Nasdaq Calypso

Bloomberg TS Integration Guide

Version 7.13.1

Revision 32.0
December 2024
Approved

Document History

Revision	Published	Summary of Changes
1.0	November 2012	First edition.
2.0	November 2012	Second edition – Add remarks under RateDefinition in Calypso Mapping.
3.0	November 2012	Third edition – Add message element mapping of Bloomberg AIM/Bloomberg TOMS to Calypso Upload Document.
4.0	November 2012	Fourth edition – Change in product lookup for Equity and Equity Index Future.
5.0	November 2012	Fifth edition – Update Java Libraries Dependency for IBM MQ. Add lookup method for default counterparty and default book. Add screenshot for setting up attributes of equity, future, equity index and future option. Mark "user extended" for some categories in Calypso Mapping. Add details to instructions in the Recovery section.
6.0	December 2012	Sixth edition – Include Bloomberg TS Phase 2 changes.
7.0	January 2013	Seventh edition – Add screenshots in Product Setup.
8.0	January 2013	Eighth edition – Add FX Option Premium Data Mapping.
9.0	January 2013	Ninth edition – Add Trade Handling.
10.0	February 2013	Tenth edition – Add details to Book Hierarchy Product Node in Calypso Mapping.
11.0	May 2015	Eleventh edition – Remove field mapping.
12.0	May 2016	Twelfth edition – Updates for version 4.1.0.
13.0	August 2016	Thirteenth edition – Updates for version 4.2.0.
14.0	February 2017	Fourteenth edition – Updates for version 5.0.0.

Revision	Published	Summary of Changes
15.0	April 2017	Fifteenth edition – Updates for version 5.0.2.
16.0	September 2017	Sixteenth edition – Updates for version 5.1.0.
17.0	September 2018	Seventeenth edition – Updates for version 5.3.4.
18.0	November 2018	Eighteenth edition – Updates for version 5.4.0.
19.0	December 2019	Nineteenth edition – Updates for version 5.6.0.
20.0	January 2019	Twentieth edition – Updates for version 5.4.3.
21.0	April 2019	Edition 21 – Updates for versions 5.4.6 and 5.5.2.
22.0	May 2020	Edition 22 – Updates for version 5.6.2.
23.0	November 2021	Edition 23 – Updates for version 5.11.0.
24.0	May 2022	Edition 24 – Update for version 5.11.0
25.0	April 2024	Added support for Bonds, Repo, and Futures in v20.
26.0	May 2024	Added support for Issuance in v20.
27.0	June 2024	Added support for Unitized Fund in v20 & CounterParty LE attribute Config
28.0	July 2024	Added ACK/NACK process
29.0	August 2024	Added support for OTC Equity Index Option and CDS Index Trade
30.0	September 2024	Added additional note in Client Account configuration Added support for Swaptions in Bloomberg AIM and FX Spot in Bloomberg TOMS
31.0	October 2024	Added support for FX Option (Vanilla) for v20
32.0	December 2024	Added support for FX Swap

This document describes the configuration required to integrate Bloomberg TS with Calypso.

NOTE: The Calypso License to use this Calypso Integration Module does not include a license for any third-party data services to which this module can interface. Clients are responsible for contracting with the appropriate third-party data service(s) prior to using this Calypso Integration Module.

IMPORTANT NOTE: For Cloud deployments please contact your application management team as the deployment procedure for Cap Cloud is different.

Table of Contents

Introduction

The Bloomberg TS module specializes in integrating the Calypso Systems with the Bloomberg AIM or Bloomberg TOMS on Gateway NET (GNET) product.

This document explains the components involved and its dependencies with Calypso and other modules. It also describes the functions provided by the module as well as the setup procedures for the module to be functioning.

Gateway Net (GNET)

Schema version 30.14 is supported currently. Clients are suggested to get in touch with their Bloomberg Representatives for compatibility details.

1.1 Software Requirements

Please refer to the Data Uploader Integration Guide and the Bloomberg Data License Integration Guide.

IBM MQ – either server or client s/w installations are required. Please refer to IBM documentation.

Java Libraries Dependency

- com.ibm.mq.commonservices_7.0.1.3.jar
- com.ibm.mq.headers.jar
- com.ibm.mq.jar
- com.ibm.mq.jmqi.jar
- com.ibm.mq.jms.Nojndi.jar
- com.ibm.mq.pcf.jar
- com.ibm.mqjms.jar
- com.ibm.mq.* from your IBM MQ installation
- dhbcore.jar
- bloomberg.jar (for integration with Bloomberg Data License)

1.1.1 Engine Dependencies

- UploadImportMessageEngine, subscribing to PSEventUpload, with argument "-config BloombergAIM" (for integrating with Bloomberg AIM) or "-config BloombergTOMS" (for integrating with Bloomberg TOMS)
- BloombergEngine (for integration with Bloomberg Data License)
- TaskEngine (for integration with Bloomberg Data License)
- UpdateManagerEngine

Calypso supports v12 and v20 tradefeed format. V12 is the Calypso certified format while v20 is the standard Tradefeed format by Bloomberg. Bloomberg recommends to move from v12 to v20 format.

For now, calypso supports v20 for the following products:

- Bonds
- Repo
- FutureBond
- FutureEquity
- FutureEquityIndex
- FutureMM
- FutureFX
- FutureCommodity
- FutureOptionBond
- FutureOptionEquity
- FutureOptionEquityIndex
- FutureOptionMM
- FutureOptionFX
- FutureOptionCommodity
- Issuance
- Unitized Fund

Calypso supports Issuance product only in v20

Calypso Configuration Instructions

2.1 Prerequisites

Install Data Uploader - For instructions on installing Data Uploader, please refer to the Calypso Data Uploader Integration Guide.

2.2 Calypso Application Configuration

2.2.1 Migration Scripts and Schema Data

Schema Data are automatically loaded in Execute SQL and migration scripts are automatically applied.

2.2.2 Upload Import Message Engine Setup

Step 1 – Prepare the engine configuration file. You may start with the samples provided, which are named calypso_bloombergaim_config.properties.sample (for integrating with Bloomberg AIM) and calypso_bloombergtoms_config.properties.sample (for integrating with Bloomberg TOMS), and specify the messaging platform information in the file.

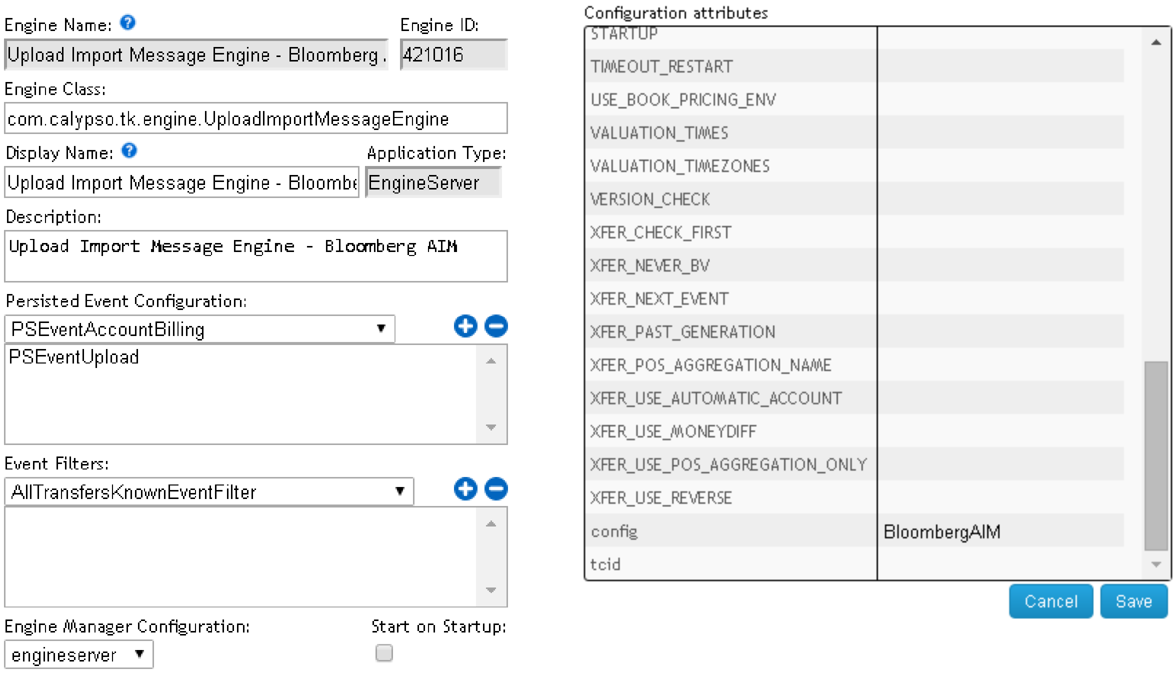
Please set uploadMode as "local" and persistMessages as "All" in the engine configuration file.

Rename the file as calypso_bloombergaim_config.properties or calypso_bloombergtoms_config.properties.

Step 2 – Configure the Upload Import Message Engine as shown in the figure.

The value of "config" should match (case insensitive) the middle part of the engine configuration file name. For example, if the file name is calypso_bloombergaim_config.properties, fill "BloombergAIM" here.

The engine should subscribe to PSEventUpload.



Connection to client's IBM MQ server via proxy, in calypso_bloombergtoms_config.properties file, we need to update the hostname, port accordingly, since it will not be updated via Tab file.

```
jms.queue.userid=calypsodev

jms.queue.queueManager=PMQNJ_DMZ2

jms.queue.hostname=10.60.50.10

jms.queue.port=8296

jms.queue.channel=P.TS.TSF.2106.12

input.queue.name=P.TS.TSF.FROM.BLP.2106.12

dynamicQueues/P.TS.TSF.FROM.BLP.2106.12.queue.setContext=true

messagingPlatform=IBMMQ

#ccdtURL=file:///C:/calypso/calypso-17.23.9.1/client/resources/P.TS.TSF.2106.12.TAB

restart.attempts=3

#IBM SSL Support

sslVersion=TLSv1.2

sslKeystore=cert.jks

sslKeystorePassword=$ENV('calypso_bloomberg_toms_keystore_password')

sslTrustStore=cert.jks

sslTrustStorePassword=$ENV('calypso_bloomberg_toms_truststore_password')

sslCipherSuite=TLS_ECDHE_RSA_WITH_AES_256_GCM_SHA384

uploadSource=Bloomberg

uploadFormat=TradeFeed
```

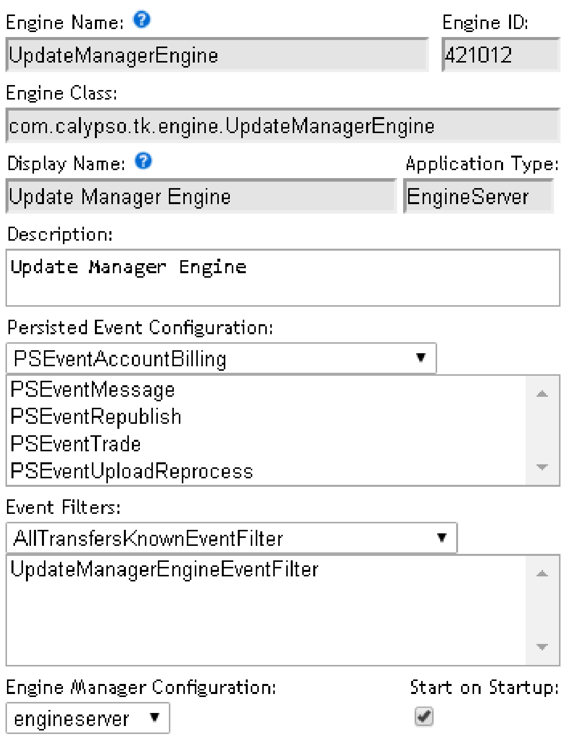
```
uploadMode=Local

persistMessages=All
```

Step 3 - Copy the configuration files to: `<calypso home>/tools/calypso-templates/resources`, then deploy the configuration files to your application servers.

2.2.3 Update Manager Engine Setup

Configure the Update Manager Engine as shown in the figure.



2.2.4 Calypso Workflow

- Please refer to the Data Uploader Integration Guide.

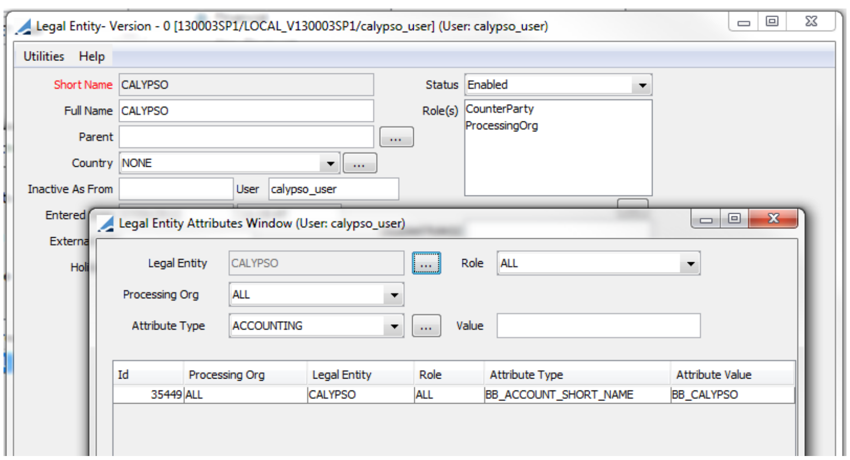
For bond trade allocation, Calypso suggests that the following actions be added to the existing bond trade workflow.

Original Status	Action	Rules	Resulting Status
VERIFIED	ALLOCATE	CheckFullAllocation CheckValidAllocation	ALLOCATED
VERIFIED	ALLOCATE	CheckPartialAllocation	PARTIAL_ALLOC

Original Status	Action	Rules	Resulting Status
		CheckValidAllocation	
ALLOCATED	ALLOCATE	CheckPartialAllocation CheckValidAllocation	PARTIAL_ALLOC
ALLOCATED	ALLOCATE	NOT(CheckValidAllocation)	VERIFIED
PARTIAL_ALLOC	ALLOCATE	CheckFullAllocation CheckValidAllocation	ALLOCATED
PARTIAL_ALLOC	ALLOCATE	CheckPartialAllocation CheckValidAllocation	PARTIAL_ALLOC
PARTIAL_ALLOC	ALLOCATE	NOT(CheckValidAllocation)	VERIFIED

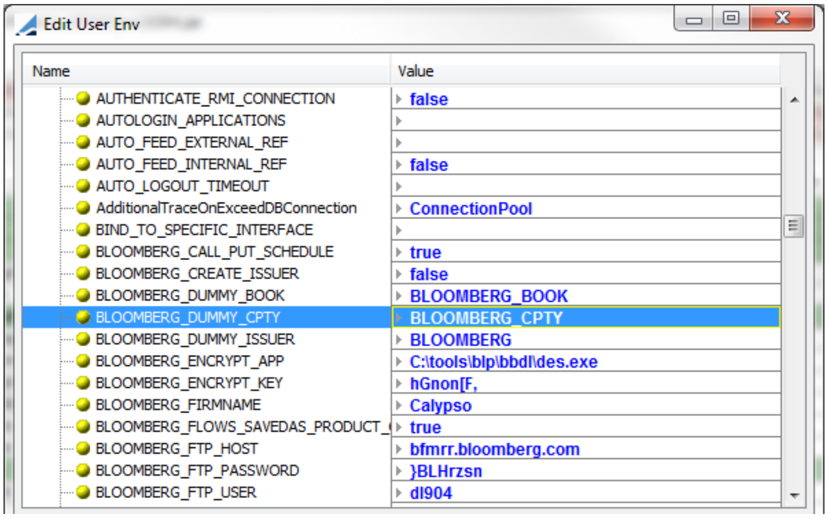
2.2.5 Counterparty, Trader and Sales Person

The Bloomberg AIM/TOMS field AccountCounterPartyShortName is used for looking up the counterparty in Calypso. The module first attempts to retrieve the counterparty via LE attribute mapping. For Bloomberg AIM and Bloomberg TOMS setup, the LE attribute name is BB_ACCOUNT_SHORT_NAME.

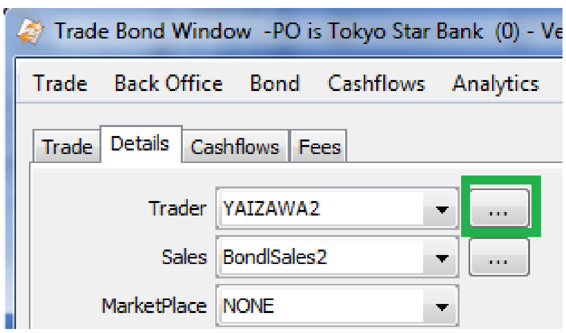


If no LE attribute mapping is found, then it searches for a counterparty with a matching name.

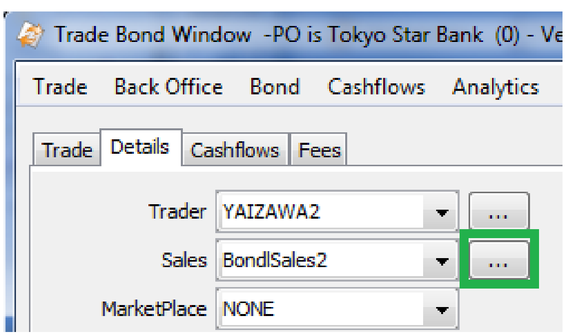
If neither is found, then the default counterparty, which is stored as environment variable BLOOMBERG_DUMMY_CPTY, will be taken.



The Bloomberg field TraderLogin will be mapped to the name of Trader in Calypso. Users need to create an appropriately named Trader values in Calypso (can be added by clicking on the eclipse located to the right of the Trader field below); otherwise the Trader default value of NONE will be used.



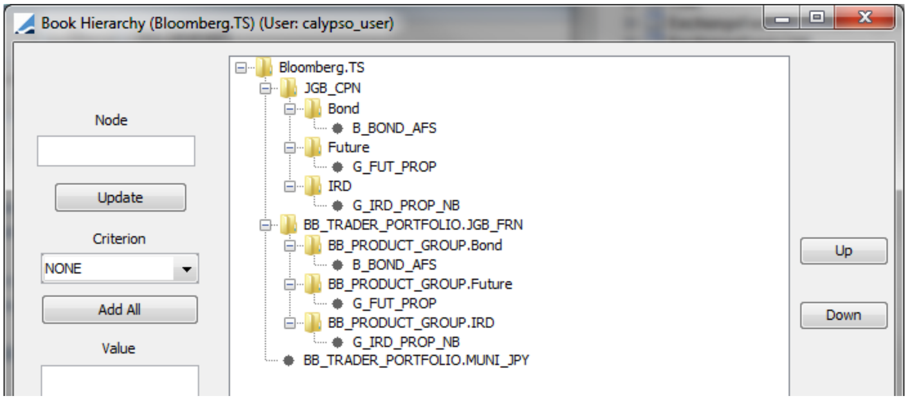
The Bloomberg field SalesLogin will be mapped to the name of Sales in Calypso. Similar to Trader described in the section above, users need to create an appropriately named Salesperson values in Calypso; otherwise the Salesperson default value of NONE will be used.



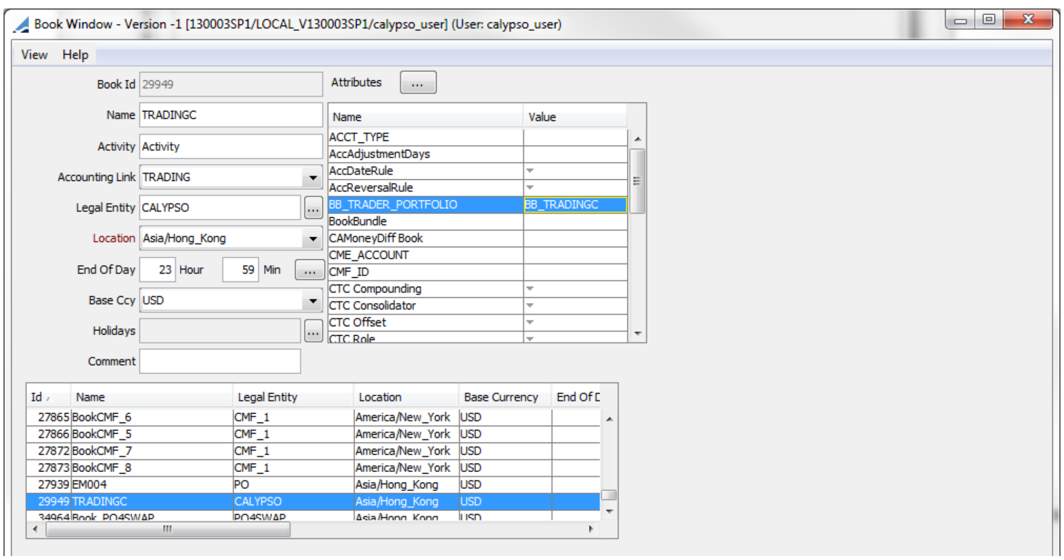
2.2.6 Book

For Bloomberg AIM or Bloomberg TOMS set up, the system will first look up the trading book from the Book Hierarchy. It searches a root node named Bloomberg.TS and then looks for a node with the name of Bloomberg

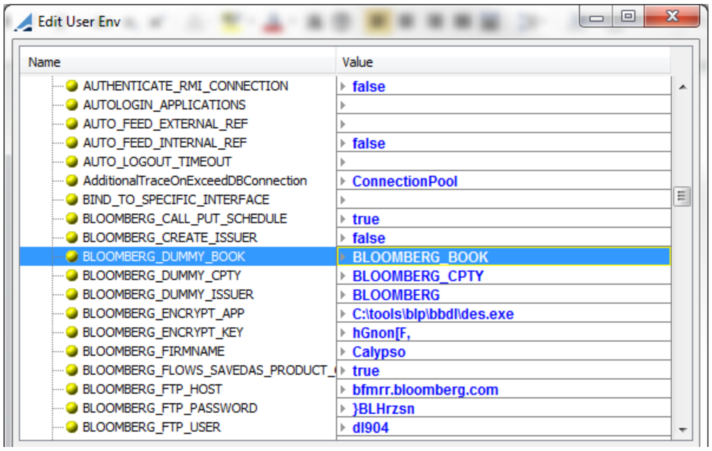
AIM or Bloomberg TOMS trade book. Finally it searches the product type of the trade. The leave node value stores the actual trade book name in Calypso.



If Book Hierarchy is not set up, the interface module would try to get the trading book by LE attribute BB_TRADER_PORTFOLIO.



If no book is found by the attribute BB_TRADER_PORTFOLIO, the default book which is stored as environment variable BLOOMBERG_DUMMY_BOOK will be used.



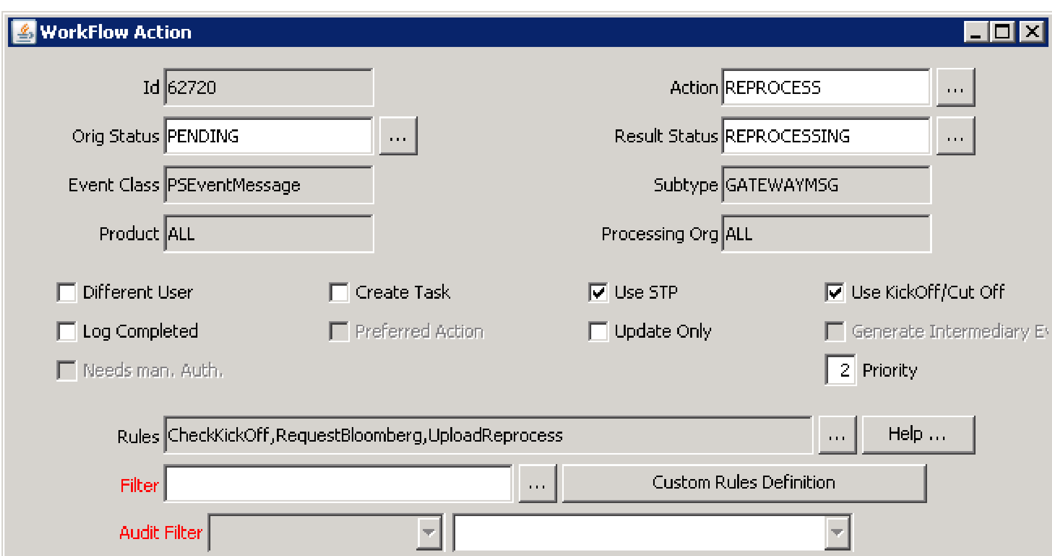
2.2.7 Bloomberg Data License Integration

For Bond trades, the module supports getting Bond product data from Bloomberg Data License if the corresponding product information is not present in Calypso System.

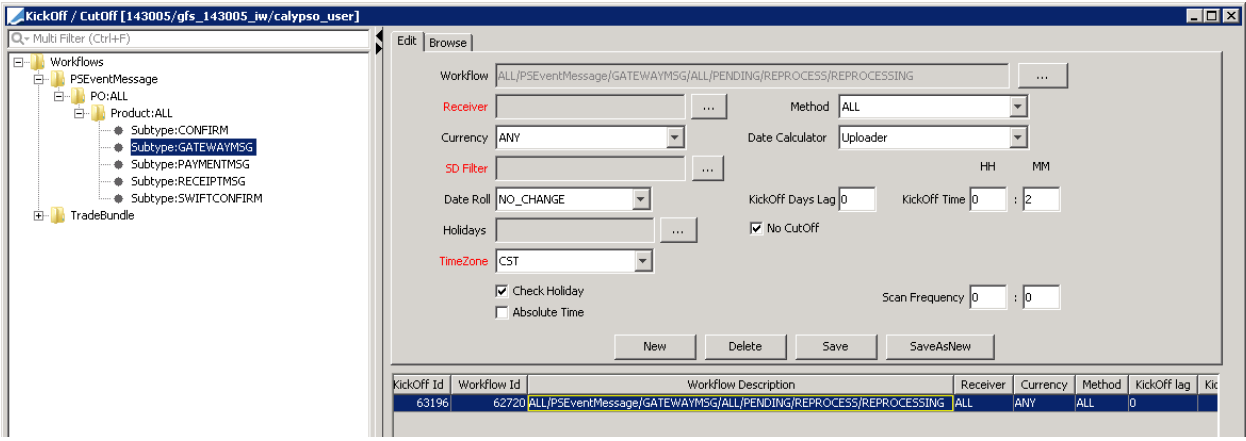
[NOTE: The Bloomberg Connect module for Calypso has to be separately licensed and set up first.]

Start the Bloomberg Engine and the Task Engine.

Then, configure the GATEWAYMESSAGE workflow, adding the rule for REPROCESS action. Please refer the below screen shot for the same:



Configure the kick off trigger as well (Configuration > Workflow > Kick-Off/Cut-Off...).



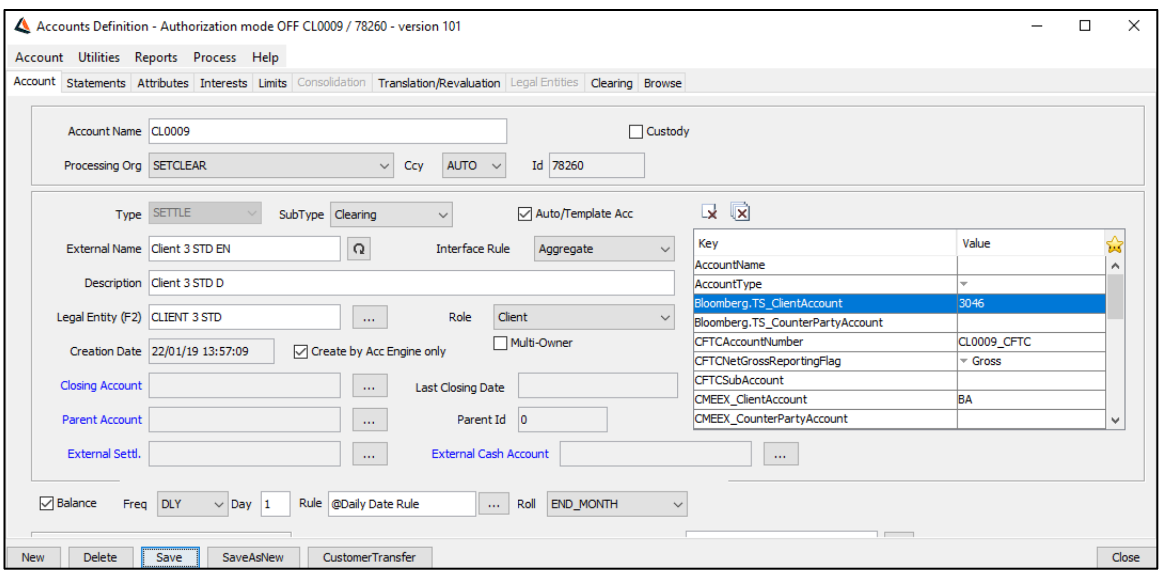
2.2.8 Task Station

- Please refer to the Data Uploader Integration Guide.

2.3 CounterParty LE attribute Config

Currently the Counterparty LE Attribute determines which Counterparty account needs to be considered to book the trades.

2.3.1 Client account Configuration



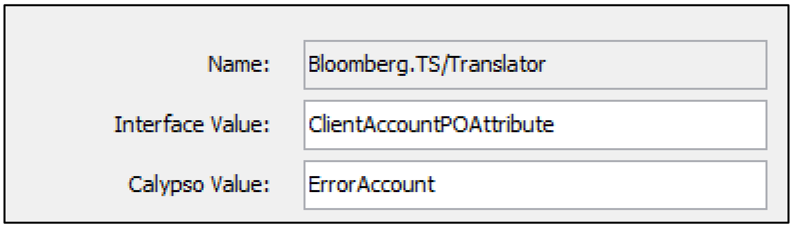
From the Bloomberg file Account number details is referred from TraderAccountNumber to link in the ClientAccount Definition. Accounts without Accountproperty in the above format will be ignored and trade will flow to Error account.

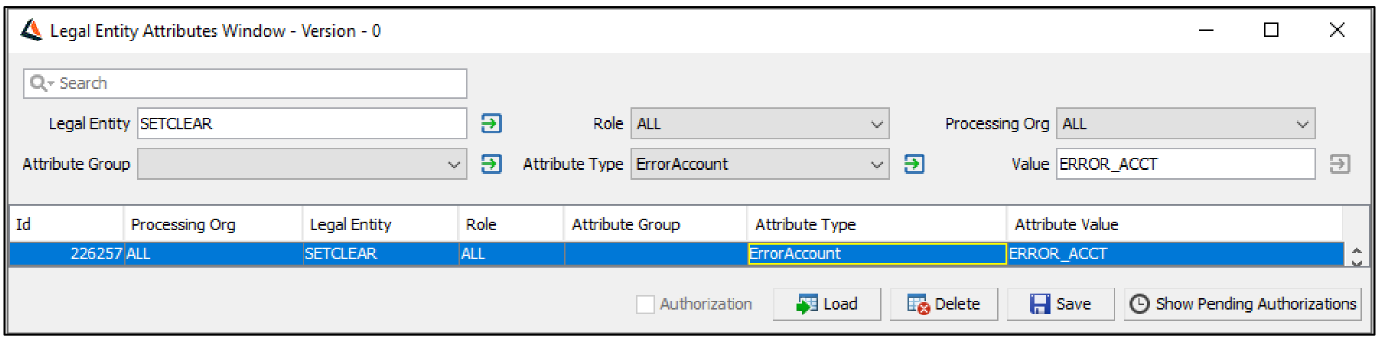
Add Account Property with prefix same name as Interface name followed by _ClientAccount.

For example:

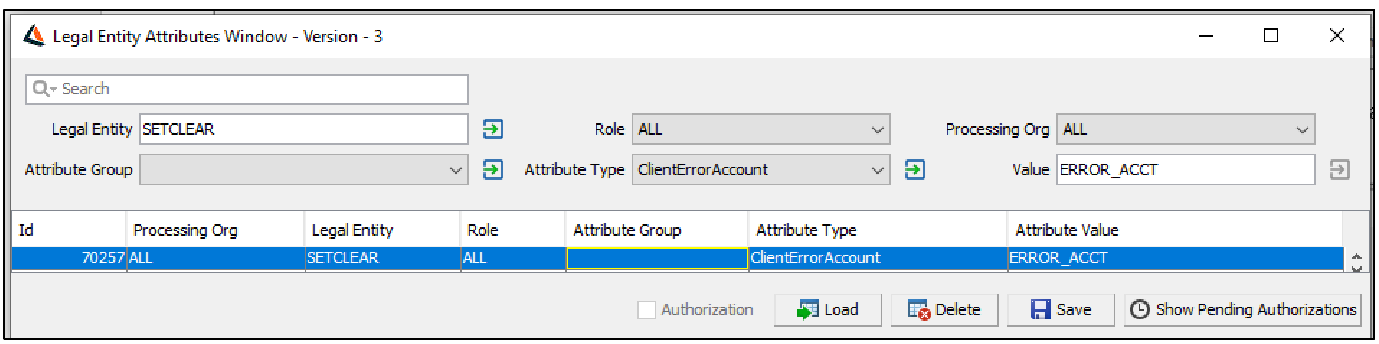
Interface name – "Bloomberg.TS" followed by underscore – "_" and then postfix as "ClientAccount" (Bloomberg.TS _ClientAccount)

Client Error Account Logic:





Check Calypso Mapping Interface Translator for Client error Account from Which PO attribute to pick, if it is not mapped then fall back to check the ClientErrorAccount PO attribute.

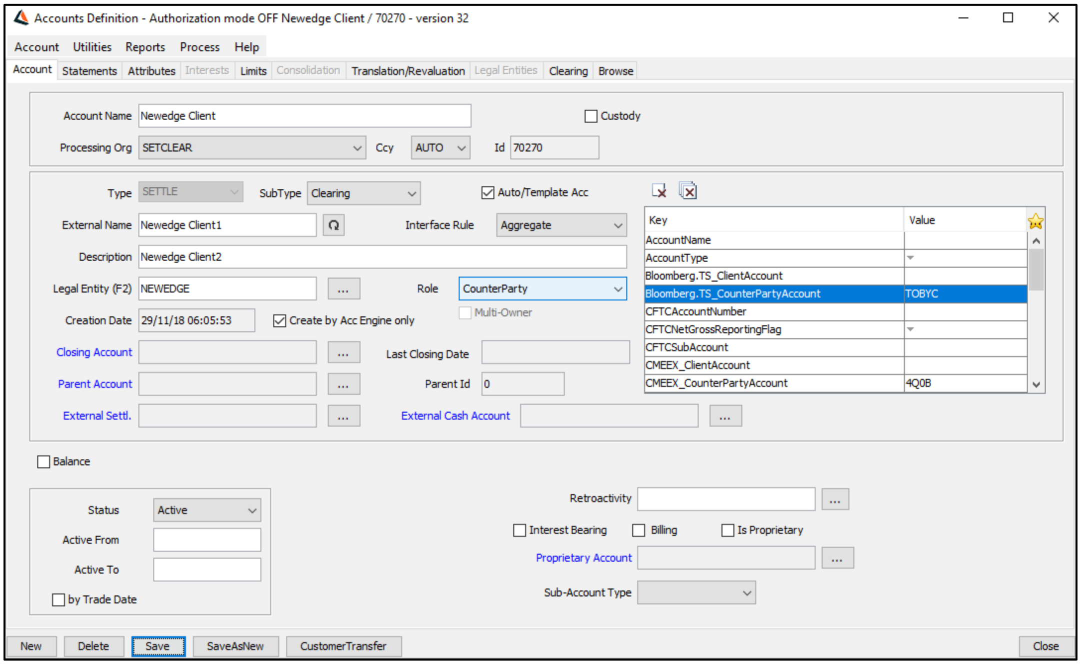


If PO ErrorAccount is not found, then fail to create the trade. The attribute value should be ClientAccount definition name.

Note: For V12, the client Account field will not be present in BBG xml file so , the trade will be booked into ClientErrorAccount.

2.3.2 Counterparty account Configuration

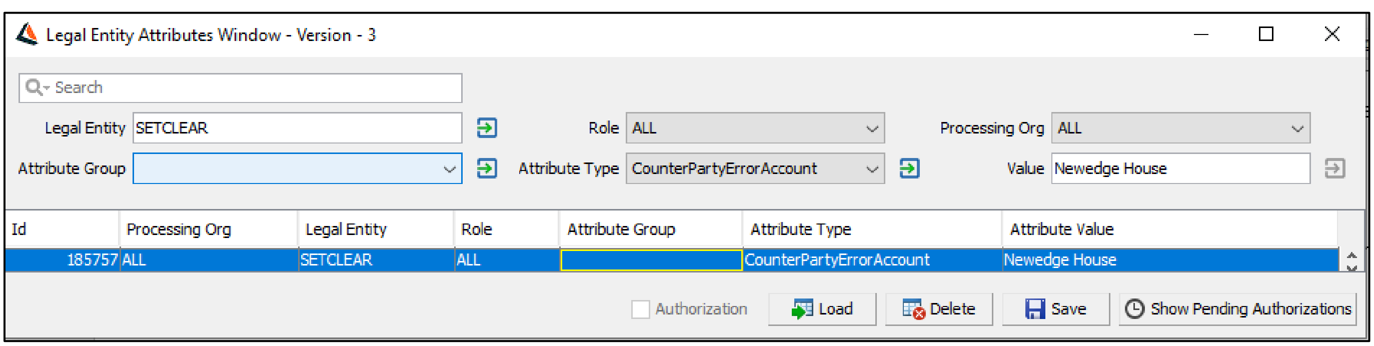
Account Configuration:



From the Bloomberg file CounterPartyAccount number details is referred from CustomerAccountCounterParty to link in the CounterPartyAccount Definition. FCM trade interface primary look is to capture Counterparty account.

Accounts without Accountproperty in the above format will be fallback to PO attribute CounterPartyErrorAccount, if not found the current behavior (check legal entity mappings) and if not, trade will fail to load.

Add Account Property with prefix same name as Interface name followed by _CounterPartyAccount.



CounterPartyErrorAccount Mapping details in PO attribute, the attribute value should be Counterparty Account Definition name.

For Example:

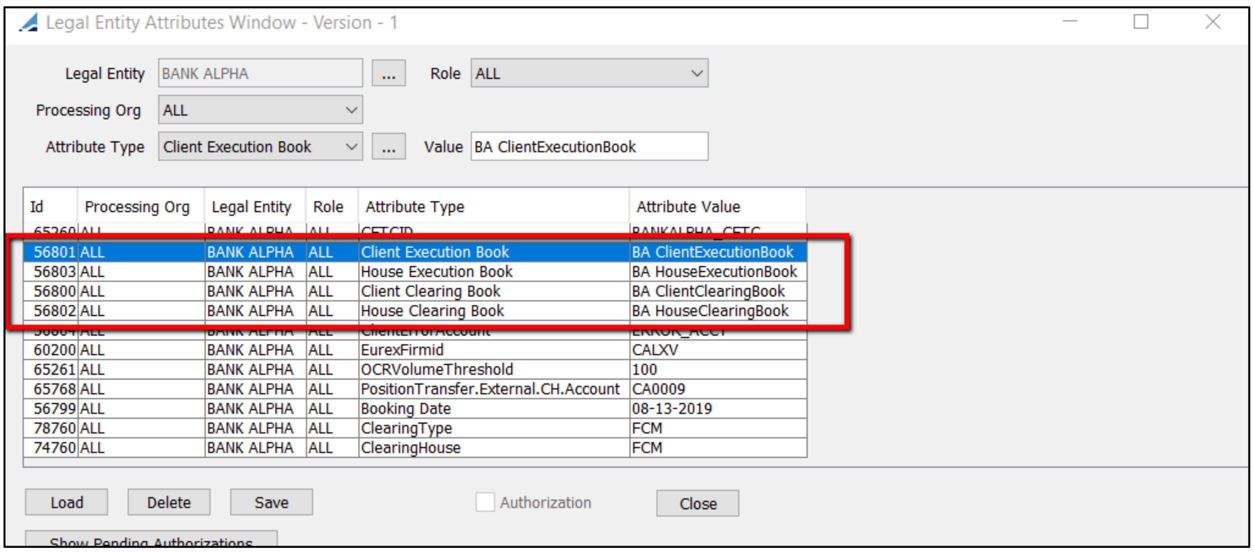
Interface name – “Bloomberg.TS” followed by underscore – “_” and then postfix as “CounterPartyAccount” (Bloomberg.TS_ CounterPartyAccount)

If the counterparty Mapping is not found then Check the PO attribute CounterPartyErrorAccount, if the PO attribute is not found then check the Legal entity attribute if this is not found fail the trade to load.

Book Mapping

If order is punched from Pricing sheet, then the book will be used from the order else it will pick the book from clearing client account property setup under Accountproperty name “Clearing Book”. If an Account has a valid Book in the ‘Clearing Book’ value, then trades should be captured into that book.

If no value is present in the ‘Clearing Book’ attribute of the account, the book will be chosen from PO LE attributes by looking at the Subtype and Origin Code of the Client Account and following the logic below:



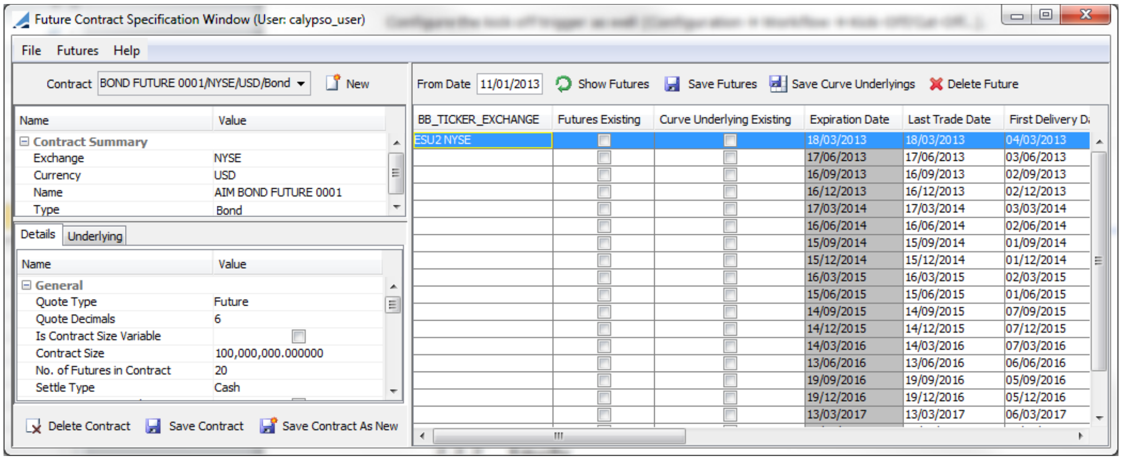
- Client Execution Book – Client account definition subtype (Execution), Account property “AccountType” (Client)
- House Execution Book – Client account definition subtype (Execution), Account property “AccountType” (House)
- Client Clearing Book – Client account definition subtype (Clearing), clearing tab Origin code (Client)
- House Clearing Book – Client account definition subtype (Clearing), clearing tab Origin code (House)

Note: in case the amend/cancel incoming message may not have client or counterparty account details then trade will be amended using the ExternalReference and ignore the check of client, book and CounterPartyAccount.

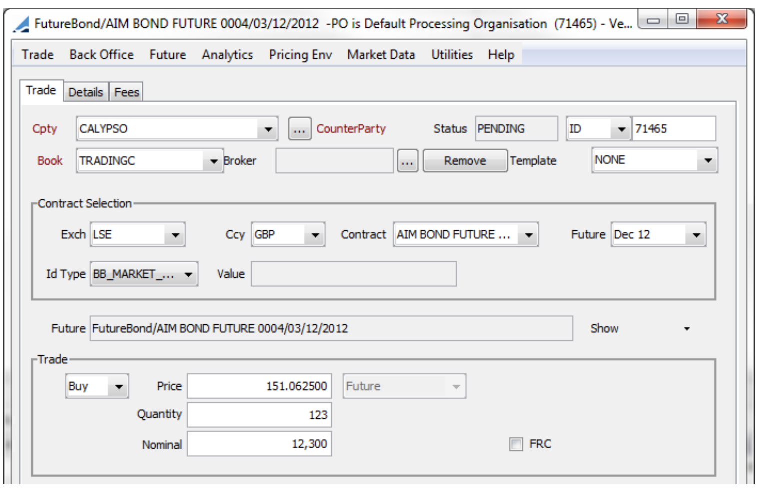
2.4 Product Setup

2.4.1 Bond Future

At the future level, map Calypso Product Code “BB_TICKER_EXCHANGE” to Bloomberg value “<Ticker> <Exchange>” (note the space between <Ticker> and <Exchange>).

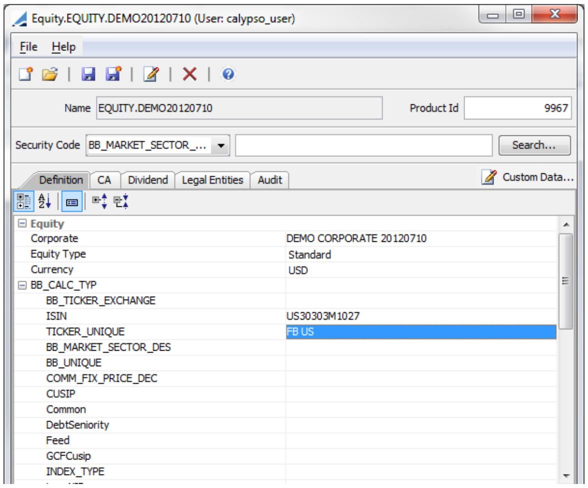


The Bond Future trades of Bloomberg AIM/TOMS are integrated into Calypso as Bond Future trades.

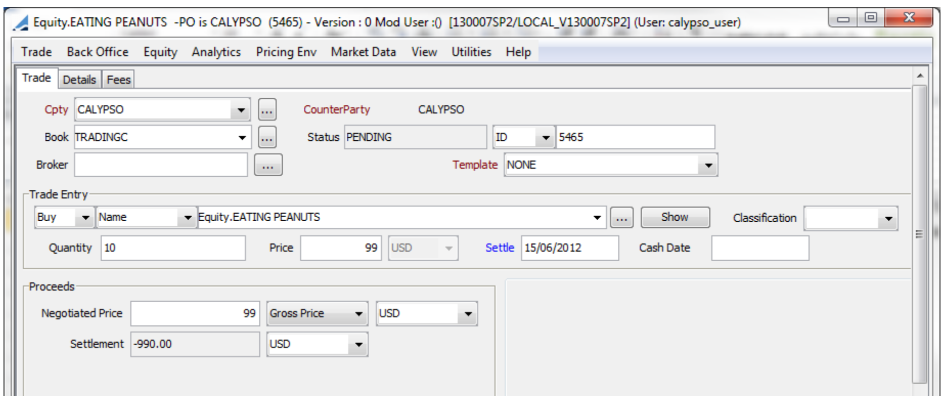


2.4.2 Equity

At the equity level, map Calypso Product Code “TICKER_UNIQUE” to Bloomberg value “<Ticker> <Exchange>” (note the space between <Ticker> and <Exchange>, for example, FB US).

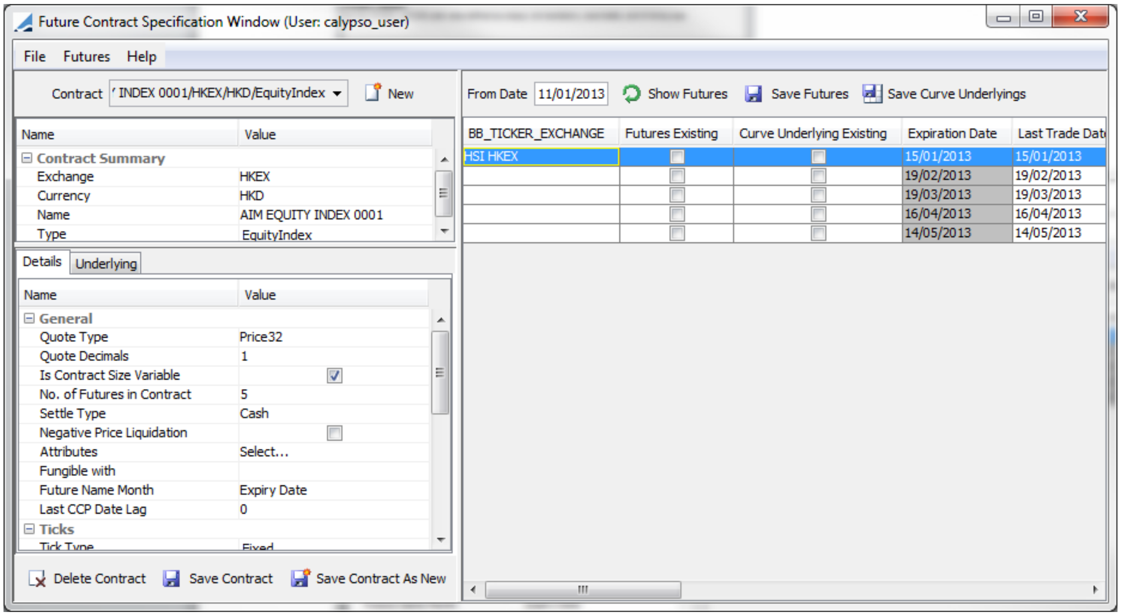


The Equity trades of Bloomberg AIM/TOMS are integrated into Calypso as Equity trades.

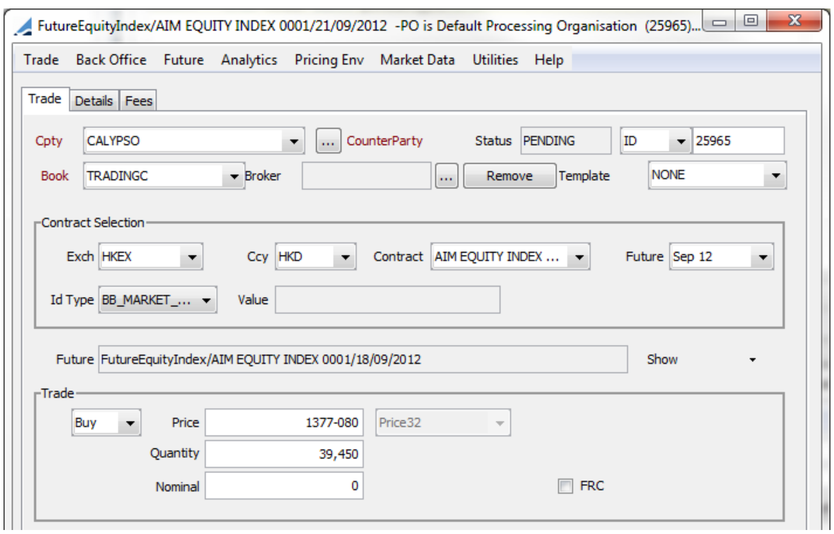


2.4.3 Equity Index Future

At the future level, map Calypso Product Code “BB_TICKER_EXCHANGE” to Bloomberg value “<Ticker> <Exchange>” (note the space between <Ticker> and <Exchange>).

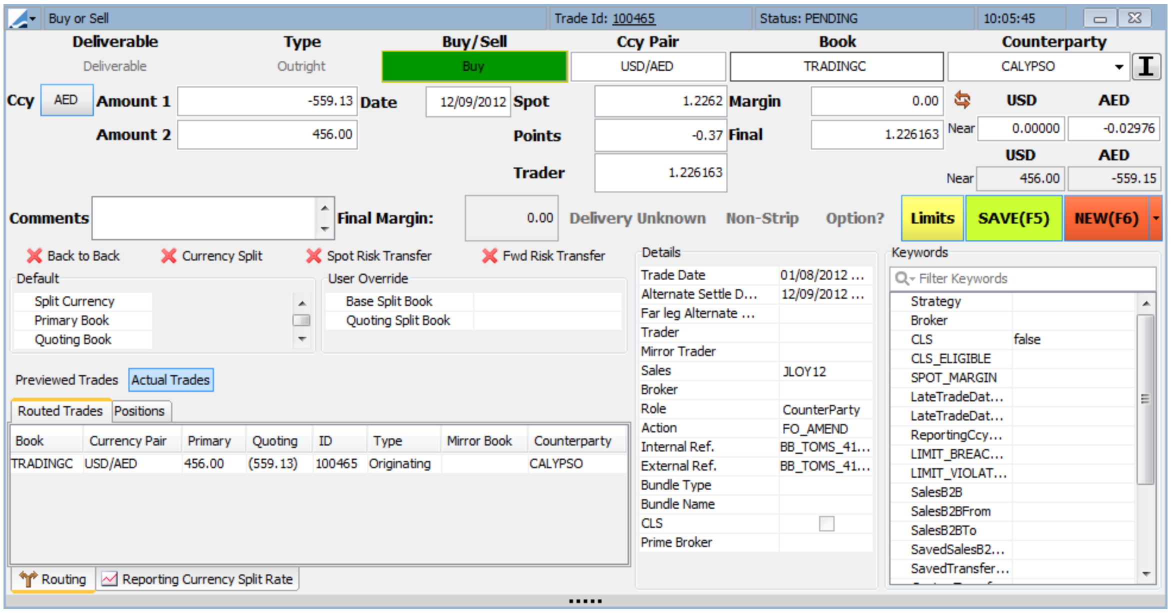


The Equity Index Future trades of Bloomberg AIM/TOMS are integrated into Calypso as Equity Index Future trades.



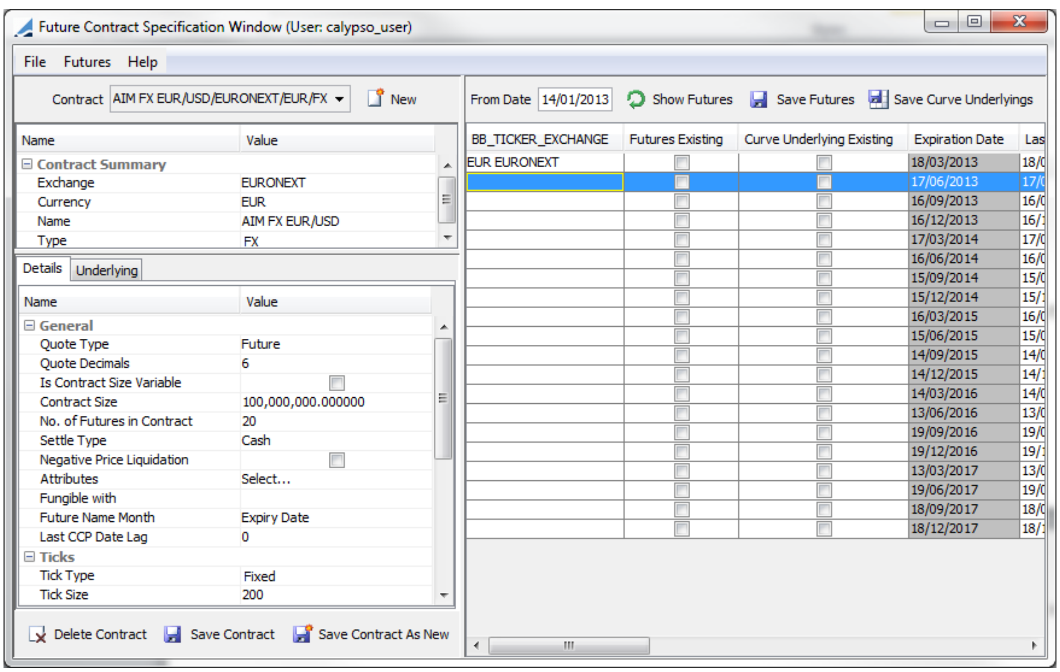
2.4.4 FX Forward

The FX Forward trades of Bloomberg AIM/TOMS are integrated into Calypso as FX Forward trades.

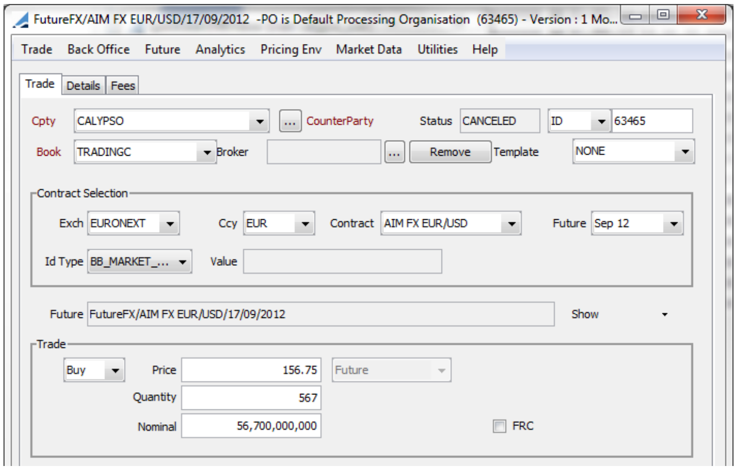


2.4.5 FX Future

At the future level, map Calypso Product Code "BB_TICKER_EXCHANGE" to Bloomberg value "<Ticker> <Exchange>" (note the space between <Ticker> and <Exchange>).

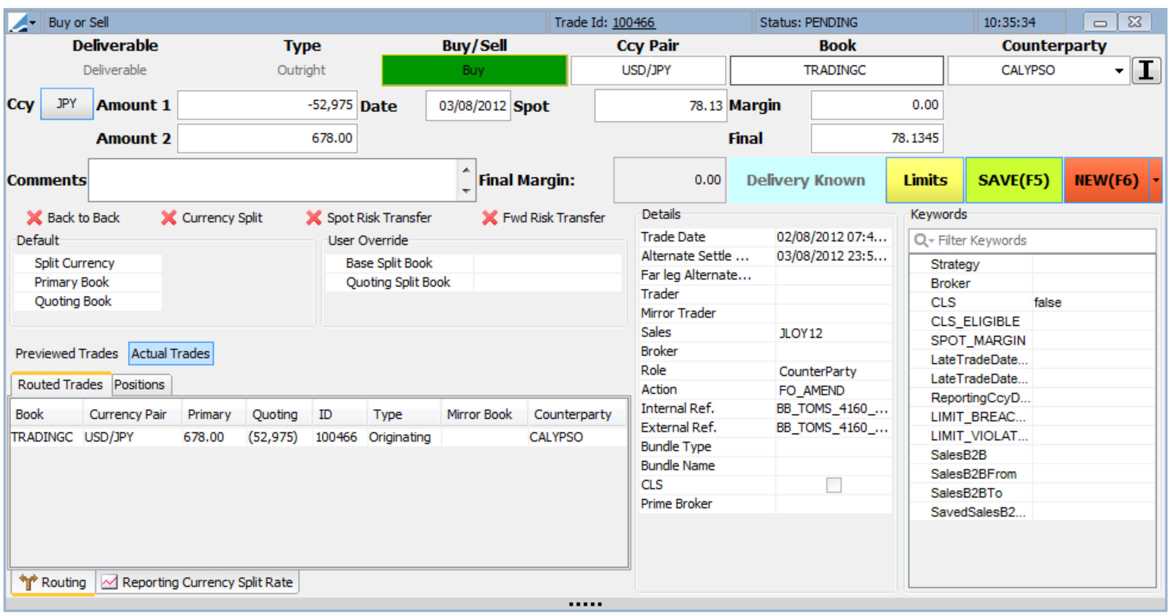


The FX Future trades of Bloomberg AIM/TOMS are integrated into Calypso as FX Future trades.



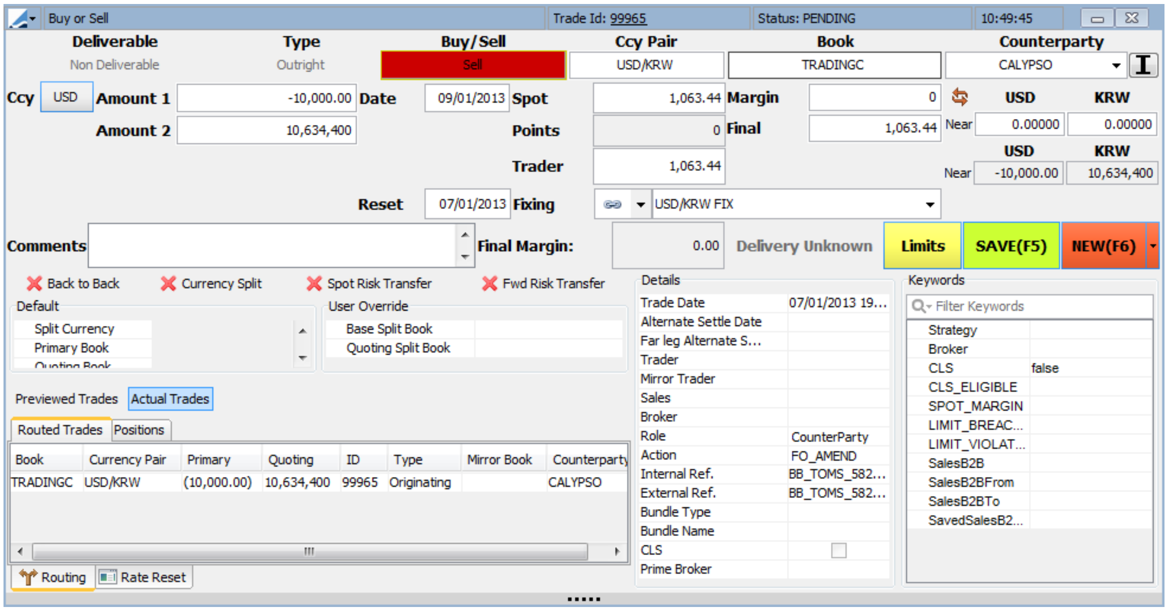
2.4.6 FX Spot

The FX Spot trades of Bloomberg AIM/TOMS are integrated into Calypso as FX Spot trades.



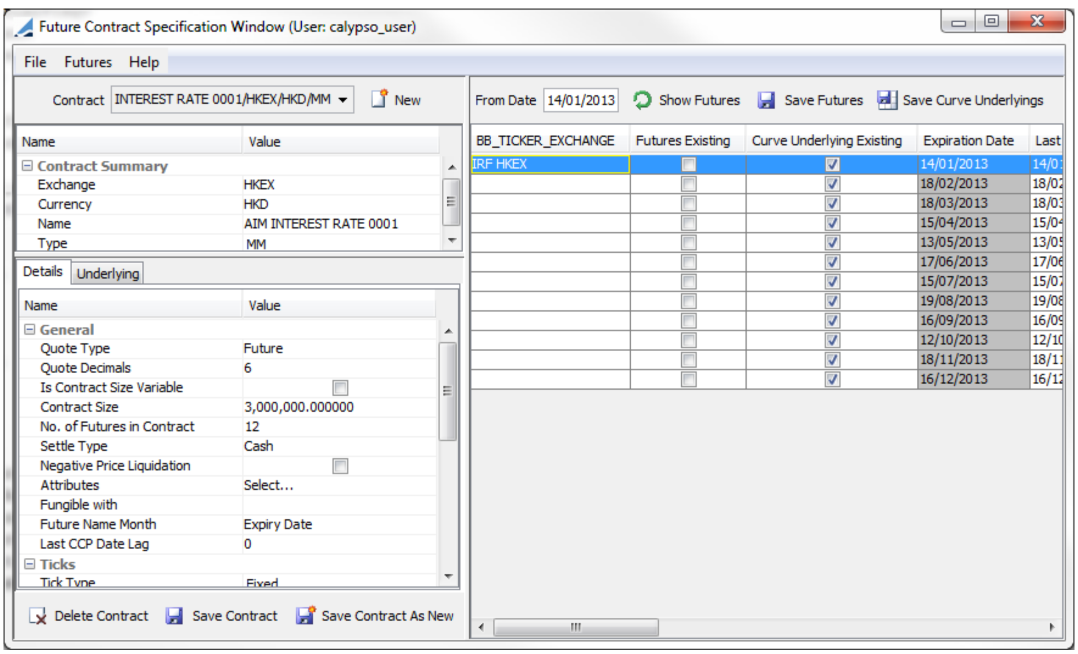
2.4.7 FX NDF

The FX NDF trades of Bloomberg AIM/TOMS are integrated into Calypso as FX NDF trades.

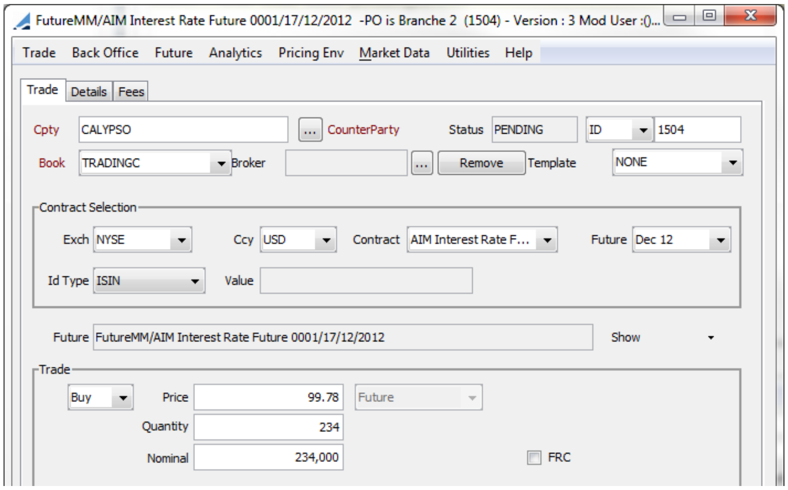


2.4.8 Interest Rate Future

At the future level, map Calypso Product Code “BB_TICKER_EXCHANGE” to Bloomberg value “<Ticker> <Exchange>” (note the space between <Ticker> and <Exchange>).

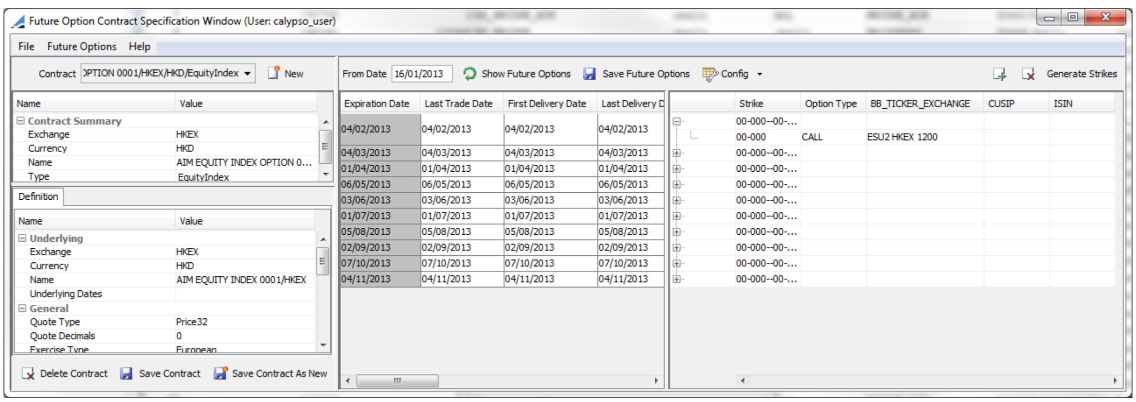


The Interest Rate Future trades of Bloomberg AIM/TOMS are integrated into Calypso as Interest Rate Future trades.

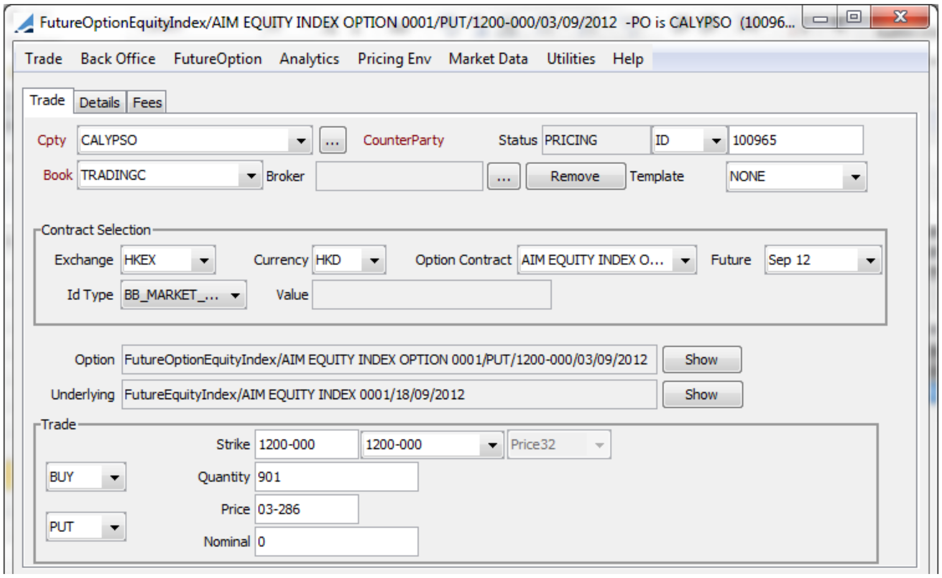


2.4.9 Option on Equity Index Future

At the future option level, map Calypso Product Code “BB_TICKER_EXCHANGE” to Bloomberg value “<Ticker> <Exchange> <Strike>” (There is a space between <Ticker>, <Exchange> and <Strike>. Please note that the number format of <Strike> should be the same between Bloomberg and Calypso.

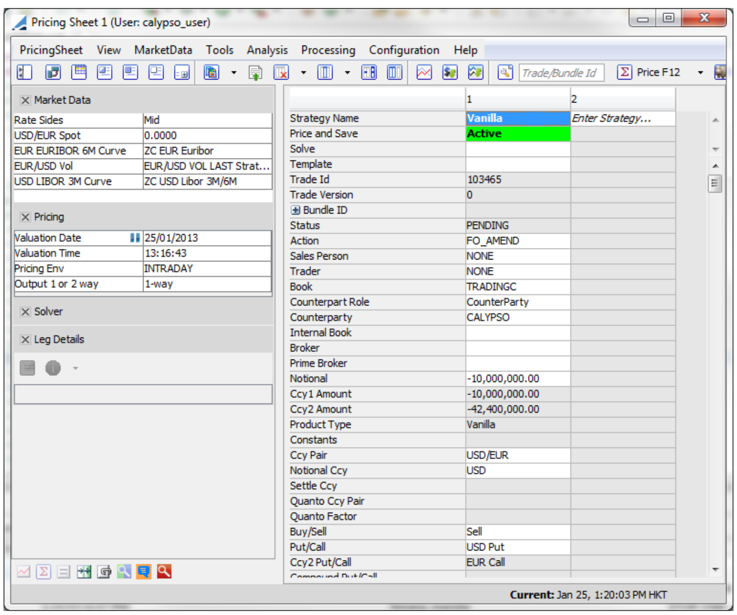


The Option on Equity Index Future trades of Bloomberg AIM/TOMS are integrated into Calypso as Option on Equity Index Future trades.



2.4.10 Vanilla FX Option

The Vanilla FX Option trades of Bloomberg AIM/TOMS are integrated into Calypso as Vanilla FX Option trades.



ExpiryTimeZone Mapping - If not set, America/NewYork is used by default.

Example:

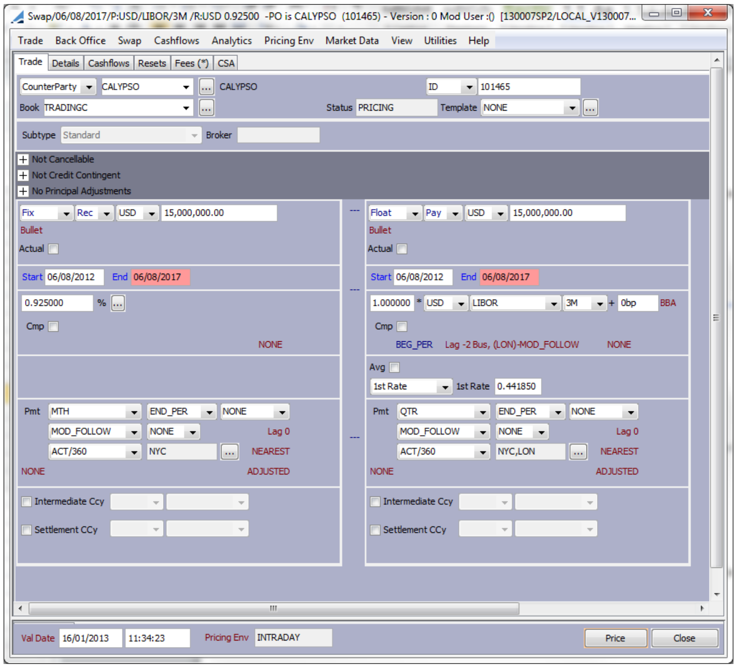
Name = Bloomberg.TS/Config

Interface Value = ExpiryTimeZone

Calypso Value = Asia/Tokyo

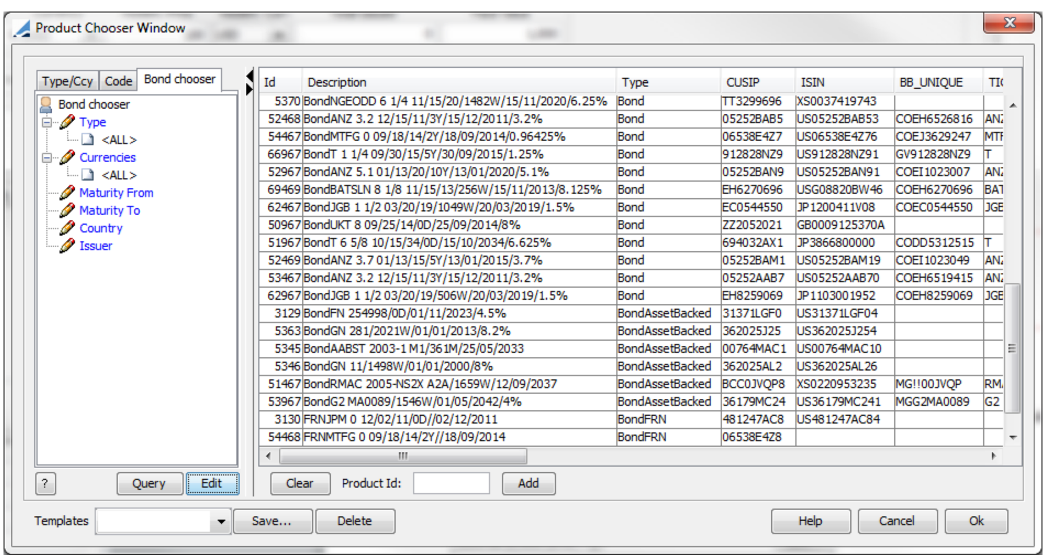
2.4.11 Vanilla Interest Rate Swap

The Vanilla Interest Rate Swap trades of Bloomberg AIM/TOMS are integrated into Calypso as Interest Rate Swap trades.

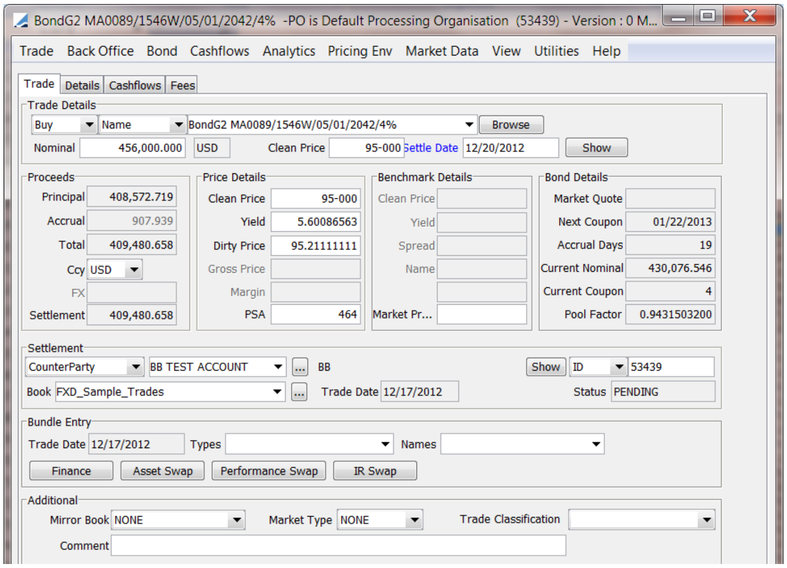


2.4.12 Asset Backed Securities

The system will look up the Securities by CUSIP, ISIN or BB_UNIQUE. If the product specified cannot be found, it will put the trade message on hold and download the product definition from Bloomberg Data License (for integrating with Bloomberg Data License). After the product definition is fed into Calypso, the system will continue to process the trade message.

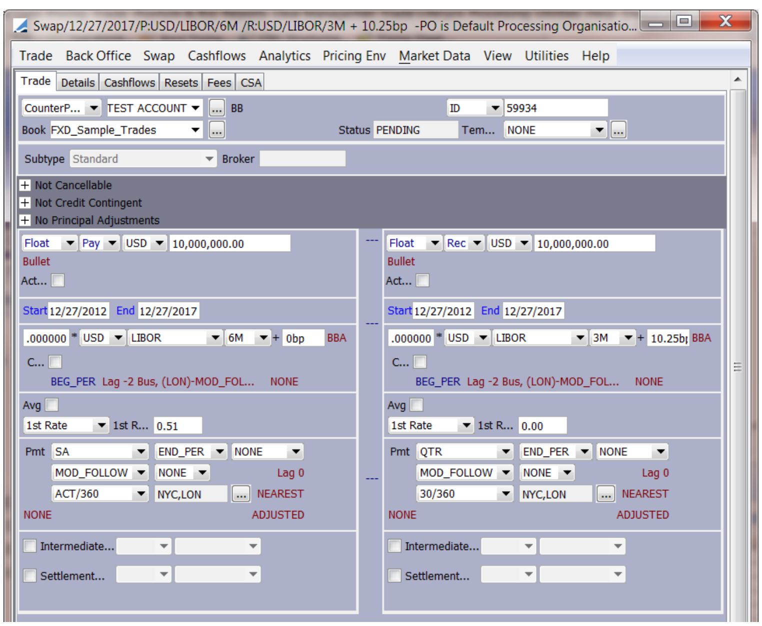


The Asset Backed Securities trades of Bloomberg AIM/TOMS are integrated into Calypso as Bond trades.



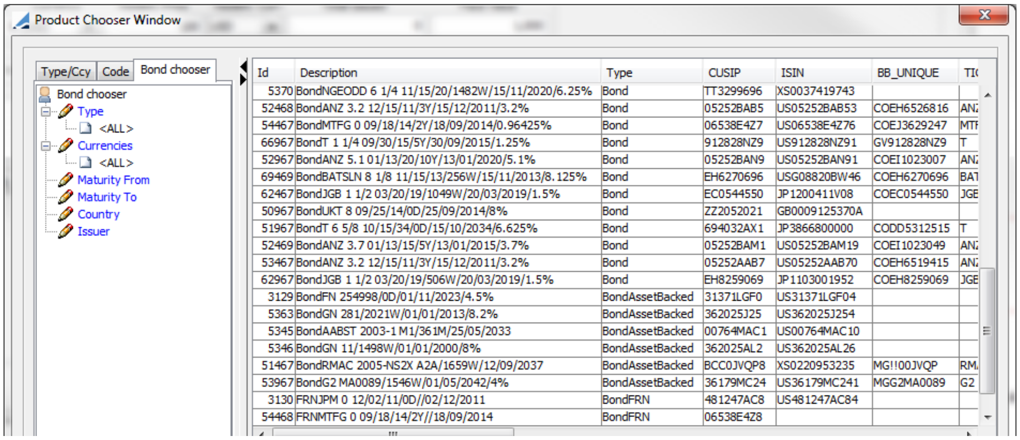
2.4.13 Basis Swap

The Basis Swap trades of Bloomberg AIM/TOMS are integrated into Calypso as Interest Rate Swap trades.

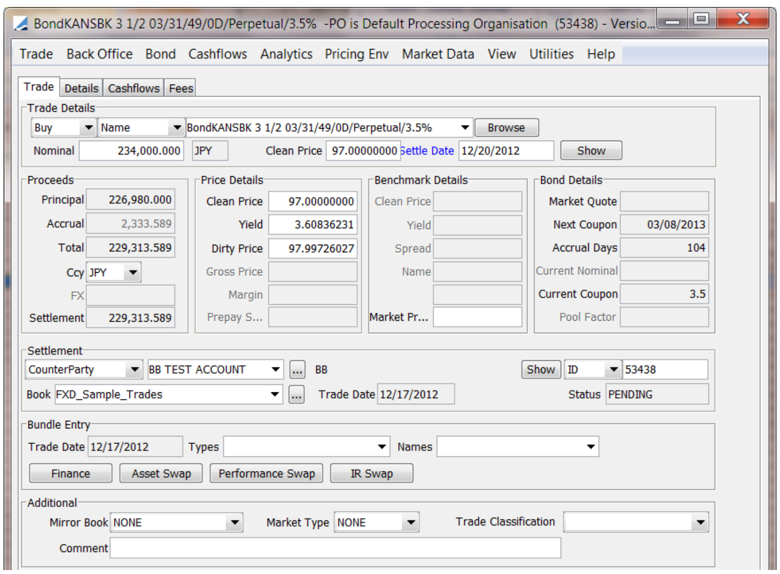


2.4.14 Callable Bond

The system will look up the Bond by CUSIP, ISIN or BB_UNIQUE. If the product specified cannot be found, it will put the trade message on hold and download the product definition from Bloomberg Data License (for integrating with Bloomberg Data License). After the product definition is fed into Calypso, the system will continue to process the trade message.

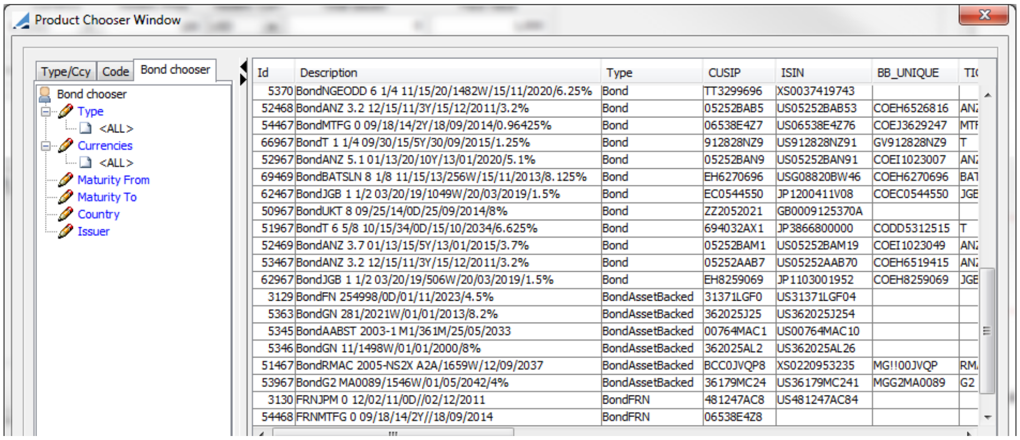


The Callable Bond trades of Bloomberg AIM/TOMS are integrated into Calypso as Bond trades.

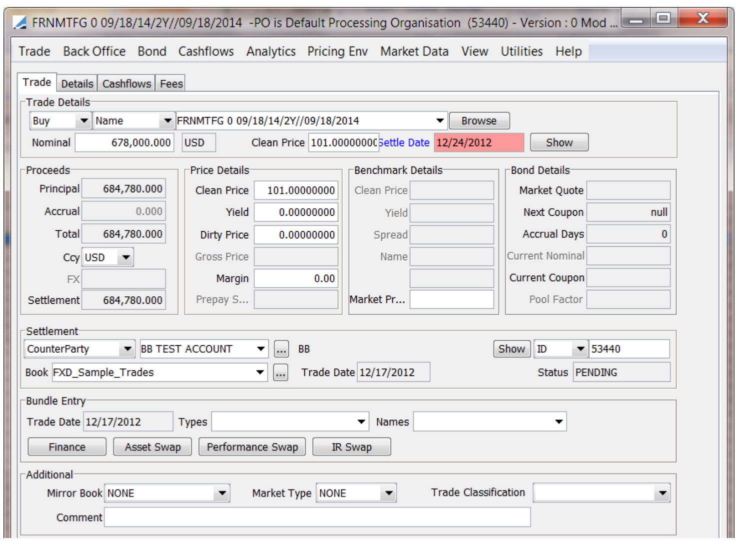


2.4.15 CD

The system will look up the CD by CUSIP, ISIN or BB_UNIQUE. If the product specified cannot be found, it will put the trade message on hold and download the product definition from Bloomberg Data License (for integrating with Bloomberg Data License). After the product definition is fed into Calypso, the system will continue to process the trade message.

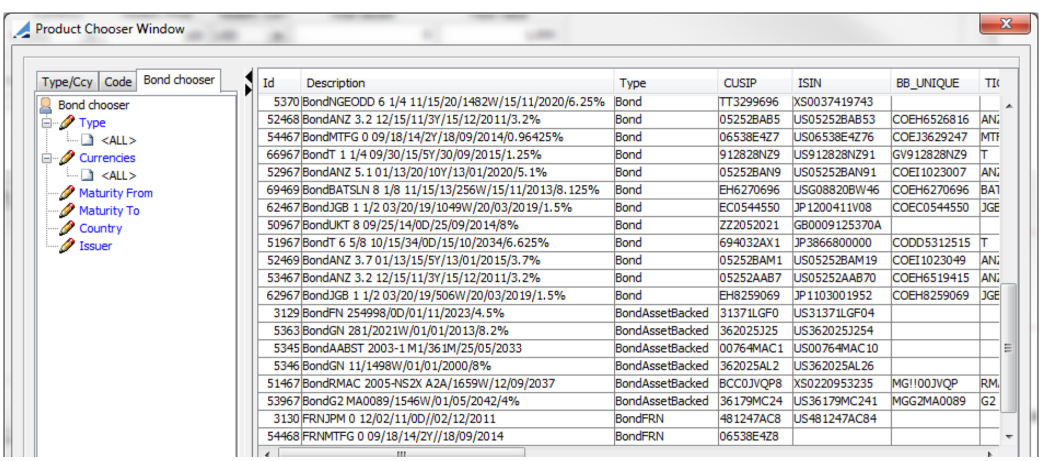


The CD trades of Bloomberg AIM/TOMS are integrated into Calypso as Bond trades.

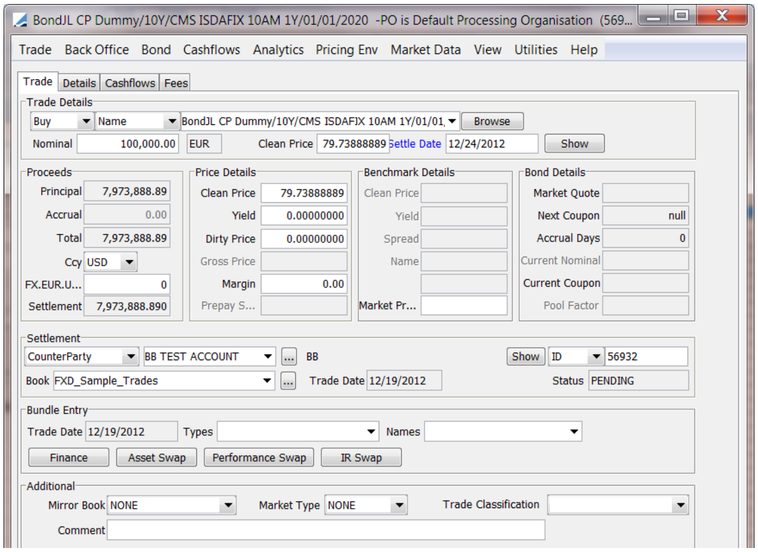


2.4.16 CP

The system will look up the CP by CUSIP, ISIN or BB_UNIQUE.

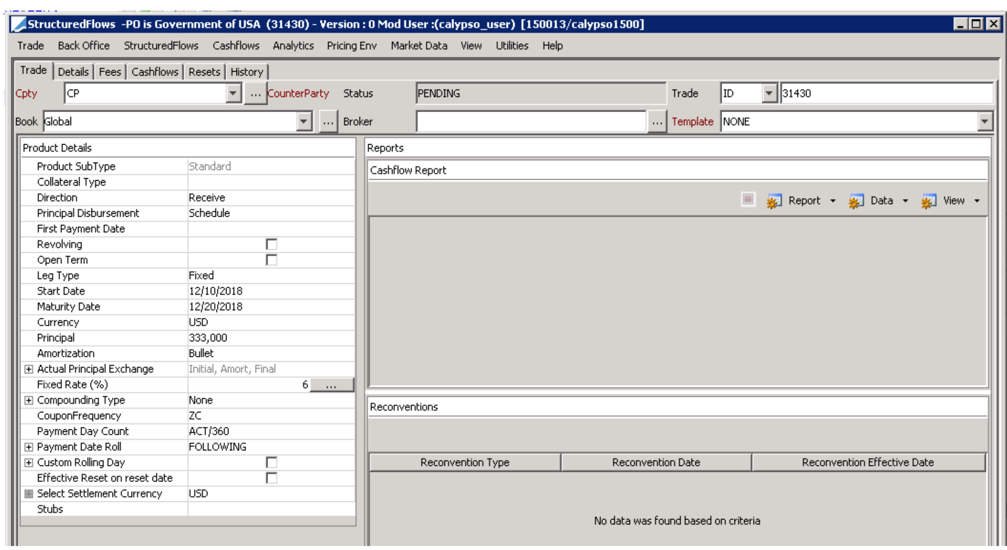


The CP trades of Bloomberg AIM/TOMS are integrated into Calypso as Bond trades.

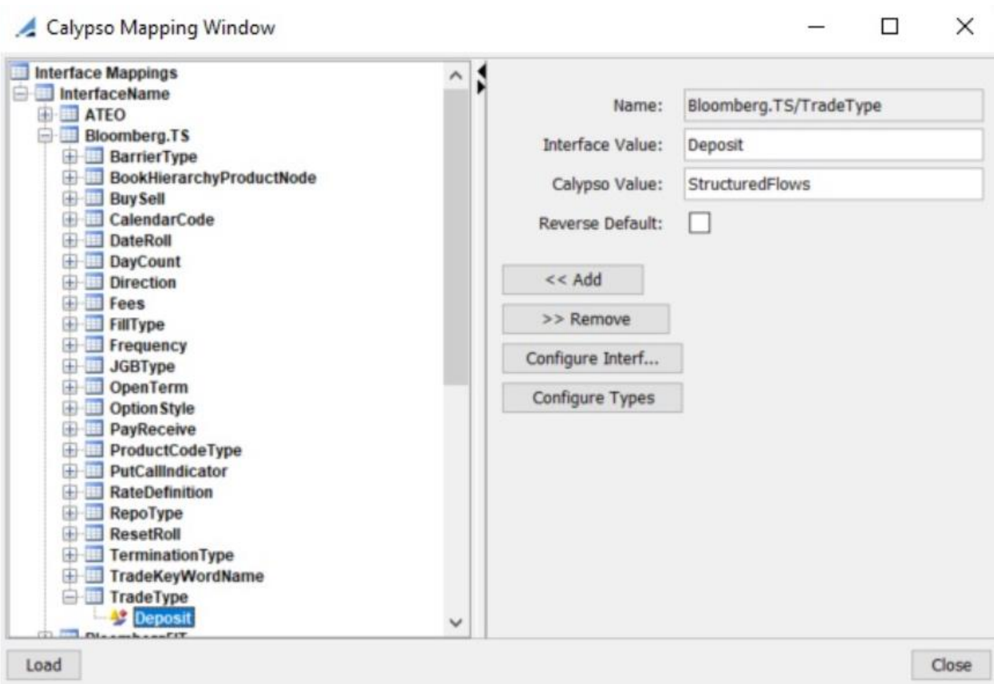


2.4.17 Fixed Term Loan and Deposit

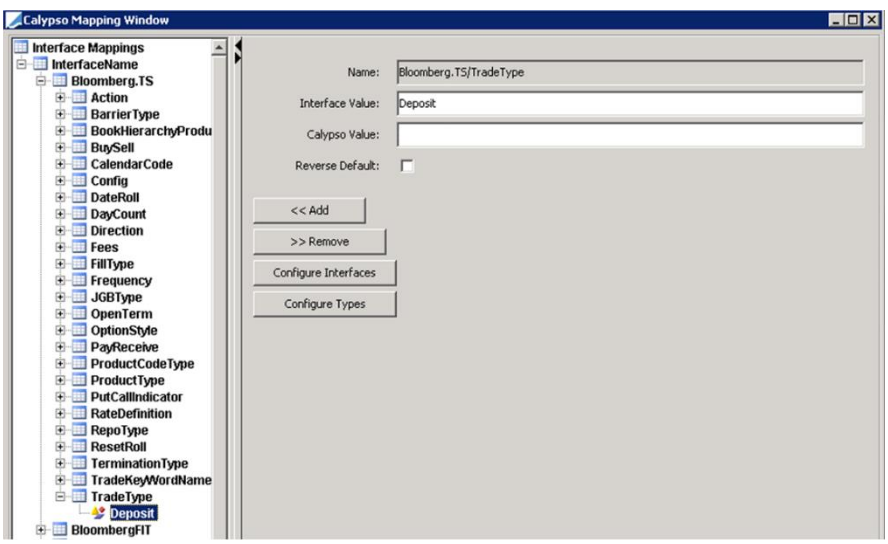
The Fixed Term Loan and Deposit trades of Bloomberg AIM/TOMS are integrated into Calypso as StructuredFlows trades by default.

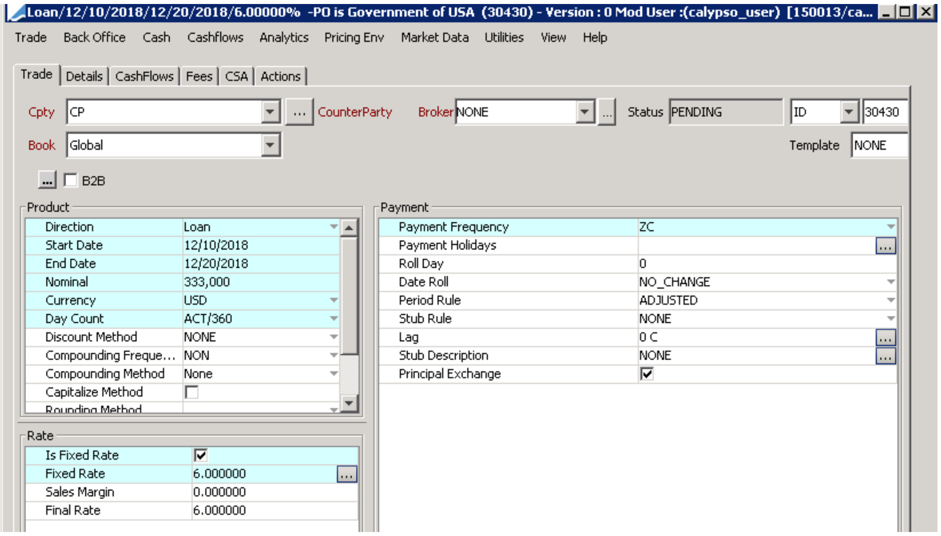


It is set in the mapping for TradeType > Deposit.



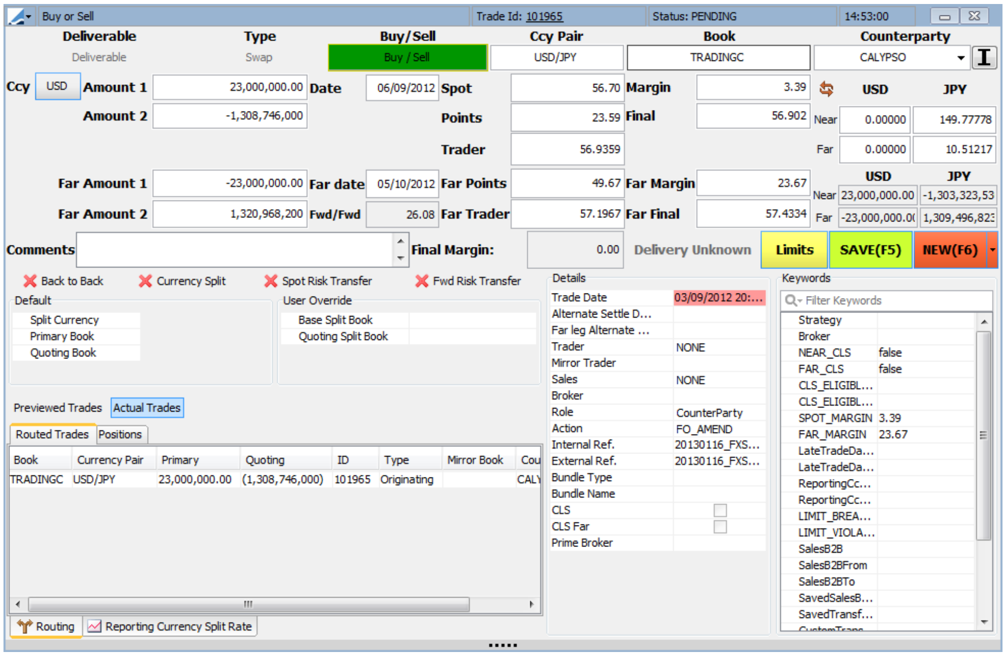
You can integrate the trades into Calypso as Loan/Deposit trades instead by clearing the Calypso Value for TradeType > Deposit.





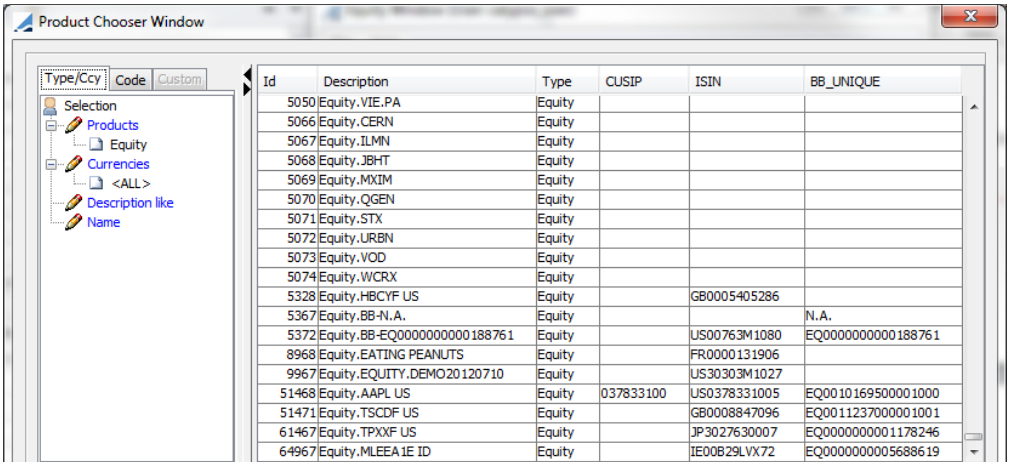
2.4.18 FX Swap

The FX Swap trades of Bloomberg AIM/TOMS are integrated into Calypso as FX Swap trades.

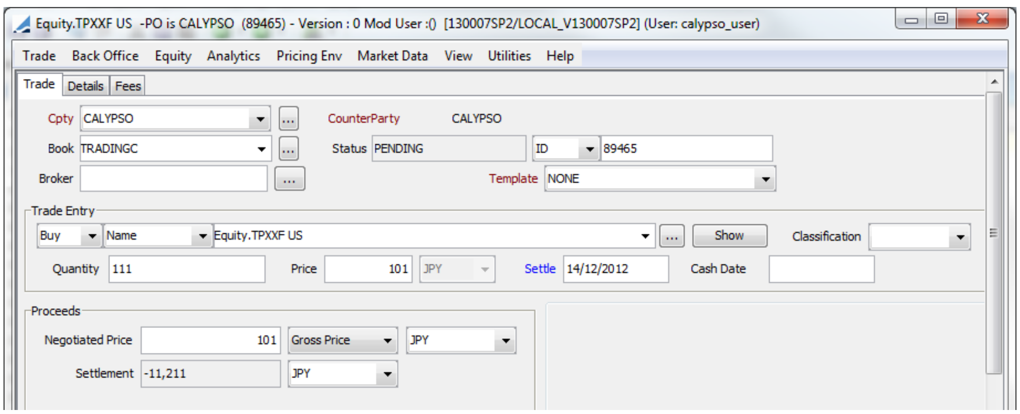


2.4.19 Index Exchange Traded Fund

The system will look up the bond by CUSIP, ISIN or BB_UNIQUE.

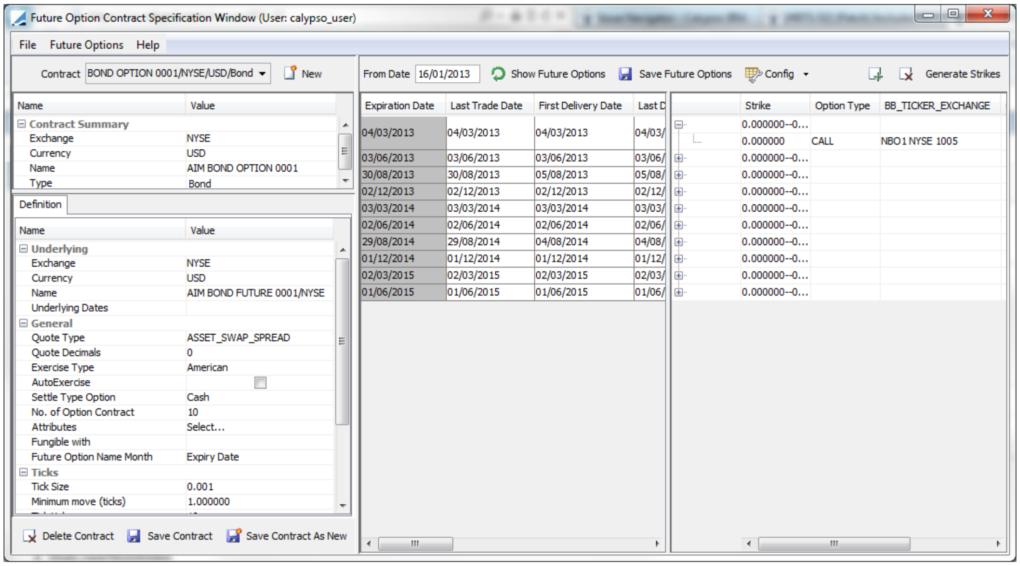


The Index Exchange Traded Fund trades of Bloomberg AIM/TOMS are integrated into Calypso as Equity trades.

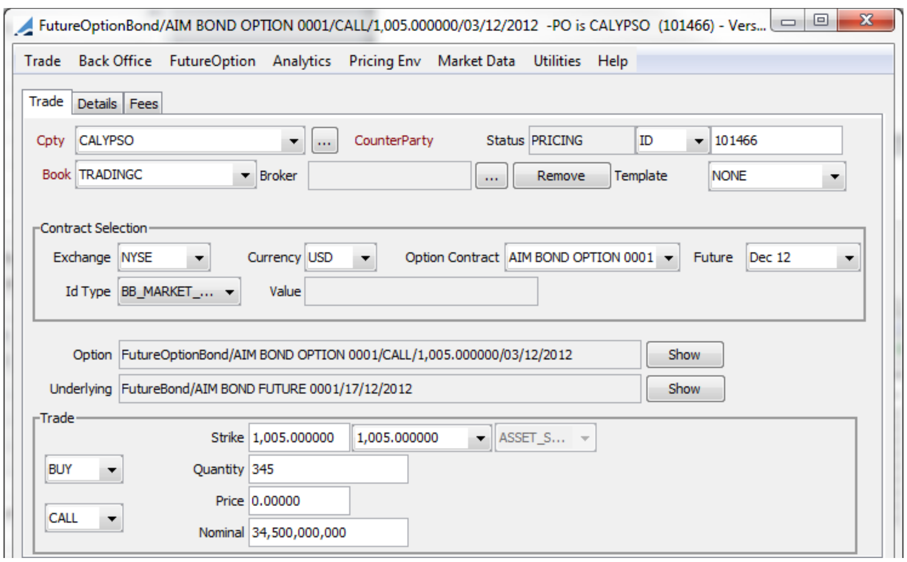


2.4.20 Listed Option on Bond Future

At the future option level, map Calypso Product Code “BB_TICKER_EXCHANGE” to Bloomberg value “<Ticker> <Exchange> <Strike>” (note the space between <Ticker>, <Exchange> and <Strike>, and note that the number format of <Strike> should be the same between Bloomberg and Calypso).

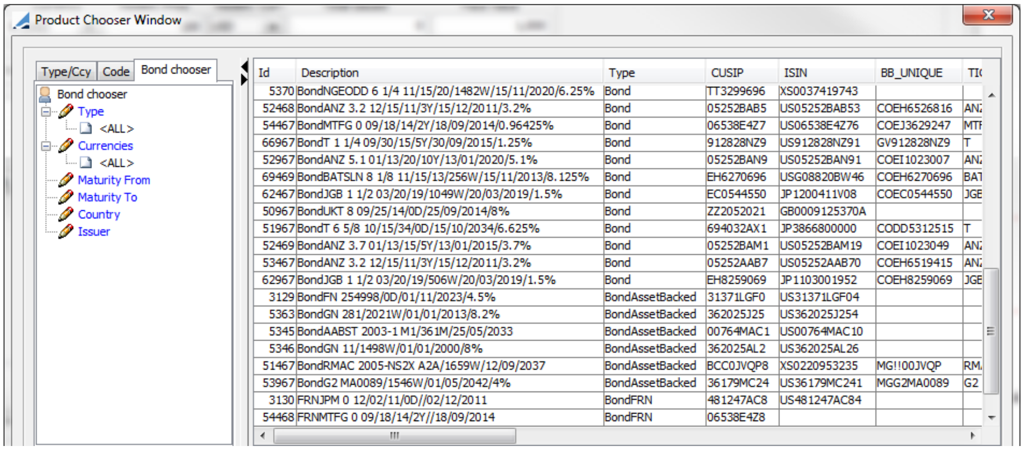


The Listed Option on Bond Future trades of Bloomberg AIM/TOMS are integrated into Calypso as Listed Option on Bond Future trades.

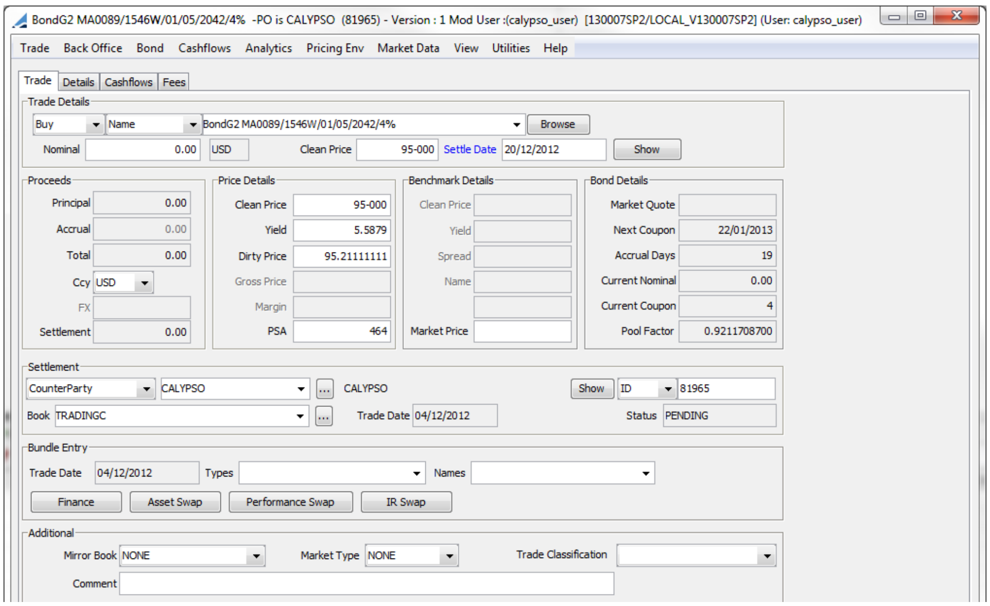


2.4.21 Mortgage Backed Securities

The system will look up the securities by CUSIP, ISIN or BB_UNIQUE. If the product specified cannot be found, it will put the trade message on hold and download the product definition from Bloomberg Data License (for integrating with Bloomberg Data License). After the product definition is fed into Calypso, the system will continue to process the trade message.



The Mortgage Backed Securities trades of Bloomberg AIM/TOMS are integrated into Calypso as Bond trades.

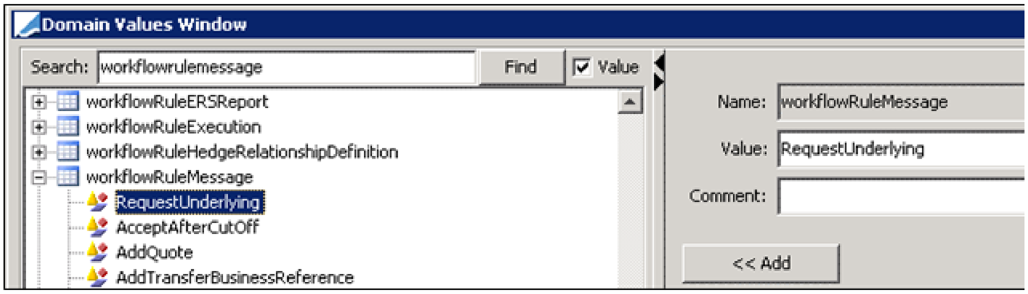


2.4.22 Repo and Reverse Repo

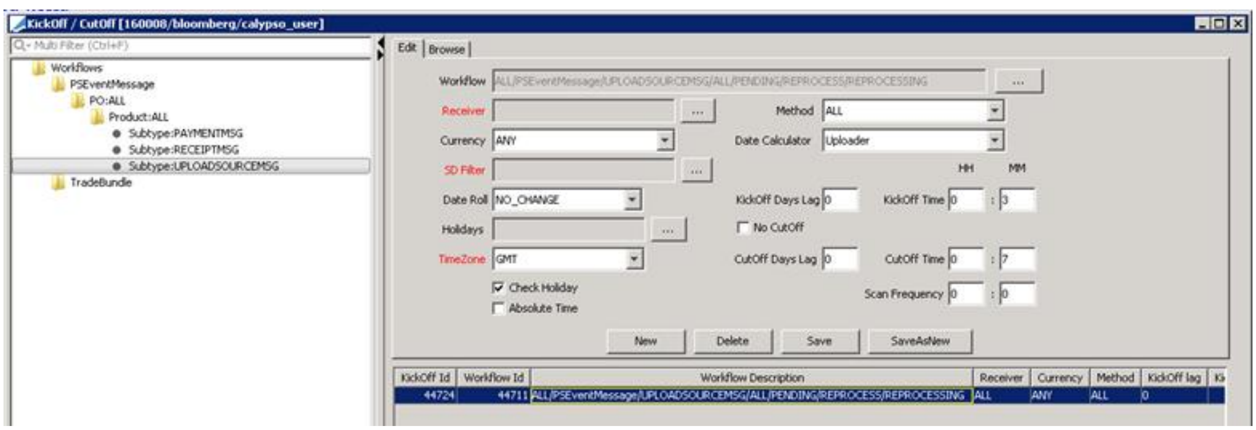
The interface supports both Bond and Equity underlying products for Repo trades.

The underlying product will be looked up by CUSIP, ISIN or BB_UNIQUE. If the product specified cannot be found, it will put the trade message on hold and download the product definition from Bloomberg Data License (for integrating with Bloomberg Data License). After the product definition is fed into Calypso, the system will continue to process the trade message. For the product definition download to work correctly for Repo and Security Lending trades, ensure that the following configurations exist, and if not, add them.

- “RequestUnderlying” must be present in the workflowRuleMessage domain value.

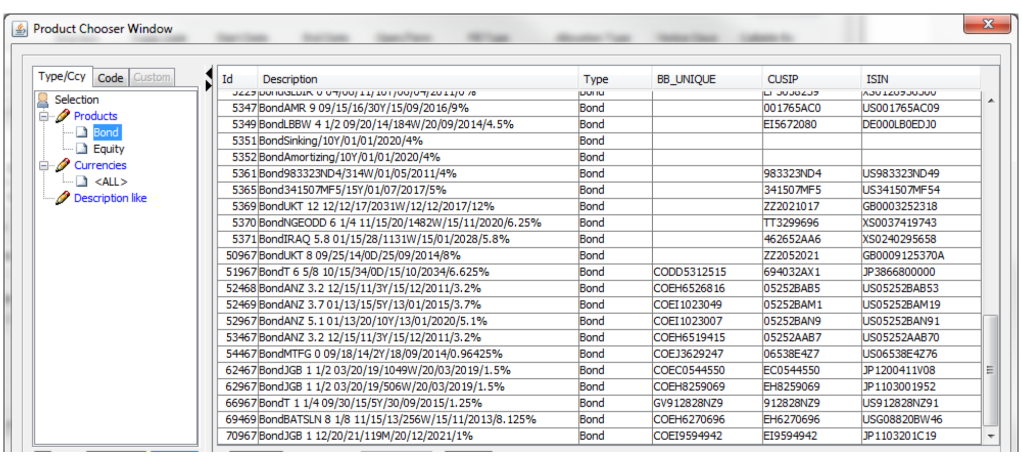


- On the PENDING – REPROCESS – REPROCESSING transition, the following rules must be present:
  - UploadReprocess
  - CheckLink
  - CheckKickOff
  - RequestUnderlying
- There should be a STP and KickOff / CutOff config defined for PENDING – REPROCESS – REPROCESSING just like you have for GATEWAYMSG.

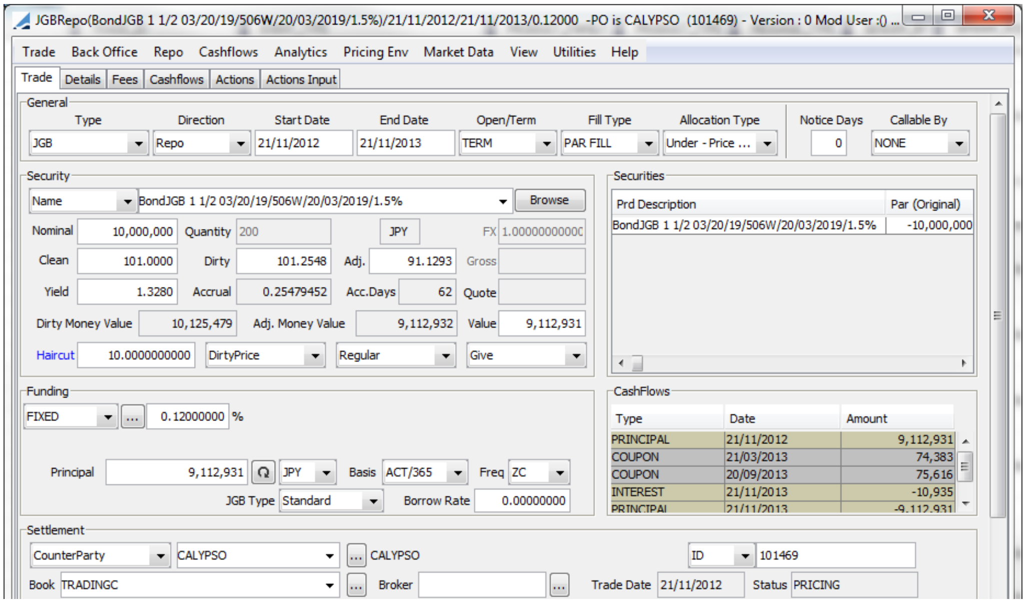


The supported transaction types are: RP (Repo), RR (Reverse Repo), BN (Buy New Gensaki), SN (Sell New Gensaki), JP (Yen Repo) and JR (Yen Reverse Repo).

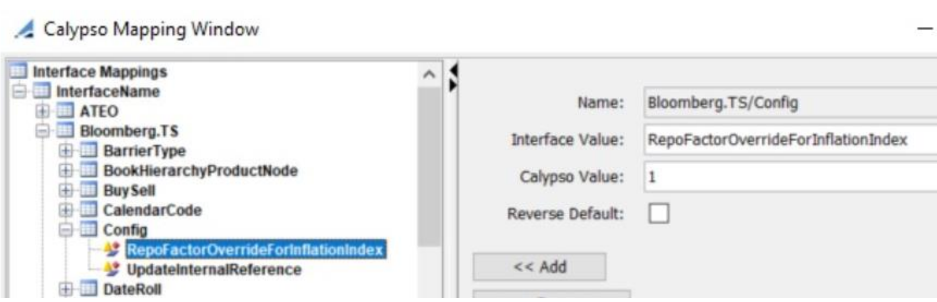
Transaction Type refers to the Transaction Type on the Bloomberg Repo Trade screen.



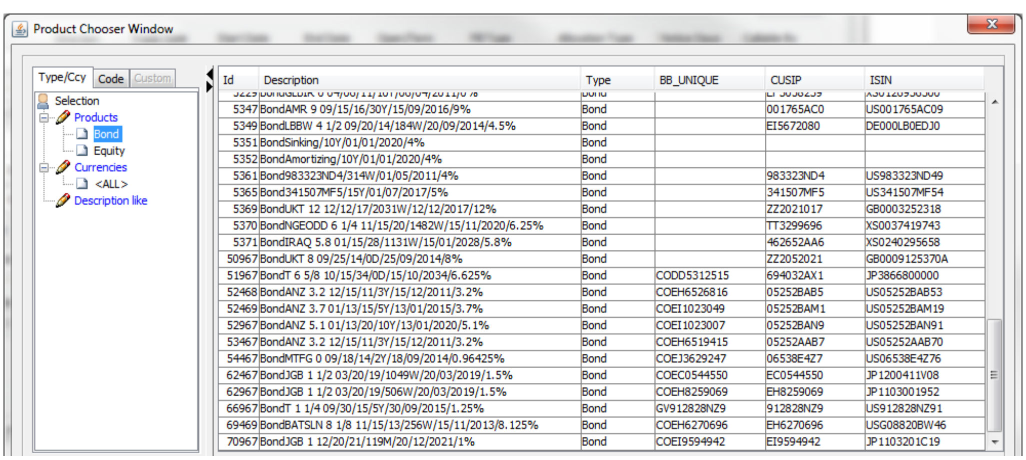
The Repo and Reverse Repo trades of Bloomberg AIM/TOMS are integrated into Calypso as Repo trades.



When the underlying bond is inflation-indexed, the mapping RepoFactorOverrideForInflationIndex is used to set the default value of 'Sec. Index Factor' in Calypso. If the mapping is left empty then 'Sec. Index Factor' will not be explicitly set.

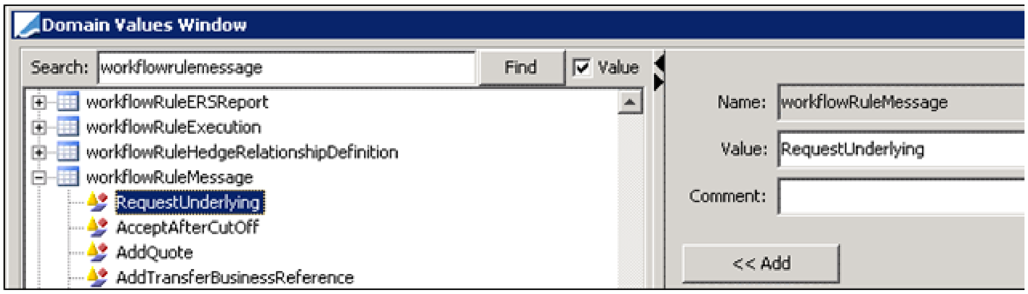


2.4.23 Security Lending

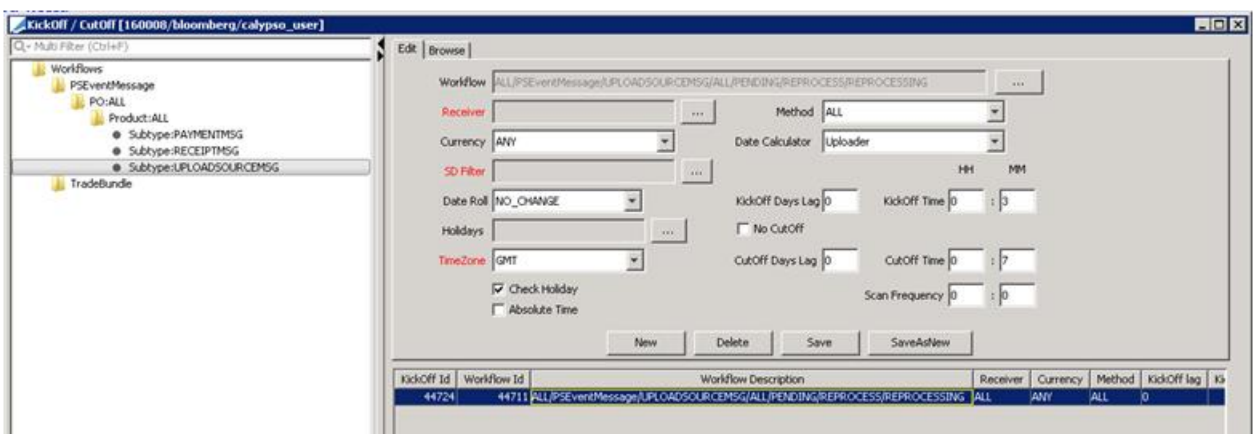


The underlying product will be looked up by CUSIP, ISIN or BB_UNIQUE. If the product specified cannot be found, it will put the trade message on hold and download the product definition from Bloomberg Data License (for integrating with Bloomberg Data License). After the product definition is fed into Calypso, the system will continue to process the trade message. For the product definition download to work correctly for Repo and Security Lending trades, ensure that the following configurations exist, and if not, add them.

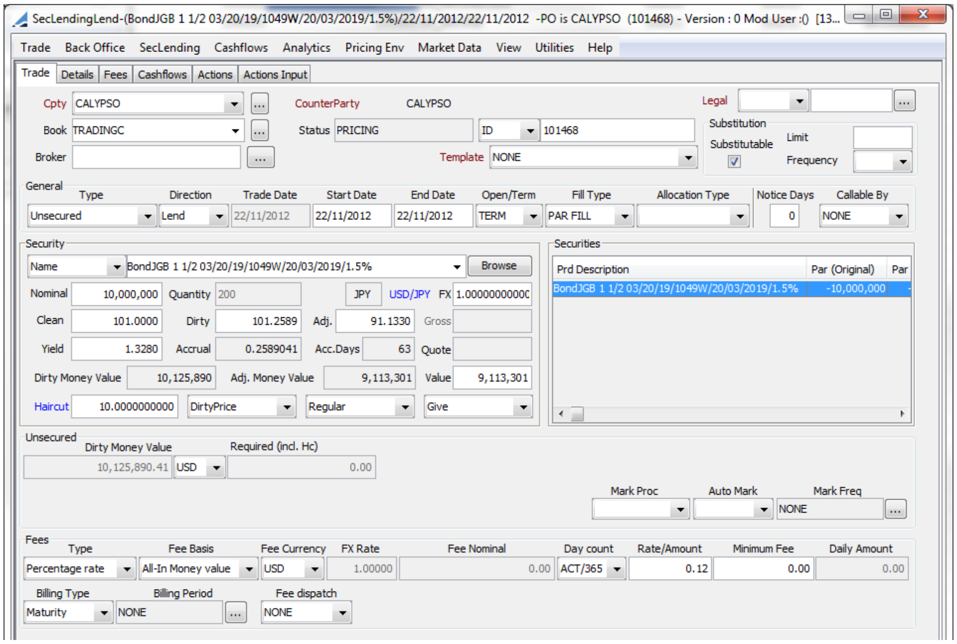
- "RequestUnderlying" must be present in the workflowRuleMessage domain value.



- On the PENDING – REPROCESS – REPROCESSING transition, the following rules must be present:
  - UploadReprocess
  - CheckLink
  - CheckKickOff
  - RequestUnderlying
- There should be a STP and KickOff / CutOff config defined for Pending – Reprocess – Reprocessing just like you have for GATEWAYMSG.

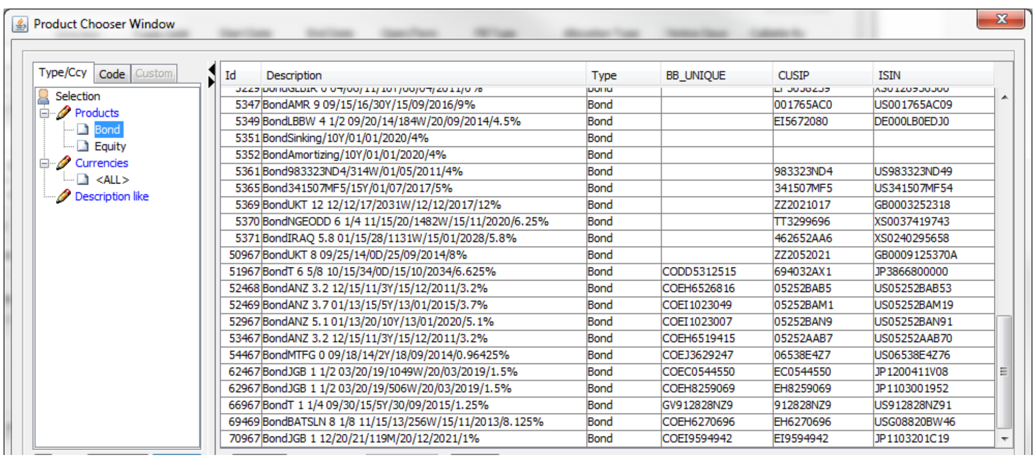


The Security Lending trades of Bloomberg AIM/TOMS are integrated into Calypso as Security Lending trades.

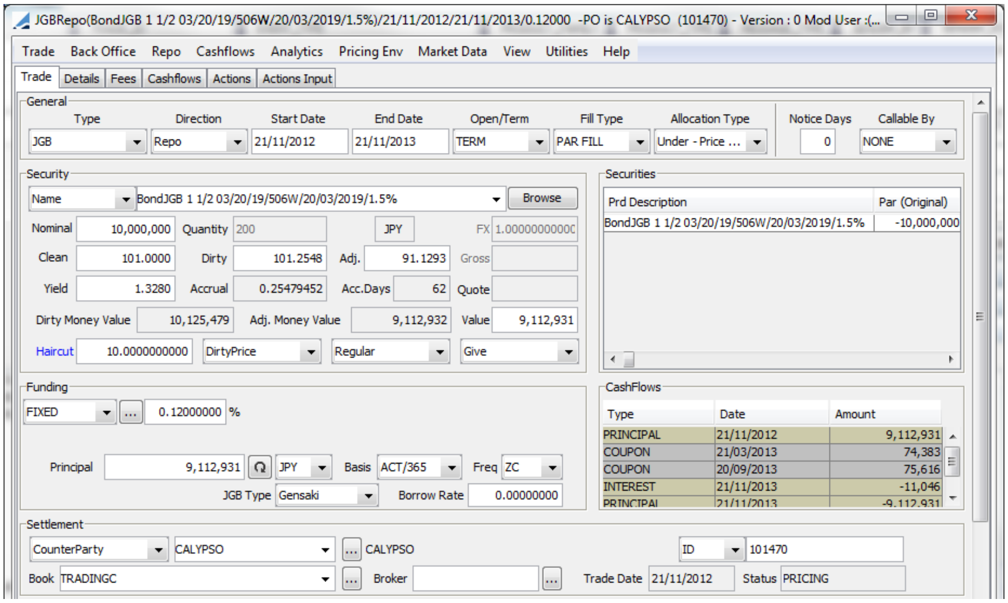


2.4.24 Shin-Gensaki

The underlying product will be looked up by CUSIP, ISIN or BB_UNIQUE.

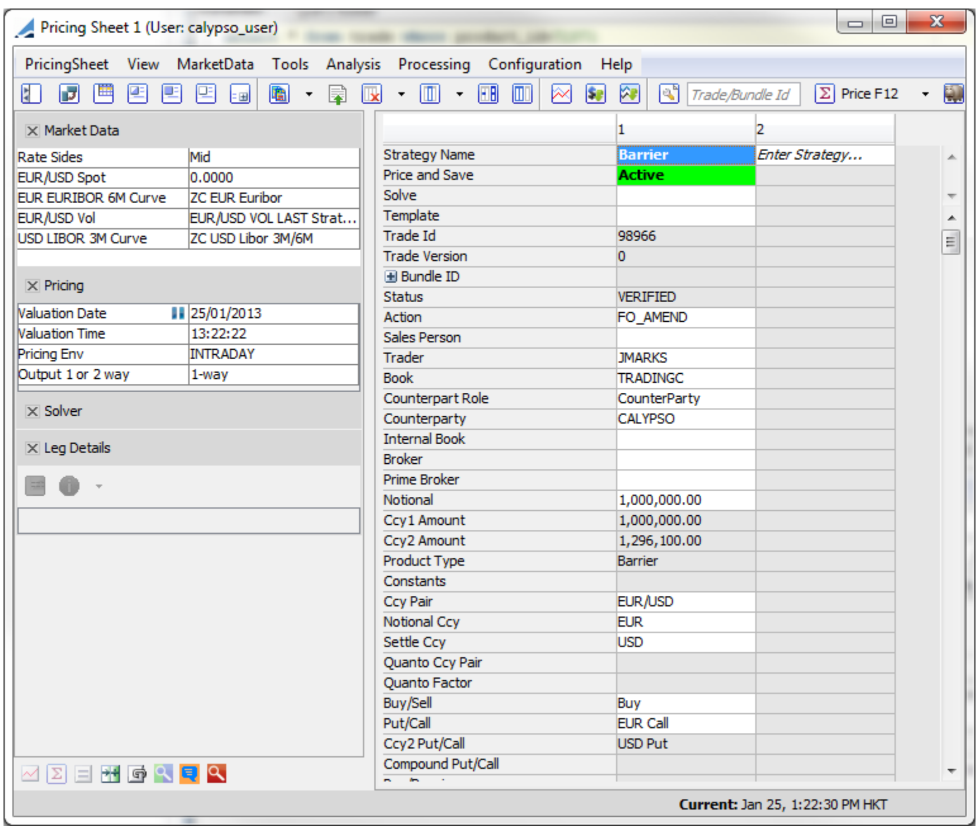


The Shin-Gensaki trades of Bloomberg AIM/TOMS are integrated into Calypso as Repo trades.



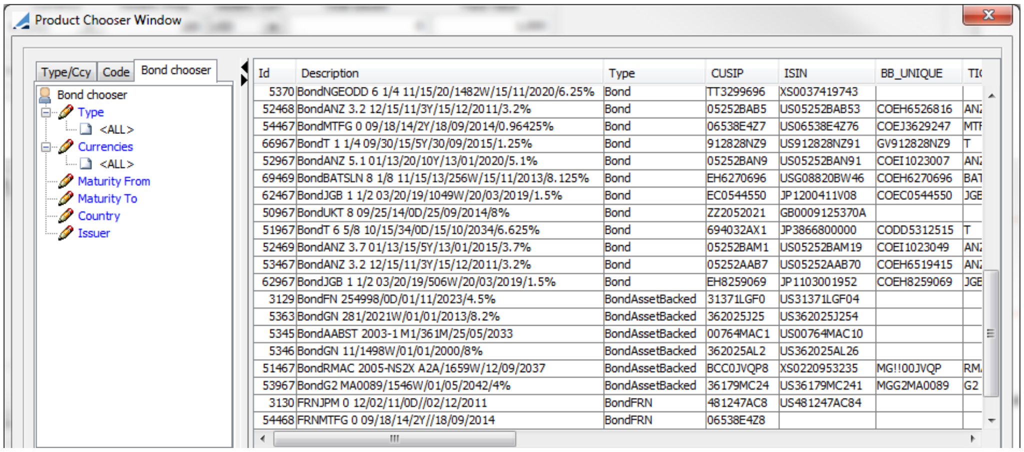
2.4.25 Single Barrier FX Option

The Single Barrier FX Option trades of Bloomberg AIM/TOMS are integrated into Calypso as FX Option trades.

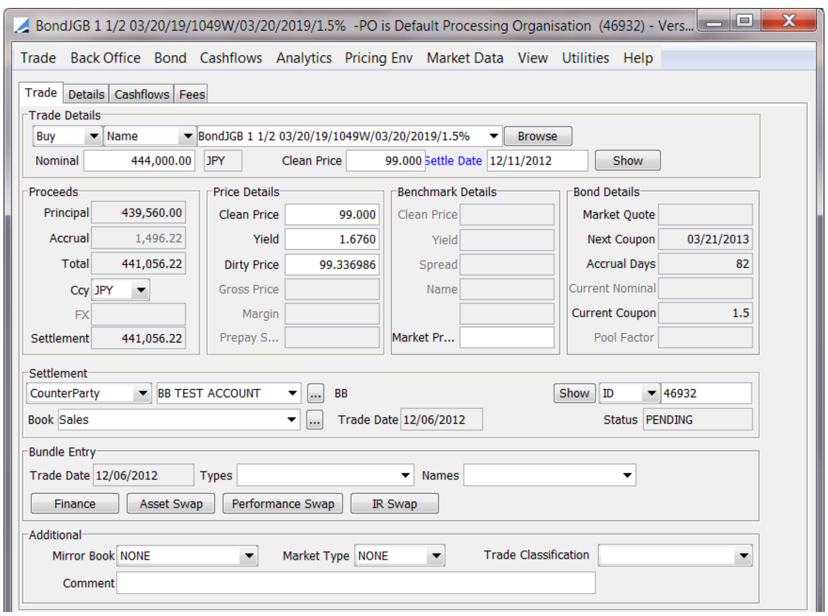


2.4.26 Standard Bonds

The system will look up the bond by CUSIP, ISIN or BB_UNIQUE. If the product specified cannot be found, it will put the trade message on hold and download the product definition from Bloomberg Data License (for integrating with Bloomberg Data License). After the product definition is fed into Calypso, the system will continue to process the trade message.

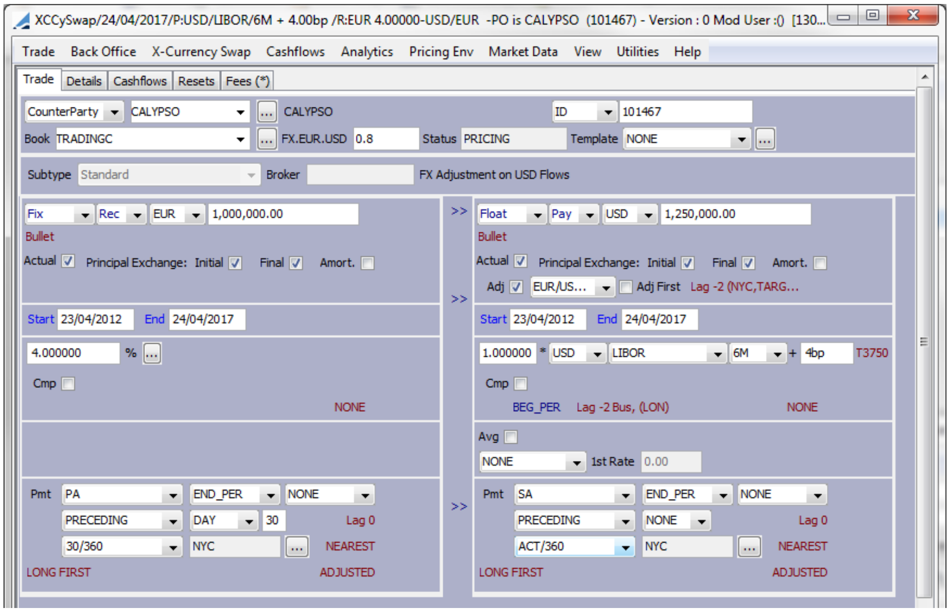


The Standard Bond trades of Bloomberg AIM/TOMS are integrated into Calypso as Bond trades.



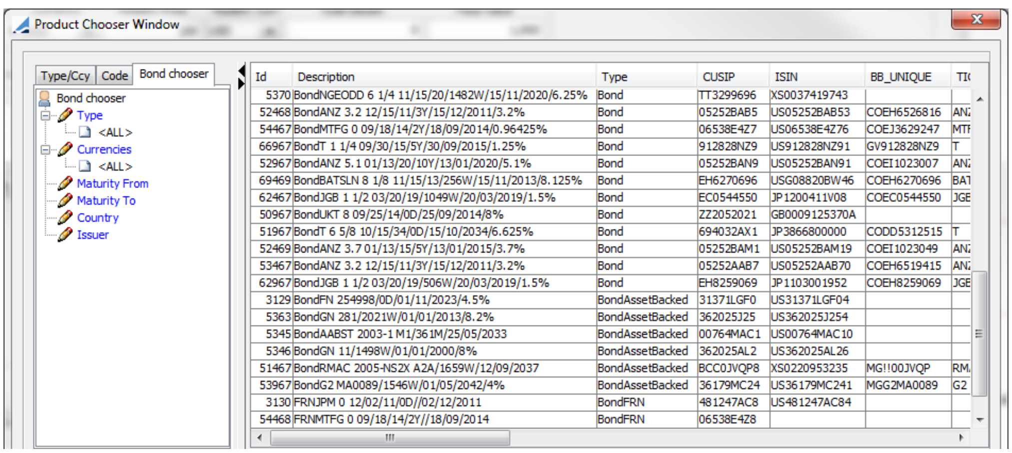
2.4.27 Vanilla Cross Currency Swap

The Vanilla Cross Currency Swap trades of Bloomberg AIM/TOMS are integrated into Calypso as Interest Rate Swap trades.

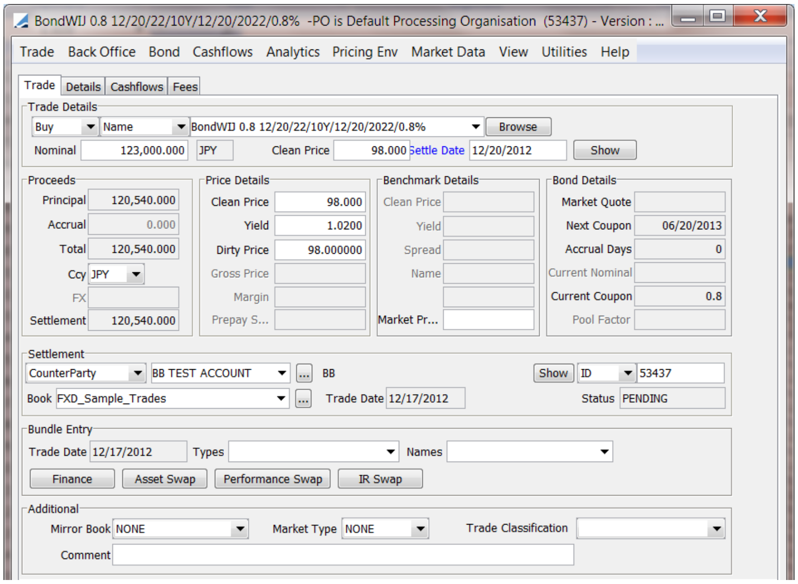


2.4.28 When Issued Bond

The system will look up the bond by CUSIP, ISIN or BB_UNIQUE. If the product specified cannot be found, it will put the trade message on hold and download the product definition from Bloomberg Data License (for integrating with Bloomberg Data License). After the product definition is fed into Calypso, the system will continue to process the trade message.



The When Issued Bond trades of Bloomberg AIM/TOMS are integrated into Calypso as Bond trades.


BondWIJ 0.8 12/20/22/10Y/12/20/2022/0.8% -PO is Default Processing Organisation (53437) - Version : ...
Trade Back Office Bond Cashflows Analytics Pricing Env Market Data View Utilities Help
Trade Details Cashflows Fees
Trade Details
Buy
Name
BondWIJ 0.8 12/20/22/10Y/12/20/2022/0.8%
Browse
Nominal 123,000.000 JPY
Clean Price 98.000
Settle Date 12/20/2012
Show
Proceeds
Principal 120,540.000
Accrual 0.000
Total 120,540.000
Ccy JPY
FX
Settlement 120,540.000
Price Details
Clean Price 98.000
Yield 1.0200
Dirty Price 98.000000
Gross Price
Margin
Prepay S...
Benchmark Details
Clean Price
Yield
Spread
Name
Market Pr...
Bond Details
Market Quote
Next Coupon 06/20/2013
Accrual Days 0
Current Nominal
Current Coupon 0.8
Pool Factor
Settlement
CounterParty
BB TEST ACCOUNT
BB
Show
ID
53437
Book FXD_Sample_Trades
Trade Date 12/17/2012
Status PENDING
Bundle Entry
Trade Date 12/17/2012
Types
Names
Finance
Asset Swap
Performance Swap
IR Swap
Additional
Mirror Book NONE
Market Type NONE
Trade Classification
Comment

Data Mapping

3.1 External Reference and Internal Reference

Calypso maintains links to imported Bloomberg trades via the Internal Reference and External Reference fields. When a trade is integrated from Bloomberg, the Internal Reference is updated to match the transaction number of the latest Bloomberg Trade Feed. The External Reference is set only for new trades, so that it keeps a reference to the first Bloomberg Trade Feed for that particular trade.

If two Bloomberg tickets are generated for a trade, for example, FX Swap and Vanilla Cross Currency Swap trades, Calypso will combine the transaction numbers of Bloomberg Feeds in the format <tr#_tradefeed1>_<tr#_tradefeed2>.

[NOTE: In Calypso trades, the Internal Reference and External Reference are automatically prefixed with "BB_AIM_<BloombergFirmID>" (for trades from Bloomberg AIM) or "BB_TOMS_<BloombergFirmID>" (for trades from Bloomberg TOMS).]

When trades are manually created in Calypso, the Internal Reference and External Reference should be left blank.

3.2 Trade Date

The "as of date" from Bloomberg AIM/TOMS message is taken as trade date for the corresponding Calypso trade.

3.3 MiFID Trade Keywords

Mapping for MiFID trade keywords can be provided in the domain "BloombergTS.MifidKeywords". Only the fields provided in this domain are saved as trade keywords.

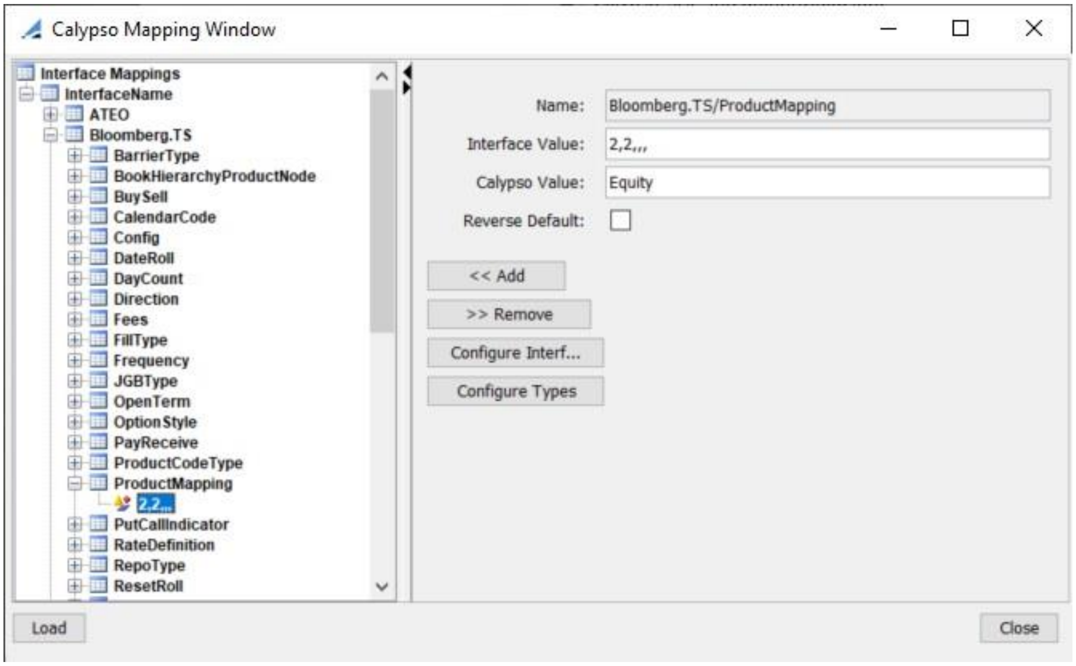
By default, this domain also contains the default SFTR field mappings.

- Please refer to Calypso Securities Financing Transaction Regulation documentation for details on SFTR.

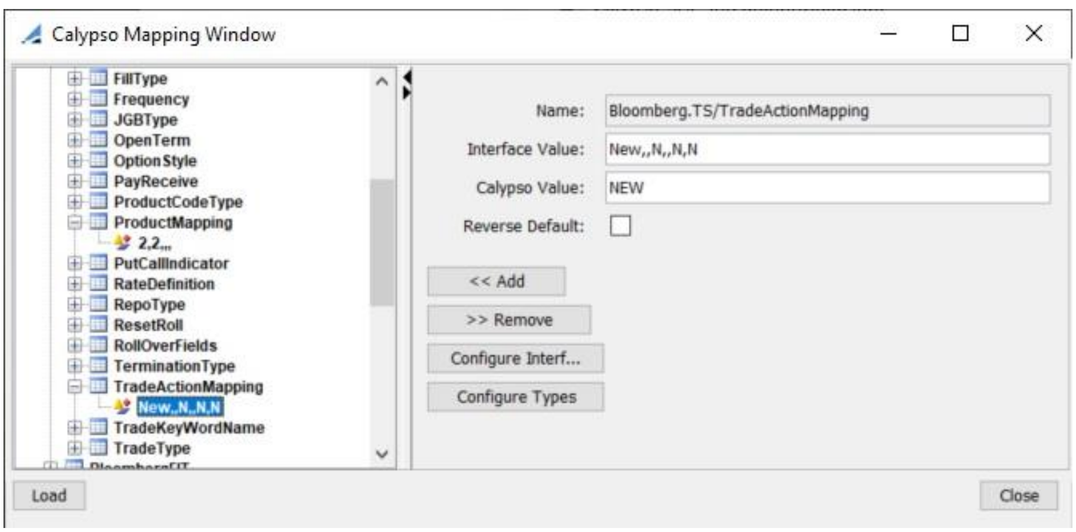
3.4 Configurable Mapping

Calypso has added a support to provide configurable mapping of product type and trade action via 'ProductMapping' and 'TradeActionMapping' in Calypso mapping window. We have provided an extension to map product type with the incoming trade feed based on key formed from trade feed. This mapping is given in Calypso mapping window under 'ProductMapping' option. Similar extension is provided to map trade action under 'TradeActionMapping' title.

Here is an example screen for 'ProductMapping':



Here is an example for ‘TadeActionMapping’ option:



Trade Handling

4.1 Supported Products and Actions

Supported Actions

- NEW, AMEND, CANCEL (for all products)
- ALLOCATE (for Bond only)
- TERMINATE, ROLLOVER (for Repo only)
-

Supported Product	Products supported in Bloomberg TOMS/AIMS version (V12 or V20)				Remarks
	TOMS		AIMS		
	V12	V20	V12	V20	
Asset Backed Securities	✓				Mapped as bond trades in Calypso
Basis Swap	✓				Mapped as interest rate swap trades in Calypso
Bond Future	✓	✓	✓		
Bond Future Option	✓		✓		
Callable Bond	✓				Mapped as bond trades in Calypso
CDS Index Trade			✓		
Certificate of Deposit	✓				Mapped as bond trades in Calypso
Commercial Paper	✓				Mapped as bond trades in Calypso
Cross Currency Swap (Vanilla)	✓		✓		
Equity	✓		✓		

Supported Product	Products supported in Bloomberg TOMS/AIMS version (V12 or V20)				Remarks
	TOMS		AIMS		
	V12	V20	V12	V20	
Equity Index Future	✓	✓	✓		
Equity Index Future Option	✓		✓		
FX Forward	✓		✓		
FX Future	✓	✓	✓		
FX NDF	✓		✓		
FX Option (Single Barrier)	✓		✓		
FX Option (Vanilla)	✓	✓	✓		
FX Spot	✓	✓	✓		
FX Swap	✓	✓			
Index Exchange Traded Fund	✓				Mapped as equity trades in Calypso
Interest Rate Future	✓		✓		Mapped as money market future in Calypso
Interest Rate Future Option	✓				Mapped as money market future option in Calypso
Interest Rate Swap (Vanilla)	✓		✓		
Loan and Deposit (Fixed Term)	✓				Mapped as loan/deposit trades in Calypso (default), or as structured flows trades (configurable)
Mortgage Backed Securities	✓				Mapped as bond trades in Calypso
OTC Equity Index Option			✓		

Supported Product	Products supported in Bloomberg TOMS/AIMS version (V12 or V20)				Remarks
	TOMS		AIMS		
	V12	V20	V12	V20	
Repo and Reverse Repo	✓	✓			Mapped as repo trades in Calypso
Security Lending	✓				
Shin-gensaki	✓				Mapped as repo trades in Calypso
Standard Bond	✓	✓	✓		Mapped as bond trades in Calypso
Swaptions			✓		Supporting only the European exercise type
Unitized Funds	✓	✓			
When Issued Bond	✓	✓			Mapped as bond trades in Calypso

4.2 New Trade in Bloomberg

Bloomberg will generate a new trade ticket.

Calypso will create a new trade. Calypso will update the Internal Reference and the External Reference to match the Bloomberg Trade ID.

4.3 Correct Trade in Bloomberg

Bloomberg will generate a cancel ticket to cancel the original trade and generate a correction ticket with a new trade ID. The cancel ticket can be identified as part of a correction by the value CancelDueToCorrection=Y. The Bloomberg correction trade contains the field TransactionNumberOfOriginTrans to identify the original trade in Bloomberg.

Calypso will ignore the cancel ticket due to a correction (identified by the value CancelDueToCorrection=Y). Calypso will instead amend the original trade. Calypso will identify the original trade by matching the Bloomberg TransactionNumberOfOriginTrans to the Calypso Internal Reference. As part of the amendment, Calypso will then update the Internal Reference to match the Bloomberg correction trade ID. The External Reference remains unchanged with the original Bloomberg Trade ID.

4.4 Cancel Trade in Bloomberg

Bloomberg will generate a cancel ticket. The Bloomberg cancel trade will have the same trade ID as the original trade.

Calypso will cancel the original trade. The Internal Reference and External Reference remain unchanged.

4.5 Terminate Trade in Bloomberg (for Repo only)

Bloomberg will generate a termination ticket which carries the same trade ID as the original trade.

Calypso will terminate the original trade. The Internal Reference and External Reference remain unchanged.

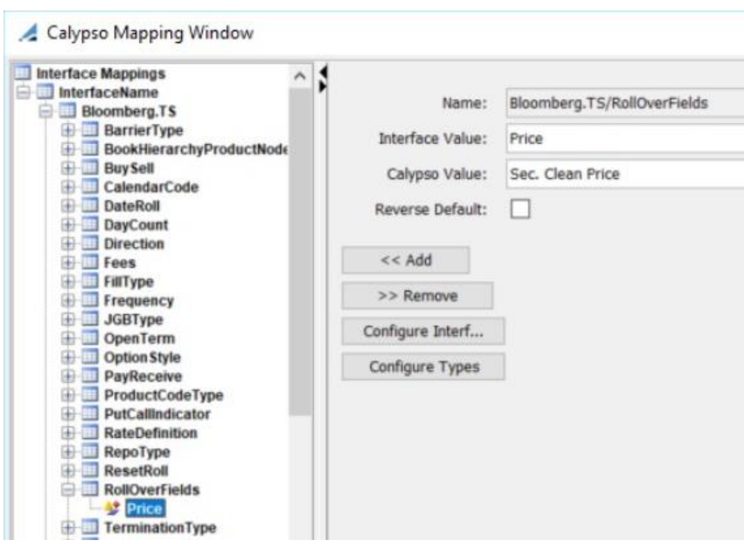
4.6 Rollover Trade in Bloomberg (for Repo only)

Bloomberg will generate a rollover ticket. End users have to fill in the trade ID of the original trade in Short Note 1 on Bloomberg systems.

> **[NOTE: End user should leave Short Note 1 on Bloomberg Systems empty except for** rolling over a repo trade **or** amending a pre-existing trade**.]**

Calypso will rollover the original trade. The Internal Reference and External Reference remain unchanged.

During a rollover action, the Bloomberg TOMS 'Price' value is mapped to 'Sec. Clean Price' in Calypso through the RollOverFields mapping.



4.7 Lifecycle Actions

Other lifecycle actions are generally not supported. The interface will not send new trades to Calypso when an option is exercised, any barrier is hit, or a rate reset is performed on Bloomberg AIM or Bloomberg TOMS.

4.8 Pre-Existing Trades

A trade may be booked in Calypso before it is booked in Bloomberg. Reasons can include simulating a hedge trade or booking trades while Bloomberg is unavailable. When the user enters a new trade in Calypso that will later be entered into Bloomberg, the user will need to set the External Reference ID to be the same as the Calypso Trade ID. When the user enters a new trade in Bloomberg that corresponds to a pre-existing trade in Calypso, the user will need to specify the Calypso Trade ID in designated Short Note 1[3]. During TOMS integration, the appropriate mappings and validation will be performed. An Amend event will be performed on the pre-existing trade in Calypso and its fields will be updated to match those of the Bloomberg trade.

ACK/NACK process

For Bloomberg TOMS, Calypso supports Ack Nak messages for all incoming messages in V20 for the following list of Products:

- Bonds
- Repo
- Bond Issuance
- Futures
- Unitized Funds

Once a trade is booked in Bloomberg TOMS, Calypso receives a trade feed message. Calypso then sends an acknowledgment (ACK) or a negative acknowledgment (NACK) after translation. If there are validation errors Calypso sends NACK with errors and when successful, Calypso sends ACK.

Trade would remain in PENDING in Bloomberg TOMS until ack is sent. In case of missing mapping in Calypso, a NACK is sent and once the trade is created, an ACK is sent, which will move trade to ACKed Status in Bloomberg.

The trade will remain in a PENDING status in Bloomberg (BBG) until an ACK is sent. If there is a missing mapping in Calypso, a NACK is sent. Once the trade is created, an ACK is sent, updating the trade status to ACKED in Bloomberg.

Sender configs

Id	Status	Product	Advice Type	Address Type	Gateway	SD Filter	Send	Save	By Gateway	By Method	By JMS	JMS Name
135707	COMPLETED	ALL	UPLOADSOURCEMSG	BloombergTOMS	BloombergTOMS		✓		✓			
135706	COMPLETED	ALL	UPLOADSOURCEMSG	BloombergAIM	BloombergAIM		✓		✓			
132207	PENDING	ALL	UPLOADSOURCEMSG	BloombergAIM	BloombergAIM		✓		✓			
132206	PENDING	ALL	GATEWAYMSG	BloombergAIM	BloombergAIM		✓		✓			
131206	COMPLETED	ALL	GATEWAYMSG	BloombergAIM	BloombergAIM		✓		✓			
130707	PENDING	ALL	GATEWAYMSG	BloombergTOMS	BloombergTOMS		✓		✓			
130706	COMPLETED	ALL	GATEWAYMSG	BloombergTOMS	BloombergTOMS		✓		✓			
129206	PENDING	ALL	UPLOADSOURCEMSG	BloombergTOMS	BloombergTOMS		✓		✓			
62706	PENDING	ALL	GATEWAYMSG	TradeUploader	TradeUploader							
45409	TO_BE_SENT	ALL	CONFIRM	MAIL	PRINTER		✓		✓			
21263	EDITED	ALL	RECEIPTMSG	SWIFT	SWIFT			✓				
17990	VERIFIED	ALL	SEC_RECEIPTMSG	SWIFT	SWIFT			✓				
17989	VERIFIED	ALL	SEC_DELIVERYMSG	SWIFT	SWIFT			✓				
17988	VERIFIED	ALL	RECEIPTMSG	SWIFT	SWIFT			✓				
17987	EDITED	ALL	PAYMENTMSG	SWIFT	SWIFT			✓				
17986	VERIFIED	ALL	PAYMENTMSG	SWIFT	SWIFT			✓				
16085	TO_BE_SENT	ALL	SEC_RECEIPTMSG	SWIFT	SWIFT		✓		✓			

Once the trade is booked, Calypso creates UPLOADSOURCEMSG message, it will remain in the PENDING status, then in case of any validation error Calypso sends a NACK. In case of no error, Calypso sends an ACK and the status is updated as COMPLETED.

A GATEWAYMSG message is created, it remains in the PENDING status. In case of any error or missing entity, it will remain in PENDING status and NACK is sent. Then once the user corrects the config or adds the missing entity, Calypso sends ACK and the status is updated to COMPLETED status.

XML messages

The following are samples XML messages.

Status Ack

```xml
<?xml version="1.0" encoding="UTF-8"?>
<TradeFeedReply>
<BloombergFirmID>4159</BloombergFirmID>
<AckNack>Ack2</AckNack>
<ErrorCount>0</ErrorCount>
<ErrorMessage>Complete</ErrorMessage>
<BloombergReferenceNumber>274141591K0000073882</BloombergReferenceNumber>
<UserReferenceNumber>Sending In Ack2</UserReferenceNumber>
<SecondaryUserReferenceNumber>123</SecondaryUserReferenceNumber> <!-- Optional Calypso trade Id -->
</TradeFeedReply>
```

Status Reject

```xml
<?xml version="1.0" encoding="UTF-8"?>
<TradeFeedReply>
<BloombergFirmID>4159</BloombergFirmID>
<AckNack>Nack</AckNack>
<ErrorCount>1</ErrorCount>
<ErrorMessage>Unable to process trade 274141591 because reason</ErrorMessage>
<BloombergReferenceNumber>274141591K0000073882</BloombergReferenceNumber>
<UserReferenceNumber>test Nack</UserReferenceNumber>
<SecondaryUserReferenceNumber>123</SecondaryUserReferenceNumber>
</TradeFeedReply>
```