Nasdaq Calypso

CME BrokerTec Integration Guide

Version 3.5.0

Revision 3.0
January 2025
Approved

Document History

Revision	Published	Summary of Changes
1.0	August 2023	First edition for version 2.0.1
2.0	January 2024	Updates for version 3.3.0
3.0	January 2025	Updates for version 3.5.0 – Added engine parameter OPTIONAL_FEATURE.

This document provides setup information for the CME BrokerTec interface.

Table of Contents

Introduction

BrokerTec Quote is a dealer-to-client RFQ (Request for Quote) repo execution platform. The service delivers innovative trading technology and workflow solutions while ensuring a compliant and orderly marketplace for all participants. The platform supports RFQ repos for EGBs, Gilts, SSAs and U.S. Treasuries. Additional asset classes will be supported in future phases. BTQ offers a full suite of services: pre-& post trade analytics, execution, post-trade services, regulatory reporting, and integration services.

This document describes the Calypso CME BrokerTec Interface setup to import repo trades.

Connectivity to the BrokerTec FIX Engine is done via Stunnel.

https://www.stunnel.org/downloads.html

Scope

Product Types

Repo and Reverse Repo – Open/Term – Fixed / Float (only on European Bond with Index ESTR) – Bilateral settlement type

Trade Lifecycle

NEW / AMEND / CANCEL actions are applicable to Open/Term Repo trades

Termination / Close / Open actions are only applicable to Open Repo trades

Installation

2.1 Software Requirements

2.1.1 Supported JRE Versions

Please use the appropriate JRE version depending on the supported version for the base Calypso release you are running.

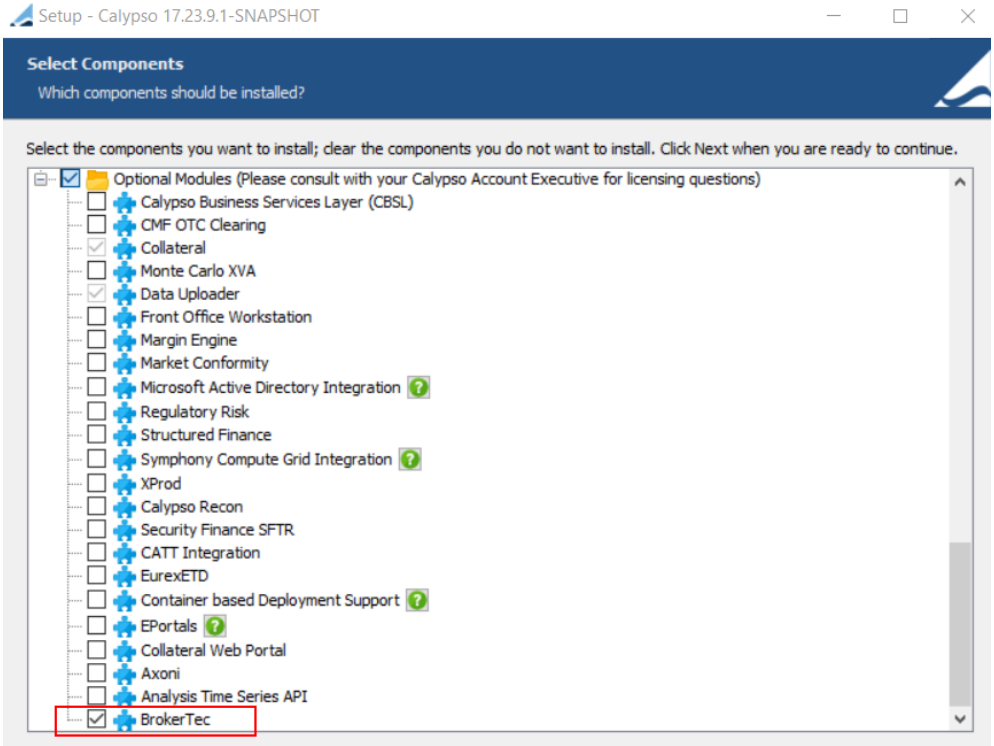
2.1.2 Supported Calypso Versions

The module supports specific versions of Calypso. In addition, your implementation must have the current Hotfixes applied. Before downloading the CME BrokerTec module, please refer to the Calypso CME BrokerTec Release Notes to determine which module versions are applicable for your implementation.

2.2 Installation Instructions

2.2.1 Calypso Components

Follow the Calypso Installation Guide to install Calypso. Check the FXall interface during the installation.



Database Setup

The database files will be loaded when you run Execute SQL.

Setup Requirements

3.1 Calypso Mapping

3.1.1 Trade Keywords

Note1, Note2, Note3, Note4, Note5 in BrokerTec UI are mapped as Trade Keywords in Calypso. For this, user need to add the below mapping in Calypso Mapping window:

Note1 = 20050

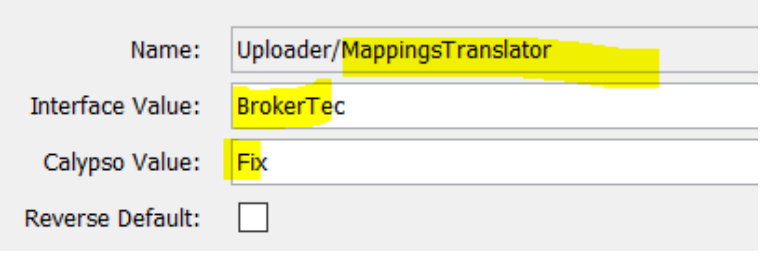
Note2 = 20051

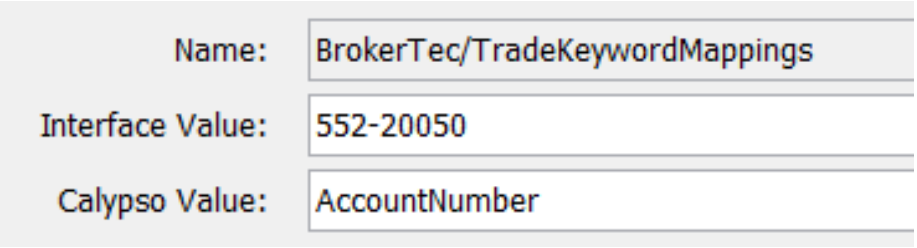
Note3 = 20052

Note4 = 20053

Note5 = 20054

Example:



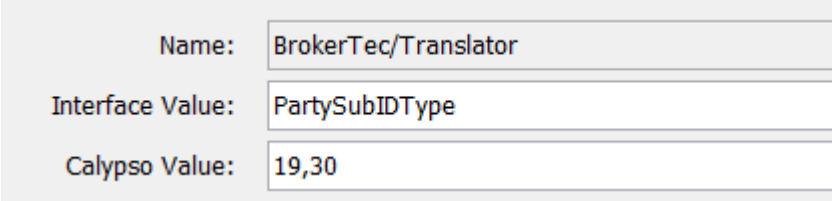


3.1.2 Counterparty

Party Identification Logic

- Get the group 453 and search for the PartyRole=1 and PartyIdSource=D

There is a mapping of PartySubIDType which is a comma separated values of tags 803 under 802 group.



Then get the PartySubId by checking the mapping in the Calypso Mapping Table. So if 803=19 and 802=30 are present in the incoming FIX message, then we use the combination of these tags to identify the Counterparty in Calypso. As per BrokerTec team, they'll always send these tags in the FIX message. By default, we get the value of tag 523 corresponding to 803=4025 as Counterparty PartySubId

- If PartySubId is not found, then get the value of 448 tag having PartyRole=1 and PartyIdSource = D. e.g. In this case, CalypsoSel.

The mapping can be done using one of the following methods.

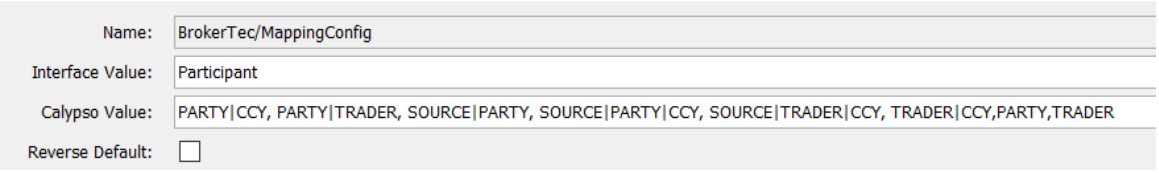
Method 1 – Mapping Criteria

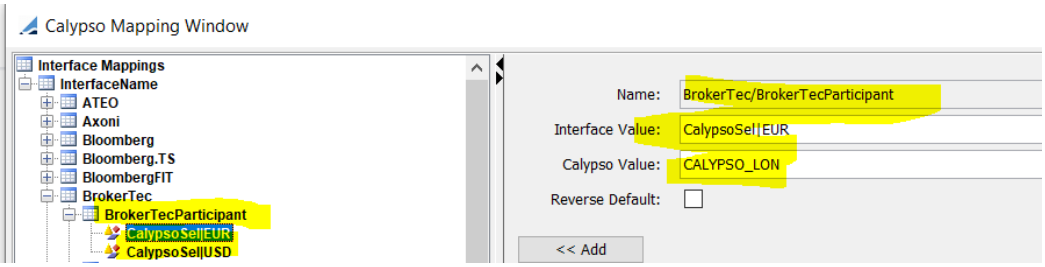
You can map multiple Calypso Entities to BrokerTec Parties using the Mapping window with the following 5 criteria. These criteria can be used in combination to identify the counterparty in Calypso.

PARTY	Party information coming from the Platform in the fix file
CCY	Currency information coming in the fix file
CCYPAIR	Currency pair information present in the incoming fix file
TRADER	Trader information present in the fix file
SOURCE	Source is the platform from which we are receiving the message. E.g. FIX

As shown below multiple combinations should be separated by coma and the combination can be defined using any separator (in this example we are using '|'). The same separator that we use in mapping config needs to be provided in BrokerTecParticipant for incoming. Also if multiple combinations of criteria are present then priority is given to the order in which the combinations are defined in the Mapping Config

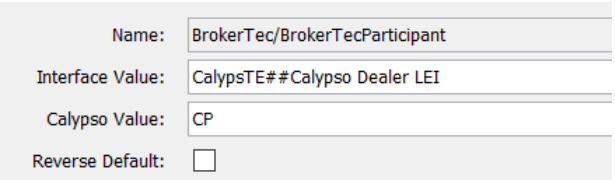
The combination needs to be added in the Mapping Config as shown in the example below.





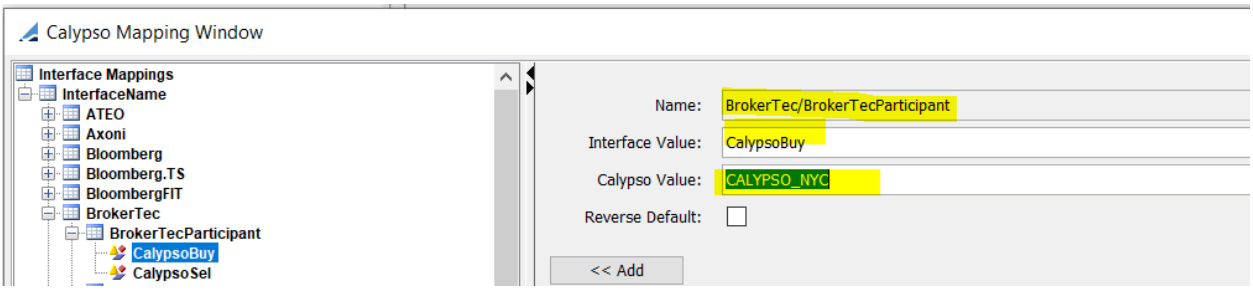
- CalypsoSel|EUR - CALYPSO_LON
- CalypsoSel|USD - CALYPSO_NYC

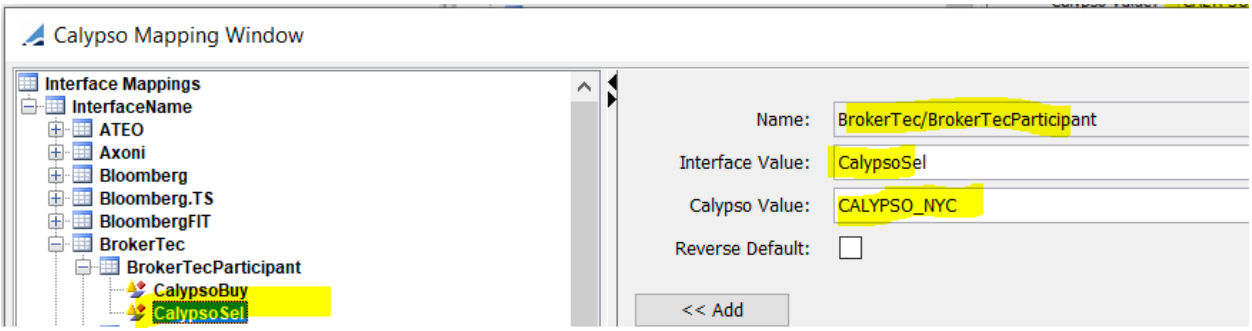
For PARTY, we use the combination of 803=19 and 803=30 tags. e.g 523=CalypsTE|803=19|523=Calypso Dealer LEI|803=30| is present in the incoming FIX message, then we do the mapping as shown below. ## is the delimiter.



Method 2 - Multiple BrokerTec Participants to Same Legal Entity in Calypso

If above mentioned Mapping Criteria is not used, you can map the entities as shown in the example below.

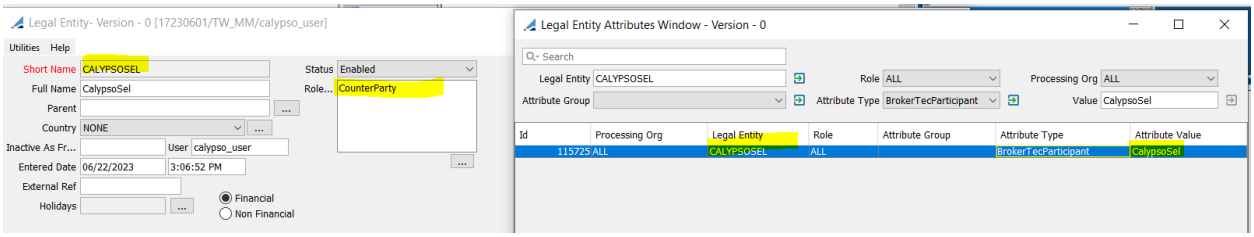




In case where 523=CalypsTE|803=19|523=Calypso Dealer LEI|803=30| tags are present in the incoming FIX message, mapping would be InterfaceValue = CalypsTE##Calypso Dealer LEI and Calypso Value = CALYPSO_NYC.

Method 3 - Using the Legal Entity Attribute BrokerTecParticipant

Example:



Where Attribute Value CalypsoSel is the Entity name coming from Platform.

In case where 523=CalypsTE|803=19|523=Calypso Dealer LEI|803=30| tags are present in the incoming FIX message, mapping would be AttributeType=BrokerTecParticipant and AttributeValue= CalypsTE##Calypso Dealer LEI.

448=CalypsoSel

447=D

452=1

802=5

523=CalypsoSellLEI

803=1

523=CalypsTE

803=19

523=Calypso Dealer LEI

803=30

523=CalypsTEBIC

803=16

523=CALDEV2

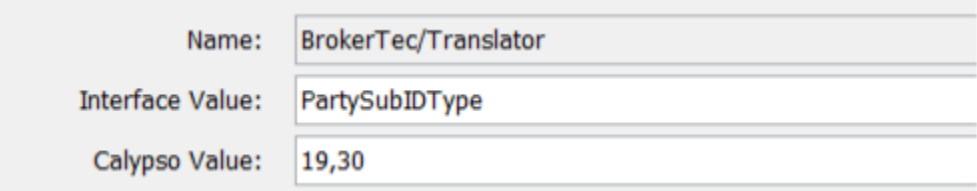
803=2

3.1.3 Book

Party Identification Logic:

- Get the group 453 and search for the PartyRole=13 and PartyIdSource=D

We have provided a mapping of PartySubIDType which is a comma separated values of tags 803 under 802 group



Then get the PartySubId by checking the mapping in the Calypso Mapping TableSo if 803=19 and 802=30 are present in the incoming FIX message, then we use the combination of these tags to identify the Counterparty in Calypso. As per BrokerTec team, they'll always send these tags in the FIX message. By default, we get the value of tag 523 corresponding to 803=4025 as Book PartySubId

- If PartySubId is not found, then we get the value of 448 tag having PartyRole=13 and PartyIdSource = D. e.g. In this case, CalypsoBuy.

The mapping can be done using one of the following methods.

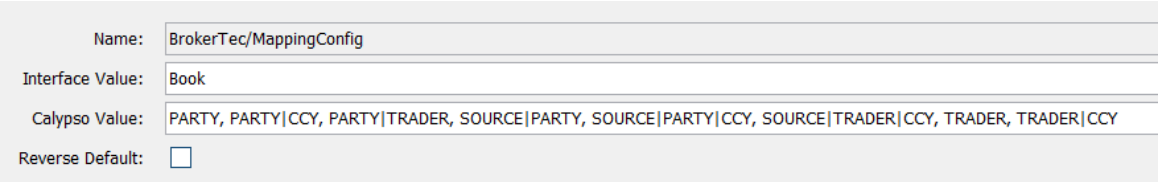
Method 1 – Mapping Criteria

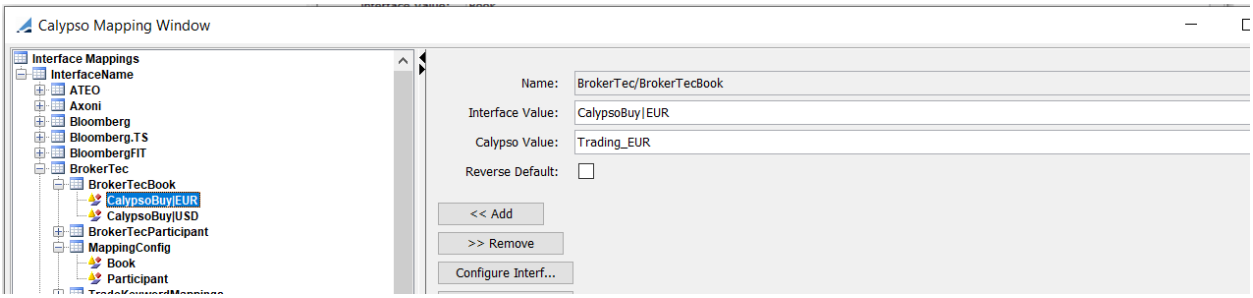
You can map multiple Calypso Entities to BrokerTec Parties using the Mapping window with the following 5 criteria. These criteria can be used in combination to identify the Book or PO in Calypso.

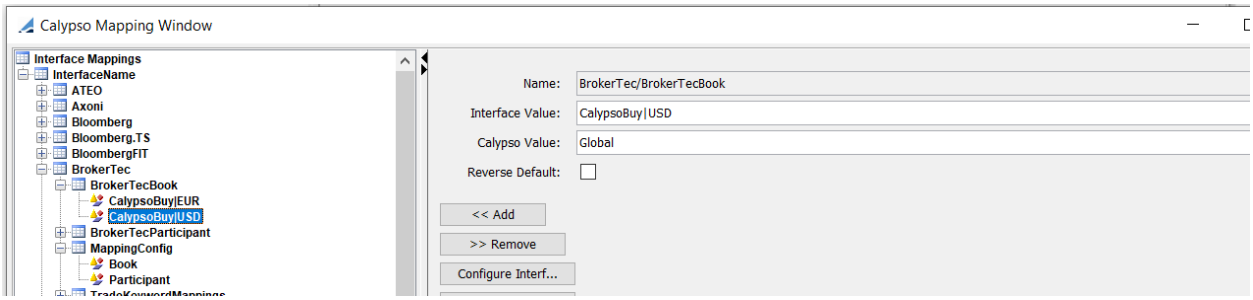
PARTY	Party information coming from the Platform in the fix file
CCY	Currency information coming in the fix file
CCYPAIR	Currency pair information present in the incoming fix file
TRADER	Trader information present in the fix file
SOURCE	Source is the platform from which we are receiving the message. E.g. FIX

As shown below multiple combinations should be separated by coma and the combination can be defined using any separator (in this example we are using '|'). The same separator that we use in mapping config needs to be provided in BrokerTecBook for incoming. Also if multiple combinations of criteria are present then priority is given to the order in which the combinations are defined in the Mapping Config

The combination needs to be added in the Mapping Config as shown in the example below.

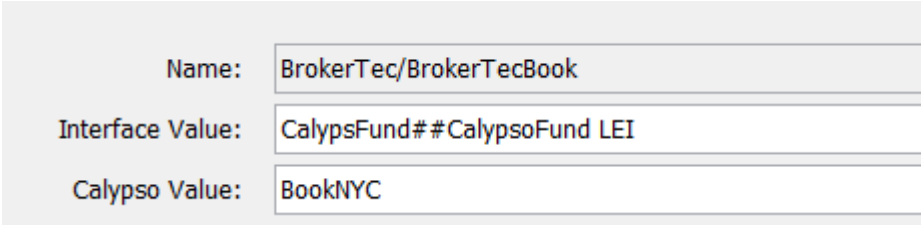






- CalypsoBuy|EUR - Trading_EUR
- CalypsoBuy|USD - Global

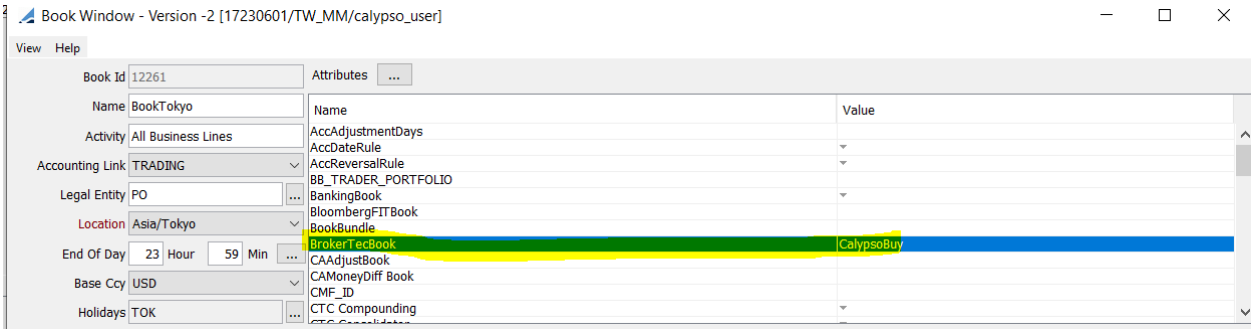
For PARTY, we use the combination of 803=19 and 803=30 tags. e.g 523=CalypsFund|803=19|523=CalypsoFund LEI|803=30| is present in the incoming FIX message, then we do the mapping as shown below. ## is the delimiter.



Method 2 - Get Book by Attribute

If Mapping Criteria is not used, you can get the book via BrokerTecBook attribute.

Example:



If the book is not found via attribute, then check if there is a book in Calypso with the same name as Platform Book, example CalypsoBuy book.

Method 3 - Get Book via PO Legal Entity

For this approach, we need to get the PO first. There are 3 approaches to get the PO.

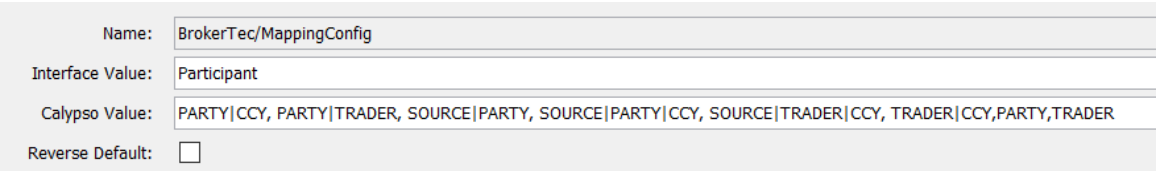
PO Mapping Criteria

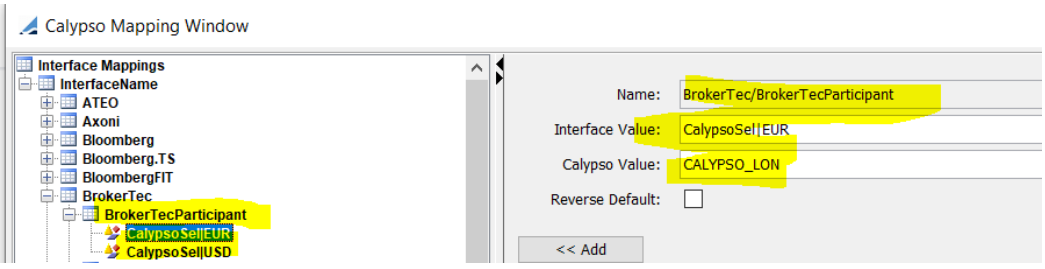
You can map multiple Calypso Entities to BrokerTec Parties using the Mapping window with the following 5 criteria. These criteria can be used in combination to identify the PO in Calypso.

PARTY	Party information coming from the Platform in the fix file
CCY	Currency information coming in the fix file
CCYPAIR	Currency pair information present in the incoming fix file
TRADER	Trader information present in the fix file
SOURCE	Source is the platform from which we are receiving the message. E.g. FIX

As shown below multiple combinations should be separated by coma and the combination can be defined using any separator (in this example we are using '|'). The same separator that we use in mapping config needs to be provided in BrokerTecParticipant for incoming. Also if multiple combinations of criteria are present then priority is given to the order in which the combinations are defined in the Mapping Config

The combination needs to be added in the Mapping Config as in the example shown below.

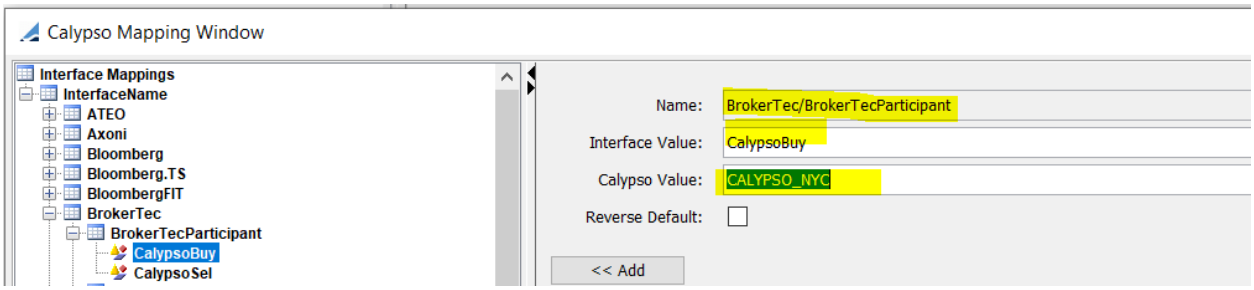


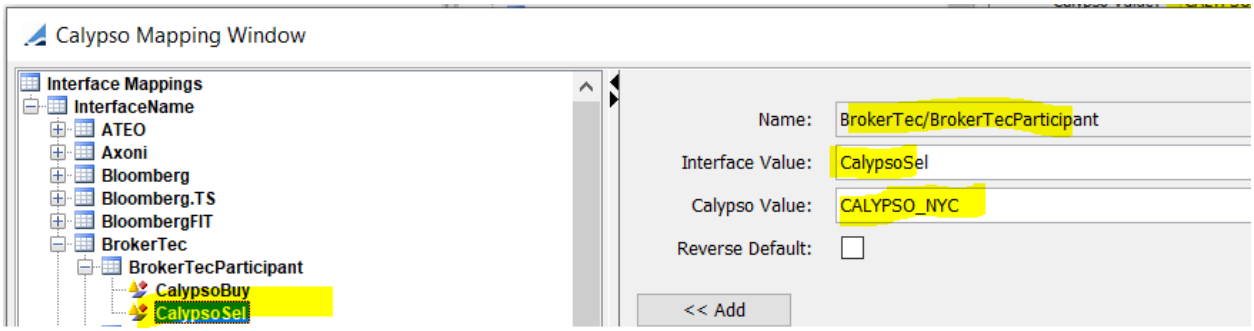


- CalypsoSel|EUR - CALYPSO_LON
- CalypsoSel|USD - CALYPSO_NYC

Multiple BrokerTec Participants to Same Legal Entity in Calypso

If above mentioned Mapping Criteria is not used, you can map the entities as shown in the example below.

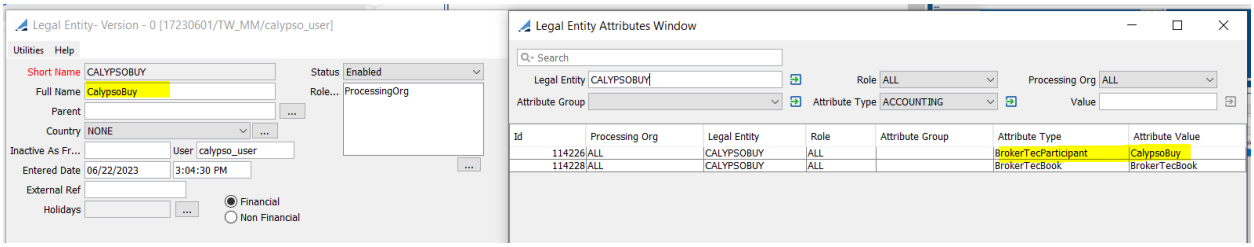




In case where 523=CalypsFund|803=19|523=CalypsoFund LEI|803=30| tags are present in the incoming FIX message, mapping would be InterfaceValue = CalypsFund##CalypsoFund LEI and Calypso Value = CALYPSO_NYC.

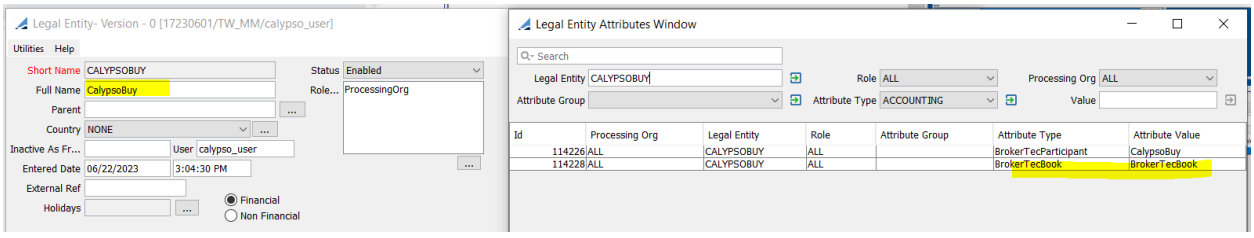
Using the Legal Entity Attribute BrokerTecParticipant

Example:



Then get the book from PO attribute BrokerTecBook.

Get the book name via BrokerTecBook attribute from Legal Entity. Then using the AttributeValue, get the book via Book Attribute - BrokerTecBook. If no book exists in Calypso with this attribute, then check if the Book is present in Calypso with the same name as Platform Book. If not such book is found, then error is raised.



In case where 523=CalypsFund|803=19|523=CalypsoFund LEI|803=30| tags are present in the incoming FIX message, mapping would be AttributeType=BrokerTecParticipant and AttributeValue= CalypsFund##CalypsoFund LEI

If above book mappings are not present, then get the 802 group with value corresponding to 803=2

- Repeat 1. Mapping Criteria

- Repeat 2. Get Book by Attribute

- Repeat 3.Get the Book via Legal Entity

448=CalypsoBuy

447=D

452=13

802=5

523=CalypsoBuyLEI

803=1

523=CalypsFund

803=19

523=CalypsoFund LEI

803=30

523=CalypFundBI

803=16

523=CALDEV1

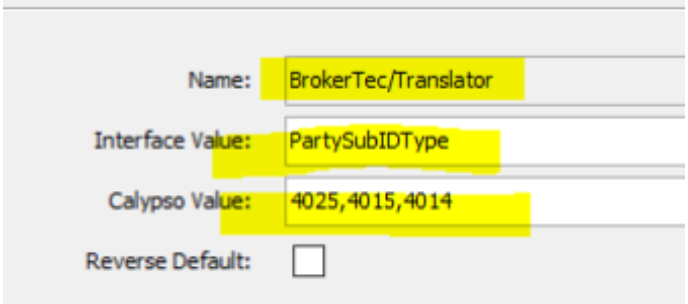
803=2

3.1.4 Trader

Party Identification Logic:

- Get the group 453 and search for the PartyRole=13 and PartyIdSource=D as highlighted in the below table.

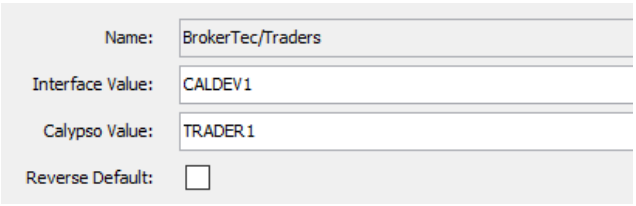
We have provided a mapping of PartySubIDType which is a comma separated values of tags 803 under 802 group.



Then get the PartySubId by checking the mapping in the Calypso Mapping Table. So if 803=4025 is present in the incoming FIXMessage, then its 523 tag is considered as the PartySubId. If not found, then we check for 803=4015 and so on. Priority of the PartySubIDType mapping is maintained.

- If the incoming FIXMessage does not contain any PartySubIdType from the mapping, then by default get the value of 523 tag corresponding to 803 = 2 as trader. In this example, CALDEV1 is considered as the trader.

Then check if the mapping for CALDEV1 is present in Traders in Calypso Mapping Table. If not, then CALDEV1 is returned.



453=3

448=BTEQ

447=G

452=16

448=CalypsoBuy

447=D

452=13

802=5

523=CalypsoBuyLEI

803=1

523=CalypsFund

803=19

523=CalypsoFund LEI

803=30

523=CalypFundBI

803=16

523=CALDEV1 / Person

803=2

448=CalypsoSel

447=D

452=1

802=5

523=CalypsoSellLEI

803=1

523=CalypsTE

803=19

523=Calypso Dealer LEI

803=30

523=CalypsTEBIC

803=16

523=CALDEV2

803=2

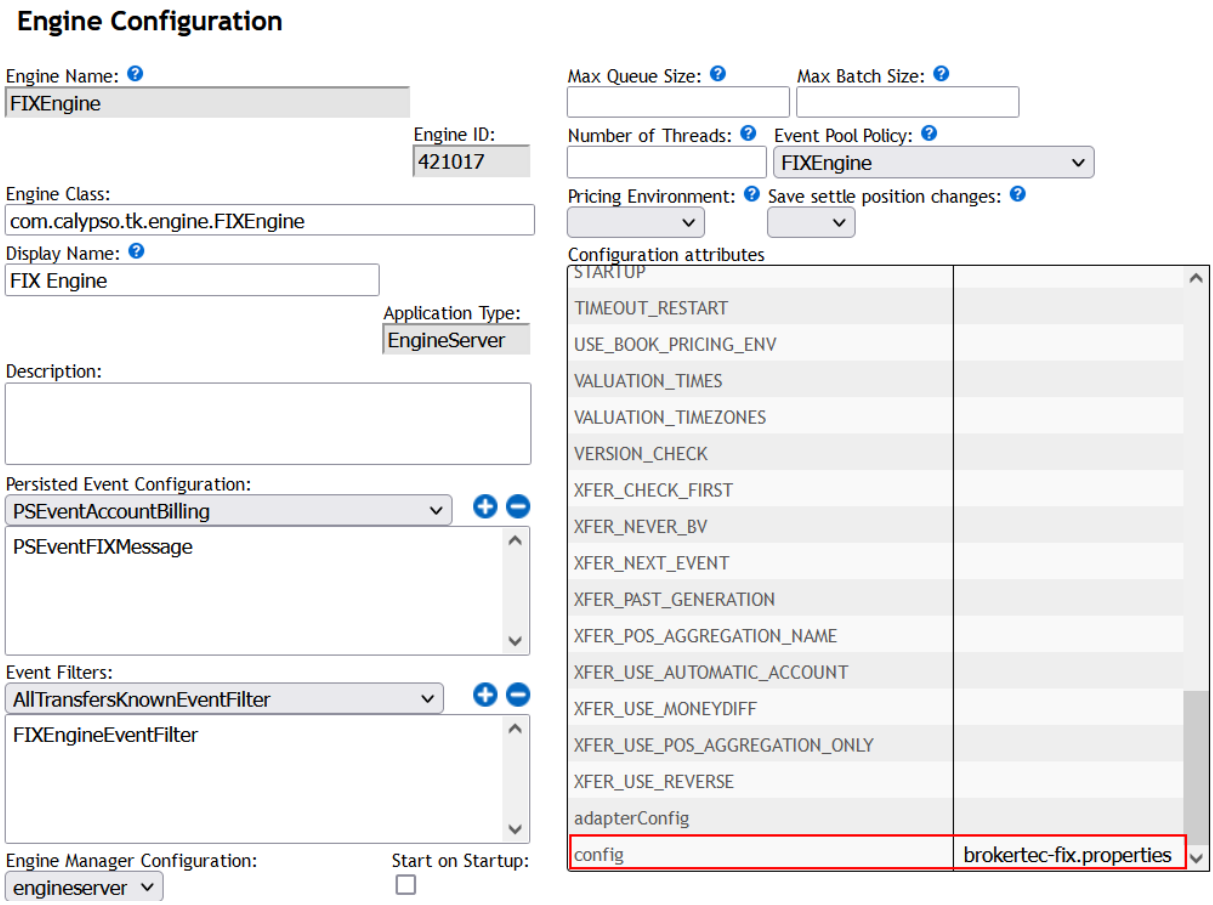
3.2 Fix-Engine Configuration

The BrokerTec FIX Engine is responsible for getting messages from the BrokerTec platform and handing it off to the appropriate workflows.

3.2.1 Configure the Engine

All the database-based Engine configuration is completed as part of applying the schema, including the engine name, event subscription, event filter, event policy, as well as assigning a unique id to the Engine.

You may refer to the schema file for more details.



Engine parameters:

config = brokertec-fix.properties

OPTIONAL_FEATURE = brokertec

3.2.2 Setup the FIX Config File

To run the BroketTec FIX Engine out-of-the-box you will need a properties file with the name “brokertec-fix.properties” with the appropriate FIX connection settings.

A sample file is included under <calypso home>/client/resources with the name “brokertec-fix.properties.sample”.

You will need to rename the file to “brokertec-fix.properties”.

Once the file is customized, copy the file to “`<calypso home>/ tools/calypso-templates/resources`”.

Sample Properties File

The sample “brokertec-fix.properties” file appears similar to the following example:

```
# The [DEFAULT] section contains default settings for all sessions

# These are inherited by each session defined below unless they are overridden in the session settings
```

```
# If you're not sure about something, use the default for now
[DEFAULT]
ConnectionType=initiator
ReconnectInterval=10
HeartBtInt=20
LogonTimeout=20
LogoutTimeout=20
Calypso.LogOnInterval=5000
Calypso.LogOnRetryCount=5

# Turn on test mode so that the FIX Engine does not try to connect to any
# of the FIX sessions listed in this file.
# It will still process messages generated from the File Watcher component.
Calypso.TestMode=false

Calypso.UploadMode=Local
Calypso.PersistMessages=All

# Each [SESSION] section contains session specific settings
# A single fix.properties file can be used for multiple sessions,
# and they will be handled in parallel by the FIX Engine

[SESSION]
#This entry should never be changed
Calypso.FIXMessageType=BrokerTec

#This is the FIX version used by BrokerTec
BeginString=FIX.4.4
DefaultApplVerID=7

# This should be set to your SenderCompID, as provided by BrokerTec
SenderCompID=CALYPSO-BTQ-BS-PTF-UAT

# This should be set to BrokerTec TargetCompID, as provided by BrokerTec
TargetCompID=BTQFIX

# This is the Data Dictionary for BrokerTec dialect of FIX
# It should only be updated based on instructions from Calypso support
```

```
DataDictionary=DD_BrokerTec_FIX.xml

AppDataDictionary=DD_BrokerTec_FIX.xml


SocketConnectHost=127.0.0.1

SocketConnectPort=9180


#These settings control the logging for the QuickFIXJ component

FileLogHeartbeats=Y

FileIncludeMilliseconds=Y

FileIncludeTimeStampForMessages=Y


# By default ValidateIncomingMessage=N because FIXEngine already gives error if required fix tag is missing or
out of order.

# Allow to bypass the message validation (against the dictionary). Default is "Y"

ValidateIncomingMessage=N


# By default ValidateUserDefinedFields=N because FIXEngine already gives error if required fix tag is missing.

# If set to N, user defined fields (field with tag >= 5000) will not be rejected if they are not defined in the

# data dictionary, or are present in messages they do not belong to.

ValidateUserDefinedFields=N


# By default AllowUnknownMsgFields=N because FIXEngine already gives error if required fix tag is missing.

# If AllowUnknownMsgFields set to Y, non user defined fields (field with tag < 5000) will not be rejected if
they are not defined

# in the data dictionary, or are present in messages they do not belong to.

AllowUnknownMsgFields=Y


# By default ValidateFieldsOutOfOrder=N because FIXEngine already gives error for fix tags out of error.

# If set to N, fields that are out of order (i.e. body fields in the header, or header fields in the body)

# will not be rejected. Useful for connecting to systems which do not properly order

# ValidateFieldsOutOfOrder=N


# Session validation setting for enabling whether field ordering is * validated. Values are "Y" or "N". Default
is "Y".

ValidateUnorderedGroupFields=N

ValidateFieldsOutOfOrder=N


#The following is required to avoid issues with reading tag 52 from the header

RequiresOrigSendingTime=N
```

```
UserName=CALYPSO-BTQ-BS-PTF-UAT
Password=474723efBG!
ResetOnLogon=Y
ResetOnLogout=Y
ResetOnDisconnect=Y

# These settings control when the engine will start & end a new
# session daily with BrokerTec, and should be based on the daily
# start/end time provided by BrokerTec
# Please see the Calypso BrokerTec setup documentation for more details
# Please see the QuickFIXJ documentation for appropriate values
StartTime=01:00:00
EndTime=23:00:00
TimeZone=America/New_York

EnabledProtocols=TLSv1.2
```

3.2.3 FIX Session Outage

The following actions are performed during a FIX session outage.

BrokerTec Case 1

While the session is down:

- book a new trade
- amend the same trade

Start the session – Calypso receives TCR for AMEND message from BrokerTec.

How it is handled in Calypso:

In Calypso, a NEW trade is created from AMEND message if no matching NEW trade is found.

Getting the trade by the PlatformTradeId keyword and if no trade exists with this external reference, then NEW action is applied on the incoming FIX message.

BrokerTec Case 2

While the session is down:

- book a new trade

- cancel the same trade

Start the session – Calypso receives TCR for cancel message from BrokerTec.

How it is handled in Calypso:

The BOMessage created for CANCEL action is marked as COMPLETED if no matching NEW trade is found.

For FIX message having 150=H, getting the trade by the PlatformTradeId keyword and if no trade exists with this external reference, then the message is ignored and moved to COMPLETED status.