

Qcaid[®]
by [®] Qbitia

*"Learn how to design
innovative trading
strategies"*



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Introduction

About this guide

This user's guide is a detailed document on Qcaid's features and functions. The manual includes a description of the interface and its elements to understand the language of the application and the way it works, with the goal of providing users with all the necessary information to acquire the practical knowledge to manage Qcaid.

Examples of use of Qcaid may be found in the video tutorials ^[1] on Qbitia's website. If you have any questions or inquiries, please contact Technical Support ^[2].

About Qcaid

Qcaid is an innovative service developed to manage the production cycle of trading strategies through all of its stages: designing, testing, optimizing and executing. Its innovative software simplifies this process and allows users to create all types of automatic strategies without writing a single line of code.

Its user-friendly desktop application provides access to the service, making it easier to design strategies, analyse backtest results and monitor the execution of automated strategies in real time. Real-time execution, both in simulated and real markets, and backtests execution are carried out in dedicated servers housed in specialized data centers. In addition to reliability and security, these data centers guarantee high-speed access to markets.

Thus, users have access to a comprehensive algorithmic trading solution without having to worry about access to markets, storage and management of historical data or servers maintenance.

Another main advantage is that Qcaid features a drag & drop strategy designer, which enables traders to create mathematical models by placing the strategy elements onto a canvas, thus creating a flow diagram that represents the trading idea in a visual and intuitive way.

Qcaid is an integrated platform that makes it possible to run any strategies in a real environment within seconds and with access to multiple markets.

Qbitia has also innovated in creating a backtester that allows users to test their strategies in past market environments. The strategies are uploaded to execution servers, where Qbitia stores high-quality data that provides a detailed representation of the market at any moment in the past.

User interface

This section describes Qcaid's user interface. Once the interface elements are explained, the following sections will describe how they work and how to use them.

General features

Qcaid's user interface consists of four main windows dedicated to the four different stages of use of the application: strategy editing, backtesting, simulation and execution.

Every window is subdivided into several areas and contains a menu with buttons to access different features.

Views may be rearranged or separated from the main window to suit personal preferences or multiple-screen desktops.

All windows share a series of features, as shown in the following table.

Icon	Action
	Connect to server
	Disconnect from server
	Edit Preferences
	About Qcaid
	Bug Report
	Open Editor
	Open Report Window
	Open Simulation Window
	Open Execution Window

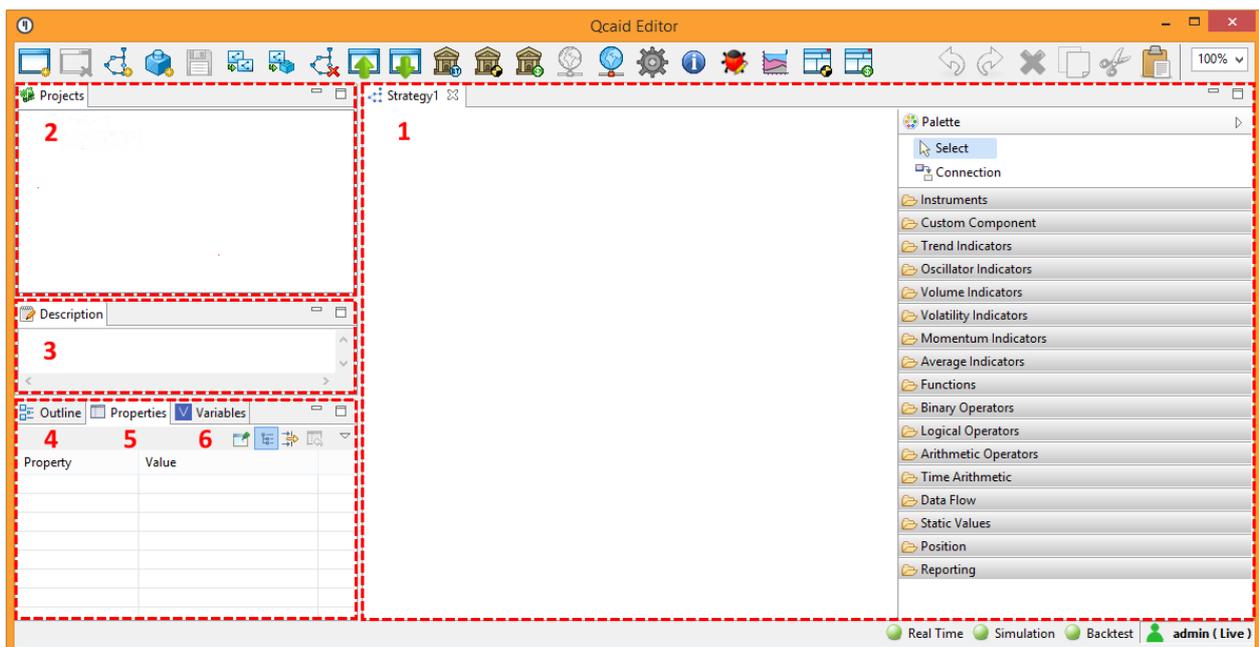
The indicators at the bottom-left corner of the interface show the state of the connection to the server and service availability.



The features and characteristics of each window are detailed below.

Editing your strategy

The strategy editor is the first window that appears once Qcaid is started and users log in. Strategies are created and edited in this window.



This window consists of six smaller areas called views:

- The **editing canvas** (1) is the main view and displays the diagram of the strategies and components. The diagram is made up of model elements, which are the elements that may be used to design strategies. They are on the right

palette grouped by categories. They can be displayed by clicking on them. To add an element to the strategy, click on it and drag it onto the canvas. The palette can be hidden by clicking on the triangular icon at its upper-right corner. The two editing modes are placed at the top of the palette: selection mode and connection mode.

Right-click on the canvas to open the same context menu as in the Projects area.

- The **Projects** area (2), located in the upper-left corner, displays all strategies and components that have been created, organized by projects. Press the triangular icon beside the name of the project or double-click directly on the name to show or hide its contents. Double-click on the name of a strategy or component to open it.
- The **Description** area (3) allows users to include a description of the strategy that they are editing.
- The **Outline** area (4) shows a thumbnail of the diagram of the strategy or component, highlighting the part displayed on the canvas.
- The **Properties** area (5) displays the properties of the selected item on the canvas and enables users to edit them.
- The **Variables** area (6) allows users to create, edit and delete variables. Variables can store integers, decimal values or logical values (true or false). These values can be optimised when backtesting and assigned at the moment of uploading the strategy.

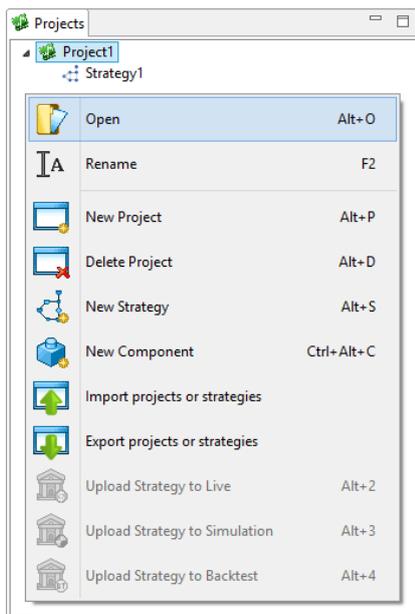
Buttons at the top are specifically used for editing actions. Depending on the item selected in the views, the buttons remain active (in color) or disabled (in gray).

The following table describes the specific menu items in the edit window.

Icono	Acción	Nota
	New project	
	Delete project	This action cannot be undone!
	New strategy	
	Create new component	
	Save	
	Create copy in project	It works both with strategies and components
	Convert strategy to component	It removes elements that should not be part of a component and connects inputs and outputs
	Delete strategy	This action cannot be undone!
	Import projects or strategies	
	Export projects or strategies	
	Upload strategy to backtest	
	Upload strategy to simulation	
	Upload strategy to live	
	Undo	It undoes the changes made in the diagram of the strategy
	Redo	It redoes the changes made in the diagram of the strategy

	Delete	It deletes the selected item on the canvas
	Copy selected nodes to the system clipboard	It copies the selected items on the canvas
	Cut selected nodes to the system clipboard	It cuts the selected items on the canvas
	Paste selected nodes from the system clipboard	It pastes the previously copied or cut items
	Zoom	

Context menu



A context menu with the main editing actions appears by right-clicking on the editing canvas or the Projects area

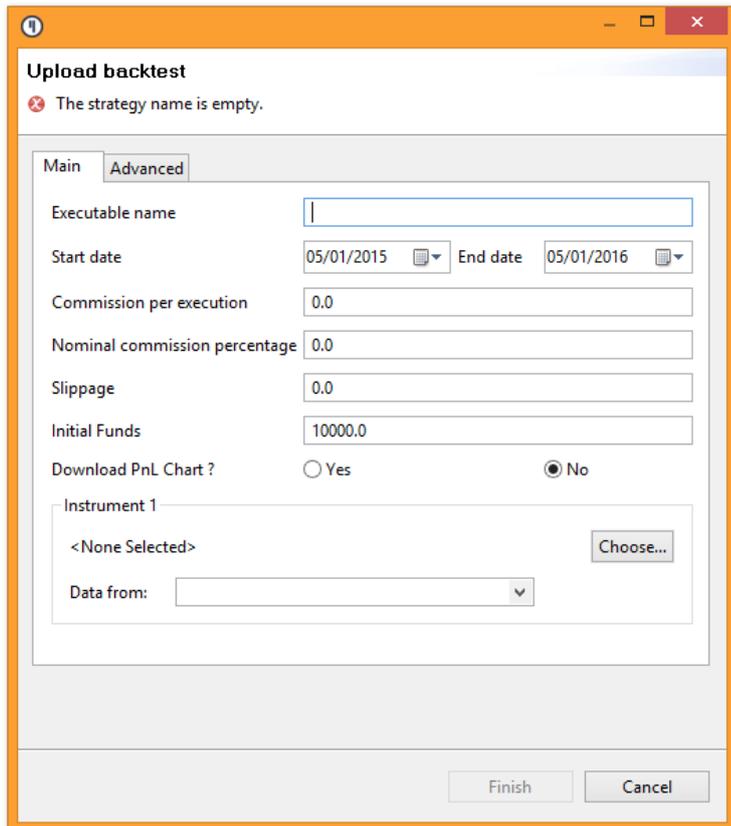
The following table shows the items displayed in the context menu.

Icon	Action	Comment
	Open	It displays or hides the list of strategies when a project is selected
	Rename	
	New project	
	New strategy	
	New component	
	Create copy in project	It works both with strategies and components
	Delete strategy or component	This action cannot be undone!
	Import projects or strategies	
	Export projects or strategies	
	Upload strategy to backtest	

	Upload strategy to simulation	
	Upload strategy to live	

Backtesting

By clicking the button  to upload a strategy to backtest, a window appears to enter the parameters for the backtest.



A message at the top of the window reminds users whether there is a required input field that has not been filled in yet.

The form has two tabs: 'Main' and 'Advanced'.

In the 'Main' area, users must enter a name for the backtest in the field 'Executable name'. This name does not need to be the same as the name of the strategy, although this practise is highly recommended in order to check and compare its results.

Start and end dates may be entered directly or by clicking on  to select a date.

Users may enter commissions as a "Nominal commission percentage" or as a "Commission per execution", that is, a commission per filled order.

The list of available instruments may be accessed by clicking on the button 'Choose...'.

Name	Symbol	Exchange	Security Type	Currency
AUD/CAD	F.US.ACDZ16	XCME - Chicago Mercantile Exch...	Future	CAD
AUD/CAD	F.US.ACDH17	XCME - Chicago Mercantile Exch...	Future	CAD
AUD/CAD	F.US.ACDH16	XCME - Chicago Mercantile Exch...	Future	CAD
AUD/CAD	F.US.ACDU16	XCME - Chicago Mercantile Exch...	Future	CAD
AUD/CAD	F.US.ACDM16	XCME - Chicago Mercantile Exch...	Future	CAD
AUD/CAD	F.US.ACDM17	XCME - Chicago Mercantile Exch...	Future	CAD
AUD/CAD Reverse Reduced Tick S...	F.US.ACDW1H16	XCME - Chicago Mercantile Exch...	Future	CAD
AUD/CAD Reverse Reduced Tick S...	F.US.ACDW1M16	XCME - Chicago Mercantile Exch...	Future	CAD
Agency DTCC GCF Repo Cal Sprea...	F.US.RPAS1U17	IFEU - ICE Futures Europe	Future	USD
Agency DTCC GCF Repo Cal Sprea...	F.US.RPAS1U16	IFEU - ICE Futures Europe	Future	USD
Agency DTCC GCF Repo Cal Sprea...	F.US.RPAS1V16	IFEU - ICE Futures Europe	Future	USD
Agency DTCC GCF Repo Cal Sprea...	F.US.RPAS1V17	IFEU - ICE Futures Europe	Future	USD
Agency DTCC GCF Repo Cal Sprea...	F.US.RPAS1X16	IFEU - ICE Futures Europe	Future	USD
Agency DTCC GCF Repo Cal Sprea...	F.US.RPAS1X17	IFEU - ICE Futures Europe	Future	USD
Agency DTCC GCF Repo Cal Sprea...	F.US.RPAS1Z16	IFEU - ICE Futures Europe	Future	USD
Agency DTCC GCF Repo Cal Sprea...	F.US.RPAS1Z15	IFEU - ICE Futures Europe	Future	USD
Agency DTCC GCF Repo Cal Sprea...	F.US.RPAS1M17	IFEU - ICE Futures Europe	Future	USD
Agency DTCC GCF Repo Cal Sprea...	F.US.RPAS1M16	IFEU - ICE Futures Europe	Future	USD
Agency DTCC GCF Repo Cal Sprea...	F.US.RPAS1N16	IFEU - ICE Futures Europe	Future	USD
Agency DTCC GCF Repo Cal Sprea...	F.US.RPAS1N17	IFEU - ICE Futures Europe	Future	USD
Agency DTCC GCF Repo Cal Sprea...	F.US.RPAS1Q17	IFEU - ICE Futures Europe	Future	USD
Agency DTCC GCF Repo Cal Sprea...	F.US.RPAS1Q16	IFEU - ICE Futures Europe	Future	USD
Agency DTCC GCF Repo Cal Sprea...	F.US.RPAS1F16	IFEU - ICE Futures Europe	Future	USD
Agency DTCC GCF Repo Cal Sprea...	F.US.RPAS1F17	IFEU - ICE Futures Europe	Future	USD
Agency DTCC GCF Repo Cal Sprea...	F.US.RPAS1G17	IFEU - ICE Futures Europe	Future	USD

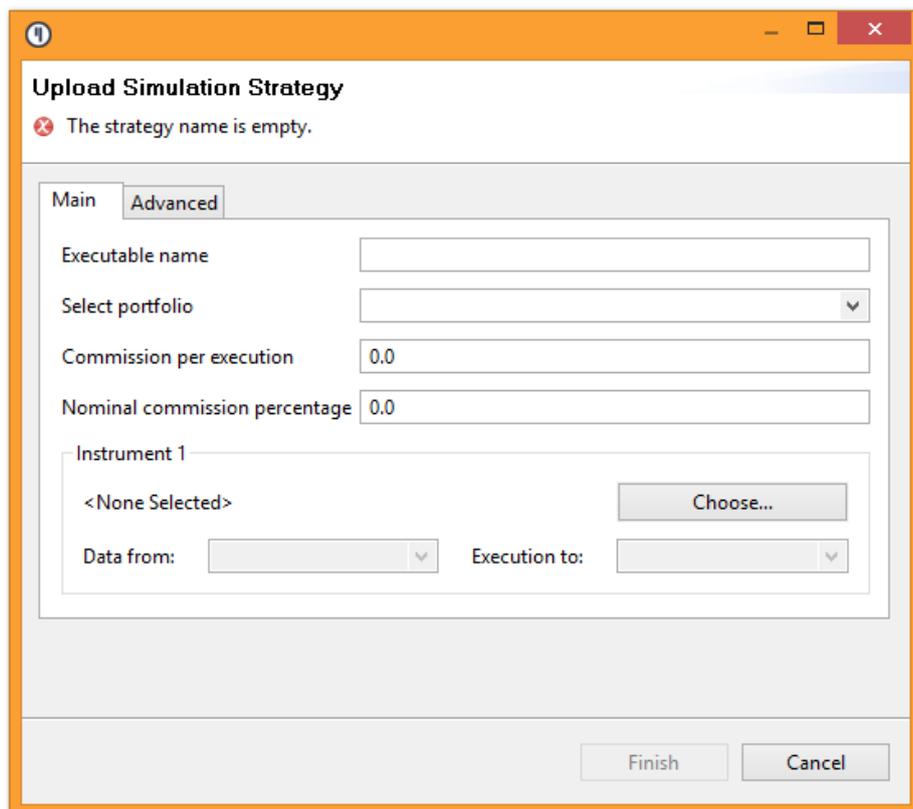
The fields that may be filled in to filter the search results are displayed at the top of the window. If several filters are combined, only instruments that met every condition will be shown. Once an instrument is selected, click 'Choose selected' to finish.

If the strategy contains variables, they will be displayed at the bottom. The 'Test range' option offers the possibility of evaluating a range of values for each variable. In this case, users must enter the fields 'Start value', 'End value' and 'Step'. The latter parameter represents the increase in the value for each step of the test within that range.

By clicking the 'Advanced' tab, users can choose the currency for their backtest. Qcaid uses the exchange rates published by the International Monetary Fund the previous day.

Simulation and execution

Click on the buttons  and  to set the configuration of the launch of the strategy's simulation or real-time execution, respectively.



Upload Simulation Strategy

✘ The strategy name is empty.

Main **Advanced**

Executable name

Select portfolio

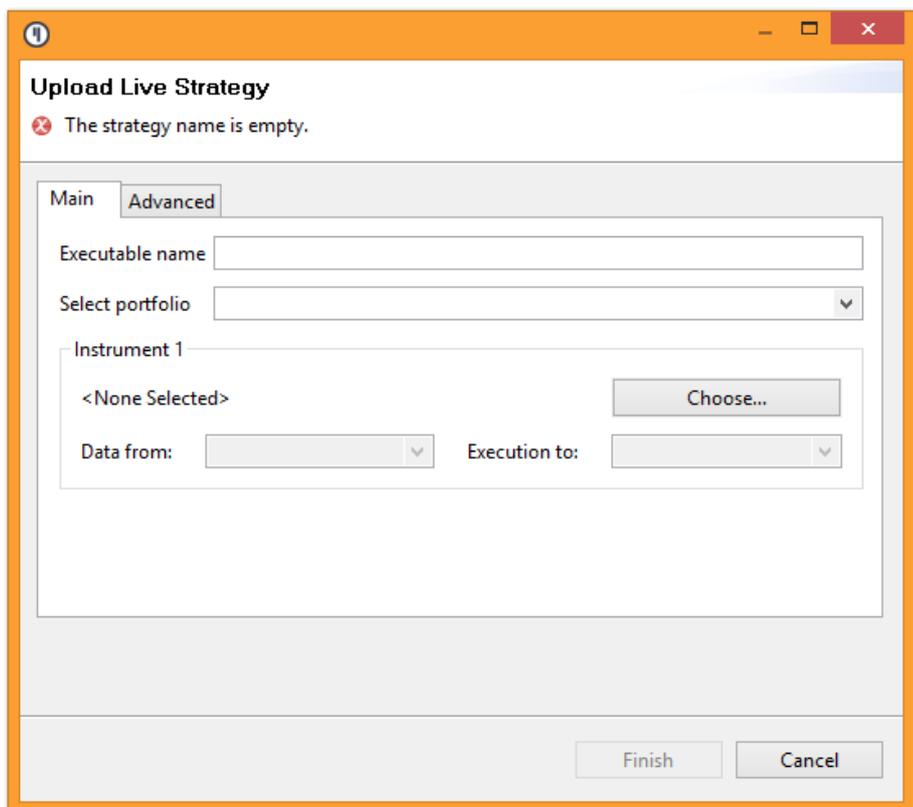
Commission per execution

Nominal commission percentage

Instrument 1

<None Selected>

Data from: Execution to:



Upload Live Strategy

✘ The strategy name is empty.

Main **Advanced**

Executable name

Select portfolio

Instrument 1

<None Selected>

Data from: Execution to:

A message at the top of the window reminds users whether there is a required input field that has not been filled in yet.

The form has two tabs: 'Main' and 'Advanced'.

In the 'Main' area, users must enter a name in the field 'Executable name'. This name does not need to be the same as the name of the strategy, although this practice is highly recommended in order to identify it in the Execution Window.

Commissions may be entered in the simulation form, so that they are taken into account in the P&L displayed. The commission can be a "Nominal commission percentage" or a "Commission per execution", that is, a commission per filled order.

The selection of instruments is performed in the same way as in backtests, accessing the list of instruments by clicking the button 'Choose...'.

The value of the variables used in the strategy should be entered at the bottom.

By clicking the 'Advanced' tab, users can choose the currency for the P&L of their strategy, as well as the behaviour of the strategy in case of unexpected error.

The execution can be configured to close the position and/or cancel the pending orders in case an unexpected situation forces the strategy to stop. It can also be configured to stop the strategy whenever it has not received data for a certain period of time. The value zero indicates that it will never stop due to a lack of data.

Backtest report view

Backtest reports are displayed in a specific window that enables users to analyze their results in detail and even compare them.

The screenshot shows the 'Report View' window with the following components:

- 1** Backtest Groups table:

Group Name	Progress
backtest	FINISHED 1 / 1
- 2** Backtest Results table:

Configuration	Instrument 1	Start date	End date	Net Profit	Progress
backtest_1	F.US.BP6H16	2015/01/15	2016/01/15	€ 0.00	FINISHED
- 3** Strategy Information panel:

Strategy	Strategy1
Report Name	backtest_1
Start Date	2015/01/15
End Date	2016/01/15
Warmup Finish Time	2015/01/15 14:09:00 CET
Initial Funds	€ 10,000.00
Commission per execution	€ 0.00
Nominal commission percentage	0.0
Slippage	0.0
Instruments	
Instrument 1	F.US.BP6H16
Variables	
- 4** Charts area: Contains a 'Charts' button and a 'Csv' button.
- 5** Performance Summary area: Contains a 'Performance Summary' button.

At the bottom of the window, there are tabs for 'Report Information', 'Performance Summary', 'Trades', and 'Orders'. The status bar shows 'Real Time', 'Simulation', 'Backtest', and a user profile 'admin (Live)'.

The Report View is divided into the following areas:

- The **Backtest Groups** area (1) shows the results of backtests whether they are executed or pending. A group of backtests may contain one result or more if a range of values for at least one variable is being tested. Click on a group of backtests to display the list of backtests from that group. Double-click on a group of backtests which has finished its execution to display a comparison of the results of the group in the reports area.

- The **Backtest Results** area (2) displays the backtests included in the group as well as the value of variables with which each of them was executed. Double-click on a backtest report to open the results report in the report area.
- The **Report** area (3) displays both backtest reports and report group comparisons. This area allows users to keep multiple reports open simultaneously, which can be accessed by clicking on the tabs located at the top of the area. Every backtest report consists of four sections accessible by clicking on the tabs at the lower part of the area. In addition, backtest reports include performance graphs and CSV files that are displayed in other areas.
- The **Charts** area (4) contains the performance graphs of the selected report. The window that displays the selected chart appears just by double-clicking. The 'Equity Curve' chart shows the evolution of profit or loss. The 'Maximum DrawDown' chart displays the performance of the maximum drawdown considering the data from the 'Equity Curve'. If the option was selected at the moment of uploading the backtest, the 'P&L' chart will also be available. This graph shows the evolution of P&L for both open and closed operations. If the backtest includes commissions, it will show its results both with and without commissions. Zoom in on any area of the graph by clicking and dragging the pointer downwards and to the right. Zoom out by clicking and dragging the pointer in another direction.
- The **Csv** area (5) includes links to data collected by the CSV elements in the strategy. The number of displayed links is equal to the number of CSV elements. Double-click on the links to save the data as a CSV file on your computer.

The following table displays the specific menu items in the backtests report view:

Icono	Acción	Nota
	Open report	
	Save report	
	Stop	
	Close	
	Delete	
	Export to PDF	A report of a specific backtest can be exported to PDF
	Export to CSV	Backtest results or a group of backtests can be exported to PDF

Simulation and execution

Simulation and execution windows allow users to start and stop execution in the simulated market or the real market, respectively. In addition, they display orders from strategies, its states and its events.

The screenshot shows the 'Simulation Strategies' application window with the following components:

- Area 1: Strategy List**

Strategy	Market	Status	Orders	P/L	Net Profit	MaxDrawl
portfolio1				€ -166.39	€ 0.00	
simulation		RUNNING	10	€ -166.39	€ 0.00	€ 172.13
British Pc	Chicago...	TRADE		USD -181...	USD 0.00	USD 187.
- Area 2: Info**

Market Order ID	506510942
Client Order ID	1452855360036009
Qcaid Order ID	13
Instrument	British Pound (Globe
Status	FILLED
Side	BUY
Type	MARKET
Total Quantity	1
Filled Quantity	1
Average Price	1.4342
Last Price Filled	1.4342
- Area 3: Order List**

Order	Symbol	Side	Quantity	Type	Limit Price
506510903	F.US.BP6...	SELL	1	LIMIT	1.5783
506463331	F.US.BP6...	SELL	1	LIMIT	1.5784
506481870	F.US.BP6...	SELL	1	LIMIT	1.5785
506491680	F.US.BP6...	SELL	1	LIMIT	1.5781
- Area 4: Historic Orders - Page 1**

Order	Symbol	Side	Quantity	Type
506510942	F.US.BP6...	BUY	1	MARKET
506481875	F.US.BP6...	BUY	1	MARKET
506472333	F.US.BP6...	BUY	1	MARKET
506481860	F.US.BP6...	BUY	1	MARKET
506491644	F.US.BP6...	BUY	1	MARKET
- Area 5: Fills List**

Type	Time	Qty	Price
CREATED	2016/01/15 12:00:00.002	1	
NEW_REQ	2016/01/15 12:00:00.004	1	
PENDING_NEW	2016/01/15 12:00:00.003	1	
NEW_ACK	2016/01/15 12:00:00.003	1	
FILL	2016/01/15 12:00:00.003	1	1.4342

At the bottom, there are status indicators for Real Time, Simulation, and Backtest, along with a user profile 'admin (Live)'.

Both windows share the same design but have different titles: 'Simulation Strategies' and 'Realtime Strategies'. The different areas into which these windows are divided and their buttons are described below.

- The **Strategy List** area (1) displays the list of portfolios and the strategies within them. Press the triangular icon beside the strategy's name to show or hide the list of strategies in a portfolio. The list of instruments used in a strategy may be shown or hidden in the same way.
- The **Info** area (2) shows information about the selected element, which can be a strategy, an instrument or an order.
- The **Order List** area (3) contains the list of active orders in the market from the selected strategy. The items displayed for every order include ID, Symbol, Side, Quantity, Type, Limit Price, Stop Price, Filled Quantity, Average Price and Status. When an order has been selected, the Fill List area shows its events in detail.
- The **Historic Orders** area (4) displays all orders sent by the selected strategy that are no longer active in the market, either because they have been completed or cancelled. When an order has been selected, the Fill List area details its events.
- The **Fills List** area (5) displays the events of an order, including total and partial fills, modifications and cancellations.

The table below describes specific menu items of the simulation and execution windows.

Icon	Action
	Rename portfolio
	Start strategy
	Stop strategy
	Show P&L Chart
	Delete strategy

Model elements / language

Model elements are all the elements which may be used to design strategies. This section describes the model elements available in Qcaid.

Qcaid's model elements may contain name, parameters, input ports and output ports.

As shown in the figure, the **name** is usually at the top of the element. In indicators and variables the name may be edited.

Parameters can be set either by selecting an option in a drop-down list or by entering a numerical value. Numerical values can be integers or decimals.

Input ports are usually located in the upper part of the figure, but in some cases they are placed on the left side or on the main part of the figure.

Output ports are usually at the bottom of the figure, but they may also be placed on the right side.

There are five types of **input** and **output** data: instrument, number, logical type (true or false), date and time interval. Input and output ports must be of the same type to be linked. When an element has several input or output ports, they are labelled. Labels can be placed inside or outside the model element. In addition, a tooltip may appear when the pointer is placed over the port.

All the model elements grouped by their functionality are described in detail below.

Market information

The elements that allow users to select the market information that will be used in the strategy are grouped in the palette under the heading '**Instruments**'. This group includes the element that references market instruments and the elements to select the frequency of use of the information.

Instrument



The Instrument element is used to represent any time series available in Qcaid. When designing a strategy, no asset is specifically referenced. Assets are selected at the moment of uploading a strategy to backtest or execution.

This model element can represent either a market instrument for which orders may be entered or a time series on which no operation can be performed, such as a market index.

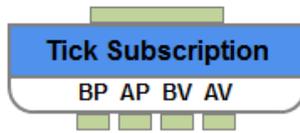
A strategy may include as many instruments as needed, but it must have at least one.

The output of the Instrument can be linked to the input of the subscription elements, which are described below, but it can also be used as a parameter in other elements.

Outputs

Name	Label	Type	Description
Instrument		Instrument	

Tick Subscription



The Tick Subscription element makes it possible to use Best Bid and Best Ask, both in the price and in the available volume.

When this element is used, the strategy is evaluated with every change of Bid or Ask, regardless of the fact that the change occurs in price or in volume.

Inputs

Name	Label	Type	Description
Instrument		Instrument	

Outputs

Name	Label	Type	Description
bidPrice	BP	Numerical	
askPrice	AP	Numerical	
bidVolume	BV	Numerical	
askVolume	AV	Numerical	

Trade Subscription



The Trade Subscription element provides the price and volume from the last executed trade.

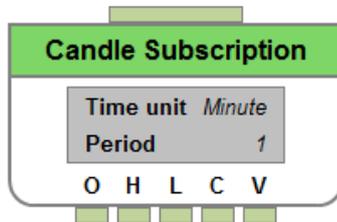
Inputs

Name	Label	Type	Description
Instrument		Instrument	

Outputs

Name	Label	Type	Description
price	P	Numerical	
volume	V	Numerical	

Candle Subscription



The Candle Subscription element provides data from the components of a candle determined by the parameters set by the user.

Candles usually originate from trades. In cases when only BBA data (Best Bid & Best Ask) are available, candles are calculated by using the midpoint. If trading volume information is not available, the value of the corresponding output will be 0.

If there is no operation during the time period of the candle, no candle is generated and the strategy is not recalculated.

Period is the only numerical parameter that cannot be replaced by a variable.

Inputs

Name	Label	Type	Description
Instrument		Instrument	

Outputs

Name	Label	Type	Description
open	O	Numerical	
high	H	Numerical	
low	L	Numerical	
close	C	Numerical	
volume	V	Numerical	

Parameters

Name	Type	Description
Time unit	Drop-down list	Options: second / minute / hour / day / week / month / year
Period	Integer	

Indicators and functions

Qcaid's palette offers a wide array of technical indicators and functions under the headings 'Trend Indicators', 'Oscillator Indicators', 'Volume Indicators', 'Volatility Indicators', 'Momentum Indicators', 'Average Indicators' and 'Functions'.

The number of input ports of an indicator determines its characteristics. When indicators have two or more, input ports are labelled and can only be linked to Candle Subscription elements. Indicators with a single input port may be linked to any numeric output port. The Offset element is special, since it can be connected both to numerical and logical outputs (true or false).

Indicators may have one or more output ports. When there is more than one, output ports are labelled in order to identify them.

Every indicators includes, at least, the 'Offset' parameter and may also include other decimal, integer and drop-down parameters.

The indicators and functions available in each group are listed below. Some indicators are available in more than one group.

Trend Indicators

- ADX
- ADXR
- Aroon
- Aroon Osc
- Avg Price
- DEMA
- DX
- EMA
- Heikin Ashi
- KAMA
- Linear Reg
- Linear Reg Angle
- Linear Reg Intercept
- Linear Reg Slope
- MACD
- MACD Ext
- MAMA
- Med Price
- Midpoint
- Minus DI
- Minus DM
- MMA
- NATR
- SAR

- SMA
- STD Dev
- T3
- TEMA
- True Range
- TRIMA
- TSF
- Ty Price
- WCL Price
- WMA

Oscillator Indicators

- APO
- ATR
- MACD
- MACD Ext
- MOM
- PPO
- RSI
- Stoch
- Stoch RSI
- TEMA
- Ult Osc
- Will R

Volume Indicators

- MFI
- OBV

Volatility Indicators

- ATR
- Bollinger Bands

Momentum Indicators

- CMO
 - MOM
 - ROC
 - ROCP
 - ROCR
 - ROCR 100
 - RSI
 - Stoch
 - Stoch RSI
-

Average Indicators

- DEMA
- EMA
- KAMA
- MAMA
- MMA
- SMA
- T3
- TEMA
- TRIMA
- WMA

Functions

- Max
- Max Index
- Min
- Min Index
- Min Max
- Min Max Index
- Norm
- Absolute Value
- Exp
- Factorial
- Logarithm
- Module
- Natural Logarithm
- Power
- Random
- Root
- Round
- Offset

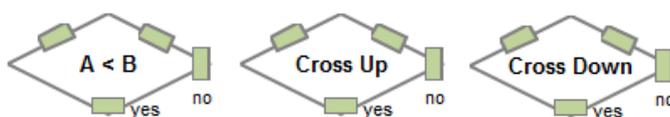
Logical rules

The 'Binary Operators' group includes several comparison operators which can be used to create logical rules, whereas elements in the 'Logical Operators' group allow users to combine those rules.

Binary Operators

Binary operators compare two numerical or duration inputs and offer a logical value as a result of the comparison. The result is provided in the output port with the label 'yes', whereas the output port with the label 'no' provides the complementary value. This complementary value is the equivalent of linking a negation operator to the output port with the label 'yes'.

Binary operators can be divided into two types: conventional comparison operators (<, <=, =, >= y >) and cross operators, both upwards ('Upward Crossover') and downwards ('Downward Crossover').



In addition, comparators may be used with dates and times, in such a way that the earlier date or time is considered 'lower' than the later date or time. For example, the value 10:30:00 is lower than the value 11:00:00, and all time values are equal to or higher than 00:00:00.

Cross operators work differently, because they also check the values that were compared by the operator in the previous calculation of the strategy. These operators send out a signal when they detect a crossing in the values from both inputs, that is, when one value is now higher than the other one. For example, the upward cross operator will send out a signal only when two conditions are met: the left input value was lower than the right one in the previous calculation of the strategy, but it is higher now. If the values from the two input ports are equal, the previous calculation is checked.

Inputs

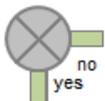
Name	Label	Type	Description
Left		Numerical, interval, date	Cross elements cannot be connected to date inputs
Right		Numerical, interval, date	Cross elements cannot be connected to date inputs

Outputs

Name	Label	Type	Description
yes	yes	Logical	
no	no	Logical	

Logical Operators

Logical operators have a round shape with two output ports. They do not have a discernible input port because the entire figure acts as an input port. Output ports work in the same way as in binary operators. The port labelled as 'yes' provides the result of the operation and the port labelled as 'no' offers the complementary result.



The **AND** element requires at least two logical inputs, but users may connect as many as they wish. The result will be positive only if all entries are positive.

Inputs

Name	Label	Type	Comment
Input		Logical	At least two inputs are required

Outputs

Name	Label	Type	Description
yes	yes	Logical	
no	no	Logical	



The **OR** element requires at least two logical inputs, but users may connect as many as they wish. The result will be positive only if at least one of the entries is positive.

Inputs

Name	Label	Type	Comment
Input		Logical	At least two inputs are required

Outputs

Name	Label	Type	Comment
yes	yes	Logical	
no	no	Logical	



The **XOR** (exclusive or) element requires two logical inputs. The result will be positive only if one of the inputs is positive and the other one is negative.

Inputs

Name	Label	Type	Comment
Input		Logical	At least two inputs are required

Outputs

Name	Label	Type
yes	yes	Logical
no	no	Logical



The **NOT** element requires only one input and has only one output port. The result of the output is always the opposite of the input value.

Inputs

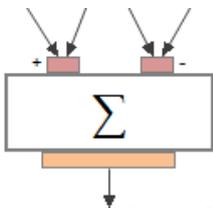
Name	Label	Type	Comment
Input		Logical	Only one input is required

Outputs

Name	Label	Type	Comment
no	no	Logical	Opposite of the input value

Arithmetic operations

Elements in the this group are used for basic operations such as addition, subtraction, multiplication and division. Every element has two input ports that may be linked to as many elements as wished.



The **Summator** element enables addition and subtraction operations, depending on the input port used.

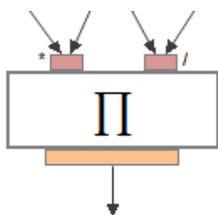
For example, if the elements A and B are linked to the input port labelled with the plus sign (+) and the elements C and D are linked to the input port labelled with the minus sign (-), the result will be $R = A + B - C - D$. If only one input is connected to the minus sign (-), the output will be the opposite of the input ($R = -A$).

Inputs

Name	Label	Type	Comment
Add	+	Numerical	Any number of inputs
Subtract	-	Numerical	Any number of inputs

Outputs

Name	Label	Type	Comment
output		Numerical	



The **Product** element enables multiplication and division operations.

For example, if the elements A and B are linked to the input port labelled with the multiplication sign and the elements C and D are linked to the input port labelled with the division sign, the result will be $R = (A * B) / (C * D)$, or, in an equivalent way, $R = A * B / C / D$. If there is only one input linked to the division port, the result will be the opposite of the input ($R = 1/A$).

Inputs

Name	Label	Type	Comment
Multiply	*	Numerical	Any number of inputs
Divide	/	Numerical	Any number of inputs

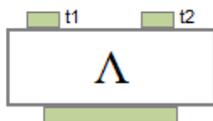
Outputs

Name	Label	Type	Comment
output		Numerical	

Time arithmetic

The Time Arithmetic group contains elements to perform operations with dates and time intervals.

Delta Time



The Delta Time element calculates the time interval between two dates. Time interval is always a positive value, regardless of the order in which inputs are connected. It should be noted that dates may contain date and time or only time.

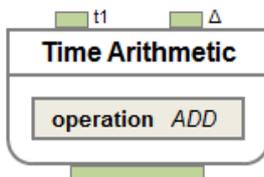
Inputs

Name	Label	Type	Comment
Time1	t1	Date & time	This input may include date and time or only time
Time2	t2	Date & time	This input may include date and time or only time

Output

Name	Label	Type	Comment
output		Interval	Expressed in milliseconds (ms)

Time Arithmetic



The Time Arithmetic element makes it possible to add a time interval to a date. Therefore, the result will be a new date. In this element, the date must be linked to the first port (t1) and the time interval must be linked to the second one (Δ).

Inputs

Name	Label	Type	Comment
Time	t1	Date & time	
Interval	Δ	Interval	

Output

Name	Label	Type	Comment
output		Date & time	

Data Flow

The Data Flow group includes elements that enable users to control the information that is processed along the strategy's flow chart.

Selector



The Selector is designed to choose between two inputs by checking a control signal (?) that acts as a logical condition. If the condition is true, the output will be the same as the left input (T). If the condition is false, the output will be the same as the right input (F). The Selector may be viewed as an if-then-else condition: **if** the condition is met, **then** the first input is chosen. **Else**, the second input is chosen.

With the exception of the control input, this element accepts any type of input or output, but they must be of the same type. When an input or output is linked, the application detects its type of data and the other ports automatically require that same type.

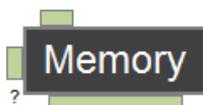
Inputs

Name	Label	Type	Comment
Control	?	Logical	
True	T	Any type	It must be of the same type as the False input
False	F	Any type	It must be of the same type as the True input

Outputs

Name	Label	Type	Comment
output		Any type	It must be of the same type as the inputs

Memory



The Memory element enables users to store a certain value whenever a condition is met. The result of the condition is linked to the control input (?), located on the left side of the element. If the condition from the control input is met,

the input value will be stored and it will become the new output value. If the condition from the control input is not met, the output will contain the value that was stored the last time the control condition was met.

The input and the output values can be of any type, but both of them must be of the same type. Once one of them is connected, the application requires the other one to be linked to a compatible element.

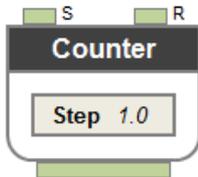
Inputs

Name	Label	Type	Comment
Control	?	Logical	
Input	T	Any type	

Outputs

Name	Label	Type	Comment
output		Any type	It must be of the same type as the input

Counter



The Counter counts the number of times that the condition linked to the input port (S) is met. In addition, it has a reset input (R) that allows users to restart the counter whenever the reset condition is met.

The 'Step' parameter determines the increase in the counter whenever the signal input condition is met. If the reset condition is met, the output value will be 0.

Inputs

Name	Label	Type	Comment
Signal	S	Logical	
Reset	R	Logical	

Outputs

Name	Label	Type	Comment
output		Numerical	

Filter



The Filter is used to link two elements only if a condition is met. Therefore, the output port will return the value from the input port only if the condition linked to the control input on the left side is met. If the condition is met, output and input will share the same value. Otherwise, the output will return a null result and the elements connected to the output port will not be processed.

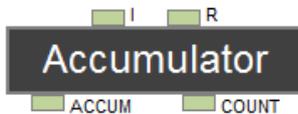
Inputs

Name	Label	Type	Comment
Control	?	Logical	
Input	T	Any type	

Outputs

Name	Label	Type	Comment
output		Any type	It must be of the same type as the input

Accumulator



The Accumulator adds the value linked to the input port (I) each time the element is processed.

This element has two output ports: one returns the accumulated value (ACCUM) and the other one returns the number of values that have been accumulated (COUNT). In addition, it has a reset input (R). If the condition linked to the reset input is met, the outputs will be reset: the accumulated value will be equal to the input value and the counter will return 1.

Inputs

Name	Label	Type	Comment
Value	I	Numerical	
Reset	R	Logical	

Outputs

Name	Label	Type	Comment
Accumulated	ACCUM	Numerical	
Counts	COUNT	Numerical	

Static Values

Elements from this group may be used to add fixed values of any data type to the strategy. The numerical type must be either an integer or a decimal.

Integer Value



The Integer Value element, which requires an integer value, is useful in parameters that expect this numerical type, such as the quantity in an order.

This element has only one parameter. Like in other elements, double-click on the parameter to edit it, or select and edit it in the 'Properties' area. Since a variable cannot be entered as a parameter, the use of a variable instead of a Static Value should be considered.

Outputs

Name	Label	Type	Comment
Value		Numerical	

Parameter

Name	Type	Description
Value	Integer	

Decimal Value



The Decimal Value element allows users to enter a numerical value that may be decimal.

This element has only one parameter. Like in other elements, double-click on the parameter to edit it, or select and edit it in the 'Properties' area. Since a variable cannot be entered as a parameter, the use of a variable instead of a Static Value should be considered.

Outputs

Name	Label	Type	Comment
Value		Numerical	

Parameters

Name	Type	Description
Value	Decimal	

Boolean Value



The Boolean Value element allows users to include a logical value in their strategies.

This element has only one parameter. Like in other elements, double-click on the parameter to edit it, or select and edit it in the 'Properties' area. Since a variable cannot be entered as a parameter, the use of a variable instead of a Static Value should be considered.

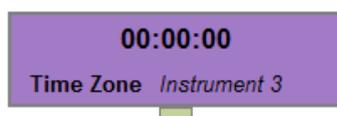
Outputs

Name	Label	Type	Comment
Value		Logical	

Parameters

Name	Type	Description
Value	Logical	

Time Value



The Time Value element allows users to enter a certain time of the day.

This element has two parameters: time and time zone. As shown in the value by default, the first parameter must be specified with hour, minutes and seconds in a 24-hour format using the colon (:) as separator. Only values strictly lower than 24 hours can be entered. In the second parameter, one of the instruments included in the strategy must be selected to set its time zone as the time zone of the Time Value. The instrument is chosen when the strategy is uploaded to backtest or execution. The application automatically carries out calculations taking into account the time zone on each date.

Outputs

Name	Label	Type	Comment
Value		Time	

Parameters

Name	Type	Description
Value	Time	
Time Zone	Drop-down list	One of the instruments used in the strategy can be selected

Duration Value

Duration	
Years	0
Months	0
Weeks	0
Days	0
Hours	0
Minutes	0
Seconds	0
Milliseconds	0

The Duration Value element calculates a time interval by adding different time units (weeks, days, hours, etc.). There is a parameter for each time unit and its values may be entered by using variables.

Outputs

Name	Label	Type	Comment
Value		Interval	Expressed in milliseconds (ms)

Parameters

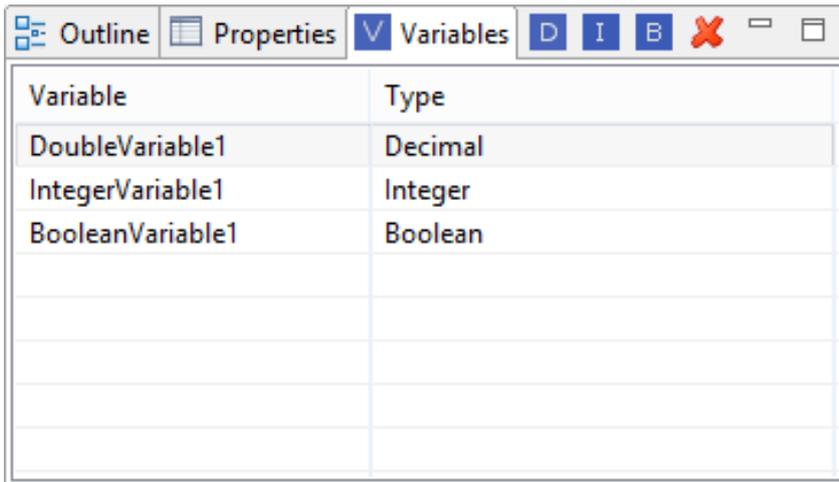
Name	Type	Description
Years	Integer	
Months	Integer	
Weeks	Integer	
Days	Integer	
Hours	Integer	
Minutes	Integer	
Seconds	Integer	
Milliseconds	Integer	

Variables



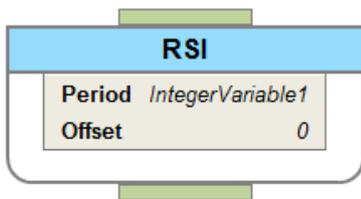
Variables store integers, decimals or logical values (true/false). Unlike static values, the value is assigned at the moment that the strategy is uploaded to backtest, simulation or execution instead of the moment that the strategy is designed.

When a strategy is uploaded to backtest, variables can be assigned a range of values to find the most suitable ones.

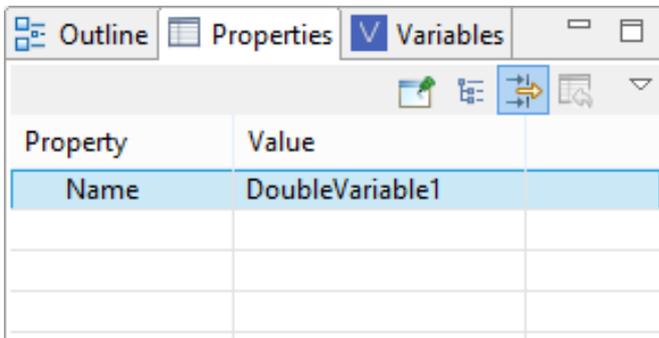


Variables are created in the variables area by clicking on one of the buttons **D I B**. Once created, they can be used in two different ways in the strategy model:

- As a parameter in a model element. In parameters that require integers or decimal values, a variable of the appropriate type may be used instead of a fixed value. A variable can be used as a parameter in more than one model element.



- As a model element in itself, that is, as a graphic element with an output port, just like a fixed value. Variables used as model elements can connect its output port to the input port of as many items as wished, but there can only be one model element for each variable.



This element has only one parameter. Like in other elements, double-click on the parameter to edit it, or select and edit it in the 'Properties' area.

Output

Name	Label	Type	Comment
Value		*	The type of the variable determines the type of output data

Parameters

Name	Type	Description
Name	Text	

Position management

Elements in the **Position** group allow users to know and control the market position of their strategies.

Current Time

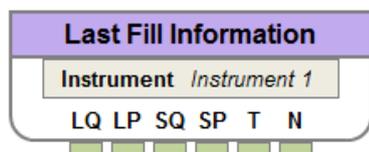


The Current Time element provides date and time of the event being processed with each recalculation of the strategy. The application automatically manages time zone, for example, when making a comparison between Current Time and a Time Value element.

Outputs

Name	Label	Type	Comment
Time		Date & time	Date and time updated at every recalculation of the strategy

Last Fill Information



With each recalculation of the strategy, the Last Fill Information element provides information about filled orders for the instrument selected as a parameter.

If there is a recalculation of the strategy and an order has completely or partially filled since the previous recalculation, this element will display the total quantity (LQ/SQ) achieved since that recalculation. It also shows the trading price (LP/SP). If there have been several filled orders, the price shown will be the weighted average price. The Time (T) output stores date and time from the last filled order. The New Fill (N) output will store a true value to indicate that the order has filled since the last calculation. If the order has not filled, outputs retain the values from the previous filled order, except for the New Fill output, which will have a false value to indicate that the values come from previous filled orders.

Outputs

Name	Label	Type	Comment
Long Quantity	LQ	Numerical	
Long Average Price	LP	Numerical	
Short Quantity	SQ	Numerical	
Short Average Price	SP	Numerical	
Time	T	Date & time	Date and time from the last filled order
New Fill	N	Logical	Options: true / false

Parameter

Name	Type	Description
Instrument	Drop-down list	One of the instruments used in the strategy may be selected

Market Order

BUY MARKET

S Q

Instrument	<i>Instrument 3</i>
Side	BUY
Stop	OFF
Take Profit	OFF
Trailing Stop	OFF

SELL MARKET

S Q

Instrument	<i>Instrument 3</i>
Side	SELL
Stop	OFF
Take Profit	OFF
Trailing Stop	OFF

Market Order allows users to execute market orders (**Buy Market/Sell Market**) with associated/subordinate **Stop** and **Take Profit** orders.

With each recalculation of the strategy, if the input condition (S) is met, a market order with the size set in the quantity input (Q) is sent out.

Subordinate orders are automatically sent out when a complete or partial fill is achieved. If the trade comes back partially filled, the corresponding part of the Stop and Take Profit orders will be sent out.

BUY MARKET		SELL MARKET	
Instrument	Instrument 1	Instrument	Instrument 1
Side	BUY	Side	SELL
Stop	PERCENTAGE	Stop	OFF
Stop value	10.0	Take Profit	OFF
Take Profit	PRICE	Trailing Stop	PERCENTAGE
Take Profit Value	2.0	Trailing Value	10.0
Trailing Stop	OFF	Trailing profit target	2.0

There are two types of Stop orders: fixed and trailing. Both types cannot be active at the same time.

To enable subordinate orders, a margin must be set, either as a price or as a percentage. If the price option is selected, the value must be in the same units as the price reported by the market. If the percentage option is selected, the value will represent the variation between the current price and the initial execution price.

In **Trailing Stop** orders, values are used differently. The **Trailing Profit Target** value represents the increase in the price (compared with the execution price) required to activate the trailing order. This value is always expressed in price units. In the trailing method, users can choose between price and percentage:

- When using price, the **Trailing Value** represents the maximum decrease in the price (compared with the execution price) that is allowed after the Trailing Stop has been activated.
- When using percentage, the **Trailing Value** represents the maximum decrease in the profit (compared with the highest profit value) that is allowed after the Trailing Stop has been activated. In this case, the value is a percentage of the profit, not of the price. The profit is the difference between the reached price and the initial execution price.

The trailing orders stop is executed by sending an order into the market when the Trailing Value is reached.

Inputs

Name	Label	Type	Comment
Signal	S	Logical	Order execution signal
Quantity	Q	Numerical	Order size

Parameters

Name	Type	Description
Instrument	Drop-down list	Instruments used in the strategy may be selected
Side	Drop-down list	Options: BUY / SELL
Stop	Drop-down list	Options: OFF / PRICE / PERCENTAGE
Stop Value	Numerical	Price in the same unit as the price reported by the market, or percentage change between the current price and the initial execution price
Take Profit	Drop-down list	Options: OFF / PRICE / PERCENTAGE

Take Profit Value	Numerical	Options: price in the same unit as the price reported by the market, or percentage change between the current price and the initial execution price
Trailing Stop	Drop-down list	Options: OFF / PRICE / PERCENTAGE
Trailing Value	Numerical	Options: maximum decrease in the price compared with the execution price (units), or maximum decrease in the profit compared with the highest profit value (percentage)
Trailing Profit Target	Numerical	Increase in the price compared with the execution price (units)

Limit Order

S P Q
BUY Limit

Instrument	Instrument 1
Side	BUY
Signal Mode	NO
Stop	OFF
Take Profit	OFF
Trailing Stop	OFF

S P Q
SELL Limit

Instrument	Instrument 3
Side	SELL
Signal Mode	NO
Stop	OFF
Take Profit	OFF
Trailing Stop	OFF

Limit Order enables users to execute limit orders (**Buy Limit/Sell Limit**) with associated/subordinate **Stop** and **Take Profit** orders.

Unlike the Market Order element, Limit Order has one price input and two operating modes.

These two operating modes differ when recalculating the strategy:

- In the default mode, a Limit Order works like a Market Order, namely, a new limit order is sent into the market whenever the input condition (S) is met.
- In the signal mode, which can be activated by the parameter with that name, the input signal works as an enabling signal. As long as the input condition is met, instead of sending in a new order every time the strategy is recalculated, the same order remains in the market. Every time the strategy is recalculated, if the input condition is met and there is no order in the market, a new order is sent in. If the element had already sent an order in, the price and the remaining quantity of the order are checked to verify whether they match the current input values. If they are not the same, the order in the market is modified to adapt it to the new price and quantity values.

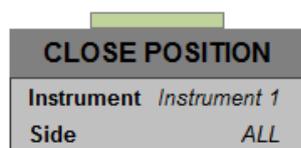
Inputs

Name	Label	Type	Comment
Signal	S	Logical	True or false
Price	P	Numerical	
Quantity	Q	Numerical	

Parameters

Name	Type	Description
Instrument	Drop-down list	Instruments used in the strategy may be selected
Side	Drop-down list	Options: BUY / SELL
Stop	Drop-down list	Options: OFF / PRICE / PERCENTAGE
Stop Value	Numerical	Price in the same unit as the price reported by the market, or percentage change between the current price and the initial execution price
Take Profit	Drop-down list	Options: OFF / PRICE / PERCENTAGE
Take Profit Value	Numerical	Options: price in the same unit as the price reported by the market, or percentage change between the current price and the initial execution price
Trailing Stop	Drop-down list	Options: OFF / PRICE / PERCENTAGE
Trailing Value	Numerical	Options: maximum decrease in the price compared with the execution price (units), or maximum decrease in the profit compared with the highest profit value (percentage)
Trailing Profit Target	Numerical	Increase in the price compared with the execution price (units)

Close Position



Close Position closes position when the input condition is met.

The 'Instrument' parameter allows users to select the instrument whose position will be closed in the strategy.

The 'Side' parameter allows users to choose between long, short, or both, when it comes to closing the position. The element automatically checks the position and sends in an order with the appropriate size and side (long/short) to close it.

This element also cancels subordinate orders that remain active for the selected instrument. If Long or Short is selected in Close Position, orders that have been entered as a result of the execution of same-side orders (long, short, or all) will be cancelled. For example, if Long is selected, Stop and Take Profit orders that have been entered as a result of the execution of Buy Market or Buy Limit orders will be cancelled.

Subordinate orders are cancelled whether there is a position or not. If Stop and Take Profit orders associated with Market Order and Limit Order elements are used, it is recommended to close the position only with the Close Position element or to wait for its closure by the Stop or Take Profit orders.

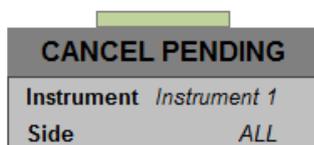
Inputs

Name	Label	Type	Comment
Signal		Logical	

Parameters

Name	Type	Description
Instrument	Drop-down list	One of the instruments used in the strategy may be selected
Side	Drop-down list	Options: LONG / SHORT / ALL

Cancel Pending



Cancel Pending cancels orders pending execution in the market. They are usually Limit Orders, but it can also be used for Market Orders that, for some reason, are pending execution.

The parameters 'Instrument' and 'Side' are used to determine which orders will be cancelled.

This element does not cancel pending orders that have been sent out as subordinate orders, namely, Stop and Take Profit orders.

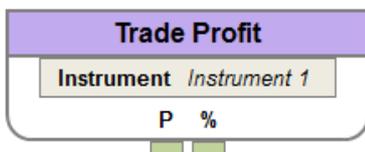
Inputs

Name	Label	Type	Comment
Signal		Logical	

Parameters

Name	Type	Description
Instrument	Drop-down list	One of the instruments used in the strategy may be selected
Side	Drop-down list	Options: LONG / SHORT / ALL

Trade Profit



With each recalculation of the strategy, Trade Profit provides the profit from the opened position concerning the selected instrument.

The Profit (P) output stores the profit in the instrument's currency. The calculation takes the size of the order into account.

The Profit Percentage (%) output stores the profit percentage, which is profit per unit (contract, share, etc.) divided by the execution price and multiplied by 100. If the position is the result of different orders or partial fills, the execution price will be the weighted average price.

This element does not take commissions into account.

Outputs

Name	Label	Type	Comment
Profit	P	Numerical	
Percentage Profit	%	Numerical	

Parameters

Name	Type	Description
Instrument	Drop-down list	One of the instruments used in the strategy may be selected

Strategy Profit

Strategy Profit

With every recalculation of the strategy, Strategy Profit provides the realized profit that the strategy has accumulated.

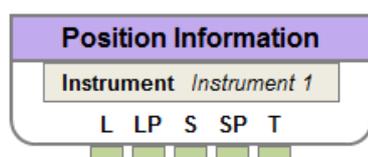
The result is the accumulated profit that has been realized since the start of the strategy. Therefore, the value is modified only when a position is closed. In this case, the profit is expressed in the base currency of the strategy, which is chosen at the moment of uploading the strategy to backtest or execution.

This element does not take commissions into account.

Outputs

Name	Label	Type	Comment
Profit		Numerical	

Position Information



With each recalculation of the strategy, Position Information provides information on the position concerning the instrument chosen as a parameter.

This element enables users to know whether the position is long or short as well as its size. It also stores the date and the time when the position was opened. If the position is modified without closing, the initial opening time of the position does not change.

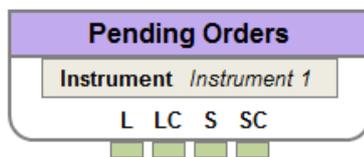
Outputs

Name	Label	Type	Comment
Long	L	Logical	True if position is long
Long Position	LP	Numerical	It stores position size if the position is long. Otherwise, it equals 0
Short	S	Logical	True if position is short
Short Position	SP	Numerical	It stores position size if the position is long. Otherwise, it equals 0
Time	T	Date and time	Date and time when the position is opened

Parameters

Name	Type	Description
Instrument	Drop-down list	One of the instruments used in the strategy may be selected

Pending Orders



With each recalculation of the strategy, Pending Orders provides information about orders sent to market that have not been completely executed.

This element enables users to know if there are pending orders (long or short), as well as the quantity pending execution. It includes all the orders that have been created but not completed or cancelled. It also includes Stop, Take Profit and Trailing Stop orders created when the initial execution order completely or partially fills.

Outputs

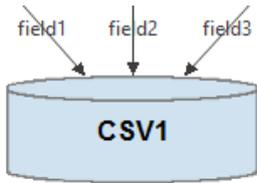
Name	Label	Type	Comment
Long	L	Logical (true/false)	True if position is long
Long Contracts	LC	Numerical	It stores quantity pending execution if the position is long. Otherwise, it equals 0
Short	S	Logical (true/false)	True if position is short
Short Contracts	SC	Numerical	It stores quantity pending execution if the position is short. Otherwise, it equals 0

Parameters

Name	Type	Description
Instrument	Drop-down list	One of the instruments used in the strategy may be selected

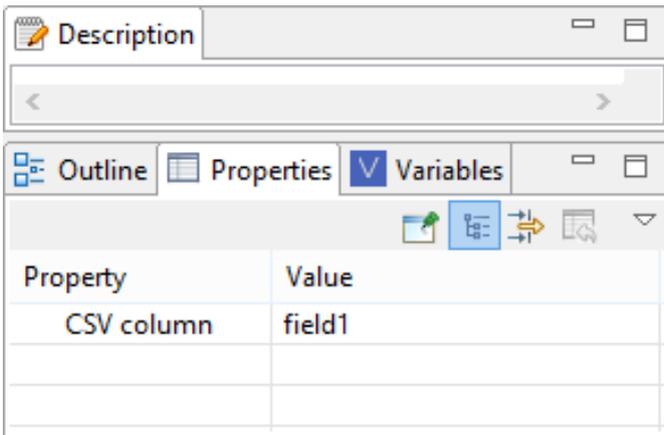
Reporting

CSV

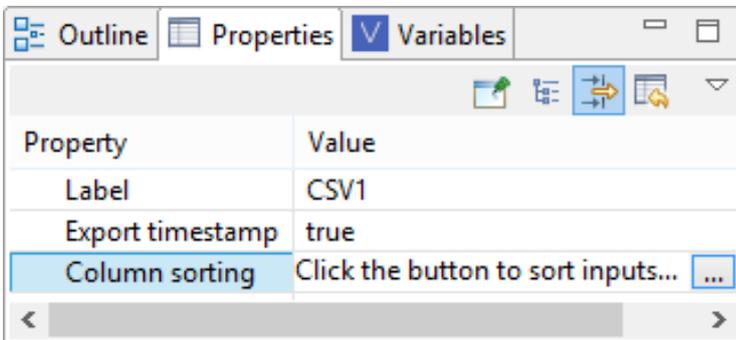


The CSV element allows users to store output data from any element in the strategy during a **backtest** to save it in a CSV file. Therefore, outputs from any element may be connected to the CSV element. With each recalculation of the strategy, a new row with the values from all the linked outputs will be added to a data table.

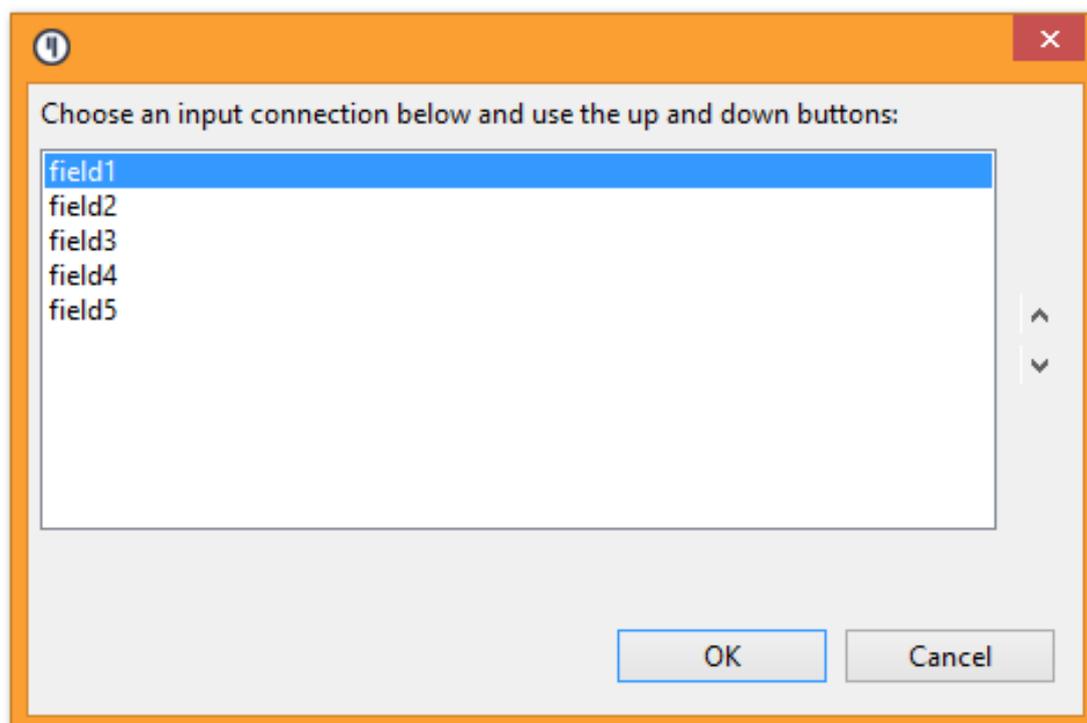
The only parameter displayed in the figure of this element is its label. Every link to the CSV element also has a label that will be the name of the column in the CSV file. The name of the connecting link may be modified by selecting the link and editing the name in the 'Properties' area. Click on the connecting link in 'Select' mode to select it.



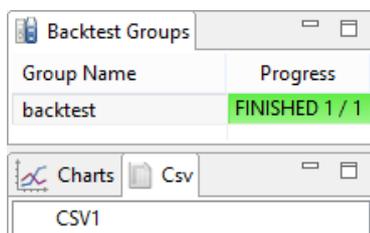
In the Properties area, users may choose to save date and time from every input ('Export timestamp') or to sort the columns in the CSV file ('Column sorting'). When 'Column sorting' is selected, a button appears in the 'Value' column. Click on it to open the column for column sorting.



Select a field and scroll down the list by clicking the arrows on the right to change the field's position. Once finished, click 'OK' to save it.



After finishing a backtest, the results stored in the CSV element can be accessed from the Csv area in the Report View. Each CSV element in the strategy will have its corresponding input in the Csv area. Inputs are identified with the label of the CSV element. Double-click on the selected input and choose the location where you wish to save the CSV file.



Inputs

Name	Label	Type	Comment
Value		Any type	It accepts any number of inputs of any type

Parameters

Name	Type	Description
Name	Text	

References

[1] <http://qubitia.com/qcaid-training/>

[2] <mailto:support.qcaid@qbitia.com>

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