket enrichment data. This means that any imported data will be used on any valuation date. It also means that when you import a new file, it deletes the existing data then creates new entries. There is no history of bucket data and valuation date does not matter.

The bucket enrichment will occur only when loading/exporting risk factors. Any risk factors that are imported will not be amended and then saved in the database. The original risk factors that were imported are saved in the database. The enrichment process only tags the appropriate data upon retrieving the risk factors for either calculation or viewing. This is automatically done, there is no setting or switch to control this.

4.1.8 EXPORT Mode

There are three EXPORT modes in MARGIN_INPUT scheduled task to export risk factors into CRIF files. Account groups is optional fields. CRIF file only contains risk factors from selected margin account group when Account groups is defined.

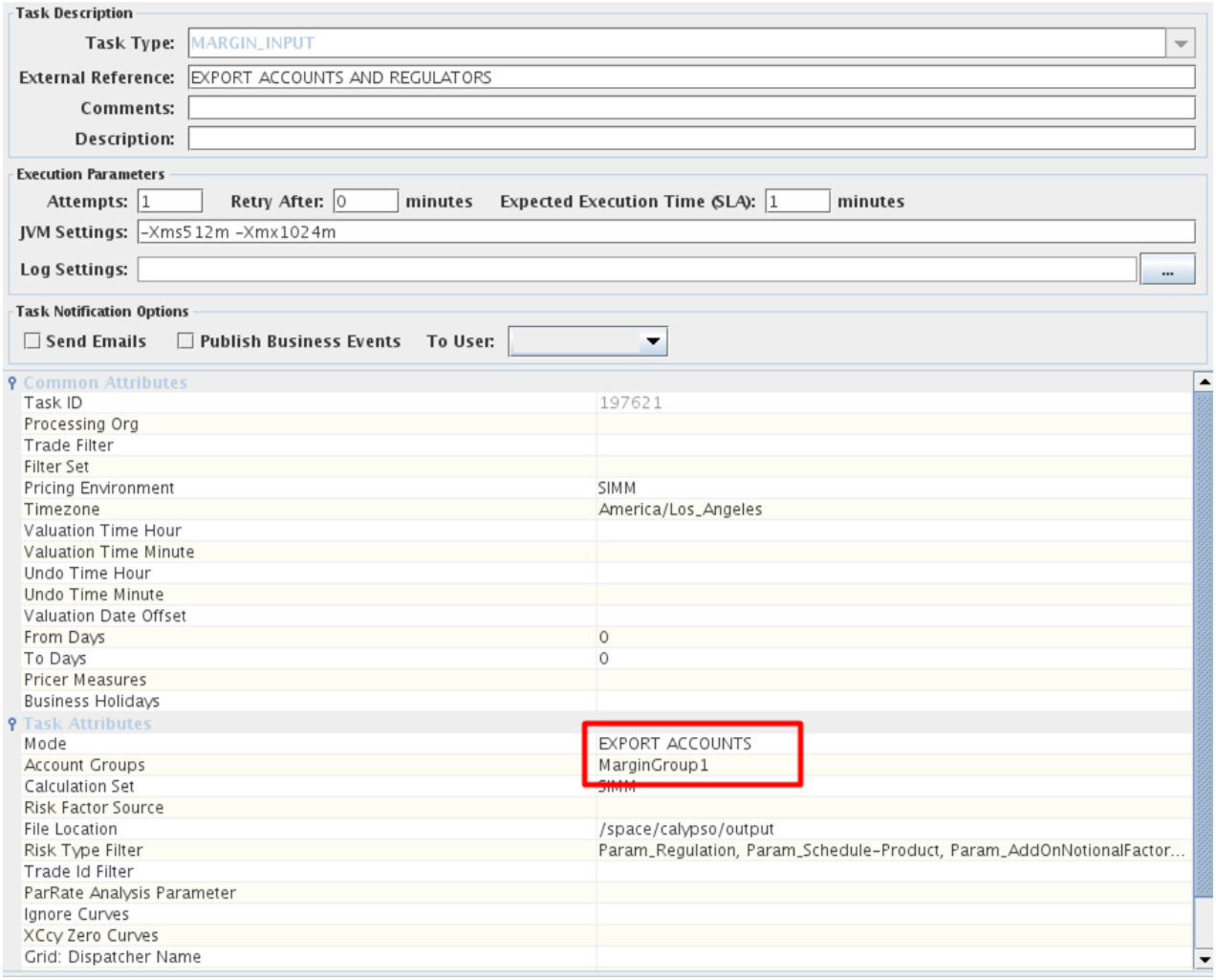
- EXPORT mode exports risk factors CRIF file in Calypso format.
- EXPORT ACADIA mode exports risk factors CRIF file in Acadia format and amount_currency is qualifier currency.
- EXPORT ACADIA MARGIN CCY mode exports risk factors CRIF file in Acadia format and amount_currency is margin currency.



4.1.9 EXPORT ACCOUNTS Mode

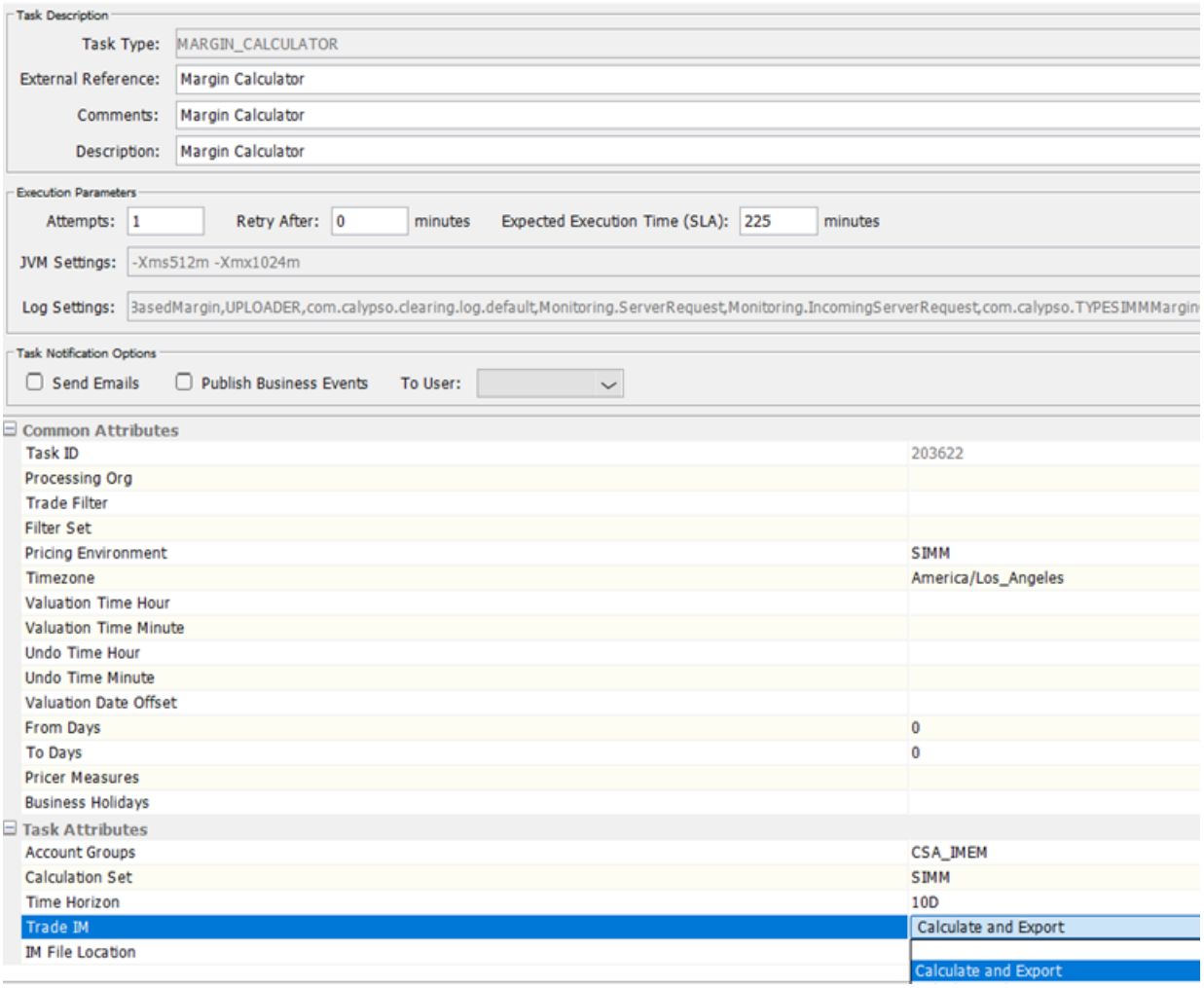
The MARGIN_INPUT scheduled task run in EXPORT ACCOUNTS mode will export a .csv file which contains account and regulator parameters. This is used to help manage the data outside of the UI if required.

The user is required to configure the File Location for export and can optionally add an account group to export only some accounts.



4.2 MARGIN_CALCULATOR Scheduled Task

Configure the MARGIN_CALCULATOR scheduled task . This scheduled task is used to calculate the margin amounts once the risk factors have been imported or calculated.



Required Attributes:

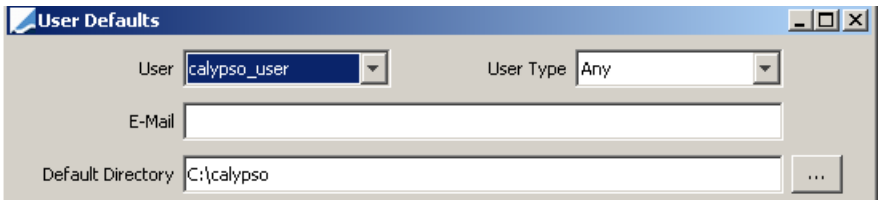
- Pricing Environment
- Timezone
- Account Groups – This attribute has replaced the Hierarchy attribute. All accounts under the selected account groups will be included in the IM calculation.
- Calculation Set – This is a mandatory attribute

Optional Attributes:

- Time Horizon – This is an optional attribute with two available values: 10D and 1D. It allows the user to select the time horizon for calculation of SIMM. The default value is 10D. 1D can only be used to generate a margin csv file. No IM Exposure PL Marks will be generated with 1D setup.
- IM File location
- Trade IM - This is a single value attribute. The available values are: blank, Calculate Only, Calculate and Export. Trade IM is calculated based on the risk factors at trade level/ sub-trade level.
  - blank (not defined) - MARGIN_CALCULATOR calculates account IM and generates csv files.
  - Calculate Only - MARGIN_CALCULATOR not only calculates IM and generates csv at account level, but also calculates Trade level IM with results saved in DB tables and Margin web UI. No trade level IM csv is generated.
  - Calculate and Export- MARGIN_CALCULATOR calculates IM and generates csv for both account level and trade level with results saved in DB tables. Output trade level result file name will contain _Trade_ along with the name defined in output file names domains described below.

Exposures will be generated for CSA In Place margin accounts if the selected calculation set is an Official calculation set and the time horizon is 10D. Exposures will not be generated if margin account is Pre-CSA, or calculation set is unofficial, or time horizon is 1D. This way was previously controlled by the *Generate Exposure Trades* attribute, but the attribute is no longer supported.

The scheduled task identifies the margin model to be used based on the trade filter criteria. Both PO and Counterparty view will automatically be calculated. The output directory can be defined in the scheduled task or in the User Defaults (user for which the scheduled task is triggered). If it is defined in the scheduled task, that location will override the User Default location. Below is an example of overriding the output directory:



4.2.1 Output File Names

You can use a set of domains to configure the name of the output files for MARGIN_CALCULATOR and MARGIN_INPUT (EXPORT mode). These domains contain the configurable file names and can use the following keywords:

- TIMESTAMP - Generation timestamp
- VALDATE – Valuation date (yyyy-mm-dd)
- PRICINGENV - Pricing Env name
- HIERARCHY - Hierarchy name
- ACCOUNTGROUP – Account Group name
- TIMEHORIZON - 1D or empty

Each element in the file name must be separated by an hyphen "-".

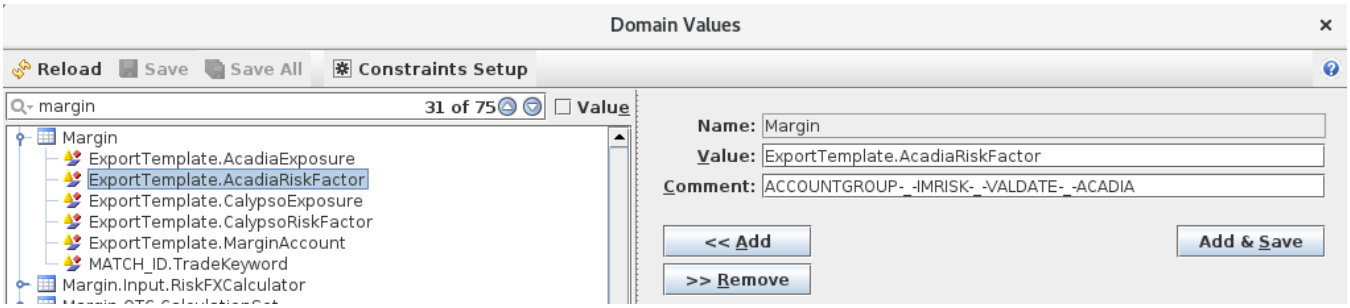
Any character other than those keywords is considered as String.

Example: "MarginExporter-_-TIMEHORIZON-_-BilateralMargin-_-PRICINGENV-_-VALDATE-_-TIMESTAMP" will generate file names like:

```
MarginExporter_1D_BilateralMargin_PENAME_2012-05-16_20120515191059000.csv
```

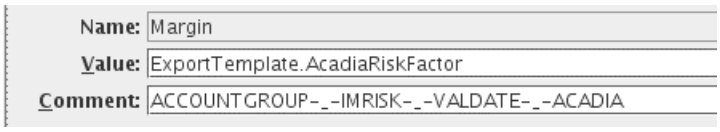
There is one domain per type of file:

- ExportTemplate.AcadiaExposure - Acadia IM exposure file name
- ExportTemplate.AcadiaRiskFactor - Acadia risk factor file name
- ExportTemplate.CalypsoExposure - Calypso IM exposure file name
- ExportTemplate.CalypsoRiskFactor - Calypso risk factor file name
- ExportTemplate.MarginAccount – Margin Account file name
- ExportTemplate.MarginBackTesting – Margin Backtesting file name



Domain "ExportTemplate.CalypsoRiskFactor" supports both HIERARCHY and ACCOUNTGROUP.

Example of export file name with account group below –



Although the domains are not defined out-of-the-box, the default values before overriding are:

ExportTemplate.AcadiaExposure - MarginExporter-_-TIMEHORIZON-_-ACCOUNTGROUP-_-VALDATE

ExportTemplate.AcadiaRiskFactor - ACCOUNTGROUP-IMRISK-_-VALDATE-_-ACADIA

ExportTemplate.CalypsoExposure - MarginExporter-_-TIMEHORIZON-_-BilateralMargin-_-VALDATE

ExportTemplate.CalypsoRiskFactor - ACCOUNTGROUP-_-IMRISK-_-VALDATE

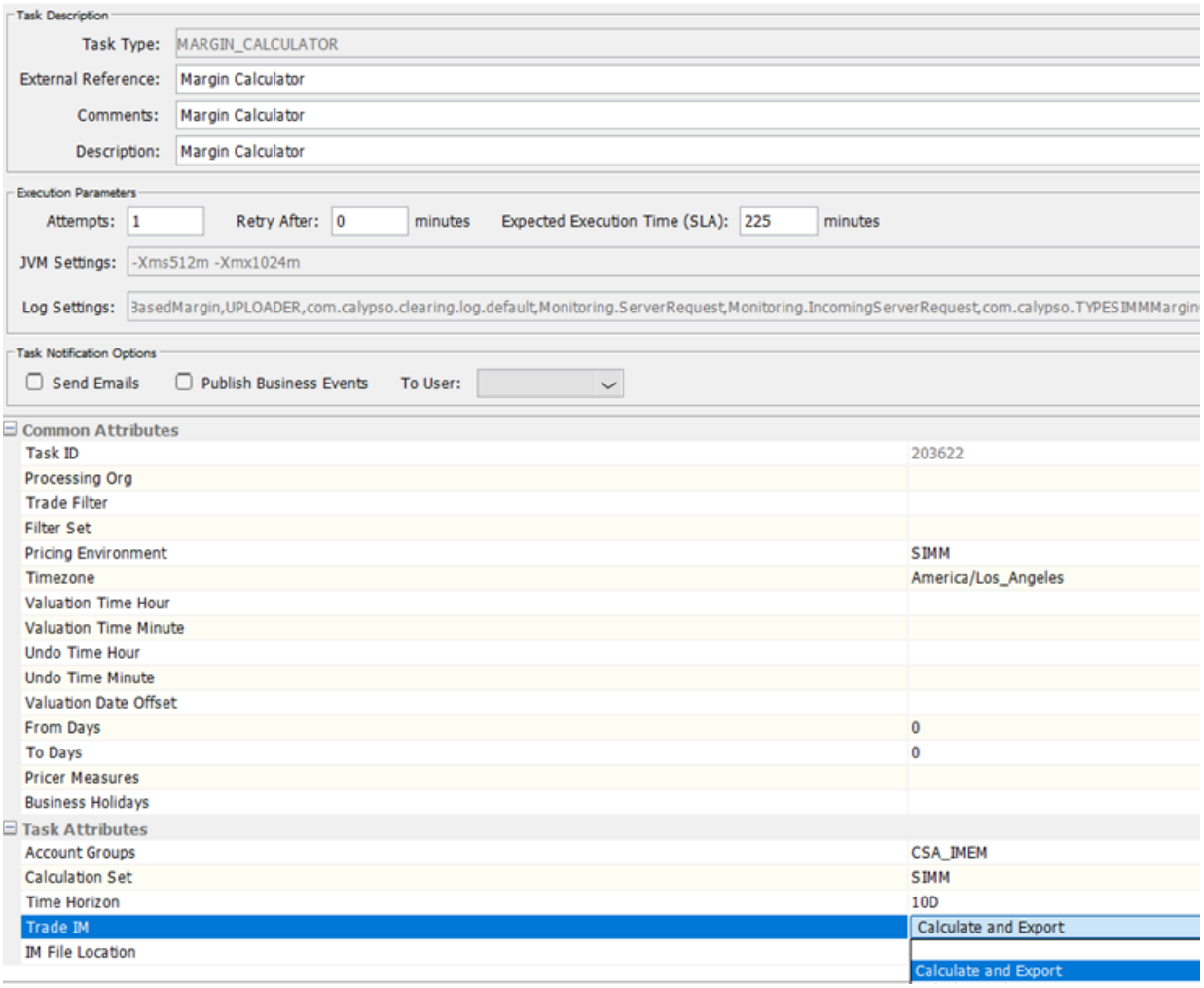
ExportTemplate.MarginAccount - MarginAccount-_-ACCOUNTGROUP -_-VALDATE

ExportTemplate.MarginBackTesting - UMRBackTesting-_-ACCOUNTGROUP-_-VALDATE

4.2.2 Generating the Initial Margin File

Margin Exposures can be generated once risk factors have either been calculated by the MARGIN_INPUT scheduled task, imported via the user interface or imported via the MARGIN_INPUT scheduled task.

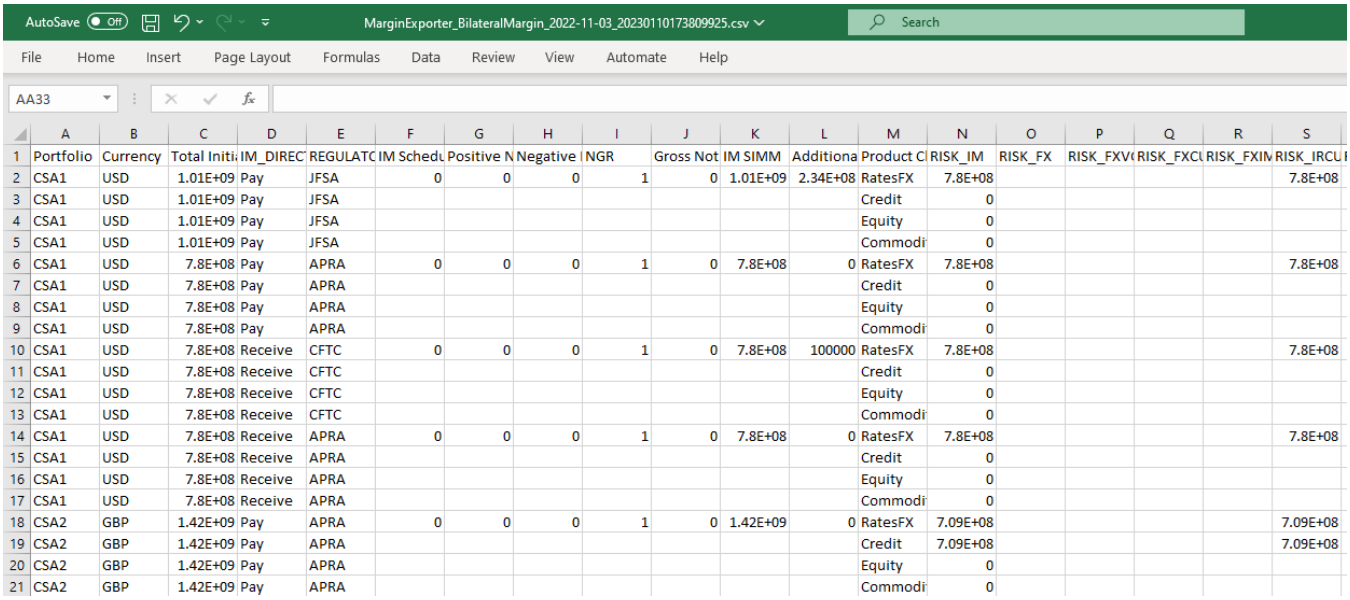
The Initial Margin can be generated at account or trade level with scheduled task MARGIN_CALCULATOR.



The output will be available in defined IM File Location or otherwise in user default folder.

The *MarginExporter_BilateralMargin* file reports the margin calculation under the various regulator combinations. The file name would also display if the var is calculated over 1-day horizon or 10-day horizon. The highest margin is reported on the first row and will be used to generate the MARGIN_CALL PL_Mark.

This report includes the additional margin calculation, as well as the schedule margin if some trades in the portfolio are subject to schedule-based margin. Below is the example for Account Level IM



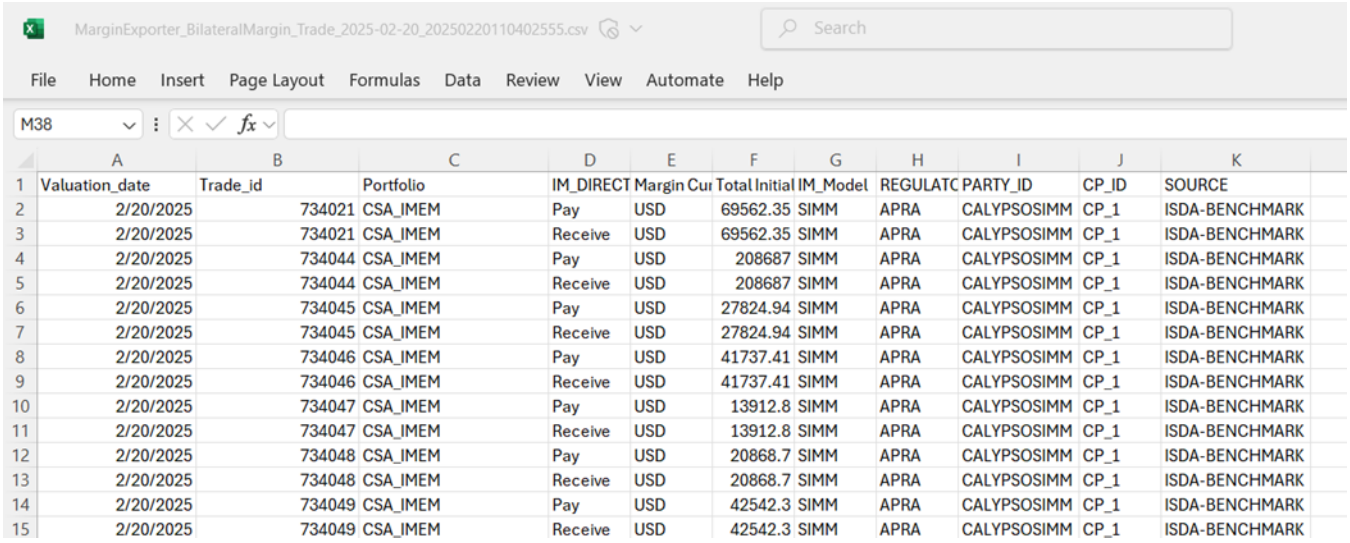
	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S
1	Portfolio	Currency	Total Initi	IM_DIREC	REGULATC	IM Schedu	Positive N	Negative	NGR	Gross Not	IM SIMM	Additiona	Product Cl	RISK_IM	RISK_FX	RISK_FXV(	RISK_FXCl	RISK_FXIN	RISK_IRCU
2	CSA1	USD	1.01E+09	Pay	JFSA	0	0	0	1	0	1.01E+09	2.34E+08	RatesFX	7.8E+08					7.8E+08
3	CSA1	USD	1.01E+09	Pay	JFSA								Credit	0					
4	CSA1	USD	1.01E+09	Pay	JFSA								Equity	0					
5	CSA1	USD	1.01E+09	Pay	JFSA								Commodi	0					
6	CSA1	USD	7.8E+08	Pay	APRA	0	0	0	1	0	7.8E+08	0	RatesFX	7.8E+08					7.8E+08
7	CSA1	USD	7.8E+08	Pay	APRA								Credit	0					
8	CSA1	USD	7.8E+08	Pay	APRA								Equity	0					
9	CSA1	USD	7.8E+08	Pay	APRA								Commodi	0					
10	CSA1	USD	7.8E+08	Receive	CFTC	0	0	0	1	0	7.8E+08	100000	RatesFX	7.8E+08					7.8E+08
11	CSA1	USD	7.8E+08	Receive	CFTC								Credit	0					
12	CSA1	USD	7.8E+08	Receive	CFTC								Equity	0					
13	CSA1	USD	7.8E+08	Receive	CFTC								Commodi	0					
14	CSA1	USD	7.8E+08	Receive	APRA	0	0	0	1	0	7.8E+08	0	RatesFX	7.8E+08					7.8E+08
15	CSA1	USD	7.8E+08	Receive	APRA								Credit	0					
16	CSA1	USD	7.8E+08	Receive	APRA								Equity	0					
17	CSA1	USD	7.8E+08	Receive	APRA								Commodi	0					
18	CSA2	GBP	1.42E+09	Pay	APRA	0	0	0	1	0	1.42E+09	0	RatesFX	7.09E+08					7.09E+08
19	CSA2	GBP	1.42E+09	Pay	APRA								Credit	7.09E+08					7.09E+08
20	CSA2	GBP	1.42E+09	Pay	APRA								Equity	0					
21	CSA2	GBP	1.42E+09	Pay	APRA								Commodi	0					

For Trade level IM, output file names are below by default.

MarginExporter_Trade_BilateralMargin_2022-11-22_20221122163646696.csv

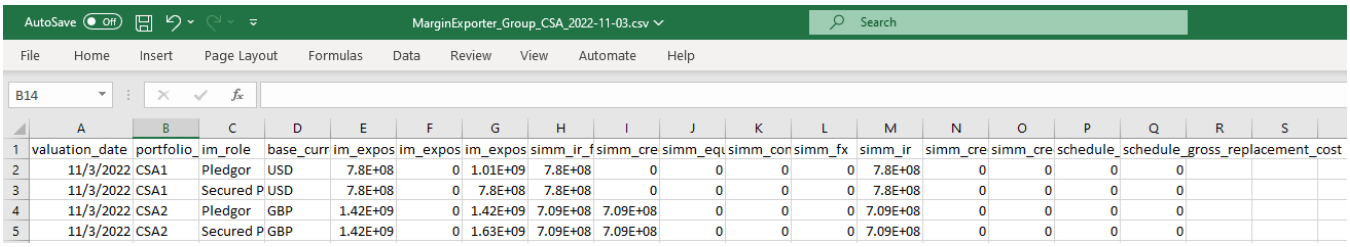
MarginExporter_Trade_1D_BilateralMargin_2022-11-22_20221122163646696.csv

This report includes IM generated for all trades for defined account groups as per the example below:



	A	B	C	D	E	F	G	H	I	J	K
1	Valuation_date	Trade_id	Portfolio	IM_DIRECT	Margin Cur	Total Initial	IM_Model	REGULATC	PARTY_ID	CP_ID	SOURCE
2	2/20/2025	734021	CSA_IMEM	Pay	USD	69562.35	SIMM	APRA	CALYPSOSIMM	CP_1	ISDA-BENCHMARK
3	2/20/2025	734021	CSA_IMEM	Receive	USD	69562.35	SIMM	APRA	CALYPSOSIMM	CP_1	ISDA-BENCHMARK
4	2/20/2025	734044	CSA_IMEM	Pay	USD	208687	SIMM	APRA	CALYPSOSIMM	CP_1	ISDA-BENCHMARK
5	2/20/2025	734044	CSA_IMEM	Receive	USD	208687	SIMM	APRA	CALYPSOSIMM	CP_1	ISDA-BENCHMARK
6	2/20/2025	734045	CSA_IMEM	Pay	USD	27824.94	SIMM	APRA	CALYPSOSIMM	CP_1	ISDA-BENCHMARK
7	2/20/2025	734045	CSA_IMEM	Receive	USD	27824.94	SIMM	APRA	CALYPSOSIMM	CP_1	ISDA-BENCHMARK
8	2/20/2025	734046	CSA_IMEM	Pay	USD	41737.41	SIMM	APRA	CALYPSOSIMM	CP_1	ISDA-BENCHMARK
9	2/20/2025	734046	CSA_IMEM	Receive	USD	41737.41	SIMM	APRA	CALYPSOSIMM	CP_1	ISDA-BENCHMARK
10	2/20/2025	734047	CSA_IMEM	Pay	USD	13912.8	SIMM	APRA	CALYPSOSIMM	CP_1	ISDA-BENCHMARK
11	2/20/2025	734047	CSA_IMEM	Receive	USD	13912.8	SIMM	APRA	CALYPSOSIMM	CP_1	ISDA-BENCHMARK
12	2/20/2025	734048	CSA_IMEM	Pay	USD	20868.7	SIMM	APRA	CALYPSOSIMM	CP_1	ISDA-BENCHMARK
13	2/20/2025	734048	CSA_IMEM	Receive	USD	20868.7	SIMM	APRA	CALYPSOSIMM	CP_1	ISDA-BENCHMARK
14	2/20/2025	734049	CSA_IMEM	Pay	USD	42542.3	SIMM	APRA	CALYPSOSIMM	CP_1	ISDA-BENCHMARK
15	2/20/2025	734049	CSA_IMEM	Receive	USD	42542.3	SIMM	APRA	CALYPSOSIMM	CP_1	ISDA-BENCHMARK

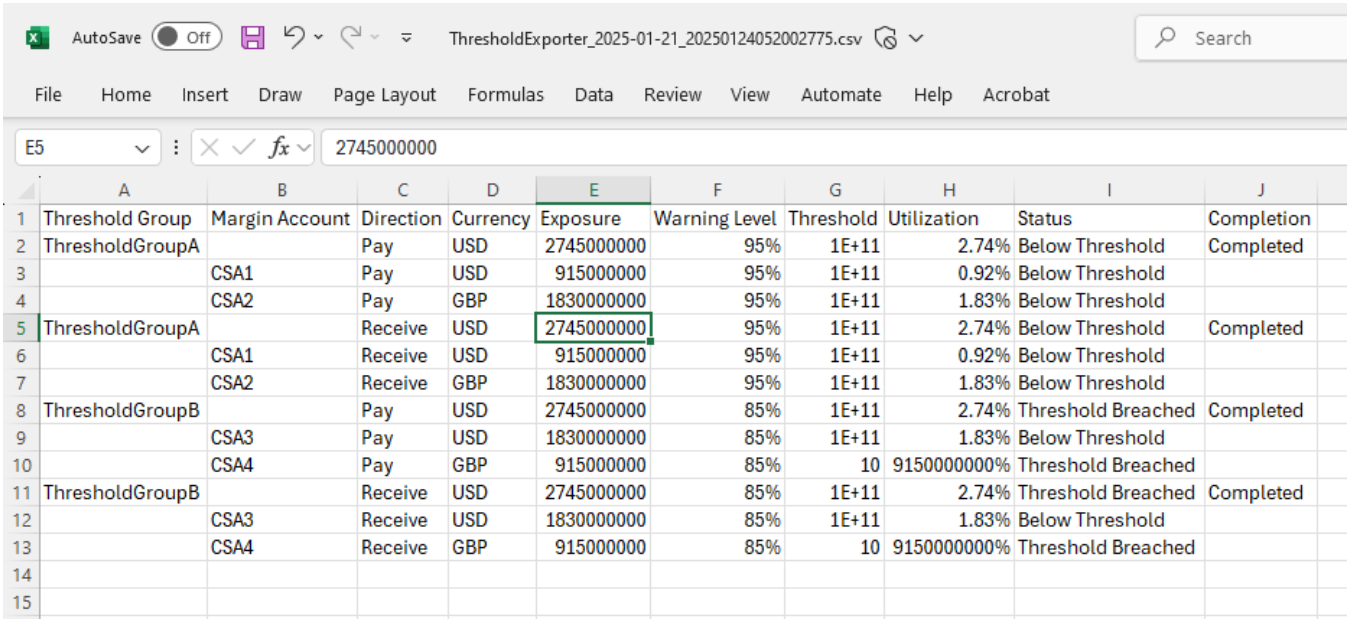
The *MarginExporter_AccountGroups* file (compatible with Acadia) only reports the highest margin calculation:



valuation_date	portfolio_	im_role	base_curr	im_expos	im_expos	im_expos	simm_ir_f	simm_cre	simm_eq	simm_cor	simm_fx	simm_ir	simm_cre	simm_cre	schedule_	schedule_	gross_replacement_cost
11/3/2022	CSA1	Pledgor	USD	7.8E+08	0	1.01E+09	7.8E+08	0	0	0	0	7.8E+08	0	0	0	0	
11/3/2022	CSA1	Secured P	USD	7.8E+08	0	7.8E+08	7.8E+08	0	0	0	0	7.8E+08	0	0	0	0	
11/3/2022	CSA2	Pledgor	GBP	1.42E+09	0	1.42E+09	7.09E+08	7.09E+08	0	0	0	7.09E+08	0	0	0	0	
11/3/2022	CSA2	Secured P	GBP	1.42E+09	0	1.63E+09	7.09E+08	7.09E+08	0	0	0	7.09E+08	0	0	0	0	

The *ThresholdExporter* file reports threshold monitoring results based on threshold group and account definition. ThresholdExporter file is generated only when below conditions are satisfied.

- Threshold Monitoring is configured in UI UMR Configuration page
- Calculation set is official
- Time Horizon is 10D



Threshold Group	Margin Account	Direction	Currency	Exposure	Warning Level	Threshold	Utilization	Status	Completion
ThresholdGroupA		Pay	USD	2745000000	95%	1E+11	2.74%	Below Threshold	Completed
	CSA1	Pay	USD	915000000	95%	1E+11	0.92%	Below Threshold	
	CSA2	Pay	GBP	1830000000	95%	1E+11	1.83%	Below Threshold	
ThresholdGroupA		Receive	USD	2745000000	95%	1E+11	2.74%	Below Threshold	Completed
	CSA1	Receive	USD	915000000	95%	1E+11	0.92%	Below Threshold	
	CSA2	Receive	GBP	1830000000	95%	1E+11	1.83%	Below Threshold	
ThresholdGroupB		Pay	USD	2745000000	85%	1E+11	2.74%	Threshold Breached	Completed
	CSA3	Pay	USD	1830000000	85%	1E+11	1.83%	Below Threshold	
	CSA4	Pay	GBP	915000000	85%	10	9150000000%	Threshold Breached	
ThresholdGroupB		Receive	USD	2745000000	85%	1E+11	2.74%	Threshold Breached	Completed
	CSA3	Receive	USD	1830000000	85%	1E+11	1.83%	Below Threshold	
	CSA4	Receive	GBP	915000000	85%	10	9150000000%	Threshold Breached	

- The output file will display IM numbers only up to 6 decimal places to meet with the Acadia guidelines.
- The calculator will filter out the sensitivities if the base amount is 'zero' or its smaller than ie^{-9}.

4.2.3 Generate the Initial Margin PL Marks

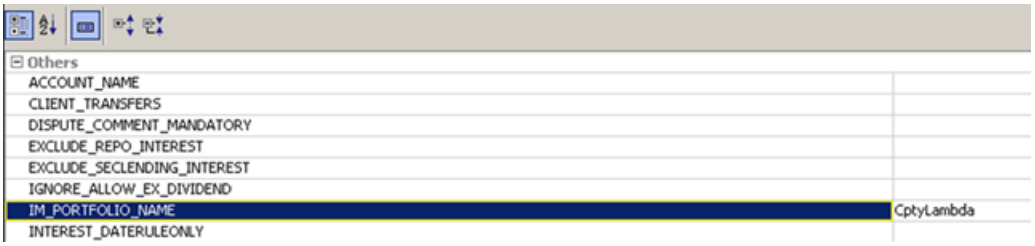
The PL marks will be used by the Collateral Manager to calculate the IM Exposures of each Margin Call Contract.

While running the scheduled task MARGIN_CALCULATOR, if the corresponding margin call contract is configured, a Collateral Exposure trade with type *Initial Margin* and currency equal to contract currency will be created automatically if:

- The calculation set is an OFFICIAL calculation set

- The Time horizon is 10D
- The Margin Account has the attribute CSA-In-Place
- No errors occur during calculation of Exposure

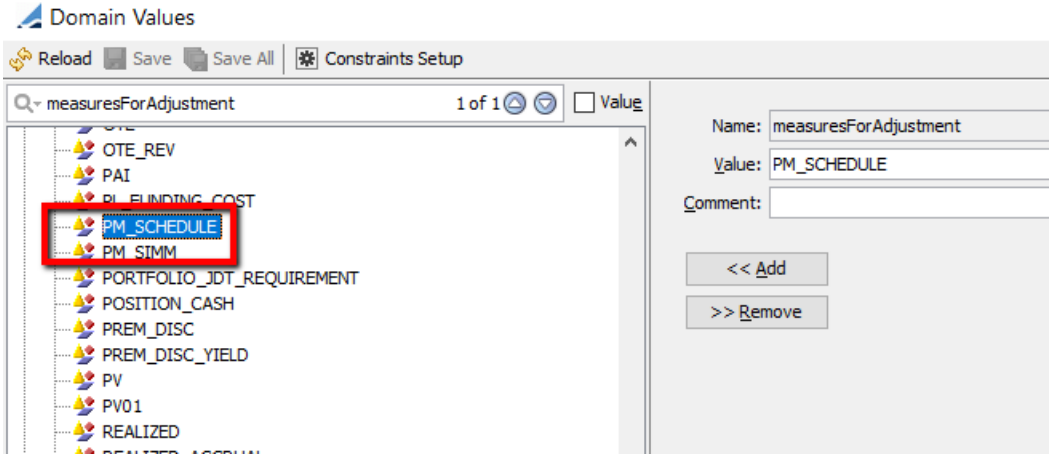
Collateral Exposure trades are saved into the default eligibility book defined in the margin call contract. In addition, the associated PL Mark *MARGIN_CALL* will be created, and the value will be the Initial Margin calculated by the scheduled task MARGIN_CALCULATOR for a given portfolio and value date. The system identifies the margin call contract according to the attribute *IM_PORTOFOLIO_NAME* defined in the ADDITIONAL_INFO tab in the Margin Call contract (see below).



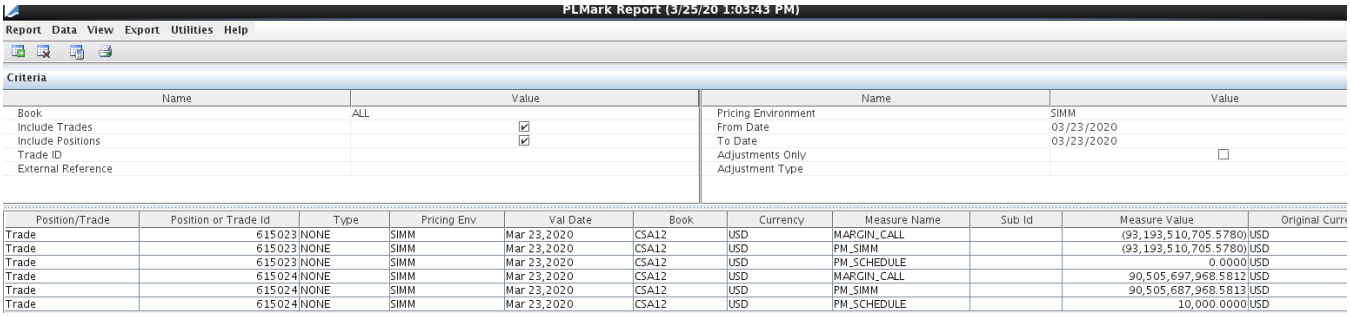
If the IM_PORTFOLIO_NAME on the margin call contract matches with the Margin Account Name, the Collateral Exposure trade and its PL Marks will be created/updated.

Please note these are two different Collateral Exposure trades, one represents Receive IM and the other represents Pay IM. For Receive IM collateral exposure trade, the trade keyword Two-way IM will be set to Receive. For Pay IM collateral exposure trade, the trade keyword Two-way IM will be set to Pay.

For each CSA agreement, two PL marks will be generated for Pay and Rec. To generate separate PL marks for SIMM and SCHEDULE, the below domain values need to be configured –



With the above config, PM_SIMM and PM_SCHEDULE measures will be generated for SIMM and SCHEDULE margins.


PLMark Report (3/25/20 1:03:43 PM)

Report Data View Export Utilities Help

Criteria

Name	Value	Name	Value
Book	ALL	Pricing Environment	SIMM
Include Trades	☑	From Date	03/23/2020
Include Positions	☑	To Date	03/23/2020
Trade ID		Adjustments Only	☐
External Reference		Adjustment Type	

Position/Trade	Position or Trade Id	Type	Pricing Env	Val Date	Book	Currency	Measure Name	Sub Id	Measure Value	Original Curr
Trade	615023	NONE	SIMM	Mar 23,2020	CSA12	USD	MARGIN_CALL		(93,193,510,705.5780)	USD
Trade	615023	NONE	SIMM	Mar 23,2020	CSA12	USD	PM_SIMM		(93,193,510,705.5780)	USD
Trade	615023	NONE	SIMM	Mar 23,2020	CSA12	USD	PM_SCHEDULE		0.0000	USD
Trade	615024	NONE	SIMM	Mar 23,2020	CSA12	USD	MARGIN_CALL		90,505,697,968.5812	USD
Trade	615024	NONE	SIMM	Mar 23,2020	CSA12	USD	PM_SIMM		90,505,687,968.5813	USD
Trade	615024	NONE	SIMM	Mar 23,2020	CSA12	USD	PM_SCHEDULE		10,000.0000	USD

The purpose of generating those Collateral Exposure trades and its PL Marks is to be used in the Collateral Manager and manage the initial margins.

Note 1: It is assumed that there will only be one Margin Call contract with each IM_PORTFOLIO_NAME. The system does not expect two or more Margin Call contracts with the same IM_PORTFOLIO_NAME value.

Note 2: PL Marks are saved with two pricing environments: The END OF DAY PRICING ENV defined on the Margin Call contract, and the pricing environment used by the scheduled task MARGIN_CALCULATOR.

Note 3: The value date of the PL Marks is defined by the "End of Day" time of the default eligibility book defined in the Margin Call contract. For example, if the user runs the scheduled task MARGIN_CALCULATOR as of 6PM and "End of Day" time of the book is 5PM, the value date will be T+1. On the other hand, if the user runs the scheduled task MARGIN_CALCULATOR as of 4PM, the value date will be T. It is a good practice to define the "End of Day" time and time zone on the default eligibility book to be the same as the valuation time and time zone on the Margin Call contract.

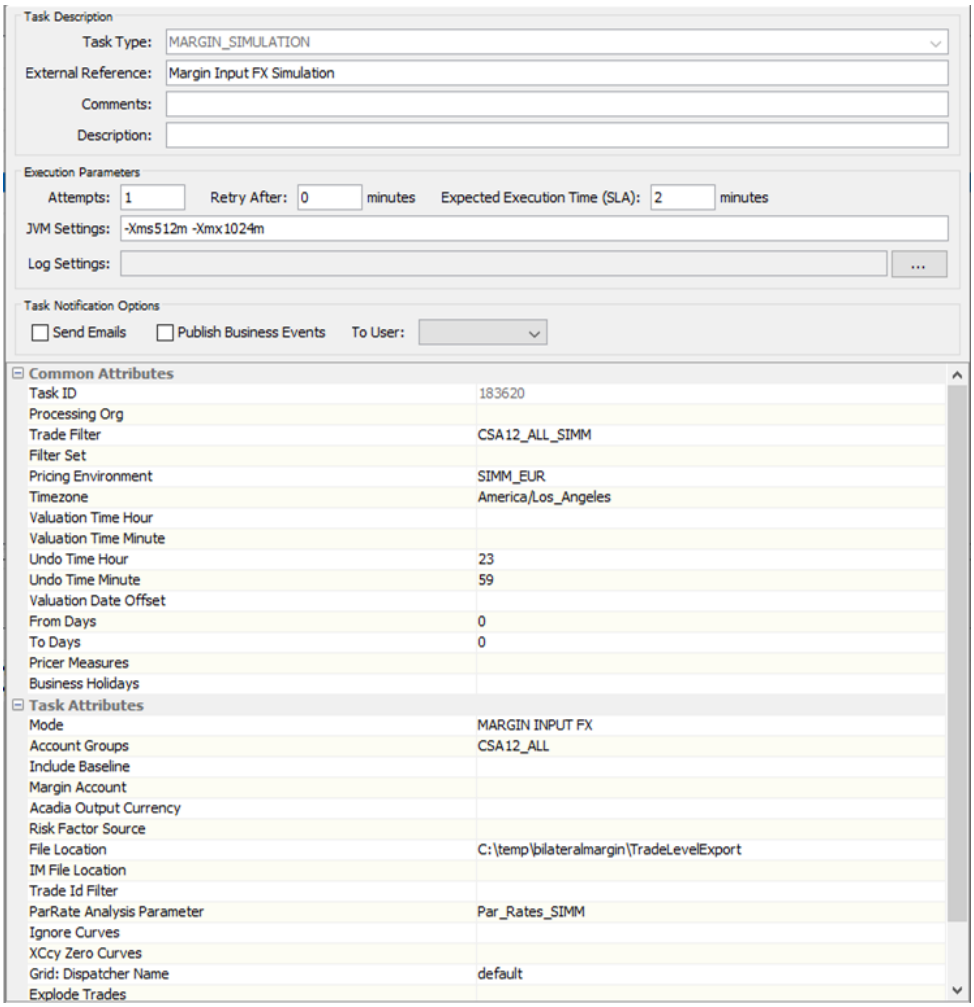
4.3 MARGIN_SIMULATION Scheduled Task

4.3.1 FX Simulation Mode

This Scheduled Task (ST) generates simulated ISDA SIMM Risk FX risk factors based on the Pricing Environment base currency, providing users with an option to simulate risk factors for selected based currencies, independent of the margin currency. In addition, the other ISDA SIM Risk factors are also generated, and are like the official MARGIN_INPUT/Calculate risk factors.

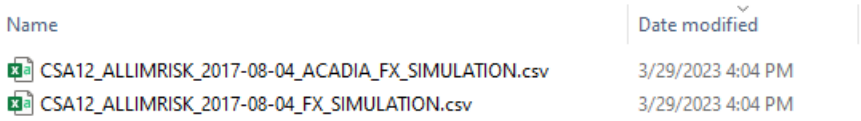
The output is generated as a csv file, in the defined “File Location”.

This scheduled task is for simulation purposes only.



The standard CRIF files will be provided and will be appended with “_FX_SIMULATION”.

Example:



Users can run this scheduled task for multiple pricing environments in separate runs.

Mandatory Attributes

- *Pricing Environment*: the PE base ccy defines the base ccy of the Risk_FX calculation.
- *Mode*: MARGIN INPUT FX
- *Account Groups*: to define Account Groups or ERS hierarchy
- To use ERS hierarchies, it is required to use similar names for Account Groups and ERS Hierarchies
- *Trade Filter*: only required if using Account groups. If no trade filter is selected, ERS hierarchies will be used.
- *File Location*: csv output destination
- *Acadia Output Currency*: to select the amount currency in the Acadia output, i.e. qualifier currency or margin currency.

4.3.2 Schedule Simulation Mode

When the task is in MARGIN CALC SCHEDULE mode, the system will calculate schedule margin for every account loaded with existing risk factors calculated or imported from MARGIN_INPUT scheduled task in official calculation sets. The account parameters are over-written during this task and all products will go through Schedule calculation. The results will not be sent to Acadia IMEM.

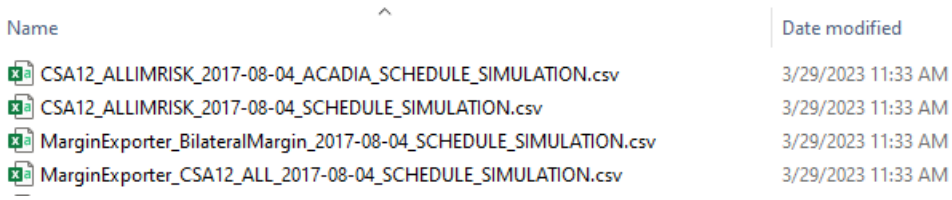
Task Attributes	
Mode	MARGIN CALC SCHEDULE
Account Groups	CSA12_ALL
Include Baseline	
Margin Account	
Acadia Output Currency	
Risk Factor Source	
File Location	
IM File Location	C:\Users\admin\Calypso\IMRExport
Trade Id Filter	
ParRate Analysis Parameter	
Ignore Curves	
XCcy Zero Curves	
Grid: Dispatcher Name	default
Explode Trades	
Job Size	10
Stop on errors	
Time Horizon	

Mandatory Attributes:

- *Mode*: MARGIN CALC SCHEDULE
- *Account Groups*: to define Account Groups or ERS hierarchy
- To use ERS hierarchies, it is required to use similar names for Account Groups and ERS Hierarchies

- *Trade Filter*: only required if using Account groups. If no trade filter is selected, ERS hierarchies will be used.
- *File Location*: csv output destination

The standard IM output files and CRIF files will be provided and will be appended with "_SCHEDULE_SIMULATION". Example:



4.3.3 SIMM Simulation Mode

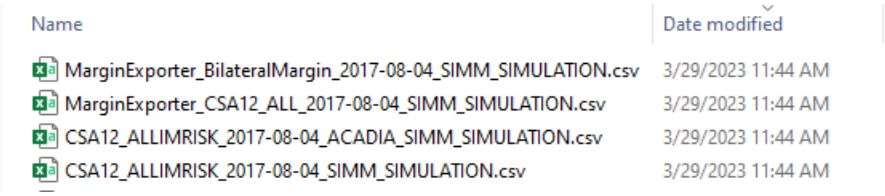
When the task is in MARGIN CALC SIMM mode, the system calculates SIMM margin for every account loaded with existing risk factors calculated or imported from MARGIN_INPUT scheduled task in official calculation sets. The account parameters are overwritten during this task and all products will go through SIMM calculation.

Task Attributes	
Mode	MARGIN CALC SIMM
Account Groups	CSA12_ALL
Include Baseline	
Margin Account	
Acadia Output Currency	
Risk Factor Source	
File Location	
IM File Location	C:\Users\admin\Calypso\IMRExport
Trade Id Filter	
ParRate Analysis Parameter	
Ignore Curves	
XCcy Zero Curves	
Grid: Dispatcher Name	default
Explode Trades	
Job Size	10
Stop on errors	
Time Horizon	

Mandatory Attributes:

- *Mode*: MARGIN CALC SIMM
- *Account Groups*: to define Account Groups or ERS hierarchy
- To use ERS hierarchies, it is required to use similar names for Account Groups and ERS Hierarchies
- *Trade Filter*: only required if using Account groups. If no trade filter is selected, ERS hierarchies will be used.
- *File Location*: csv output destination

The standard IM output files and CRIF files will be provided and will be appended with *"_SIMM_SIMULATION"*.



When the domain value GENERATE_ALL_RF_SCHEDULE is set to *true*, all risk factors will be generated for Schedule trades. This behavior can be avoided by setting the domain value to *false*. Default is *true* if empty.

4.3.4 Bulk Trades Simulation Mode

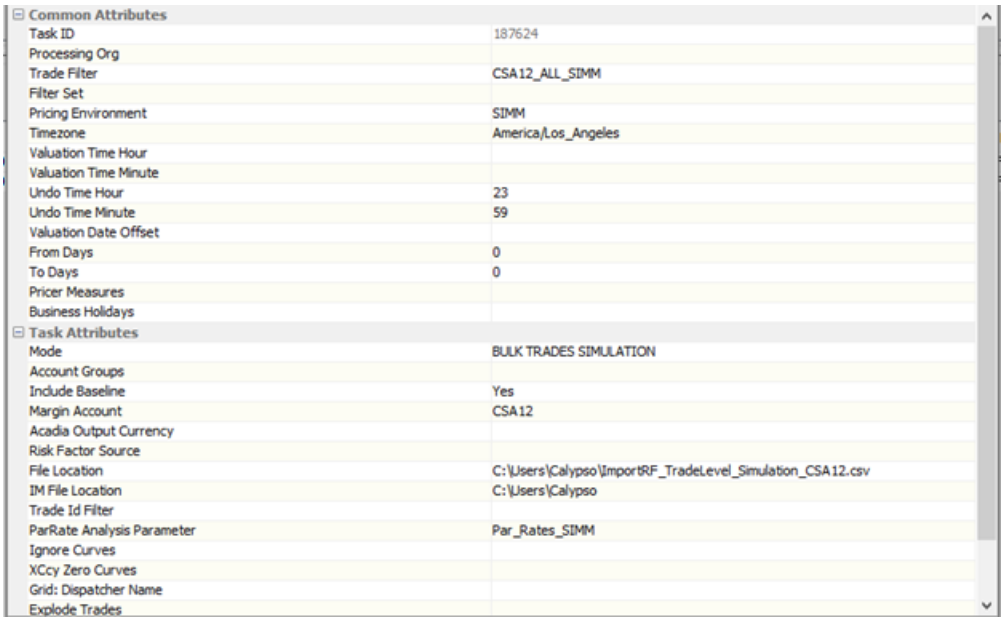
When the task is in BULK TRADES SIMULATION mode, the system will add risk factors to the existing OFFICIAL risk factors for a given margin account, then Exposure is calculated. The added risk factors will either be calculated from trades in the selected trade filter, and/or uploaded from the selected file. These results will not be sent to Acadia IMEM.

This mode is designed to satisfy three business use cases:

- Cleared trades simulation – What if these cleared trades are margined under an existing account?
- Legacy trades simulation – What if these legacy trades become eligible for UMR in a new account?
- Bulk trade simulation – What will the exposure look like if I booked these trades in an existing account?

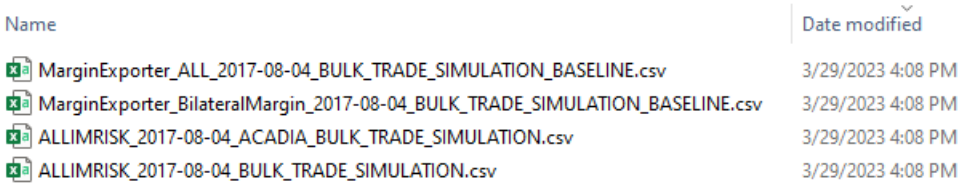
In Bulk trades mode, there are some additional parameter usages:

- *Trade Filter* – This can contain any trades that should create risk factors which will be added to the calculation.
- *Include Baseline* – If set to true, the baseline official risk factors will be included in the calculation. If false, only the newly calculated/imported risk factors during the task will be used.
- *Margin Account* – The account to be used for calculation.
- *Account Groups* – NOT used for bulk trades mode.
- *File Location* – The location of the risk factor file to import



Common Attributes	
Task ID	187624
Processing Org	
Trade Filter	CSA12_ALL_SIMM
Filter Set	
Pricing Environment	SIMM
Timezone	America/Los_Angeles
Valuation Time Hour	
Valuation Time Minute	
Undo Time Hour	23
Undo Time Minute	59
Valuation Date Offset	
From Days	0
To Days	0
Pricer Measures	
Business Holidays	
Task Attributes	
Mode	BULK TRADES SIMULATION
Account Groups	
Include Baseline	Yes
Margin Account	CSA12
Acadia Output Currency	
Risk Factor Source	
File Location	C:\Users\Calypso\ImportRF_TradeLevel_Simulation_CSA12.csv
IM File Location	C:\Users\Calypso
Trade Id Filter	
ParRate Analysis Parameter	Par_Rates_SIMM
Ignore Curves	
XCcy Zero Curves	
Grid: Dispatcher Name	
Explode Trades	

The standard IM output files and CRIF files will be provided and will be appended with *"_BULK_TRADE_SIMULATION"*.



Name	Date modified
MarginExporter_ALL_2017-08-04_BULK_TRADE_SIMULATION_BASELINE.csv	3/29/2023 4:08 PM
MarginExporter_BilateralMargin_2017-08-04_BULK_TRADE_SIMULATION_BASELINE.csv	3/29/2023 4:08 PM
ALLIMRISK_2017-08-04_ACADIA_BULK_TRADE_SIMULATION.csv	3/29/2023 4:08 PM
ALLIMRISK_2017-08-04_BULK_TRADE_SIMULATION.csv	3/29/2023 4:08 PM

For any uploaded risk factors:

- Calypso overrides any account values in the import file so that they are automatically mapped to the account selected in the ST.
- The same validation that occurs for normal risk factors will be done here upon upload.

4.3.5 Margin Simulation Dashboard

As part of the margin user interface, there is a new page which will contain results for simulations run across accounts.

Simulations

Displaying 20 Simulations

Account Group: All | Accounts: All | Currencies: All | Add filters

Account Group	Account	Margin CCY	Direction	Baseline	Schedule	1D IM	Incremental 10D IM	Simulated 10D IM
Calypso Global	Calypso NH @ BOFA NA	USD	Pay	124,362,823	0	35,070,733	-	-
Calypso Global	Calypso NH @ BOFA NA	USD	Receive	124,964,852	0	35,670,903	-	-
Calypso Global	Calypso NH @ BOFA Sec	USD	Receive	20,021,445	0	6,416,410	-	-
Calypso Global	Calypso NH @ BOFA Sec	USD	Pay	19,817,318	0	6,398,965	-	-
Calypso Global	Calypso NH @ Barclays Cap	EUR	Receive	3,523,072	0	1,332,507	74,716,271	78,239,343
Calypso Global	Calypso NH @ Barclays Cap	USD	Pay	4,102,386	0	1,595,622	78,734,266	82,836,653
Calypso Global	Calypso NH @ Barclays Ltd	USD	Receive	7,957,006	0	2,460,335	-	-
Calypso Global	Calypso NH @ Barclays Ltd	USD	Pay	8,135,014	0	2,750,087	-	-
Calypso Global	Calypso NH @ CITI	USD	Receive	2,449,742	2,400,000	720,787	4,830,331	7,280,072
Calypso Global	Calypso NH @ CITI	USD	Pay	2,449,742	2,400,000	720,787	4,830,331	7,280,072
Calypso Global	Calypso NH @ NAB Cleared	AUD	Receive	0	0	0	119,498,010	119,498,010
Calypso Global	Calypso NH @ NAB Cleared	AUD	Pay	0	0	0	118,993,820	118,993,820

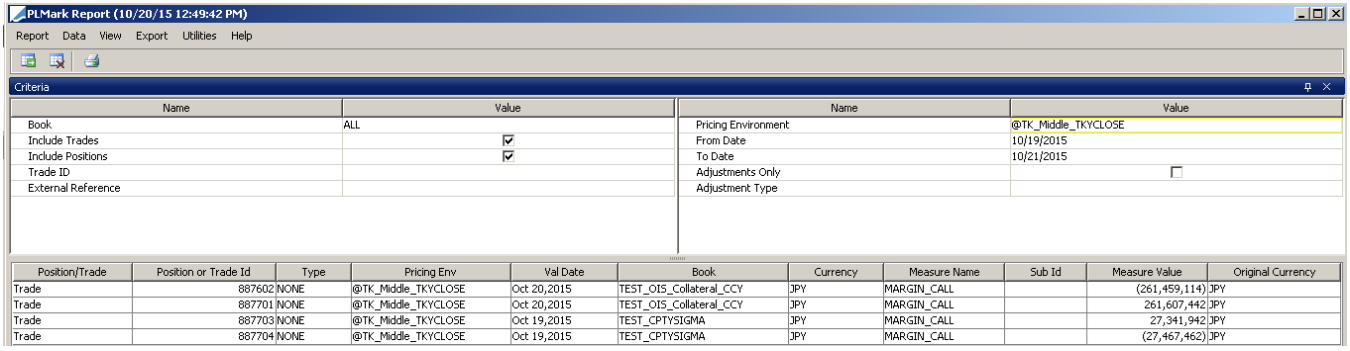
Data will be populated only if it has been calculated, therefore there may be empty cells in the results.

The following calculated data is shown:

- Baseline: This is the Official IM Exposure. (Official calculation set, 10D horizon)
- Schedule: This is the results of running the account in SCHEDULE SIMULATION mode
- 1D IM: This is the result of running the Exposure calculation in an official calculation se with 1D horizon
- Incremental 10D IM: This is the change in exposure from the baseline to the bulk trades simulation results.
- Simulated 10D IM: This is the result of the BULK TRADES SIMULATION calculation.

4.4 Collateral Integration

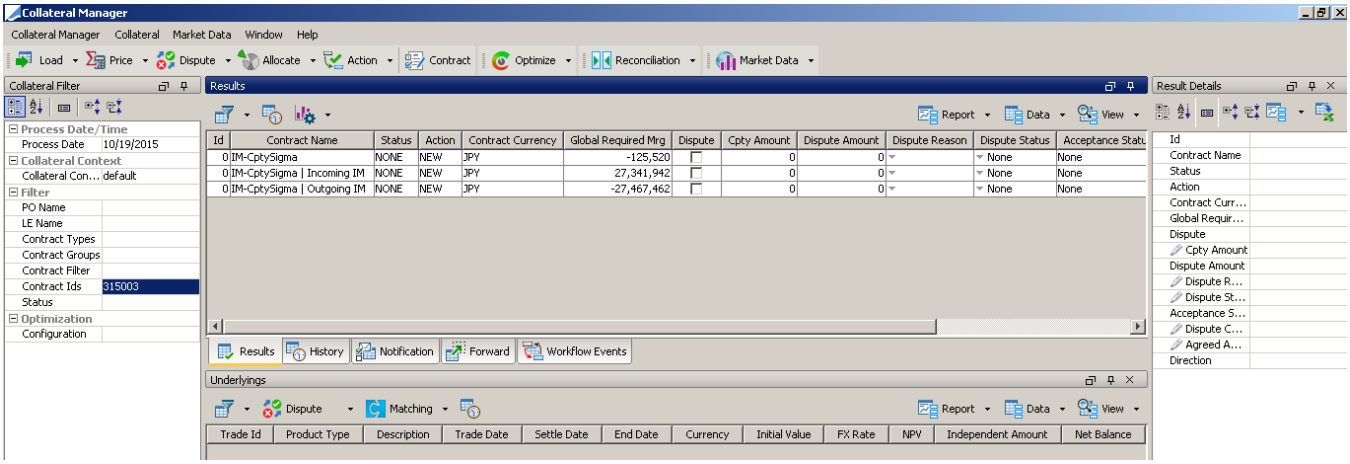
The user can use the PL Mark Report to view the PL Marks generated by the scheduled task MARGIN_CALCULATOR. To view the PL Mark Report, go to **Position & Risk > P&L Mark > P&L Mark Report**.



The user can select required criteria and query the values.

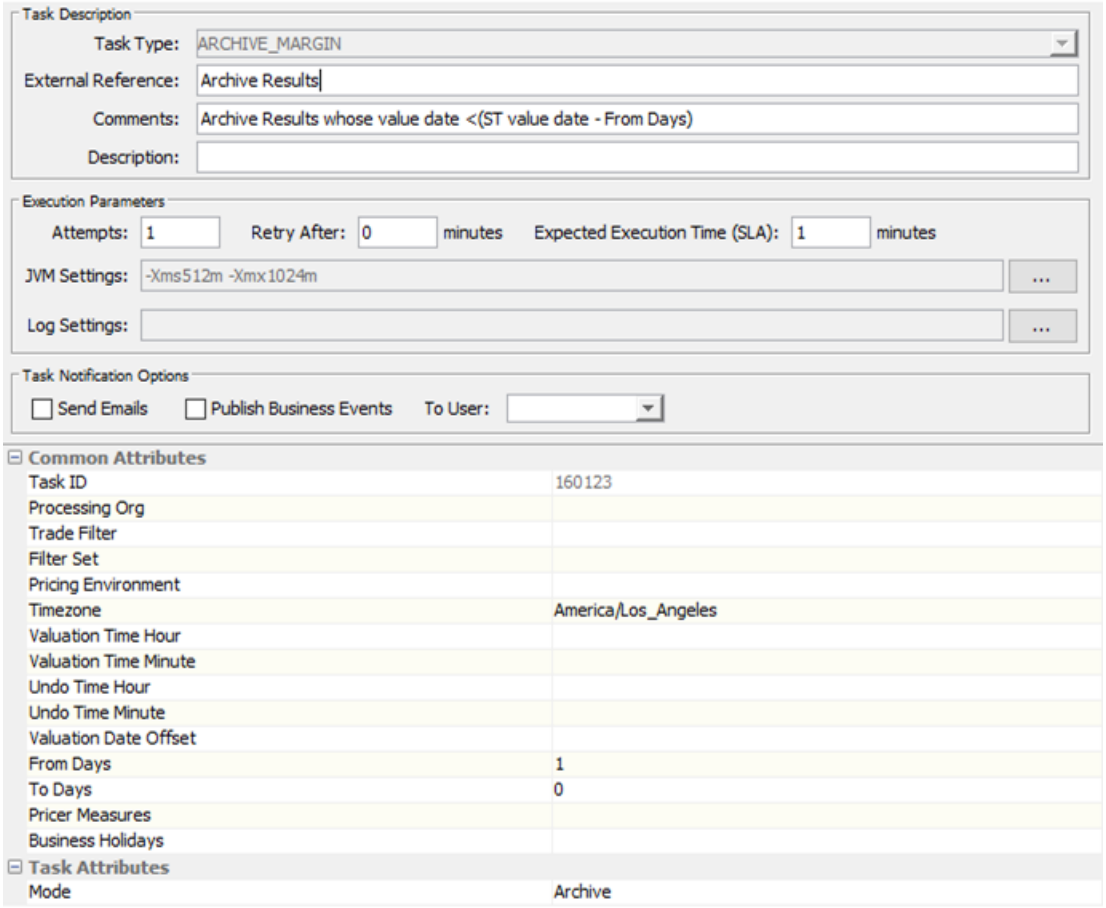
PL Marks are used to price the collateral exposure trades and the user can go to the Collateral Manager to perform the pricing task and execute the margin calls. For details of how to use collateral manager, please refer to the Collateral module documentation.

To view the Collateral Manager, go to **Processing > Collateral Management > Collateral Manager**.



4.5 ARCHIVE_MARGIN Scheduled Task

UMR results including risk factors, IM results, and threshold monitoring results are saved in several database tables. The ARCHIVE_MARGIN scheduled task allows user to archive these results to history tables and restore them back to original tables.

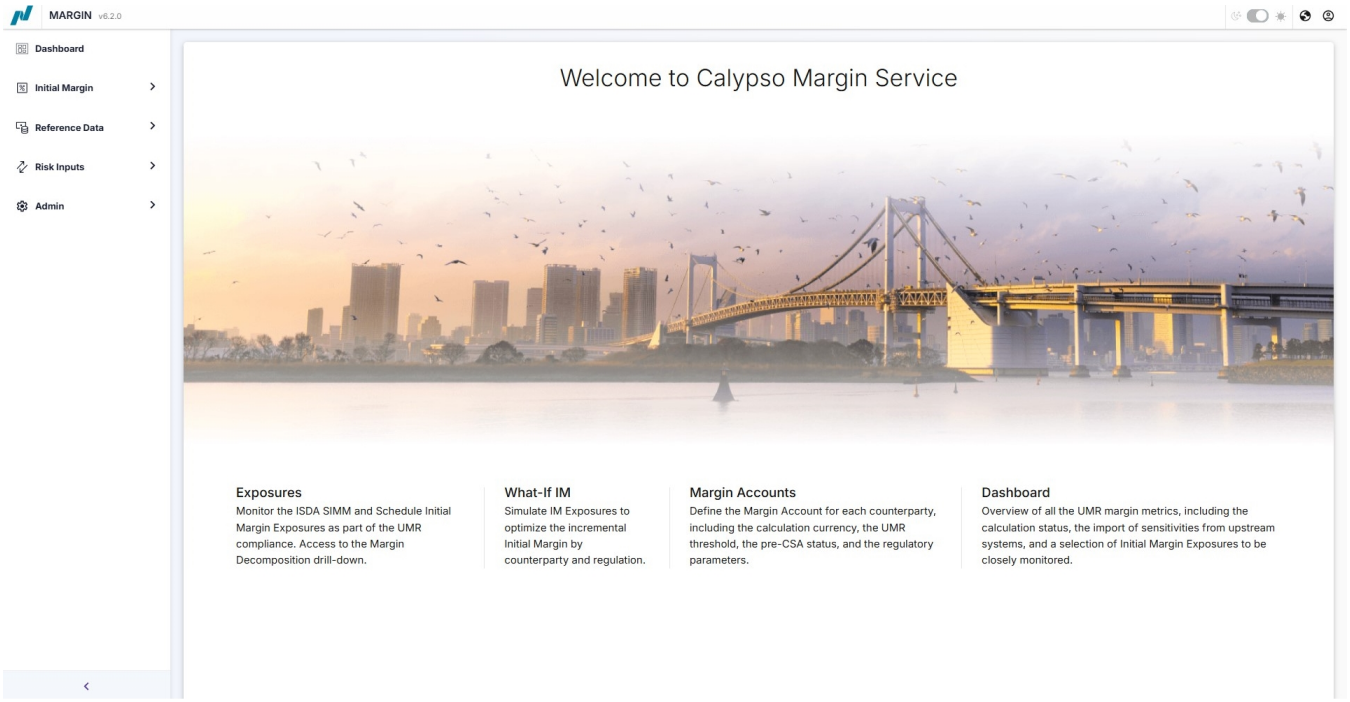


Mandatory Attributes:

- *Mode*: Archive/Restore. When it's Archive, results with value date < (ST value date – From Days) are archived to history tables. When it's Restore, results in history tables with value date >= (ST value date – From Days) are restored to original tables.

5. Bilateral Margin Dashboard and Reports

The margin UI allows the user to view the exposures in detail, as well as view high level information in the dashboard.



The UI is opened with the following URL:

http://localhost:8800/margin-ui or http://localhost:9140/margin-ui if API Gateway is disabled.

You can also use the Navigator Link previously created.

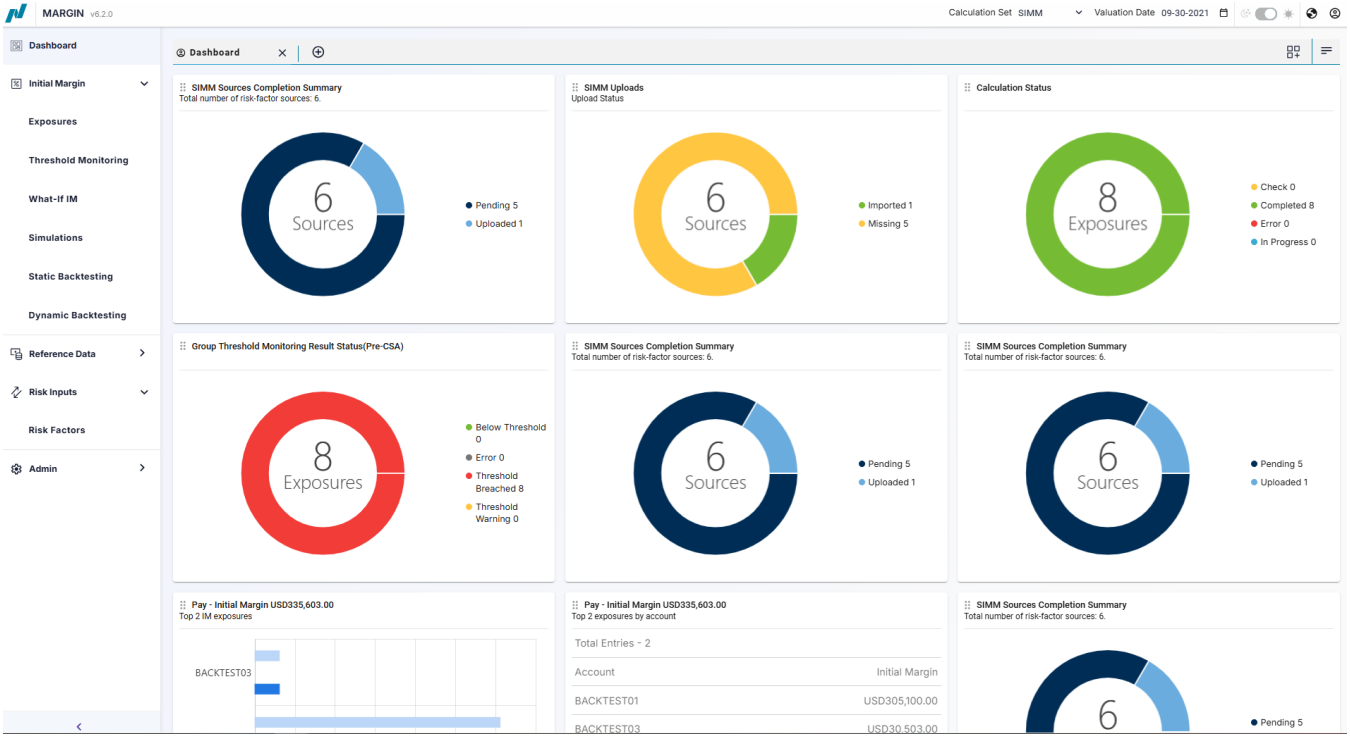
Make sure that you have started *marginserver.bat\sh*.

Also, please start *calypsoMessagingServer.bat\sh*. This service is needed to run the Margin scheduled tasks.

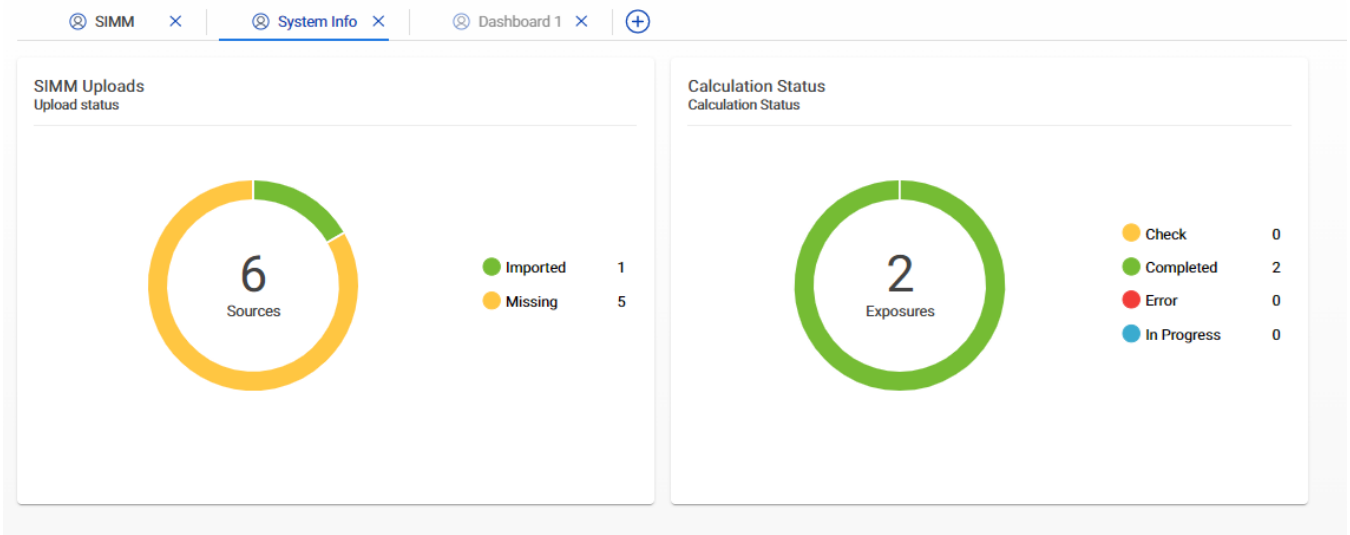
5.1 Margin Dashboard

The Margin Dashboard is a configurable page where the user can add or change widgets. The user can add, edit or delete pages. Each page may contain up to 6 widgets.

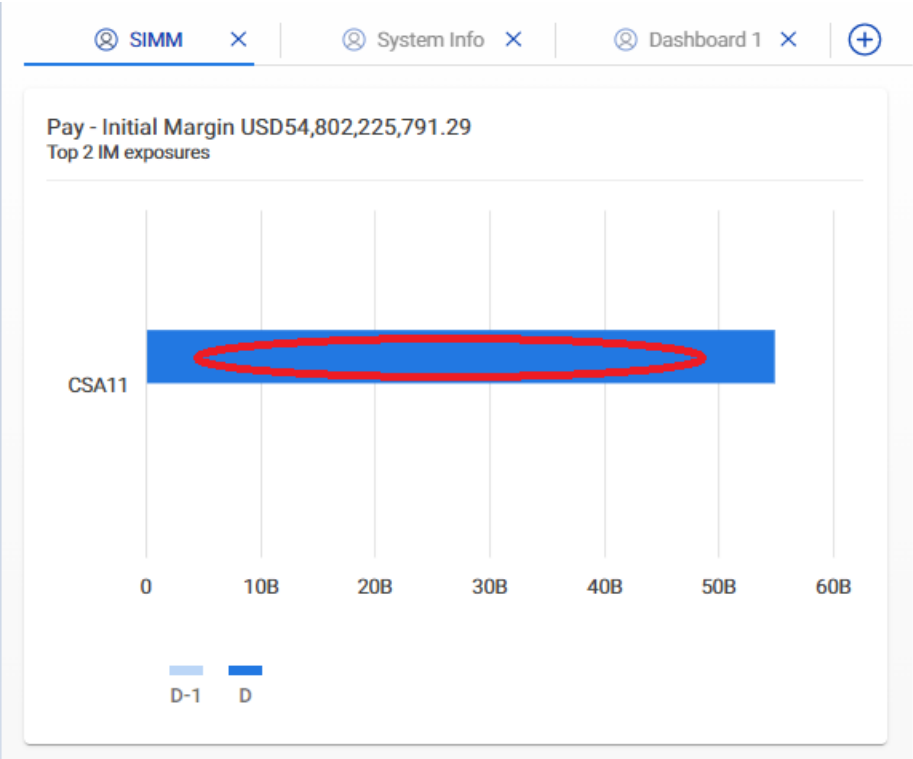
By default, the SIMM and System Info tabs are pre-configured.



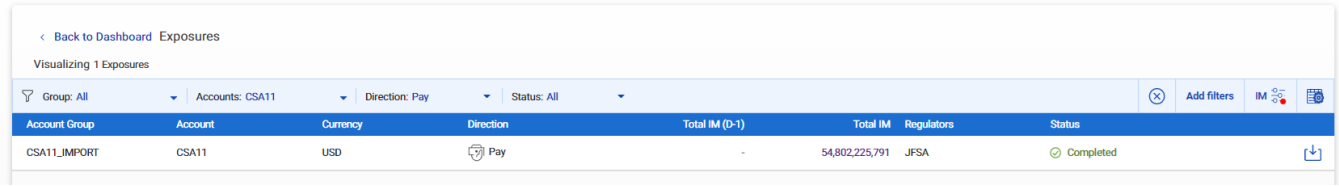
The System info tab contains a widget which shows which of the sources have been successfully uploaded on the valuation date.



Drill-down into a selected exposure to review the margin decomposition (Click on the Blue line to open the drill down)



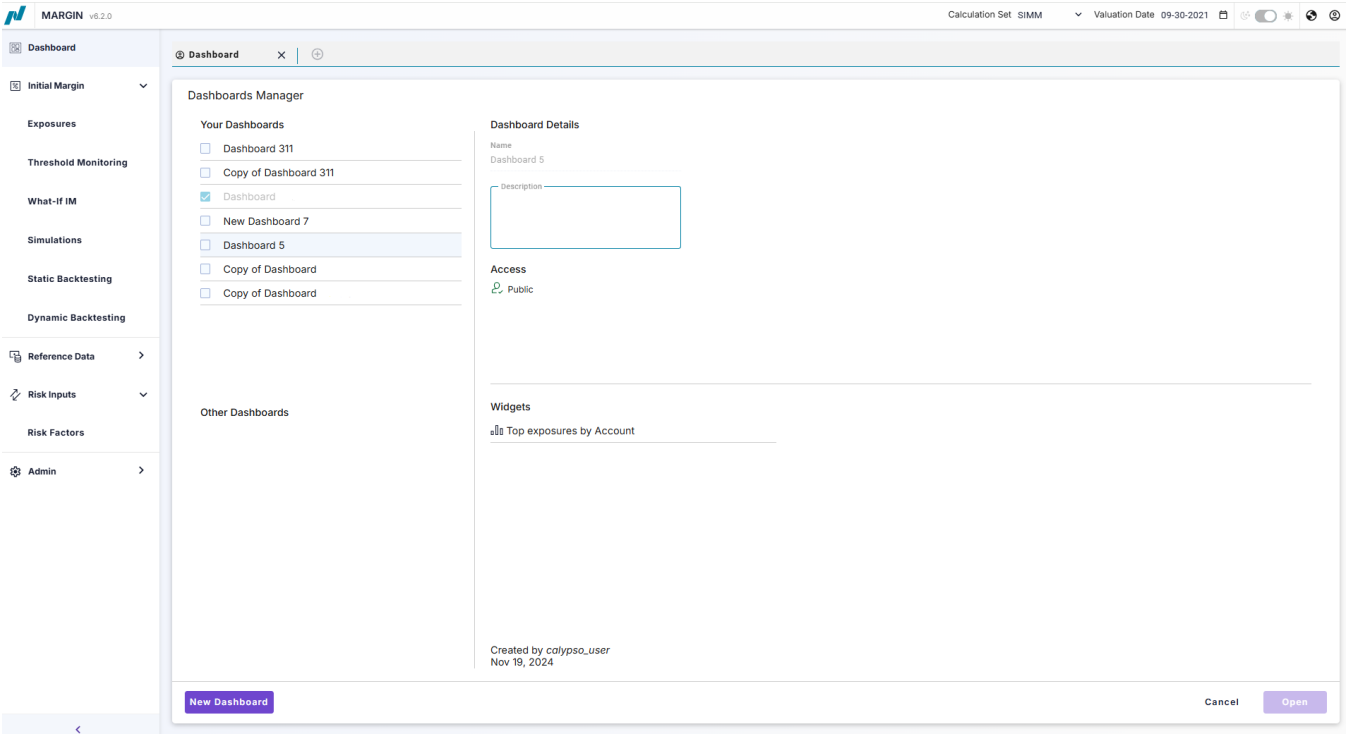
The drilldown displays the detailed Exposures page.



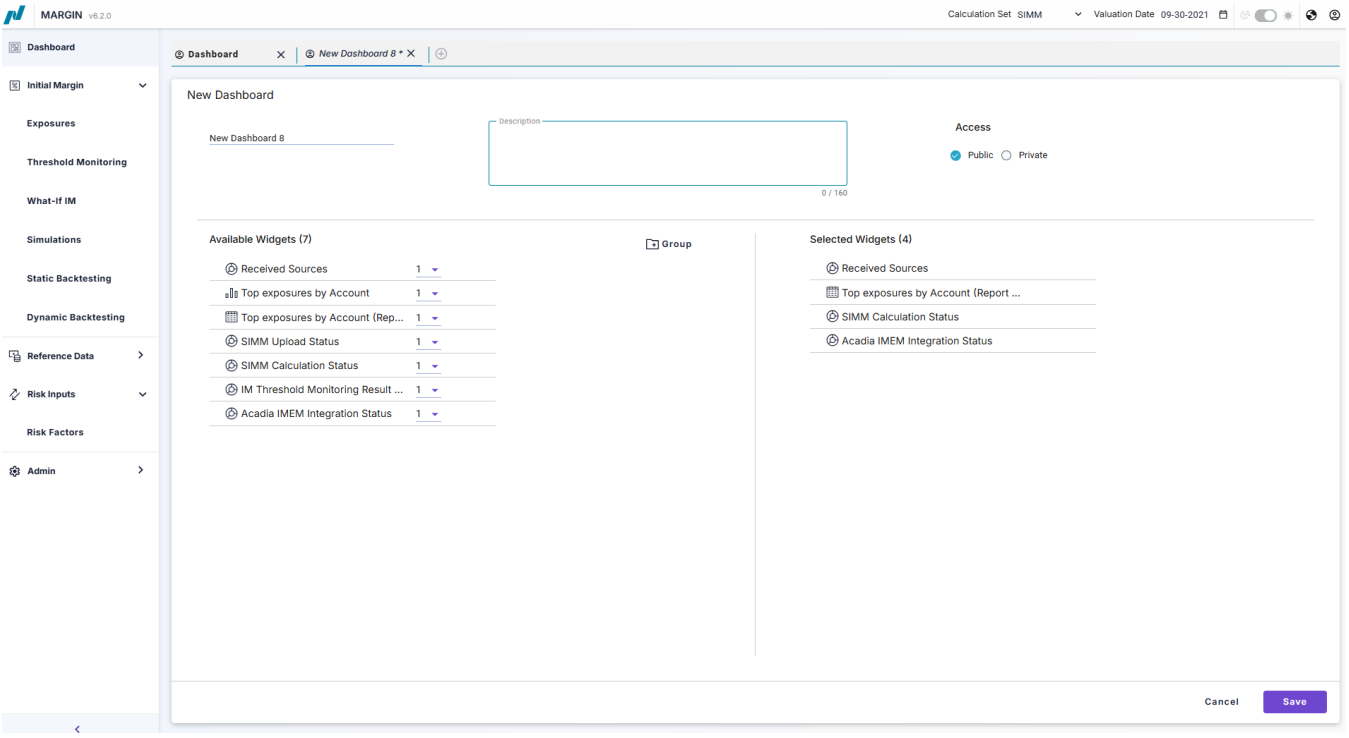
Dashboard Creation and Customization

To create a new dashboard, select Dashboard and click 

If you already have existing dashboards, click  and then select New Dashboard.

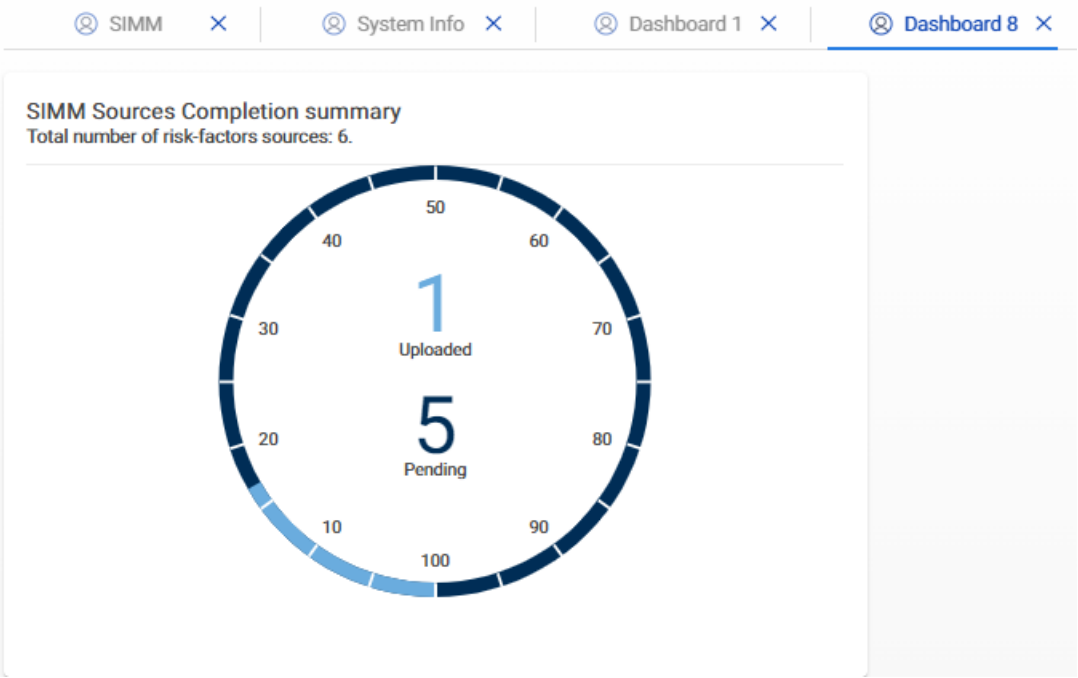


It brings up the New Dashboard window.



- Enter the Dashboard name and description.
- Choose the access permissions for the dashboard - Public or Private.
  - Public: The dashboard is accessible to all users.
  - Private: The dashboard is accessible only to the creator of the dashboard.
- Select the widgets you want to display.
- Click **Save**.

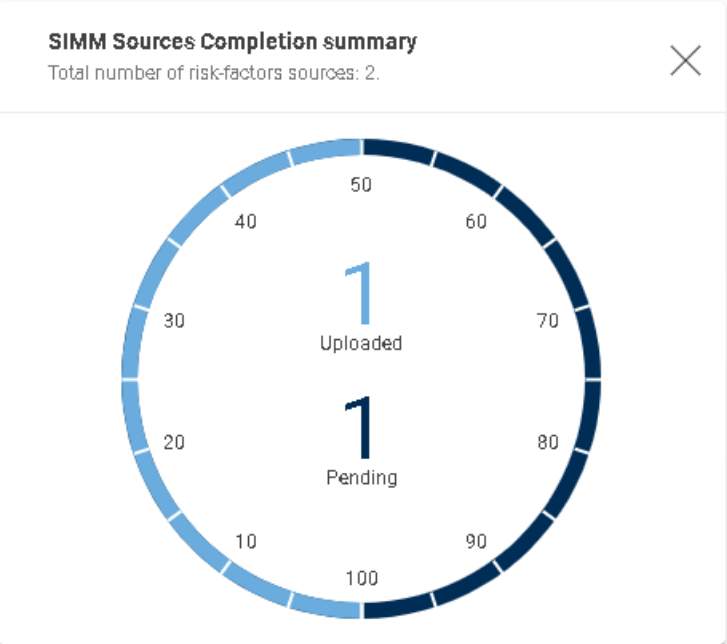
The resulting dashboard is available after clicking the Save button.



Additional widgets can be added by clicking on  button on the dashboard page.

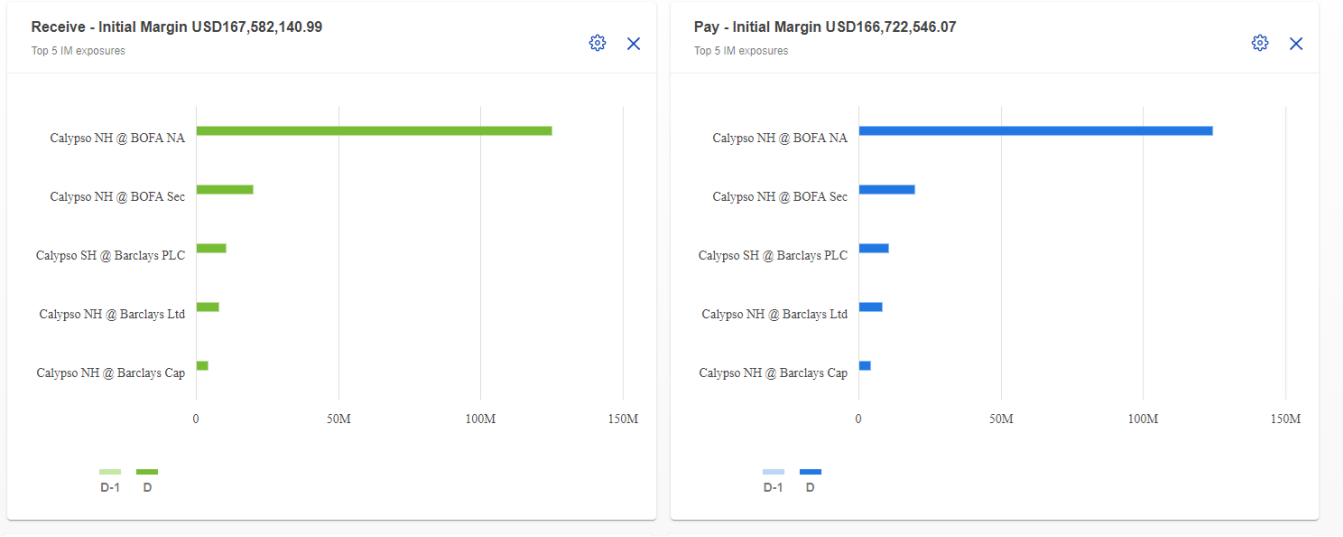
Received Sources

Shows if risk factors have been uploaded from each source on the valuation date.



Top Exposures by Account

Shows the Top pay or receive exposures by account.

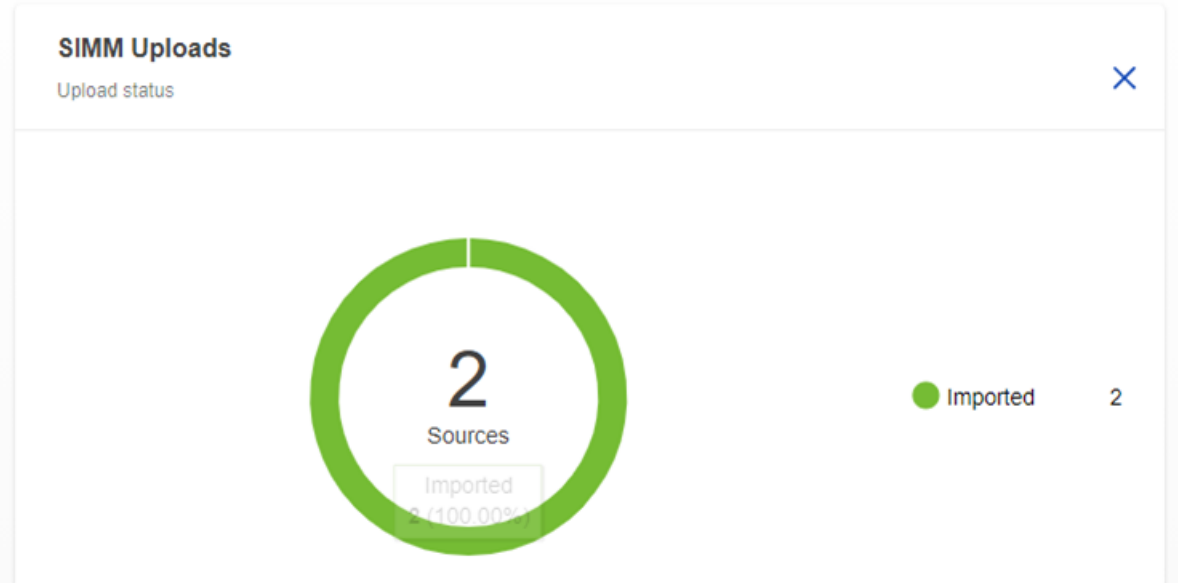


Top Exposures by Account (Report View)

This shows the top pay or receive exposures by value.

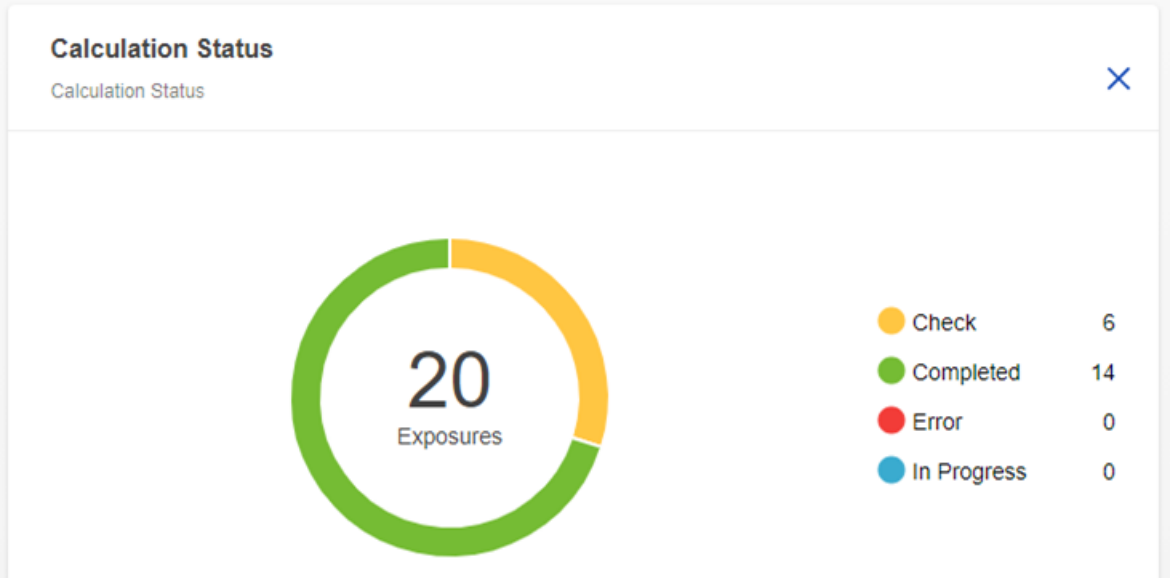
SIMM Upload Status

Shows if risk factors have been uploaded from each source on the valudation date.



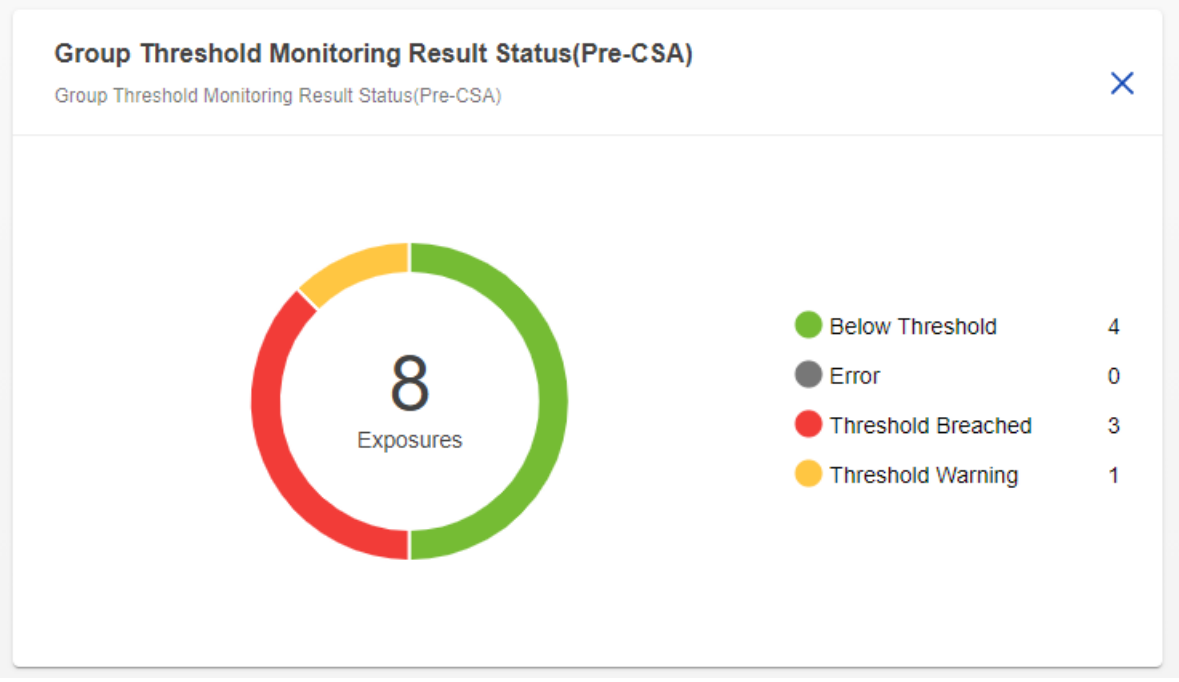
SIMM Calculation Status

This shows the number of accounts with successful IM calculation and the number of accounts with errors in the IM calculation.



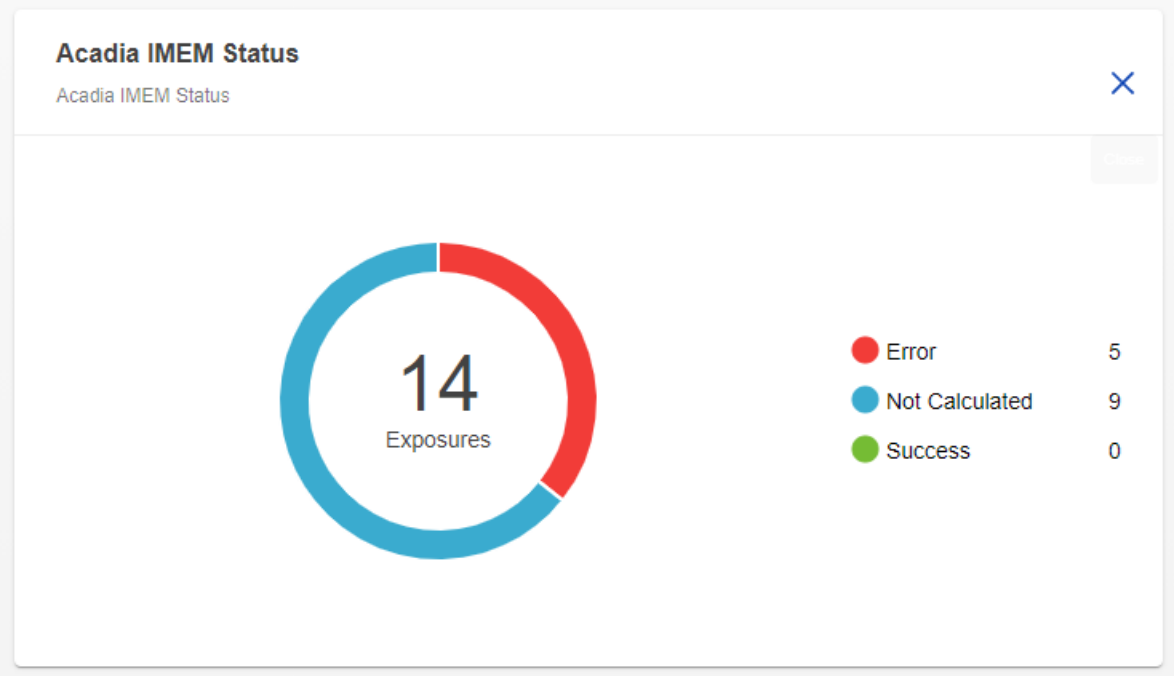
IM Threshold Monitoring Results

This shows the number of group threshold monitoring results in each status. Group and Account level thresholds are displayed.

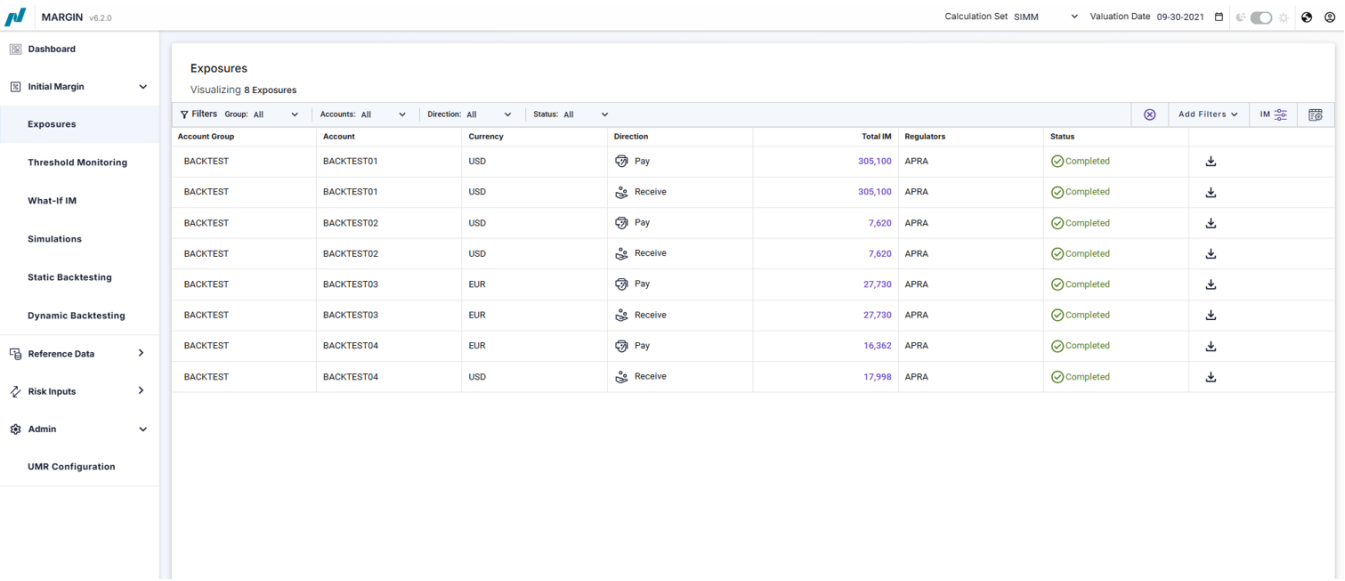


Acadia IMEM Integration Status

This shows the number of exposures sent to IMEM in each status.



5.2 Viewing Exposures



NOTE : Only 10D exposures are viewable in the Web UI.

The user can also see the status of the exposures. The values in the Status column will be:

Completed: the IM calculation is completed without any errors.

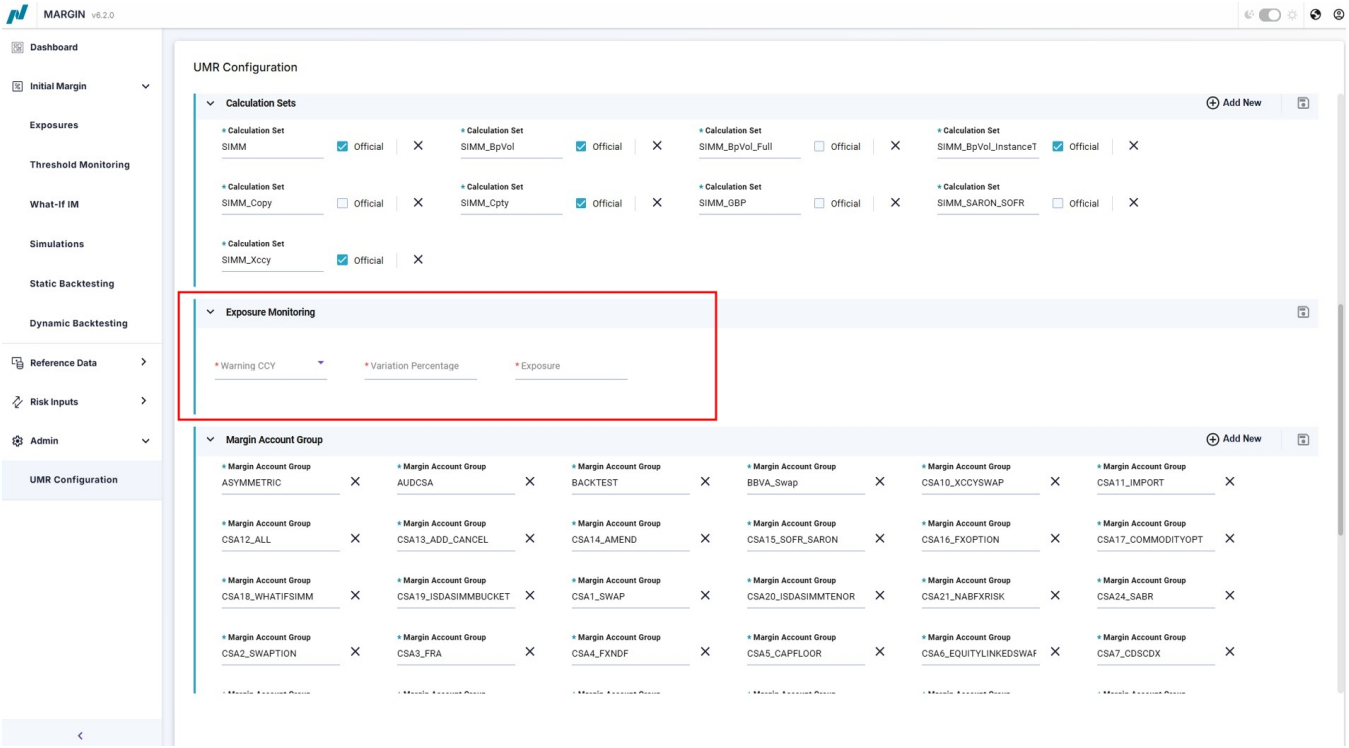
In Progress: IM calculation is in progress.

Error: One or more errors were encountered while calculating IM.

Check: IM is calculated but does not meet the criteria defined under 'Exposure Management' criteria under UMR configuration explained below.

Exposure Monitoring:

Under **Admin > UMR Configuration** there is a section for exposure monitoring. This section has three options which determine the 'Check' status above in the exposure page.



The variation in the IM exposure from one day to the next is checked against the latest result found in the system based on the Account/ Direction/ Calculation Set of the results. The user can configure thresholds for exposure, variation percentage and warning currency in the exposure management panel shown in the screen above. Total IM exposure in the warning ccy will be configured under Exposure with no decimals and the percentage variation will be defined under Variation Percentage in % with two decimals. The warning ccy will be used to define the total amount to be used for warning. Any exposure will be converted to this ccy before being compared to the warning amount. If the IM results for a certain date does not meet this criterion, the user will see 'Check' in the status.

Example:
Warning is 1,000,000,000
Warning ccy is USD
Exposure is EUR 1,000,000,000- converted to warning currency is USD 1,200,000,000.

So, this exposure will go into **Check** status.

Default config:
In case there is no configuration for the currency, % and Amount, the below default values will be used:
Warning currency = USD
% variation = 20%
Total IM exposure = 1,000,000,000

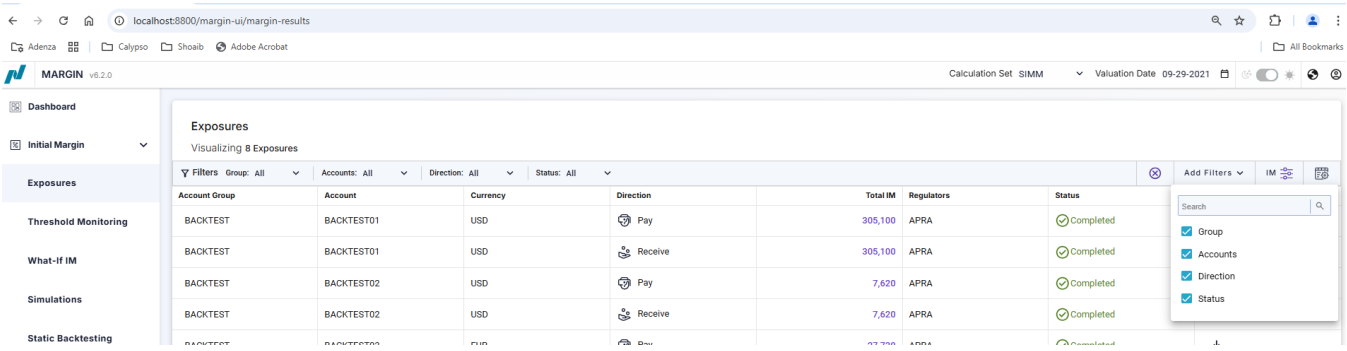
Zoom in to the Margin Decomposition by clicking the Total IM value:

Details

Account	SIMM IM	Additional IM	Schedule IM	Currency	Direction
IMEMBreak1	2,987,137,482.41	300,000	0	USD	Pay

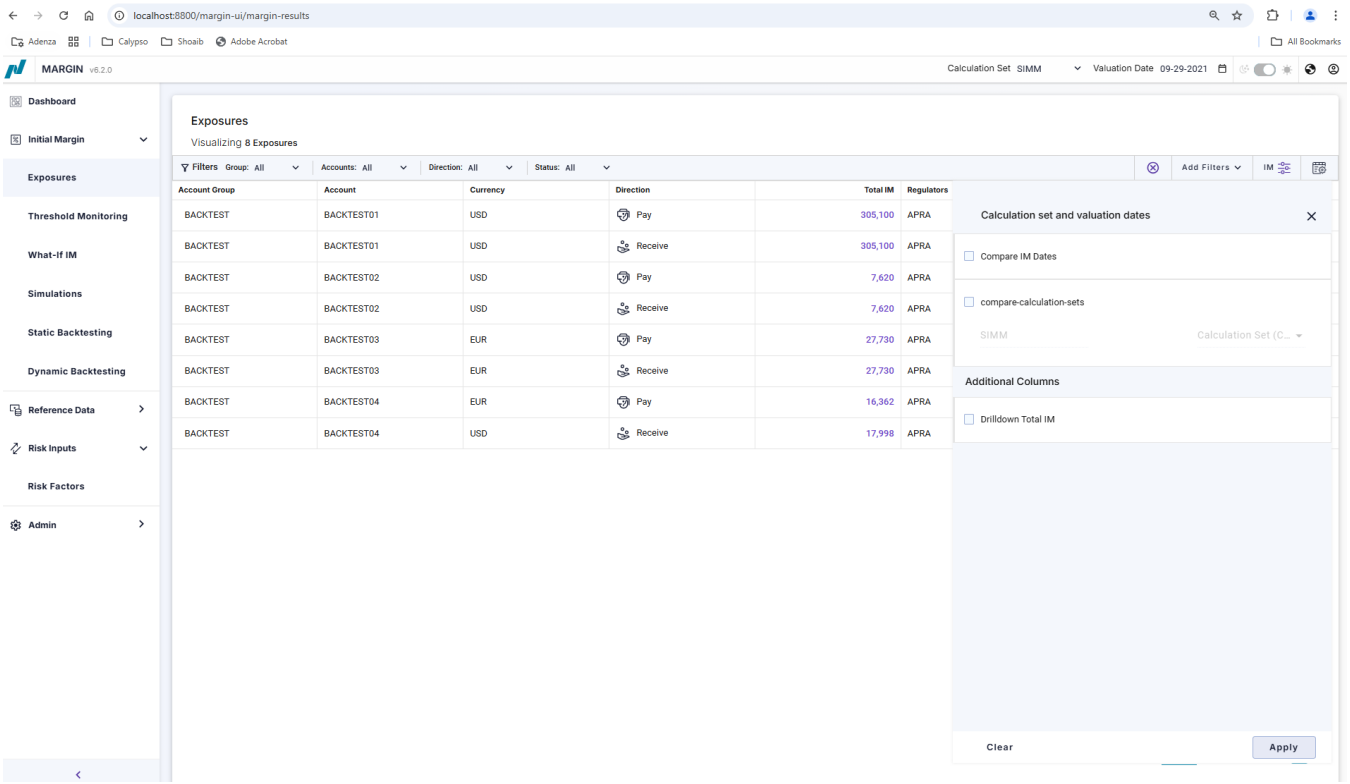
IM RatesFX	**1,037,701,125**						
IR IM	1,037,696,588	FX IM	32,399				
IR	1,031,296,236	FX Delta	-				
IR Volatility	6,400,352	FX Volatility	32,399				
IR Curvature	-	FX Curvature	-				
IM Credit	**263,005,279**						
CreditNQ IM	259,750,000	Credit IM	14,970,000	IR IM	-	FX IM	-
CreditNQ	250,000,000	Credit	970,000	IR Delta	-	FX Delta	-
CreditNQ Volatility	9,750,000	Credit Vega	-	IR Vega	-	FX Vega	-
CreditNQ Curvature	-	Credit Curvature	-	IR Curvature	-	FX Curvature	-
		Credit BaseCorrelation	14,000,000				
IM Equity	**1,518,655,618**						
Equity IM	1,518,655,618	IR IM	-	FX IM	-		
Equity	580,000	IR Delta	-	FX Delta	-		
Equity Volatility	1,518,075,618	IR Vega	-	FX Vega	-		

Select a specific account by opening the filter icon and typing in or selecting the Account names.



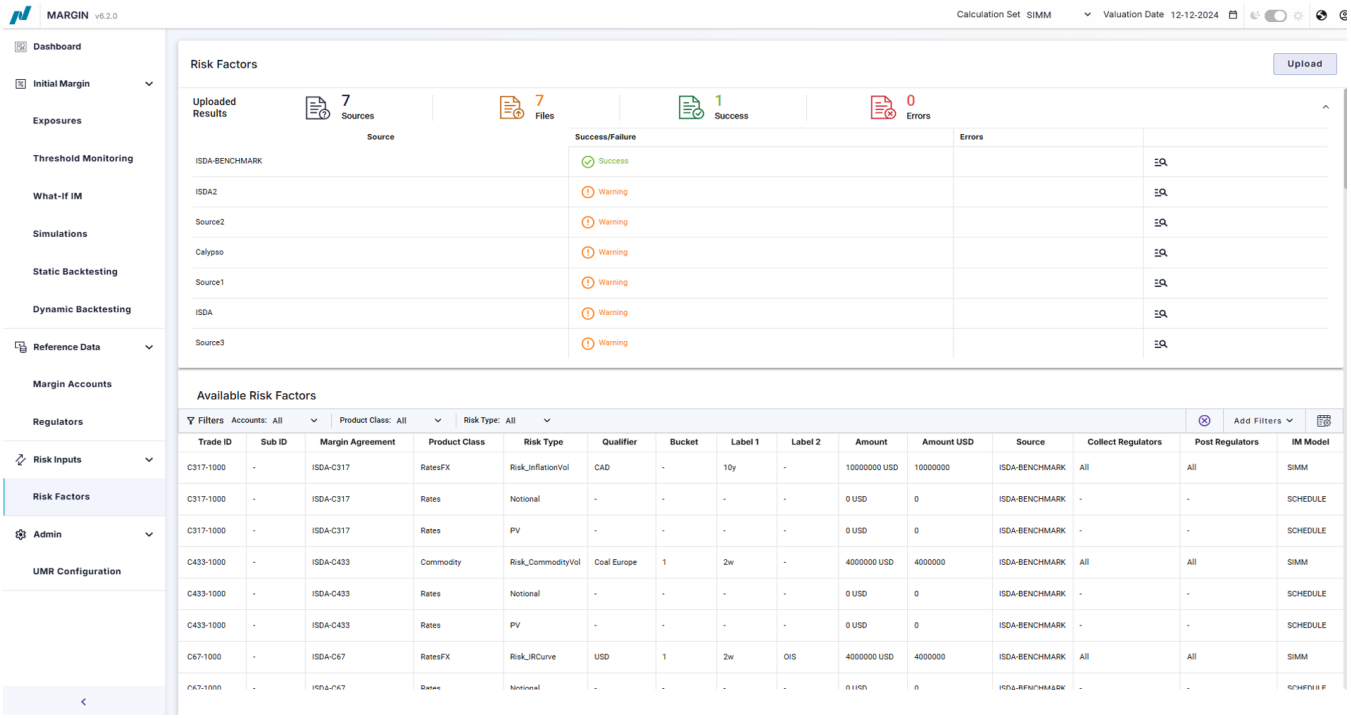
Export the Margin Files and CRIF files interactively by clicking on the Export icon

User can also view IM drilldown, IMEM status or compare IM results by dates and calculation sets.



5.3 Risk Factors Monitoring

Users can view the calculated and imported Risk Factors. Risk factors can also be imported by using the *Upload* button:



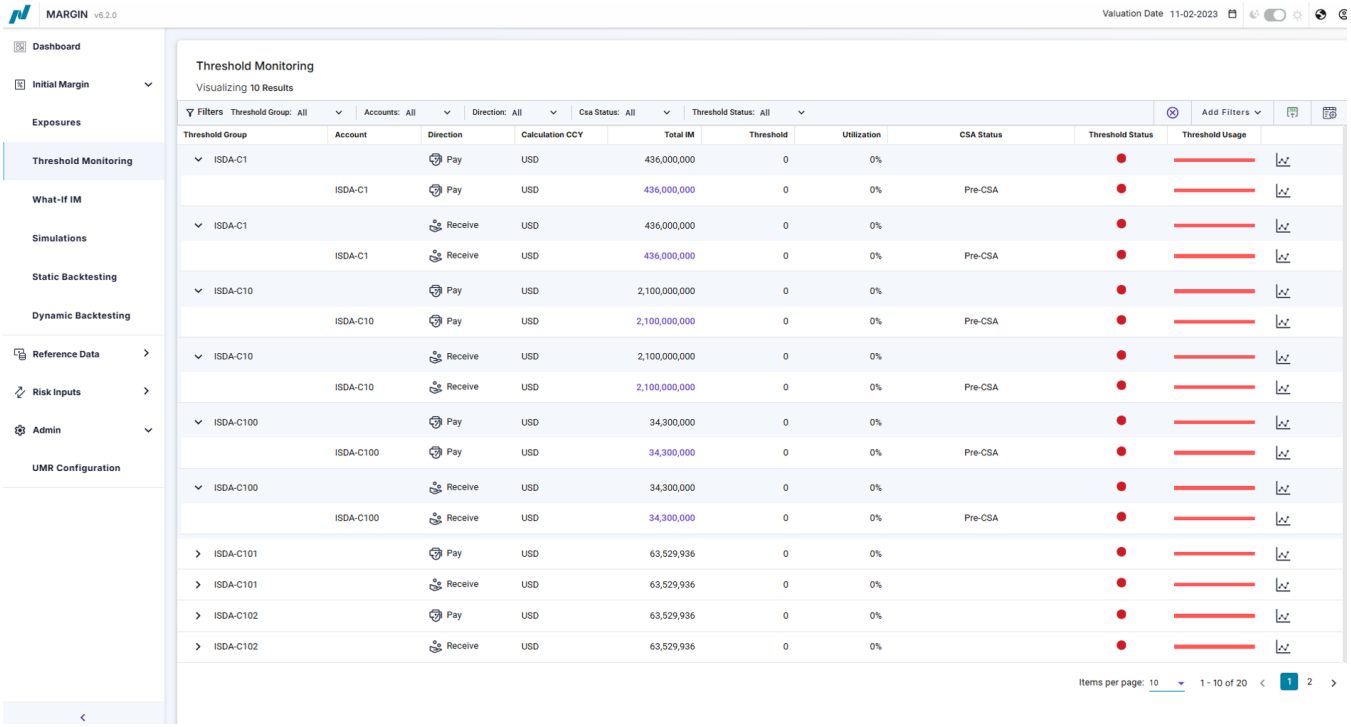
5.4 Threshold Monitoring

The Threshold Monitoring dashboard allows users to monitor thresholds at the group level. Multiple Margin accounts can be grouped into a Threshold Group, which can have a separate threshold and status from the individual accounts.

The CSA Status column indicates if the account is CSA in Place or Pre-CSA. The view can be filtered to include only one type of account using the Csa Status filter.

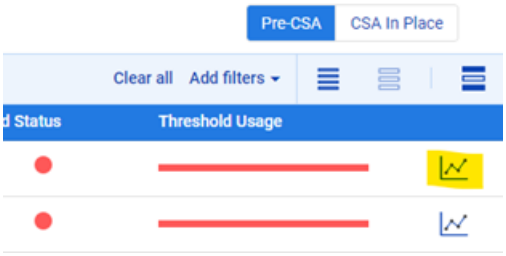
All results come from the OFFICIAL calculation set for a given account. It is required that each account only have ONE official calculation set associated (this is not linked, but up to the user configuration). Threshold monitoring results are fetched at the [Group/Entity + direction] level and filtered by Official calculation sets. If multiple official results have been calculated for a single account, it may result in an error indicating “Duplicate IM group threshold monitoring results found.”

A new attribute “Threshold Groups” introduced for the MARGIN_CALCULATOR Scheduled Task allows the user to filter the results in the output file by one or more threshold groups. This attribute is optional, and the user can add multiple values. The default value is empty when creating a new scheduled task. When the attribute value is empty, the threshold output file includes all available results, which is the same as current behavior.



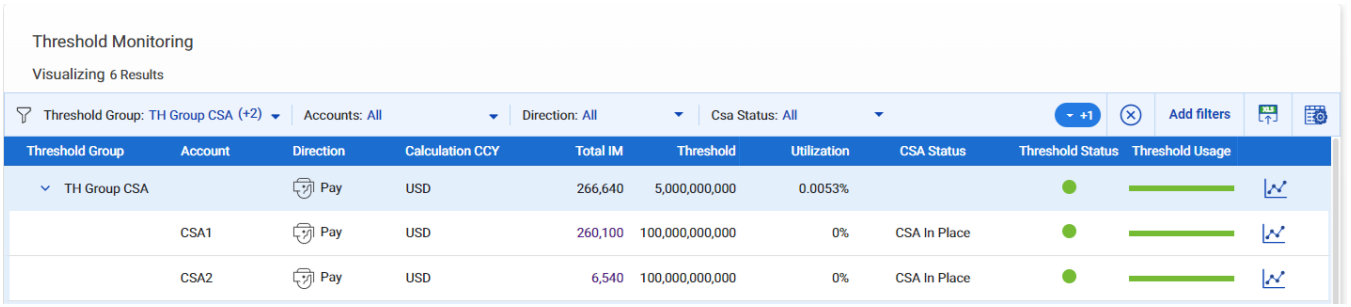
- **IM Exposure** – This is the exposure for the pay or receive side of the account/group for the valuation date and calculation set.
- **Threshold** – This is taken from the account/group definition.
- **Utilization** – This is the percentage of the threshold that is used, and is equal to Threshold / IM Exposure.
- **Threshold Status** – Only applies to Pre-CSA View. The group level status will be the worst of the underlying accounts and the group itself.
  - **Green** when IM Exposure < Trigger
  - **Yellow** when Trigger < IM Exposure < Threshold
  - **Red** when Threshold < IM Exposure
  - **Error** when the FX conversion rate is missing when converting account threshold to group threshold currency.
- **Threshold Usage** – Shows a quick indicator of utilization from 0 to 100%, where red is the portion that is used.

When the user clicks on the graph icon, they are presented with a historical drilldown of the IM Exposure, Trigger and Threshold over time.



The user can export the threshold monitoring results from the UI, as well as export them while running the MARGIN_CALCULATOR scheduled task.

In the UI, the export button is the in the top right:



The MARGIN_CALCULATOR scheduled task will automatically output the threshold monitoring results when threshold monitoring is enabled.

The output file will populate group and account level information along with the new column *Completion* which indicates the completion status of the margin calculation for each threshold group.

Threshold results are accumulative results when accounts in the same threshold group are from different margin account groups. In this case, threshold results will be completed once IM is calculated for all accounts, and this will be done through running multiple MARGIN_CALCULATOR scheduled tasks.

When the results are incomplete, the Completion column displays the status as "In-Progress" at group level. Once the results are completed, the Completion column displays the status as "Completed".

An example of "In-Progress" completion status -

Threshold Group	Margin Account	Direction	Currency	Exposure	Warning Level	Threshold	Utilization	Status	Completion
ThresholdGroupX		Pay	USD	915000000	95%	1E+11	0.92%	Below Threshold	In-Progress
	CSA1	Pay	USD	915000000	95%	1E+11	0.92%	Below Threshold	
ThresholdGroupX		Receive	USD	915000000	95%	1E+11	0.92%	Below Threshold	In-Progress
	CSA1	Receive	USD	915000000	95%	1E+11	0.92%	Below Threshold	
ThresholdGroupY		Pay	USD	1830000000	85%	1E+11	1.83%	Below Threshold	In-Progress
	CSA2	Pay	GBP	1830000000	85%	1E+11	1.83%	Below Threshold	
ThresholdGroupY		Receive	USD	1830000000	85%	1E+11	1.83%	Below Threshold	In-Progress
	CSA2	Receive	GBP	1830000000	85%	1E+11	1.83%	Below Threshold	

An example of "Completed" completion status -

Threshold Group	Margin Account	Direction	Currency	Exposure	Warning Level	Threshold	Utilization	Status	Completion
ThresholdGroupB		Pay	USD	2745000000	85%	1E+11	2.74%	Threshold Breached	Completed
	CSA3	Pay	USD	1830000000	85%	1E+11	1.83%	Below Threshold	
	CSA4	Pay	GBP	915000000	85%	10	9150000000%	Threshold Breached	
ThresholdGroupB		Receive	USD	2745000000	85%	1E+11	2.74%	Threshold Breached	Completed
	CSA3	Receive	USD	1830000000	85%	1E+11	1.83%	Below Threshold	
	CSA4	Receive	GBP	915000000	85%	10	9150000000%	Threshold Breached	

Group level rows will not be populated with “Margin Account”.

6. ACADIA IMEM Connectivity

Acadia IMEM is commonly used for reconciliation of Risk factors and IM exposure. Calypso can automatically send both risk factors and the IM Exposures to Acadia via API.

To enable this functionality, the connection information must be set in the environment properties file. The related environment properties are: (The values are just examples. Please replace with your Acadia URL, username and password).

- ACADIA_SERVER_URL=https://uat.acadiahub.com/
- ACADIA_IMEM_USERNAME=CALYPSO.API@Calypso
- ACADIA_IMEM_PASSWORD=*****
- ACADIA_HTTP_READ_TIMEOUT=350000
- ACADIA_HTTP_CONNECT_TIMEOUT=35000

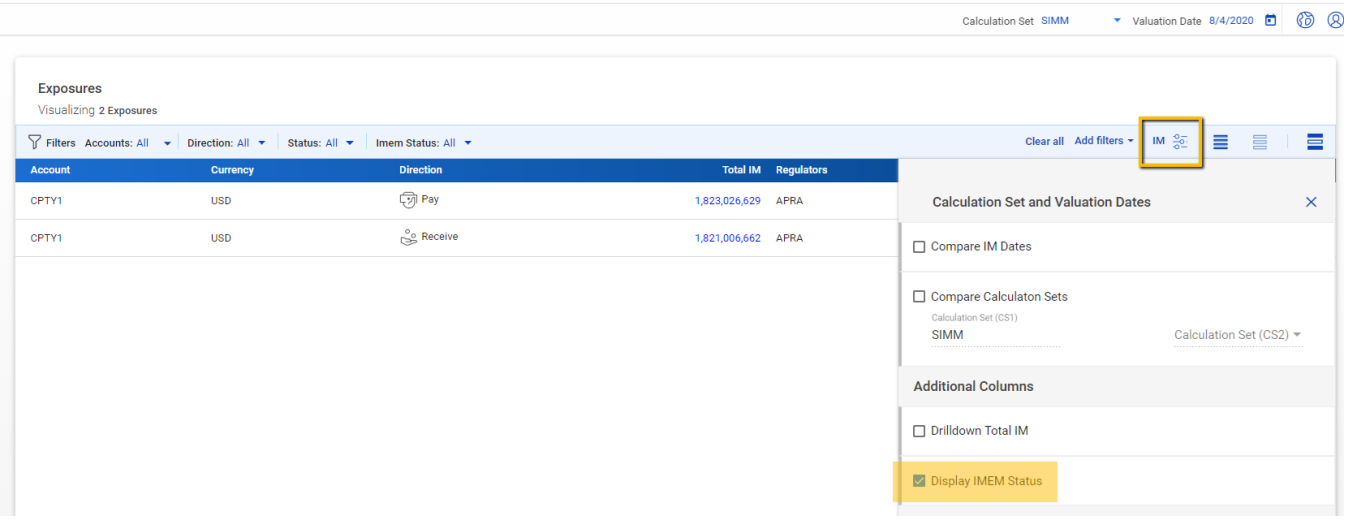
Make sure the margin account name is same in Calypso and in Acadia. Once these parameters are defined in the Environment Properties, then the CALCULATE_MARGIN scheduled task will automatically send Risk factors and exposures to IMEM if the following conditions are met:

- Calculation Set is an Official Calculation Set as defined in the margin UI
- Time Horizon is 10D

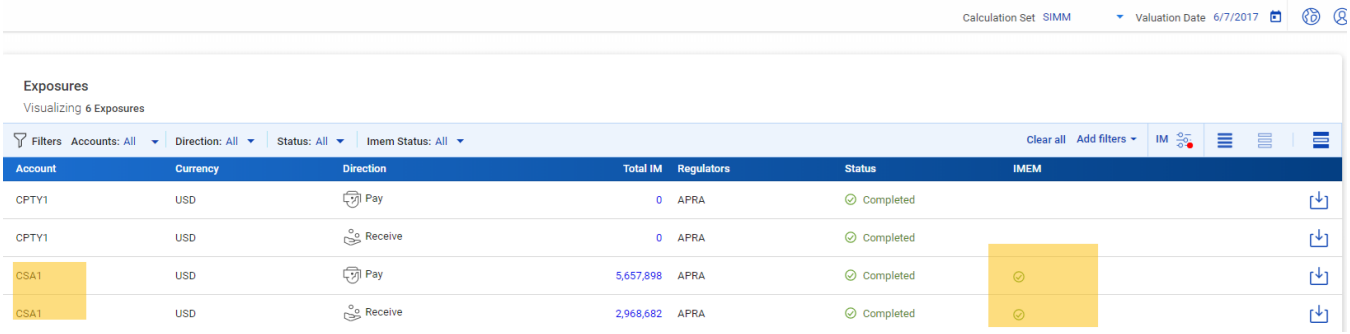
For accounts that are Pre-CSA, no margin call contract is required to be linked to send exposures to IMEM. The MARGIN_CALCULATOR scheduled task does not require a margin call contract as a mandatory attribute; it avoids creating collateral exposure trades for Pre-CSA accounts. It still allows the scheduled task to finish successfully for CSA in Place accounts.

IMEM In Margin User Interface

The IMEM related objects in the web UI will only be displayed when the IMEM connection is enabled. The enabling is driven by the environment properties. If there is connection information in the env property file, then IMEM is enabled. When enabled, the widget, and status columns in the exposure report are visible to the users. When disabled, the widget and status columns in the exposure report are hidden.

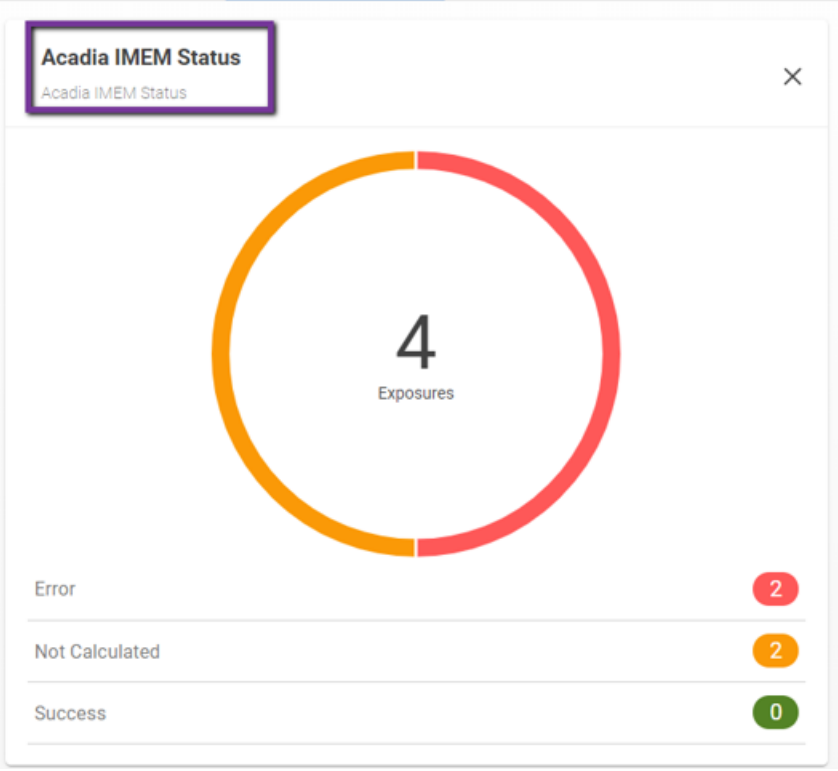


The sensitvities can be imported and when imported successfully, we can see the IMEM status as completed .

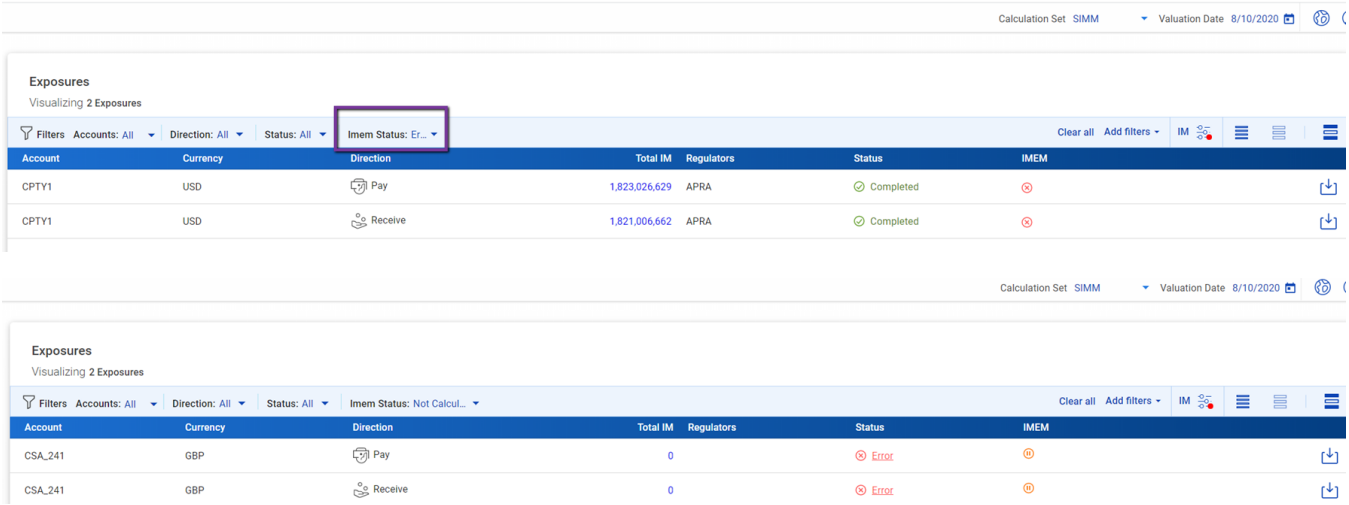


When we use calculate mode for native trades with Explode trades=true, exposures are generated in Calypso webui and also in Acadia.

We also have a dashboard widget for Acadia IMEM Status .



When the user clicks on each of these statuses, they can see the exposure results for those statuses. For example –



7. What-If Margin

7.1 Configuration

7.1.1 Domain Values

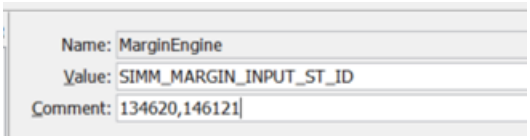
Add the list of Margin_Input scheduled task ID run in CALCULATE mode to generate sensitivities to the Comment of the domain *MarginEngine* for value SIMM_MARGIN_INPUT_ST_ID.

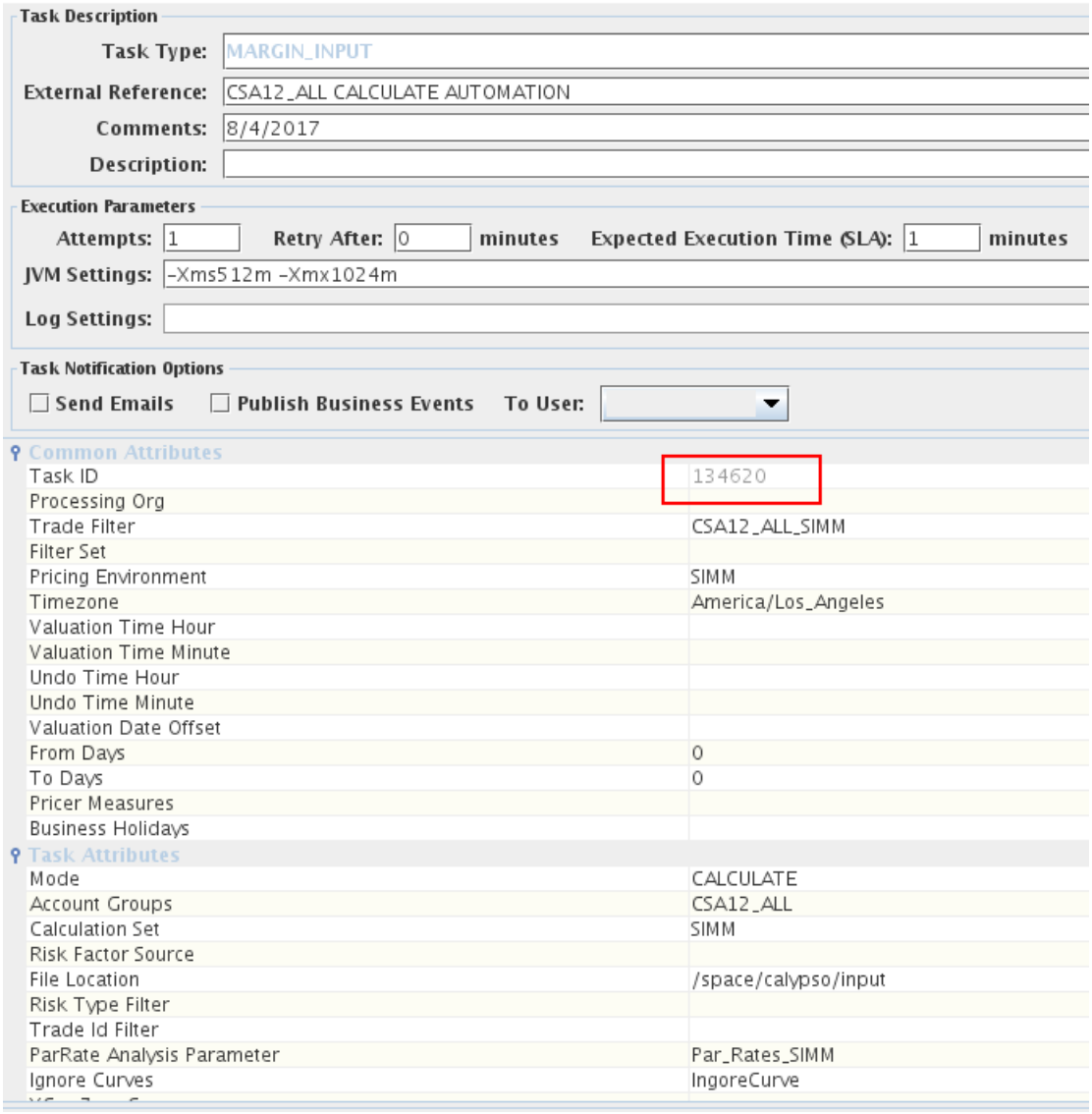
Example:

Domain = MarginEngine

Value = SIMM_MARGIN_INPUT_ST_ID

Comment = scheduled task IDs separated by commas





7.1.2 Pricing Sheet Configuration

In the Pricing Sheet, activate the IM mode as shown below:

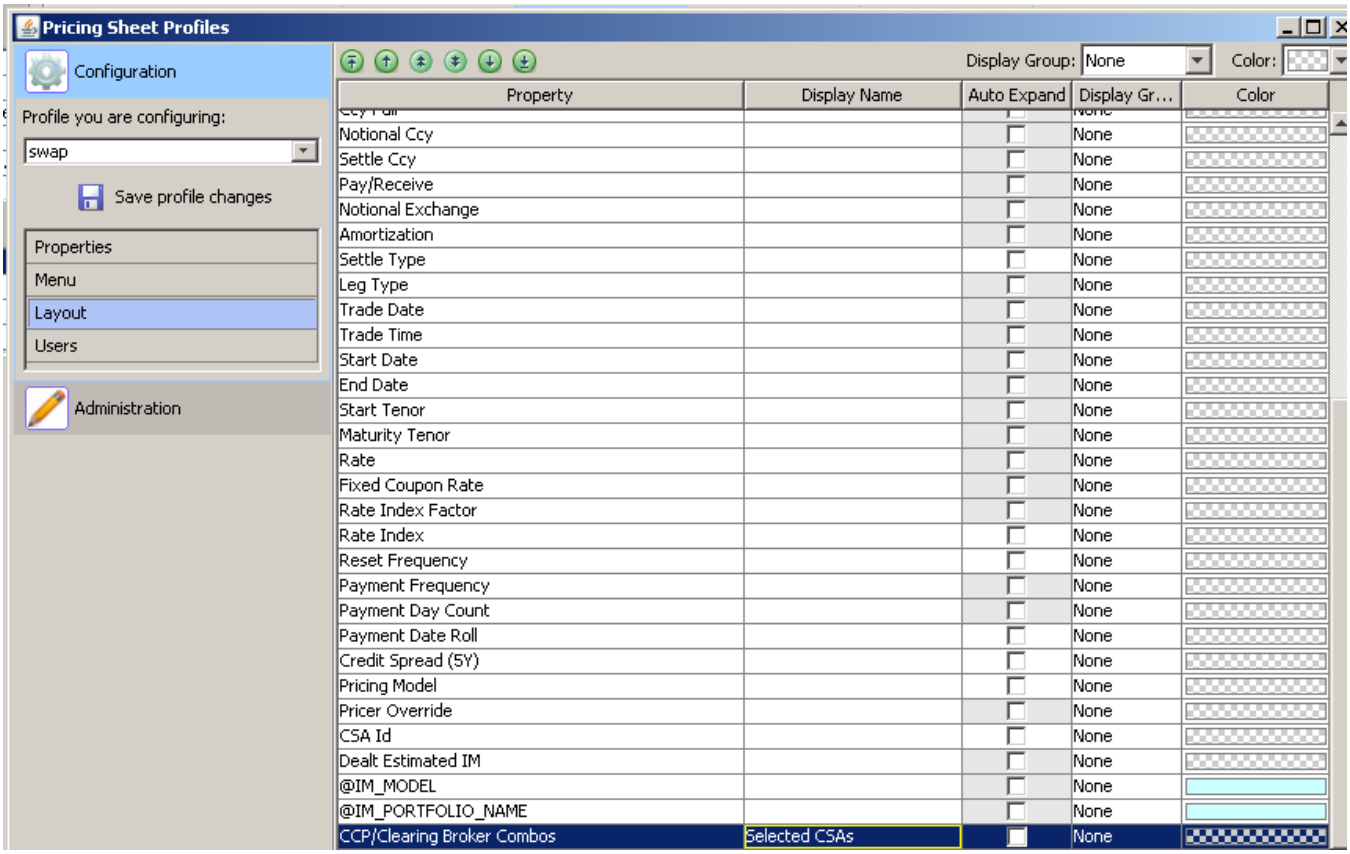
Default IM Mode - Select *IM Sheet Mode* or *IM Strategy Mode*. Sheet mode calculates incremental IM for all strategies on the active sheet collectively. Strategy mode calculates incremental IM for all strategies independently.

CCP/CB Pricer Measure Display – Select *Cheapest* or *Default*. Cheapest provides the cheapest IM across all available CSAs. Default provides the IM for the selected Default CCP/Clearing Broker (default CSA).

The CSAs are retrieved from the Comment for domain *MarginEngine* and value SIMM_MARGIN_INPUT_ST_ID.

Default CCP/Clearing Broker – Select the default CSA.

Rename the CCP/Clearing Broker Combos property:



7.2 What-If in the Pricing Sheet

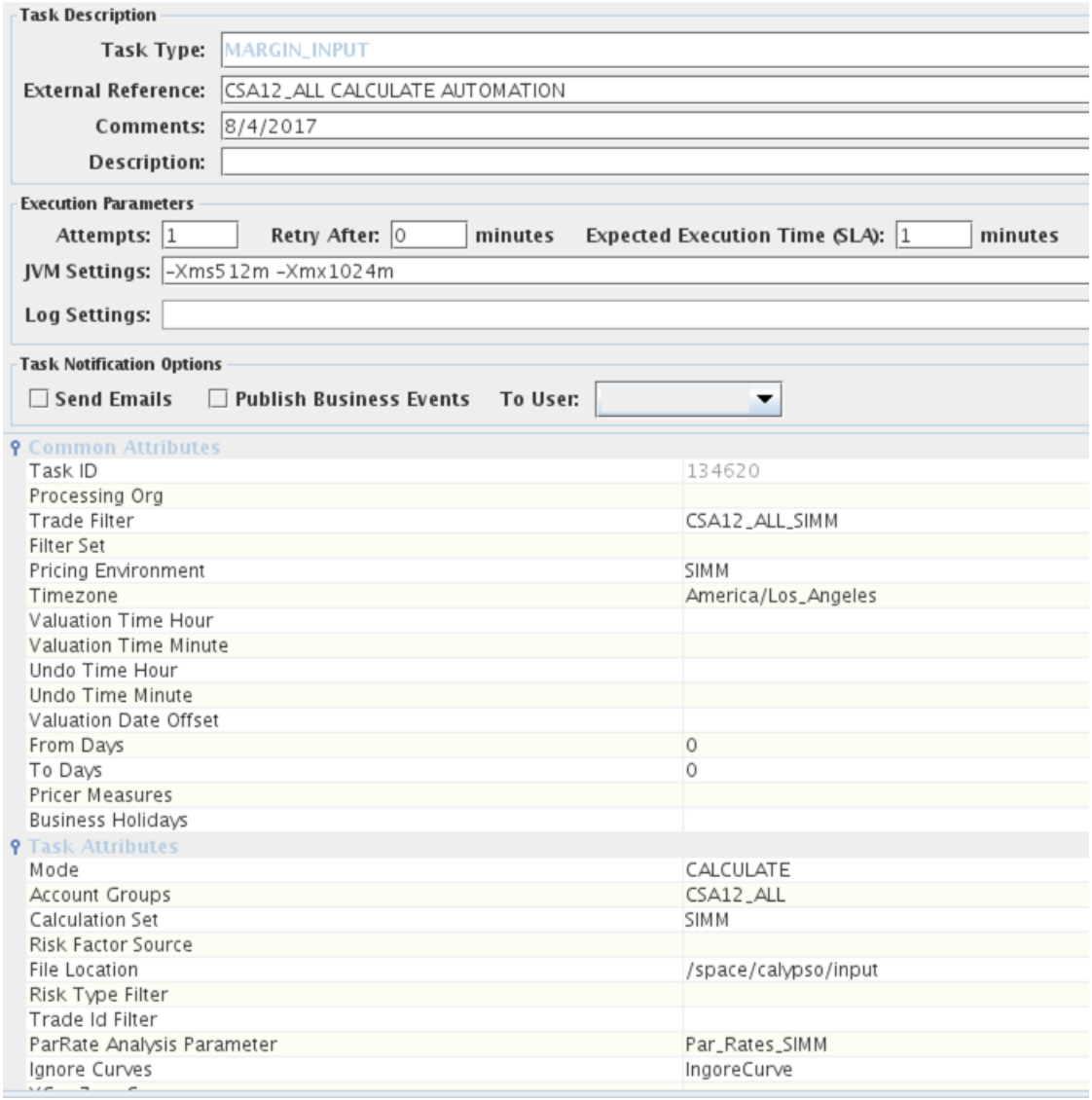
7.2.1 Servers to Start

- Auth Server
- Event Server
- Data Server
- Discovery Server
- Gateway Server
- Shared Services
- Navigator
- Calypso Scheduler
- Dispatcher
- Data Grid Node and Data Grid Enabled Calculator

- Engine Server
- Risk Messaging Server
- Calypso Messaging Server
- Margin Server
- MarginEngineSIMM

7.2.2 EOD Scheduled Task to be Run: MARGIN_INPUT

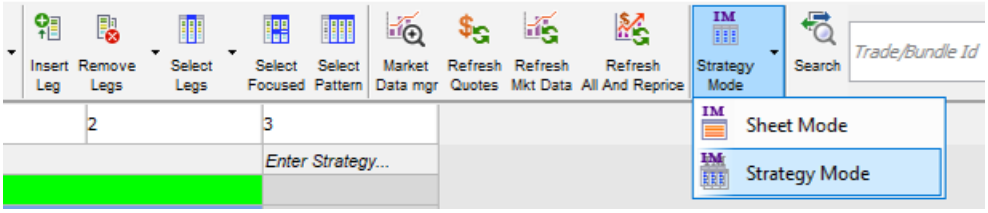
The MARGIN_INPUT scheduled tasks defined in domain value SIMM_MARGIN_INPUT_ST_ID need to be run for a valuation date for what if IM calculation in pricing sheet. When there are results from multiple dates, the latest valuation date is used when pricing what if trades and calculating what if IM.



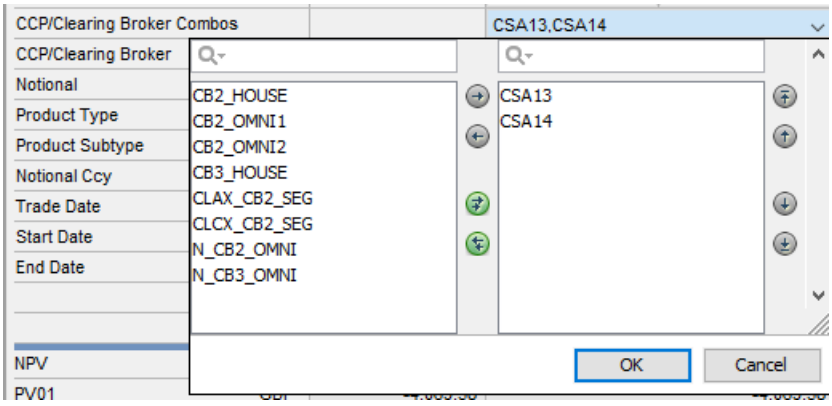
7.2.3 Pricing Sheet

- Once all required servers are started with proper configuration, what if IM can be calculated in pricing sheet.
- Input new trade information. Single or multiple trades. Note that what if is calculated for new unsaved trades (i.e. trade id is not created).
- Select IM calculation modes: Sheet mode and Strategy mode. Sheet mode calculates what if IM for selected CSA agreements for bulk trades. Strategy mode calculates what if IM for selected CSA agreements for each single trade.
- Select CSA agreements under field CCP/Clearing Broker Combos. The dropdown list of this fields come from margin accounts from MARGIN_INPUT scheduled task list defined in SIMM_MARGIN_INPUT_ST_ID domain value. In sheet mode, select CCP/Clearing Broker Combos in Total column. In strategy mode, select CCP/Clearing Broker Combos in each trade column.
- Trigger what if by clicking Price & Calc IM button.
- View returned what if IM as well as drill down of each CSA agreement.

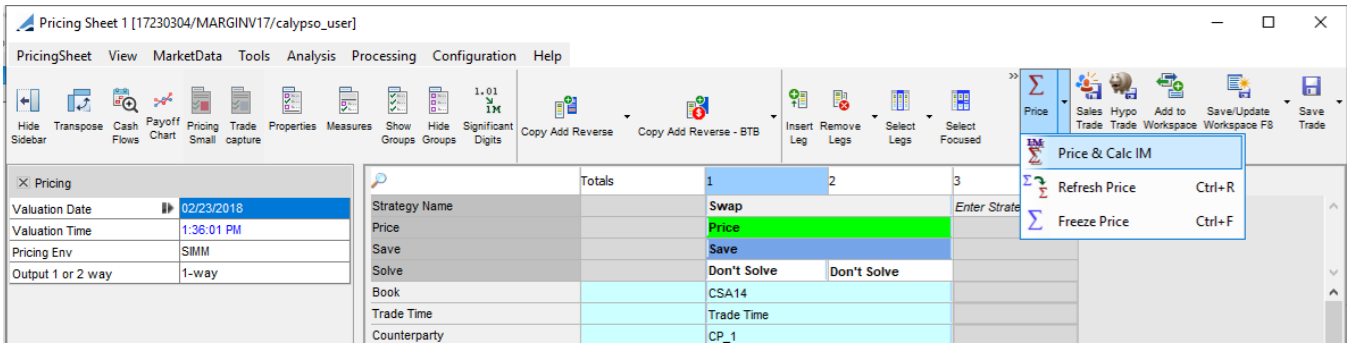
IM calculation modes button:



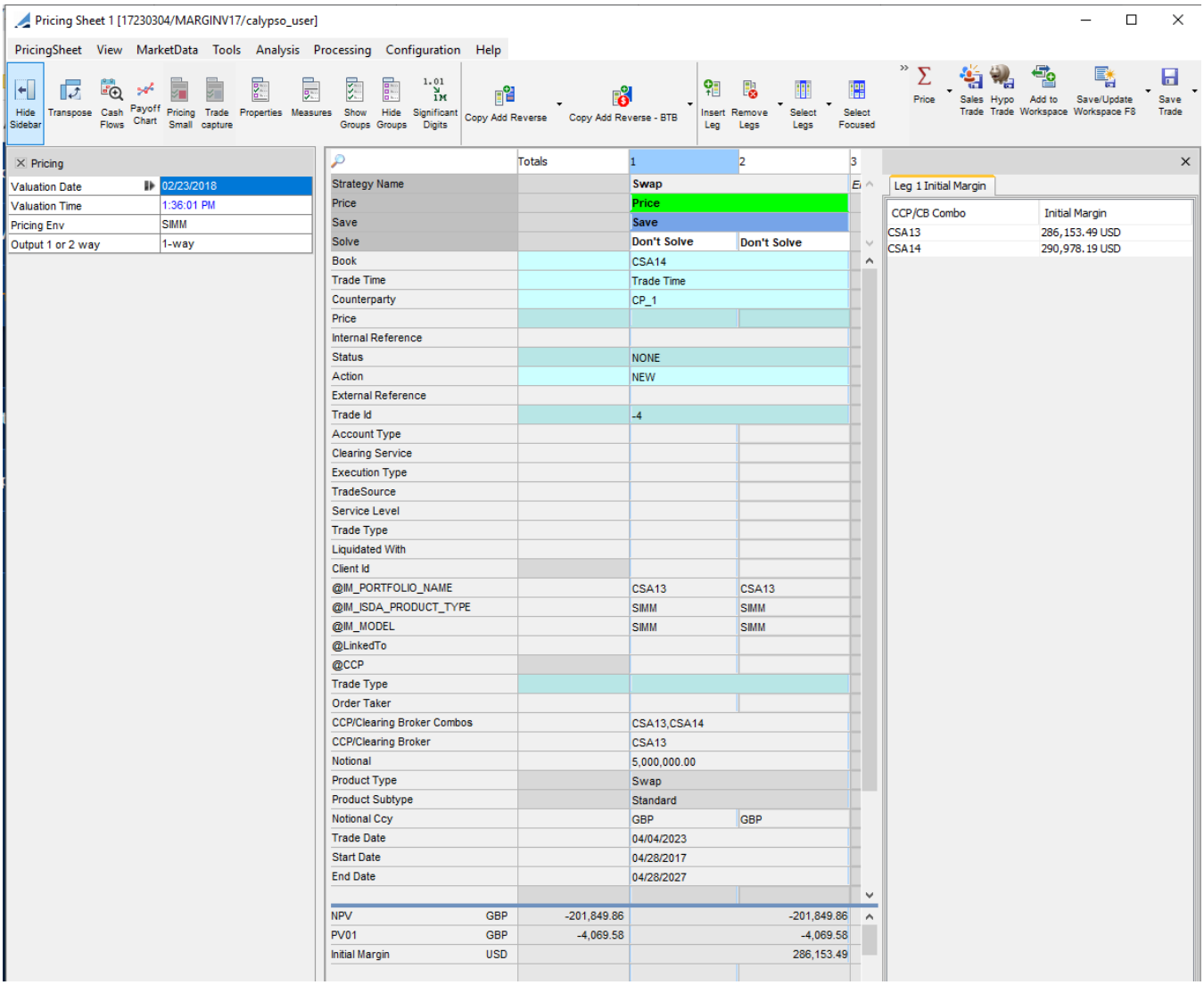
CCP/Clearing Broker Combos:



Price & Calc IM button:



View what if results:



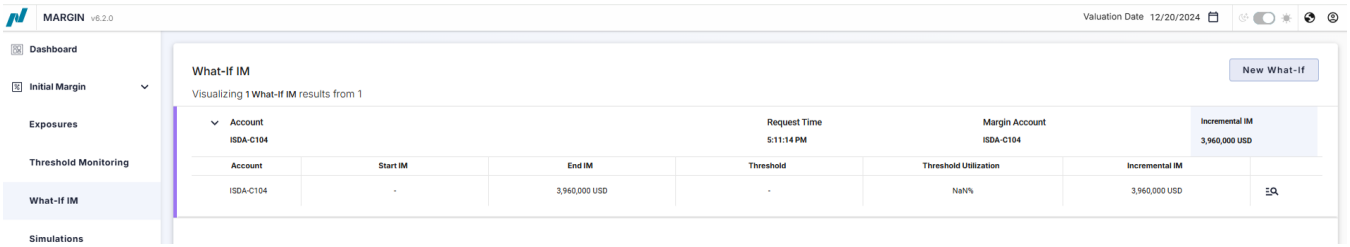
Logging Categories

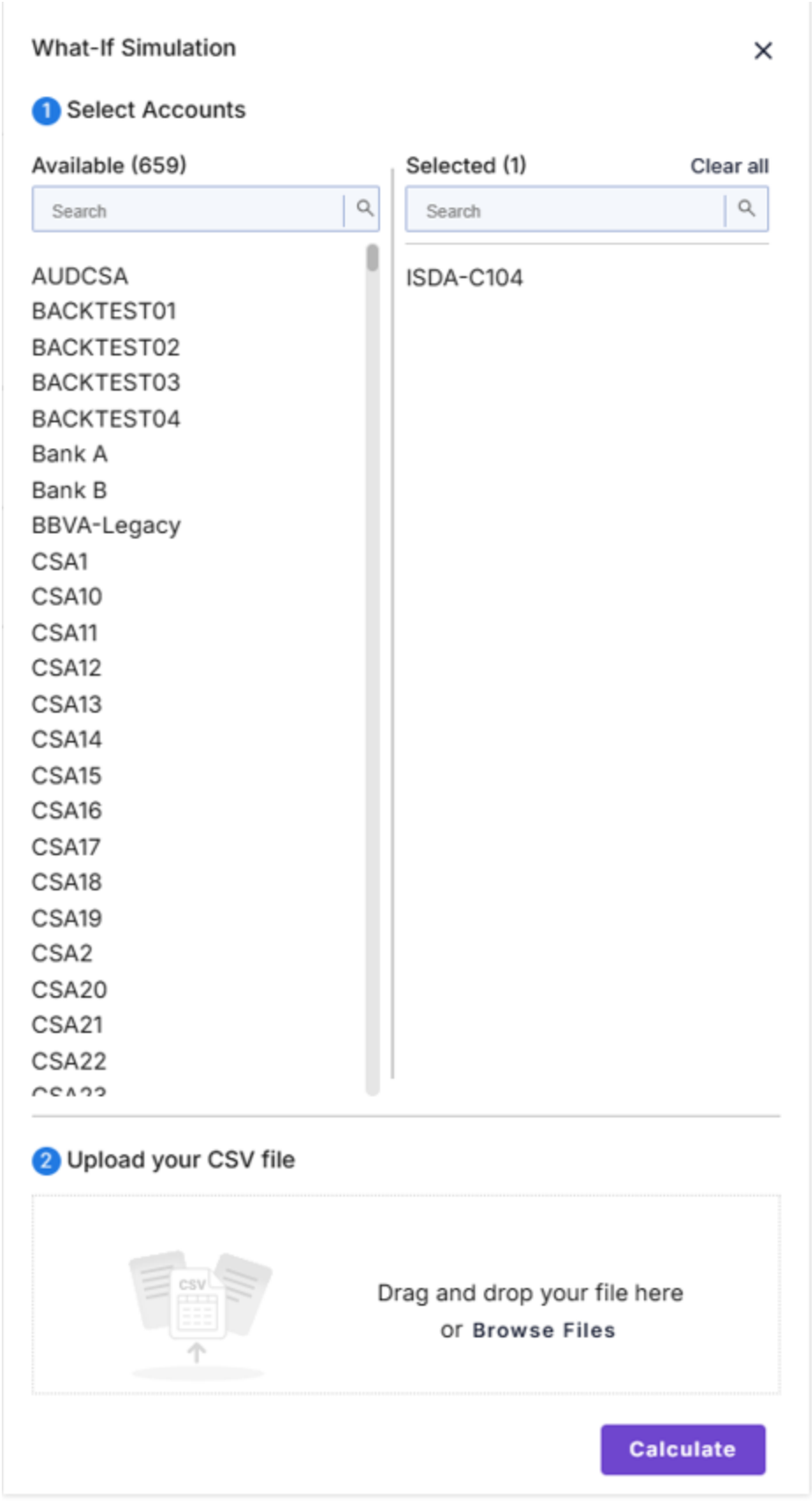
- INC_RISK
- INC_RISK_TRADE_CALC

7.3 What-If in the Web User Interface

In the Web UI, you can simulate the incremental margin based on imported sensitivities for new trades. In doing so, you can compare the results for various accounts to select the cheapest counterparty.

First, click on the New What-If button on top to open the 'New What-If simulation' panel. Then choose a set of accounts you want to compare across.

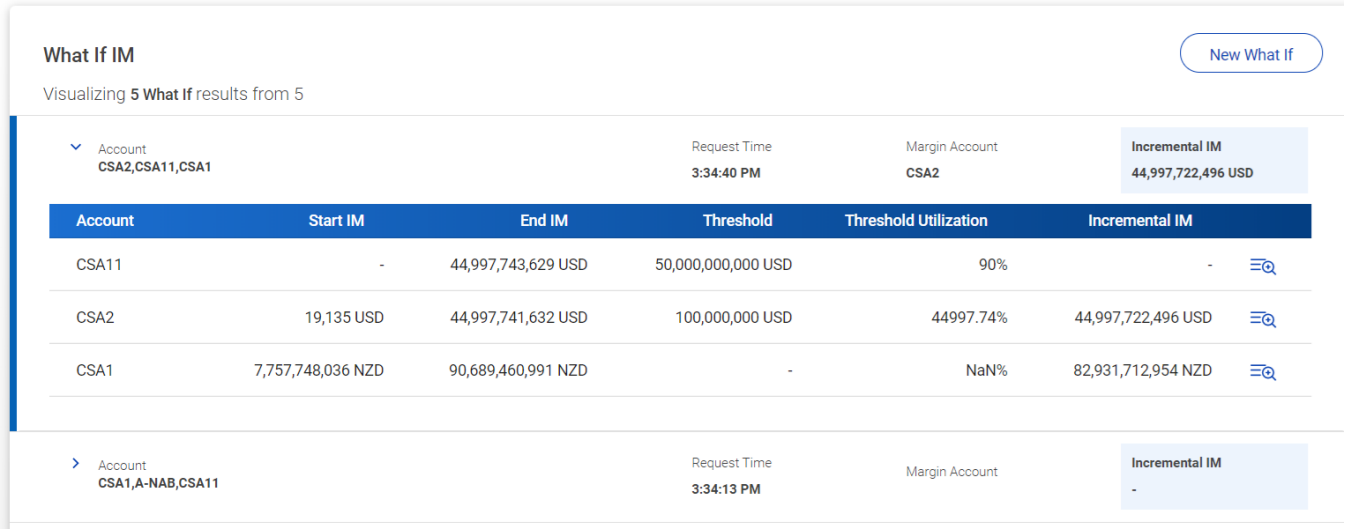



What-If Simulation
1 Select Accounts
Available (659)
Search
Selected (1)
Clear all
Search
AUDCSA
BACKTEST01
BACKTEST02
BACKTEST03
BACKTEST04
Bank A
Bank B
BBVA-Legacy
CSA1
CSA10
CSA11
CSA12
CSA13
CSA14
CSA15
CSA16
CSA17
CSA18
CSA19
CSA2
CSA20
CSA21
CSA22
ISDA-C104
2 Upload your CSV file
CSV
Drag and drop your file here
or Browse Files
Calculate

Then, click the Upload your csv file option to select a file that contains sensitivities. A sample file called *What_if IM5* can be found in the Bilateral Margin Samples folder.

Sample File of Sensitivities

Once uploaded, the calculation occurs and you can view the results which show the change in IM at each account if these risk factors were used on top of the existing risk factors.

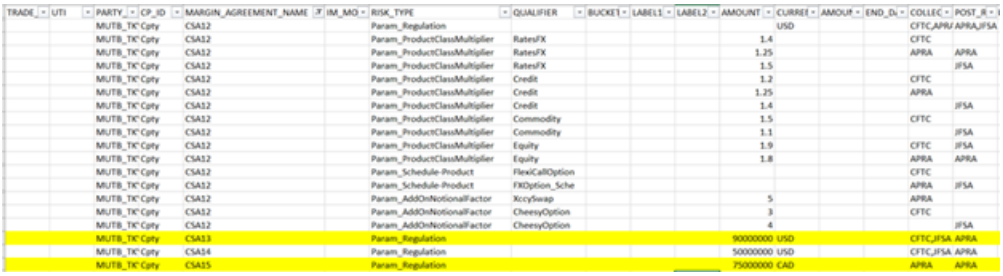


UMR 50M Threshold

This functionality adds the UMR threshold to the what-if page. The threshold information needs to be uploaded as part of the Account csv file, where the threshold is modelled as the “Amount” for the param-regulator.

The "Account Threshold" is defined at the Margin Account level, for the Pay and Receive side.

Import sample:

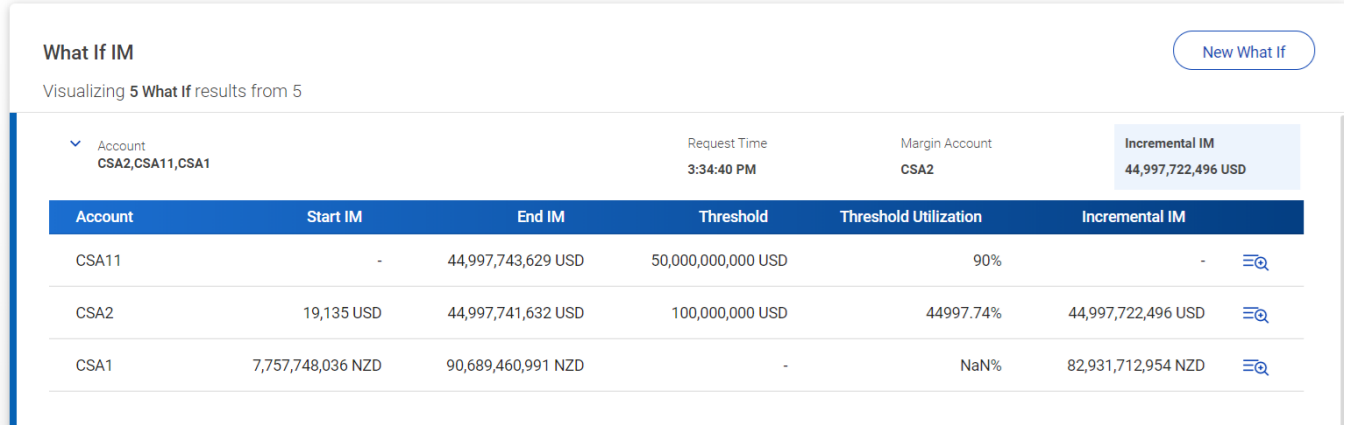


- If no threshold is defined at the account level, we will use the default of the ISDA Definition:

IM Threshold									
USA	Japan	Canada	Europe	Switzerland	Australia	Hong Kong	Singapore	Korea	Brazil
USD 50 million	JPY 7 billion	CAD 75 million	EUR 50 million	CHF 50 million	AUD 75 million	HKD 375 million	SGD 80 million	KRW 65 billion	BRL 150 million

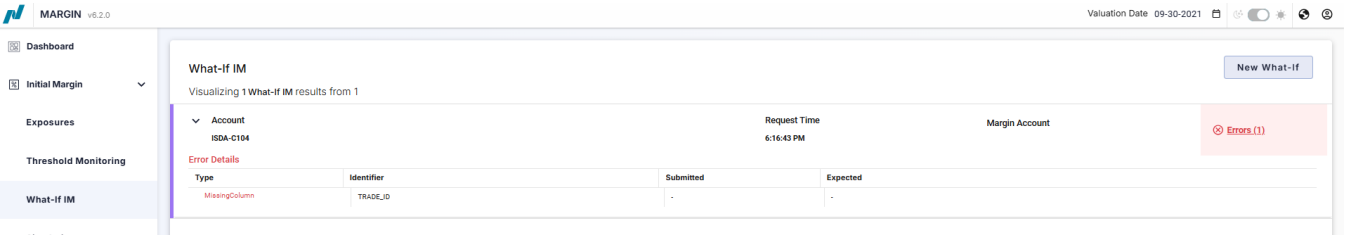
- The currency of the threshold is the same as the currency of the Margin Account

The what-if IM calculation includes the UMR threshold in the what-if IM account selection:



Error Messages in What-If

If there are any error in the what-if upload file, the users can view the number of errors in the What-if UI page and when they click on the number of errors, they can see the details of the errors in a pop-up box.



8. AANA Calculation

Regulators have defined a criterion based on the average notional of a portfolio which drives the need to comply to UMR. Each year the Average aggregate notional amount (AANA) is calculated over a specified period and used to determine if they need to be compliant for the following year.

8.1 Overview

8.1.1 In Scope

UMR eligible product types are in scope for the AANA calculation as well as FX trades

The scope of products varies with each jurisdiction and can be found here: https://www.isda.org/a/zUATE/ISDA-In-Scope-Products-Chart_UnclearedMargin_In-process-3.18.21.pdf

Trades within Calypso are eligible for Notional calculation, while trades outside of Calypso must have their Notional imported every day using the Risk Factor/CRIF format.

8.1.2 Out of Scope

The ISDA documents state that “The notional amounts for AANA-covered products between margin affiliates should only be counted once”. Given that Calypso will not have the ability to know what legal entities are affiliated in each jurisdiction, Calypso will take the more conservative approach. If there is a trade that is between margin affiliates, the notional will be counted under BOTH organizations.

Calypso will calculate AANA per processing organization, it is up to the user to add together AANA for legal entities that are part of a group.

8.2 AANA_CALCULATIONS Scheduled Task

The AANA calculation is done through two steps in the AANA_CALCULATIONS scheduled task. The first step is to calculate notionals, then the second step adds notionals across dates to get the average.

The task has the following attributes:

Attribute	Calculate Notional Mode	Calculate AANA Mode
Mode	“Calculate Notional”	“Calculate AANA”
Pricing Environment	Used to price trades and convert all notionals into Base Currency.	Not used
Holiday Calendar	A Calypso holiday calendar which will be used to determine what business days the scheduled task will be run on.	Holiday Calendar determines which dates to look for notionals on within the start and end date
Trade Filter	A user defined trade filter which will includes which PO’s to	Not Used

Attribute	Calculate Notional Mode	Calculate AANA Mode
	process	
Import Notional File Location	Choose a location for a file upload of Notional information. This field supports date wildcards. For example: \dir\AANANotionals_PO1_|yyyy-mm-dd|.csv	Not Used
Start Date	Not Used	Start Date of the calculation period
End Date	Not Used	End date of the calculation period
Averaging Methodology	Not Used	Select either Daily or Month End
Include Trades	Not Used	Default false. Set to true in order to calculate Average Trade level Notional as well as AANA.
AANA Output File Location	Not Used	Define the file path where the AANA calculation results will be written.

8.2.1 Calculate Notional

The calculate Notional mode will either import via .csv or calculate notionals from Calypso trades. One (1) Calculate Notional scheduled task should be configured for all PO's in the same jurisdiction (ie base currency). If there are PO's with differing jurisdictions, then one ST will be configured for each jurisdiction/base currency. The trade filters and uploaded notionals must be configured to appropriately filter the PO level information.

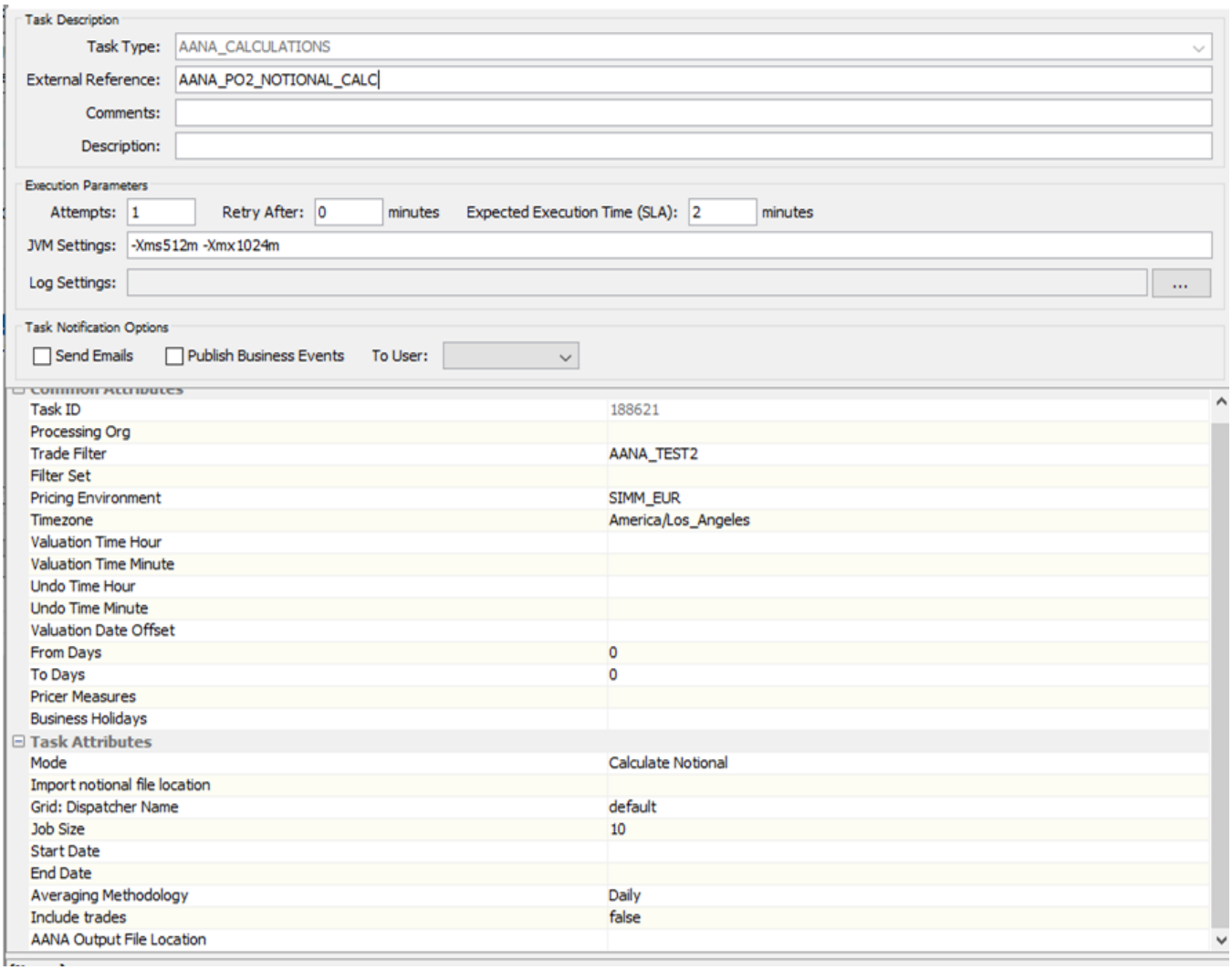
The Notional amounts can be sourced from trade calculation within Calypso and/or imported. A trade filter will define what trades are eligible within Calypso, and a file location will be used to define what is uploaded. Either one is required, but both may be used. If there are multiple sources to import, then multiple ST's with a file path defined must be configured.

Rerunning the scheduled task will delete all Notionals with the same Valuation Date/Source. Calypso trades are automatically tagged with source "Calypso".

Upon Calculation or import, the notionals will also be converted into pricing environment base currency and stored.

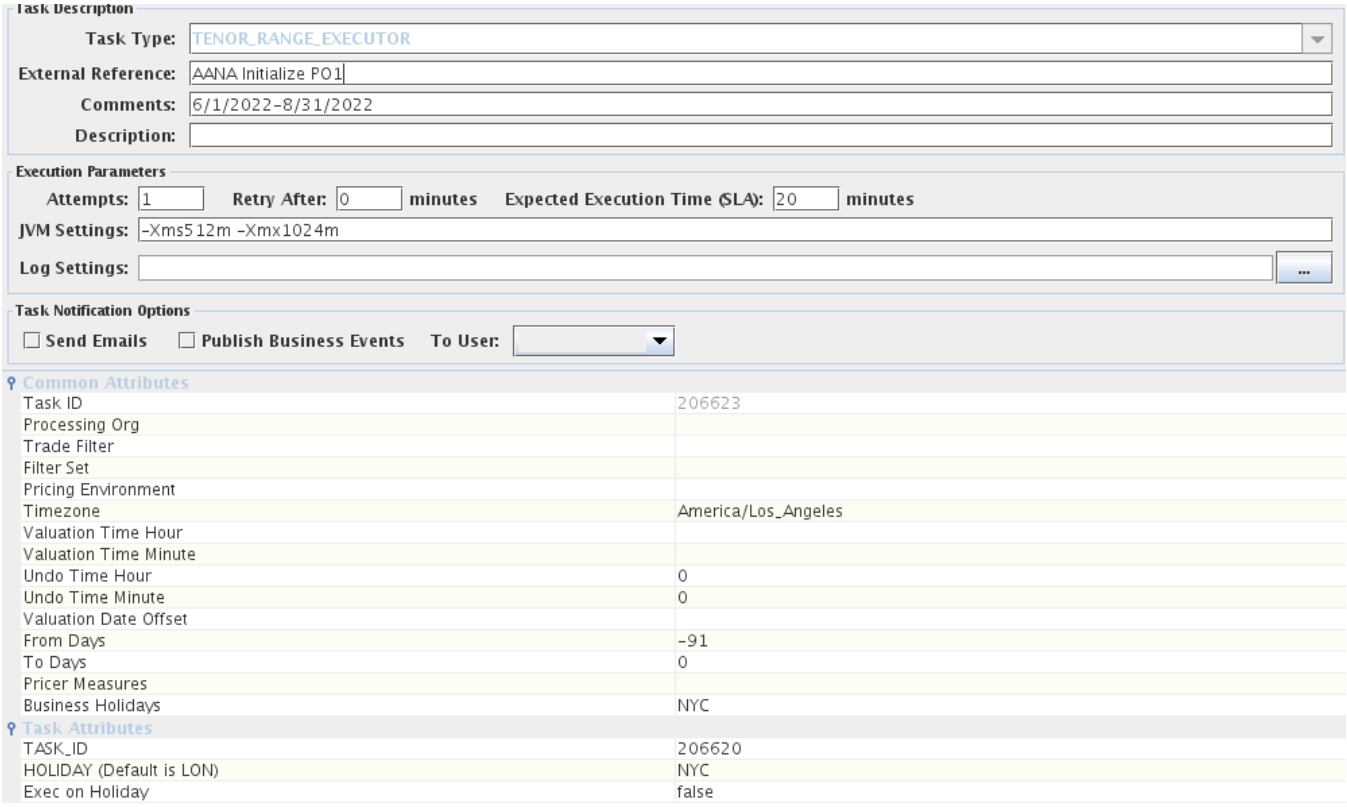
Standard Process

The standard procedure is the run the calculate notional scheduled task every business day. This will store the notional amounts for later use in AANA calculation. After the initialization, the scheduled task should be run daily.



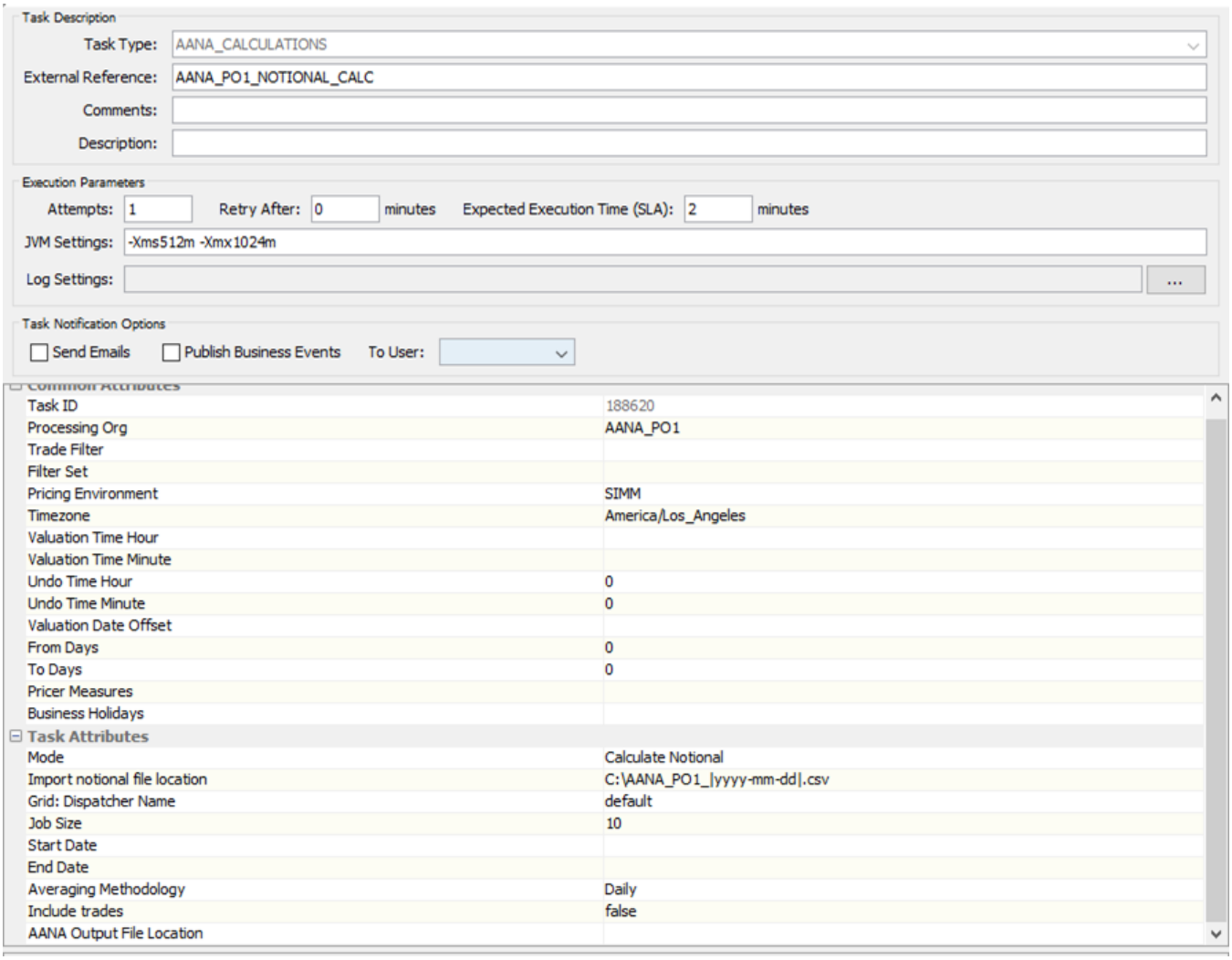
Initialization Process

To initialize, the user can use the TENOR_RANGE_EXECUTOR scheduled task. Configure this task to point to the calculate notional task, and it will run it over multiple days. Example:



Import Notionals

AANA_CALCULATIONS scheduled task can import trade notionals from csv file with same mode of Calculate Notional



The file upload will contain the following fields and they should be populated on each row.

Field	Optional/required	Format	Description
Source	Required	String	What source is the data coming from
Trade ID	Required	String	Unique per source
Processing Organization	Required	String	Must be a valid Calypso Short Name with role PO
Counterparty	Optional	String	Must be a valid Calypso Short Name with role Counterparty to filter out double counting of trades between affiliates
Product Type	Optional	String	Used for reporting
Notional	Required	Positive Number	

Field	Optional/required	Format	Description
Notional Currency	Required	Currency Code	Used to convert into base currency

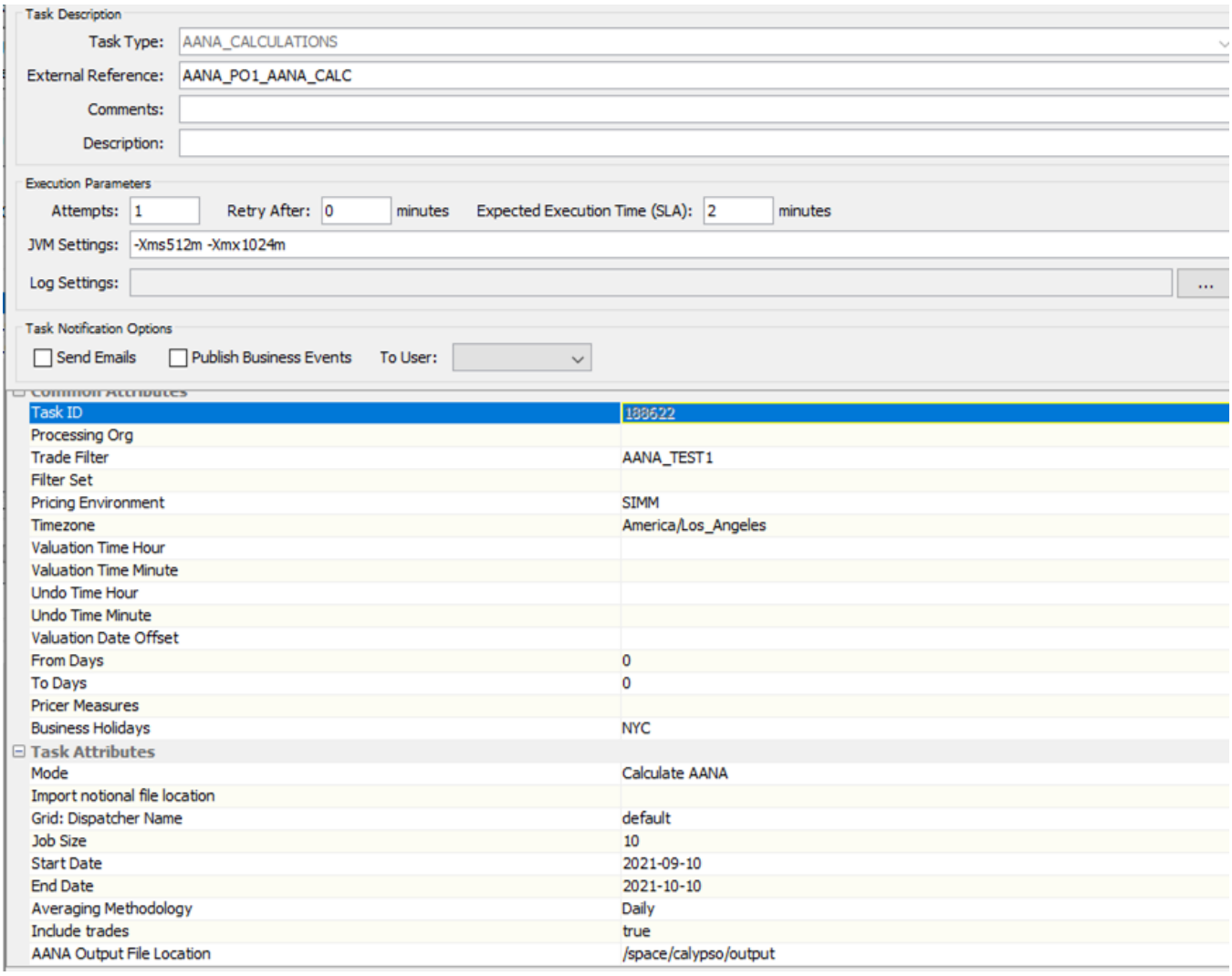
For example,

	A	B	C	D	E	F	G
1	Source	Trade ID	Processing Orga	Counterparty	Product Ty	Notional	Notional Currency
2	External1	101	AANA_PO1	AANA_PO2	Swap	500000	USD
3	External1	102	AANA_PO1	AANA_PO2	Swap	500000	EUR
4	External2	103	AANA_PO1	AANA_PO2	Cap	1000000	GBP

8.2.2 Calculate AANA

Once Notionals are calculated for every day in the AANA calculation period the second stage, Calculate AANA, can be run.

The Calculate AANA mode of the scheduled task will load all Notionals and aggregate by PO. There is no distinction between jurisdiction here, notionals are summed by their base currency amount, so all Notional_Base values for a given PO must be in the same currency. All PO's will be calculated with the averaging methodology selected. If the user desires Daily for some PO's and Month End for others, the task can be run twice, once in each mode, and then filtered accordingly.



The results of calculation are exported into a .csv file.

Trade level only, in trade currency

Processing Organization	Trade ID	Counterparty	Product Type	Source	Averaging Methodology	Start Date	End Date	Days	Avg Notional	Avg Notional Currency	AANA	AANA Currency	Status	Doc Notes
BRANCHE2					Daily	6/1/2020	6/1/2020	1			7,150,000.00	EUR	Completed	PO Level calculation. Note trade ID is emtpy
BRANCHE2	500	CUS02		ExtSys2	Daily	6/1/2020	6/1/2020	1	6,500,000.00	GBP	7,150,000.00	EUR	Completed	Trade Level calculation. Note trade ID is populated
BRANCHE1					Daily	6/1/2020	6/1/2020	1			6,500,000.00	USD	Completed	PO Level calculation. Note trade ID is emtpy
BRANCHE1	1002	CUS01	Swap	ExtSys	Daily	6/1/2020	6/1/2020	1	5,000,000.00	EUR	5,500,000.00	USD	Completed	Trade Level calculation. Note trade ID is populated
BRANCHE1	1001	CUS05	Swap	ExtSys	Daily	6/1/2020	6/1/2020	1	1,000,000.00	USD	1,000,000.00	USD	Completed	Trade Level calculation. Note trade ID is populated
PO2					Daily	6/1/2020	6/1/2020	1			2,009,090.91	EUR	Completed	PO Level calculation. Note trade ID is emtpy
PO2	709050	CP2	SwapXccy	Calypso	Daily	6/1/2020	6/1/2020	1	1,000,000.00	GBP	1,100,000.00	EUR	Completed	Trade Level calculation. Note trade ID is populated
PO2	709528	CP2	Swap	Calypso	Daily	6/1/2020	6/1/2020	1	1,000,000.00	USD	909,090.91	EUR	Completed	Trade Level calculation. Note trade ID is populated

Validation

One or more PO's may still have successful results, in this case the output file will still be written. PO's with errors can still show in the output but will have an AANA values of blank and the scheduled task will complete in status "Finished with Errors".

Validation 1: All sample data is present

AANA calculation requires a Sum of Notionals for sample days during the calculation period. If there is a missing value for a given PO, the calculation will be considered failed for that PO, and each missing date will be logged. For example:

AANA calculation failed for PO1. Missing sum of Notionals on 2020-06-01.

This will result in a failure calculation status for this PO's AANA in the results and will show a blank AANA for the given PO.

Validation 2: Trade Notional validation

AANA calculation at the trade level requires a sum of Notionals across the period for a given trade. A missing value may be valid (trade matured or started within the period for example). To ensure we have the correct data, some validation will occur:

Load Notionals per trade, sort by date. Compare to sample dates. If a sample date that occurs (before or equal to the last notional), or (after or equal to the first notional) does not exist, then we throw an error and do not calculate AANA for the trade. For example:

AANA calculation failed for Trade ID: 1001 from Source: ExtSys. Could not find Notional on 2020-05-07.

This will result in a failure calculation status for this Trades's AANA in the results and will show a blank AANA and average notional for the given Trade

Examples of where an error would be seen:

Calc Start	5/1/2020						If missing, error										
Calc End	5/17/2020																
	5/1/2020	5/2/2020	5/3/2020	5/4/2020	5/5/2020	5/6/2020	5/7/2020	5/8/2020	5/9/2020	5/10/2020	5/11/2020	5/12/2020	5/13/2020	5/14/2020	5/15/2020	5/16/2020	5/17/2020
Trade 1001	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Trade 1002						200	200	200	200	200	200	200	200	200	200	200	200
Trade 1003	300	300	300	300	300	300	300	300									
Trade 1004					400	400	400	400	400	400	400	400					

Validation 3: Currency of notional Sums per PO must be the same.

All the notional base values for a given PO must be in the same currency for each PO during the AANA calculation phase. If there are multiple currencies found and error is logged:

"Multiple Base currencies found for PO, data must be recalculated or imported in a single base currency"

This will result in a failure calculation status for this PO's AANA in the results and will show a blank AANA for the given PO.

9. Backtesting

9.1 Static Backtesting

9.1.1 Additional Configuration

The Gateway API needs to be enabled to perform backtesting. Users must set the environment property USE_GATEWAY to true and start the following servers:

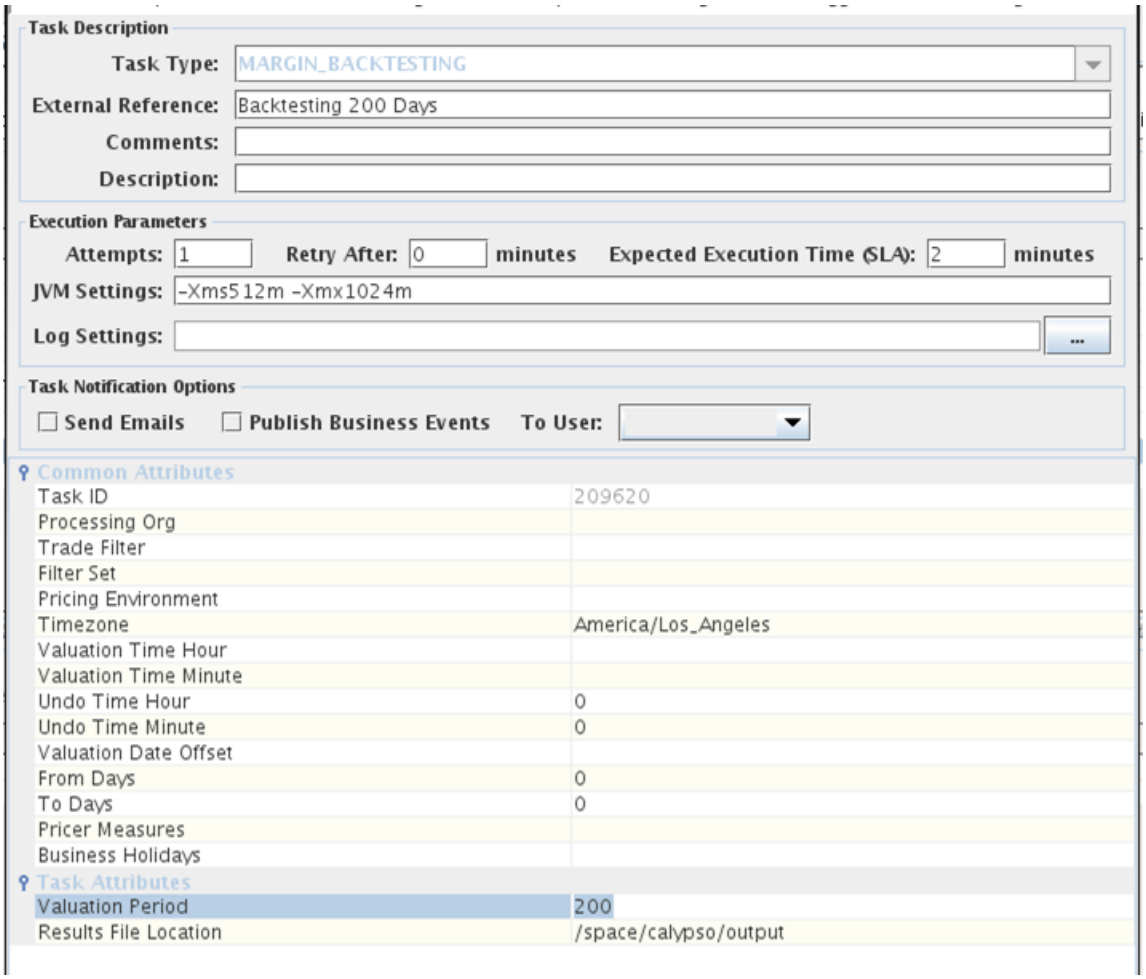
- discoveryServer.sh/bat
- gatewayServer.sh/bat
- sharedServices.sh/bat

All microservice framework applications should use the API gateway URL *(http://localhost:8800 or https://localhost::8801 if using SSL)*.

For example, to access the margin UI using SSL, user should use *https://localhost:8801/margin-ui* instead of *https://localhost:9141/margin-ui*.

9.1.2 Backtesting Process

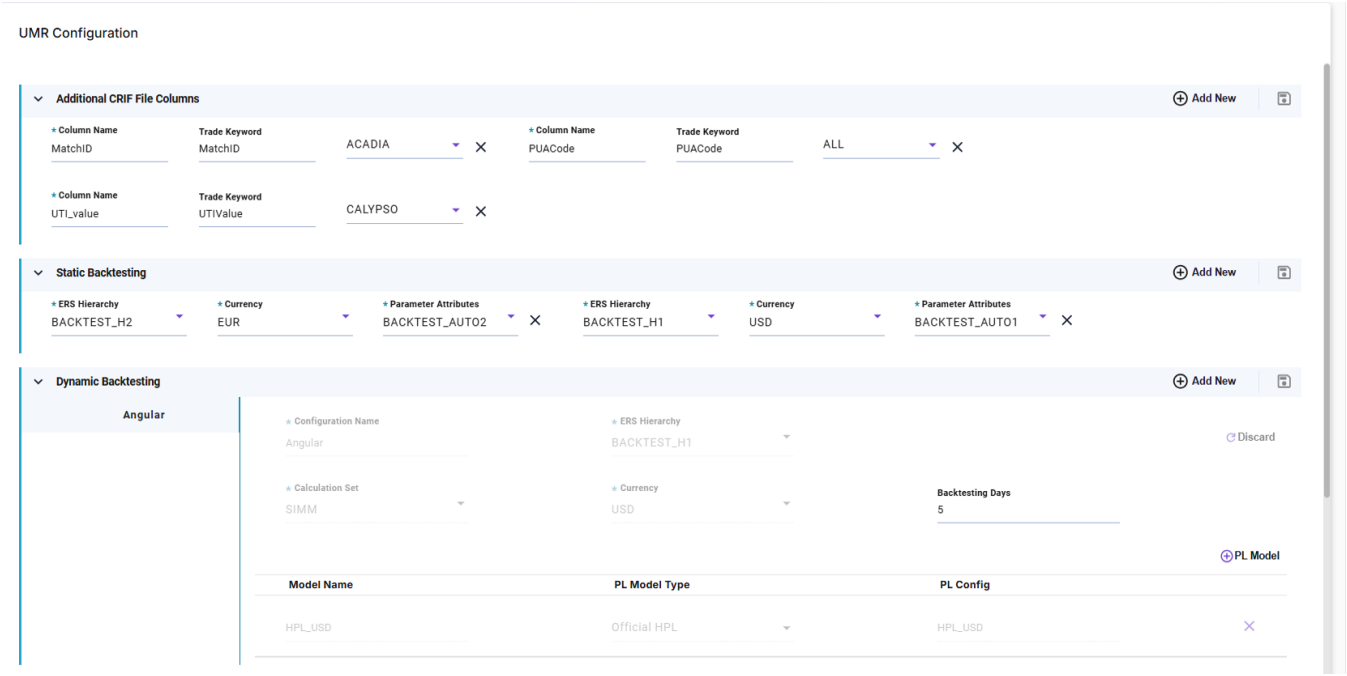
Static backtesting can be performed in calypso using the MARGIN_BACKTESTING scheduled task –



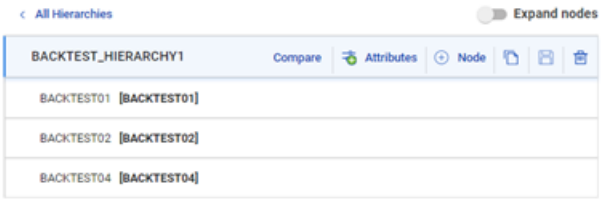
The user will need to have access to the backtesting service to perform this function.

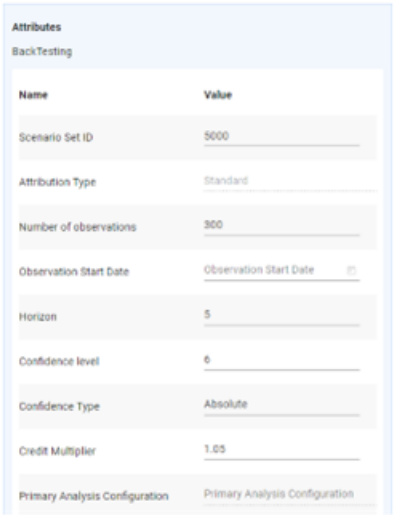
The backtesting is done at the margin account level where the portfolio is held static on a single date and we compare the IM Exposure on this date with 1 year of stressed PnL vectors and 3 recent years of historical PnL vectors (i.e. 1+3 ISDA Standard Backtest). The users will need to set up the ERS parameters to calculate the historical PL vectors. The scheduled task will then compare these PL vectors with the IM exposure for the selected valuation date for the selected valuation period and the results will be displayed in the Margin UI as well as in the form of a csv file.

The configuration can be defined in Margin UI as below –

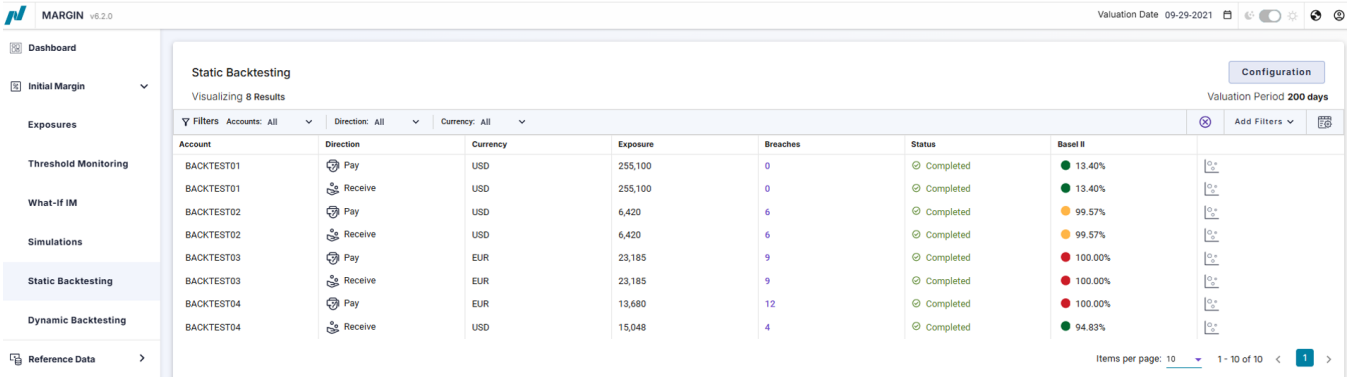


The users can configure multiple ERS Hierarchy, currency and ERS parameter set combinations. The ST will run for all the saved configurations.

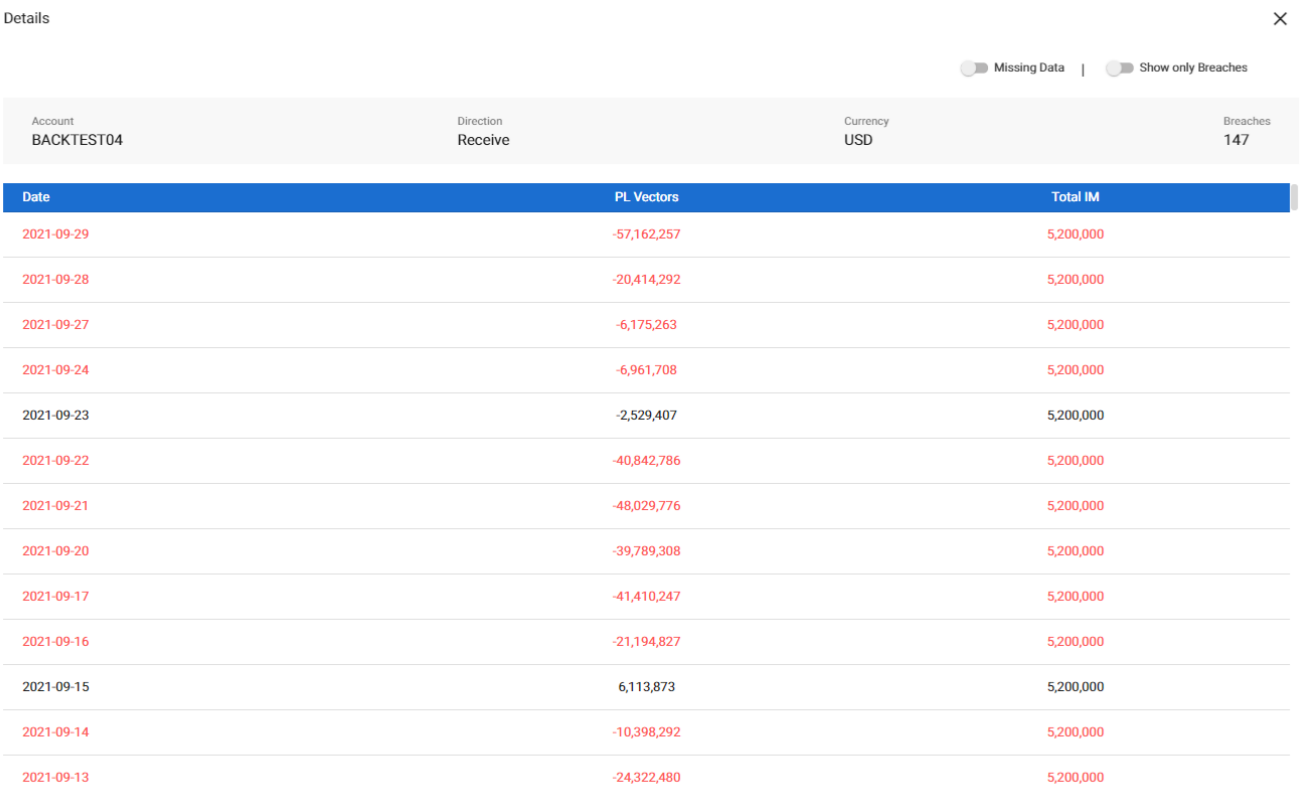




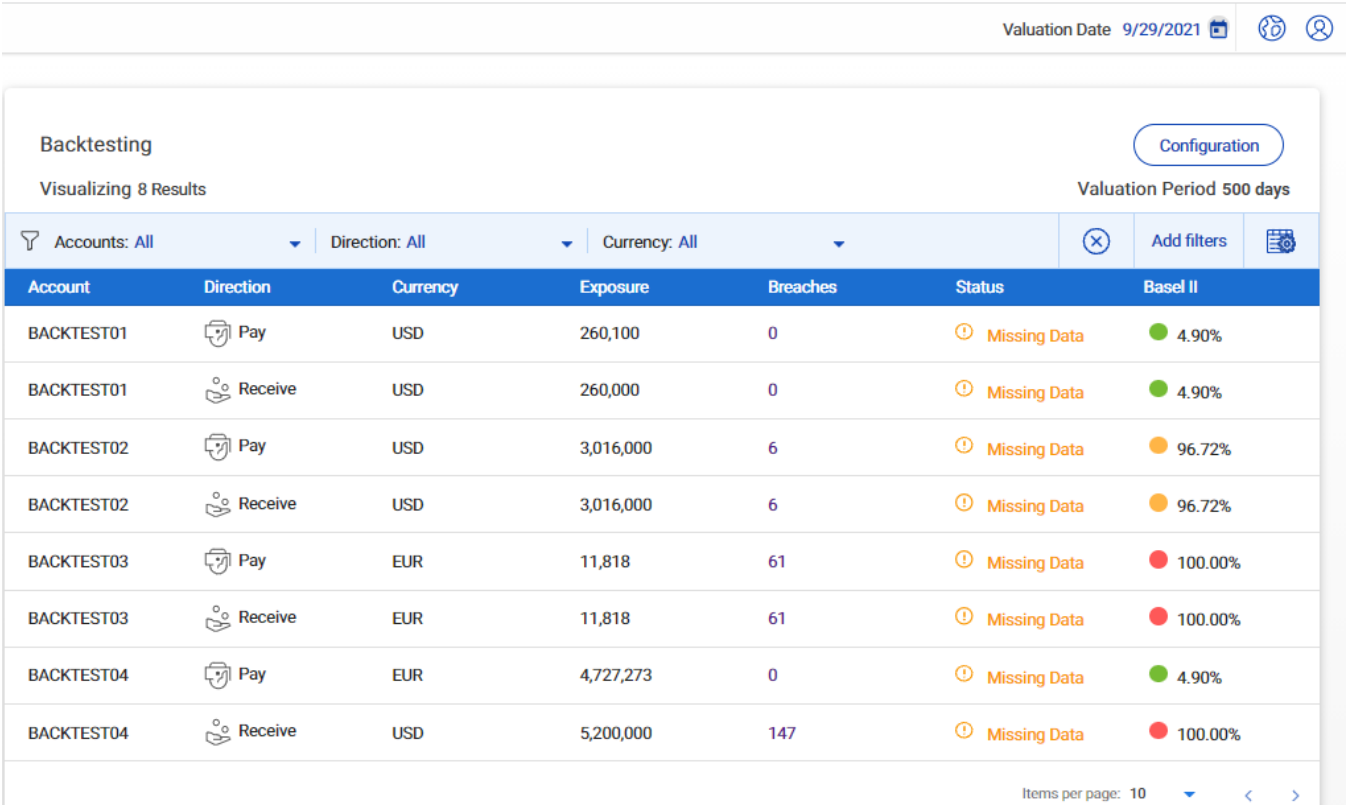
The users can then select valuation period and output file location in the ST and run for a selected valuation date. The historical PL vectors for the selected valuation period will be compared to the IM exposure of the valuation date and if the PL vectors are more than IM, it'll be reported as a breach. The output in the Margin UI will show the results as below.

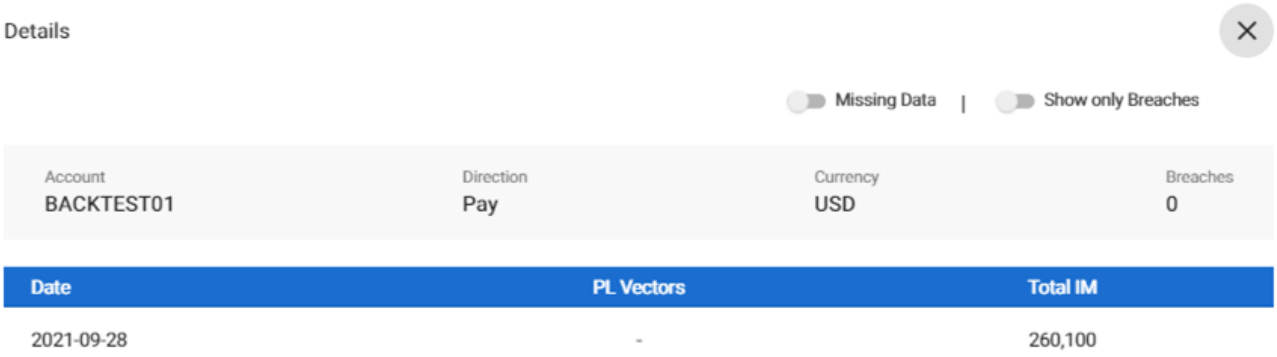


The number of breaches can be further drilldown into a complete list of PL vectors and IM exposure where the users can see the breaches in Red and filter the output for only breaches as below.



If PI vectors or IM for a certain date are missing, the results will show 'Missing Data' and the user can filter those rows in the drill down pop-up. For example, When IM results are available, but PL vectors results are not, the results will show Missing Data with empty PL vectors –

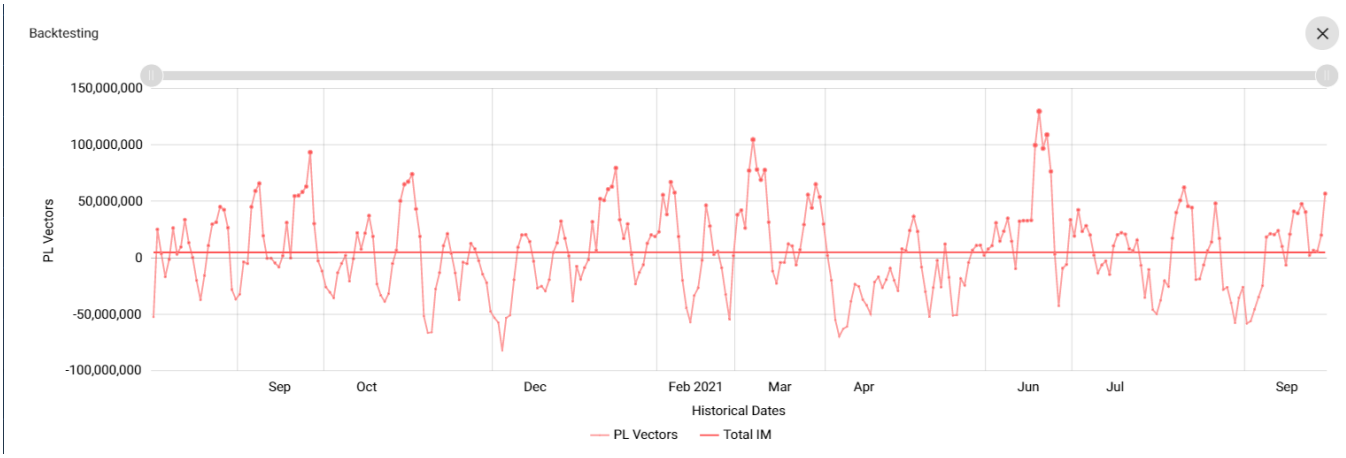


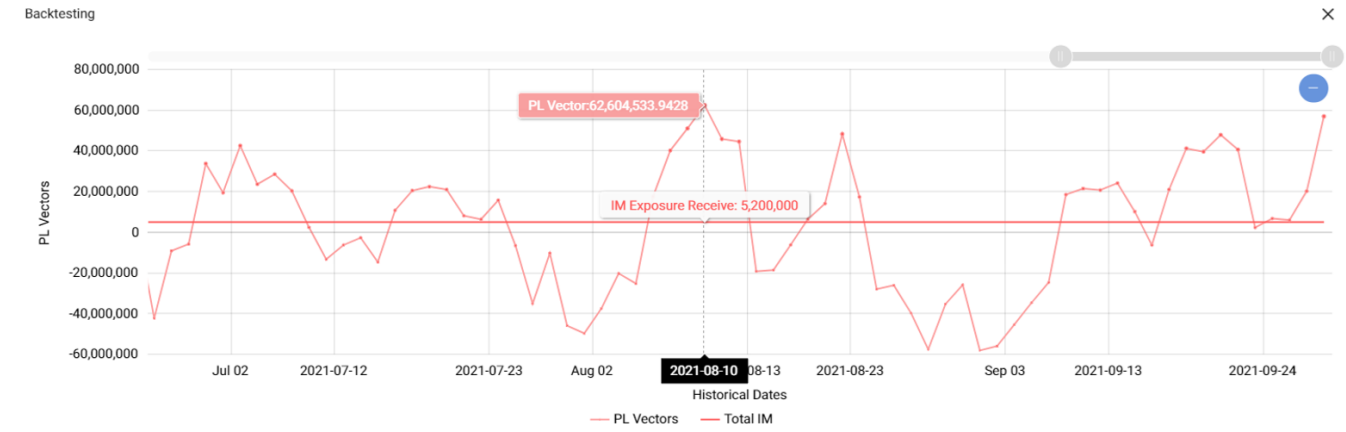


The UI also shows the Basel II percentages and traffic lights based on the cumulative probabilities. When Basel II results is green when it's less than 95%, is amber when it's between 95% and 99.99%, is red when it's > 99.99%.

The breach results are also available in the form of a graph where x-axis shows the historical dates, Y – axis shows PL vectors and all PL vector points plotted above the IM exposure line are breaches. The users can zoom in using the

scroll bar above to look at the exact breaches and the dates. The date, PL vector amount and IM exposure can also be viewed by hovering over each point.





The scheduled task also generates a csv file (Example - UMRBackTesting_ALL_2021-09-29) with the Backtesting output including the drilldown into breaches –

Account	Direction	Currency	Exposure	Breaches	Date	PL Vector	IM Exposu	Basel II
BACKTEST02	Receive	USD	3016000	6				99.57%
					9/29/2021	2939988	3016000	
					9/28/2021	4622789	3016000	
					9/27/2021	3263850	3016000	
					9/24/2021	1703314	3016000	
					9/23/2021	1616426	3016000	
					9/22/2021	1198443	3016000	
					9/21/2021	1246944	3016000	
					9/20/2021	856288.9	3016000	
					9/17/2021	1711857	3016000	
					9/16/2021	789562.8	3016000	
					9/15/2021	-254546	3016000	
					9/14/2021	-1177464	3016000	
					9/13/2021	348493.5	3016000	
					9/10/2021	391589.7	3016000	
					9/9/2021	479599.8	3016000	
					9/8/2021	449200	3016000	
					9/7/2021	924934.1	3016000	
					9/6/2021	44752.22	3016000	
					9/3/2021	-697491	3016000	
					9/2/2021	-1441274	3016000	

9.2 Dynamic Backtesting

UMR Dynamic Backtesting is based on the existing Market Risk Official Backtesting Service.

Please refer to Calypso Backtesting Service documentation for details.

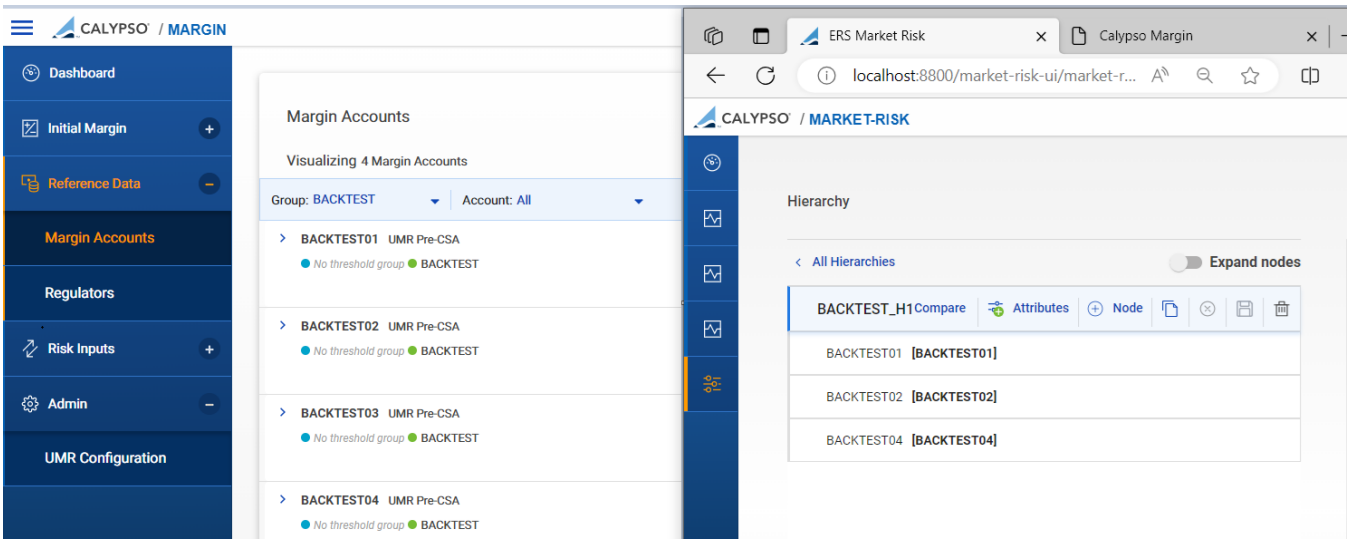
The Backtesting service allows testing different Models (Var, Param Var, IM) against a Reference (APL or HPL), based on a range of dates.

ⓘ Note: More information on Actual P&L and Hypothetical P&L analysis could be found in Calypso Regulatory P&L documentation.

Dynamic Backtesting allows to compare one-day SIMM value to one-day Actual or Hypothetical P&L moves on the Margin Account level. The recommended observation period is the most recent twelve-month period available from the reference date but should not be less than 250 days. Any Backtesting assessment with fewer than 200 observations would be considered invalid.

To obtain reliable results, the user must respect certain configuration logics, mostly driven by the need to combine multicurrency calculations of different frameworks (IM, HPL/APL).

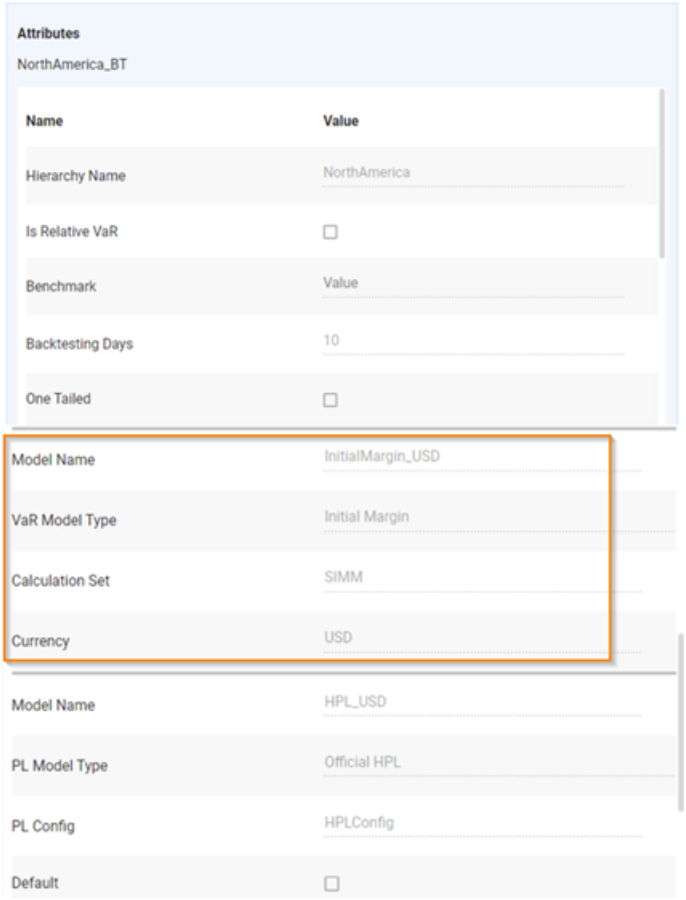
First step is the ERS hierarchy creation, where the names of its nodes must match exactly the names of the Margin Accounts. The recommendation is to include all the Margin accounts/Directions of the same currency within the same hierarchy. In case of asymmetric accounts, the user will have to save two separate BT configurations for the pay and receive currency. The Backtesting results will be generated for all accounts linked to the configured hierarchies, using the provided ccy and Calculation set.



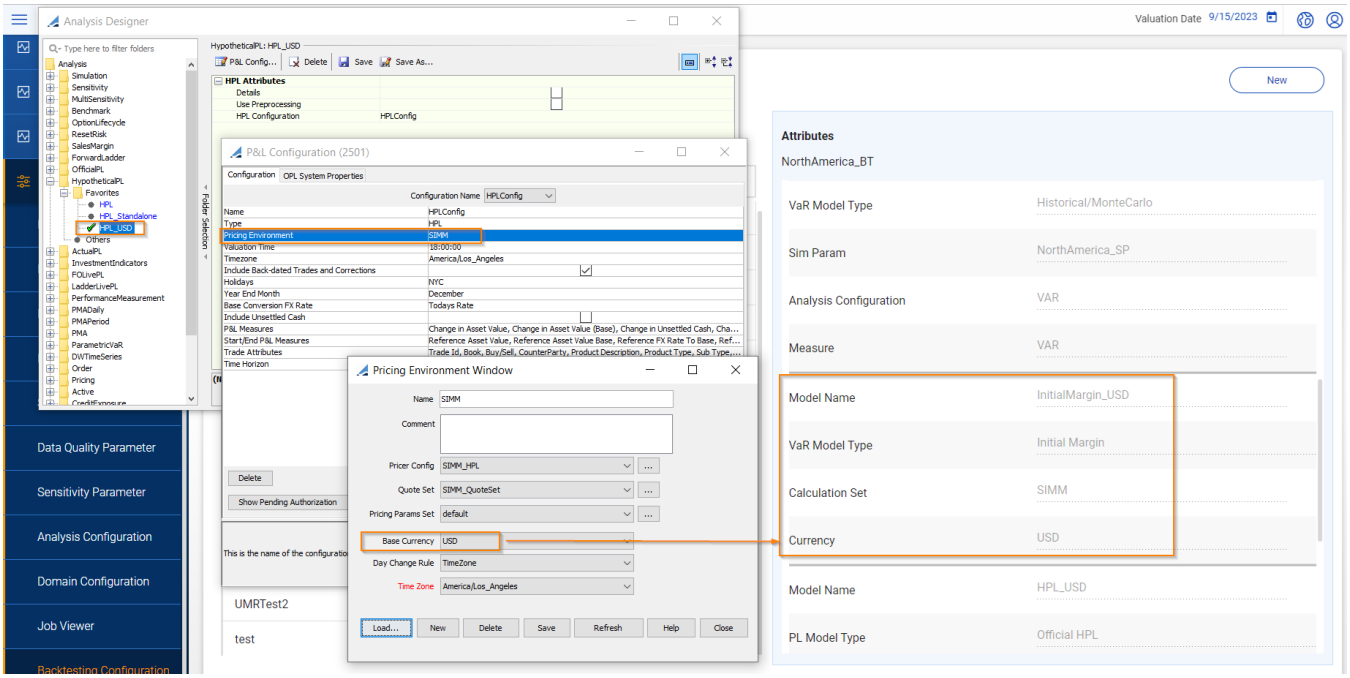
Next step is the Backtesting Configurations creation (currently in the Market Risk Web UI). A new environment property “IM_BACKTESTING_IN_MARKETRISK” must be set to “true” to make a new Var Model Type = Initial Margin available. When set to False, the feature will be disabled. The default value is False.

When “Initial Margin” Type is selected , a "Calculation Set" (that is defined in Margin UI), a “Currency” and a “Model Name” should be defined by the user.

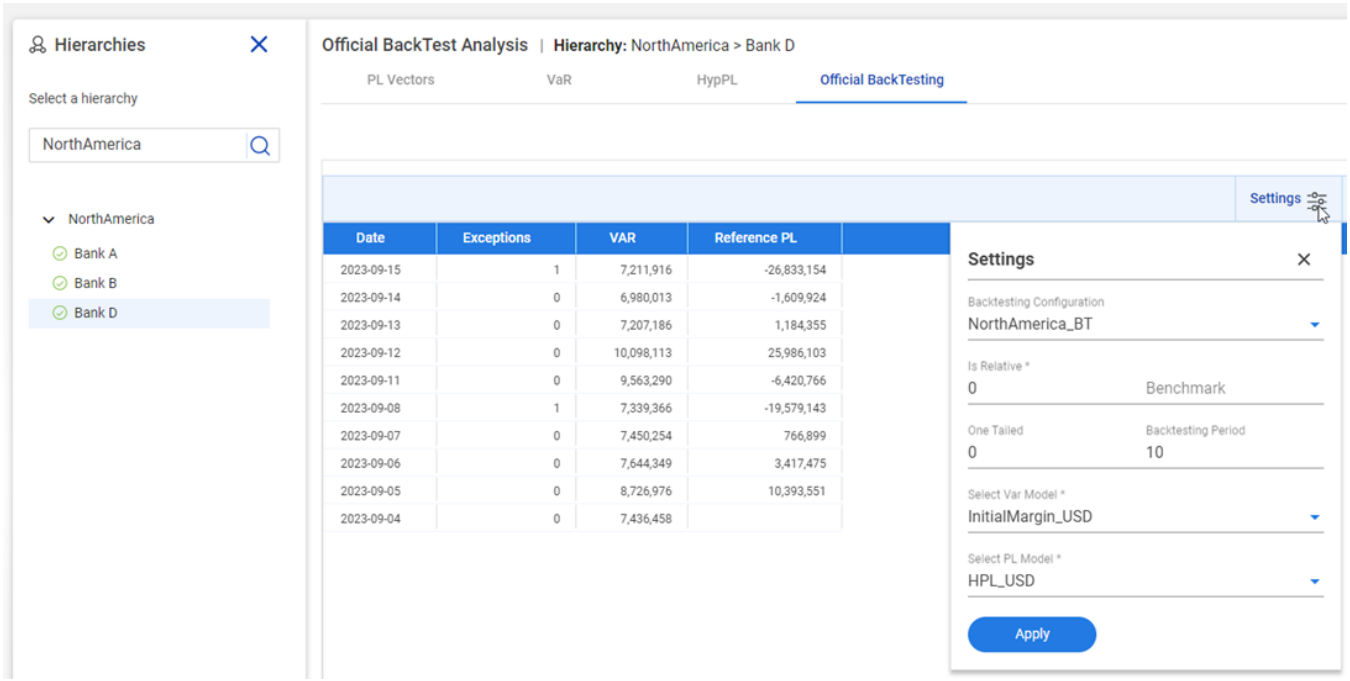
It is expected to have only one Initial Margin model per Backtesting Configuration/Hierarchy/Currency/Calculation Set.



For each Backtesting Configuration several P&L models of types HPL and APL can be defined . To obtain consistent results, the Pricing Environment's base currency from HPL/APL configuration must match the Currency from the Initial Margin model (HPL/APL should be configured in different pricing environments per currency, depending on the Margin Account currency).



The results are displayed in the Official Backtesting of the Market Risk Web UI.



On the above example the VaR IM Model “InitialMargin_USD” is compared with the HPL Reference model “HPL_USD”. Exception column reflects the presence of breaches for each valuation date of the backtesting period.

10. Technical Documentation

10.1 Installation

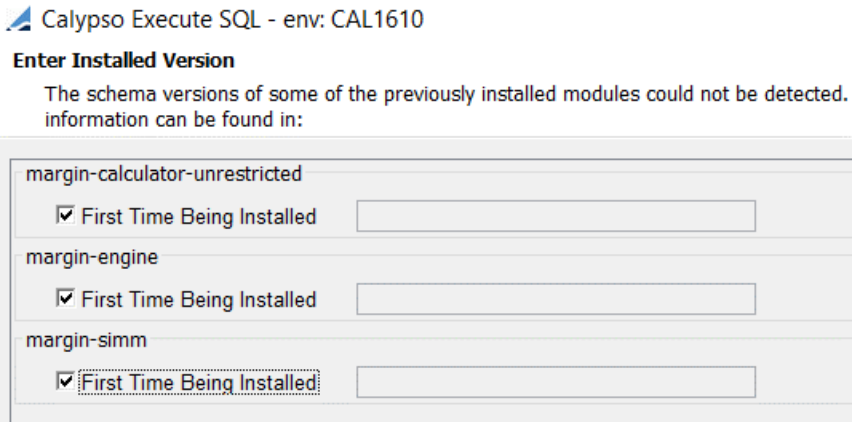
The Margin Calculators are installed as part of the Calypso Installer.

In addition to core Calypso, you need the following modules:

- Collateral
- Market Risk
- Margin Engine (If using MarginEngineSIMM for WhatIf IM and Intraday Trades Processing)

When you run Execute SQL, all necessary data files will be automatically loaded.

You may be prompted to confirm the installation of some margin modules for the first time.



10.2 API Gateway Support

The Margin Server by default, requires the API Gateway to be running. This is used by both the Margin Web UI and Margin scheduled tasks.

The API Gateway provides unified access to Calypso REST APIs.

▶ See the Calypso Install Guide for more informatioimage268n on API Gateway.

10.3 Application Components to Start

The required processes to startup an environment to run margin are the following in order:

- authServer

- discoveryServer
- gatewayServer
- eventServer
- sharedServices
- dataServer
- dataGridNode (required if running ersRiskServer)
- dataGridEnabledCalculator (required if running ersRiskServer)
- dispatcher
- ersRiskServer (required when using ERS account hierarchy or Backtesting. If using account groups this service is not needed)
- engineServer (lifecycle engine is included here)
- calypsoMessagingServer (must be started to publish events i.e. saving accounts)
- marginServer (the margin web services, among others, are contained here)
- scheduler (to run the scheduled tasks)
- UI's (Navigator or the WebUI)

10.4 Environment Properties

10.4.1 Margin Calculator

MARGIN_CLOUD_RESULTS_TIMEOUT – Defines the max amount of time (in milliseconds) to wait for margin-results from the margin cloud services, default value is 10000.

MARGIN_CLOUD_HTTP_CONNECT_TIMEOUT – Defines the max amount of time (in milliseconds) to wait while attempting to connect the margin cloud services, default value is 30000.

MARGIN_CLOUD_HTTP_READ_TIMEOUT – Similar to MARGIN_CLOUD_RESULTS_TIMEOUT, but the read timeout for everything else other than margin results, default value is 30000.

10.4.2 ISDA SIMM Version

The environment property ISDA_VERSION can be set to switch the calculation methodology from ISDA SIMM 2.6 to ISDA SIMM 2.7.

To set the calculation model to 2.7, set ISDA_VERSION=2_7

It defaults to "2_6" if not set, which maps to ISDA SIMM 2.6 version.

Adenza can provide the users access to the full ISDA unit test cases for the latest ISDA version. The two files that can be shared are:

- file 1: account_27_10d.csv -> the account definition for all tests
- file 2: riskFactor_27_10d.csv -> the risk factors for all tests

All accounts can be added to the ISDA-BENCHMARK Group. It should be possible to run the MARGINCALCULATOR scheduled task for this Group only. These files are generated for QA purposes and will be available upon demand.

10.4.3 Margin Services Setup

Define the environment property *MARGIN_APP_URL as:*

http://<calypso services host name>:<calypso services port number>/margin-ui/

The default is http://localhost:8800/margin-ui or http://localhost:9140/margin-ui (if API gateway disabled).

The scheduled task MARGIN_INPUT requires access to the web services.

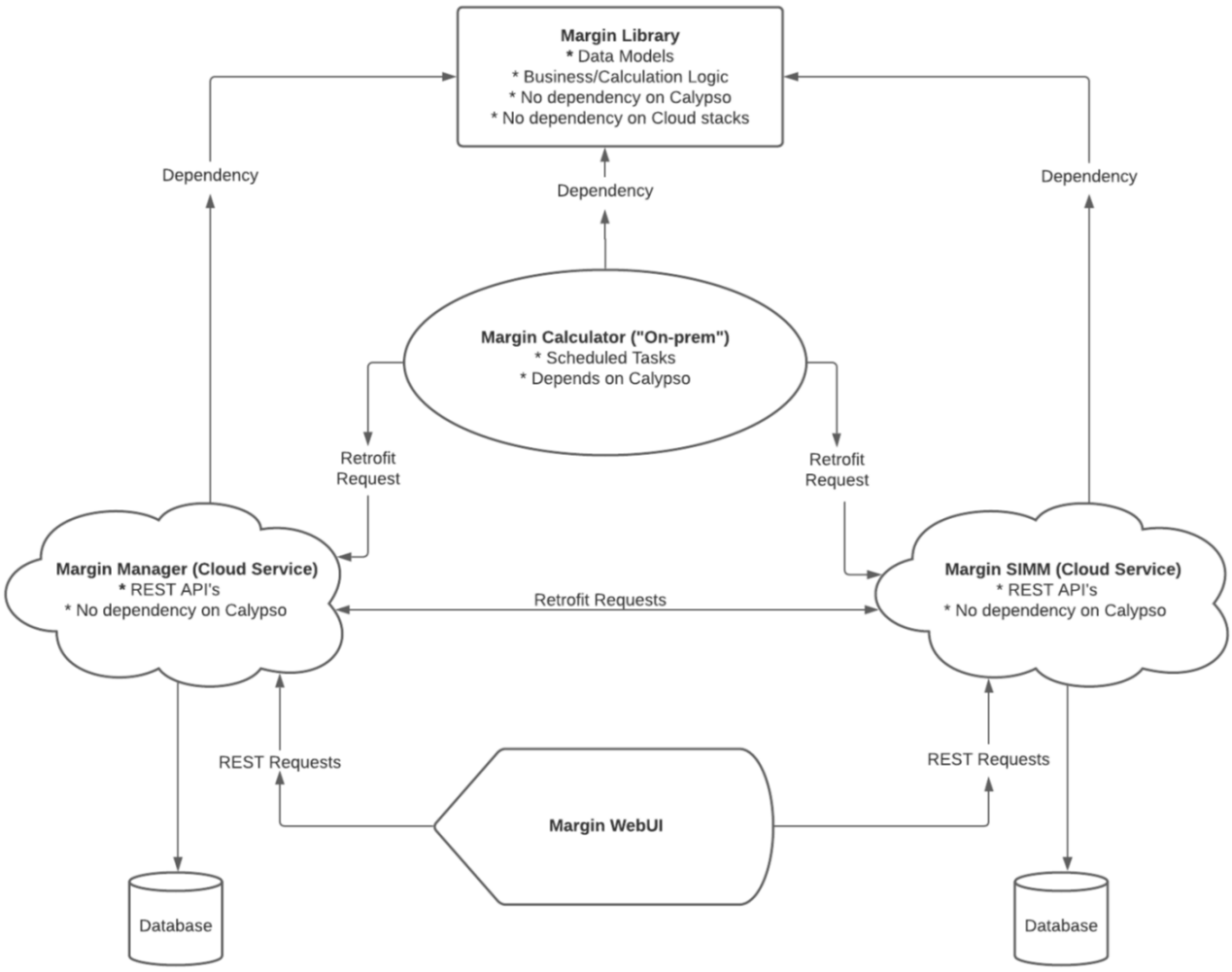
It is **mandatory** to define a Calypso user with *MARGIN_ADMINRole* permission and set this user in the environment properties.

10.4.4 Navigator Link

A navigator link or tile can be configured which will launch a web browser and direct the user to the Margin UI using the value of environment property *MARGIN_APP_URL*.

Set the action as *MarginBrowser*.

10.4.5 Architecture



Module Information

Service/Module	On-prem / Cloud	Patchable	Main Responsibilities	SQL (Schemas)	Comments
mgncl-javalib	Both	No	Margin shared code, including: Data models Calculator Implementations (SIMM, OTC, etc.)	No	No dependency on core calypso Dependents are margin-calculator, margin-simm, and margin-manager
margin-manager	Cloud	Yes	Backend for:	Yes	Depends on mgncl-

Service/Module	On-prem / Cloud	Patchable	Main Responsibilities	SQL (Schemas)	Comments
(aka margin-srvc)			margin-accounts margin-results static data (product-mapping, domains, etc.)		javalib Makes REST requests using retrofit to margin-simm-srvc
margin-simm (aka margin-simm-srvc)	Cloud	Yes	Backend for: risk factors SIMM calculations what-if calculations	Yes	Depends on mgncl-javalib Makes REST requests using retrofit to margin-manager
Margin-calculator	On-prem	Yes (as jars in the on-prem lib directory)	Calypso on-prem specific layer for interacting with other modules/services inluding margin-simm and margin-manager. Responsibilities include: MARGIN_INPUT ST drives the risk analysis post accounts to margin-manager post RF's to margin-simm MARGIN_CALCULATOR ST triggers the margin-simm calculations	Yes	Most of the pre-cloud SIMM functionality has moved out of this module, and into mgncl-javalib/margin-manager/margin-simm

10.4.6 Logging

Margin Calculator

Scheduled Task MARGIN_INPUT

- "ScheduledTask"
- "MARGIN_INPUT"

- "com.calypso.margin.simm.service.SIMMCloudMarginInpurService"
- "Margin"
- "TYPESIMMMarginCalculator"
- "TYPEScheduleMarginCalculator"

Scheduled Task MARGIN_CALCULATOR

- "ScheduledTask"
- "MarginCalculator"

Margin Manager

- "com.calypso.cloud.margin.account.service.MarginAccountServiceImpl"
- “com.calypso.cloud.margin.account.service.SIMMRegulatorParameterServiceImpl”
- “com.calypso.cloud.margin.isda.service.ISDAStaticDataService”
- “com.calypso.cloud.margin.messaging.MarginResultTreeConsumer”
- “com.calypso.cloud.margin.fx.FXService”
- “com.calypso.cloud.margin.fx.DefaultPricingClient”
- “com.calypso.cloud.margin.collateral.client.DefaultMarginCollateralClient”
- “com.calypso.cloud.margin.acadia.service.AcadiaIMEMIntegrationServiceImpl”
- “com.calypso.cloud.margin.acadia.messaging.AcadiaMarginResultsConsumer”
- “com.calypso.cloud.margin.acadia.client.DefaultAcadiaClient”
- “com.calypso.cloud.margin.acadia.configuration.AcadiaConfiguration”
- “com.calypso.cloud.margin.legalentity.client.DefaultLegalEntityClient”
- “com.calypso.cloud.margin.CollateralServiceConfiguration”
- “com.calypso.cloud.margin.results.service.MarginResultServiceImpl”
- “com.calypso.cloud.margin.results.service.WhatIfExposureServiceImpl”
- “com.calypso.cloud.margin.simm.client.DefaultMarginSIMMClient”

Margin SIMM

- “com.calypso.cloud.margin.calculation.consumer.AccountCalculationRequestConsumer”
- “com.calypso.cloud.margin.calculation.service.AccountCalculationRequestServiceImpl”
- “com.calypso.cloud.margin.collateral.CollateralServiceConfigurationImpl”
- “com.calypso.cloud.margin.legalentity.client.DefaultLegalEntityClient”

- “com.calypso.cloud.margin.simm.collateral.client.DefaultMarginCollateralClient”
- “com.calypso.cloud.margin.simm.service.AbstractSIMMCloudService”
- “com.calypso.cloud.margin.simm.service.CalculationRequestServiceImpl”
- “com.calypso.cloud.margin.simm.service.FXService”
- “com.calypso.cloud.margin.simm.service.RiskFactorServiceImpl”
- “com.calypso.cloud.margin.simm.service.SIMMAccountCalculationServiceImpl”
- “com.calypso.cloud.margin.simm.service.SIMMMarginCalculationServiceImpl”
- “com.calypso.cloud.margin.simm.service.WhatIfCalculationServiceImpl”

Log Locations

Scheduler

When running the on-prem scheduled tasks in the margin-calculator you can find the logs in the Calypso home directory. The log that is typically of interest shows up in the following format once the scheduled task has been executed:

CalypsoScheduler_<your_environment_name>_<calypso_version>.log

Margin Server

When running Margin Server you can find the logs in the Calypso home directory. The log that is typically of interest shows up in the following format once the scheduled task has been executed:
margin-service_marginserver_<your_environment_name>_<calypso_version>.log

Note: The same can be done for other services/processes (i.e. dataserver, engineserver, etc.)

10.5 Margin Messages

For certain actions performed by margin, there will be events published to the messaging server with a topic name. This standard practice typically when persisting any of our objects, in the case a “consumer” would like to perform some post processing after the persisting. For example:

Calculate margin results

Persist the margin results

Publish the event containing the results with a topic name (“margin_results”). *See annotation @MessageEmitter(topic =“some_topic”, payloadType = “some_class.class”)...*

Consume the message containing these results with a class annotated with the topic name it wants to consume. *See annotation @MessageConsumerService(topic = “some_topic”, group = “some_group”, payloadType = “some_class”)...*

Message Topics

- “margin_results”*
- “what_if_margin_results”
- “results_topic_im_monitoring”*
- “margin_product_mappings”
- “margin_accounts”
- “imem”*
- “backtesting”*
- “margin_account_requests”*
- “margin_aana_po_requests”*
- “margin_aana_calc_result”

NOTE:Means this topic has an existing consumer in either margin-simm or margin-manager.