Nasdaq Calypso

Expiration and Exercise

Version 18

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Approved

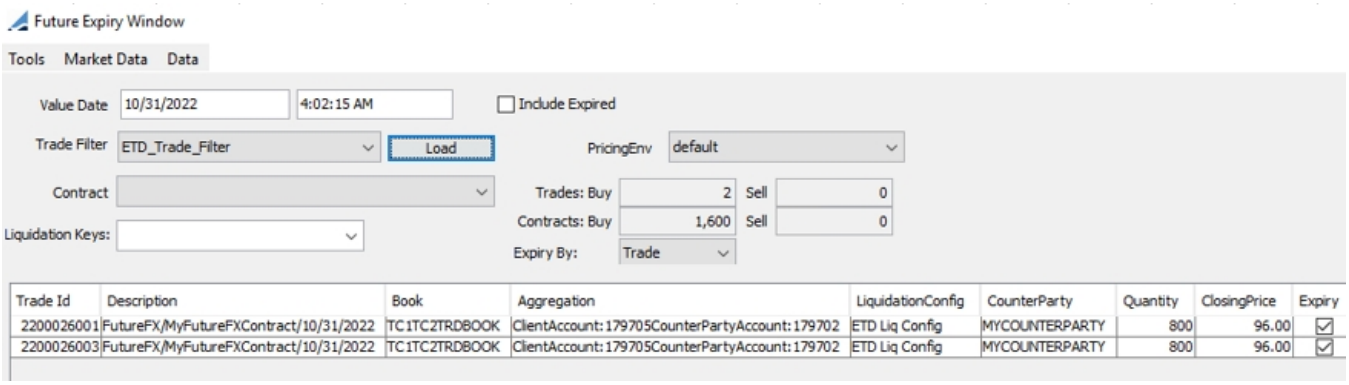
1. Future Expiration

Futures can be expired using **Trade Lifecycle > Expiration & Exercise > Future Expiry** (menu action `reporting.FutureExpiryWindow`).

You can also use the FUTURE_POSITION_EXPIRY scheduled task to expire futures.

▶ See FUTURE_POSITION_EXPIRY Scheduled Task for details.

1.1 Expiration



» Enter a value date.

Note that you cannot expire futures in the future.

» Check the Include Expired checkbox if you want to undo an expiration or if you want to view expired futures.

▶ See Undoing an Expiration for details.

» Select a trade filter, a pricing env and a contract as applicable.

Note that the pricing env must have the following pricing parameters:

- INSTANCE_TYPE set to CLOSE
- NPV_FROM_QUOTE set to true
- FUTURE_FROM_QUOTE set to true

You also need closing prices on the value date. Select **Tools > Check Quotes** to check if the required quotes are available.

» Then click **Load**.

The contracts maturing on the value date and satisfying the search criteria will be displayed.

You can choose Expiry By:

- Trade - To generate close out trades by open trade
- Position - To generate close out trades by position specification

Check the Expiry checkbox then click **Apply** to expire the corresponding futures.

Close out trades are created. The trade keyword TerminationType is set to CloseOut and the trade keyword LiquidableWith is set to the expired trade id on the close out trades as shown below.

The trade keyword SettlementType is set to the contract's settlement type.

An automatic liquidation is performed between the expired trades and the close out trades.

If the delivery type is physical, a trade is created for the underlying. For a bond future, the cheapest-to-deliver bond is delivered.

The transfer engine generates REALIZED_PL transfers, provided it subscribes to PSEventLiquidatedPosition, PSEventUnliquidatedPosition and PSEventAggLiquidatedPosition events. The REALIZED_PL transfers are not generated if trade keyword SettlementType = Physical.

▶ Please refer to Calypso Settlements documentation for setup details.

1.1.1 Tools Menu

The menu items of the Tools menu are described below.

Menu Items	Description
Trade Filter	To define trade filters.
Check Quotes	To check if the required market data are available in the pricing environment.
Clear	To clear the window.
Close	To close the window.

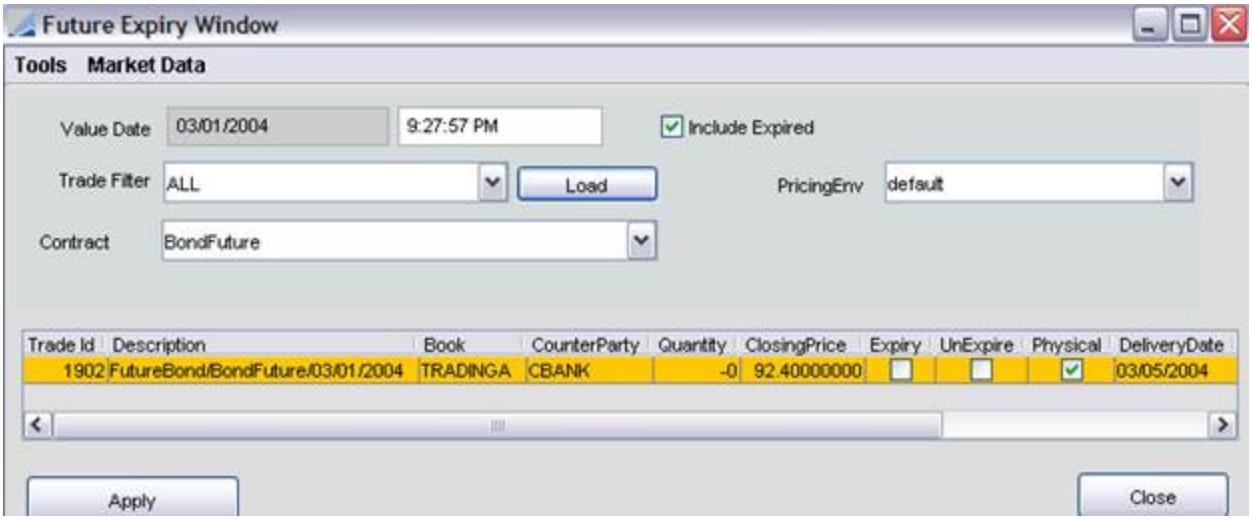
1.1.2 Market Data Menu

The menu items of the Market Data menu are described below.

Menu Items	Description
Pricing Env	To define pricing environments.
Reload	To reload the pricing environment: definition and market data as of the current valuation date and time.

Menu Items	Description
Display	Not applicable.
Check	To check if the required market data are available in the pricing environment.
Quotes	To open the Quote window.

1.2 Undoing an Expiration



To undo an expiration, enter the expiration date in the value date and do the following:

- Check the Include Expired checkbox to load expired trades.
- Select a trade filter, a pricing env and a contract as applicable.
- Then click **Load**.

  The contracts expired on the value date and satisfying the search criteria will be displayed.

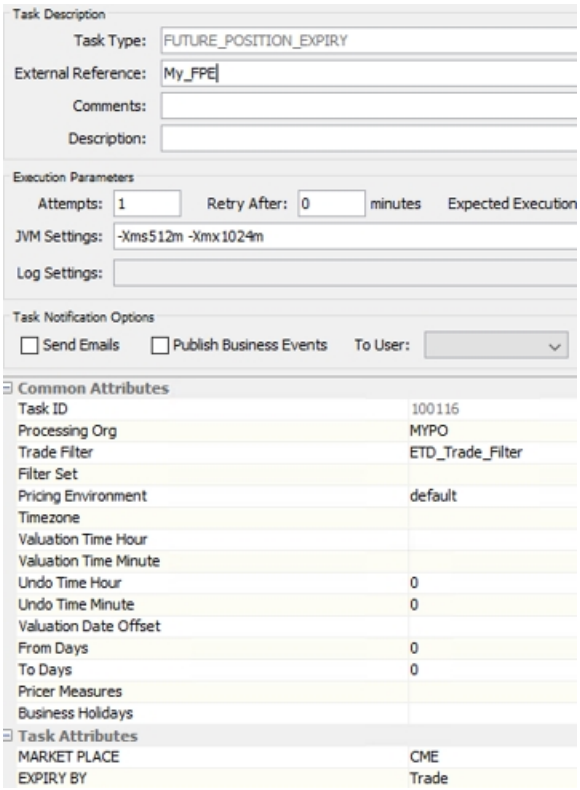
  Check the UnExpire checkbox then click **Apply** to cancel the expiration.

[NOTE: You must have the workflow rule *UnExerciseExpiry* setup to handle this operation for physically settled future contracts. This rule cancels the physical trade created upon Exercise / Expiry when canceling the CloseOut trade. This rule should be set on the CANCEL action of CloseOut future trades (transition VERIFIED - CANCEL - CANCELED)]

1.3 FUTURE_POSITION_EXPIRY Scheduled Task

The FUTURE_POSITION_EXPIRY scheduled task can be used to automatically expire futures.

From the Calypso Navigator, navigate to **Configuration > Scheduled Tasks** (menu action `scheduling.ScheduledTaskListWindow`), and select the FUTURE_POSITION_EXPIRY scheduled task as shown below.



- Select a trade filter, pricing env, and processing org as applicable.

  Note that the pricing env must have the following pricing parameters:

  - INSTANCE_TYPE set to CLOSE
  - NPV_FROM_QUOTE set to true
  - FUTURE_FROM_QUOTE set to true

  You also need closing prices on the execution date.
- Select the market place as needed.
- Select EXPIRY BY:
  - Trade - To generate close out trades by open trade
  - Position - To generate close out trades by position specification
- Then save the scheduled task and execute it as applicable.

  The contracts maturing on the execution date will be expired.

  Close out trades are created. The keyword TerminationType is set to CloseOut, and the keyword LiquidableWith is set to the expired trade id on the close out trades.

An automatic liquidation will be performed between the expired trades and the close out trades.

If the delivery type is physical, a trade is created for the underlying. For a bond future, the cheapest-to-deliver bond is delivered.

2. Listed Options Exercise

Applies to Future Options and ETO Equity Options.

It allows exercising long positions and assigning short positions. You can exercise and assign positions provided they are in-the-money, otherwise the positions expire.

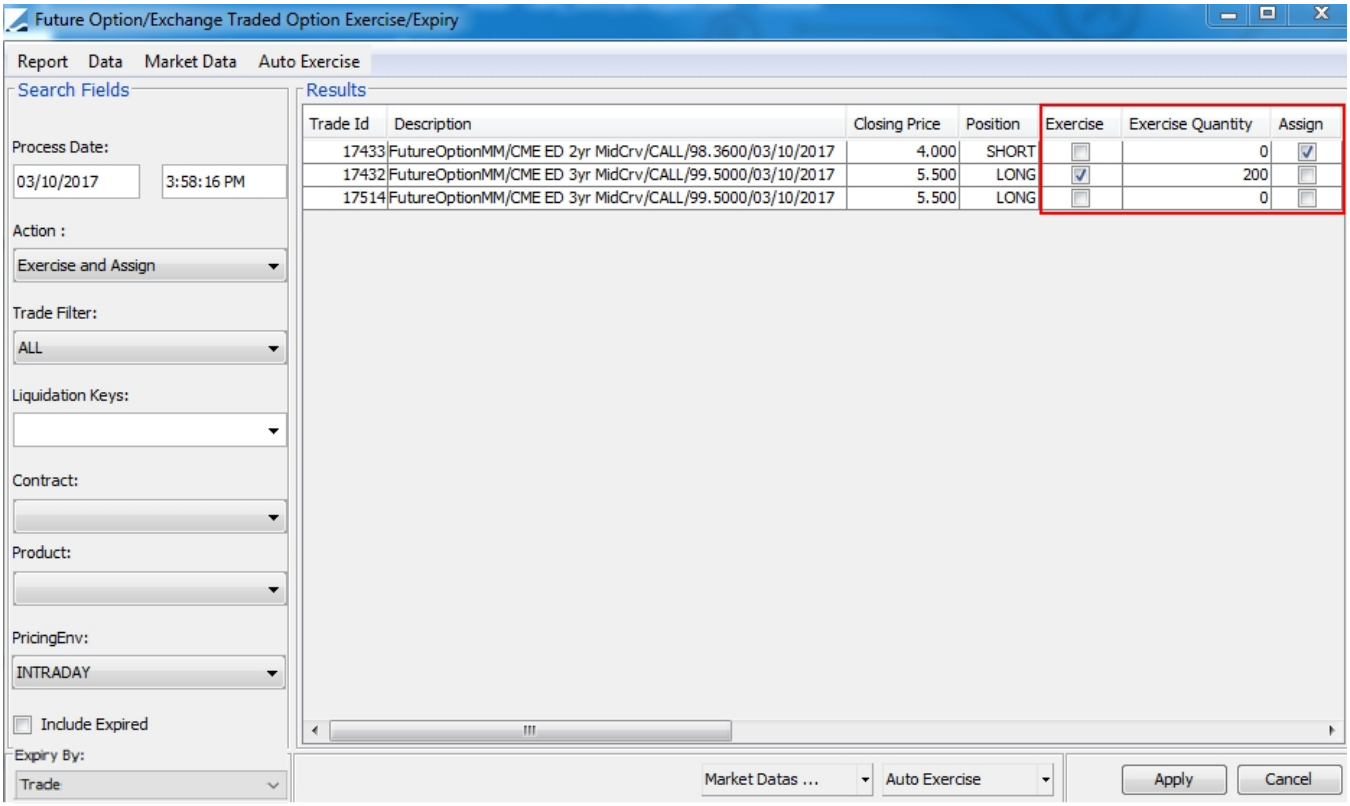
You can also use the scheduled task ETO_EXERCISE.

2.1 Workflow Configuration

Make sure that you set the trade workflow rule CheckETOExercise on the transition PRICING-EXECUTE-PENDING (it is applied when the close-out trade is created).

2.2 Exercise, Assignment and Expiration Process

From the Calypso Navigator, navigate to **Trade Lifecycle > Expiration & Exercise > Fut Option / ETO Exercise** (menu action `reporting.ETOExerciseWindow`) to exercise / assign future options and ETOs as shown below.

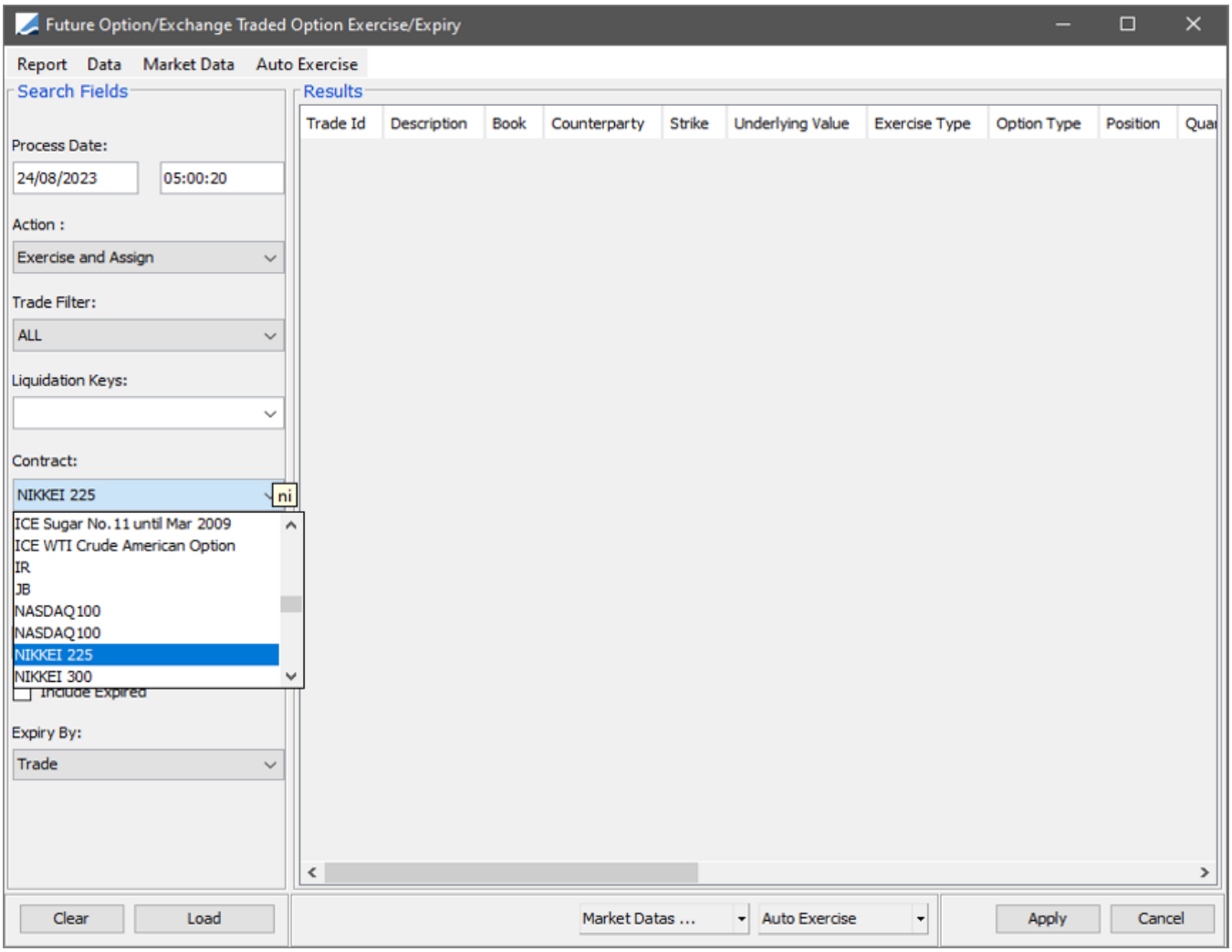


You can configure the display using **Data > Configure Columns**.

- Enter a process date.

  Note that you cannot process options in the future.
- Selection an Action:
  - Exercise and Assign: To load both long and short positions.
  - Exercise: To load long positions only.
  - Assign: To load short positions only.
- Select a trade filter, liquidation keys, a pricing environment as applicable.

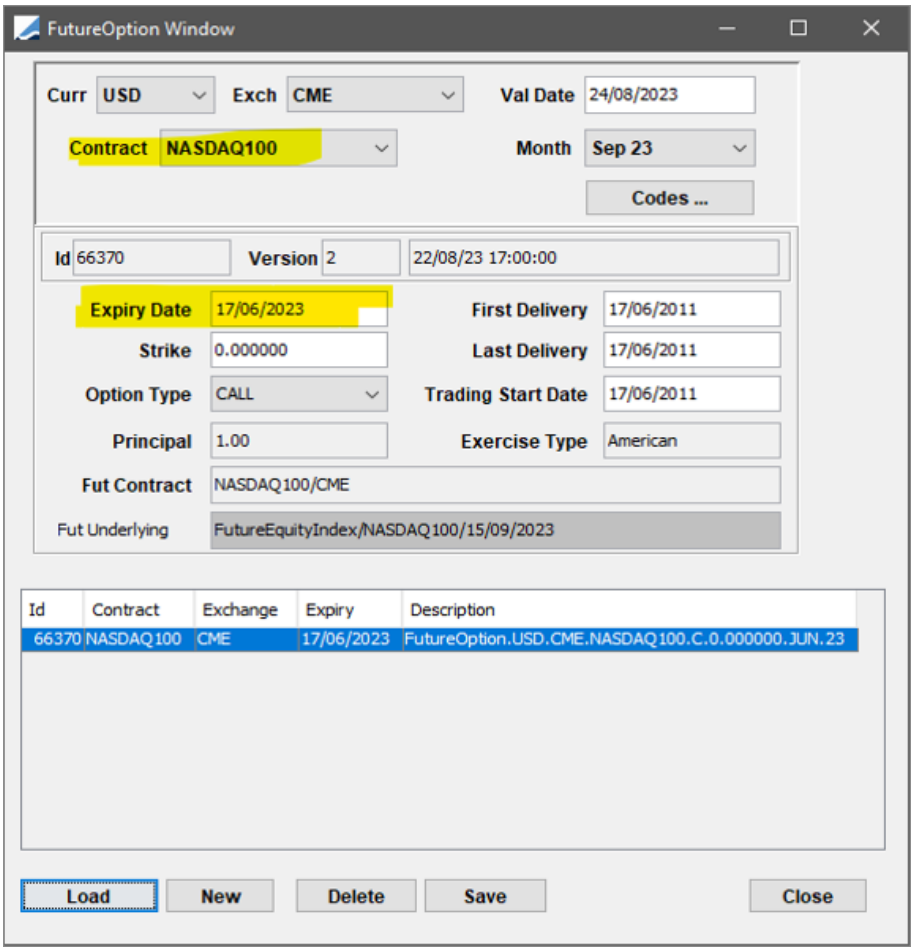
  Note that the pricing env must have the following pricing parameters:
  - INSTANCE_TYPE set to CLOSE
  - NPV_FROM_QUOTE set to true
  - FUTURE_FROM_QUOTE set to true
- In the Contract & Products dropdown, a new Search tool has been implemented.



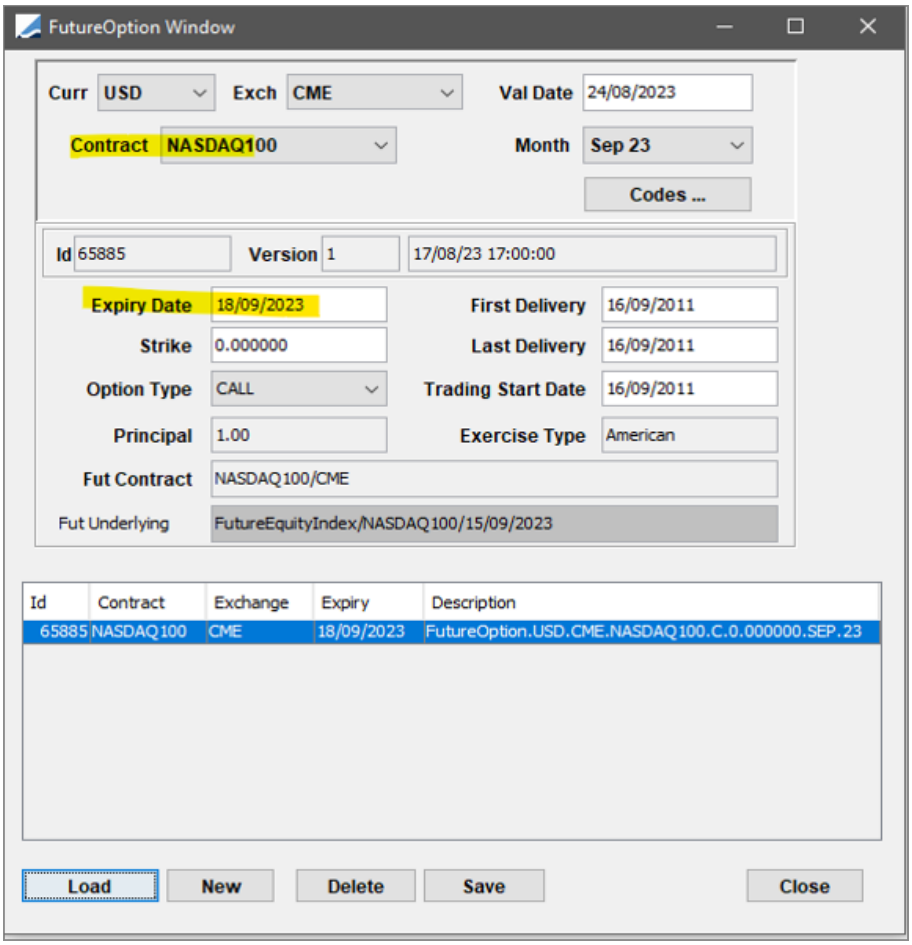
- Contracts appeared when you started typing the word.

» You can also exclude products that have expired from the drop-down list.

Example:

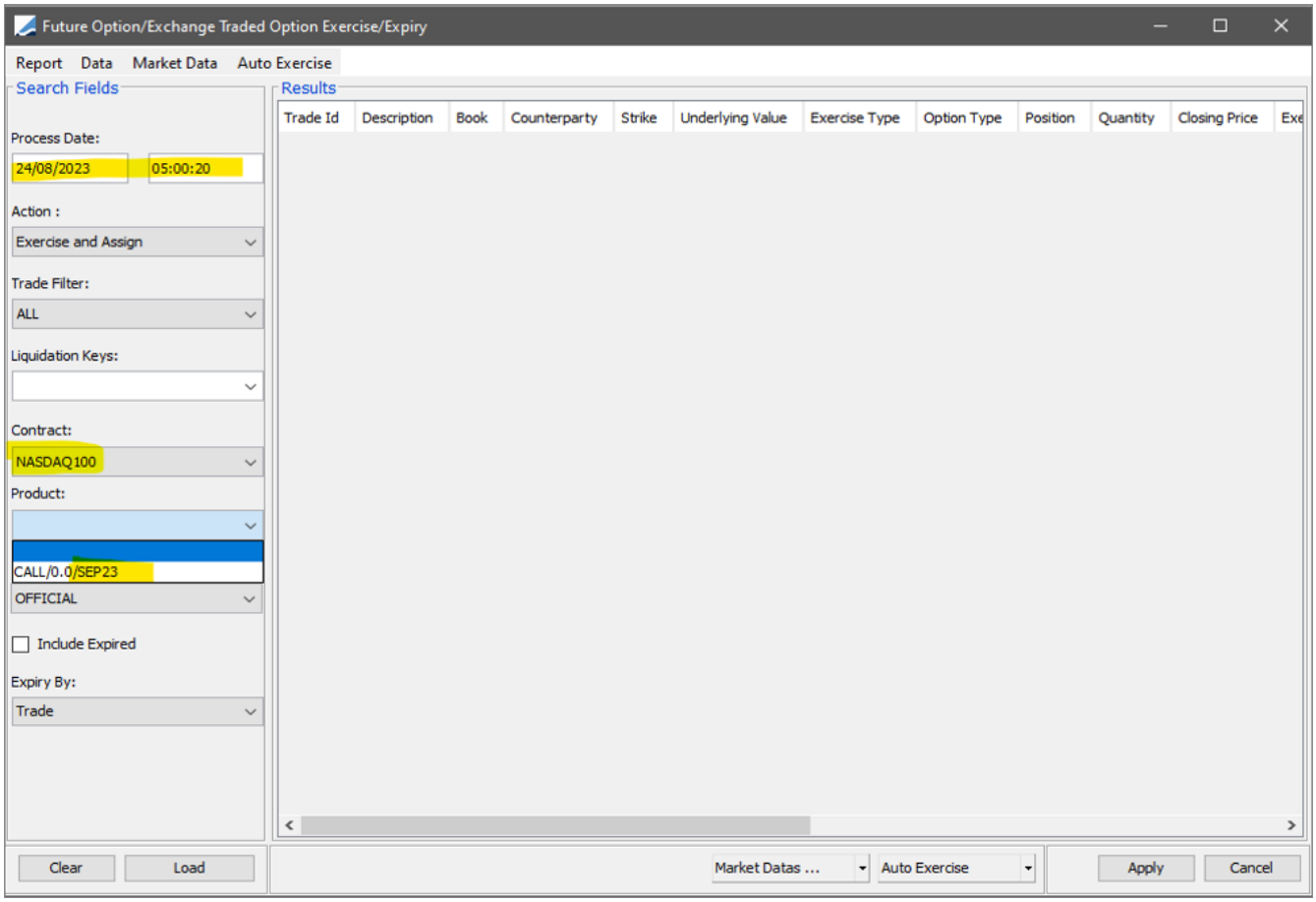


Expires On - June 17, 2023

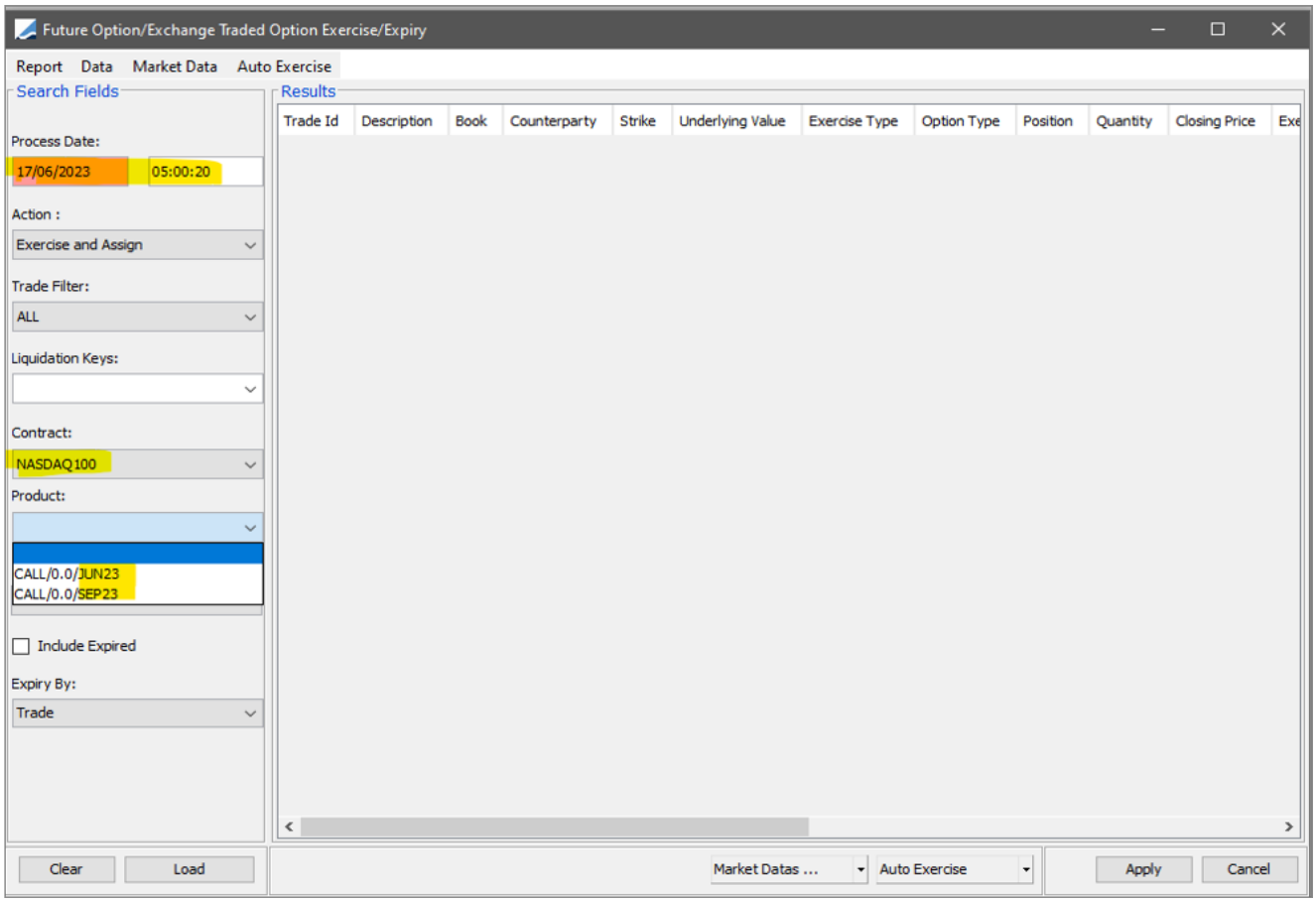


Expires On - Sep 18, 2023

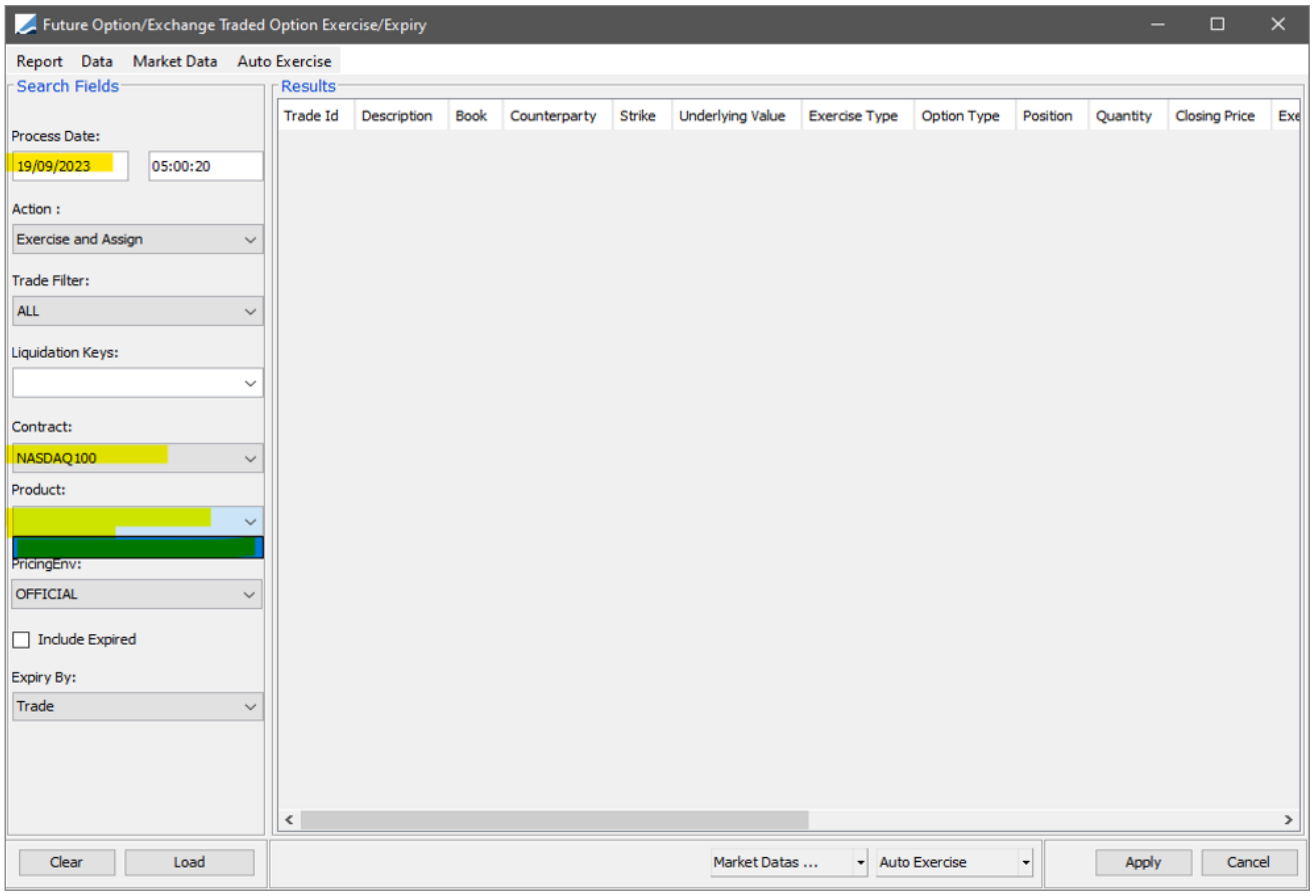
a. When contract NASDAQ100 is selected with process date as Aug 24'2023 only product 2 is displayed.



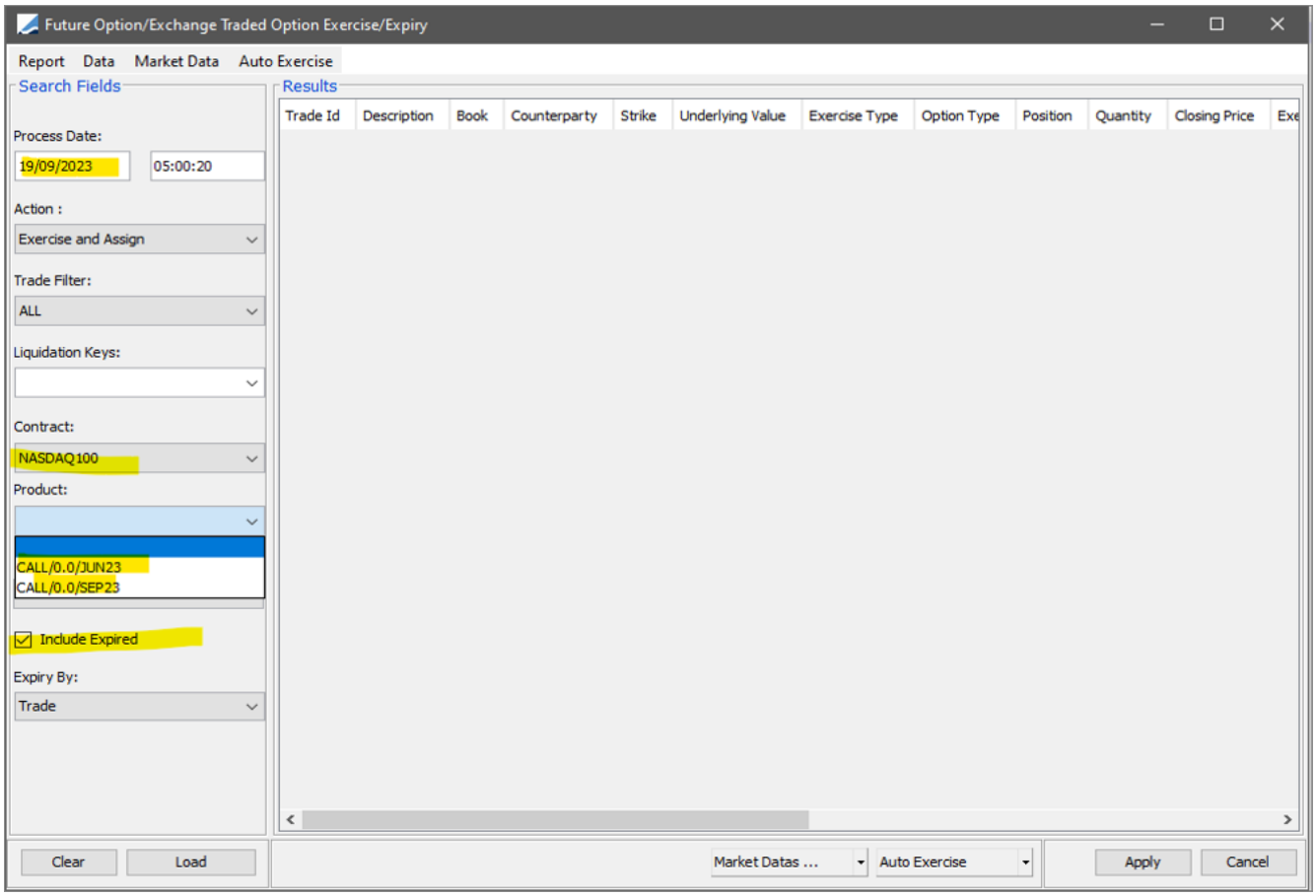
b. When contract NASDAQ100 is selected with process date as Jun 17'2023 both products displayed.



c. No products displayed when process date is Sept 19'2023.



d. All products included when include expired is checked.



You also need closing prices on the process date. Choose **Market Data > Check** to check if the required quotes are available.

For the Physical settlement type, the Exercise process does not require the underlying price except if the Contract Size has a decimal. In this case, the underlying price is required to calculate the OPT_CASH_ADJ transfer amount. An exception is raised into the Task Station. The user can enter the underlying price and reprocess the exception.

For the Cash settlement type, the underlying price is required.

» You can check the Include Expired checkbox if you want to undo an expiration or if you want to view exercised/expired options.

▶ See Undoing an Expiration for details.

» Then click **Load**.

The positions maturing on the process date (for European options), or maturing before the process date (for American options), and satisfying the search criteria will be displayed.

Positions for which the CLOSE quote is not set will appear with a red background.

You can choose Expiry By:

- Trade - To generate close out trades by open trade
- Position - To generate close out trades by position specification

Select the Exercise checkbox, the Expiry checkbox or the Assign checkbox as applicable. The exercise / assign quantity is set to the position quantity by default. You can modify the quantity as needed.

field).

Click **Apply** to exercise, expire or assign the corresponding positions.

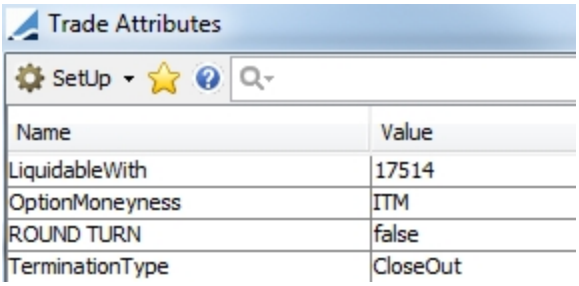
You can check the Internal checkbox to set the Internal trade keyword on the trades. It will be propagated to the CloseOut trades provided it is also added to the domains “keywords2CopyUponExpiry” and “keywords2CopyUponExercise”. You can then setup a static data filter on the Fee Grid to bypass the fee calculation for Internal trades.

» You can also choose auto exercise.

▶ See Auto Exercise Menu for details.

2.2.1 Exercise / Assignment

Close-out trades are created. The keyword TerminationType is set to CloseOut, the keyword LiquidableWith is set to the exercised / assigned trade id and the keyword OptionMoneyness is set to ATM, ITM or OTM as applicable.



An automatic liquidation will be performed between the exercised / assigned trades and the close-out trades.

If the delivery type is physical, a trade is created for the underlying future.

The system generates one "close-out" FutureOption trade per open trade to liquidate only that trade (specified in the *LiquidableWith* trade keyword), only for the selected position (specified in *LiqConfigId* and *PosAggId* trade keywords). If Position Keeping is configured for multiple Liquidation Configurations and/or Liquidation Attributes (Position Aggregations), the Exercise process must be performed for each unique position.

The close out price and exercise fee are computed as describe below:

Close Out Trade Price = Original Price of the Trade which is closed.

Premium Payment Convention	Settlement Type	Premium Transfer	Exercise Fee
Conventional	Cash Settled	No premium transfer.	Intrinsic Value of Option * Quantity * Tick Value * Tick Size
Conventional	Physical	No premium transfer	Amount is set to zero.
Variation Margined	Cash Settled	Premium on the Close Out trade equal to: Trade Price * -1 * Quantity * Tick Value * Tick Size	Trade Price * -1 * Quantity * Tick Value * Tick Size
Variation Margined	Physical	Premium on Close Trade equal to: Price * -1 * Quantity * Tick Value * Tick Size	Amount is set to zero.

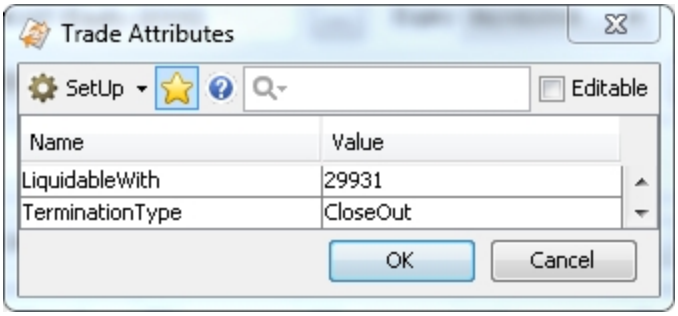
The transfer engine generates REALIZED_PL transfers, provided it subscribes to PSEventLiquidatedPosition, PSEventUnliquidatedPosition and PSEventAggLiquidatedPosition events. The REALIZED_PL transfers are not generated if trade keyword SettlementType = Physical.

▶ Please refer to Calypso Settlements documentation for setup details.

If Expiry By = 'Position', Partial Close Out is performed only when the 'Exercise Quantity'/'Assign Quantity' field values are less than 'Quantity' field value.

2.2.2 Expiration

Close-out trades are created. The keyword TerminationType is set to CloseOut, and the keyword LiquidableWith is set to the expired trade id on the close-out trades as shown below.



An automatic liquidation will be performed between the expired trades and the close-out trades.

2.2.3 Report Menu

The menu items of the Report menu are described below.

Menu Items	Description
New	To clear the window.
Load	To load contracts based on the search criteria.
Refresh	To refresh loaded contracts.
Trade Filter	To define a trade filter.
Close	To close the window.

2.2.4 Data Menu

The menu items of the Data menu are described below.

Menu Items	Description
Configure Columns	To customize the display columns of the results.
Reset Default Column Configuration	To reset the column configuration to the default configuration.
Save Configure Columns	To save the customized column configuration.

2.2.5 Market Data Menu

The menu items of the Market Data menu are described below. Refer to the *Calypso Market Data User Guide* for details on these menu items.

Menu Items	Description
Pricing Env	To define pricing environments.
Reload	To reload the pricing environment: definition and market data as of the current valuation date and time.
Display	To display the market data used by the contracts currently loaded.
Check	To check if the required market data are available in the selected pricing environment.
Quotes	To open the Quote window.

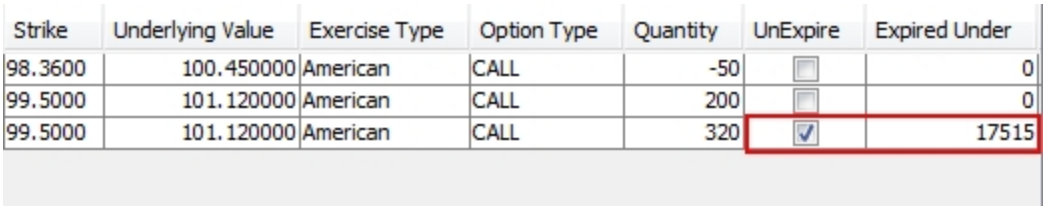
2.2.6 Auto Exercise Menu

The menu items of the Auto Exercise menu are described below.

Menu Items	Description
All	Sets Assign & Exercise fields for both long and short, in-the-money trades. Sets Expiry fields for both long and short, out-of-the-money trades on the expiry date.

Menu Items	Description
Exercise	Sets Exercise fields for long, in-the-money trades only.
Assign	You can choose the following options: • All - Sets Assign fields for short, in-the-money trades only. • Random - This only applies if you have select a product in the search criteria. You will be prompted to enter a quantity to assign. The system will use the Eurex random algorithm to set the assign quantity on the loaded positions. • Pro Rata - This only applies if you have selected a product in the search criteria. You will be prompted to enter a quantity to assign. The system will prorate the assign quantity on the loaded positions. You can associated a contract with an assignment method using the contract attribute AssignmentMethod: Random or Pro Rata. In this case, you can only use the corresponding assignment method.
Expiry	Sets Expiry fields for both long and short, out-of-the-money trades on the expiry date.

2.3 Undoing an Expiration



Strike	Underlying Value	Exercise Type	Option Type	Quantity	UnExpire	Expired Under
98.3600	100.450000	American	CALL	-50	☐	0
99.5000	101.120000	American	CALL	200	☐	0
99.5000	101.120000	American	CALL	320	☑	17515

To undo an expiration, enter the expiration date in the process date and do the following:

» Check the “Include Expired” checkbox to load expired trades.

» Select a trade filter, liquidation keys, a pricing env a contract and a product as applicable.

» Then click **Load**.

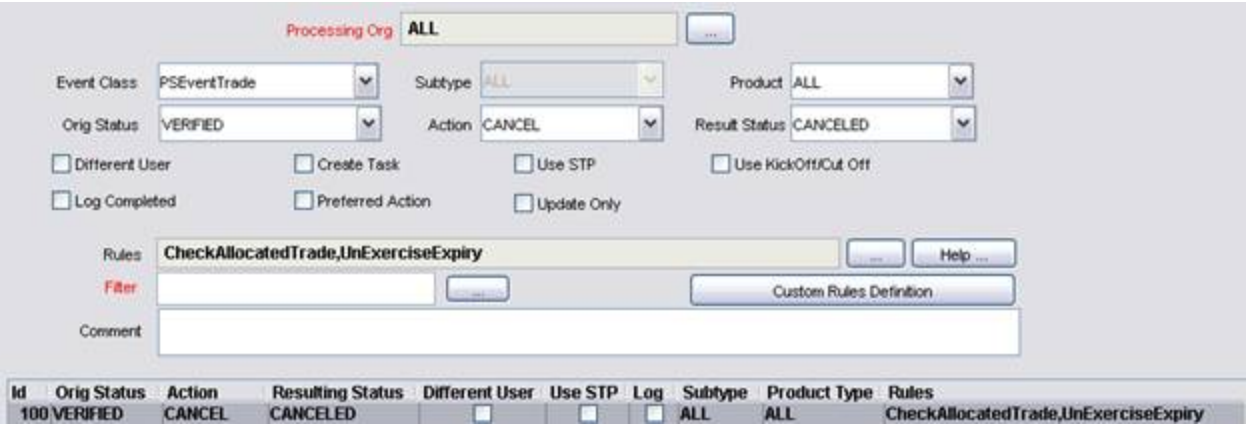
The contracts expired and exercised / assigned on the process date, and satisfying the search criteria, will be displayed.

Check the UnExpire checkbox then click **Apply** to cancel the expiration.

2.4 Undoing an Exercise

To undo an exercise, you need to apply the CANCEL action on the close-out trade.

The underlying delivery trade, if any, will be canceled as well, provided the UnExerciseExpiry trade rule is placed on the CANCEL transitions in the trade workflow as shown below.



2.5 Viewing Expiration and Exercise History

Choose **Back Office > Exercise/Expiry History** to view exercised and expired trades related to trade currently loaded.

- You can choose **Utilities > Configure Columns** to customize the display.
- Click **Close** when you are done.

2.6 Exercise / Assignment Import from Broker

For firms that use an external broker to clear their ETD business. The broker can provide a file of Exercises & Assignments which have taken place on the firm's accounts and the firm now needs to process these on their own ETD clearing back office system for their own clients.

The broker file is an XML file that can be imported using the scheduled task CLEARING_BROKER_FILE_UPLOAD.

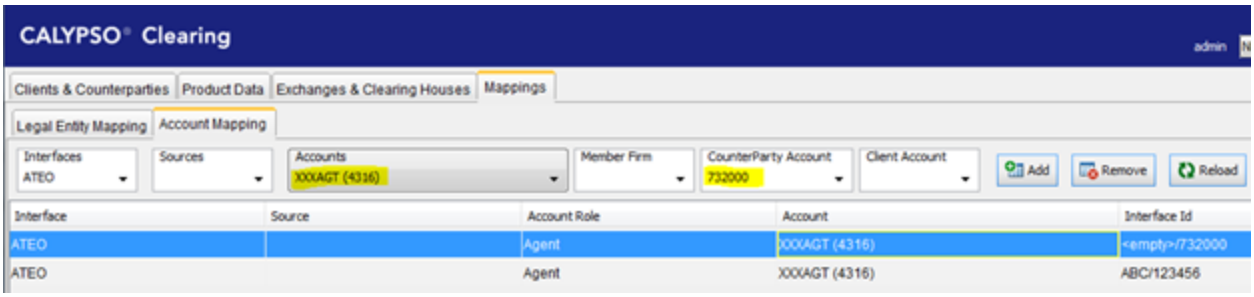
2.6.1 Setup Requirement

You need to set the account attribute "AssignmentMethod" on the Counterparty Accounts to the assignment algorythm: RANDOM or PRORATA. Default is RANDOM if not set.

2.6.2 Mapping Requirements

The Account name on the broker file needs to map to the respective CounterParty Account within Calypso. The process will look for open positions under this CounterParty Account to exercise or assign, and then Client_Ref if defined.

From the Account Dashboard, navigate to the Mappings - Account Mapping panel.

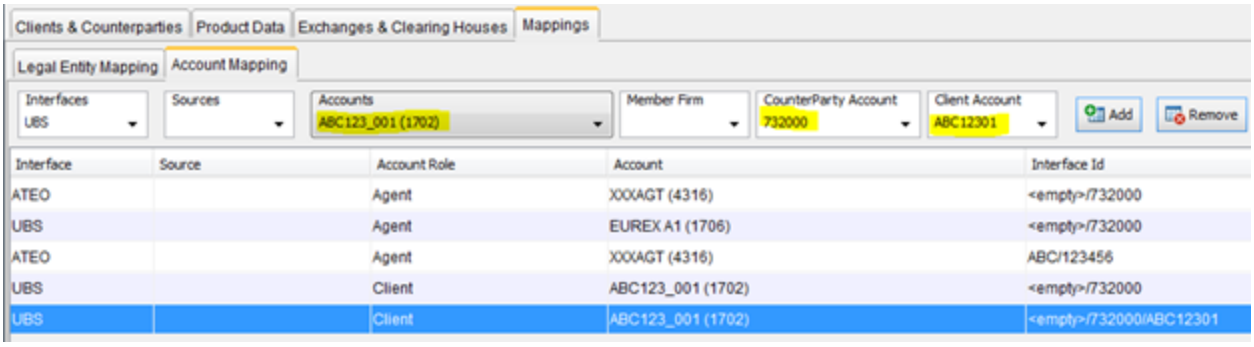


- Select the Interface that will be used under Interfaces.
- Select the Calypso Counterparty Account that the Account name on the file will map to under Accounts.
- Type in the Account name at the broker in the CounterParty Account field, and click **Add**.

Client_Ref Mapping

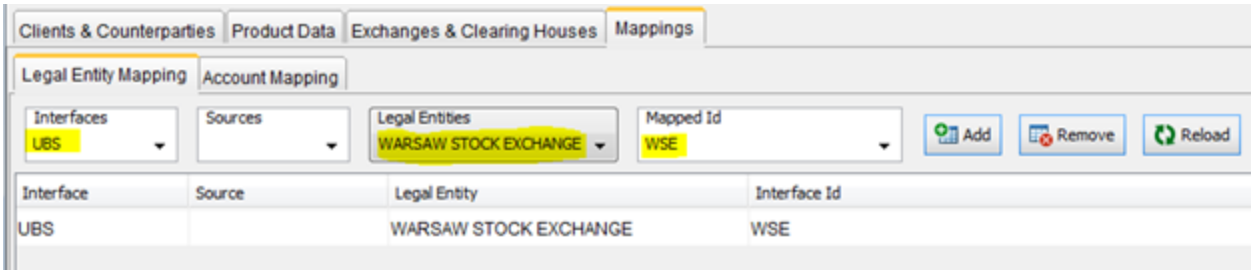
You may need a Client_Ref mapping which will require both the CounterParty & Client Account code from the broker to be mapped to the Calypso client account.

This will be mapped in the same way as above. In the following example, CounterParty 732000 & Client Account map to Calypso account ABC123_001.



Market Mapping

You may also need mapping for the Market code. This is mapped under the Legal Entity Mapping panel.



- Select the Interface and Legal Entity.
- Enter the market code in the Mapped Id field, and click **Add**.

2.6.3 File Format

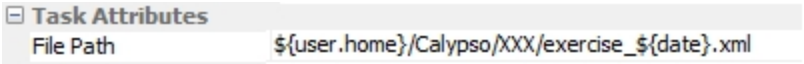
Key fields:

Field Name	Description	Mandatory / Optional	Sample data	Mapping Required	Notes
Transaction Type	EXER = Exercise ASSN = Assignment	M	ASSN	No	
Run Date	yyyymmdd format.	M	20161007	No	Process date in Calypso
Trade Date	yyyymmdd format.	O	20161006	No	
Account	Account name at the broker (omnibus account). Maps to counterparty account name in Calypso .	M	732000	Yes – Acct Mapping Table, Source=XXX	XXX provide 732000, maps to Calypso Counterparty acct = XXXAGT
Client_Ref	Client account name. Maps to client account name in Calypso.	O	EW3063	Yes – Acct Mapping Table, Source=XXX	Brokers may choose to provide this, or not
Market	Exchange of the contract.	M	OCC	Yes	
Product	Contract code mapped to the ClearingExchangeTicker	M	AEO	Yes	
Prompt_ Date	Prompt Month/Day in format yyyymmdd. For Monthly the last day of the month is provided e.g. Oct 2016 is 20161031.	M		No	
Trade_Type	F (Futures), P (Puts), C (Calls).	M	P	No	

Field Name	Description	Mandatory / Optional	Sample data	Mapping Required	Notes
Strike_Price	Option product strike	M	15.790000	No	
Product_ Series	Series Version Number	O	0	No	
Call / Put	Put, Call	M	P	Yes	P=Put C=Call
Contracts	Number of lots to exercise or assigned.	M	19.000000	No	

2.6.4 Import

Configure the scheduled task CLEARING_BROKER_FILE_UPLOAD to import the file.



- File Path - You can enter a folder and file name format in the File Path field. The file name needs to match the folder and file name format, in particular the valuation date must be the same as the {data} variable.

3. OTC Option Exercise

The Option Exercise window allows exercising or expiring options manually.

From the Calypso Navigator, navigate to **Trade Lifecycle > Expiration & Exercise > Option Exercise**, or choose **Back Office > Exercise** from the trade window.

You can also run the Option Lifecycle analysis and the OPTION_EXERCISE scheduled task.

[NOTE: Future Options and ETOs are exercised and expired under Trade Lifecycle > Expiration & Exercise > Future Option / ETO Exercise]

Contents

3.1 Setup Requirements

3.1.1 Workflow Setup

Make sure that your trade workflow has the following transitions to exercise/expire and un-exercise/un-expire options.

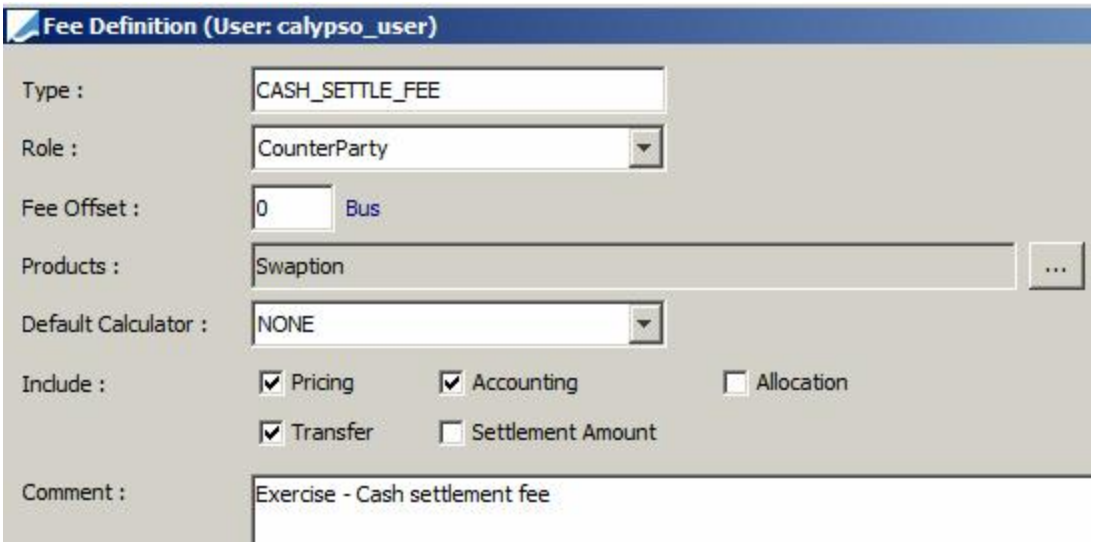
- VERIFIED - EXERCISE - EXERCISED
- EXERCISED - UNEXERCISE - VERIFIED, workflow rule: UnexerciseOption
- VERIFIED - EXPIRE - EXPIRED
- EXPIRED - UNEXPIRE - VERIFIED, workflow rule: UnexerciseOption

For partial exercise, a trade is created with the residual un-exercised amount. If you add the workflow rule CancelRemainderOfPartialExercise on the VERIFIED - EXERCISE - EXERCISED transition, the trade for the residual amount will be in status CANCELED, otherwise it will be in status VERIFIED.

3.1.2 CASH_SETTLE_FEE

You can compute the fee CASH_SETTLE_FEE for cash settled swaptions. It corresponds to the settlement amount upon exercise.

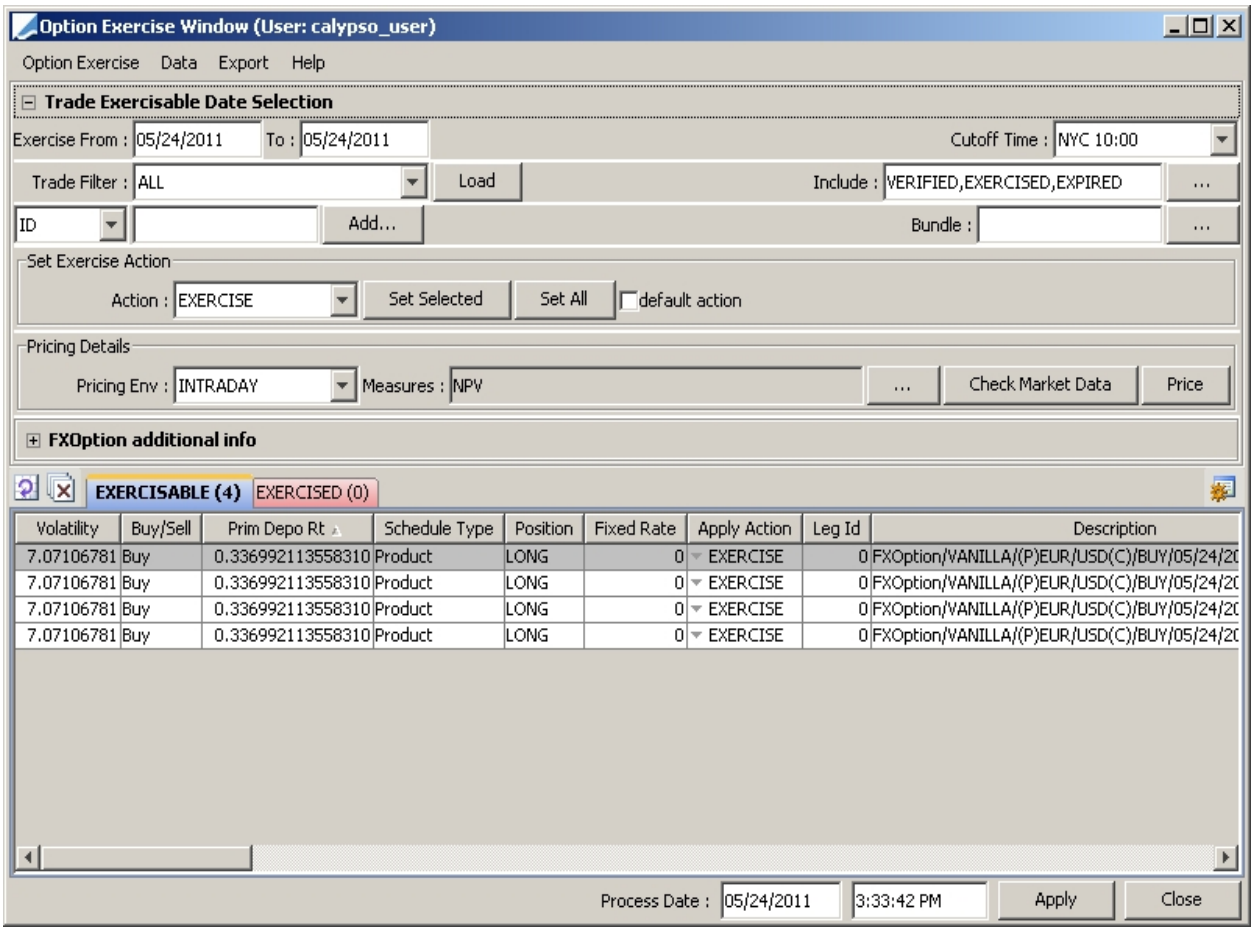
Define the fee as follows:



Sample fee:

Type	Date	Start Date	End Date	Currency	Amount
EXERCISE_FEE	07/14/2011	07/14/2011	07/14/2011	USD	565
CASH_SETTLE_FEE	07/14/2011	07/14/2011	07/14/2011	USD	6,444.488

3.2 Exercising Options



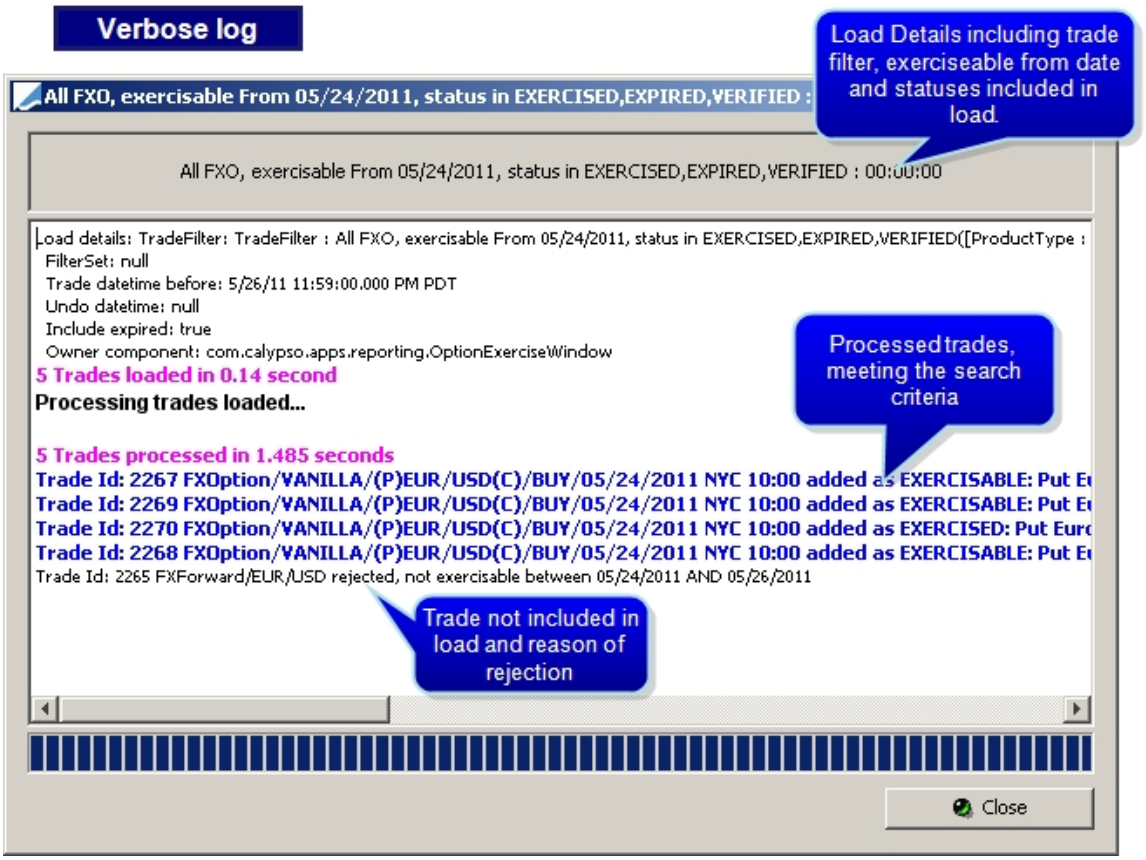
Option Exercise window

The EXERCISABLE panel displays the options that may be exercised or expired.

The EXERCISED panel displays the options that have been exercised or expired. Options may be un-exercised or un-expired from this panel.

Step 1 - Enter search criteria as needed and click **Load** to load the corresponding options. The search criteria are described below.

When loading the options, a log file displays during the load. After the options are loaded, you are able to view this log file by selecting **Option Exercise > Show Log Progress**. If you would like to see a more detailed log, select the toggle **Verbose Log Progress** under the Option Exercise menu. This must be selected prior to loading if you wish to view the detailed log.



You can double-click an option to view its details.

You can configure the display using **Data > Configure Columns** or click  .

Search Criteria

Fields	Description
Exercise From / To	Enter the exercise date range for loading the exercisable options. The default dates are today.
Process Date / Time	Specifies the date and time that you are processing the options. Defaults to the current date and time. The system uses the process date and time as the trade date and time for physically settled options.
Cutoff Time	Optional. For FX Options, you can select a expiry to use as the cutoff time. All options that are less than or equal to the selected time, or only equal to the selected time will be loaded in the Option Exercise Window. The default value is not to use a cutoff time.

Fields	Description
Include	Options with these workflow statuses will be loaded in the Option Exercise Window. Click **...** to remove statuses from the list or add statuses to the list. Statuses listed in the right panel in the pop-up window are included in the criteria. The statuses are tied to the workflow. See the Workflow Configuration.
Trade Filter	Select a trade filter to use when loading the options. Only options included in the trade filter will be loaded.
ID	You can load a specific trade by entering the trade id in this field and pressing [Enter]. You can also load a specific trade by the external or internal reference. Select Ext Ref or Int Ref, respectively, from the drop-down menu. Enter the reference in the adjacent field and press [Enter] to load the trade. You can click **Add** to load multiple trades according to the attributes defined in the Trade Selector Window.
Bundle	You can load trades that belong to the same trade bundle. Click **...** to select a trade bundle for loading the corresponding trades.

Step 2 - Complete the details of any required fields in the options. For example, for cash-settled options, you can enter the Settlement Rate.

Product-specific details are described below.

Step 3 - Select the pricer measures you want to compute, a pricing environment and click **Check Market Data** to check that all required market data are available.

Then click **Price** to price the options.

For cash-settled options, the application calculates the settlement amount.

The application displays the pricing results in the pricer measure columns.

Step 4 - Select the action to be applied upon exercise as needed.

The actions are tied to the trade workflow.

You can click **Set Selected** to set the action on the trades selected in the option table, or click **Set All** to set the action on all of the trades displayed in the option table.

You can also check "default action" to apply the the first compatible action in the workflow.

For swaptions, the default action is EXERCISE if the option is in-the-money, (e.g. the market rate is greater than the strike price in the case of calls), or the expiry action from domain "*tradeExpiryAction*" otherwise.

Step 5 - Select an FX Reset for FX Options as needed.

Fields	Description
FX Reset	To use the FX reset: » Select the currency pair from the drop-down menu. » Select the FX reset from the adjacent drop-down menu. » Select the option row(s) in the EXERCISE panel. » Click **Set Opt Info** to use the FX reset quote on the selected options.
Auto Exercise	Use this feature to flag options for automatic exercise. The AUTOMATIC_EXERCISE scheduled task automatically exercises in-the-money options. The scheduled task does not support Bermudan or American Swaptions. » Select the Auto Exercise checkbox. » Select the option(s) to flag for automatic exercise. » Click **Set Opt Info**. The application sets the "Auto Exercise" checkbox on the selected options(s).

Step 6 - Select the options that you would like to exercise/expire and click **Apply**.

For cash settlement exercise, an exercise fee is attached to the option trade, and the trade moves to status EXERCISED.

For physical exercise, a trade is created for the underlying product, and the option trade moves to status EXERCISED.

- The ExercisedUnder trade keyword is set on the option trade. It contains the trade id of the trade generated for the underlying product.
- The ExercisedOption trade keyword is set on the trade generated for the underlying product. t contains the trade id of the option trade.

For expiration, the trade moves to EXPIRED.

The trade keyword ExercisedAmount contains the partial amount entered upon partial exercise. For full exercise, it contains the exercised quantity for quantity-based trades or the exercised notional otherwise.

Mode details are provided by product type below.

3.2.1 Commodity Options Exercise

The Option Exercise window should only be used to excise physically-settled commodity options.

For cash-settled commodity options, which are cashflow based, you need to use the Price Fixing function. It will fix the cashflows and create the necessary transfers to affect payment.

The following table describes product-specific details for exercising Commodity Options.

Option Type	Description
Commodity OTC	Select the Settlement type Physical.

Option Type	Description
Option 2	***Physical Settlement*** The application automatically selects the Create Underlying checkbox when you select the Physical Settlement type. The exercise generates the Commodity Forward trade. • The ExercisedUnder trade keyword attaches to the Commodity OTC Option 2 trade. It contains the trade id of the generated Commodity Forward trade. • The ExercisedOption trade keyword attaches to the Commodity Forward trade. It contains the trade id of the exercised Commodity OTC Option 2 trade. The Commodity Forward has the following details: Quantity = option deal quantity. Price = option strike price. Units = option deal units. Payment Currency = option deal currency. Settle Date = delivery date = CO2 final payment maturity date. Trade Date = option 'Exercise' date. Commodity = underlying commodity of the option commodity reset. Forward Price Method = option forward price method. Fixing Holidays = option fixing holidays. Payment Details = option payment details. Buy if the option is Buy-Call or Sell-Put. Sell if option is Buy-Put or Sell-Call.

3.2.2 Equity Derivatives Barrier Processing

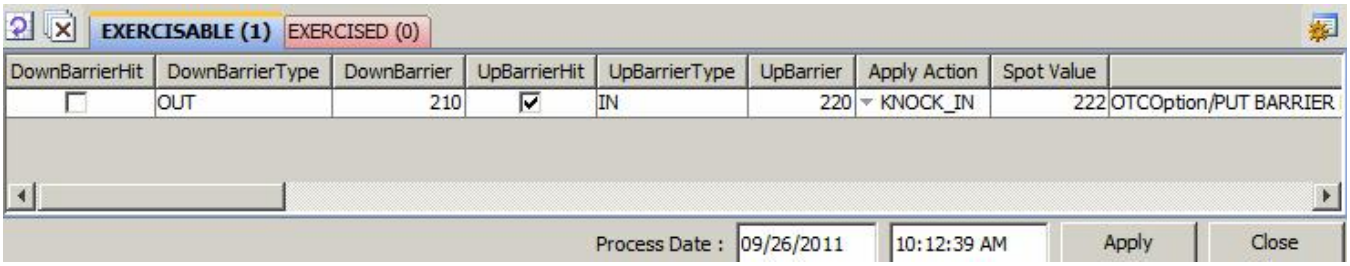
The process to knock-in / knock out equity derivatives barriers is a manual process.

You can use the Option Exercise window or the Option Lifecycle analysis to process barriers.

Once the options are loaded in the Option Exercise window, the checkboxes Up Barrier Hit or Down Barrier Hit are checked based on the underlying's monitoring quotes.

[NOTE: Make sure that the proper monitoring quotes are set based on the Monitoring type of the barrier]

Depending on the type of option (In or Out), you can knock-in / knock-out the barrier by applying the corresponding action.



Option Exercise Window - Sample Knock-in

- Select the applicable action.
- For a KI option, **Create Underlying** must be checked as well.
- Then click **Apply**.

  Exercise / expiration activity can be performed after processing the barriers, as applicable.

Available Actions

Action	Description
Knock In (KI)	Knocking in a barrier whose in barrier has been breached will create a new vanilla option or a KO barrier (if KIKO Type B). This action can be done on any date within the barrier window.
Knock-In (KIKO)	Knocking in a barrier whose KI barrier has been breached will create a new Vanilla option (KIKO type A). This action can be done on any date within the barrier window.
Knock Out (KO)	Knocking out a barrier whose out barrier has been breached will terminate the option. This action can be done on any date within the barrier window.
Knock-Out (KIKO)	Knocking out a barrier whose KO barrier has been breached will terminate the option. This action can be done on any date within the barrier window.
Exercise (KO)	Exercising a barrier option whose knock-out barrier has not been breached will create the appropriate payoff. This action can be done only after expiration time. Knock In barriers will have been knocked-in to a Vanilla; therefore KI exercise is not valid.
Expire (KI, KIKO)	Expiring a barrier option whose KI barrier has not been breached or a barrier option whose KO barrier has not been breached will terminate the option and generate a rebate fee. This action can only be done after expiration time.

Recommended Workflow Setup

Origin Status	Action	Resulting Status	Rule	Comments
KNOCKED_IN	UN-KNOCK_IN	VERIFIED	UnexerciseOption	Trade undo knock in.
KNOCKED_IN	UNEXERCISE	VERIFIED	UnexerciseOption	
KNOCKED_OUT	UN-KNOCK_OUT	VERIFIED	UnexerciseOption	Trade undo knock out.

Origin Status	Action	Resulting Status	Rule	Comments
KNOCKED_OUT	UNEXERCISE	VERIFIED	UnexerciseOption	
VERIFIED	KNOCK_IN	KNOCKED_IN		
VERIFIED	KNOCK_OUT	KNOCKED_OUT		

Processing Results

- The status of the trade on which the action is performed will be changed to the status associated with the action in the workflow.
- A fee corresponding to the rebate is generated:
  - When a KO barrier is hit.
  - When a KI trade is expired without having been knocked-in.
- For KI options, a trade is generated that has the same characteristics as the parent trade, expect it has no KI barrier, and the effective date of the trade equal to the event process date. All other trade attributes on the generated trades are the same as those on the parent trade:
  - Notional / Quantity
  - Underlying
  - Maturity
  - Strike
  - etc.
- In addition, trade Termination keywords are populated on both the parent and child trades.
  - On the parent trade:

TerminationDate	Event Process Date
TerminationPayIntFlow	true
TerminationTradeDate	Event Process Date and time
TerminationType	UpBarrierOUT / DownBarrierOUT / UpBarrierIN / DownBarrierIn

  - On the child trade:

ExercisedOption	Parent Trade_ID
TransferDate	Parent Trade Maturity Date
TransferFrom	Parent Trade_ID
TransferTradeDate	Parent Trade Maturity Date and Time

3.2.3 FX Options Exercise

[NOTE: The 5PM New York Rule impacts the processing of FX Options in the Option Exercise Window. The close of business for the trading day is 4:59:59 pm New York time when the book attribute DayChangeRule is set to FX. The new trading day starts at 5PM New York time]

The following table describes product-specific details for exercising FX Options.

Option Type	Description
Vanilla	Select the Settlement type Cash or Physical. The default value is the settlement type selected in the Vanilla option. ***Cash Settlement*** The quote set associated with the selected Pricing Environment requires the Spot Value. Click **Price** to calculate the Settlement Amt, which is the amount for the exercise fee. Also, you can manually enter the fee in the Settlement Amt column. Following are examples of the settlement amount calculation. Call on the primary currency: Settlement Amt in Secondary Currency = (Spot Value – Strike) * Primary Amount Put on the primary currency: Settlement Amt in Secondary Currency = (Strike – Spot Value) * Primary Amount The exercise fee attaches to the FX Option trade. ***Physical Settlement*** The application automatically selects the "Create Underlying" checkbox when you select the Physical Settlement type. The exercise generates the FX trade. • The ExercisedUnder trade keyword attaches to the Vanilla option. It contains the trade id of the generated FX trade. • The ExercisedOption trade keyword attaches to the FX trade. It contains the trade id of the exercised Vanilla option.
Asian	***Cash Settlement*** The Settlement type is Cash. The exercise fee attaches to the trade. • AVERAGE RATE — The system calculates the average of all the fixings and compares it with the strike. The Spot Value is the average of the fixings. The Settlement Amt is the difference between the Spot Value and Strike multiplied by the Primary Amount in the FX Option trade. • AVERAGE STRIKE — The system calculates the strike from the average of all the fixings. The Strike is the average of the fixings. The Settlement Amt is the difference between

Option Type	Description
	the Spot Value and Strike multiplied by the Primary Amount in the FX Option trade. • GEOM AVERAGE RATE — The system calculates the geometric average of all the fixings and compares it with the strike. The Spot Value is the geometric average of the fixings. The Settlement Amt is the difference between the Spot Value and Strike multiplied by the Primary Amount in the FX Option trade. • GEOM AVERAGE STRIKE — The system calculates the Strike from the geometric average of all the fixings. The Settlement Amt is the difference between the Spot Value and Strike multiplied by the Primary Amount in the FX Option trade.
Barrier	The following columns in the exercise window are related to Barrier options: • HasBarrier — The system automatically selects this checkbox when the option has a defined trigger or barrier. • UpBarrier — Specifies the strike for the up barrier if that barrier is defined. • UpBarrierType — IN or OUT • DownBarrier — Specifies the strike for the down barrier if that barrier is defined. • DownBarrierType — IN or OUT • UpBarrierHit — The system automatically selects this checkbox if the spot rate hit the barrier. However, you can manually clear or select this checkbox. • DownBarrierHit — The system automatically selects this checkbox if the spot rate hit the barrier. However, you can manually clear or select this checkbox. ***Physical Settlement*** The application automatically selects the "Create Underlying" checkbox when you select the Physical Settlement type. The exercise generates the FX trade. • The Termination trade keywords attach to the Barrier option. • The TransferTo trade keyword attaches to the Barrier option. It contains the trade id of the generated trade. • The TransferFrom trade keyword attaches to the generated trade. It contains the trade id of the Barrier option. ***Cash / Physical Settlement*** The rebate fee, if applicable, attaches to the exercised Barrier option.
Digital	***Cash Settlement*** The Settlement type is Cash. The Settlement Amt column displays the payout. The exercise fee attaches to the trade.

Option Type	Description
	The following columns in the exercise window are related to Digital options: • HasBarrier — the system automatically selects this checkbox when the option has a defined trigger or barrier. • UpBarrier — specifies the strike for the up barrier if that barrier is defined. • UpBarrierType — IN or OUT • DownBarrier — specifies the strike for the down barrier if that barrier is defined. • DownBarrierType — IN or OUT • UpBarrierHit — the system automatically selects this checkbox if the spot rate hit the barrier. However, you can manually clear or select this checkbox. • DownBarrierHit — the system automatically selects this checkbox if the spot rate hit the barrier. However, you can manually clear or select this checkbox.
Lookback Fixed Strike	***Cash Settlement*** The system calculates the payout based on the difference between the strike set in the option and either the minimum or maximum rate fixed on the reset schedule. Following are examples of the calculations. Call on the primary currency: Settlement Amt in Secondary Currency = (Maximum Rate – Strike) * Primary Amount Put on the primary currency: Settlement Amt in Secondary Currency = (Strike – Minimum Rate) * Primary Amount
Lookback Floating Strike	***Cash Settlement*** The system calculates the payout based on the difference between the floating strike (either the minimum or maximum rate fixed on the reset schedule) and the spot rate from the FX reset index. Following are examples of the calculations. Call on the primary currency: Settlement Amt in Secondary Currency = (Spot – Minimum Rate) * Primary Amount Put on the primary currency: Settlement Amt in Secondary Currency = (Maximum Rate – Spot) * Primary Amount ***Physical Settlement*** The application automatically selects the "Create Underlying" checkbox when you select the Physical Settlement type. The following examples show how the system derives the spot rate for the generated FX trade. Call on the primary currency: Spot rate on the FX trade is the Minimum Rate fixed on the reset schedule.

Option Type	Description
	Put on the primary currency: Spot rate on the FX trade is the Maximum Rate fixed on the reset schedule. The exercise generates the FX trade. • The ExercisedUnder trade keyword attaches to the Lookback option. It contains the trade id of the generated FX trade. • The ExercisedOption trade keyword attaches to the FX trade. It contains the trade id of the exercised Lookback option.
Range Accrual	***Cash Settlement*** The application automatically calculates the Settlement Amt using the number of fixing dates whose rates meet the range accrual conditions. For example, if there are 4 fixing dates, the PayOut is 4M USD, and the rate on the fixing dates is within the range on 3 of the fixing dates, then the Settlement Amt is 3M USD. The exercise fee attaches to the trade.
Volatility Forward	***Cash Settlement*** Enter the agreed upon Volatility. By default, the Volatility column displays the volatility from the FX volatility surface. The exercise generates the premium fee, which attaches to the trade. Premium = Notional * Vega * (Fixed Volatility on trade date – agreed Volatility on exercise date)

3.2.4 Cancellable Swaps

Following table describes the fields available in Option Exercise Window for Cancellable Swaps.

Fields	Description
Do Interest Cleanup	• It generates a transfer to payout the accrued interest as of the Delivery date. • Check to perform interest cleanup upon exercise. • If the domain value for exerciseDoInterestCleanUp is set to 'True'or blank, the field will be checked by default and if the domain value for exerciseDoInterestCleanUp is set to 'False', the field will be unchecked by default.

Pmt Lag on Int Clean-Up	This field will provide users with the ability to use Pmt Lag of the swap leg to be applied on Pmt Dt of Interest Clean-up cashflow. It will only have an impact when Interest Clean-up is checked (i.e. set to TRUE). When the trade is exercised with Interest Clean-up set to true and the flag (on Pmt Lag) is checked, Pmt Date of interest clean up transfer = Delivery Date + Pmt Lag of the Swap Leg. The transfer settles on this Pmt Date. When the trade is exercised with Interest Clean-up set to true and the flag (on Pmt Lag) is un-checked, Pmt Date of interest clean up transfer = Delivery Date. The transfer settles on this Pmt Date. Default value of this flag in Option Exercise Window is as below: • If the trade has non-zero payment lag, then the default value of the new flag will be True i.e. the flag will be checked. • If the trade has zero payment lag, then the default value of the new flag will be False i.e. the flag will be un-checked. ⓘ **NOTE: The flag can be manually checked or unchecked by users according to their requirements.** To summarize, If trade cashflows use a Pmt Lag, the same lag will now by default get applied to the settle date of Interest Clean Up transfers created from exercise. If the Interest Clean Up transfer should be paid on the Delivery dt, users must now set the flag to false.