



# Nasdaq Calypso

## CCP OTC Margin

Version 18

Revision 5.0

November 2024

Approved

Copyright © November 2024, Nasdaq, Inc. All rights reserved.

All content in this document is owned, or licensed, by Nasdaq, Inc. or its affiliates ('Nasdaq'). Unauthorized use is prohibited without written permission of Nasdaq.

While reasonable efforts have been made to ensure that the contents of this document are accurate, the document is provided strictly "as is", and no warranties of accuracy are given concerning the contents of the information contained in this document, including any warranty that the document will be kept up to date. Nasdaq reserves the right to change details in this document without notice. To the extent permitted by law no liability (including liability to any person by reason of negligence) will be accepted by Nasdaq or its employees for any direct or indirect loss or damage caused by omissions from or inaccuracies in this document.

### Document History

Revision	Published	Summary of Changes
1.0	February 2024	First revision for version 18
2.0	April 2024	Updates for version 18 monthly release
3.0	May 2024	Updates version 18 monthly release - Added "Exclude Product Family" to Variation Margin Config
4.0	August 2024	Updates for version 18 monthly release – Added "Zero VM measures on CCY Holiday" to Variation Margin Config
5.0	November 2024	Updates for version 18 monthly release – Updated user interface screenshots

**This document describes how to install, configure, and run CCP OTC Margins**

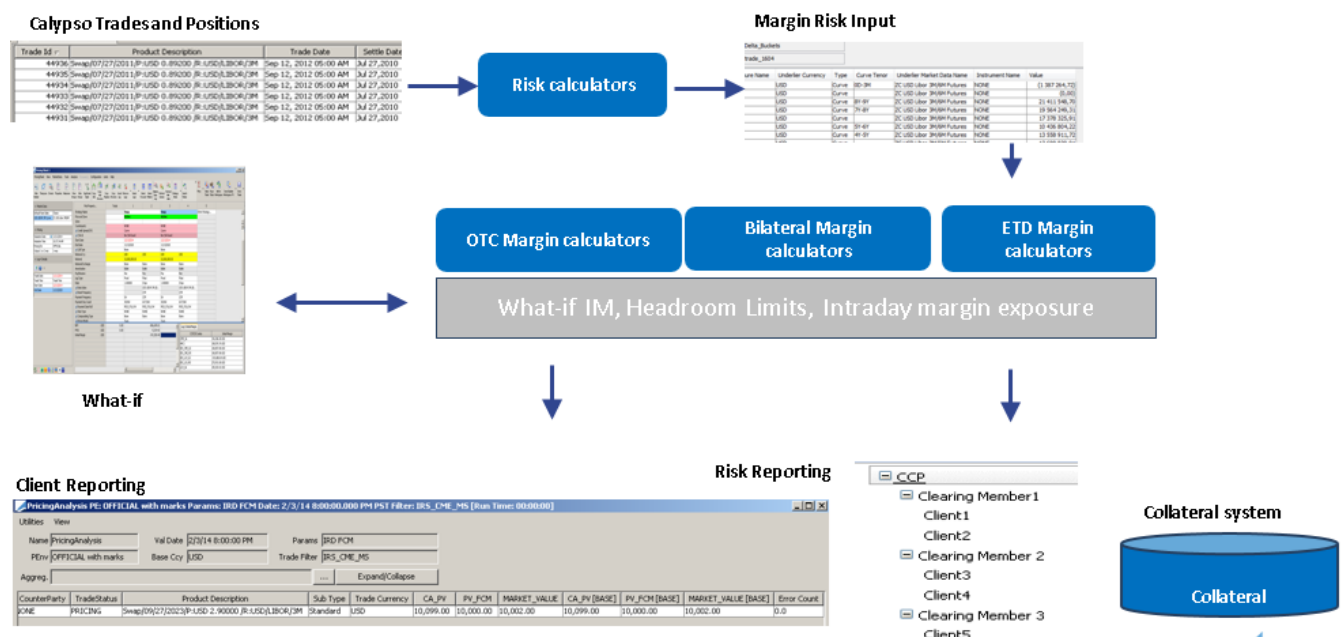
# Table of Contents

<b>1. OTC Margin Overview</b>	<b>5</b>
<b>2. OTC Margin Installation</b>	<b>11</b>
<b>3. OTC Margin CCP Setup</b>	<b>13</b>
3.1 Trade Workflow	13
3.1.1 CCP Trade Workflow	13
3.1.2 New Trades Submitted to Margin Engine	13
3.1.3 Existing Trades Resubmitted to the Margin Engine	13
3.1.4 Messages Received via the Incoming Feed/Feed Translator	14
3.2 Limit Check	17
3.2.1 Environment Properties	17
3.2.2 Domain "MarginEngine"	18
3.2.3 Limits	21
3.2.4 Margin Controller Engine	22
3.2.5 Update Manager Engine	23
<b>4. OTC Margin Process Setup</b>	<b>25</b>
4.1 Trade Filters	25
4.2 Market Risk Hierarchies	25
4.3 Data Grid Configuration	25
4.4 End of Day Batch	27
4.5 Market Data	29
4.6 LIQUIDITY_RISK_INPUT Scheduled Task	29
4.7 MARGIN_OTC_CALCULATOR Scheduled Task	30
4.8 MARGIN_OTC_VM_CALCULATOR Scheduled Task	32
4.8.1 Variation Margin Configuration	32
4.8.2 PAI Configuration	32
4.8.3 Scheduled Task	34
4.9 Email Alert	40
<b>5. OTC Margin Collateral Setup</b>	<b>44</b>
5.1 Collateral Management Engine	44
5.2 Margin Call Contracts	45
5.3 Importing External Collateral Amounts	45
5.4 Collateral Workflow	46
5.5 Steps for Collateral Withdrawal and Limit Check	48

<b>6. OTC Margin Sample Process</b>	<b>51</b>
6.1 Running the Servers	51
6.2 Computing the Margins	51
6.2.1 Create a Batch Configuration	51
6.2.2 Populate the Data Grid	52
6.2.3 Compute the Sim Analysis	52
6.2.4 Compute the Margins	54
6.2.5 Margin Engine Monitoring	54
6.3 Limit Check Process	57
6.3.1 Initializing the Limit Check Process	57
6.3.2 Starting the Limit Check Process	58
6.3.3 Limit Check Monitor	58
6.3.4 Trade Blotter	59
<b>7. OTC Margin Headroom Check Lifecycle</b>	<b>61</b>
7.1 Configuration	61
7.2 Trade Lifecycle Events	64
7.3 MARGIN_ENGINE_CONTROLLER Scheduled Task	66
7.4 Headroom Check: Post-trade Novation Events	67
7.4.1 Backloading	68
7.4.2 Portfolio Transfer	71
7.4.3 Portfolio Compression	73
7.5 Margin Report	76
<b>8. OTC Margin What If API</b>	<b>82</b>

# 1. OTC Margin Overview

After all the market data and shifting scenarios have been imported by the various market data scheduled tasks, you can compute initial margins using the Margin Engine.



## Intraday incremental margin calculation, limit/headroom check, and clearing novation (INCREMENTAL MARGIN section below)

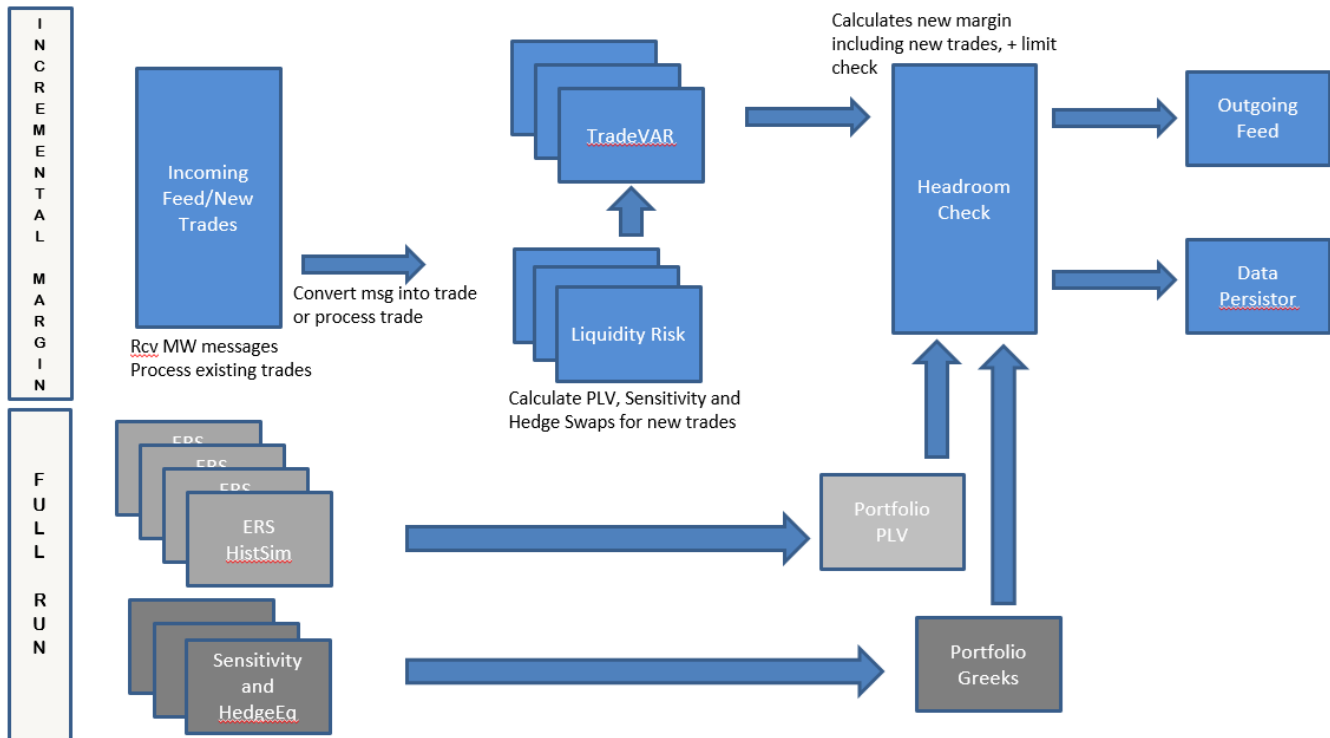
- In preparation for the clearing novation limit check and incremental margin calculation, at the start of the day, PL Vectors are loaded in memory for all portfolios in the selected hierarchy
- SEF or MW proxy messages are injected in Calypso via the “Message Injector”, and validated
- Messages are paired in the “Trade Pairing” Engine
- Messages are translated into trade objects by the “Feed Translator”
- The PL Vectors for each new trade are calculated by the “Trade VAR” engine
- The incremental Margin Exposure for each new trade is calculated by the “Headroom Check” engine
- The updated Margin Exposure (including the incremental margin calculated in step f) is compared against the Initial Margin and Headroom limits. If the limits are breached, trades are rejected; if not trades are accepted for clearing. This process is handled by the “Headroom Check” engine.
- Accepted trades are booked between the CCP and each Clearing Member. Trades attributes are created to track information related to the clearing channel, and the clearing limit check.
- In parallel, data related to margin calculation and limit check are persisted in the database by the “Data Persistor”. An example of the persisted data is provided below.

## End of day Margin Calculation (FULL RUN section below)

As part of the end of day process, the margin calculation is performed by running HistSim Analysis, using a DataGrid and a Calculation Grid.

The margin calculation process is decomposed into 4 steps:

- Using the Data Grid, hydrate the market data and historical scenarios for the selected hierarchy of portfolios.
- Using the Calculation Grid, calculate the PL Vectors and Initial Margin
- Save the results in the database
- The results will be loaded in memory for intraday incremental margin calculation, at the start of the day, and each time a market data catch up is required.
- Results are also available in a csv files, and can be saved as PL Marks (using the Scheduled task MARGIN\_OTC\_VM\_CALCULATOR)



Sample market data setup for margin estimation is described below.

The general process for accepting or rejecting incoming messages is the following:

- The process allows users to check whether they have enough limits to accept a trade request for clearing.
- The process is an intraday process, which calculates and stores PL Vectors in memory, for a fast estimate of the corresponding Initial Margin, and Limit Check. It is based on an incremental update of the initial margin.

- The limits consider the Initial Margin Exposure, the collateral and the limits defined at the CCP Margin Account and/or the client level.
- The end-to-end process is the following:
  - As part of the End of Day process the current Initial Margin exposure is calculated for each portfolio. At the start of the day, those exposures are loaded in memory (in the form of PL Vectors).
  - Messages are received from the CCPs: Request for Consent, Cleared, Rejected, Terminated, Compressed. Those messages are converted into transient trades when possible, and sent to the limit layer for processing.
  - The process is organized around 3 steps: P&L Vector calculation for new trade (in Trade VAR), incremental IM estimation and limit check.
  - Once the limit check is complete, the results are sent to the Persistor, which will save the trades to the database. Trades are saved in a LIMIT\_APPROVED or LIMIT\_REJECTED trade status.
  - If the messages don't include enough information for the limit check, the messages will be sent to the Persistor to be mapped to existing trades, and resent to the limit check. This is done via the Update Manager.
- The trade workflow can be configured to either reject the trades automatically, send them back for a new limit check, or manual approval.

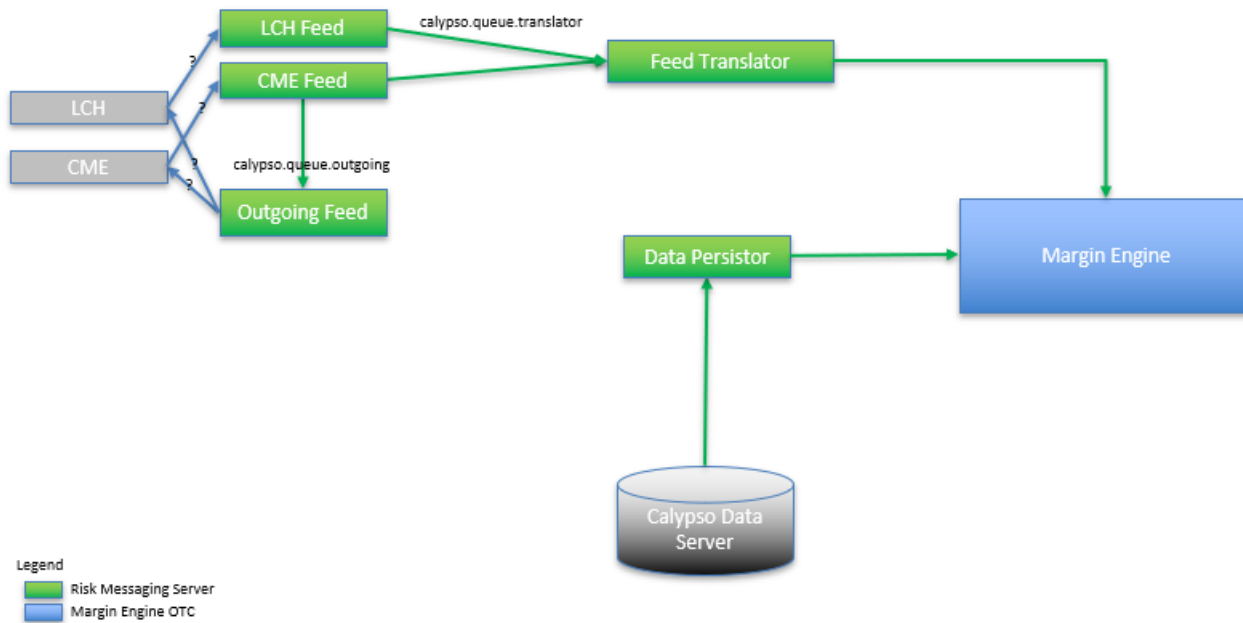
If the collateral positions are modified intraday, a set of processes allow updating the limit check accordingly.

If new limits are imported intraday, the limit check will take the updated limits into account intraday.

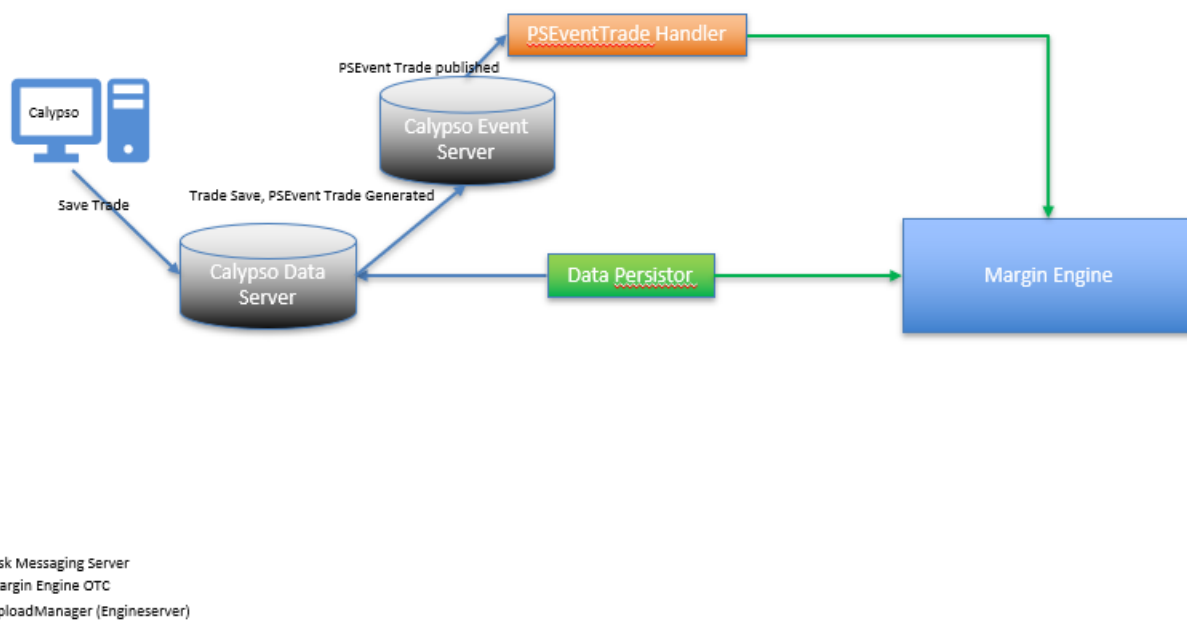
The limit check does not process messages in a sequential order.

## ***FCM and CCP Architecture Overview***

## Margin Engine – Flow - FCM

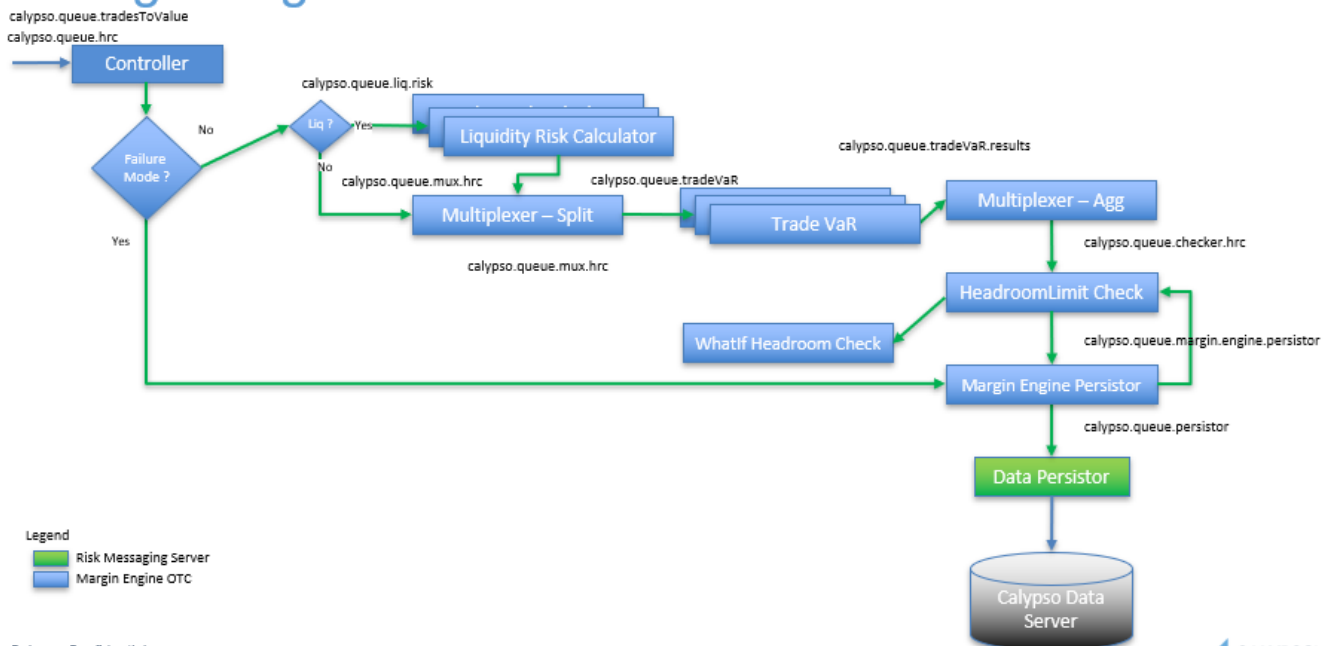


## Margin Engine – Flow - CCP

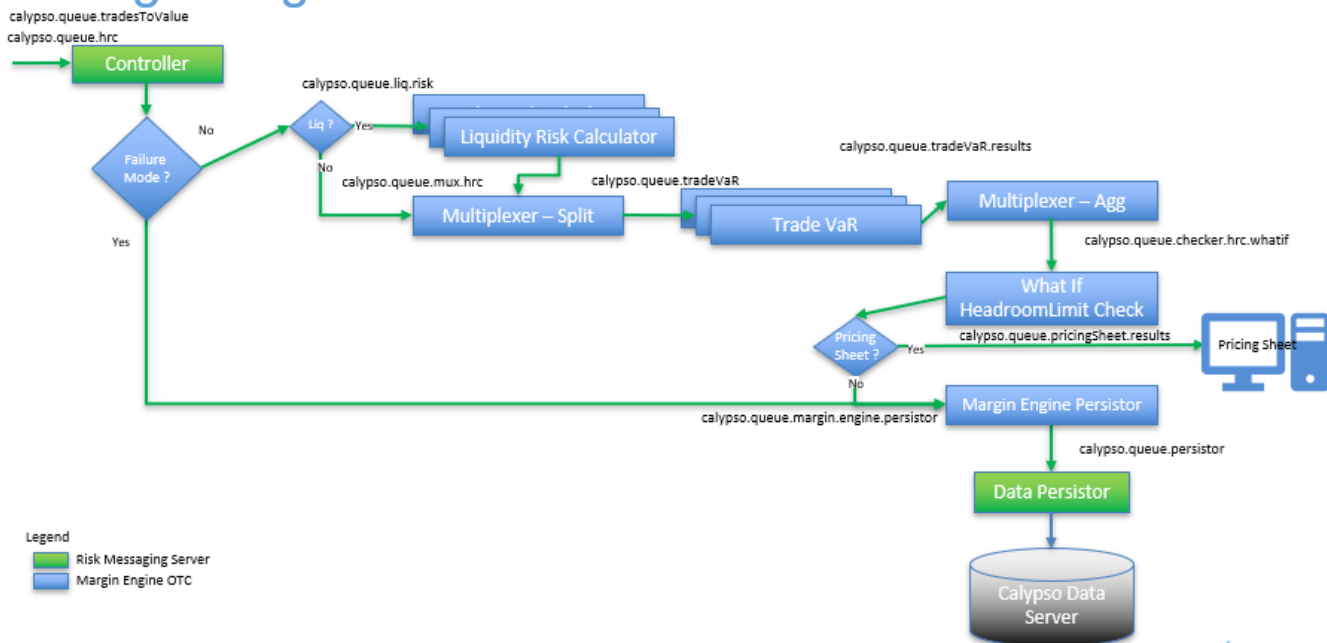




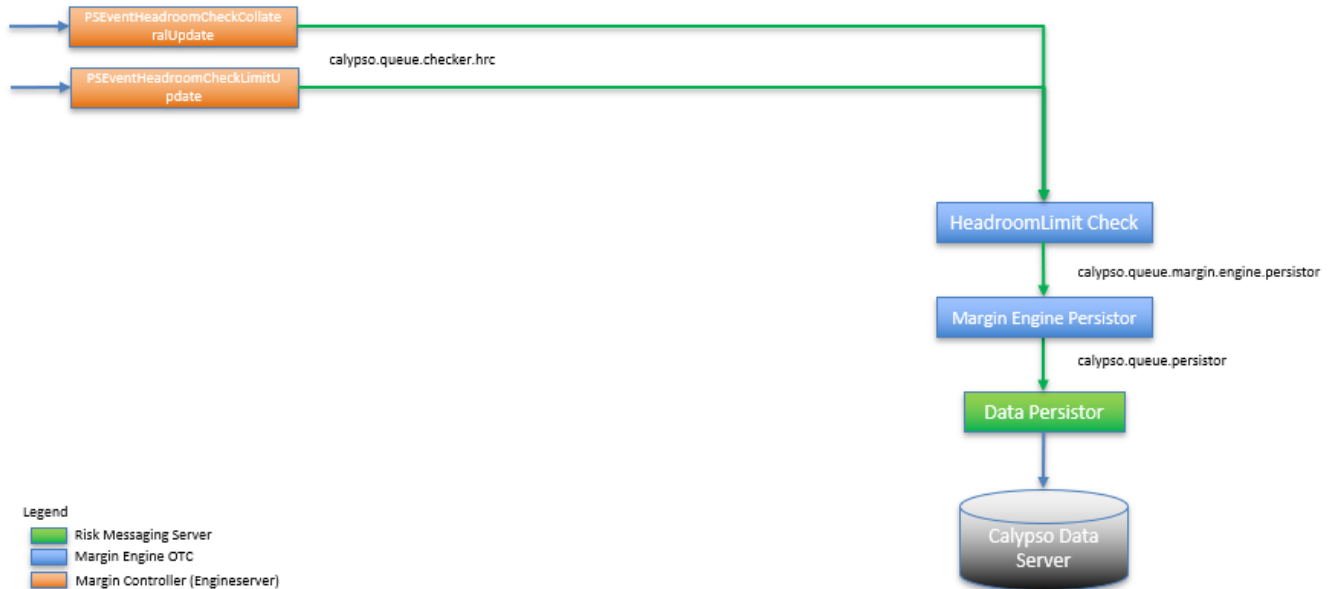
## Margin Engine – Trades flow



## Margin Engine – What If flow



## Margin Engine – Update Flow (Limits and Collateral)

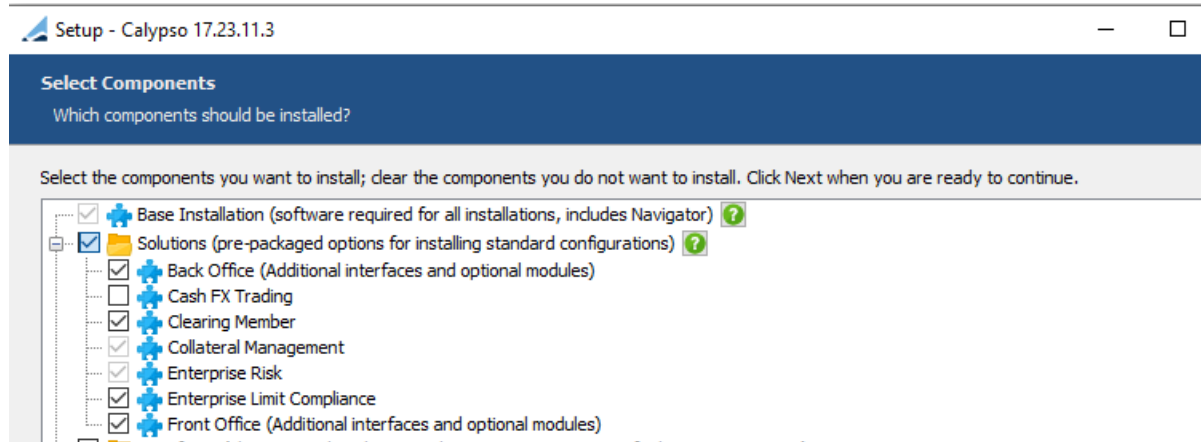


## 2. OTC Margin Installation

The Margin calculators are installed as part of the Calypso Installer when you select the “Clearing Member” and the “Margin Engine” modules.

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

- Clearing Member
- Collateral
- Data Uploader
- Enterprise Risk
- Margin Engine








Please refer to the *Calypso Installation Guide* and *Calypso Clearing Member Setup Guide* for installation details.

### Margin Calculators

In the “Common Third-Party Libraries & Extension” window, add the Margin Calculator JARs to the “Libraries (Jar files)” section.

Please contact Calypso Product Support for obtaining the margin calculators. They will be delivered via the customer portal.

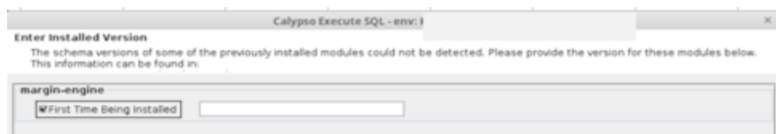
Name	Date modified	Type	Size
 calypso-margin-calculator-typed-15.11.1.jar	12-05-2023 00:23	Executable Jar File	20 KB
 calypso-margin-calculator-typee-15.11.2.jar	04-09-2023 00:41	Executable Jar File	9 KB
 calypso-margin-calculator-typef-15.11.2.jar	04-09-2023 00:41	Executable Jar File	12 KB
 calypso-margin-calculator-typeh-15.11.2.jar	04-09-2023 00:41	Executable Jar File	12 KB
 calypso-margin-calculator-typeia-15.11.1.jar	23-05-2023 00:52	Executable Jar File	26 KB
 calypso-margin-calculator-typej-15.11.2.jar	04-09-2023 00:41	Executable Jar File	58 KB

### Database Upgrade

When you run Execute SQL as part of your installation, the data files will be already loaded.

For first-time installation, check “First Time Being Installed”.

In case of upgrade, please enter value of 1.0.0 for previous version.



## 3. OTC Margin CCP Setup

### 3.1 Trade Workflow

There are multiple use cases:

- Messages are received via the Incoming Feed/Feed translator
- New trade pairs (\*) are submitted to the Margin Engine for limit and headroom check
- Existing trades are resubmitted to the Margin Engine for re-processing or post-novation event

(\*) the trade pairing is not supported out of the box and needs to be customized.

#### 3.1.1 CCP Trade Workflow

This workflow will be triggered based on the trade keyword BusinessFlow = CCP.

Sample workflow available on the Documentation Portal: "ccp\_wf.wf".

#### 3.1.2 New Trades Submitted to Margin Engine

Trades can go through various trade transitions.

Trades will only be sent to the Margin Engine for specific transitions, ie specific Origin Status and specific Actions.

The following is the out of the box solution- a configurable version will be available in the August MR.

Orig status	Action	Action Definition	Resulting Status
<b>Out of the Box</b>			
PENDING	SUBMIT	No action	user choice
WAIT_MARGIN	ACCEPT	Add trade	user choice
WAIT_MARGIN	REJECT	Remove Trade	user choice

#### 3.1.3 Existing Trades Resubmitted to the Margin Engine

For existing trades, here are the supported actions:

Orig status	Action	Action Definition	Resulting Status
<b>Out of the Box</b>			
TO_BE_TERMINATED	TERMINATE	Remove Trade	user choice
TO_BE_TRANSFERRED	TRANSFER	Remove Trade	user choice

For any other action, trades will not be updated, and the margin results will not be saved. A task will be created in the task station.

NOTE: For bulk actions, i.e. trade compression, portfolio transfer, backloading, the process is different. See “Headroom Check: Post-trade Novation Events” for details.

### 3.1.4 Messages Received via the Incoming Feed/Feed Translator

The Feed translator creates a trade in memory. It is processed by the Margin Engine. After the margin calculation and limit check process, a trade is created with a NONE/NEW transition. The trade will be assigned 3 keywords:

- HRCStatus - Accepted/Rejected/AutoRejected
- HRCRejectReason
- IM\_PORTFOLIO\_NAME

#### Sample Workflow

You can import the trade workflow from:

```
<calypso home>/client/resources/workflow/TRADE_WORKFLOW_HRC.wf
```

**Step 1** – Edit “TRADE\_WORKFLOW\_HRC.wf”, and set the processing org to your processing org. It is set to CALYPUS by default.

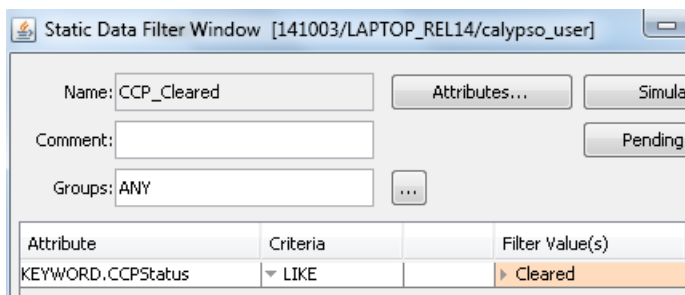
```
TRADE_WORKFLOW_HRC.wf
1 PSEventTrade;CLEARED;COMPRESS;PENDING_HRC_TERM;true;false;false;ALL;ALL;;CALYPUS;false
2 PSEventTrade;CLEARED;DECLAR;PENDING_HRC_TERM;true;false;false;ALL;ALL;;CALYPUS;false;
3 PSEventTrade;CLEARED;TRANSFER;PENDING_HRC_TERM;true;false;false;ALL;ALL;;CALYPUS;false
```

**Step 2** – Import the trade workflow (PSEventTrade) for your processing org, ALL subtypes, ALL product types.

Orig Status	Action	Resulting Status	Use STP	Rules	Filter
CLEARED	COMPRESS	PENDING_HRC_TERMINATE	false	blank	blank
CLEARED	DECLAR	PENDING_HRC_TERMINATE	false	blank	blank
CLEARED	TRANSFER	PENDING_HRC_TERMINATE	false	blank	blank
LIMIT_APPROVED	CLEAR	CLEARED	true	blank	CCP_Cleared
LIMIT_APPROVED	REFUSE	PENDING_HRC_REVERT	false	blank	blank
LIMIT_FAILED	CANCEL	CANCELED	false	blank	CCP_NotCleared
LIMIT_FAILED	FORCE_ACCEPT	PENDING_HRC	false	blank	blank
LIMIT_FAILED	FORCE_REJECT	PENDING_HRC_REJECTION	false	blank	CCP_NotCleared
LIMIT_FAILED	REFUSE	REJECTED	false	blank	CCP_NotCleared
LIMIT_FAILED	SUBMIT	PENDING_HRC	false	blank	blank

Orig Status	Action	Resulting Status	Use STP	Rules	Filter
LIMIT_REJECTED	REFUSE	REJECTED	false	blank	blank
NONE	NEW	PENDING	true	blank	CCP_NotCleared
NONE	NEW	PENDING_HRC	true	blank	CCP_Cleared
PENDING	CANCEL	CANCELED	false	Cancel	blank
PENDING	STP-ACCEPT	LIMIT_APPROVED	true	blank	HRC_Accepted
PENDING	STP-REJECT	LIMIT_FAILED	true	blank	HRC_Rejected
PENDING	STP-REJECT	LIMIT_REJECTED	true	blank	HRC_AutoRejected
PENDING_HRC	ACCEPT	LIMIT_APPROVED	false	blank	blank
PENDING_HRC	FORCE_ACCEPT	PENDING_HRC	false	blank	blank
PENDING_HRC	REFUSE	REJECTED	false	blank	blank
PENDING_HRC	REJECT	LIMIT_FAILED	False	blank	blank
PENDING_HRC	SUBMIT	PENDING_HRC	false	blank	blank
PENDING_HRC_REJECTION	STP-REJECT	LIMIT_REJECTED	true	blank	blank
PENDING_HRC_REVERT	REVERT	REJECTED	false	blank	blank
PENDING_HRC_REVERT	SUBMIT	PENDING_HRC_REVERT	false	blank	blank
PENDING_HRC_REVERT	UPDATE	PENDING_HRC_REVERT	false	blank	blank
PENDING_HRC_TERMINATE	SUBMIT	PENDING_HRC_TERMINATE	false	blank	blank
PENDING_HRC_TERMINATE	TERMINATE	TERMINATED	false	blank	blank
PENDING_HRC_TERMINATE	UPDATE	PENDING_HRC_TERMINATE	false	blank	blank
REJECTED	ACCEPT	PENDING_HRC_REVERT	false	blank	blank
REJECTED	REJECT	REJECTED	false	blank	blank

Static data filters:



Static Data Filter Window [141003/LAPTOP\_REL14/calypso\_user]

Name: CCP\_Cleared    Attributes...    Simula

Comment:    Pending

Groups: ANY    ...

Attribute	Criteria	Filter Value(s)
KEYWORD.CCPStatus	LIKE	Cleared

Static Data Filter Window [141003/LAPTOP\_REL14/calypso\_user]

Name: CCP\_NotCleared    Attributes...    Simula

Comment:    Pending

Groups: ANY    ...

Attribute	Criteria	Filter Value(s)
IN Static Data Filter	NOT_IN	Add CCP_Cleared

Static Data Filter Window [140018SP1/LAPTOP\_REL14/calypso\_use]

Name: HRC\_Accepted    Attributes...    ...

Comment:    ...

Groups: ANY    ...

Attribute	Criteria	Filter Value(s)
KEYWORD.HRCStatus	LIKE	Accepted

Static Data Filter Window [140018SP1/LAPTOP\_REL14/calypso\_user]

Name: HRC\_AutoRejected    Attributes...    ...

Comment:    ...

Groups: ANY    ...

Attribute	Criteria	Filter Value(s)
KEYWORD.HRCStatus	LIKE	AutoRejected

Static Data Filter Window [140018SP1/LAPTOP\_REL14/calypso\_use]

Name: HRC\_Rejected    Attributes...    ...

Comment:    ...

Groups: ANY    ...

Attribute	Criteria	Filter Value(s)
KEYWORD.HRCStatus	LIKE	Rejected

The various types of incoming messages may trigger limit check and/or impact IM Exposure:

Message Type	CCP	Limit Check	IM Exposure	Workflow
Request for Consent	CME	Check	Include	If the limit check passes, a trade is created in status LIMIT_APPROVED.
Clearing Confirm (auto consent)	CME	No Check	None	A LIMIT_APPROVED trade moves to status CLEARED.



Message Type	CCP	Limit Check	IM Exposure	Workflow
Clearing Refuse	CME	No check	Remove	A LIMIT_APPROVED trade moves to status REJECTED.
Clearing Confirm (no auto consent)	CME	No check	Include	A trade is created in status CLEARED.
Clearing Confirm (netting new)	CME	No check	Include	A trade is created in status CLEARED.
Clearing Confirm (Terminate, Transfer)	CME	No check	Remove	A CLEARED trade moves to status TERMINATED.
Clearing Confirm (Terminate, Netting)	CME	No check	Remove	A CLEARED trade moves to status TERMINATED.
Request for Consent (normal trade, transfer in, transfer out)	LCH	Check	Include	If the limit check passes, a trade is created in status LIMIT_APPROVED.
Clearing Confirm (normal trade, transfer in, transfer out)	LCH	No check	None	A LIMIT_APPROVED trade moves to status CLEARED.
Clearing Refuse	LCH	No check	Remove	A LIMIT_APPROVED trade moves to status REJECTED.
Clearing Confirm (netting new)	LCH	No check	Include	A trade is created in status CLEARED.

When the limit check fails, the trade can be manually resubmitted for limit check (action SUBMIT). In this case, the trade is routed to the TradeVaR process through the Margin Controller engine.

## 3.2 Limit Check

For complete details on Limit Check setup, please also refer to the *Calypso Messaging Framework Integration Guide*.

### 3.2.1 Environment Properties

Please set the following environment properties:

Property Name	Property Value	Description
datagrid.impl	hazelcast	In-memory data grid.
RISKCONTROLEVENTSERVERURL	tcp://localhost:61919	Host name and port number of the Uploader Messaging Server.

### 3.2.2 Domain "MarginEngine"

The following domain values need to be defined in the domain "MarginEngine".

#### Value = HEADROOMCHECK\_PRICING\_ENV

Comment = Pricing environment used to compute Limit Check. It defines what base currency is used for client level calculation.

#### Value = HEADROOMCHECK\_NPV\_RULE

Determines if the NPV should be included in limit check:

Name:	MarginEngine
Value:	HEADROOMCHECK_NPV_RULE
Comment:	ALWAYS

- ALWAYS - NPV is included for all trades.
- NEVER - NPV is never included.
- BACKDATED - NPV is included only for back-dated trades.
- RISK\_INCREASING - Only Positive NPV is included for all trades.

#### Value = HRC\_MAX\_DAYS\_BACK

Name:	MarginEngine
Value:	HRC_MAX_DAYS_BACK
Comment:	5000

Comment = Number of days for which historical PL Vectors can be used (mostly for testing). The domain value is used to load collateral results. This can be set to any number of days.

#### Value = HEADROOMCHECK\_RULES

Name:	MarginEngine
Value:	HEADROOMCHECK_RULES
Comment:	CMFMarginAccountRules

Comment = Limit Check rule. You can set:

- CMFMarginAccountRules - Checks limits at the account level only.

- CMFClientAndMarginAccountRules - Checks limits at the account and aggregation levels.
- OriginHeadroomTotalIM – Checks limits for hierarchies with a single level.
- ClientHeadroomTotalIM - Checks headroom limits (Collateral + Limit – TOTAL IM>0 or risk reducing) and IM limit (Limit – IM > 0 or risk reducing) at the Clearing Member level.
- IPDPClientClearingRule- Checks headroom limits and IM limit at the DP House level, and IM limit at IP House level.
- DynamicHeadroomCheckRule – This headroom check rule is applicable to both headroom and Initial Margin limits and is configured using the domain values below, which will be added out of the box. If you only want to check 'Headroom' limits, you can remove Initial Margin from the Comment.

Name:	MarginEngine
Value:	DynamicHeadroomCheckRule.LimitType
Comment:	Headroom,Initial Margin

For the DynamicHeadroomCheckRule, the following changes need to be made to the Market Risk hierarchy:

- Add attribute ClearingMember=true at clearing member level in Market Risk hierarchy.  
In the example below, this attribute will be added at 'CB2' and 'CB3' level.
- Add attribute CheckLimit=true at gross omnibus account level.

For example, G\_CB2\_OMNI\_ALL.

Based on this rule and this attribute, the limit check will happen at second level in the hierarchy. In the below example, it'll happen at CB2\_HOUSE, CLCX\_CB2\_SEG, CLAX\_CB2\_SEG, G\_CB2\_OMNI\_ALL, N\_CB2\_OMNI, CB3\_HOUSE, and N\_CB3\_OMNI.

Assuming only Headroom is added to the domain value, the risk increasing trades are accepted when:

$IM + CVM + UVM - \text{collateral} < \text{Headroom Limit}$

Risk reducing trade will be accepted without checking the formula.

Hierarchy

< All Hierarchies

**CCP\_AUTO2**

▼ CB2

CB2\_HOUSE [CB2\_HOUSE]

CLCX\_CB2\_SEG [CLCX\_CB2\_SEG]

CLAX\_CB2\_SEG [CLAX\_CB2\_SEG]

> G\_CB2\_OMNI\_ALL

N\_CB2\_OMNI [N\_CB2\_OMNI]

> CB3

Attributes

G\_CB2\_OMNI\_ALL

Name	Value
CheckLimit	true

Hierarchy

< All Hierarchies

**CCP\_AUTO2**

▼ CB2

CB2\_HOUSE [CB2\_HOUSE]

CLCX\_CB2\_SEG [CLCX\_CB2\_SEG]

CLAX\_CB2\_SEG [CLAX\_CB2\_SEG]

> G\_CB2\_OMNI\_ALL

Attributes

CB2

Name	Value
ClearingMember	true

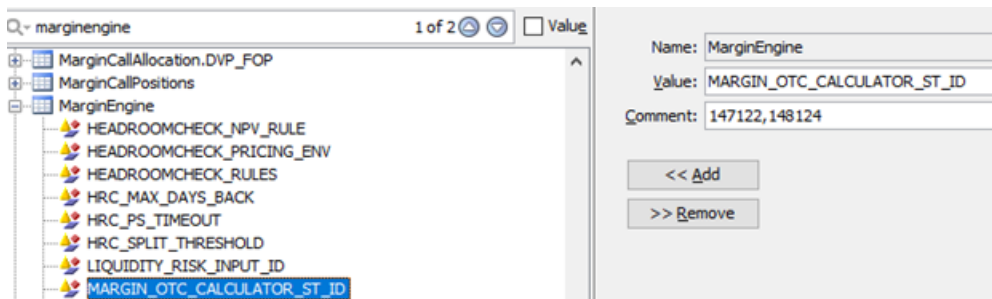
Value = HRC\_PS\_TIMEOUT

Name:	MarginEngine
Value:	HRC_PS_TIMEOUT
Comment:	300000

Data Persistor timeout in ms.

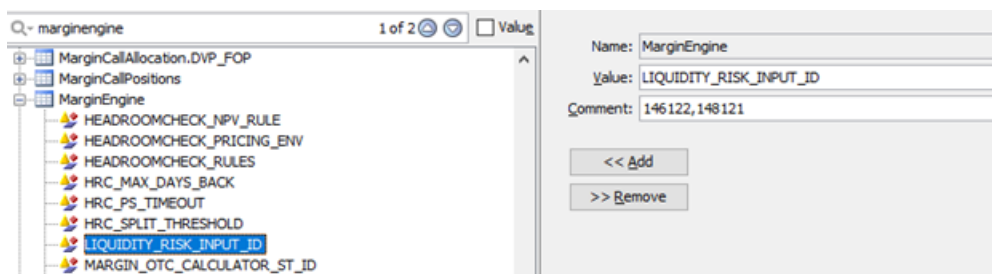
Value = MARGIN\_OTC\_CALCULATOR\_ST\_ID

List of scheduled task ids of MARGIN\_OTC\_CALCULATOR scheduled task used to calculate IM for intraday trades.



Value = LIQUIDITY\_RISK\_INPUT

List of scheduled task ids of LIQUIDITY\_RISK\_INPUT scheduled task used to calculate liquidity add-on for intraday trades. This attribute is mandatory to start the liquidity risk calculator. This calculator is only required for TYPEJ for calculating liquidity risk component for EUREX.



### 3.2.3 Limits

Limits can be imported using the Data Uploader.

Limits can be set to 0 by default.

Limits can be updated in bulk for all margin accounts, or for individual margin accounts.

Limits are set based on hierarchies.

Sample hierarchies:

#### CCP

Clearing Member 1

House (CCP limit)

Client (CCP Limit)

Client 1 (CMF Limit)

Client 2 (CMF Limit)

## CMF

Client 1 (Client Limit)

CCP1 MA (Margin Limit)

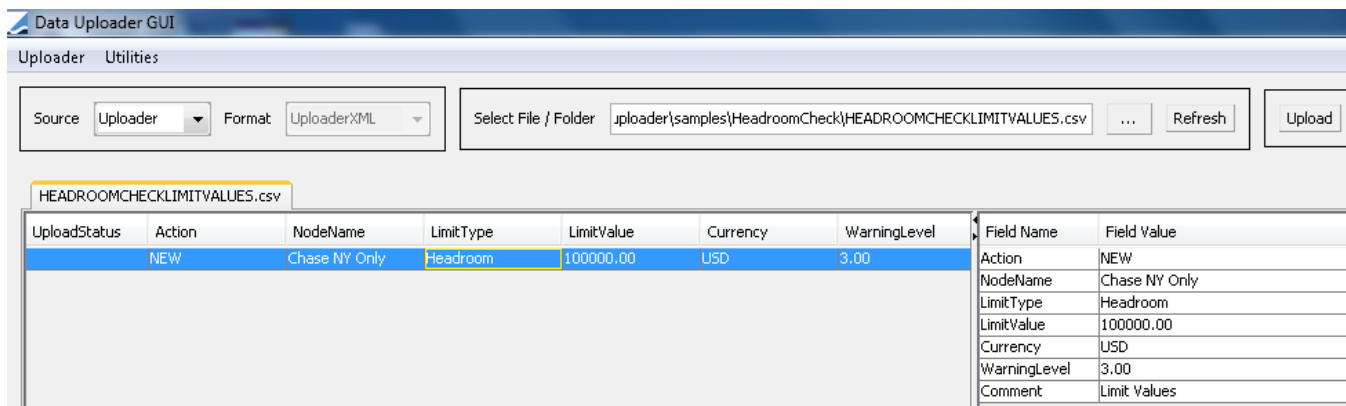
CCP2 MA (Margin Limit)

The Data Uploader supports CSV and XML files. The file names should start with “HEADROOMCHECKLIMITVALUES\_”, for example “HEADROOMCHECKLIMITVALUES\_<name>.csv”.

Sample files are provided under <calypso home>/docs/calypso-datauploader/samples/HeadroomCheck.

Launch the Data Uploader window using Processing > Tools > Data Uploader from the Calypso Navigator.

Select a file from your machine, the content for the file is displayed:



The screenshot shows the 'Data Uploader GUI' window. It has tabs for 'Uploader' and 'Utilities'. In the 'Uploader' tab, there are dropdowns for 'Source' (set to 'Uploader') and 'Format' (set to 'UploaderXML'). A 'Select File / Folder' button is followed by a text field containing the file path '.uploader\samples\HeadroomCheck\HEADROOMCHECKLIMITVALUES.csv', a 'Refresh' button, and an 'Upload' button. Below this, a table titled 'HEADROOMCHECKLIMITVALUES.csv' is displayed. The table has columns: UploadStatus, Action, NodeName, LimitType, LimitValue, Currency, WarningLevel, Field Name, and Field Value. The first row of data is highlighted in blue: NEW, Chase NY Only, Headroom, 100000.00, USD, 3.00. To the right of the table, a 'Field Name' and 'Field Value' section lists the values for each column: Action: NEW, NodeName: Chase NY Only, LimitType: Headroom, LimitValue: 100000.00, Currency: USD, WarningLevel: 3.00, and Comment: Limit Values.

UploadStatus	Action	NodeName	LimitType	LimitValue	Currency	WarningLevel	Field Name	Field Value
NEW		Chase NY Only	Headroom	100000.00	USD	3.00	Action	NEW
							NodeName	Chase NY Only
							LimitType	Headroom
							LimitValue	100000.00
							Currency	USD
							WarningLevel	3.00
							Comment	Limit Values

» Click **Upload** to load the limit values into Calypso.

### 3.2.4 Margin Controller Engine

The Margin Controller Engine allows routing the collateral positions changes to the Trade VaR process.

It is configured in the Engine Manager of Web Admin: event subscription and engine parameters.

You may need to add this engine if it is not available for configuration: Create a new engine called MarginController with class name `com.calypso.service.limitsOrchestrator.MarginController`.

It subscribes to:

- PSEventHeadroomCheckCollateralUpdate
- PSEventHeadroomCheckLimitUpdate
- PSEventTrade
- PSEventMarginCallEntry

No event filter.

## Engine Configuration

Unable to edit a running engine. Displaying in read-only mode.

Engine Name: <a href="#">?</a>	Engine ID:	Max Queue Size: <a href="#">?</a>	Max Batch Size: <a href="#">?</a>																						
MarginController	421016																								
Engine Class:		Number of Threads: <a href="#">?</a>	Event Pool Policy: <a href="#">?</a>																						
com.calypso.service.limitsOrchestrator.MarginController																									
Display Name: <a href="#">?</a>		Pricing Environment: <a href="#">?</a>	Save settle position changes: <a href="#">?</a>																						
Margin Controller																									
	Application Type:	Configuration attributes																							
	EngineServer	<table border="1"> <thead> <tr> <th>Attribute Name</th> <th>Attribute Value</th> </tr> </thead> <tbody> <tr><td>BALANCE_MODE</td><td></td></tr> <tr><td>CLASS_NAME</td><td></td></tr> <tr><td>DISPLAY_NAME</td><td></td></tr> <tr><td>DateType</td><td></td></tr> <tr><td>EVENT_ORDER</td><td></td></tr> <tr><td>EXCLUDE_PRODUCTTYPE</td><td></td></tr> <tr><td>EXCLUDE_STATUS</td><td></td></tr> <tr><td>HANDLE_FUTURE_LIQ_CASH_FLOWS</td><td></td></tr> <tr><td>IGNORE_ACTION</td><td></td></tr> <tr><td>INSTANCE_NAME</td><td></td></tr> </tbody> </table>		Attribute Name	Attribute Value	BALANCE_MODE		CLASS_NAME		DISPLAY_NAME		DateType		EVENT_ORDER		EXCLUDE_PRODUCTTYPE		EXCLUDE_STATUS		HANDLE_FUTURE_LIQ_CASH_FLOWS		IGNORE_ACTION		INSTANCE_NAME	
Attribute Name	Attribute Value																								
BALANCE_MODE																									
CLASS_NAME																									
DISPLAY_NAME																									
DateType																									
EVENT_ORDER																									
EXCLUDE_PRODUCTTYPE																									
EXCLUDE_STATUS																									
HANDLE_FUTURE_LIQ_CASH_FLOWS																									
IGNORE_ACTION																									
INSTANCE_NAME																									
Description:																									
Margin Controller																									
Persisted Event Configuration:																									
PSEventAccountBilling																									
PSEventMarginCallEntry																									
PSEventTrade																									
riskControl.tk.event.PSEventHeadroomCheckCollateralUp																									
riskControl.tk.event.PSEventHeadroomCheckLimitUpdate																									
Event Filters:																									
AllTransfersKnownEventFilter																									

Please refer to Calypso Web Admin documentation for complete details.

### 3.2.5 Update Manager Engine

The Update Manager engine allows routing of trade, imported collateral and limit updates.

It is configured in the Engine Manager of Web Admin: event subscription and engine parameters.










You may need to add this engine if it is not available for configuration: Create a new engine called UpdateManagerEngine with class name `com.calypso.tk.engine.UpdateManagerEngine`.

It subscribes to:

- PSEventTrade

Event filter = UpdateManagerEngineEventFilter

## Engine Configuration

Engine Name: 	Engine ID: 	Max Queue Size: 	Max Batch Size: 	Number of Threads: 																										
<input type="text" value="UpdateManagerEngine"/>	<input type="text" value="421014"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>																										
Engine Class:																														
<input type="text" value="com.calypso.tk.engine.UpdateManagerEngine"/>																														
Display Name: 	Application Type:	Event Pool Policy: 	Pricing Environment: 																											
<input type="text" value="Update Manager Engine"/>	<input type="text" value="EngineServer"/>	<input type="text" value=""/>	<input type="text" value=""/>																											
Description:	Save settle position changes: 																													
<input type="text"/>	<input type="text" value=""/>																													
Persisted Event Configuration:	Configuration attributes																													
<input type="text" value="PSEventAccountBilling"/>	<table border="1"> <thead> <tr> <th>Attribute Name</th> <th>Attribute Value</th> </tr> </thead> <tbody> <tr><td>BALANCE_MODE</td><td></td></tr> <tr><td>CLASS_NAME</td><td></td></tr> <tr><td>DISPLAY_NAME</td><td></td></tr> <tr><td>DateType</td><td></td></tr> <tr><td>EVENT_ORDER</td><td></td></tr> <tr><td>EXCLUDE_PRODUCTTYPE</td><td></td></tr> <tr><td>EXCLUDE_STATUS</td><td></td></tr> <tr><td>HANDLE_FUTURE_LIQ_CASH_FLOWS</td><td></td></tr> <tr><td>IGNORE_ACTION</td><td></td></tr> <tr><td>INSTANCE_NAME</td><td></td></tr> <tr><td>INV_MAX_POSITION</td><td></td></tr> <tr><td>LIQUIDATION_TIMEOUT</td><td></td></tr> </tbody> </table>				Attribute Name	Attribute Value	BALANCE_MODE		CLASS_NAME		DISPLAY_NAME		DateType		EVENT_ORDER		EXCLUDE_PRODUCTTYPE		EXCLUDE_STATUS		HANDLE_FUTURE_LIQ_CASH_FLOWS		IGNORE_ACTION		INSTANCE_NAME		INV_MAX_POSITION		LIQUIDATION_TIMEOUT	
Attribute Name	Attribute Value																													
BALANCE_MODE																														
CLASS_NAME																														
DISPLAY_NAME																														
DateType																														
EVENT_ORDER																														
EXCLUDE_PRODUCTTYPE																														
EXCLUDE_STATUS																														
HANDLE_FUTURE_LIQ_CASH_FLOWS																														
IGNORE_ACTION																														
INSTANCE_NAME																														
INV_MAX_POSITION																														
LIQUIDATION_TIMEOUT																														
<input type="text" value="PSEventTrade"/>																														
Event Filters:																														
<input type="text" value="AllTransfersKnownEventFilter"/>																														
<input type="text" value="UpdateManagerEngineEventFilter"/>																														
Engine Manager Configuration:	Start on Startup:																													
<input type="text" value="engineserver"/>	<input type="checkbox"/>																													

Please refer to Calypso Web Admin documentation for complete details.



## 4. OTC Margin Process Setup

This section describes the configuration requirements to compute the margins.

### 4.1 Trade Filters

You need to configure a trade filter for each clearing member and for each CCP that contains the trades for which you want to compute IM exposure.

### 4.2 Market Risk Hierarchies

Market Risk hierarchies are created using /market-risk/setup/hierarchy/edit.

Create a node for each clearing member and each clearing member account, or for each clearing member (single level). The last node must be associated with the trade filter previously created.

Examples:

FX Tree

< All Hierarchies		Expand nodes	
CCP-FX-IM		Compare	Attributes
CM201		+ Node	
CM201P_FX [CM201P_FX]			

IRS Tree

< All Hierarchies		Expand nodes	
CCP-IRS-IM		Compare	Attributes
CM201		+ Node	
CM201P_IRS [CM201P_IRS]			

You can set the CreditMultiplier attribute for each node. This will be used as COMPLIANCE FACTOR to calculate Compliance Margin and Initial Margin for the HistSim report.

**[NOTE: The last node MUST have the same name as the trade filter]**

### 4.3 Data Grid Configuration

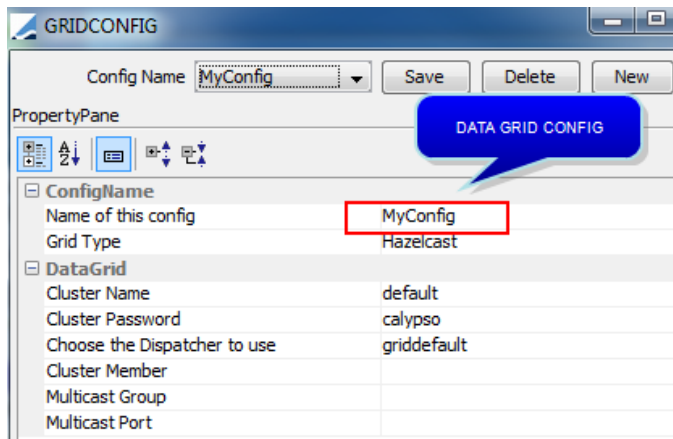
You need to use the in-memory data grid to compute the HistSim analysis.

Calypso currently supports the Hazelcast data grid.

The data grid is created using the scheduled task DATA\_GRID\_HYDRATE based on a data grid configuration and a HistSim batch name.

The HistSim analysis is then run on the data grid using the scheduled task ERS\_ANALYSIS.

Bring up the Data Grid Configuration window (menu action `grid.GridConfigEditor`).



- » Enter a name for the configuration. It is used to generate the data grid. Then enter the fields describe below.
- » Then click Save.

### Fields Details

Fields	Description
Grid Type	Select Hazelcast. Add datagrid.impl=hazelcast in env properties file.
Cluster Name	Enter a cluster name and cluster password.
Cluster Password	The cluster members (nodes) and clients having the same cluster configuration (i.e. same cluster name and password) form a private cluster.
Choose the Dispatcher to use	Select the dispatcher configuration for the data grid. <b>[NOTE: You need a dedicated dispatcher configuration for all data grid calculators]</b> Please refer to the Calypso Installation Guide for information on setting up a dispatcher.
Cluster Member	Enter a cluster member (optional). If no value is entered, then Hazelcast client expects the data grid server to be running on the same machine as the client.
Multicast Group	Enter the multicast group IP address. Values can be between 224.0.0.0 and 239.255.255.255.
Multicast Port	Enter the multicast socket port which Hazelcast member listens to and uses to send discovery

Fields	Description
	messages.

### Environment Property

Once you have defined the Data Grid Configuration, set the environment property:

grid.config=<data grid configuration name>


## 4.4 End of Day Batch

The end of day batch will be composed of margin inputs (PL vectors, risk sensitivities) and margin calculation.

The margin inputs are run in:





- ERS\_ANALYSIS/HistSim (for the VAR component)
- LIQUIDITY\_RISK\_INPUT (for the sensitivities part- this part is optional)





Sample of end of day batch:

 Task Chain Definition

**Task Chain Definition**  
 Task Chains are special types of task definitions which consist of other previously defined tasks.

External Reference: TYPEB\_IRS\_IM CHAIN  
 Description:

 Add
  Remove
  Move Up
  Move Down

	External Ref.	ID	Type	Trade Filter
	TYPEB_IRS_IM HYDRATE	160120	DATA_GRID_HYDRATE	
	TYPEB_IRS_IM analysis	160121	ERS_ANALYSIS	
	TYPEB_IRS_IM liquidity	160122	LIQUIDITY_RISK_INPUT	
	TYPEB_IRS_IM calculator	160123	MARGIN_OTC_CALCULATOR	

### HistSim Analysis

You need define SIM parameter in **Setup>>Sim parameter** UI page.

**Attributes**

TYPEF

Name	Value	⊕ Add
Scenario Set ID	9003	
Attribution Type	Aggr	
Number of observations	350	
Observation Start Date	Observation Start Date	📅
Horizon	5	
ApplyFXPostPL	true	×
Interpolation Type	-1	×
Confidence level	6	×
Confidence Type	Absolute	×
CreditMultiplier	0.5	×
Primary Analysis Configuration	Var	

- Scenario Set ID – Enter the scenario set ID for the historical simulation.
- Number of observations – Enter the number of observations (scenarios) for the historical simulation.
- Confidence Level – Enter the confidence interval for the VAR calculation.

Add the following attribution types using **Setup>>risk-attribution** in UI page.

Risk Attribution

< All Risk Attributions

Standard

FX

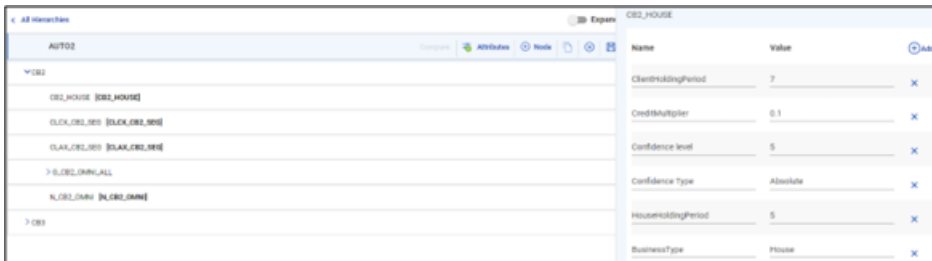
ShiftItemFX

Rates

ShiftItemCurveZero

Setup primary analysis as per Market Risk User Guide.

Add-on components for initial margin can also be configured at node level instead of parameter level. Multipliers or add-on factors can be different for different nodes –



Name	Value	Unit
ClientHoldingPeriod	7	
CreditMultiplier	0.1	
ConfidenceLevel	5	
ConfidenceType	Absolute	
HouseHoldingPeriod	5	
BusinessType	House	

In the margin calculation results, the add-on factors will be calculated for separate nodes based on their node attributes, like in the example below –

Portfolio	Currency	Measure	Value
CB2_HOUSE	USD	ETL	81689.9921
CB2_HOUSE	USD	Initial Margin	81689.9921
CB2_HOUSE	USD	VaR	76224.8931
CB2_HOUSE	USD	CreditMultiplier	0
CB2_HOUSE	USD	Credit Margin	0
CB2_HOUSE	USD	HolidayMultiplier	0
CB2_HOUSE	USD	Holiday Margin	0
CB2_HOUSE	USD	Discretionary Margin	0
CB2_HOUSE	USD	Total IM	81689.9921
CB2_HOUSE	USD	Total Margin	81689.9921
CLCX_CB2_SEG	USD	ETL	69787.48806
CLCX_CB2_SEG	USD	Initial Margin	69787.48806
CLCX_CB2_SEG	USD	VaR	69624.39246
CLCX_CB2_SEG	USD	CreditMultiplier	0.3
CLCX_CB2_SEG	USD	Credit Margin	20936.24642
CLCX_CB2_SEG	USD	HolidayMultiplier	0.02
CLCX_CB2_SEG	USD	Holiday Margin	1395.749761
CLCX_CB2_SEG	USD	Discretionary Margin	500
CLCX_CB2_SEG	USD	Total IM	92619.48424
CLCX_CB2_SEG	USD	Total Margin	92619.48424
CLAX_CB2_SEG	USD	ETL	57936.37143
CLAX_CB2_SEG	USD	Initial Margin	57936.37143
CLAX_CB2_SEG	USD	VaR	54455.02923
CLAX_CB2_SEG	USD	CreditMultiplier	0
CLAX_CB2_SEG	USD	Credit Margin	0
CLAX_CB2_SEG	USD	HolidayMultiplier	0
CLAX_CB2_SEG	USD	Holiday Margin	0
CLAX_CB2_SEG	USD	Discretionary Margin	0
CLAX_CB2_SEG	USD	Total IM	57936.37143
CLAX_CB2_SEG	USD	Total Margin	57936.37143

## 4.5 Market Data

Market data and scenario shifts are required to run HistSim.

Please refer to Calypso Market Risk documentation for information on importing Scenario Shifts.

## 4.6 LIQUIDITY\_RISK\_INPUT Scheduled Task

Create a LIQUIDITY\_RISK\_INPUT scheduled task.

<b>Task Description</b>	
Task Type:	LIQUIDITY_RISK_INPUT
External Reference:	XXX
Comments:	
Description:	
<b>Execution Parameters</b>	
Attempts:	1
Retry After:	0 minutes
Expected Execution Time (SLA):	1 minutes
JVM Settings:	-Xms512m -Xmx1024m
Log Settings:	
<b>Task Notification Options</b>	
<input type="checkbox"/> Send Emails	<input type="checkbox"/> Publish Business Events
To User:	
<b>Common Attributes</b>	
Task ID	153121
Processing Org	
Trade Filter	
Filter Set	
Pricing Environment	OFFICIAL
Timezone	America/Los_Angeles
Valuation Time Hour	
Valuation Time Minute	
Undo Time Hour	
Undo Time Minute	
Valuation Date Offset	
From Days	
To Days	
Pricer Measures	
Business Holidays	
<b>Task Attributes</b>	
Methodology	CCP
Hierarchy Name	CCP
Rate Buckets	DV01 Hedging
Grid: Dispatcher Name	default
Job Size	5

## 4.7 MARGIN\_OTC\_CALCULATOR Scheduled Task

The margin OTC calculator will calculate the Initial Margin, based on the inputs generated in HistSim and LIQUIDITY\_RISK\_INPUT. The margin methodology to apply is defined as an attribute.

The calculated IM is available as a csv file and as a PL Mark associated with a Collateral Exposure Trade (mapped to a margin call contract).

Create a MARGIN\_OTC\_CALCULATOR scheduled task referencing the ERS batch name.

<b>Task Description</b>	
Task Type:	MARGIN_OTC_CALCULATOR
External Reference:	IM_CALCULATION
Comments:	IM_CALCULATION
Description:	IM_CALCULATION
<b>Execution Parameters</b>	
Attempts:	1
Retry After:	0 minutes
Expected Execution Time (SLA):	1 minutes
JVM Settings:	-Xms512m -Xmx1024m
Log Settings:	RS.TYPED,ERS.TYPEH,HistSimMargin,cmu.default,SensBasedMargin,UPLOADER,com.calypso.clearing.log.defi
<b>Task Notification Options</b>	
<input type="checkbox"/> Send Emails	<input type="checkbox"/> Publish Business Events
To User:	
<b>Common Attributes</b>	
Task ID	193120
Processing Org	
Trade Filter	CCP
Filter Set	
Pricing Environment	OFFICIAL
Timezone	America/Los_Angeles
Valuation Time Hour	
Valuation Time Minute	
Undo Time Hour	
Undo Time Minute	
Valuation Date Offset	
From Days	0
To Days	0
Pricer Measures	
Business Holidays	
<b>Task Attributes</b>	
Mode	Calculate
Methodology	TYPESIMPLE
Batch Name	otc_batch
Generate Exposure Trades	true
IM File Location	C:\Users\Default
Calculation Set	Default

- » Mode – Calculate or Intraday Exposure Trades. Calculate mode calculates and saves the IM Results. Intraday Exposure Trades mode updates intraday PL marks in collateral exposure trades.
- » Methodology – The desired methodology for the CCP is selected here based on the margin calculator being used.
- » Batch Name – Select the Market batch to run. It should be the same Market Risk batch specified in the DATA\_GRID\_HYDRATE and ERS\_ANALYSIS scheduled task.
- » Generate Exposure Trades – True/False. When set to true, Collateral Exposure trades (CET) are generated against a VM margin call contract.
- » IM File Location – This is the location where the results will be saved in csv format.
- » Calculation Set – Calculation set which will be used to save IM results for value date.

Add the scheduled task ID to the comment of the MARGIN\_OTC\_CALCULATOR\_ST\_ID value in domain "MarginEngine":

Example:

Name = MarginEngine

Value = MARGIN\_OTC\_CALCULATOR\_ST\_ID

Comment = 193120

## 4.8 MARGIN\_OTC\_VM\_CALCULATOR Scheduled Task

This scheduled task computes the VM for the given set of trades and stores the output as VM measures in the database. It can also compute Unsettled VM based on Variation Margin configurations.

### 4.8.1 Variation Margin Configuration

The Variation Margin Configuration window (menu action `margin.VariationMarginConfigWindow`) allows configuring the computation of Unsettled VM, the fees included VM Cash and Coupon, and exclusion of product families.



Variation Margin Config

- » Select fee types for which user wants to include in VM\_COUPON and VM\_CASH.
- » Select the product families for which user wants to exclude from VM results.
- » Select the VM measures for which user wants to have zero values on currency holidays.

Unsettle Variation Margin Config

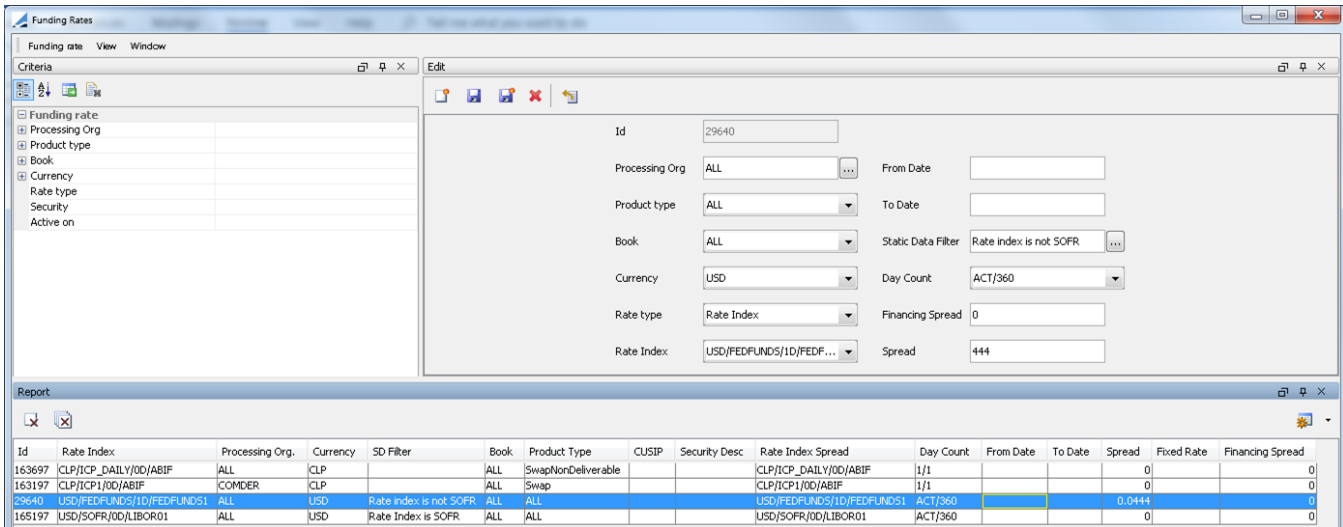
- » Set Calculate Unsettle VM to True to calculate unsettled VM.
- » Select the transfer types for which user wants to calculate unsettled VM.
- » Select the transfer directions for which user wants to calculate unsettled VM.

### 4.8.2 PAI Configuration

The Funding Rate window allows a user to define the funding rule given a set of trade criteria.



You can access the Funding Rate window using **Configuration > Definitions > Funding Rates** from the Calypso Navigator.



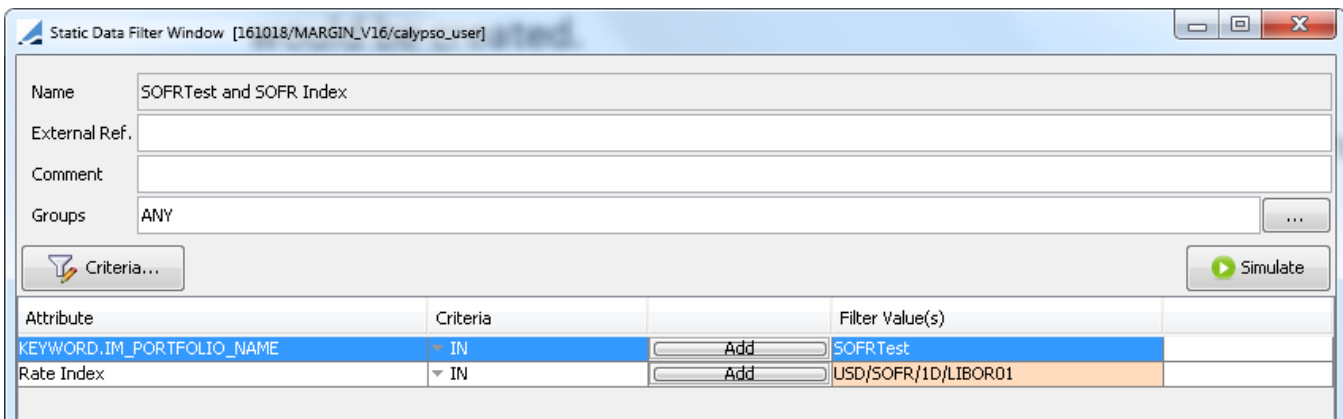
Id	Rate Index	Processing Org.	Currency	SD Filter	Book	Product Type	CUSIP	Security Desc	Rate Index Spread	Day Count	From Date	To Date	Spread	Fixed Rate	Financing Spread
163697	CLP/ICP_DAILY/0D/ABIF	ALL	CLP		ALL	SwapNonDeliverable			CLP/ICP_DAILY/0D/ABIF	1/1			0		0
163197	CLP/ICP1/0D/ABIF	COMDER	CLP		ALL	Swap			CLP/ICP1/0D/ABIF	1/1			0		0
29640	USD/FEDFUNDS/1D/FEDFUNDS1	ALL	USD	Rate index is not SOFR	ALL	ALL			USD/FEDFUNDS/1D/FEDFUNDS1	ACT/360			0.0444		0
165197	USD/SOFR/0D/LIBOR01	ALL	USD	Rate Index is SOFR	ALL	ALL			USD/SOFR/0D/LIBOR01	ACT/360			0		0

Static data filters are used to explicitly define a rate for PAI calculation. The key to identifying the rate to be applied is [Book + Product Type + Currency + SD Filter]. This is the out of the box implementation of the funding rate utility itself, so the PAI lookup during the scheduled task refers to the funding rate definitions and lets the funding rate utility filter and apply a rate accordingly.

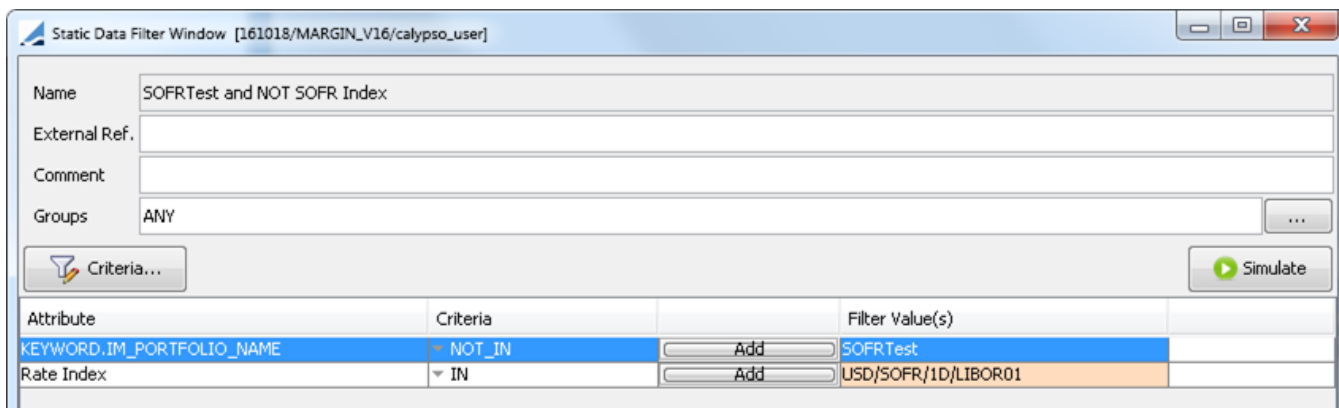
### Configuration for more than one index

To configure different PAI rules for different margin accounts, you need multiple static data filters.

Example:



Attribute	Criteria	Filter Value(s)
KEYWORD.IM_PORTFOLIO_NAME	IN	SOFRTest
Rate Index	IN	USD/SOFR/1D/LIBOR01



Static Data Filter Window [161018/MARGIN\_V16/calypso\_user]

Name: SOFRTTest and NOT SOFR Index

External Ref.:

Comment:

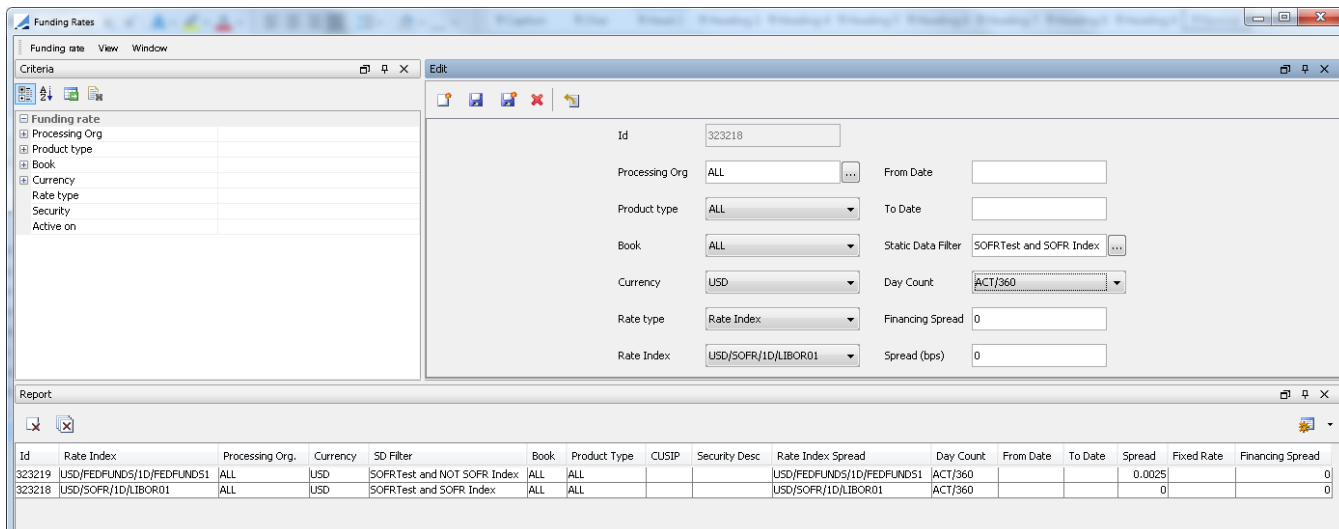
Groups: ANY

Criteria...

Simulate

Attribute	Criteria	Filter Value(s)
KEYWORD.IM_PORTFOLIO_NAME	NOT_IN	SOFRTTest
Rate Index	IN	USD/SOFR/1D/LIBOR01

Then, the user would define two rules in the funding rate window, one for each SD Filter.



Funding Rates

Criteria

Edit

Id: 323218

Processing Org: ALL

Product type: ALL

Book: ALL

Currency: USD

Rate type: Rate Index

Rate Index: USD/SOFR/1D/LIBOR01

From Date:

To Date:

Static Data Filter: SOFRTTest and SOFR Index

Day Count: ACT/360

Financing Spread: 0

Spread (bps): 0

Report

Id	Rate Index	Processing Org.	Currency	SD Filter	Book	Product Type	CUSIP	Security Desc	Rate Index Spread	Day Count	From Date	To Date	Spread	Fixed Rate	Financing Spread
323219	USD/FEDFUNDS/1D/FEDFUNDS1	ALL	USD	SOFRTTest and NOT SOFR Index	ALL	ALL			USD/FEDFUNDS/1D/FEDFUNDS1	ACT/360			0.0025		0
323218	USD/SOFR/1D/LIBOR01	ALL	USD	SOFRTTest and SOFR Index	ALL	ALL			USD/SOFR/1D/LIBOR01	ACT/360			0		0

In this case, any USD Trades across any books will then be picked up if they are part of the defined IM\_PORTFOLIO\_NAME. If the trade has an index of SOFR, then it will use the SOFR Index to find the applicable PAI rate. If the trade has any other index or is fixed rate, it will use the FEDFUNDS index to find the applicable rate.

The SD Filters can be set up on any trade criteria, so very detailed rules can be created for applying different indexes, fixes rates, or spreads to different trades.

### 4.8.3 Scheduled Task

Create a MARGIN\_OTC\_VM\_CALCULATOR scheduled task.

<b>Task Description</b>	
Task Type:	MARGIN_OTC_VM_CALCULATOR
External Reference:	Margin_Official
Comments:	
Description:	
<b>Execution Parameters</b>	
Attempts:	1
Retry After:	0 minutes
Expected Execution Time (SLA):	8 minutes
JVM Settings:	-Xms512m -Xmx1024m
Log Settings:	
<b>Task Notification Options</b>	
<input type="checkbox"/> Send Emails	<input type="checkbox"/> Publish Business Events
To User:	
<b>Common Attributes</b>	
Task ID	199620
Processing Org	
Trade Filter	
Filter Set	
Pricing Environment	OFFICIAL
Timezone	America/Los_Angeles
Valuation Time Hour	
Valuation Time Minute	
Undo Time Hour	
Undo Time Minute	
Valuation Date Offset	
From Days	0
To Days	0
Pricer Measures	
Business Holidays	
<b>Task Attributes</b>	
Include VM Cash	Yes
VM Measures	CVM, NPV, PV01, VM_PRINCIPAL_PRI, VM_PRINCIPAL_SEC, VM...
Include PAI	No
PAI Pre Pay	No
Hierarchy Name	Margin_Official
Include Settlement Cash	No
Calculation Set	Default
Previous Day Calculation Set	Default
Grid: Dispatcher Name	default
Job Size	10
Generate Exposure Trades	true
Special Working Day TradeFilters	
Special Working Day Calendars	

## Mandatory Fields

- Trade Filter: Trade filter pointing to the "IM\_PORTFOLIO\_NAME" keyword, which represents a Margin Account.
- Pricing Environment: This is the pricing env that will be used to calculate the VM measures.

## Task Attributes

- Include VM Cash: Yes/No. When set to Yes, the VM\_CASH is included in the VM\_EXPOSURE.

- VM Measures: Select the VM measures you want to calculate. Available VM measures are retrieved from the table margin\_vm\_definition (see below for details).
- Include PAI: Yes/No. When set to Yes, the PAI is included in the VM\_EXPOSURE.
- PAI Pre Pay: Yes/No. Funding Period is calculated differently based on this flag of PAI calculation.
- Hierarchy Name: Market Risk Hierarchy which will be used to load the trade for which the calculation needs to be run.
- Include Settlement Cash: Yes/No. When set to Yes, cash settlement is included in the VM calculation.
- Calculation Set: Calculation set which will be used to save VM results for value date.
- Previous Day Calculation Set: Calculation set which will be used to retrieve previous VM results.
- Grid: Dispatcher Name / Job Size: Attributes to select a Dispatcher and the number of trades per calculator.
- Generate Exposure Trades: True/False. When set to true, Collateral Exposure trades (CET) are generated against a VM margin call contract.
- Special Working Day TradeFilters: A trade filter which contains only special working day trades.
- Special Working Day Calendars: the calendar which only contains special working days as business days, all other days will be holidays on this calendar.

VM is calculated at the trade level and then aggregated at the Margin Call Contract level. The VM is calculated in the trade currency (or settlement currency for NDF). VM is then aggregated in CET and all the aggregation is done at the trade currency level, i.e. there is one CET for each trade currency in the margin/position account.

The VM exposure for each trade is calculated using the formula given below:

#### T+1 Currencies

$$NPV\_ADJ(T) = NPV(T) - \text{Cash}(T+1) * DF(1 \text{ Day})$$

$$VM(T) = NPV\_Adj(T) - NPV\_Adj(T-1)$$

$$VM\_EXPOSURE(T) = VM\_CASH(T) + VM(T)$$

#### T+2 Currencies

$$NPV\_ADJUSTED(T) = NPV(T) - \text{CASH}(T+1) * DF(1 \text{ Day}) - \text{CASH}(T+2) * DF(2 \text{ Day})$$

$$VM(T) = NPV\_Adj(T) - NPV\_Adj(T-1)$$

$$VM\_EXPOSURE(T) = VM\_CASH(T) + VM(T)$$

$$T+1 = \text{One Business Day After } T$$

Where:

Cash(T+1) = coupon and fees to be settled next business day for T+1 currencies

Cash(T+2) = coupon and fees to be settled in two business days for T+2 currencies

NPV\_Adj(T-1) = NPV\_Adj from previous business day's result using currency holiday in Previous Day Calculation Set

### Exception for GBP FRAs:

GBP FRAs

$NPV\_ADJ(T) = NPV(T)$

$VM(T) = NPV\_Adj(T) - NPV\_Adj(T-1)$

### New Trade

Any trade where no VM was run on previous day will be treated as "new" trade and while calculating VM, the NPV\_ADJ and VM for previous day will be set to zero. VM for previous day will not be calculated on the fly if it was not run for previous day. For example, backloaded trades will be treated as new trades and the NPV\_ADJ and VM for previous day will be set to zero.

### PAI

PAI is calculated using the following formula:

$PAI = -1 * (Adjusted\ NPV) * (Funding\ Rate) * (Funding\ Period) / (Day\ Count).$

Where

- Adjusted NPV = First, pick a settlement date: Check if valuation date is a Currency OR Clearing holiday.  
If Valuation date = Holiday, then Last Settlement date is one business day before the valuation date using both clearing and currency holidays.  
If Valuation date is not a holiday, then last settlement date is equal to valdate.  
Once the settlement date is calculated, the NPV\_ADJ selection date will be:  
If Trade NOT IN the SWD filter, choose the previous business day from settlement date using clearing calendar.  
If Trade IS in the SWD filter, choose the previous business day from the settlement date using the clearing and SWD calendars.
- Funding Rate = The rate returned from the funding rate utility as of value date of the scheduled task.  
If rate is not found, an error is thrown. All trades should have a funding rate definition so that some trades are not accidentally missed. Trades which are not supposed to have a PAI but are included in the scheduled task filter should be assigned a Fixed Rate of 0 in the funding rate window.
- Funding Period = This will have two options and will act differently according to a PAI\_PREPAY flag on the scheduled task.  
If attribute is true: (Next Business Date – Valuation Date)  
If attribute is not set or set to false: (Valuation Date – Previous Business Date)

In both above cases, the next or previous business date

If Trade NOT IN the SWD filter, use the clearing calendar to find a business date.

If Trade IS in the SWD filter, use the clearing and SWD calendars to find a business date.

If no calendar is set on the Book's Processing Organization, the currency calendar will be used in place of the clearing calendar.

- Day Count = Use the day count according to the Funding Rate Definition

## Table margin\_vm\_definition

VM measures to be computed are selected from that table. You can add more measures as needed.

NAME	ADDITIONAL_COLUMN_INDEX	PRODUCT_TYPE	MEASURE_NAME	INTRADAY	CUMULATIVE
NPV	-1		NPV	1	1
VM	-1		VM	1	1
VM_CASH	-1		VM_CASH	1	1
NPV_ADJ	-1		NPV_ADJ	1	1
PAI	-1		PAI	0	0
VM_EXPOSURE	-1		VM_EXPOSURE	0	1
FUNDING_RATE	1		PAI_FUNDING_RATE	0	0

When the scheduled task is run for a certain date, the resulting VM measures are stored in the following tables: margin\_trade\_vm and margin\_portfolio\_vm. No PL Marks will be generated for these measures. These measures can be configured in the trade browser and can be added as additional columns for reporting.

## Table margin\_trade\_vm

Query Result												
TRADE_ID	VALUATION_DATE	CURRENCY	MARGIN_AGREEMENT_NAME	VM	VM_CASH	NPV	NPV_ADJ	PAI	VM_EXPOSURE	ADDITIONAL_MEASURE_1	ADDITIONAL_MEASURE_2	ADDITIONAL_MEASUI
598430	1/23/19 4:00:00:000 PM PST	GBP	CM201P_IRS	0	0	-77873.91160336789	-77873.91160336789	0	0	0.8860163986682892	0	0
598934	1/23/19 4:00:00:000 PM PST	EUR	CM201P_IRS	0.8860163986682892	0	-77873.91160336789	-77873.91160336789	0	0.8860163986682892	0	0	0
625029	1/23/19 4:00:00:000 PM PST	EUR	CM201P_IRS	0.8860163986682892	0	-77873.91160336789	-77873.91160336789	0	0.8860163986682892	0	0	0
598930	1/23/19 4:00:00:000 PM PST	USD	CM201P_IRS	7.918812767078634	0	135255.19103684527	135255.19103684527	0	7.918812767078634	0	0	0
631014	1/23/19 4:00:00:000 PM PST	GBP	CM201P_IRS	-8.882606888131704	0	-455460.1180786683	-455460.1180786683	0	-8.882606888131704	0	0	0
598933	1/23/19 4:00:00:000 PM PST	GBP	CM201P_IRS	-8.882606888131704	0	-455460.1180786683	-455460.1180786683	0	-8.882606888131704	0	0	0
631006	1/23/19 4:00:00:000 PM PST	GBP	CM201P_IRS	-8.882606888131704	0	-455460.1180786683	-455460.1180786683	0	-8.882606888131704	0	0	0
628503	1/23/19 4:00:00:000 PM PST	GBP	CM201P_IRS	8.882606888131704	0	455460.1180786683	455460.1180786683	0	8.882606888131704	0	0	0
631517	1/23/19 4:00:00:000 PM PST	GBP	CM201P_IRS	-455460.1180786683	0	-455460.1180786683	-455460.1180786683	0	-455460.1180786683	0	0	0
625511	1/23/19 4:00:00:000 PM PST	EUR	CM201P_IRS	0.8860163986682892	0	-77873.91160336789	-77873.91160336789	0	0.8860163986682892	0	0	0
631008	1/23/19 4:00:00:000 PM PST	GBP	CM201P_IRS	-8.882606888131704	0	-455460.1180786683	-455460.1180786683	0	-8.882606888131704	0	0	0
628005	1/23/19 4:00:00:000 PM PST	GBP	CM201P_IRS	8.882606888131704	0	455460.1180786683	455460.1180786683	0	8.882606888131704	0	0	0
598931	1/23/19 4:00:00:000 PM PST	EUR	CM201P_IRS	54.65461673401296	0	-6588142.06510825	-6588142.06510825	0	54.65461673401296	0	0	0
598431	1/23/19 4:00:00:000 PM PST	EUR	CM201P_IRS	87.53076844108728	0	-17451.583623906976	-17451.583623906976	0	87.53076844108728	0	0	0
628003	1/23/19 4:00:00:000 PM PST	GBP	CM201P_IRS	8.882606888131704	0	455460.1180786683	455460.1180786683	0	8.882606888131704	0	0	0
631504	1/23/19 4:00:00:000 PM PST	GBP	CM201P_IRS	-8.882606888131704	0	-455460.1180786683	-455460.1180786683	0	-8.882606888131704	0	0	0
628007	1/23/19 4:00:00:000 PM PST	GBP	CM201P_IRS	8.882606888131704	0	455460.1180786683	455460.1180786683	0	8.882606888131704	0	0	0
624579	1/23/19 4:00:00:000 PM PST	EUR	CM201P_IRS	0.8860163986682892	0	-77873.91160336789	-77873.91160336789	0	0.8860163986682892	0	0	0
629504	1/23/19 4:00:00:000 PM PST	GBP	CM201P_IRS	-8.882606888131704	0	-455460.1180786683	-455460.1180786683	0	-8.882606888131704	0	0	0
598932	1/23/19 4:00:00:000 PM PST	EUR	CM201P_IRS	36.50524268345907	0	-3672743.8795696828	-3672743.8795696828	0	36.50524268345907	0	0	0
628505	1/23/19 4:00:00:000 PM PST	GBP	CM201P_IRS	8.882606888131704	0	455460.1180786683	455460.1180786683	0	8.882606888131704	0	0	0
627017	1/23/19 4:00:00:000 PM PST	EUR	CM201P_IRS	0.443008727960199	0	-38937.013569218805	-38937.013569218805	0	0.443008727960199	0	0	0
629508	1/23/19 4:00:00:000 PM PST	GBP	CM201P_IRS	-8.882606888131704	0	-455460.1180786683	-455460.1180786683	0	-8.882606888131704	0	0	0
631007	1/23/19 4:00:00:000 PM PST	GBP	CM201A1_IRS	8.882606888131704	0	455460.1180786683	455460.1180786683	0	8.882606888131704	0	0	0
629007	1/23/19 4:00:00:000 PM PST	GBP	CM201A1_IRS	8.882606888131704	0	455460.1180786683	455460.1180786683	0	8.882606888131704	0	0	0
631503	1/23/19 4:00:00:000 PM PST	GBP	CM201A1_IRS	8.882606888131704	0	455460.1180786683	455460.1180786683	0	8.882606888131704	0	0	0
629503	1/23/19 4:00:00:000 PM PST	GBP	CM201A1_IRS	8.882606888131704	0	455460.1180786683	455460.1180786683	0	8.882606888131704	0	0	0
631009	1/23/19 4:00:00:000 PM PST	GBP	CM201A1_IRS	8.882606888131704	0	455460.1180786683	455460.1180786683	0	8.882606888131704	0	0	0
631015	1/23/19 4:00:00:000 PM PST	GBP	CM201A1_IRS	8.882606888131704	0	455460.1180786683	455460.1180786683	0	8.882606888131704	0	0	0
600430	1/23/19 4:00:00:000 PM PST	EUR	CM201A1_IRS	0.8860163986682892	0	-77873.91160336789	-77873.91160336789	0	0.8860163986682892	0	0	0

## Table margin\_portfolio\_vm

Query Result

VERSION	VALUATION_DATE	CURRENCY	MARGIN_AGREEMENT_NAME	VM	VM_CASH	NPV	NPV_ADJ	PAI	VM_EXPOSURE	ADDITIONAL_MEASURE_1	ADDITIONAL_MEASURE_2	ADDITIONAL_MEASURE_3
0	1/23/19 4:00:00.000 PM PST	EUR	CM201A1_IRS	0.886016396682892	0	-77873.91160336789	-77873.91160336789	0	0.886016396682892	0	0	0
0	1/23/19 4:00:00.000 PM PST	USD	CM201P_IRS	7.918812767078634	0	135255.19103684527	135255.19103684527	0	7.918812767078634	0	0	0
0	1/23/19 4:00:00.000 PM PST	EUR	CM202A1_IRS	0	0	0	0	0	0	0	0	0
0	1/23/19 4:00:00.000 PM PST	EUR	CM201P_IRS	192.6777022260285	0	-10628770.18828463	-10628770.18828463	0	192.6777022260285	0	0	0
0	1/23/19 4:00:00.000 PM PST	GBP	CM201P_IRS	-455477.8832924446	0	-1366380.3542360049	-1366380.3542360049	0	-455477.8832924446	0	0	0
0	1/23/19 4:00:00.000 PM PST	EUR	CM202P_IRS	3.101057968008875	0	-272558.74837932247	-272558.74837932247	0	3.101057968008875	0	0	0
0	1/23/19 4:00:00.000 PM PST	GBP	CM201A1_IRS	455522.29632088523	0	3643680.844629346	3643680.844629346	0	455522.29632088523	0	0	0
0	1/24/19 4:00:00.000 PM PST	GBP	CM201A2_IRS	455469.0105746831	0	455469.0105746831	455469.0105746831	0	455469.0105746831	0	0	0
0	1/30/19 4:00:00.000 PM PST	GBP	CM201P_IRS	455522.49484105606	0	444113.2133389374	455522.49484105606	0	455522.49484105606	0	0	0
0	1/30/19 4:00:00.000 PM PST	EUR	CM201P_IRS	10503531.821183462	0	10503531.821183462	10503531.821183462	0	10503531.821183462	0	0	0
0	1/30/19 4:00:00.000 PM PST	GBP	CM201A2_IRS	-455522.49484105606	0	-455522.49484105606	-455522.49484105606	0	-455522.49484105606	0	0	0
0	1/30/19 4:00:00.000 PM PST	EUR	CM202A1_IRS	0	0	0	0	0	0	0	0	0
0	1/30/19 4:00:00.000 PM PST	GBP	CM201A1_IRS	-455522.49484105606	0	-455522.49484105606	-455522.49484105606	0	-455522.49484105606	0	0	0
0	1/30/19 4:00:00.000 PM PST	EUR	CM202P_IRS	132134.36834968044	0	132134.36834968044	132134.36834968044	0	132134.36834968044	0	0	0
0	1/30/19 4:00:00.000 PM PST	USD	CM201P_IRS	-135311.52948210144	0	-135311.52948210144	-135311.52948210144	0	-135311.52948210144	0	0	0
0	1/30/19 4:00:00.000 PM PST	EUR	CM201A1_IRS	88089.54039077554	0	88089.54039077554	88089.54039077554	0	88089.54039077554	0	0	0
7	1/24/19 4:00:00.000 PM PST	EUR	CM201P_IRS	-45894.81744798855	0	-10657213.42210871	-10657213.42210871	0	-45894.81744798855	0	0	0
0	1/24/19 4:00:00.000 PM PST	EUR	CM202A1_IRS	0	0	0	0	0	0	0	0	0
7	1/24/19 4:00:00.000 PM PST	EUR	CM201A1_IRS	-10221.33433170407	0	-88095.24593507196	-88095.24593507196	0	-10221.33433170407	0	0	0
7	1/24/19 4:00:00.000 PM PST	GBP	CM201P_IRS	-2732840.741510826	0	-4099221.095746831	-4099221.095746831	0	-2732840.741510826	0	0	0

The variation margin results can also be configured in the trade browser by adding the desired columns.

Trade Browser / Trade Browser

Report Data View Export Market Data Process Utilities Help

Criteria

Template Description

Trade

Settle

Process

Maturity

Trade Id

Buy/Sell

CP role: ALL

Processing Org

Custody

Keywords

Search

Trade Id External Reference

626014626014

625028625028

Configure Columns

All Elements:

Q- variation margin|

Trade

Linked Object

Product

TradeVM

Variation Margin

Variation Margin.CVM

Variation Margin.CVM Currency

Variation Margin.DELTA

Variation Margin.DELTA Currency

Variation Margin.FUNDING\_RATE

Variation Margin.Margin Account

Variation Margin.NOTIONAL

Variation Margin.NOTIONAL Currency

Variation Margin.NPV

Variation Margin.NPV Currency

Variation Margin.NPV\_ADJ

Variation Margin.NPV\_ADJ Currency

Variation Margin.NPV\_ADJ\_FAR

Variation Margin.NPV\_ADJ\_FAR Currency

Variation Margin.NPV\_ADJ\_NEAR

Variation Margin.NPV\_ADJ\_NEAR Currency

Variation Margin.NPV\_ADJ\_PAY

Variation Margin.NPV\_ADJ\_PAY Currency

Variation Margin.NPV\_ADJ\_REC

Variation Margin.NPV\_ADJ\_REC Currency

Variation Margin.NPV\_FAR

Variation Margin.NPV\_FAR Currency

Variation Margin.NPV\_NEAR

Variation Margin.NPV\_NEAR Currency

Variation Margin.NPV\_PAY

Variation Margin.NPV\_PAY Currency

Variation Margin.NPV\_REC

Variation Margin.NPV\_REC Currency

Variation Margin.PAI

Variation Margin.PAI Currency

Variation Margin.PV01

Variation Margin.PV01 Currency

Variation Margin.VM

Variation Margin.VM Currency

Variation Margin.VM\_CASH

Variation Margin.VM\_CASH Currency

Selected Elements:

Trade Id

External Reference

TRADE\_KEYWORD.IM\_PORTFOLIO\_NAME

TRADE\_KEYWORD.LinkedTo

TRADE\_KEYWORD.BusinessFlow

Mirror Trade Id

TRADE\_KEYWORD.CCPClearDate

Product Description

TradeStatus

Product Type

Principal Amount

Product Currency

Book

TRADE\_KEYWORD.CCP

TRADE\_KEYWORD.RelatedProductType

TRADE\_KEYWORD.CCPAccountReference

Trade Date



Trade Browser / Trade Browser

Report Data View Export Market Data Process Utilities Help

Criteria

Template Description

Trade Start End + -

Settle Start End + -

Process Start End + -

Maturity Start End + -

Trade ID Bundle Id

Buy/Sell Max Rows#

CP role: ALL

Processing Org

Custody

Sec Code BB\_CALC\_TYP

Excl. Underlying products

Undo Date

Trade Filter CM203A1\_IRS

SD Filter

Filter Set

Currency

Product Family

Product Type

Product Id

Status RTIALLY\_ACCEPTED,REGISTERED,TEMP

Action

Keywords

Search Criteria

Trade Id	Principal Amount	Product Currency	Book	Trade Date	Variation Margin.NPV	Variation Margin.VM	Variation Margin.VM_CASH	Variation Margin.CVM	Variation Margin.NPV_ADJ	Variation Margin.PAI
647004	4,000,000.00USD		CM203	Apr 12, 2019 03:17 PM	78,390.44368494	64,945.467434773	0	64,945.467434773	78,390.44368494	0
645506	4,000,000.00USD		CM203	Apr 04, 2019 03:28 PM	78,390.44368494	64,945.467434773	0	64,945.467434773	78,390.44368494	0
642505	2,000,000.00EUR		CM203	Jul 02, 2018 08:00 AM	-49,982.153841294	11.545216936	0	11.545216936	-49,982.153841294	0

## 4.9 Email Alert

You can setup an email alert if the available limit is close to preventing from clearing more trades. For example, if the warning level is 80% and the limit is \$10,000,000, if the limit utilization reaches \$8,000,000, a trade keyword is set on the trade (HEADROOM\_IN\_WARNING = Y), and an email is triggered.

### Message Configuration HRC\_HEADROOM\_WARNING

Message Configuration Setup Window - Version - 0

Utilities Help

PO: ALL

PO: CALYPUK

PO: CALYPUS

PO: FCM

Product: Swap

VERIFIED\_TRADE

id=310218 : HRC\_HEADROOM\_WARNING

id=310219 : HRC\_IM\_WARNING

Edit Browse

Product Type Swap

Event Type VERIFIED\_TRADE

Message Type HRC\_HEADROOM\_WARNING

Processing Org FCM

PO Contact Type Default

Receiver ALL

Receiver Role CounterParty

Rec Contact Type Default

Grouping

Config Id 310218

Delete Save Save As New

Language English

Address Type EMAIL

Gateway PRINTER

Format Type HTML

Template headroomcheckwarning.html

SD Filter Headroom Limit Warning

Audit Filter

Matching Inactive

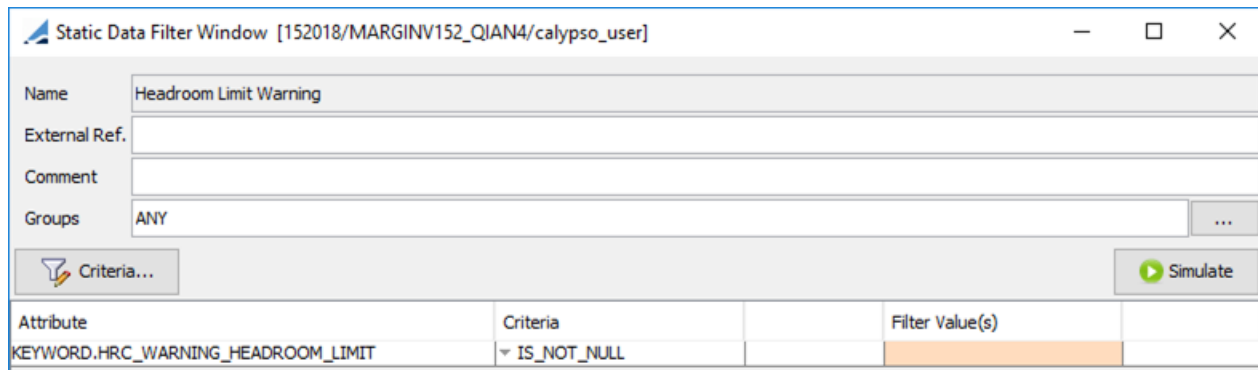
Do not Send Message

Id	Product	Event	Message Type	ProcessingOrg	PO Contact Type	Receiver	Receiver Role	Rec Cont
310218	Swap	VERIFIED_TRADE	HRC_HEADROOM_WARNING	FCM	Default	ALL	CounterParty	Default
310219	Swap	VERIFIED_TRADE	HRC_IM_WARNING	FCM	Default	ALL	CounterParty	Default

- Product Type = Swap



- Event Type = VERIFIED status of the trade. This can be changed according to client's requirement. E.g. client can decide when this message will be generated.
- Address Type = "EMAIL"
- Gateway = "PRINTER"
- Format Type = HTML
- Template can be a custom one
- SD filter filters trades with keyword Headroom Limit Warning



Static Data Filter Window [152018/MARGINV152\_QIAN4/calypso\_user]

Name: Headroom Limit Warning

External Ref.:

Comment:

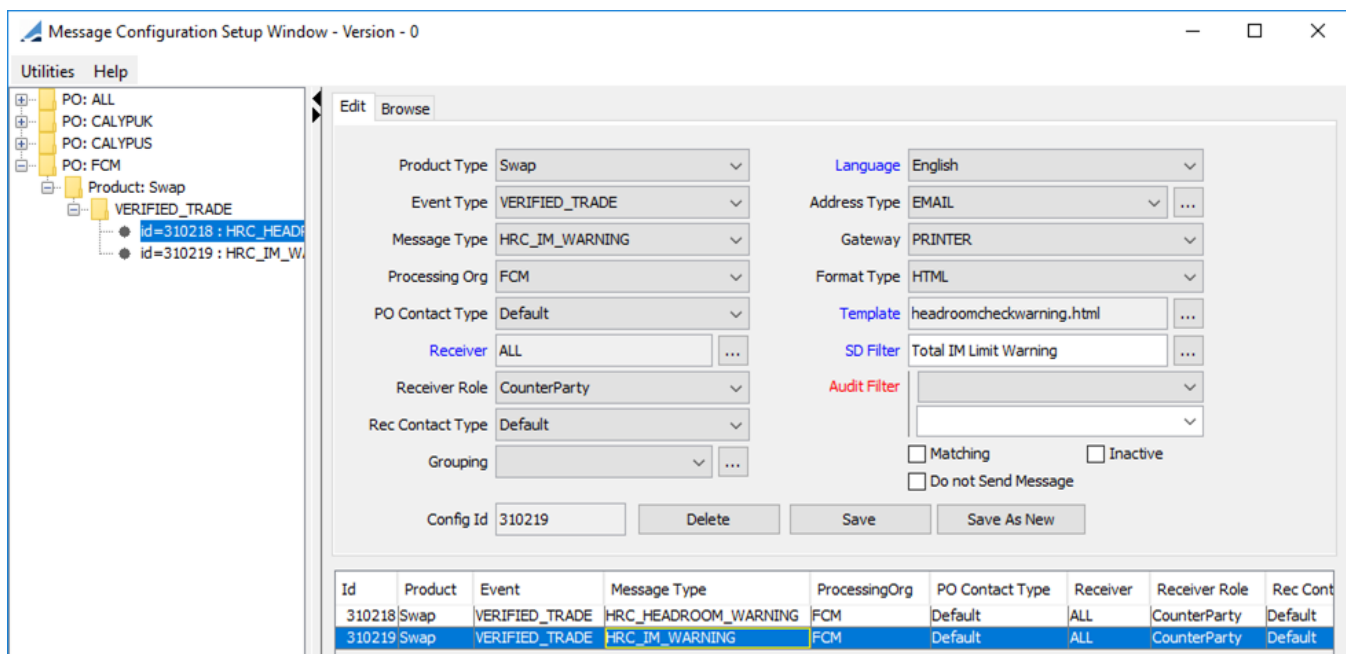
Groups: ANY

Criteria... Simulate

Attribute	Criteria	Filter Value(s)
KEYWORD.HRC_WARNING_HEADROOM_LIMIT	IS_NOT_NULL	

- PO Contact Type set to Default
- Rec Contact Type set to Default

## Message Configuration HRC\_IM\_WARNING



Message Configuration Setup Window - Version - 0

Utilities Help

PO: ALL  
PO: CALYPUK  
PO: CALYPUS  
PO: FCM  
Product: Swap  
VERIFIED\_TRADE  
id=310218 : HRC\_HEADROOM\_WARNING  
id=310219 : HRC\_IM\_WARNING

Edit Browse

Product Type: Swap  
Event Type: VERIFIED\_TRADE  
Message Type: HRC\_IM\_WARNING  
Processing Org: FCM  
PO Contact Type: Default  
Receiver: ALL  
Receiver Role: CounterParty  
Rec Contact Type: Default  
Grouping:

Language: English  
Address Type: EMAIL  
Gateway: PRINTER  
Format Type: HTML  
Template: headroomcheckwarning.html  
SD Filter: Total IM Limit Warning  
Audit Filter:

Matching ☐ Inactive ☐  
Do not Send Message ☐

Config Id: 310219 Delete Save Save As New

Id	Product	Event	Message Type	ProcessingOrg	PO Contact Type	Receiver	Receiver Role	Rec Cont
310218	Swap	VERIFIED_TRADE	HRC_HEADROOM_WARNING	FCM	Default	ALL	CounterParty	Default
310219	Swap	VERIFIED_TRADE	HRC_IM_WARNING	FCM	Default	ALL	CounterParty	Default

Static Data Filter Window [152018/MARGINV152\_QIAN4/calypso\_user]

Name: Total IM Limit Warning  
External Ref.:  
Comment:  
Groups: ANY ...  
Criteria... Simulate

Attribute	Criteria	Filter Value(s)
KEYWORD:HRC_WARNING_IM_LIMIT	IS_NOT_NULL	

## Messenger Sender Configuration

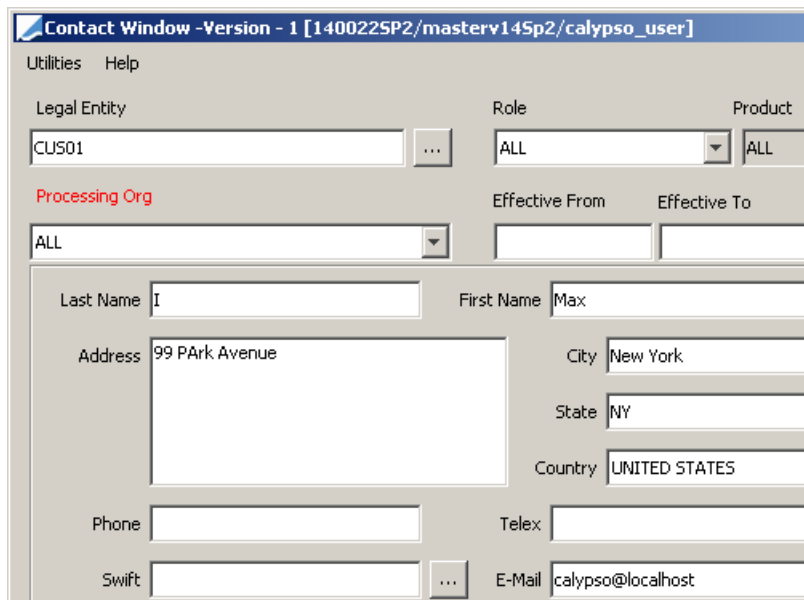
Message Sender Config

Sender Config Copy Config

Message Status: SENT Product Type: Swap  
Advice Type: CUSTOM Address Type: EMAIL  
Static Data Filter: Gateway: PRINTER  
☒ Save Master and Copies AdviceDocuments will be saved in DB  
☒ Send ☒ Sender By Method ☐ Sender By Gateway  
EMAILDocumentSender class will be called  
Save Remove New

Id	Status	Product	Advice Type	Address Type	Gateway	SD Filter	Send	Save	By Gateway	By Method
281218	SENT	Swap	CONFIRM	EMAIL	PRINTER		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
1	TO_SEND	ALL	CONFIRM	SWIFT	SWIFT		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
850	SENT	ALL	CONFIRM	MAIL	PRINTER		<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
142196	SENT	ALL	CONSENT	LCH_UK	MQ	NonCancelSubActionMsg	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
116698	TO_BE_SENT	ALL	CONSENT	LCH_UK	MQ	NonCancelSubActionMsg	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
83704	TO_BE_SENT	ALL	CONSENT	LCH	MQ	NonCancelSubActionMsg	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
64733	TO_BE_SENT	ALL	CONSENT	CME	MQ		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
281217	SENT	Swap	CUSTOM	EMAIL	PRINTER		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
273214	TO_BE_SENT	ALL	CVR_WORKSHEET	LCH	MQ	isLCHCVRValidToSend	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
910	PENDING	ALL	DKCONF	DTCC	DTCC		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>

Email address is configured on the sender's and receiver's contact specified in the Message Setup.



Utilities Help

Legal Entity: CU501 ... Role: ALL Product: ALL

Processing Org: ALL Effective From: Effective To:

Last Name: I First Name: Max

Address: 99 Park Avenue City: New York

State: NY Country: UNITED STATES

Phone: Telex:

Swift: ... E-Mail: calypso@localhost

Email address is configured on the sender's and receiver's contact specified in the Message Setup.

## 5. OTC Margin Collateral Setup

The collateral can be taken into account in the limits check. You can use the collateral computed for Calypso Margin Call Contracts, or you can import external collateral amounts.

### 5.1 Collateral Management Engine

#### Engine Configuration

Unable to edit a running engine. Displaying in read-only mode.

Engine Name: ?  Engine ID:

Engine Class:

Display Name: ?  Application Type:

Description:

Persisted Event Configuration:

PSEventAccountBilling  
 PSEventInventorySecPosition  
 PSEventMarginCallEntry  
 PSEventTrade  
 PSEventTransfer

Event Filters:

AllTransfersKnownEventFilter  
 CollateralManagementEventFilter

Engine Manager Configuration:  Start on Startup: ☒

Max Queue Size: ?  Max Batch Size: ?  Number of Threads: ?

Event Pool Policy: ?  Pricing Environment: ?

Save settle position changes: ?

Configuration attributes

Attribute Name	Attribute Value
BALANCE_MODE	
CLASS_NAME	
DISPLAY_NAME	
DateType	
EVENT_ORDER	
EXCLUDE_PRODUCTTYPE	
EXCLUDE_STATUS	
HANDLE_FUTURE_LIQ_CASH_FLOWS	
IGNORE_ACTION	
INSTANCE_NAME	
INV_MAX_POSITION	
LIQUIDATION_TIMEOUT	
MAX_TIMER_POSITION	
MCC_DATE_KEYWORD	
MCC_FEED_NAME	
MCC_IGNORE_CONFIG_CHANGES	
MCC_INTRA_DELAY	

[Go Back](#)

## 5.2 Margin Call Contracts

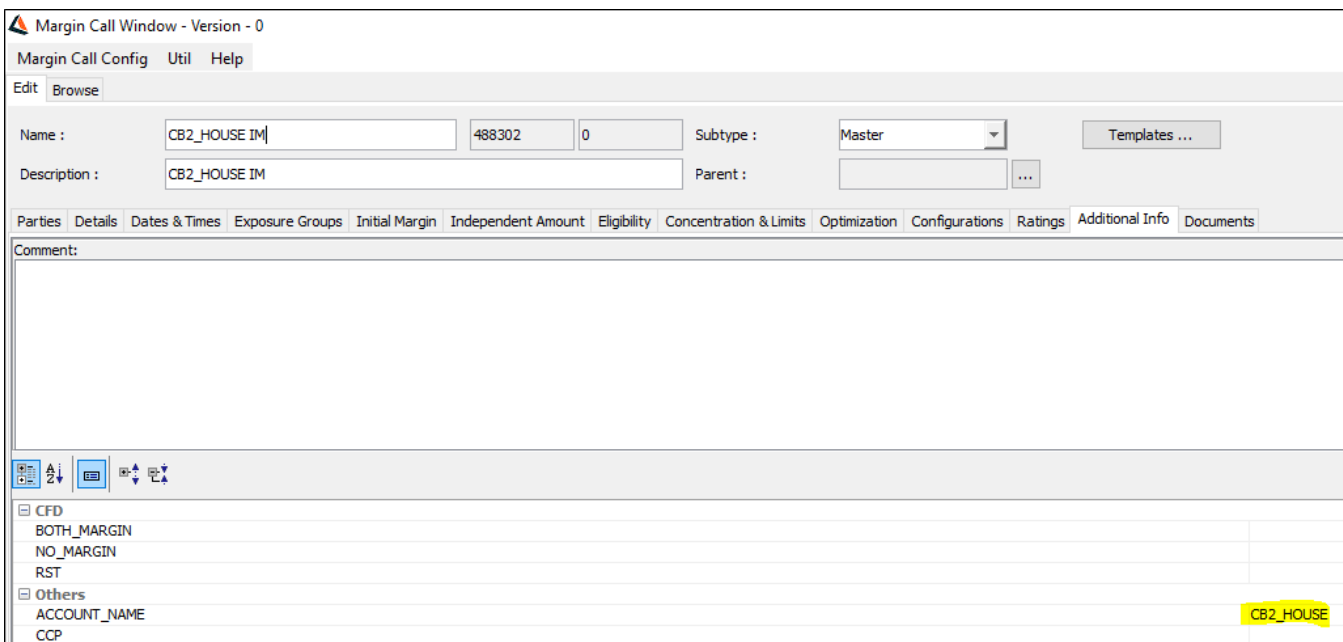
For the IM Clearing Member contracts, you need to add a margin call contract attribute that matches the clearing member account node.

Sample account node in the Market Risk Hierarchy



The screenshot shows a tree view of the Market Risk Hierarchy. The root node is **CCP\_AUTO2**. Under it is a node labeled **CB2**. Under **CB2** is a node labeled **CB2\_HOUSE [CB2\_HOUSE]**. To the right of the tree are buttons for **Attributes**, **Node**, and a document icon.

Set the margin call contract attribute ACCOUNT\_NAME to the account node.



The screenshot shows the **Margin Call Window - Version - 0**. The window has a menu bar with **Margin Call Config**, **Util**, and **Help**. Below the menu bar is a toolbar with **Edit** and **Browse**. The main form has fields for **Name** (CB2\_HOUSE IM), **Description** (CB2\_HOUSE IM), **Subtype** (Master), and **Parent**. There are also buttons for **Templates ...** and **...**. Below the form is a tabbed interface with tabs for **Parties**, **Details**, **Dates & Times**, **Exposure Groups**, **Initial Margin**, **Independent Amount**, **Eligibility**, **Concentration & Limits**, **Optimization**, **Configurations**, **Ratings**, **Additional Info**, and **Documents**. The **Additional Info** tab is selected. Below the tabs is a **Comment** field. At the bottom is a table with columns for **CFD**, **Others**, and **ACCOUNT\_NAME**. The table has rows for **BOTH\_MARGIN**, **NO\_MARGIN**, **RST**, and **CCP**. The **ACCOUNT\_NAME** column for the **CCP** row is highlighted in yellow and contains the text **CB2\_HOUSE**.

## 5.3 Importing External Collateral Amounts

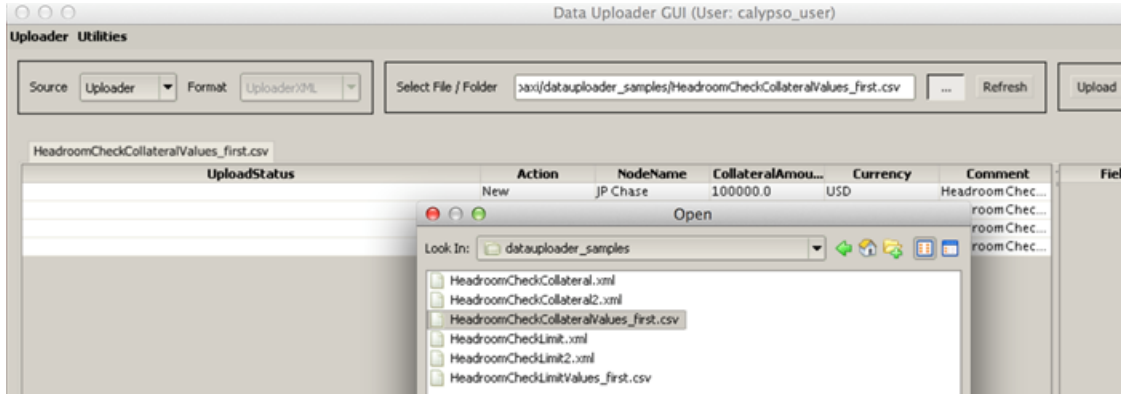
External Collateral Amounts can be imported using the Data Uploader.

The Data Uploader supports CSV and XML files. The file names should start with "HEADROOMCHECKCOLLATERALVALUES", for example "HEADROOMCHECKCOLLATERALVALUES\_<name>.csv".

Sample files are provided under <calypso home>/docs/calypso-datauploader/samples/HeadroomCheck.

Launch the Data Uploader window using **Processing > Tools > Data Uploader** from the Calypso Navigator.

Select a file from your machine, the content for the file is displayed:



» Click **Upload** to load the collateral amounts into Calypso.

Note that the collateral currency is the base currency of the pricing environment defined in the environment property HEADROOMCHECK\_PRICING\_ENV.

## 5.4 Collateral Workflow

In order to trigger the Limit Check for collateral positions updates, you need to add the following rules to the Collateral workflow provided out-of-the box by the Collateral module.

- All the transitions from NONE to EXECUTED should be STP.
- Add the rule StartMonitorEntryEvent on the transition NONE – NEW – PRICING. It allows the scheduled task COLLATERAL\_MANAGEMENT to monitor collateral positions changes. It generates PSEventMarginCallEntry events that are consumed by the CollateralManagement engine to update the Limit Check accordingly.
- Add the rule StopMonitorEntryEvent on the transition of your choice, (all PRICING – PRICE transitions for example). It stops monitoring collateral positions changes for those transitions.

1\_LOCAL/calpso\_user]

Processing Org: ALL

Event Class: Collateral Subtype: ALL Product: ALL

Orig Status: AGREED\_NO\_CALL Action: EXECUTE Result Status: EXECUTED

☐ Different User ☐ Create Task ☒ Use STP ☐ Use KickOff/Cut Off  Priority

☐ Log Completed ☒ Preferred Action ☐ Update Only ☐ Generate Intermediary Event ☐ Needs manual Authorization

Rules:  ... Help...

Filter:  ... Custom Rules Definitions...

Audit Filter:

Comment:

Id	Orig Status	Action	Resulting Status	Different User	Use STP	Priority	Log	Subtype	Product Type	Rules	Processing Org
284237	AGREED_NO_CALL	EXECUTE	EXECUTED	<input type="checkbox"/>	<input checked="" type="checkbox"/>	0	<input type="checkbox"/>	ALL	ALL		ALL
284238	ALLOCATED	DISPUTE	DISPUTED	<input type="checkbox"/>	<input type="checkbox"/>	0	<input type="checkbox"/>	ALL	ALL		ALL
284239	ALLOCATED	VALIDATE	VALIDATED	<input type="checkbox"/>	<input checked="" type="checkbox"/>	0	<input type="checkbox"/>	ALL	ALL		ALL
327719	CALCULATED	PROCESS	PROCESSED	<input type="checkbox"/>	<input type="checkbox"/>	0	<input type="checkbox"/>	ALL	ALL		ALL
284240	DISPUTED	RESOLVE_DISPUTE	ALLOCATED	<input type="checkbox"/>	<input type="checkbox"/>	0	<input type="checkbox"/>	ALL	ALL		ALL
284241	EXPOSURE_AGREED	ALLOCATE	ALLOCATED	<input type="checkbox"/>	<input type="checkbox"/>	0	<input type="checkbox"/>	ALL	ALL		ALL
284242	EXPOSURE_AGREED	CLOSE	CLOSED	<input type="checkbox"/>	<input type="checkbox"/>	0	<input type="checkbox"/>	ALL	ALL	Close	ALL
284243	EXPOSURE_AGREED	EXECUTE	EXECUTED	<input type="checkbox"/>	<input type="checkbox"/>	0	<input type="checkbox"/>	ALL	ALL		ALL
284244	EXPOSURE_AGREED	RETURN	RETURNED	<input type="checkbox"/>	<input type="checkbox"/>	0	<input type="checkbox"/>	ALL	ALL	Return	ALL
284245	EXPOSURE_AGREED	VALIDATE	PENDING_APPROVAL	<input type="checkbox"/>	<input checked="" type="checkbox"/>	0	<input type="checkbox"/>	ALL	ALL		ALL
284246	NONE	NEW	PRICING	<input type="checkbox"/>	<input type="checkbox"/>	0	<input type="checkbox"/>	ALL	ALL	StartMonitorEntryEvent	ALL
284247	PENDING_APPROVAL	ALLOCATE	ALLOCATED	<input type="checkbox"/>	<input type="checkbox"/>	0	<input type="checkbox"/>	ALL	ALL		ALL
284248	PRICED_NO_CALL	AGREE_EXPOSURE	EXPOSURE_AGREED	<input type="checkbox"/>	<input type="checkbox"/>	0	<input type="checkbox"/>	ALL	ALL		ALL
284249	PRICED_NO_CALL	NOCALL	AGREED_NO_CALL	<input type="checkbox"/>	<input checked="" type="checkbox"/>	0	<input type="checkbox"/>	ALL	ALL		ALL
284250	PRICED_PAY	AGREE_EXPOSURE	EXPOSURE_AGREED	<input type="checkbox"/>	<input checked="" type="checkbox"/>	0	<input type="checkbox"/>	ALL	ALL	AutoAdjust	ALL
284251	PRICED_RECEIVE	AGREE_EXPOSURE	EXPOSURE_AGREED	<input type="checkbox"/>	<input checked="" type="checkbox"/>	0	<input type="checkbox"/>	ALL	ALL	AutoAdjust	ALL
284252	PRICING	PRICE	PRICED_NO_CALL	<input type="checkbox"/>	<input type="checkbox"/>	0	<input type="checkbox"/>	ALL	ALL	CheckNoCall,StopMonitorEntryEvent	ALL
284253	PRICING	PRICE	PRICED_PAY	<input type="checkbox"/>	<input type="checkbox"/>	0	<input type="checkbox"/>	ALL	ALL	CheckPay,StopMonitorEntryEvent	ALL
284254	PRICING	PRICE	PRICED_RECEIVE	<input type="checkbox"/>	<input type="checkbox"/>	0	<input type="checkbox"/>	ALL	ALL	CheckReceive,StopMonitorEntryEvent	ALL
327720	PROCESSED	CALCULATE	CALCULATED	<input type="checkbox"/>	<input type="checkbox"/>	0	<input type="checkbox"/>	ALL	ALL		ALL
327721	PROCESSED	EXECUTE	EXECUTED	<input type="checkbox"/>	<input type="checkbox"/>	0	<input type="checkbox"/>	ALL	ALL	Execute,StopMonitorEntryEvent	ALL
284255	VALIDATED	EXECUTE	EXECUTED	<input type="checkbox"/>	<input checked="" type="checkbox"/>	0	<input type="checkbox"/>	ALL	ALL	StopMonitorEntryEvent	ALL

Make sure that there are no entries for Margin call contracts you use for margin engine in PENDING\_MARGIN\_CALL\_ENTRIES DB table. If there are any MCC entries from some old dates then the user should go back to collateral manager and load MCC on the process date and apply the action which trigger the stopmonitorevent.

For example, there are entries for MCC 501801 AND 501804 on process date May 17 2019

Query: select \* from pending\_margin\_call\_entries where mcc\_id in ('501801','501804','522802')

Query Result: 2 in 0.006 seconds

ID	AUDIT_VERSION	LAST_UPDATE	LAST_USER	MCC_ID	NET_BALANCE	PREV_SECURITY_MARGIN	PREV_SECURITY_MARGIN_DATE	CONSTITUTED_MARGIN	CONSTITUTED_MARGIN_ROUNDED	MTA_AMOUNT	GLOBAL_REQUIRED_MARGIN
1	39511	317-MAY-19 08:48:14.000000000	FM calypso_user	501801	-7801.639999999999	0	(null)	-1007801.64	-1007801.64	0	-1007801.64
2	39513	330-MAY-19 09:30:10.000000000	FM calypso_user	501804	9522.619999999999	0	30-MAY-19 12:00:00.000000000 AM	-30477.38	-30477.38	0	-30477.38

Query Result: 2 in 0.006 seconds

E_DATE_SECURITY	TRADE_MARGIN	MARGIN_REQUIRED	TRADE_DATETIME	PROCESS_DATETIME	PROCESS_DATE	PREV_CASH_MARGIN	PREV_CASH_MARGIN_DATE	NETTABLE_EXPOSURE	ROUNDING_METH
1	-7801.639999999999	-7801.639999999999	18-MAY-19 03:59:00.000000000 AM	18-MAY-19 03:59:00.000000000 AM	17-MAY-19 12:00:00.000000000 AM	1000000	17-MAY-19 12:00:00.000000000 AM	0	BNONE
2	9522.619999999999	9522.619999999999	18-MAY-19 03:59:00.000000000 AM	18-MAY-19 03:59:00.000000000 AM	17-MAY-19 12:00:00.000000000 AM	40000	30-MAY-19 12:00:00.000000000 AM	0	BNONE

Load the MCC on 5/17/2019 and execute the contracts and make sure that the entries are not there in the DB table anymore.

Id	Contract Name	Status	Action	Contract Currency	Global Required Mrg	Dispute	Cpty Amount	Dispute Amount	Dispute Reason	Dispute Status	Acceptance Status	Dispute Comment	Agreed Amount	Direction
262503	MARGIN ENGINE CH203P_IRS IM	EXECUTED	NONE	EUR	-7,801.64		0.00	0.00		None	None		0.00	Pay
262504	MARGIN ENGINE CH203A_IRS IM	EXECUTED	NONE	EUR	-50,477.30		0.00	0.00		None	None		0.00	Pay
0	MARGIN ENGINE CH203A2_IRS IM	NONE	NEW	EUR	0.00		0.00	0.00		None	None		0.00	Pay

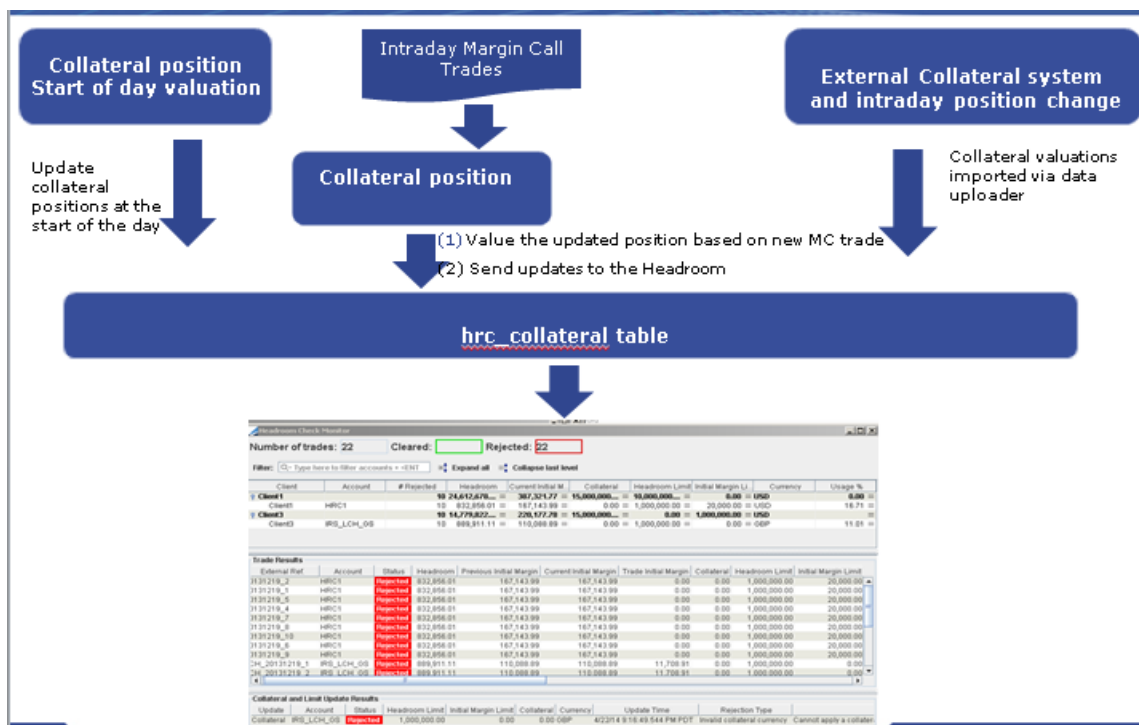
Query Builder

```
select *from pending_margin_call_entries where mcc_id in ('501801','501804','522802')
```

Query Result

All Rows Fetched: 0 in 0.002 seconds

ID	AUDIT_...	LAST_U...	LAST_U...	MCC_ID	NET_BA...	PREV_S...	PREV_S...
----	-----------	-----------	-----------	--------	-----------	-----------	-----------



## 5.5 Steps for Collateral Withdrawal and Limit Check

1. Margin Call Trade is saved



2. Transfer Engine generates transfers for margin call trade
3. Margin Call Position (Inventory Position) is created by Margin Call Position Engine.
4. Collateral Management Engine gets Inventory Position.
5. Collateral Management Engine creates Pending Margin Call Entries.
6. Margin Controller Engine gets a PSEventMarginCallEntry event.
7. Margin Controller Engine sends a specific message (Headroom Collateral Message) to the margin engine bus to request head room validation. This message will carry the trade information along with it, so the action accept, or reject could be applied as an outcome of the headroom check
8. The Margin Engine Head Room check either accepts or rejects the collateral request
9. The DataPersistor within Margin Engine receives the Accept/Reject result from the Margin Engine
10. The DataPersistor applies the "ACCEPT" or "REJECT" action to the Margin Call Trade
11. If rejected, the Margin Call Trade should have workflow that CANCELS the Transfers
12. If rejected, the transfers are canceled
13. The Margin Call Position engine receives the event for the canceled transfers and updates the Inventory Position

Margin Call trade and collateral workflow:

Processing Org

FCM

...

Event Class PSEventTrade

Subtype ALL

Product MarginCall

Orig Status NONE

Action NEW

Result Status PENDING

☐ Different User

☒ Create Task

☐ Use STP

☐ Use KickOff/Cut Off

0 Priority

☐ Log Completed

☐ Preferred Action

☐ Update Only

☐ Generate Intermediary Event

☐ Needs manual Authorization

Rules  ... Help...

Filter

...
Custom Rules Definitions...

Audit Filter

Comment

Id	Orig Status	Action	Resulting Status	Different User	Use STP	Priority	Log	Subtype	Product Type	Rules	Processing Org
295718	NONE	NEW	PENDING	<input type="checkbox"/>	<input type="checkbox"/>	0	<input type="checkbox"/>	ALL	MarginCall		FCM
310722	PENDING	AMEND	PENDING	<input type="checkbox"/>	<input type="checkbox"/>	0	<input type="checkbox"/>	ALL	MarginCall		FCM
295719	PENDING	AUTHORIZE	VERIFIED	<input type="checkbox"/>	<input type="checkbox"/>	0	<input type="checkbox"/>	ALL	MarginCall		FCM
327218	PENDING	SUBMIT	PENDING_HRC_COLL	<input type="checkbox"/>	<input checked="" type="checkbox"/>	0	<input type="checkbox"/>	ALL	MarginCall		FCM
310719	PENDING_HRC_COLL	ACCEPT	VERIFIED	<input type="checkbox"/>	<input type="checkbox"/>	0	<input type="checkbox"/>	ALL	MarginCall		FCM
310720	PENDING_HRC_COLL	REJECT	CANCELED	<input type="checkbox"/>	<input type="checkbox"/>	0	<input type="checkbox"/>	ALL	MarginCall		FCM
295720	VERIFIED	AMEND	VERIFIED	<input type="checkbox"/>	<input type="checkbox"/>	0	<input type="checkbox"/>	ALL	MarginCall		FCM
310721	VERIFIED	CANCEL	CANCELED	<input type="checkbox"/>	<input type="checkbox"/>	0	<input type="checkbox"/>	ALL	MarginCall		FCM

Processing Org ALL

Event Class Collateral

Subtype ALL

Product ALL

Orig Status AGREED\_NO\_CALL

Action EXECUTE

Result Status EXECUTED

☐ Different User
 ☐ Create Task
 ☒ Use STP
 ☐ Use KickOff/Cut Off
 

0 Priority

☐ Log Completed
 ☒ Preferred Action
 ☐ Update Only
 ☐ Generate Intermediary Event
 ☐ Needs manual Authorization

Rules

Filter

Audit Filter

Comment

Help...

Custom Rules Definitions...

Id	Orig Status	Action	Resulting Status	Different User	Use STP	Priority	Log	Subtype	Product Type	Rules	Processing Org
284237	AGREED_NO_CALL	EXECUTE	EXECUTED	<input type="checkbox"/>	<input checked="" type="checkbox"/>	0	<input type="checkbox"/>	ALL	ALL		ALL
284238	ALLOCATED	DISPUTE	DISPUTED	<input type="checkbox"/>	<input type="checkbox"/>	0	<input type="checkbox"/>	ALL	ALL		ALL
284239	ALLOCATED	VALIDATE	VALIDATED	<input type="checkbox"/>	<input checked="" type="checkbox"/>	0	<input type="checkbox"/>	ALL	ALL		ALL
284240	DISPUTED	RESOLVE_DISPUTE	ALLOCATED	<input type="checkbox"/>	<input type="checkbox"/>	0	<input type="checkbox"/>	ALL	ALL		ALL
284241	EXPOSURE_AGREED	ALLOCATE	ALLOCATED	<input type="checkbox"/>	<input type="checkbox"/>	0	<input type="checkbox"/>	ALL	ALL		ALL
284242	EXPOSURE_AGREED	CLOSE	CLOSED	<input type="checkbox"/>	<input type="checkbox"/>	0	<input type="checkbox"/>	ALL	ALL	Close	ALL
284243	EXPOSURE_AGREED	EXECUTE	EXECUTED	<input type="checkbox"/>	<input type="checkbox"/>	0	<input type="checkbox"/>	ALL	ALL		ALL
284244	EXPOSURE_AGREED	RETURN	RETURNED	<input type="checkbox"/>	<input type="checkbox"/>	0	<input type="checkbox"/>	ALL	ALL	Return	ALL
284245	EXPOSURE_AGREED	VALIDATE	PENDING_APPROVAL	<input type="checkbox"/>	<input checked="" type="checkbox"/>	0	<input type="checkbox"/>	ALL	ALL		ALL
284246	NONE	NEW	PRICING	<input type="checkbox"/>	<input type="checkbox"/>	0	<input type="checkbox"/>	ALL	ALL	StartMonitorEntryEvent	ALL
284247	PENDING_APPROVAL	ALLOCATE	ALLOCATED	<input type="checkbox"/>	<input type="checkbox"/>	0	<input type="checkbox"/>	ALL	ALL		ALL
284248	PRICED_NO_CALL	AGREE_EXPOSURE	EXPOSURE_AGREED	<input type="checkbox"/>	<input type="checkbox"/>	0	<input type="checkbox"/>	ALL	ALL		ALL
284249	PRICED_NO_CALL	NOCALL	AGREED_NO_CALL	<input type="checkbox"/>	<input checked="" type="checkbox"/>	0	<input type="checkbox"/>	ALL	ALL		ALL
284250	PRICED_PAY	AGREE_EXPOSURE	EXPOSURE_AGREED	<input type="checkbox"/>	<input checked="" type="checkbox"/>	0	<input type="checkbox"/>	ALL	ALL	AutoAdjust	ALL
284251	PRICED_RECEIVE	AGREE_EXPOSURE	EXPOSURE_AGREED	<input type="checkbox"/>	<input checked="" type="checkbox"/>	0	<input type="checkbox"/>	ALL	ALL	AutoAdjust	ALL
284252	PRICING	PRICE	PRICED_NO_CALL	<input type="checkbox"/>	<input type="checkbox"/>	0	<input type="checkbox"/>	ALL	ALL	CheckNoCall,StopMonitorEntryEvent	ALL
284253	PRICING	PRICE	PRICED_PAY	<input type="checkbox"/>	<input type="checkbox"/>	0	<input type="checkbox"/>	ALL	ALL	CheckPay,StopMonitorEntryEvent	ALL
284254	PRICING	PRICE	PRICED_RECEIVE	<input type="checkbox"/>	<input type="checkbox"/>	0	<input type="checkbox"/>	ALL	ALL	CheckReceive,StopMonitorEntryEvent	ALL
284255	VALIDATED	EXECUTE	EXECUTED	<input type="checkbox"/>	<input checked="" type="checkbox"/>	0	<input type="checkbox"/>	ALL	ALL	StopMonitorEntryEvent	ALL

## 6. OTC Margin Sample Process

### 6.1 Running the Servers

The following servers need to be running. They are located under `<calypso_home>/deploy-local/<environment>/`.

- authServer
- discoveryServer
- gatewayServer
- eventserver
- dataServer
- riskServer
- sharedServices
- dataGridNode
- dataGridEnabledCalculator
- dispatcher
- ersRiskServer
- engineServer
- calypsoMessagingServer
- riskMessagingServer
- marginEngineOtcCleared
- Scheduler
- Navigator

### 6.2 Computing the Margins

#### 6.2.1 Create a Batch Configuration

Bring up Market Risk and create a batch configuration under **Setup>>Batch**. Please refer to Calypso Market Risk documentation for details.

## 6.2.2 Populate the Data Grid

Create a DATA\_GRID\_HYDRATE scheduled task.

<b>Task Description</b>	
Task Type:	DATA_GRID_HYDRATE
External Reference:	Data Grid Population
Comments:	
Description:	
<b>Execution Parameters</b>	
Attempts:	1
Retry After:	0
JVM Settings:	-Xms512m -Xmx1024m -XX:MaxPermSize
Log Settings:	
<b>Task Notification Options</b>	
<input type="checkbox"/> Send Emails	<input type="checkbox"/> Publish Business Events
<b>Common Attributes</b>	
<b>Task Attributes</b>	
Global Trade Filter List	
Pricing Env List	_IM
ERS Analysis Config	
CCR Analysis Config	

- » Enter a trade filter
- » Enter a pricing environment
- » Enter the Market Risk Batch for which you want to use a data grid.

The CCR Analysis Config attribute **does not apply** to Market Risk.

Run the DATA\_GRID\_HYDRATE scheduled task.

## 6.2.3 Compute the Sim Analysis

Create a ERS\_ANALYSIS scheduled task.

<b>Task Description</b>	
Task Type:	ERS_ANALYSIS
External Reference:	
Comments:	
Description:	
<b>Execution Parameters</b>	
Attempts:	1
Retry After:	0 minutes
Expected Execution Time (SLA):	5 minutes
JVM Settings:	-Xms512m -Xmx1024m
Log Settings:	
<b>Task Notification Options</b>	
<input type="checkbox"/> Send Emails	<input type="checkbox"/> Publish Business Events
To User:	
<b>Common Attributes</b>	
Task ID	106120
Processing Org	
Trade Filter	
Filter Set	
Pricing Environment	IM
Timezone	America/Los_Angeles
Valuation Time Hour	0
Valuation Time Minute	0
Undo Time Hour	
Undo Time Minute	
Valuation Date Offset	
From Days	
To Days	
Pricing Measures	
Business Holidays	
<b>Task Attributes</b>	
Batch Name	HRC
Is Live	false
Dispatcher config	default
Save Results ?	true
Max Trade Per Task	5
Calculator Count	5
Gather Execution Stats	true

- » Batch Name – Select the Market Risk batch to run. It should be the same Market Risk batch specified in the DATA\_GRID\_HYDRATE scheduled task.
- » Is Live – Need to be set to False
- » Dispatcher config – Select the dispatcher configuration to use.
- » Save Results? – True or false. Set to true to save the analysis results to the database.  
If set to false or not set, you can save the results to the database using the scheduled task ERS\_SAVE\_RESULTS (described below). Optional.
- » Max Trade Per Task – For optimization, you can restrict the maximum number of trades that each calculator will process at a time. Optional.
- » Calculator Count – For optimization, you can enter the number of calculators. Optional.
- » Gather Execution Stats – True or false. Set to true to gather job execution statistics. Optional.

Run the ERS\_ANALYSIS scheduled task.

**[NOTE: Make sure to set the timezone in the scheduled tasks – It is mandatory]**

## 6.2.4 Compute the Margins

It is mandatory to start the margin engine (using the engine server).

Then run the following scheduled tasks as needed:

CCP OTC Margins:

- LIQUIDITY\_RISK\_INPUT - For CCP OTC margins only
- MARGIN\_OTC\_CALCULATOR
- MARGIN\_OTC\_VM\_CALCULATOR scheduled task.

Clearing Member (FCM) Margins:

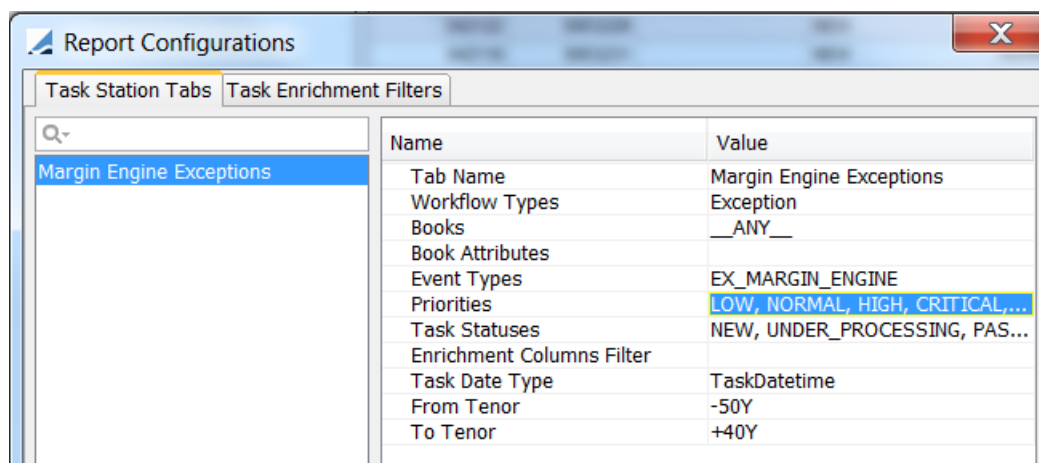
- CLEARING\_RISK\_SERVICE

## 6.2.5 Margin Engine Monitoring

Margin Engine Monitoring

If the Margin Engine cannot start due to a missing FX rate or a missing batch, or any other “business reason”, the user can select Action/Retry after updating the market data or running the EOD batch. The Margin Engine will try to restart.

### Task Station Setup



**Report Configurations**

Task Station Tabs Task Enrichment Filters

Q-

Tasks

Name	Value
Tab Name	Tasks
Workflow Types	Trade
Books	__ANY__
Book Attributes	
Event Types	PENDING_HRC_TRADE, PENDING RE...
Priorities	LOW, NORMAL, HIGH, CRITICAL, VER...
Task Statuses	NEW, UNDER_PROCESSING, COMPLE...
Enrichment Columns Filter	
Task Date Type	TaskDatetime
From Tenor	-50Y
To Tenor	+50Y

**Summary Panel Configurations**

Browse and manage summary panel configurations

Workflow Subtype PO Product Type Product Subtype

Workflow Type: Trade

all [all] [all] [all]

**Available Columns** **Column Names**

Q- Type here to filter columns

- Clearing
  - Client Direction
  - Client Product Description
- ClientPricer
- Product
- Trade
  - .Upfront Fee Settlement
- Account
  - Action
  - Allocated Quantity
  - Alternate Date
  - Analysis Key
  - Benchmark
  - Block Size
  - Book
  - Book Base Ccy
  - Book EOD
  - Book Id
  - Book LE Parent
  - Book Legal Entity
  - Book Location
  - Book\_Attr
- Bundle
  - Bundle Id

Trade Id  
Book  
CounterParty.Short Name  
Product Description  
Trade Date  
Nominal  
Quantity  
Trade Price  
Trade Currency  
Buy/Sell  
Entered Date  
Entered User  
Bundle Name  
Bundle Type  
TradeStatus  
Trader  
TRADE\_KEYWORD.HRCRejectCo  
TRADE\_KEYWORD.HRCRejectRe  
TRADE\_KEYWORD.HRCStatus  
TRADE\_KEYWORD.HRC\_WARNI  
TRADE\_KEYWORD.HRC\_WARNI  
TRADE\_KEYWORD.IM\_PORTFOL

**Summary Panel Key Detail**

Workflow Type: Trade  
Workflow Type: all  
PO: all  
Product Type: all  
Product Subtype: all

Apply Cancel

## Sample Outputs

Task Station [160013/MARGINDEMO\_V16\_13/calypso\_user]

Task Station View

Report Catalog

q- Type here to filter tree elements

- TaskStation Configs [1]
  - Margin Engine [1]
    - Trades
    - Margin Engine Exceptions [1]
      - Margin Engine Trades
      - Tasks

Margin Monitor

Processor	Status	Queue Size	Consumers	Messages/Sec
What-If HRC Limit Checker	Suspended	0	0	0.00
EngineServer::CollateralManag...	Suspended	240	1	0.00
EngineServer::MarginController	Running	0	1	0.00
Trade VaR Calculator	Suspended	0	0	0.00
LiquidityRiskCalculator	Suspended	0	0	0.00
HRC Controller	Running	0	3	0.00
HRC Multiplexer	Suspended	0	0	0.00
HRC Aggregator	Suspended	0	0	0.00
HRC Limit Checker	Suspended	0	0	0.00
Data Persistor	Running	0	3	0.00
Engine Server::UpdateManager	Running	0	1	0.00

Margin Engine Exceptions [1]

Task Id	Task Owner	Task Status	Priority	Event Type	Comments
7102481		NEW	HIGH	EX_MARGIN_ENGINE	Portfolio: CUS02   Exception occurred while pricing FX rate not found for USDGBP on 08/18/2024

Task Station [160013/MARGINDEMO\_V16\_13/calypso\_user]

Task Station View

Report Catalog

q- Type here to filter tree elements

- TaskStation Configs [0]
  - Margin Engine [0]
    - Trades
    - Margin Engine Exceptions [0]
      - Margin Engine Trades
      - Tasks

Margin Monitor

Processor	Status	Queue Size	Consumers	Messages/Sec
What-If HRC Limit Checker	Running	0	1	0.00
EngineServer::CollateralManag...	Suspended	240	1	0.00
EngineServer::MarginController	Running	0	1	0.00
Trade VaR Calculator	Running	0	3	0.00
LiquidityRiskCalculator	Running	0	3	0.00
HRC Controller	Running	0	3	0.00
HRC Multiplexer	Running	0	3	0.00
HRC Aggregator	Running	0	3	0.00
HRC Limit Checker	Running	0	1	0.00
Data Persistor	Running	0	3	0.00
Engine Server::UpdateManager	Running	0	1	0.00

Margin Engine Exceptions [0]

Task Id	Task Owner	Task Status	Priority	Event Type	Comments
---------	------------	-------------	----------	------------	----------

## Margin Engine Logs



Following alerts are logged in the *ALERT* log file. These alerts are triggered when ...

- **System|Startup**  
--> When the technical wiring of a component is done
- **System|Disconnected**  
--> When the component is disconnected from the bus. A business error is preventing the component to connect properly. Business User is expecting to fix the issue and retry (through the task station)
- **System|Connected**  
--> When the component is disconnected from the bus. Business initialization is Successful
- **MarginEngine|ConsumerInfo**  
--> Each time the Number of Consumers (thread) changes
- **MarginEngine|QueueSize**  
--> Each time the Queue size of a Component is bigger than the threshold defined in the alerts.properties (default is 1), refreshes each time the queue size changes
- **MarginEngine|QueueSizeInfo**  
--> Each time the Queue size is changed, and not above threshold. So by default this alert is generated when the Queue Size comes back to 0.

Example of Log generated

```
2017-11-16 14:18:39,186-0800|1510870719184|WARN|SQL|GetConnectionTime|1|Mar
2017-11-16 14:18:44,000-0800|1510870724000|INFO|System|Startup|2|TopicClean
2017-11-16 14:18:46,198-0800|1510870726198|INFO|System|Startup|3|HRCMultipl
2017-11-16 14:18:46,678-0800|1510870726678|INFO|MarginEngine|ConsumerInfo|4
2017-11-16 14:18:46,679-0800|1510870726678|INFO|MarginEngine|QueueSizeInfo|
2017-11-16 14:18:46,733-0800|1510870726733|INFO|MarginEngine|ConsumerInfo|6
2017-11-16 14:18:46,734-0800|1510870726734|INFO|MarginEngine|QueueSizeInfo|
```

## 6.3 Limit Check Process

### 6.3.1 Initializing the Limit Check Process

At the start of day, a number of scheduled tasks need to be executed in the following order, to initialize the Limit Check process:

- HRC\_CLEAR\_NPV – Initialization of cumulative NPV for all portfolios.
- HRC\_COLLATERAL\_INITIALIZATION – Initialization of collateral amounts.
- HRC\_NODE\_INITIALIZATION – Initialization of Limit Check results.


You can also use the scheduled task HRC\_START\_OF\_DAY with everything set to true to initialize the process.

Task Attributes	
Initialize Collateral	true
Initialize Headroom Check Nodes	true
Restart Option	Restart IM, Init PLVectors, Restart VM, Clear VM, Init VM
Additional Calculation Params	

You can also use the scheduled task HRC\_BEFORE\_HISTSIM to initialize headroom statistics or to catch up intraday market data changes in order to update all statistics based on latest market data.

The scheduled task HRC\_BEFORE\_HISTSIM does not have any attributes.





And if you want to refresh the Market Risk batch and restart the Margin Engine components, you can run a scheduled task chain like below.







Task Chain Definition

### Task Chain Definition

Task Chains are special types of task definitions which consist of other previously defined tasks.

External Reference	HRC Chain
Description	HRC Chain

 Add
 Remove
 Move Up
 Move Down

	Extern...	ID	Type	Trade Filter
	HRC B...	130621	HRC_BEFORE_HISTSIM	
	LCHSA,...	119620	DATA_GRID_HYDRATE	
	HRC ...	109620	ERS_ANALYSIS	
	Margin ...	135620	MARGIN_OTC_CALCULAT...	
	HRC S...	130620	HRC_START_OF_DAY	

### 6.3.2 Starting the Limit Check Process

Start the following servers:

- Risk Messaging Server using "riskMessagingServer.bat\ .sh" (this server must be started first) – It creates in-memory trades for the imported trades.
- Margin Engine OTC Cleared using "marginEngineOtcCleared.bat\ .sh" – It takes trades routed by the Trade VaR Server and the Margin Controller engine and computes incremental VaR.
- Engine Server– It starts the Margin Controller engine that routes the collateral and limit changes to the Trade VaR process, and starts the Update Manager engine that routes the trades and limit changes to the Margin Controller.

### 6.3.3 Limit Check Monitor

You can add a menu item for the Limit Check Monitor to view the results of the Limit Check (menu action hc.apps.monitor.HeadroomCheckMonitor).

If "IM Exposure – Collateral" <= Limit

=> The trade is accepted

If "IM Exposure – Collateral" > Limit

=> The trade is rejected

In addition, limits are also checked at the trade pair level:

- If both trades of a trade pair are accepted, both trades are accepted
- If any trade of the trade pair is rejected, both trades are rejected

For the Headroom Limit Checker to send results to the Headroom Check Monitor, HRC\_MONITOR needs to be set to true in the Calypso environment property file.

```
MARGIN_APP_URL=http\://localhost\:9140/margin-ui
DS_ENFORCE_UNIQUE=false
DBURL=jdbc\:oracle\:thin\:@localhost\:1521\:CALYPSO
HTML_EDITOR=C\:\Program\ FilesMicrosoft\ OfficeOffice10WINWORD.EXE
BLOOMBERG_FTP_PASSWORD=]zHUu.sVLzK0DRXP
HRC_MONITOR=true
ERS_INTERNAL_LE_RULE=TRUE
EDEALINGWEBSERVER_NAMING_PROVIDER_URL=http-remoting\://localhost\:8460
WEB_SERVER_LOCATION=SET\ PATH\ TO\ <CALYPSO_HOME>
PARTIAL_CASH_FOR_SECURITY_MATCHING=TRUE
ENTITLEMENTSERVER_NAMING_PROVIDER_URL=http\://localhost\:8320
```

### 6.3.4 Trade Blotter

You can right-click a trade in the Trade Blotter and choose "Headroom Check Results" to view Limit Check information:

Headroom Check Trade Blotter Window												
Trade Blotter												
Trade Id	Client	Account	Status	Limit Type	Currency	Limit Util	Limit Util (%)	IM (End)	IM (Start)	Collateral	Date	Headroom Limit
44936	Client1	-	Rejected	Headroom	USD	24,612,678.23	-146.13%	387,321.77	387,321.77	15,000,000.00	04/23/2014 04:08:00 AM	10,000,000.00
44936	Client1	-	Rejected	Total IM	USD	14,612,678.23		387,321.77	387,321.77	15,000,000.00	04/23/2014 04:08:00 AM	10,000,000.00

The Limit Check popup window shows the following information:

- Time of Check
- Start initial margin (at the time of the check)
- Initial margin including the new submitted trade
- Trade NPV (if applicable)
- Initial margin Limit (at the time of check)
- Limit (at the time of check)
- Collateral value (at the time of check)
- Utilization

- Limit Utilization
- STATUS of limit check
- Corresponding trade in the pair (if applicable)

Limit Utilization is defined as follows:

HRC Utilization = Total IM

HRC Utilization % = Total IM / (Total Collateral+ Limit)

**For Headroom Limit, it translates into:**

HRC Utilization = Total IM – Total Collateral

HRC Utilization % = Total IM / (Total Collateral+ Limit), limit can be 0.

**For IM Limit, it translates into:**

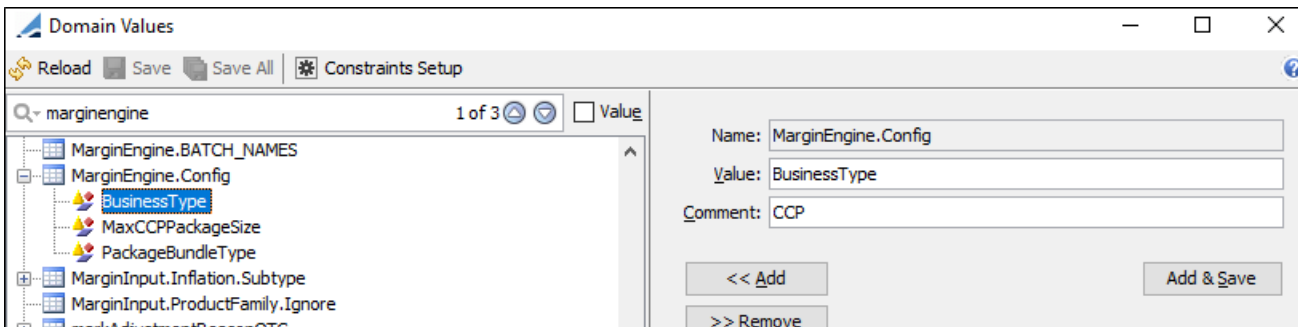
HRC Utilization = Total IM

HRC Utilization % = Total IM /Limit (total Collateral = 0)

# 7. OTC Margin Headroom Check Life-cycle

## 7.1 Configuration

1. The domain value for business type should be set to CCP

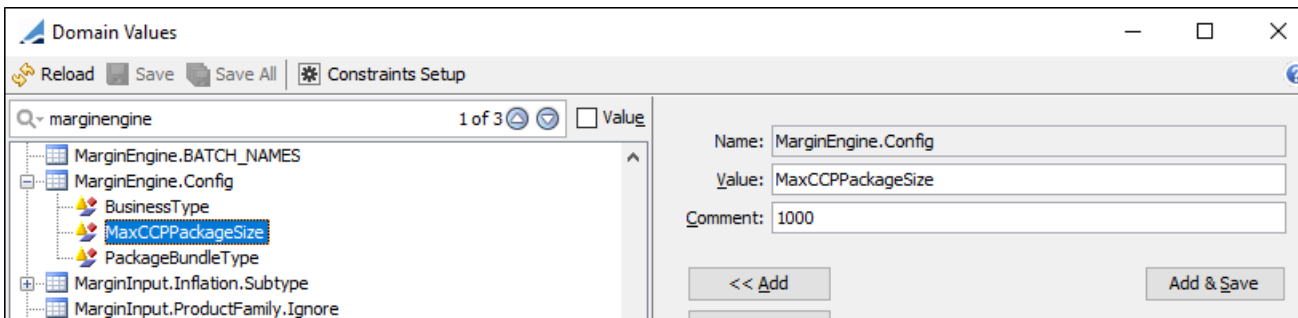


The screenshot shows the 'Domain Values' window with the 'Constraints Setup' tab selected. The search bar contains 'marginengine'. In the tree view, 'MarginEngine.Config' is expanded, and 'BusinessType' is selected. The right-hand pane shows the configuration for 'MarginEngine.Config' with the following fields:

- Name: MarginEngine.Config
- Value: BusinessType
- Comment: CCP

Buttons at the bottom include '<< Add', '>> Remove', and 'Add & Save'.

2. Max CCP package size is the maximum number of trades in a trade package configured by the user.

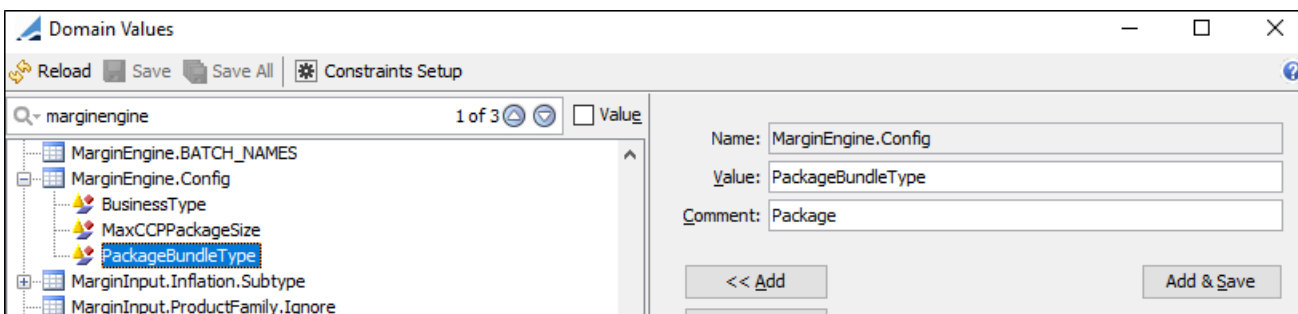


The screenshot shows the 'Domain Values' window with the 'Constraints Setup' tab selected. The search bar contains 'marginengine'. In the tree view, 'MarginEngine.Config' is expanded, and 'MaxCCPPackageSize' is selected. The right-hand pane shows the configuration for 'MarginEngine.Config' with the following fields:

- Name: MarginEngine.Config
- Value: MaxCCPPackageSize
- Comment: 1000

Buttons at the bottom include '<< Add', '>> Remove', and 'Add & Save'.

3. Package Bundle type can be configured as 'Package' for trade package lifecycle events.



The screenshot shows the 'Domain Values' window with the 'Constraints Setup' tab selected. The search bar contains 'marginengine'. In the tree view, 'MarginEngine.Config' is expanded, and 'PackageBundleType' is selected. The right-hand pane shows the configuration for 'MarginEngine.Config' with the following fields:

- Name: MarginEngine.Config
- Value: PackageBundleType
- Comment: Package

Buttons at the bottom include '<< Add', '>> Remove', and 'Add & Save'.

4. The workflow statuses can be configured by the CCP using the below domain where the comment section can be used to describe if the trades will be added or removed by the action resulting in this status. The names of the actions in the workflows would remain constant and cannot be configured.

Domain "MarginEngine.Config.CCPTradeIntegration":

Value = WAIT\_TRANSFER

Comment = REMOVE

Value = WAIT\_TERMINATE

Comment = REMOVE

Value = WAIT\_MARGIN

Comment = ADD

Value = WAIT\_DECLAR

Comment = REMOVE

### Sample CCP Workflow

Below is a sample CCP workflow which shows different trade lifecycle workflows with the above status customization.

Orig Status	Action	Resulting Status	Use STP	Sub Type	Product Type	Rules
CLEARED	PORTFOLIO_TRANSFER	WAIT_P_TRANSFER	false	ALL	ALL	
CLEARED	COMPRESS	WAIT_COMPRESSION	false	ALL	ALL	
CLEARED	ROLLBACK	WAIT_BULK_MARGIN	false	ALL	ALL	
CLEARED	BACKLOAD	WAIT_BACKLOAD	false	ALL	ALL	
CLEARED	TRANSFER	TO_BE_TRANSFERED	false	ALL	ALL	
CLEARED	TERMINATE	TO_BE_TERMINATED	false	ALL	ALL	
CLEARED	DECLAR	WAIT_DECLAR	false	ALL	ALL	ApplyLifeCycle
CLEARED	AMEND	CLEARED	false	ALL	ALL	
CLEARED	CANCEL	CANCELED	false	ALL	ALL	

Orig Status	Action	Resulting Status	Use STP	Sub Type	Product Type	Rules
DECLEARED	ROLLBACK	CLEARED	false	ALL	ALL	
DECLEARED	CANCEL	CANCELED	false	ALL	ALL	
HELD_WAIT_DECLEAR	SUBMIT	WAIT_DECLEAR	false	ALL	ALL	ApplyLifeCycle
HELD_WAIT_DECLEAR	REJECT	CLEARED	false	ALL	ALL	
HELD_WAIT_TERMINATE	SUBMIT	WAIT_TERMINATE	false	ALL	ALL	ApplyLifeCycle
HELD_WAIT_TERMINATE	REJECT	CLEARED	false	ALL	ALL	
HELD_WAIT_TRANSFER	SUBMIT	WAIT_TRANSFER	false	ALL	ALL	ApplyLifeCycle
HELD_WAIT_TRANSFER	REJECT	CLEARED	false	ALL	ALL	
WAIT_DECLEAR	REJECT	HELD_WAIT_DECLEAR	false	ALL	ALL	
WAIT_DECLEAR	ACCEPT	DECLEARED	false	ALL	ALL	
WAIT_MARGIN	REJECT	PROCESSING	false	ALL	ALL	
WAIT_MARGIN	ACCEPT	CLEARED	false	ALL	ALL	
WAIT_TERMINATE	ACCEPT	TERMINATED	false	ALL	ALL	
WAIT_TERMINATE	REJECT	HELD_WAIT_TERMINATE	false	ALL	ALL	
WAIT_TRANSFER	ACCEPT	TERMINATED	false	ALL	ALL	
WAIT_TRANSFER	REJECT	HELD_WAIT_TRANSFER	false	ALL	ALL	
NONE	NEW	PENDING	false	ALL	ALL	
PENDING	ASSIGN	WAIT_BULK_MARGIN	true	ALL	ALL	
PENDING	BACKLOAD	WAIT_BACKLOAD	false	ALL	ALL	
PENDING	AMEND	PENDING	false	ALL	ALL	
PENDING	SUBMIT	WAIT_MARGIN	true	ALL	ALL	ApplyLifeCycle
PENDING	TERMINATE	WAIT_MARGIN	false	ALL	ALL	ApplyLifeCycle
PENDING	TRANSFER	WAIT_MARGIN	false	ALL	ALL	ApplyLifeCycle

Orig Status	Action	Resulting Status	Use STP	Sub Type	Product Type	Rules
PENDING	AUTHORIZE	CLEARED	false	ALL	ALL	
PENDING	CANCEL	CANCELED	false	ALL	ALL	
PROCESSING	REJECT	LIMIT_FAILED	false	ALL	ALL	ApplyLifeCycle
PROCESSING	SUBMIT	WAIT_MARGIN	false	ALL	ALL	ApplyLifeCycle
PROCESSING	CANCEL	CANCELED	false	ALL	ALL	
TERMINATED	COMPRESS	WAIT_COMPRESSION	false	ALL	ALL	
TERMINATED	ROLLBACK	CLEARED	false	ALL	ALL	
TO_BE_TERMINATED	TERMINATE	WAIT_TERMINATE	false	ALL	ALL	ApplyLifeCycle
TO_BE_TERMINATED	ROLLBACK	CLEARED	false	ALL	ALL	
TO_BE_TRANSFERED	PORTFOLIO_TRANSFER	WAIT_P_TRANSFER	false	ALL	ALL	
TO_BE_TRANSFERED	TRANSFER	WAIT_TRANSFER	false	ALL	ALL	ApplyLifeCycle
WAIT_BACKLOAD	REJECT	WAIT_BACKLOAD	false	ALL	ALL	
WAIT_BACKLOAD	ACCEPT	CLEARED	false	ALL	ALL	
WAIT_BULK_MARGIN	ACCEPT	CLEARED	false	ALL	ALL	
WAIT_BULK_MARGIN	REJECT	CANCELED	false	ALL	ALL	
WAIT_COMPRESSION	ACCEPT	TERMINATED	false	ALL	ALL	
WAIT_COMPRESSION	REJECT	CLEARED	false	ALL	ALL	
WAIT_P_TRANSFER	AMEND	WAIT_P_TRANSFER	false	ALL	ALL	
WAIT_P_TRANSFER	ASSIGN	TO_BE_TRANSFERED	false	ALL	ALL	
WAIT_P_TRANSFER	ACCEPT	TERMINATED	false	ALL	ALL	
WAIT_P_TRANSFER	REJECT	CLEARED	false	ALL	ALL	

## 7.2 Trade Lifecycle Events

**1. New Trade:** If a new trade pair is injected, it goes to a status 'WAIT\_MARGIN' and this status triggers the post novation events and limit check. The new trade pair goes through margin engine and if its accepted, it goes to 'cleared' status. If the trade pair is rejected, then it will move to 'Processing' status, to wait for reprocessing. User can reprocess rejected trade pair by taking action SUBMIT on one of the trades.

Sample workflow:



328739	PENDING	AUTHORIZE	CLEARED	<input type="checkbox"/>	<input type="checkbox"/>	0	<input type="checkbox"/>	ALL	ALL	
324719	PENDING	CANCEL	CANCELED	<input type="checkbox"/>	<input type="checkbox"/>	0	<input type="checkbox"/>	ALL	ALL	
328718	PENDING	SUBMIT	WAIT_MARGIN	<input type="checkbox"/>	<input checked="" type="checkbox"/>	0	<input type="checkbox"/>	ALL	ALL	ApplyLifeCycle
330218	PENDING	TERMINATE	WAIT_MARGIN	<input type="checkbox"/>	<input type="checkbox"/>	0	<input type="checkbox"/>	ALL	ALL	ApplyLifeCycle
329219	PENDING	TRANSFER	WAIT_MARGIN	<input type="checkbox"/>	<input type="checkbox"/>	0	<input type="checkbox"/>	ALL	ALL	ApplyLifeCycle
328722	PROCESSING	REJECT	LIMIT_FAILED	<input type="checkbox"/>	<input type="checkbox"/>	0	<input type="checkbox"/>	ALL	ALL	ApplyLifeCycle
328725	WAIT_DECLAR	REJECT	HELD_WAIT_DECLAR	<input type="checkbox"/>	<input type="checkbox"/>	0	<input type="checkbox"/>	ALL	ALL	
328719	WAIT_MARGIN	ACCEPT	CLEARED	<input type="checkbox"/>	<input type="checkbox"/>	0	<input type="checkbox"/>	ALL	ALL	
328720	WAIT_MARGIN	REJECT	PROCESSING	<input type="checkbox"/>	<input type="checkbox"/>	0	<input type="checkbox"/>	ALL	ALL	
328729	WAIT_TERMINATE	ACCEPT	TERMINATED	<input type="checkbox"/>	<input type="checkbox"/>	0	<input type="checkbox"/>	ALL	ALL	

**2. DECLAR:** If a cleared trade is declared, it'll go to the status 'WAIT\_DECLAR' first before post novation events can be triggered. From 'WAIT\_DECLAR' status, it would go through margin engine for limit check and if the trade is accepted it will go to 'DECLARED' status. But if the trade pair is rejected, then both trades are moved to HELD\_WAIT\_DECLAR status and can be resubmitted to go through limit check again.

Sample Workflow:

Id	Orig Status	Action	Resulting Status	Different User	Use STP	Priority	Log	Subtype	Product Type	Rules
328723	CLEARED	DECLAR	WAIT_DECLAR	<input type="checkbox"/>	<input type="checkbox"/>	0	<input type="checkbox"/>	ALL	ALL	ApplyLifeCycle
328728	CLEARED	TERMINATE	WAIT_TERMINATE	<input type="checkbox"/>	<input type="checkbox"/>	0	<input type="checkbox"/>	ALL	ALL	ApplyLifeCycle
328745	WAIT_COMPRESSION	REJECT	CLEARED	<input type="checkbox"/>	<input type="checkbox"/>	0	<input type="checkbox"/>	ALL	ALL	
328724	WAIT_DECLAR	ACCEPT	DECLARED	<input type="checkbox"/>	<input type="checkbox"/>	0	<input type="checkbox"/>	ALL	ALL	
328725	WAIT_DECLAR	REJECT	HELD_WAIT_DECLAR	<input type="checkbox"/>	<input type="checkbox"/>	0	<input type="checkbox"/>	ALL	ALL	
328719	WAIT_MARGIN	ACCEPT	CLEARED	<input type="checkbox"/>	<input type="checkbox"/>	0	<input type="checkbox"/>	ALL	ALL	

**3. Transfer:** Transfer action can be applied to move cleared trades from one portfolio to another. The existing trades are canceled, and new trades are booked in the new portfolio by the transfer action. The user will need to add trade keyword 'Transfer To' to the original trade pair and save a new trade pair with 'Transfer From' trade keyword in the new portfolio. Based on the workflow, the new trades would remain in pending status. This step is flexible for users and the purpose it to have all four trades with correct keywords.

When action 'Transfer' is applied to the original trade pair with 'Transfer to' keyword, they move to 'TO\_BE\_TRANSFERRED' status. When the action is applied, all four trades go to margin engine for limit check. The original trades will be in 'WAIT\_TRANSFER' status and the new trades will be in 'WAIT\_MARGIN' status. Based on the limit check, if the trades are accepted, the original trades will change to TERMINATED and new trades will be CLEARED. If the limit check is rejected, the original trades stay as HELD\_WAIT\_TRANSFER, and new trades stay as PROCESSING.

Sample Workflow:

324719	PENDING	CANCEL	CANCELED	<input type="checkbox"/>	<input type="checkbox"/>	0	<input type="checkbox"/>	ALL	ALL	
328718	PENDING	SUBMIT	WAIT_MARGIN	<input type="checkbox"/>	<input checked="" type="checkbox"/>	0	<input type="checkbox"/>	ALL	ALL	ApplyLifeCycle
329219	PENDING	TRANSFER	WAIT_MARGIN	<input type="checkbox"/>	<input type="checkbox"/>	0	<input type="checkbox"/>	ALL	ALL	ApplyLifeCycle
328722	PROCESSING	REJECT	LIMIT_FAILED	<input type="checkbox"/>	<input type="checkbox"/>	0	<input type="checkbox"/>	ALL	ALL	ApplyLifeCycle
328721	PROCESSING	SUBMIT	WAIT_MARGIN	<input type="checkbox"/>	<input type="checkbox"/>	0	<input type="checkbox"/>	ALL	ALL	ApplyLifeCycle
329719	TO_BE_TRANSFERRED	TRANSFER	WAIT_TRANSFER	<input type="checkbox"/>	<input type="checkbox"/>	0	<input type="checkbox"/>	ALL	ALL	ApplyLifeCycle
328741	WAIT_BACKLOAD	ACCEPT	CLEARED	<input type="checkbox"/>	<input type="checkbox"/>	0	<input type="checkbox"/>	ALL	ALL	

328724	WAIT_DECLAR	ACCEPT	DECLARED	<input type="checkbox"/>	<input type="checkbox"/>	0	<input type="checkbox"/>	ALL	ALL
328725	WAIT_DECLAR	REJECT	HELD_WAIT_DECLAR	<input type="checkbox"/>	<input type="checkbox"/>	0	<input type="checkbox"/>	ALL	ALL
328719	WAIT_MARGIN	ACCEPT	CLEARED	<input type="checkbox"/>	<input type="checkbox"/>	0	<input type="checkbox"/>	ALL	ALL
328720	WAIT_MARGIN	REJECT	PROCESSING	<input type="checkbox"/>	<input type="checkbox"/>	0	<input type="checkbox"/>	ALL	ALL
328729	WAIT_TERMINATE	ACCEPT	TERMINATED	<input type="checkbox"/>	<input type="checkbox"/>	0	<input type="checkbox"/>	ALL	ALL
328730	WAIT_TERMINATE	REJECT	HELD_WAIT_TERMINATE	<input type="checkbox"/>	<input type="checkbox"/>	0	<input type="checkbox"/>	ALL	ALL
328735	WAIT_TRANSFER	ACCEPT	TERMINATED	<input type="checkbox"/>	<input type="checkbox"/>	0	<input type="checkbox"/>	ALL	ALL
328736	WAIT_TRANSFER	REJECT	HELD_WAIT_TRANSFER	<input type="checkbox"/>	<input type="checkbox"/>	0	<input type="checkbox"/>	ALL	ALL

**4. Full Termination:** When action 'Terminate' is applied to a cleared trade pair. It goes to status 'WAIT\_TERMINATE' before going through margin engine for limit check. If its accepted, the trade pair is terminated and if its rejected, it goes to 'HELD\_WAIT\_TERMINATE' status until its resubmitted.

**Partial Termination:** Partial termination works like transfer where original trades are terminated, and new trades are created in the same portfolio with the remaining notional. The user will need to add trade keyword 'Transfer To' to the original trade pair and save a new trade pair with 'Transfer From' trade keyword. When action terminate is applied, the trades go to 'WAIT\_TERMINATE' before going through margin engine for limit check and if they are accepted, the original trade pair is terminated, and new trade pair are cleared and if rejected, the original trades stay as HELD\_WAIT\_TERMINATE, and new trades stay as PROCESSING.

Sample Workflow:

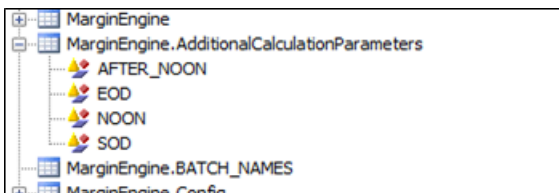
Id	Orig Status	Action	Resulting Status	Different User	Use STP	Priority	Log	Subtype	Product Type	Rules
328728	CLEARED	TERMINATE	WAIT_TERMINATE	<input type="checkbox"/>	<input type="checkbox"/>	0	<input type="checkbox"/>	ALL	ALL	ApplyLifeCycle
329718	CLEARED	TRANSFER	TO_BE_TRANSFERED	<input type="checkbox"/>	<input type="checkbox"/>	0	<input type="checkbox"/>	ALL	ALL	

328720	WAIT_MARGIN	REJECT	PROCESSING	<input type="checkbox"/>	<input type="checkbox"/>	0	<input type="checkbox"/>	ALL	ALL
328729	WAIT_TERMINATE	ACCEPT	TERMINATED	<input type="checkbox"/>	<input type="checkbox"/>	0	<input type="checkbox"/>	ALL	ALL
328730	WAIT_TERMINATE	REJECT	HELD_WAIT_TERMINATE	<input type="checkbox"/>	<input type="checkbox"/>	0	<input type="checkbox"/>	ALL	ALL
328735	WAIT_TRANSFER	ACCEPT	TERMINATED	<input type="checkbox"/>	<input type="checkbox"/>	0	<input type="checkbox"/>	ALL	ALL

## 7.3 MARGIN\_ENGINE\_CONTROLLER Scheduled Task

The MARGIN\_ENGINE\_CONTROLLER scheduled task is run to Suspend/Resume the Margin Engine. The scheduled task below has attribute 'Suspend/resume margin engine', that can be configured based on the desired action. Another attribute 'Additional Calculation Params' can be selected to be SOD, NOON, AFTER NOON and EOD for the resume action to decide when the user wants to resume margin engine. These params are designed to give user flexibility to have different margin calculation during different time. The above parameters need to define in a domain value below.



Task Attributes	
Suspend/Resume Margin Engine	SUSPEND
Additional Calculation Params	

When the scheduled task with suspend action runs successfully, the HRC Controller in margin monitor in task station can be seen as suspended and if new trades are injected, the trades would wait in 'WAIT\_MARGIN' status.

Margin Monitor					
Processor	Status	Queue Size	Error Queue	Cons...	Mess...
What-If HRC Limit Checker	Running	0	0	1	0.00
EngineServer::CollateralManage...	Running	0	0	1	0.00
EngineServer::MarginController	Running	0	0	1	0.00
Trade VaR Calculator	Running	0	0	3	0.00
LiquidityRiskCalculator	Running	0	0	3	0.00
MarginEnginePersistor	Running	0	0	1	0.00
HRCController	Suspended	1	0	3	0.00
HRC Multiplexer	Running	0	0	3	0.00
HRC Aggregator	Running	0	0	3	0.00
HRC Limit Checker	Running	0	0	1	0.00
Data Persistor	Running	0	0	3	0.00
Engine Server::UpdateManager	Running	0	0	1	0.00

When the scheduled task is run again with 'Resume' attribute, the HRC Controller will go back to running and the trades in Wait\_Margin status will be processed.

Task Attributes	
Suspend/Resume Margin Engine	RESUME
Additional Calculation Params	SOD, NOON

## 7.4 Headroom Check: Post-trade Novation Events

For portfolio level post-trade novation, trades are submitted as a group of trades to be processed together. Trades are moved to a specific trade status, based on user interaction, or a customized process and then passed through margin engine for headroom check using a scheduled task. If accepted, trades will go to cleared status and if rejected they will stay in the same status and can be resubmitted later. The below post-trade novation events are supported by margin engine in this core version:

- Backloading
- Portfolio Transfer
- Portfolio Compression

The user can design their own workflow for these events. Here is a sample workflow which shows how the trades go through margin engine and limit check.

Id	Orig Status	Action	Resulting Status	Different User	Use STP	Priority	Log	Subtype	Product Type	Rules
331218	CLEARED	AMEND	CLEARED				0	ALL	ALL	
329218	CLEARED	CANCEL	CANCELED				0	ALL	ALL	
329219	CLEARED	COMPRESS	WAIT_COMPRESSION				0	ALL	ALL	
329220	CLEARED	DECLAR	WAIT_DECLAR				0	ALL	ALL	ApplyLifeCycle
330219	CLEARED	LOCK	WAIT_TERMINATE				0	ALL	ALL	ApplyLifeCycle
330218	CLEARED	TERMINATE	TO_BE_TERMINATED				0	ALL	ALL	
329222	CLEARED	TRANSFER	TO_BE_TRANSFERED				0	ALL	ALL	
329223	HELD_WAIT_DECLAR	REJECT	CLEARED				0	ALL	ALL	
329224	HELD_WAIT_DECLAR	SUBMIT	WAIT_DECLAR				0	ALL	ALL	ApplyLifeCycle
328229	HELD_WAIT_TERMINATE	REJECT	CLEARED				0	ALL	ALL	
328228	HELD_WAIT_TERMINATE	SUBMIT	WAIT_TERMINATE				0	ALL	ALL	ApplyLifeCycle
328233	HELD_WAIT_TRANSFER	REJECT	CLEARED				0	ALL	ALL	
328232	HELD_WAIT_TRANSFER	SUBMIT	WAIT_TRANSFER				0	ALL	ALL	ApplyLifeCycle
316719	NONE	NEW	PENDING				0	ALL	ALL	
329226	PENDING	AMEND	PENDING				0	ALL	ALL	
329227	PENDING	ASSIGN	WAIT_BULK_MARGIN				0	ALL	ALL	
329228	PENDING	AUTHORIZE	CLEARED				0	ALL	ALL	
335218	PENDING	BACKLOAD	WAIT_BACKLOAD				0	ALL	ALL	
329229	PENDING	CANCEL	CANCELED				0	ALL	ALL	
328718	PENDING	SUBMIT	WAIT_MARGIN		✓		0	ALL	ALL	ApplyLifeCycle
330718	PENDING	TERMINATE	WAIT_MARGIN				0	ALL	ALL	ApplyLifeCycle
329230	PENDING	TRANSFER	WAIT_MARGIN				0	ALL	ALL	ApplyLifeCycle
329231	PROCESSING	REJECT	LIMIT_FAILED				0	ALL	ALL	ApplyLifeCycle
328220	PROCESSING	SUBMIT	WAIT_MARGIN				0	ALL	ALL	ApplyLifeCycle
334218	TO_BE_TERMINATED	AMEND	TO_BE_TERMINATED				0	ALL	ALL	
330220	TO_BE_TERMINATED	TERMINATE	WAIT_TERMINATE				0	ALL	ALL	ApplyLifeCycle
333718	TO_BE_TRANSFERED	P_TRANSFER	WAIT_P_TRANSFER				0	ALL	ALL	
329232	TO_BE_TRANSFERED	TRANSFER	WAIT_TRANSFER				0	ALL	ALL	ApplyLifeCycle
329719	VERIFIED	TRANSFER	TO_BE_TRANSFERED				0	ALL	ALL	
329233	WAIT_BACKLOAD	ACCEPT	CLEARED				0	ALL	ALL	
335219	WAIT_BACKLOAD	AMEND	WAIT_BACKLOAD				0	ALL	ALL	
329234	WAIT_BACKLOAD	REJECT	WAIT_BACKLOAD				0	ALL	ALL	
329235	WAIT_BULK_MARGIN	ACCEPT	CLEARED				0	ALL	ALL	
333722	WAIT_BULK_MARGIN	AMEND	WAIT_BULK_MARGIN				0	ALL	ALL	
329236	WAIT_BULK_MARGIN	REJECT	CANCELED				0	ALL	ALL	
329237	WAIT_COMPRESSION	ACCEPT	TERMINATED				0	ALL	ALL	
329238	WAIT_COMPRESSION	REJECT	CLEARED				0	ALL	ALL	
329239	WAIT_DECLAR	ACCEPT	DECLARED				0	ALL	ALL	

The rule ApplyLifeCycle is used in case of 'Transfer' and 'Partial Termination'. In both cases there are 2 sets of trade pairs, one with the original counterparty and one with the new one. Both these trade pairs have the following two keywords: The 'Linked To' keyword links the two trades in a trade pair and the 'TransferTo' and 'TransferFrom' keywords specify which trade pair is being transferred and where is it transferred to. So the original trade pair has the 'TransferTo' keyword and the new trade pair will have the 'TransferFrom' keyword. When these two sets of trade pairs have these trade keywords and the workflow has ApplyLifeCycle rule, any action that is applied to any one of the trades is applied to all four trades. The ApplyLifeCycle rule makes sure that the action is applied to all four trades and they are all sent to the margin engine.

### 7.4.1 Backloading

To move the backloaded trades through margin engine for limit check, the user needs to configure the Post trade novation scheduled task. All backloaded trades will go through the margin engine in a package and this will be defined in a trade filter in calypso. All trades in this trade filter will be in trade status 'WAIT\_BACKLOAD'.

Trade Filter [161012/MARGIN\_HKEX\_161/calypso\_user]

Name 
Time Zone

Comment 
Holidays  ...

☐ Use SQL
Parent

☐ Check Holidays

☐ Cache trades on load
☐ Set as default parent

Post Processing
Position Spec
Counterparty
Portfolio Hierarchy
Diary Criteria

Ranges
Date / Time
Product Criteria
Trade Criteria
Underlying Security
Custom Criteria

☒ BUY
☒ SELL

Internal Reference ☒ IN

Bundle  ... Id  ...

Bundle Attribute  ...

Book ☒ IN  ...

Trader ☒ IN  ...

Status ☒ IN  ...

Sales ☒ IN  ...

Book Attribute  ...

Keyword Value  ...

Keyword   ...

Market Type ☒ IN  ...

Market Place ☒ IN  ...

Currency ☒ IN  ...

Once we have all the backloaded trades in a trade filter and they are all in 'WAIT\_BACKLOAD' status, we can run the POST\_TRADE\_NOVATION\_HRC scheduled task to push these trades to margin engine to go through limit check.

In the attributes, the 'Novation Type' is set to 'Backloading' and the trade status-add is set to 'WAIT\_BACKLOAD'. Trade Status – Remove can be left blank in case of backloading.

Task Description

Task Type:

POST\_TRADE\_NOVATION\_HRC

External Reference:

POST TRADE NOVATION

Comments:

Description:

Execution Parameters

Attempts:

1

Retry After:

0

minutes

Expected Execution Time (SLA):

8

minutes

JVM Settings:

-Xms512m -Xmx1024m

Log Settings:

Task Notification Options

☐ Send Emails

☐ Publish Business Events

To User:

Common Attributes

Task ID

156620

Processing Org

Trade Filter

backload\_test

Filter Set

Pricing Environment

Timezone

America/Los\_Angeles

Valuation Time Hour

Valuation Time Minute

Undo Time Hour

Undo Time Minute

Valuation Date Offset

From Days

0

To Days

0

Pricer Measures

Business Holidays

Task Attributes

Novation Type

Backloading

Trade Status - Add

WAIT\_BACKLOAD

Trade Status - Remove

Make sure that you add the below argument to the JVM settings in the ST to run it successfully.

-Dorg.apache.activemq.SERIALIZABLE\_PACKAGES=\* JVM

After the ST runs successfully, the trades will be submitted to headroom check and will be accepted or rejected based on the available limits. Accepted trades will go to 'Cleared' status and rejected ones will stay in 'Wait\_Backload' status until submitted again.

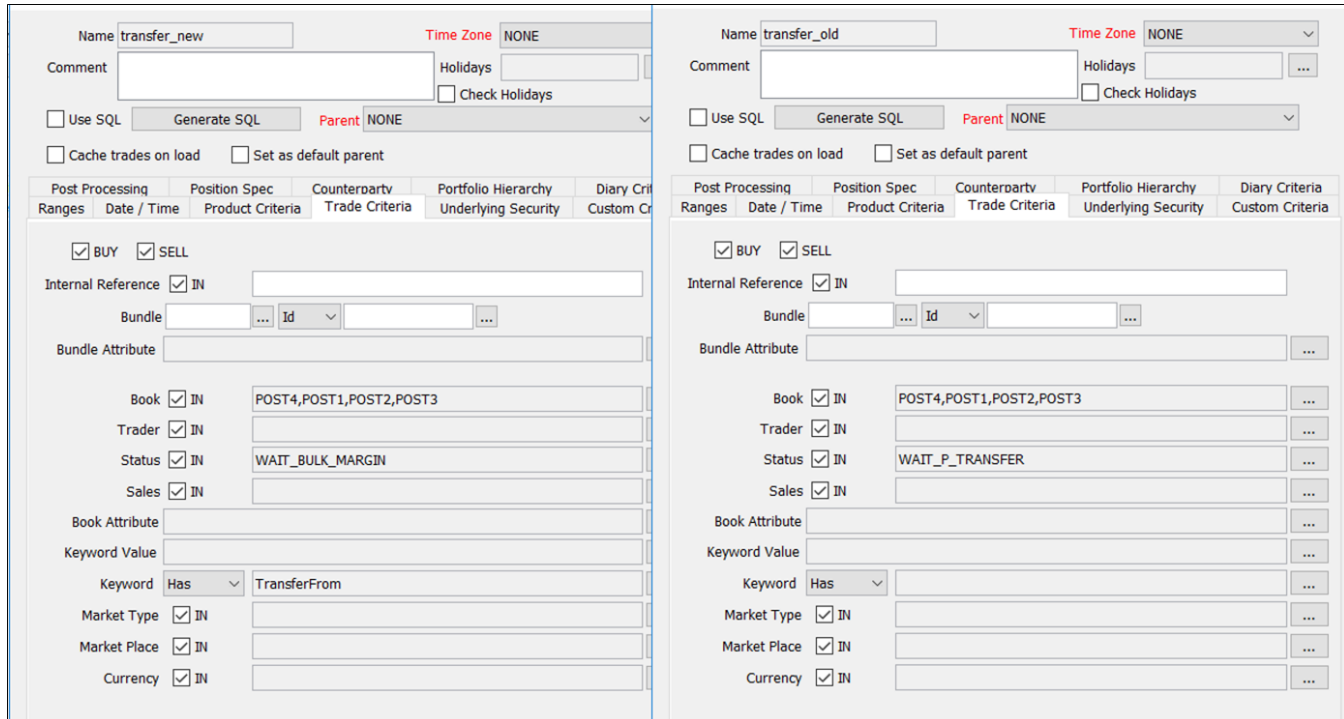
Headroom Check Monitor													
Number Of Trades: 16		Cleared: 10		Rejected: 6									
Filter: <input type="text"/> Type here to filter accounts + <input type="button" value="Expand all"/> <input type="button" value="Collapse last level"/>													
Client	Account	Currency	# Rejected	Headroom Usage	Headroom	IM	VM	Collateral	Headroom Limit	Total IM Limit			
POST3	USD	USD	1	0.00	66,666.00	0.00	0.00	0.00	66,666.00	88,888.00			
Trade Results													
External Ref.	Account	Currency	Status	Rejection	Headroom	Prev. IM	Current IM	Prev. VM	Current VM	Trade IM	Trade VM	Collateral	Headroom Li
621961	HREXPOST4A	USD	Rejected	TOTAL IM LIMIT EXCEEDED: Portfolio: POST4   Limit: Total IM   Limit failed: Limit exceeded for POST4 because 66626.33 (IM) > 30000.00 (IM Limit Amount)	-26,348.56	26,348.56	26,348.56	0.00	0.00	13,929.42	0.00	0.00	
621960	HREXPOST1	USD	Rejected	TOTAL IM LIMIT EXCEEDED: Portfolio: POST1   Limit: Total IM   Limit failed: Limit exceeded for POST1 because 28943.14 (IM) > 0.00 (IM Limit Amount)	109,210.57	20,789.43	20,789.43	0.00	0.00	8,153.71	0.00	0.00	130.00
621963	HREXPOST4B	USD	Rejected	TOTAL IM LIMIT EXCEEDED: Portfolio: POST4   Limit: Total IM   Limit failed: Limit exceeded for POST4 because 79045.68 (IM) > 30000.00 (IM Limit Amount)	-26,348.56	26,348.56	26,348.56	0.00	0.00	26,348.56	0.00	0.00	
621962	HREXPOST3	USD	Rejected	TOTAL IM LIMIT EXCEEDED: Portfolio: POST3   Limit: Total IM   Limit failed: Limit exceeded for POST3 because 21497.74 (IM) > 0.00 (IM Limit Amount)	-6,860.18	6,860.18	6,860.18	0.00	0.00	14,637.56	0.00	0.00	
621961	HREXPOST4A	USD	Rejected	TRADE PAIR REJECTED: Rejected due to related trades being rejected: 621960/621960	-26,348.56	26,348.56	26,348.56	0.00	0.00	13,929.42	0.00	0.00	
621960	HREXPOST1	USD	Rejected	TOTAL IM LIMIT EXCEEDED: Portfolio: POST1   Limit: Total IM   Limit failed: Limit exceeded for POST1 because 28943.14 (IM) > 28282.00 (IM Limit Amount)	109,210.57	20,789.43	20,789.43	0.00	0.00	8,153.71	0.00	0.00	130.00
621963	HREXPOST4B	USD	Accepted		-52,697.12	26,348.56	52,697.12	0.00	0.00	26,348.56	0.00	0.00	
621962	HREXPOST3	USD	Accepted		-21,497.74	6,860.18	21,497.74	0.00	0.00	14,637.56	0.00	0.00	



## 7.4.2 Portfolio Transfer

In case of portfolio transfer, the user will define two groups of trades in the trade filter. One group in a 'Wait\_Bulk\_Margin' status and other in 'Wait\_Portfolio\_Transfer' status. The first group will stay in the same portfolio and the other one will transfer to a different portfolio after running the ST. The user will define the groups by creating two different trade filters, for the existing and new portfolio based on the trade statuses.

Trade Filter examples:



The image displays two side-by-side screenshots of the Nasdaq Calypso Trade Filter configuration interface. Both filters are named 'transfer\_new' and 'transfer\_old' respectively, and both have a 'Time Zone' set to 'NONE'.

**Left Screenshot (transfer\_new):**

- Name:** transfer\_new
- Comment:** (empty)
- Holidays:** (empty)
- Check Holidays:** ☐
- Use SQL:** ☐ **Generate SQL:** ☐ **Parent:** NONE
- Cache trades on load:** ☐ **Set as default parent:** ☐
- Post Processing:** Ranges, Date / Time, Product Criteria, Trade Criteria, Underlying Security, Custom Criteria
- Position Spec:** (empty)
- Counterparty:** (empty)
- Portfolio Hierarchy:** (empty)
- Diary Criteria:** (empty)
- BUY:** ☒ **SELL:** ☒
- Internal Reference:** ☒ IN
- Bundle:** (empty) **Id:** (empty)
- Bundle Attribute:** (empty)
- Book:** ☒ IN POST4,POST1,POST2,POST3
- Trader:** ☒ IN
- Status:** ☒ IN WAIT\_BULK\_MARGIN
- Sales:** ☒ IN
- Book Attribute:** (empty)
- Keyword Value:** (empty)
- Keyword:** Has TransferFrom
- Market Type:** ☒ IN
- Market Place:** ☒ IN
- Currency:** ☒ IN

**Right Screenshot (transfer\_old):**

- Name:** transfer\_old
- Comment:** (empty)
- Holidays:** (empty)
- Check Holidays:** ☐
- Use SQL:** ☐ **Generate SQL:** ☐ **Parent:** NONE
- Cache trades on load:** ☐ **Set as default parent:** ☐
- Post Processing:** Ranges, Date / Time, Product Criteria, Trade Criteria, Underlying Security, Custom Criteria
- Position Spec:** (empty)
- Counterparty:** (empty)
- Portfolio Hierarchy:** (empty)
- Diary Criteria:** (empty)
- BUY:** ☒ **SELL:** ☒
- Internal Reference:** ☒ IN
- Bundle:** (empty) **Id:** (empty)
- Bundle Attribute:** (empty)
- Book:** ☒ IN POST4,POST1,POST2,POST3
- Trader:** ☒ IN
- Status:** ☒ IN WAIT\_P\_TRANSFER
- Sales:** ☒ IN
- Book Attribute:** (empty)
- Keyword Value:** (empty)
- Keyword:** Has
- Market Type:** ☒ IN
- Market Place:** ☒ IN
- Currency:** ☒ IN

The scheduled task POST\_TRADE\_NOVATION\_HRC is then run to perform headroom check and to transfer the trades in the 'Wait\_P\_Transfer' status from the existing portfolio.

'Transfer\_test' trades filter in the ST screenshot below includes both trade filters above for the old and new portfolio. The trades will then be transferred to a new portfolio based on the keywords and will move to WAIT\_BULK\_MARGIN and go through margin engine for headroom check.

<b>Task Description</b>	
Task Type:	POST_TRADE_NOVATION_HRC
External Reference:	HKEX TRANSFER POST TRADE NOVATION
Comments:	
Description:	
<b>Execution Parameters</b>	
Attempts:	1
Retry After:	0 minutes
Expected Execution Time (SLA):	8 minutes
JVM Settings:	-Xms512m -Xmx1024m
Log Settings:	
<b>Task Notification Options</b>	
<input type="checkbox"/> Send Emails	<input type="checkbox"/> Publish Business Events
To User:	
<b>Common Attributes</b>	
Task ID	157120
Processing Org	
Trade Filter	transfer_test
Filter Set	
Pricing Environment	
Timezone	America/Los_Angeles
Valuation Time Hour	
Valuation Time Minute	
Undo Time Hour	
Undo Time Minute	
Valuation Date Offset	
From Days	0
To Days	0
Pricer Measures	
Business Holidays	
<b>Task Attributes</b>	
Novation Type	Portfolio Transfer
Trade Status - Add	WAIT_BULK_MARGIN
Trade Status - Remove	WAIT_P_TRANSFER

## Default Management

For Default Management, a new trade keyword needs to be added to the defaulted trade:

TransferType = DefaultTransfer

Example:

T1 (associated with Clearing Member CM1) is linked to T2

CM1 defaults

T1 is transferred to CM3 and T3 is created

T3 is linked to T2

Trade Keywords after default: Since T1 defaulted, a trade keyword is added to T1

T1: TransferType=DefaultTransfer

TransferTo=T3



LinkedTo=<blank>

T2: LinkedTo=T3

T3: LinkedTo=T2

TransferFrom=T1

Since T2 is unchanged there is no need to send it to HRC. Only {T1, T3} will be send to the Margin Engine.

### 7.4.3 Portfolio Compression

Compression is similar to portfolio transfer where the user will define two different trade filters for the trades to be compressed and saved as new trade and the trades that will stay in the portfolio as is. Trades to be compressed will be moved to a WAIT\_COMPRESSION trade status, based on the TriOptima custom process. Trades resulting from trade compression will be saved as a WAIT\_COMPRESSION status and will then go through the margin engine for limit check.

For example, the user will define the trade filters as below based on trade status –

Name 
Time Zone

Comment 
Holidays  ...

☐ Use SQL 
Parent

☐ Check Holidays

☐ Cache trades on load
☐ Set as default parent

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  ...

Trader ☒ IN  ...

Status ☒ IN  ...

Sales ☒ IN  ...

Book Attribute  ...

Keyword Value  ...

Keyword   ...

Market Type ☒ IN  ...

Market Place ☒ IN  ...

Currency ☒ IN  ...

Name 
Time Zone

Comment 
Holidays  ...

☐ Use SQL 
Parent

☐ Check Holidays

☐ Cache trades on load
☐ Set as default parent

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  ...

Trader ☒ IN  ...

Status ☒ IN  ...

Sales ☒ IN  ...

Book Attribute  ...

Keyword Value  ...

Keyword   ...

Market Type ☒ IN  ...

Market Place ☒ IN  ...

Currency ☒ IN  ...

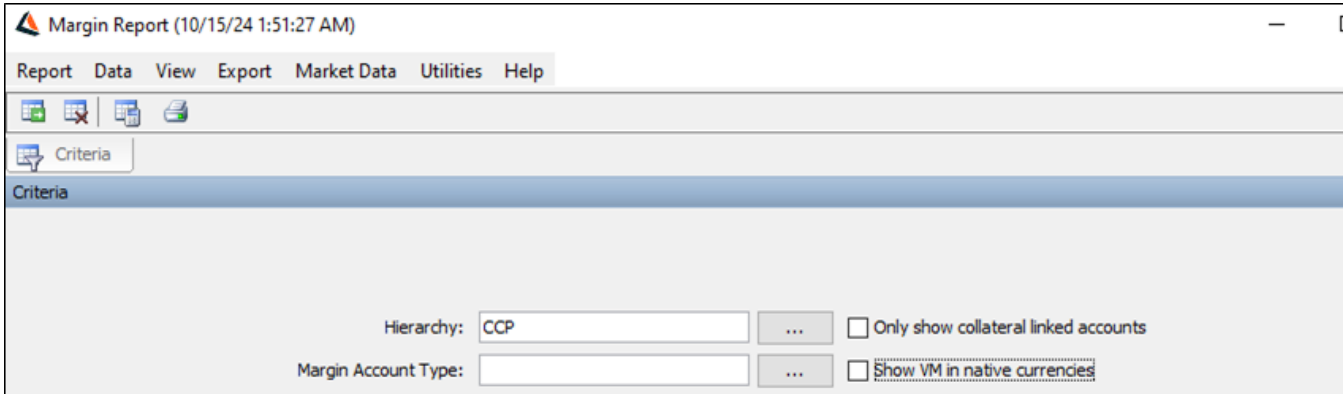
<b>Task Description</b>	
Task Type:	POST_TRADE_NOVATION_HRC
External Reference:	COMPRESSION POST TRADE NOVATION
Comments:	
Description:	
<b>Execution Parameters</b>	
Attempts:	1      Retry After: 0 minutes      Expected Execution Time (SLA): 8 minutes
JVM Settings:	-Xms512m -Xmx1024m
Log Settings:	
<b>Task Notification Options</b>	
<input type="checkbox"/> Send Emails <input type="checkbox"/> Publish Business Events    To User:	<div></div>
<b>Common Attributes</b>	
Task ID	157620
Processing Org	
Trade Filter	compression_test
Filter Set	
Pricing Environment	
Timezone	America/Los_Angeles
Valuation Time Hour	
Valuation Time Minute	
Undo Time Hour	
Undo Time Minute	
Valuation Date Offset	
From Days	0
To Days	0
Pricer Measures	
Business Holidays	
<b>Task Attributes</b>	
Novation Type	Compression
Trade Status - Add	WAIT_BULK_MARGIN
Trade Status - Remove	WAIT_COMPRESSION

After the scheduled task is run successfully, the trades in WAIT\_COMPRESSION go to CLEARED status if accepted and the trades in WAIT\_BULK\_MARGIN go to TERMINATED status.

## 7.5 Margin Report

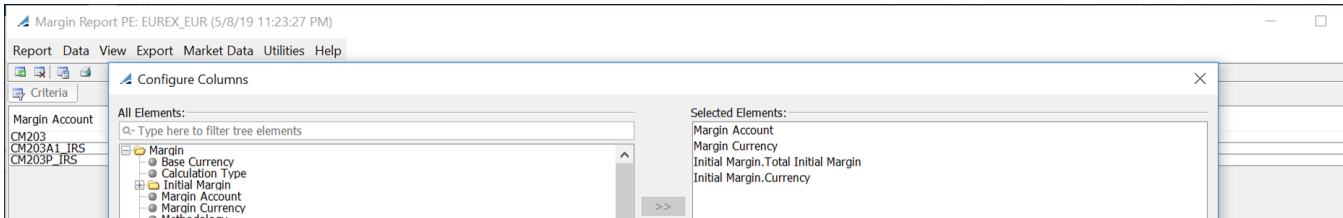
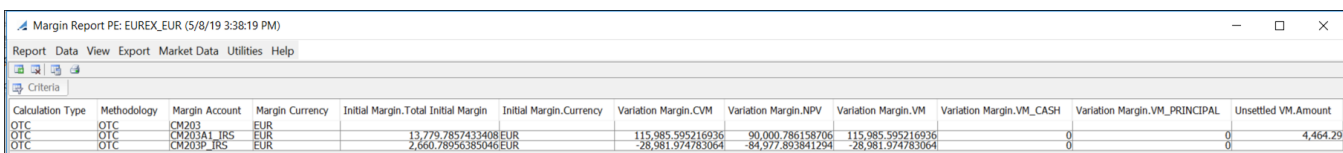
The Margin report can be loaded for a hierarchy for a given date and pricing environment and it'll display all IM and VM results for that day for the margin account and all nodes based on the headroom check rule selected in the domain values. The columns can be configured to include only desired columns.

Below action can be used to add a tile for margin report in calypso –  
`reporting.ReportWindow$Margin`



## Criteria


- » Hierarchy: select one or multiple hierarchies to load margin results.
- » Margin Account Type: select Margin Account Types based on node attribute MarginAccountType.
- » Only show collateral linked accounts: view results of margin accounts with collateral exposures and margin call contract.
- » Show VM in native currencies: View VM results in native currency breakdown with Variation Margin (Ccy) columns.

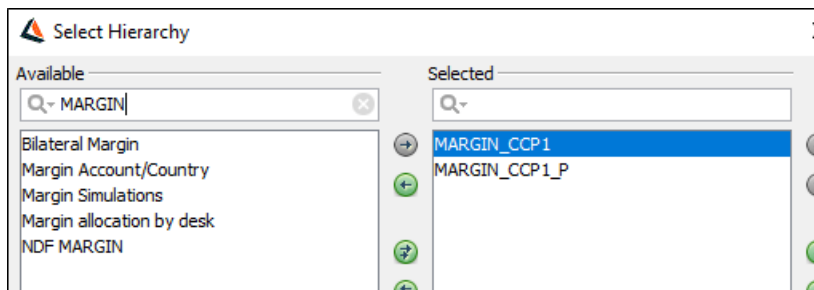



Calculation Type	Methodology	Margin Account	Margin Currency	Initial Margin.Total Initial Margin	Initial Margin.Currency	Variation Margin.CVM	Variation Margin.NPV	Variation Margin.VM	Variation Margin.VM_CASH	Variation Margin.VM_PRINCIPAL	Unsettled VM.Amount
OTC	OTC	CM203	EUR								
OTC	OTC	CM203A1_IRS	EUR	13,779,785,743,340,8	EUR	115,985,595,216,936	90,000,786,158,706	115,985,595,216,936	0	0	4,464,29
OTC	OTC	CM203P_IRS	EUR	2,660,789,563,850,46	EUR	-28,981,974,783,064	-84,977,893,841,294	-28,981,974,783,064	0	0	

If the CCP has two different hierarchies for Pending and cleared trades, they can load the information for both hierarchies in the margin report at the same time.

A typical use case will be the merge of the “Margin” hierarchy for Cleared Trades and “Pending” Hierarchy for Pending Trades:

MARGIN_CCP1 	MARGIN_CCP1_P
▼ CB2	▼ CB2
CB2_HOUSE [CB2_HOUSE]	CB2_HOUSE_P [CB2_HOUSE_P]
CLCX_CB2_SEG [CLCX_CB2_SEG]	CLCX_CB2_SEG_P [CLCX_CB2_SEG_P]
CLAX_CB2_SEG [CLAX_CB2_SEG]	CLAX_CB2_SEG_P [CLAX_CB2_SEG_P]
> G_CB2_OMNI_ALL	> G_CB2_OMNI_ALL_P
N_CB2_OMNI [N_CB2_OMNI]	N_CB2_OMNI_P [N_CB2_OMNI_P]
▼ CB3	▼ CB3
CB3_HOUSE [CB3_HOUSE]	CB3_HOUSE_P [CB3_HOUSE_P]
N_CB3_OMNI [N_CB3_OMNI]	N_CB3_OMNI_P [N_CB3_OMNI_P]



Margin Report (7/11/19 1:03:18 PM)

ReportDataViewExportMarket DataUtilitiesHelp

Criteria

Margin Account	Margin Currency	Initial Margin.Total Initial Margin /
ClientSeg	USD	0.00
ClientSeg_P	USD	0.00
NetOmnibus	USD	0.00
NetOmnibus_P	USD	0.00
Client1	USD	4,226,378.63
Client1_P	USD	4,226,378.63
Client2	USD	4,226,378.63
Client2_P	USD	4,226,378.63
GrossOmnibus	USD	16,905,514.50

Margin Report with IM breakdown results.

Report	Data	View	Export	Market Data	Utilities	Help							
Criteria													
Margin Account	Margin Currency	Initial Margin.Total Initial Margin	Initial Margin.ETL	Initial Margin.VaR	Initial Margin.MFM	Initial Margin.Credit Margin	Initial Margin.Credit Multiplier	Initial Margin.Holiday Margin	Initial Margin.Holiday Multiplier	Initial Margin.Discretionary Margin	Initial Margin.Liquidity	Unsettled VM.Amount	Variation Margin.CVM
CB2	USD	328,933.68	304,931.50	294,685.28	245,124.15	22,033.29	0	1,468.89	0	500.00	0.00	0.00	55,427.38
CB2_HOUSE	USD	118,649.48	118,649.48	118,416.64	140,387.30	0.00	0	0.00	0	0.00	0.00	0.00	-25,951.81
CLAX_CB2_SEG	USD	97,446.49	73,444.31	71,327.30	50,339.04	22,033.29	0.3	1,468.89	0.02	500.00	0.00	0.00	13,336.59
CLAX_CB2_SEG	USD	56,936.65	56,936.65	54,648.70	140,064.16	0.00	0	0.00	0	0.00	0.00	0.00	-12,687.84
U_CB2_OMNE_ALL	USD	43,952.51	43,952.51	41,583.65	4,818.84	0.00	0	0.00	0	0.00	0.00	0.00	-27,814.47
CB2_OMNE1	USD	40,339.03	40,339.03	40,088.79	4,657.29	0.00	0	0.00	0	0.00	0.00	0.00	1,683.60
CB2_OMNE2	USD	1,613.48	1,613.48	1,494.86	161.35	0.00	0	0.00	0	0.00	0.00	0.00	-29,498.07
N_CB2_OMNE	USD	11,948.55	11,948.55	10,708.99	1,315.02	0.00	0	0.00	0	0.00	0.00	0.00	108,544.92
CB3	USD	113,873.30	113,873.30	109,291.39	23,913.39	0.00	0	0.00	0	0.00	0.00	0.00	999,194.81
CB3_HOUSE	USD	56,936.65	56,936.65	54,648.70	11,956.70	0.00	0	0.00	0	0.00	0.00	0.00	-12,687.84
N_CB3_OMNE	USD	56,936.65	56,936.65	54,648.70	11,956.70	0.00	0	0.00	0	0.00	0.00	0.00	-986,506.96

Margin Report with IM and VM results with VM breakdown in native currencies.

Margin Report PE: ASX\_AUD (2/21/24 1:08:08 PM) / ASX\_AUD IM/VM

ReportDataViewExportMarket DataUtilitiesHelp

Criteria

Hierarchy: CCP

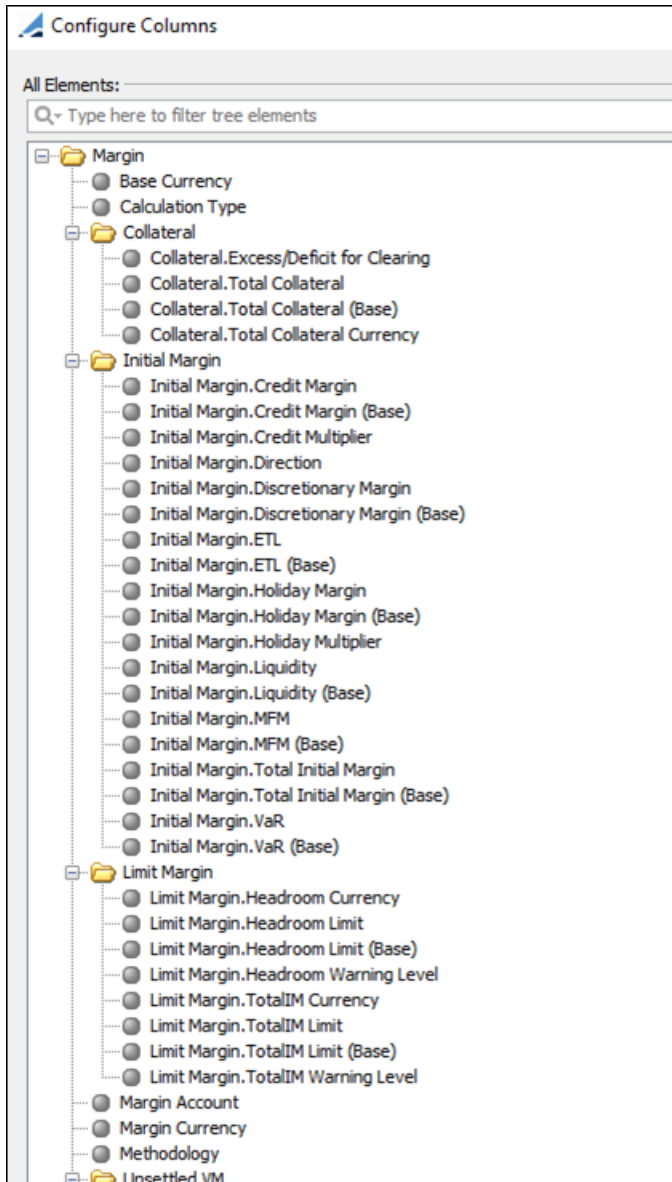
Margin Account Type:

☐ Only show collateral linked accounts


☒ Show VM in native currencies

AGGREGATION	Margin Account	Margin Currency	Initial Margin.Total Initial Margin	Total Margin.Total Margin	Total Margin.Total Margin (Ccy)	Variation Margin.NPV_ADJ (Ccy)	Variation Margin.NOTIONAL (Ccy)	Variation Margin.VM_EXPOSURE	Variation Margin.VM_EXPOSURE (Ccy)
Margin									
Client_CM3									
Client_CM3	AUD		167,852,692.62	167,852,653.50	167,852,692.76	37,353.09	2,000,000.00	-39.12	0.14
Client_CM3	NZD		0.00	0.00	-42.01	178,426.17	1,000,000.00	0.00	-42.01
Client_CM3_ACCT01									
Client_CM3_ACCT01	AUD		166,107,336.44	166,107,336.44	166,107,336.44	0.00	0.00	0.00	0.00
Client_CM3_ACCT02									
Client_CM3_ACCT02	AUD		1,745,356.18	1,745,317.06	1,745,356.32	37,353.09	2,000,000.00	-39.12	0.14
Client_CM3_ACCT02	NZD		0.00	0.00	-42.01	178,426.17	1,000,000.00	0.00	-42.01
Client_CM3_ACCT03									
Client_CM3_ACCT03			0.00	0	0	0.00	0.00	0.00	0.00
House									
House	AUD		140,931,488.67	140,931,449.55	140,931,488.81	37,353.09	2,000,000.00	-39.12	0.14
House	NZD		0.00	0.00	-42.01	178,426.17	1,000,000.00	0.00	-42.01
CM3_HOUSE									
CM3_HOUSE	AUD		140,931,488.67	140,931,449.55	140,931,488.81	37,353.09	2,000,000.00	-39.12	0.14
CM3_HOUSE	NZD		0.00	0.00	-42.01	178,426.17	1,000,000.00	0.00	-42.01

These are all the columns available in margin report:






**Configure Columns**

All Elements:

- Limit Margin.Headroom Limit
- Limit Margin.Headroom Limit (Base)
- Limit Margin.Headroom Warning Level
- Limit Margin.TotalIM Currency
- Limit Margin.TotalIM Limit
- Limit Margin.TotalIM Limit (Base)
- Limit Margin.TotalIM Warning Level
- Margin Account
- Margin Currency
- Methodology
- Unsettled VM
  - Unsettled VM.Amount
  - Unsettled VM.Amount (Base)
- Used
- Variation Margin
  - Variation Margin.CVM
  - Variation Margin.CVM (Base)
  - Variation Margin.DELTA
  - Variation Margin.DELTA (Base)
  - Variation Margin.FUNDING\_RATE
  - Variation Margin.NOTIONAL
  - Variation Margin.NOTIONAL (Base)
  - Variation Margin.NPV
  - Variation Margin.NPV (Base)
  - Variation Margin.NPV\_ADJ
  - Variation Margin.NPV\_ADJ (Base)
  - Variation Margin.PAI
  - Variation Margin.PAI (Base)
  - Variation Margin.PV01
  - Variation Margin.PV01 (Base)
  - Variation Margin.VM
  - Variation Margin.VM (Base)
  - Variation Margin.VM\_CASH
  - Variation Margin.VM\_CASH (Base)
  - Variation Margin.VM\_COUPON
  - Variation Margin.VM\_COUPON (Base)
  - Variation Margin.VM\_EXPOSURE
  - Variation Margin.VM\_EXPOSURE (Base)
  - Variation Margin.VM\_PRINCIPAL
  - Variation Margin.VM\_PRINCIPAL (Base)
  - Variation Margin.VM\_PRINCIPAL\_PRI
  - Variation Margin.VM\_PRINCIPAL\_PRI (Base)
  - Variation Margin.VM\_PRINCIPAL\_SEC
  - Variation Margin.VM\_PRINCIPAL\_SEC (Base)

## 8. OTC Margin What If API

API to call synchronous What If calculation:

```
MarginEngineClient.get().getWhatIfOTCCalculator().calculateWhatIf(requests,timeout);
```

where requests is List<WhatIfRequest> and timeout is a long.

Request

```
/**
 * A What If Request. It contains a Collection of trade for one portfolio.
 */
public interface WhatIfRequest extends Serializable {
    /**
     * @return the portfolio this request is for
     */
    public String getPortfolio();
    /**
     * @return the Trades to be posted for this WhatIfRequest
     */
    public Collection<Trade> getTrades();
}
```

Response will be a WhatIfOTCMessage

```
public interface WhatIfOTCMessage extends Serializable{
    /**
     * @return the portfolioName requested in the What If Request
     */
    public String getPortfolio();
    /**
     * @return the Previous IM for the given portfolio
     */
    public double getPreviousIM();
    /**
     * @return the Trade IM for the given portfolio
     */
    public double getTradeIM();
    /**
     * @return the IM Currency for the given portfolio
     */
    public String getIMCurrency();
    /**
     * @return the Margin Result Tree for the given portfolio
     */
    public MarginResultTree getInitialMargin();
    /**
     * @return the Rejection for the given portfolio
     */
    public HeadroomCheckRejection getHeadroomCheckRejection();
}
```