



uTrade

# API USER MANUAL

API Version 2.0.1

Date Aug 2, 2018

## Company Overview

**uTrade Solutions** is a fintech company providing enterprise software for financial trading, including multi-asset trading platform, algorithms and risk management solutions to financial institutions and their end customers. Our product suite includes the following:

- ✓ **Low latency algorithmic trading platform:** Used in exchange co-location environment or in client data centers/cloud for fastest access to markets to execute arbitrage, market making, execution, excel based, quant driven, API based proprietary and various other strategies across all asset classes. It also provides FIX APIs for DMA and Algos access.
- ✓ **Multi Asset Trading platform:** with full suite application and html5 web-based front ends (Including admin functions, risk management, order management, connectivity to exchanges etc.). It supports trading for all listed products including equities, futures, options, commodities, as well as for non-listed products like FX etc.
- ✓ **Open Source, Risk Management, and Custom Solutions:** We also customize and open source some modules of our technologies.
- ✓ **Hashcove** - uTrade's partner firm Hashcove is driving new age technology solutions around crowdsourced digital platforms.

We have built our products from ground-up with a modular architecture in order to effectively address current and rapidly evolving user needs. We have also filed for 6 patents in India and 1 patent in US/UK to lead innovation in the trading life cycle.

Please watch our video demos at:

- [www.youtube.com/utradesolutions](http://www.youtube.com/utradesolutions)
- [www.youtube.com/hashcove](http://www.youtube.com/hashcove)

uTrade Solutions was recognized as a leading innovative fintech start-up by



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# 1.Disclaimer

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## 2. Preface

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The objective of this document is to guide the users to understand uTrade's latency sensitive API interface for coding custom strategies. This document explains all the features available in the API 2.0.1

## 3. Scope of Document

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The scope of this document is to specify the steps to write custom strategy (both front-end and backend logic) which can work with uTrade's latency sensitive algorithmic trading platform. It explains various features of the API 2.0.1, does not cover the inbuilt strategies which come with the uTrade platform.



## 4. Overview

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- ✓ uTrade's API 2.0.1 provides backend infrastructure, which allows you to create your own latency sensitive strategies and run with uTrade's latency sensitive trading platform.
- ✓ Custom strategies can be written only in C++ (Linux platform)
- ✓ New custom strategies can be integrated and run in the platform on the fly with no effect on the already running strategies. They can be run from the same front-end.
- ✓ Risk Management features are also available, same as the trading platform.
- ✓ You will have to code only for backend strategy.
- ✓ You need to generate Frontend using an in-built tool.
- ✓ Custom strategy can be run with both TBT and snapshot feed. Latest data (order book) is provided to the strategy on request basis.
- ✓ API 2.0.1 supports all segments of NSE, BSE, SGX, CFH

## 5. Steps for writing and running custom strategy

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- ✓ You need to generate front-end using an in-built tool
- ✓ You need to code and create custom strategy .so file (as shared object or dynamic library) ✓  
At back-end, you need to copy the .so to custom strategy folder.
- ✓ Now, to run the strategy from front-end, you need to specify the name of .so file.
- ✓ Automatically, the strategy gets loaded in the application
- ✓ Now you can run the strategy



# 6. Designing Front-end for Custom Strategy

Select parameters from tool box that you wish to see on the frontend window.

Depending on the type of parameter, front-end form gets generated where you can fill values based on logic, and integrate with the custom strategy back-end implementation.

## 6.1 Tool Box

| Leg                                       | Instrument | Order Mode |
|---|------------|------------|
| <input checked="" type="checkbox"/> Leg 1 | Stock      | Buy        |
| <input checked="" type="checkbox"/> Leg 2 | Stock      | Buy        |
| <input type="checkbox"/> Leg 3            | Stock      | Buy        |
| <input type="checkbox"/> Leg 4            | Stock      | Buy        |

**ToolBox**

- ☒ Check Box
- 1** Qty Spin Box
- 1.2 Price Spin Box
- 1 Spin Box
- 1.2 Double Spin Box
- Combo Box
- Date/Time
- SEPARATOR
- STRETCH

**Strategy Params**

Properties

Create Preview

Select number of legs you want to view on the

frontend to run your custom

strategy. For e.g. if you want to create a 2 leg strategy, select two legs.



| Leg                                       | Instrument | Order Mode |
|---|------------|------------|
| <input checked="" type="checkbox"/> Leg 1 | Stock      | Buy        |
| <input checked="" type="checkbox"/> Leg 2 | Stock      | Buy        |
| <input type="checkbox"/> Leg 3            | Future     | Buy        |
| <input type="checkbox"/> Leg 4            | Option     | Buy        |

**ToolBox**

- Radio Button
- Check Box
- Qty Spin Box
- Price Spin Box
- Spin Box
- Double Spin Box
- Combo Box
- Date/Time
- SEPARATOR

**Strategy Params**

Properties

Create Preview

Select default instrument for different legs. If you want to run cash future strategy, select stock for first leg and future for second leg.

| Leg                                       | Instrument | Order Mode |
|---|------------|------------|
| <input checked="" type="checkbox"/> Leg 1 | Stock      | Buy        |
| <input checked="" type="checkbox"/> Leg 2 | Stock      | Sell       |
| <input type="checkbox"/> Leg 3            | Stock      | Buy        |
| <input type="checkbox"/> Leg 4            | Stock      | Buy        |

**ToolBox**

- Radio Button
- Check Box
- Qty Spin Box
- Price Spin Box
- Spin Box
- Double Spin Box
- Combo Box
- Date/Time
- SEPARATOR

**Strategy Params**

Properties

Create Preview

Select, buy or sell options for different legs. For e.g. if you want to sell cash and buy futures, select sell for leg one and buy for second leg.

Select Spin box for entering quantity or whole values. Define label like Order Quantity, define value range min and max, enter default value you want to trade on and update.

The screenshot shows the 'API Form Design Tool' window. The 'Symbols' table at the top lists four legs with their respective instruments and order modes. The 'ToolBox' on the left contains various UI controls, with 'Price Spin Box' selected. The 'Strategy Params' area on the right shows a list of parameters, with 'Price Spin Box' selected. The 'Properties' section at the bottom is configured for a 'price\_2' label, with a minimum value of 0.00, a maximum value of 99.00, and a default value of 0.00. The 'Update' button is visible next to the default value field.

| Leg                                       | Instrument | Order Mode |
|---|------------|------------|
| <input checked="" type="checkbox"/> Leg 1 | Stock      | Sell       |
| <input checked="" type="checkbox"/> Leg 2 | Future     | Buy        |
| <input type="checkbox"/> Leg 3            | Stock      | Buy        |
| <input type="checkbox"/> Leg 4            | Stock      | Buy        |

| ToolBox         | Strategy Params |
|-----------------|-----------------|
| Radio Button    | Qty Spin Box    |
| Check Box       | Qty Spin Box    |
| Qty Spin Box    | Price Spin Box  |
| Price Spin Box  |                 |
| Spin Box        |                 |
| Double Spin Box |                 |
| Combo Box       |                 |
| Date/Time       |                 |
| SEPARATOR       |                 |

Properties

Label: price\_2    Min Val: 0.00    Max Val: 99.00    Def Val: 0.00    Update

Create    Preview

Select double spin box for entering price or rational numbers. Define label like Min Profit, define price range min and max, set default price you want to trade on and update.

The screenshot shows the 'API Form Design Tool' window. The 'Symbols' table at the top lists four legs with their respective instruments and order modes. The 'ToolBox' on the left contains various UI controls, with 'Combo Box' selected. The 'Strategy Params' area on the right shows a list of parameters, with 'Combo Box' selected. The 'Properties' section at the bottom is configured for a 'combobox\_3' label, with a value field, an 'Add' button, a dropdown menu, a 'Remove' button, and an 'Update' button. The 'Update' button is visible next to the dropdown menu.

| Leg                                       | Instrument | Order Mode |
|---|------------|------------|
| <input checked="" type="checkbox"/> Leg 1 | Stock      | Sell       |
| <input checked="" type="checkbox"/> Leg 2 | Future     | Buy        |
| <input type="checkbox"/> Leg 3            | Stock      | Buy        |
| <input type="checkbox"/> Leg 4            | Stock      | Buy        |

| ToolBox         | Strategy Params |
|-----------------|-----------------|
| Radio Button    | Qty Spin Box    |
| Check Box       | Qty Spin Box    |
| Qty Spin Box    | Price Spin Box  |
| Price Spin Box  | Combo Box       |
| Spin Box        |                 |
| Double Spin Box |                 |
| Combo Box       |                 |
| Date/Time       |                 |
| SEPARATOR       |                 |

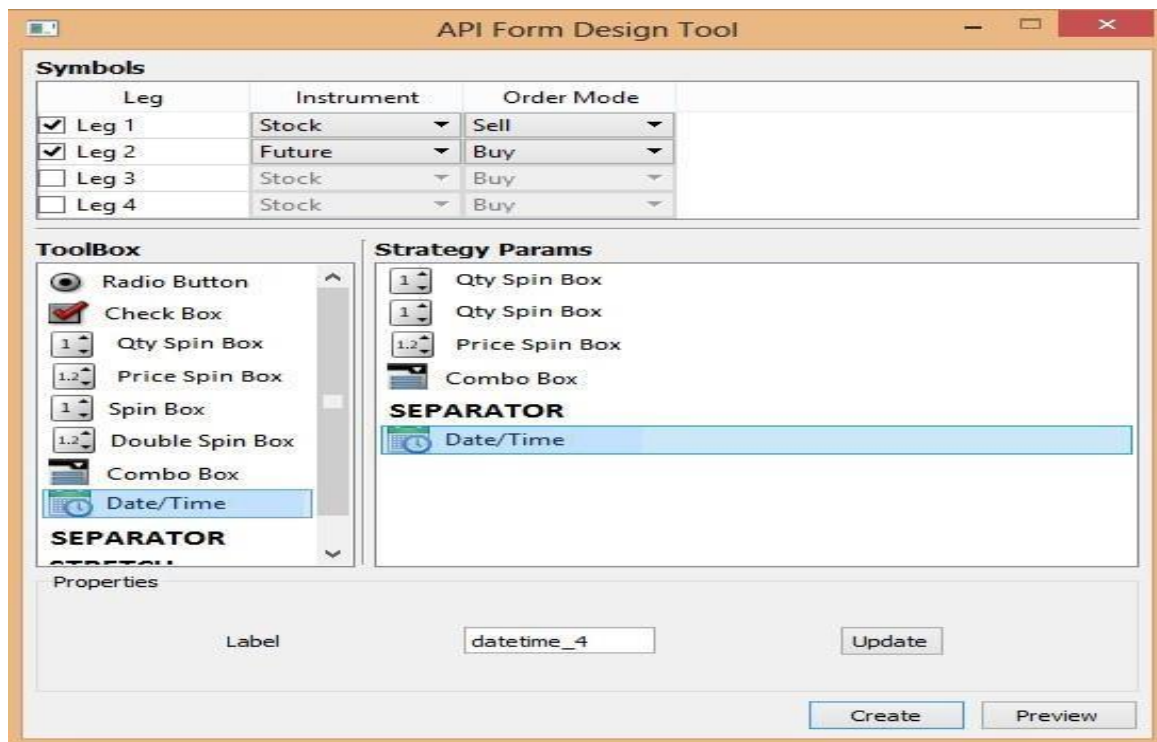
Properties

Label: combobox\_3    Value:    Add    combobox\_3    Remove    Update

Create    Preview

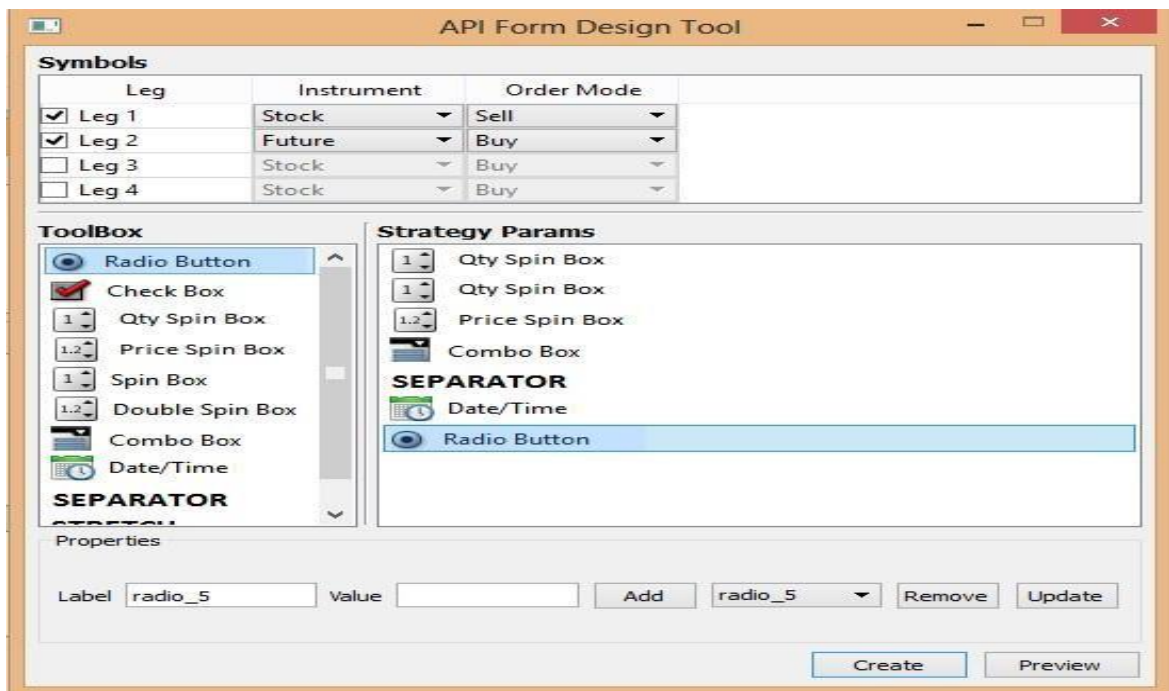


Combo will give a drop-down option. Label the Combo like Hedge Methods, add values like best bid, best ask, etc. you can add or remove the values, click on the value you want to see as default and update.

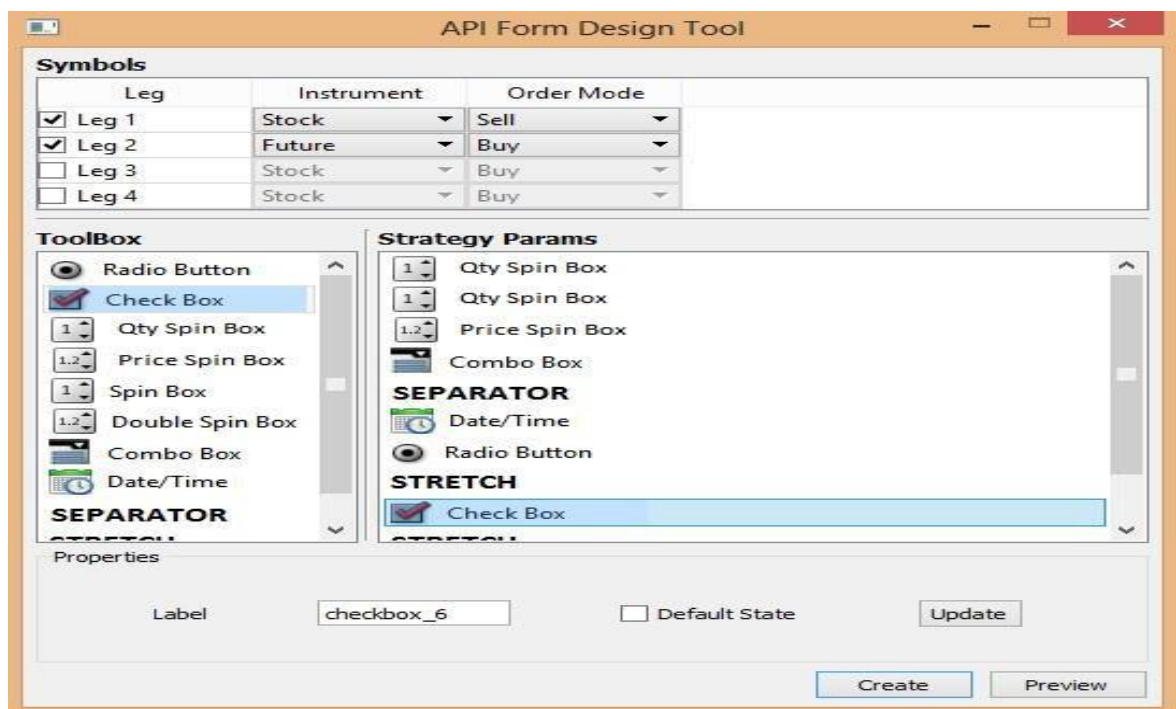


Separator adds a horizontal line and date/time adds a box with timer. You only have the option to edit the label.





Radio allows you to select either of the options; you have to add minimum 2 values in radio. Label will not appear on the screen, you can only view the values, select one of the value and update.



Stretch will create a gap between two different parameters. Check box allows you to select multiple options; you can select more than one option. Add label to the check box, select on default state if you want this particular box to be checked.

The API Form Design Tool window is used to configure the front-end form. It includes the following sections:

- Symbols:** A table for configuring order legs.
 

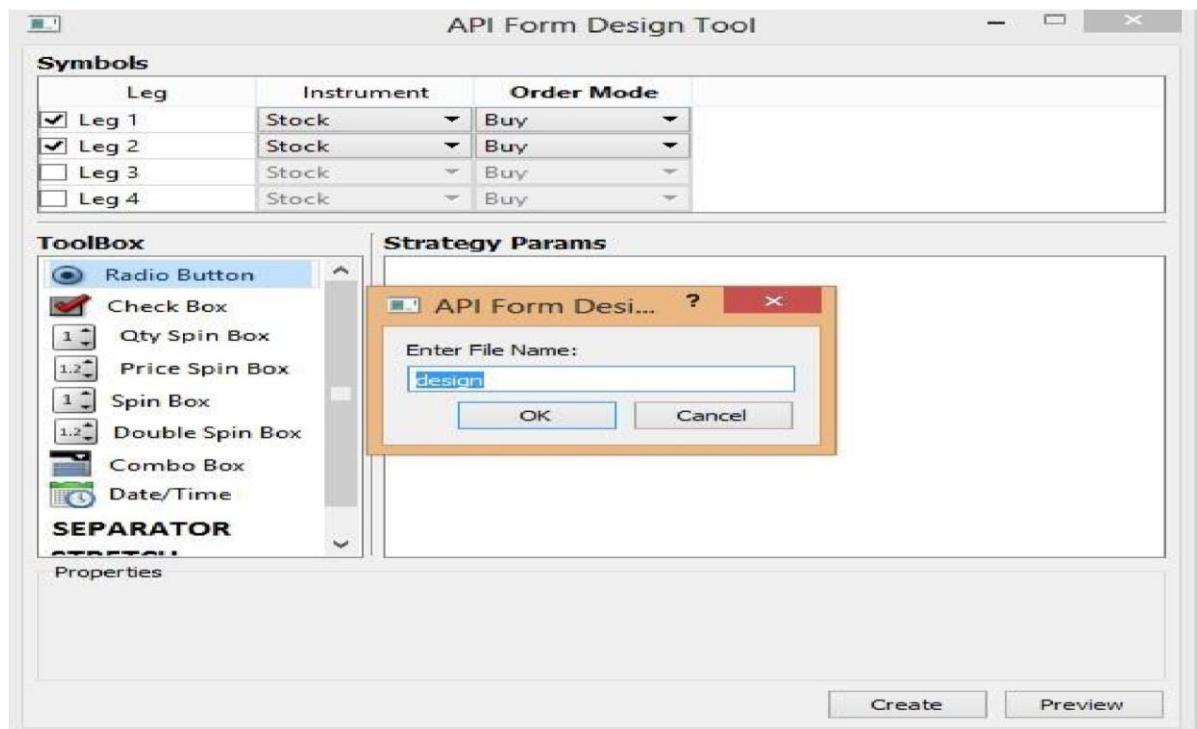
| Leg                                       | Instrument | Order Mode |
|---|------------|------------|
| <input checked="" type="checkbox"/> Leg 1 | Future     | Buy        |
| <input checked="" type="checkbox"/> Leg 2 | Stock      | Sell       |
| <input type="checkbox"/> Leg 3            | Stock      | Buy        |
| <input type="checkbox"/> Leg 4            | Stock      | Buy        |
- ToolBox:** A list of UI components available for the form, including Radio Button, Check Box, Qty Spin Box, Price Spin Box, Spin Box, Double Spin Box, Combo Box, Date/Time, SEPARATOR, and STRETCH.
- Strategy Params:** A list of parameters to be included in the form, such as Qty Spin Box, Price Spin Box, Combo Box, SEPARATOR, Date/Time, Radio Button, STRETCH, and Check Box.
- Properties:** Fields for configuring the selected parameter. For example, for a Qty Spin Box, the Label is 'Total Qty', Min Val is 0, Max Val is 10000, and Def Val is 100.
- Buttons:** 'Create' and 'Preview' buttons at the bottom right.

Click on preview to see the window which will appear on front-end.

The Preview window displays the final front-end form based on the configurations in the API Form Design Tool. It includes the following sections:

- Order Entry:** Fields for Mode (SELL/BUY), Market (NSE), Instrument (Stock/Future), Symbol, Series, Expiry, Opt Mode, Strike, and Lot Size.
- Strategy Params:** Fields for Total Qty (100), Order Qty (10), Min Profit (100.00), Hedge Methods (Best Bid/Ask), Timer (12:11:57.723), and checkboxes for Product, Actual, Chk Spread, and Bid Diff.
- Buttons:** 'New', 'Edit', 'Commit', 'Add', 'Remove', 'Run', 'Stop', and 'Stop All' buttons.
- Table:** A table with columns: Id, State, Comment, Risk Status, SYMBOL LEG1, Order Mode 1, SYMBOL LEG2, Order Mode 2, Total Qty, and Order Mode.

Based on your criteria and your default selection, this is how your front-end window will appear. If you don't want to modify, click on create and add enter file name.



The file will be created, go to your application folder and find the name of the file, open in notepad to view the code.

The **code** thus generated will be:

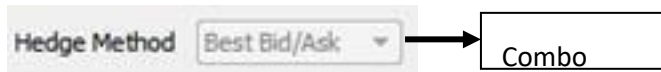
```
[SYMBOL]
SYMBOL LEG1=UINT64:F
Order Mode 1=UCHAR:1
SYMBOL LEG2=UINT64:F
Order Mode 2=UCHAR:0
[STRATEGY_PARAMS]
Total Qty=UINT64:SPINBOX:0:99999:1:Q
Order Qty=UINT64:SPINBOX:0:99999:1:Q
Min Profit=FLOAT:DSPINBOX:0.00:999.00:0.05:P
Hedge Method=COMBO:Market Order:Best Bid/Ask:Best
Ask/Bid:Best Bid/Ask
SEPARATOR=1
Timer=TIMER
Spd Type=RADIO:Product:Actual:Def Rule:Actual
STRETCH=1
Bid Diff Chk=BOOL:0
Bid Diff Val=UINT64:SPINBOX:0:999:0
[OTHER]
```

This file is required for **back-end implementation**.

## 6.2 How to use different parameters

### 6.2.1 COMBO

*Name=COMBO:Data 1:Data 2:Data 3*



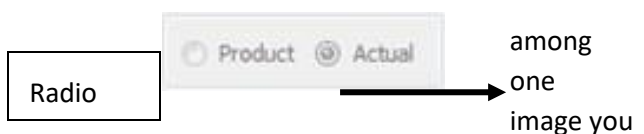
Combo is used to create any parameter with drop down option, like in above mentioned image you can click on drop down option and select different hedge methods.

### 6.2.2 RADIO

*Name=RADIO:Radio 1:radio 2:radio 3:radio 2*

Last value (radio 2) is default checked radio button.

Radio is used where parameter can be selected multiple options; however you can choose only one option. Radio is represented by circle. In above have multiple options, but you can only select either of the two.



### 6.2.3 CHECK BOX

Checkbox is used where parameter can be selected as true/false. Bool is represented by a check/square box.

### 6.2.4 SEPARATOR will create a horizontal line

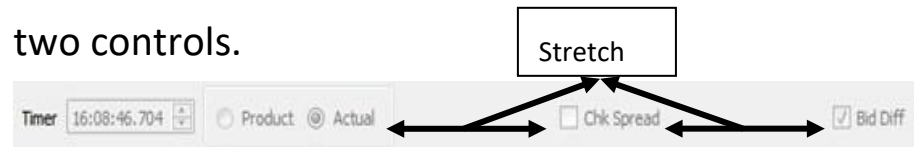


Separator is used where you want to divide the window to show different parameters in different row. In above image total qty, order qty, min profit and hedge methods are separated by horizontal line from other parameters like timer, product, actual, chk spread and bid diff.

### 6.2.5 STRETCH will create some space in between



two controls.



Stretch is used to create gap between the two parameters. In above image you can see there is a stretch between actual and chk spread, and chk spread and bid diff.

#### 6.2.6 Create box for quantity parameter

*Qty=UINT64:Q*

Q will be used for quantity.



To create box for values in whole number UINT64 is used. In above image to define quantity, which is a whole number, UINT64 is used. (SPIN BOX)

#### 6.2.7 Create box for price parameter

*Min Profit=FLOAT:P*

P will be used for Price.



To create box for values in natural number FLOAT is used. In above image to define price, which is a natural number, FLOAT is used. (DOUBLE SPIN BOX)

Note:

1. Whenever you are creating a symbol bar, order mode with it is compulsory. e.g.

**SYMBOL LEG1=UINT64**

*Order Mode 1=UCHAR*

The screenshot shows a trading interface with a symbol bar. The fields in the symbol bar are: BUY (dropdown), NSE (dropdown), Future (dropdown), INFY (text field), XX (dropdown), 29/05/20 (date field), and 125 (text field).

2. Line starting with # is comment and can't be used. e.g.

**#SYMBOL LEG3=UINT64**

# 7. Steps for writing a strategy (back-end implementation)

---

## 7.1 Create an external interface

Your strategy will run in the same process as muTrade backend application, your strategy will be created as a shared object.

The following functions are mandatory to be present: extern

“C”

{

// inside extern “C” Specifier

std :: string getFrontendDesign();

It is used to get the script file which will be passed to frontend, further it will render the GUI design using which you strategy will run.

void \* getDriver(void \* params);

It will be called when front-end issues strategy run command to the back-end.

Here params will point to object of class SG::Parameters defined in sgLib/sgApiParameters.h

}

Both of the above functions will need to be place under <extern “C”> specifier.

The strategy will be running inside the HFT back-end.

See [API-Documentation](#)

## 7.2 Inherit from API2::SGContext

Here you need to write you own class which inherits [API2::SGContext](#).



[API2::SGContext](#) provides various functionalities such as Market Data Subscription, Order Execution, OrderBook and Net Position processing and will provide your derived class various Event call-backs for different types of Order Confirmations.

See [API-Documentation](#)

## 7.3 Write your core strategy logic in your derived class.

Here you need to write your core strategy logic, which will be executed on various Events provided such as

### 7.3.1 Market Data Event:

For enabling this event use:

marketDataEventRequired = true while starting the algo

See [API-Documentation](#)

This event call-back is generated whenever there is a change in market feed for the subscribed Feed Type (TBT Feed or Snapshot Feed)

### 7.3.2 On Frontend Command:

This event call-back is generated whenever there is a command from frontend, like stop/modify strategy etc

See [API-Documentation](#)

### 7.3.3 On Order Confirmations:

This event call-back is generated whenever an Exchange Order Confirmation (new/modify confirmed/rejected/partially-filled/filled) is received. The call-back is generated after process the Confirmation.

See [API-Documentation](#)

### 7.3.4 General Event call-back:

([API2::SGContext::onDefaultEvent](#))





This call-back is generated if none out of the above event has occurred.

For enabling this event use `marketDataEventRequired = false`

while starting the algo using [API2::SGContext::reqStartAlgo\(\)](#)

See [API-Documentation](#)

## 7.4 Drive the algo:

Read the front-end parameters and construct object for your

derived class and call the [API2::SGContext::reqStartAlgo\(\)](#)

# 8. Things to do before calling Start Algo

---

## 8.1 Add all the instruments to be used in the strategy.

- To add an instrument use:

**API2::SGContext** or **API2::SGContext::createNewInstrument**

- If required for market data subscription, set the subscription parameters accordingly.

See [API-Documentation](#). By calling the above functions, a new instrument is created and market data is subscribed as requested, for that particular symbol (configurable). This function will set up instrument, which will aid you with functionalities such as to monitor, Net Positions, Order Status etc.

## 8.2 Choose start Algo function argument

After market data subscription, you can call [API2::SGContext::reqStartAlgo](#) function; this takes a single argument, **marketDataEventRequired**.

- **If it is set to true**, then strategy will receive an event, every time feed changes in any symbol, registered.



All symbols that are subscribed infra will monitor them and whenever feed change is detected event callback `onMarketDataEvent` is generated


- If it is set to false, then strategy is responsible to update quote, to receive latest quotes. Whenever a general event call-back.

`API2::SGContext::onDefaultEvent` is generated infinitely. The algo is required to update Market Data, by calling `API2::SGContext::reqUpdateMarketData()` to update market data.

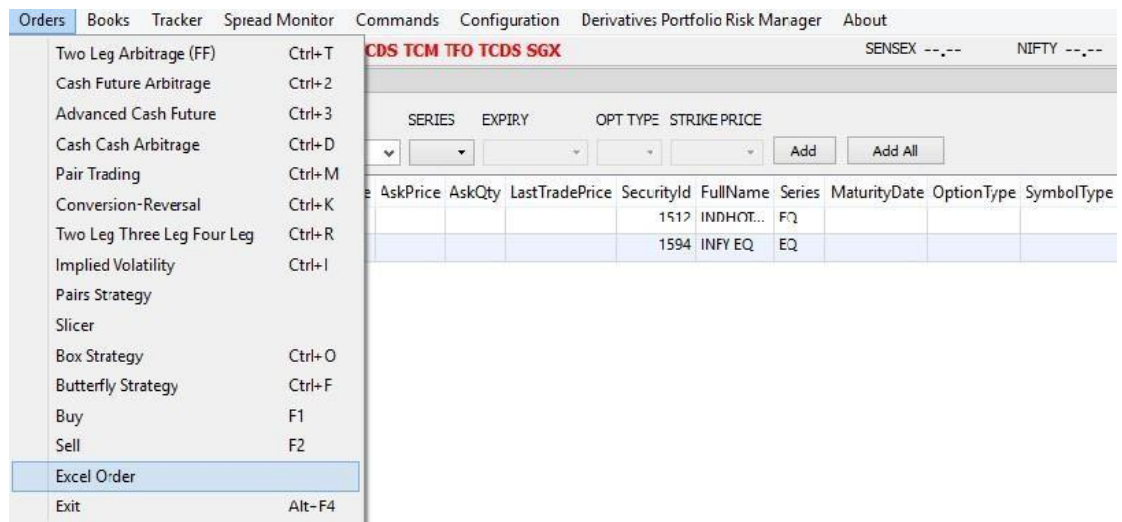
## 9. Excel Feeder based Trading

Excel feeder is an api based algo trading application software, which is not used for latency sensitive algo trading. You can create your own strategies and implement them.

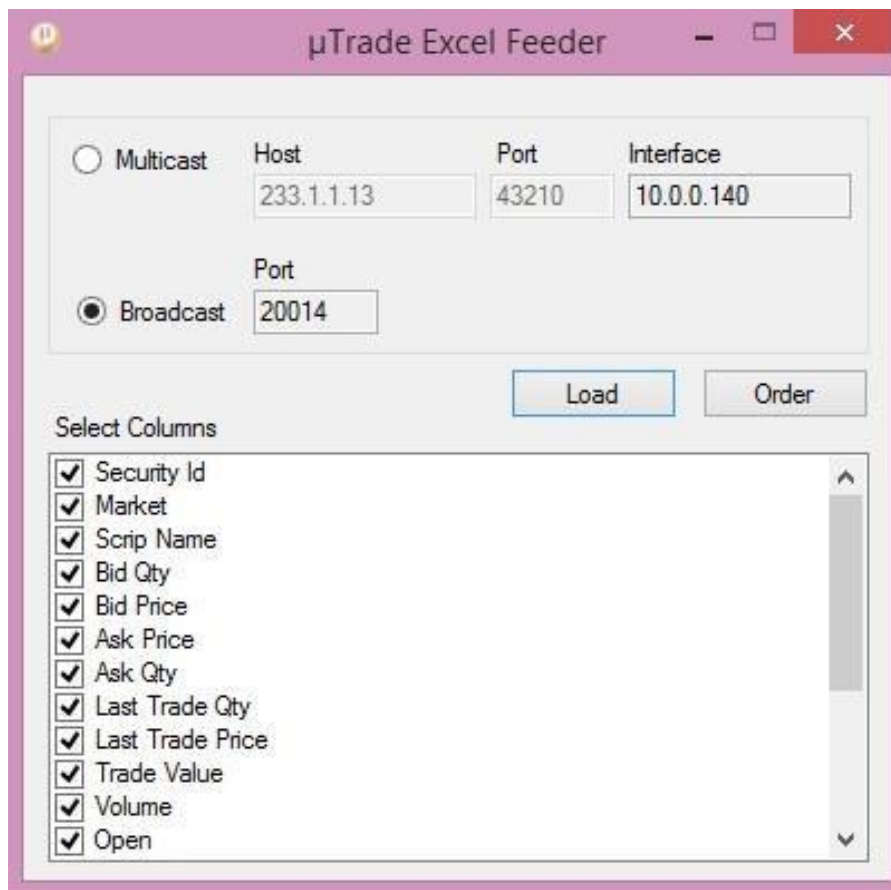
Login to your account using muTrade application; fill in your login credentials.



After successful login, go to the main menu bar and click on **"Orders"**, select **"Excel Order"**.



Excel order will open a new window (following is the image)



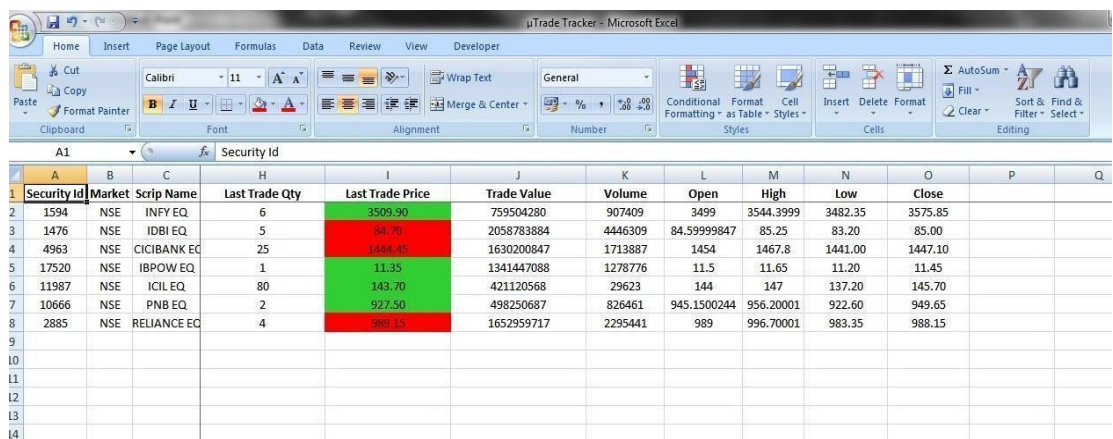
Select the option (Multicast or Broadcast) from where you want to get the feeds. You can also select the columns you want to display on your excel file.

You can also change the location of various columns.

Once you have selected the columns click on **“Order”**. It will open muTrade Application tracker. There are 5 sheets in muTrade Tracker namely:

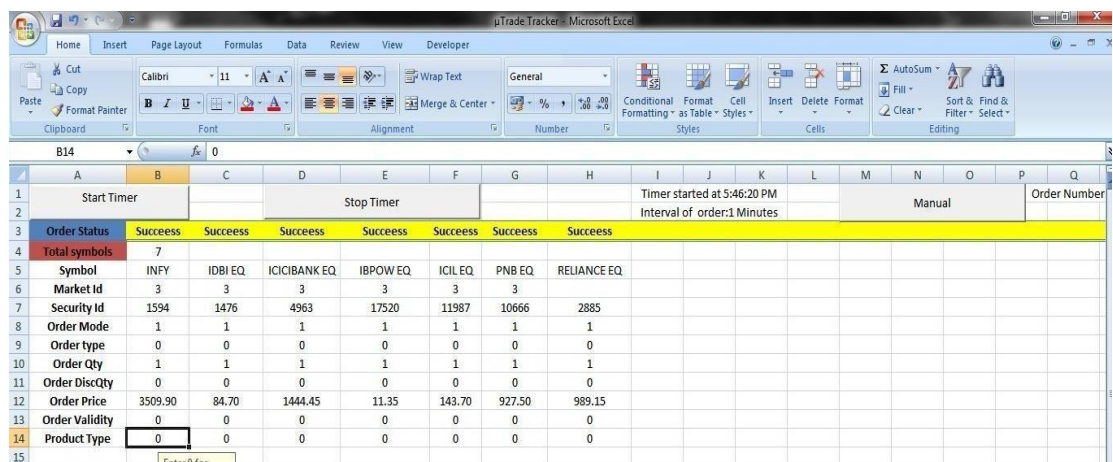
1. Feed
2. Order
3. LTP
4. Log
5. OHLC

**Feed:** Its similar to Market watch, you simply need to add Security ID, Market and the Scrip Name. You will receive the feeds automatically.



| Security Id | Market | Scrip Name  | Last Trade Qty | Last Trade Price | Trade Value | Volume  | Open        | High      | Low     | Close   |
|-------------|--------|-------------|----------------|------------------|-------------|---------|-------------|-----------|---------|---------|
| 1594        | NSE    | INFY EQ     | 6              | 3509.90          | 759504280   | 907409  | 3499        | 3544.3999 | 3482.35 | 3575.85 |
| 1476        | NSE    | IDBI EQ     | 5              | 14.70            | 2058783884  | 4446309 | 84.59999847 | 85.25     | 83.20   | 85.00   |
| 4963        | NSE    | CICIBANK EQ | 25             | 1894.40          | 1630200847  | 1713887 | 1454        | 1467.8    | 1441.00 | 1447.10 |
| 17520       | NSE    | IBPOW EQ    | 1              | 11.35            | 1341447088  | 1278776 | 11.5        | 11.65     | 11.20   | 11.45   |
| 11987       | NSE    | ICIL EQ     | 80             | 143.70           | 421120568   | 29623   | 144         | 147       | 137.20  | 145.70  |
| 10666       | NSE    | PNB EQ      | 2              | 927.50           | 498250687   | 826461  | 945.1500244 | 956.20001 | 922.60  | 949.65  |
| 2885        | NSE    | RELIANCE EQ | 4              | 989.15           | 1652959717  | 2295441 | 989         | 996.70001 | 983.35  | 988.15  |

**Order:** It allows you to place orders manually or in an automated manner after a certain time interval as defined by the trader.



| Order Status   | Success | Success | Success      | Success  | Success | Success | Success     |
|----------------|---------|---------|--------------|----------|---------|---------|-------------|
| Total symbols  | 7       |         |              |          |         |         |             |
| Symbol         | INFY    | IDBI EQ | ICICIBANK EQ | IBPOW EQ | ICIL EQ | PNB EQ  | RELIANCE EQ |
| Market Id      | 3       | 3       | 3            | 3        | 3       | 3       |             |
| Security Id    | 1594    | 1476    | 4963         | 17520    | 11987   | 10666   | 2885        |
| Order Mode     | 1       | 1       | 1            | 1        | 1       | 1       | 1           |
| Order type     | 0       | 0       | 0            | 0        | 0       | 0       | 0           |
| Order Qty      | 1       | 1       | 1            | 1        | 1       | 1       | 1           |
| Order DiscQty  | 0       | 0       | 0            | 0        | 0       | 0       | 0           |
| Order Price    | 3509.90 | 84.70   | 1444.45      | 11.35    | 143.70  | 927.50  | 989.15      |
| Order Validity | 0       | 0       | 0            | 0        | 0       | 0       | 0           |
| Product Type   | 0       | 0       | 0            | 0        | 0       | 0       | 0           |



If you chose to place order in an automated manner, you need to add a time limit after which the order will be generated automatically and start the timer, if you wish to stop the orders from getting generated you may stop the timer.

You can also place orders manually.

**Order Status** gives an update whether the order placed is successful or if there is something lacking or some information left unfilled.

**Total Symbols:** allow you to define the number of orders you want to place, for e.g. if you want to buy first three instruments then you'll type 3.

In case you want to buy last two symbols, then you need to rearrange the symbols and type 2 so that first two instruments order gets generated.

**Symbol:** Allows you to enter symbols you want to trade on.

**Market ID:** Select and Enter Market ID. View comments when you click on Market ID.

**Security ID:** Enter the Security ID of each scrip

**Order Mode:** Select buy/sell order. Click on the order mode to read comments.

**Order Type:** Allows you to select limit/market order. Click on the order type to view comments.

**Order Quantity:** Define quantity you wish to buy for each symbol.

**Order Disclose Quantity:** Enter disclose quantity of each symbol as defined by the exchange.

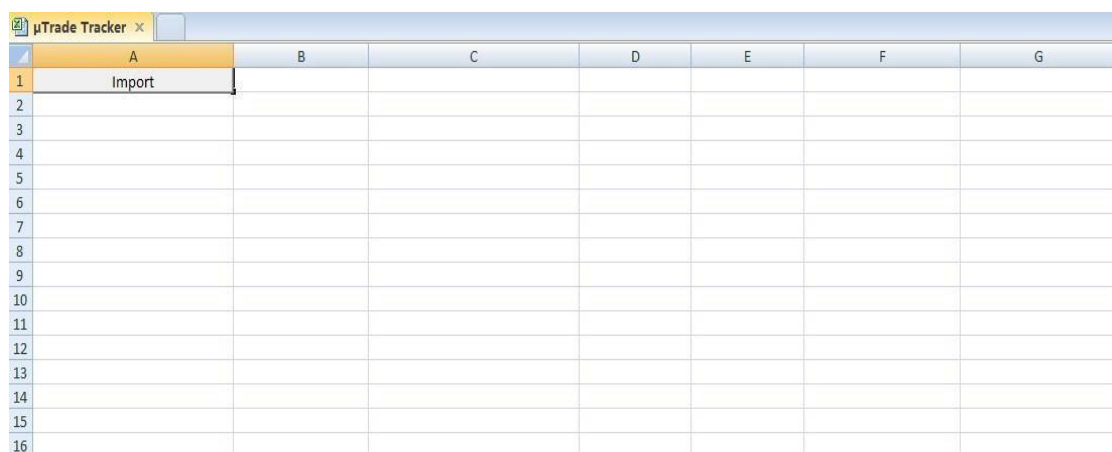
**Order Price:** It is the price that the trader will provide by applying his strategy. This row will be mapped to the strategy page where the order price gets generated.

**Order Validity:** Select Day/IOC order. Click on the order validity to view comments.

**Product type:** Select Intraday/delivery order. Click on the product type to view comments.



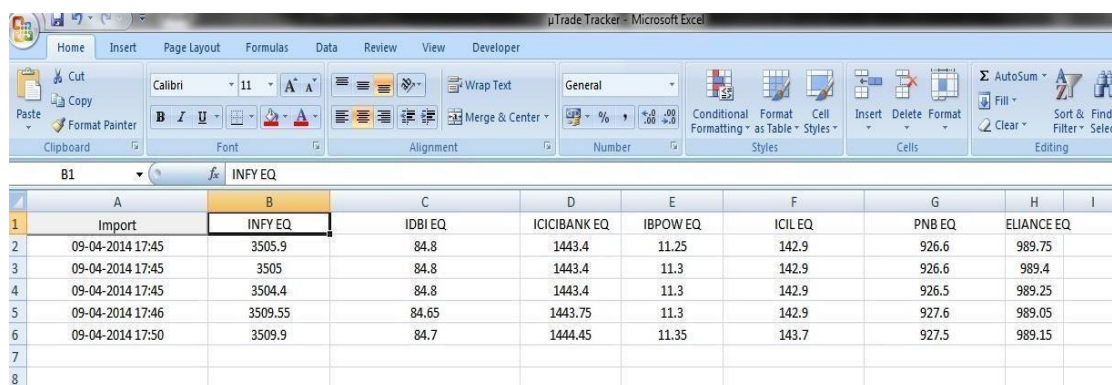
**LTP:** LTP gets auto populated when you click on Import Button. You will see all the symbols added to your orders page getting populated to LTP sheet.



|    | A      | B | C | D | E | F | G |
|----|--------|---|---|---|---|---|---|
| 1  | Import |   |   |   |   |   |   |
| 2  |        |   |   |   |   |   |   |
| 3  |        |   |   |   |   |   |   |
| 4  |        |   |   |   |   |   |   |
| 5  |        |   |   |   |   |   |   |
| 6  |        |   |   |   |   |   |   |
| 7  |        |   |   |   |   |   |   |
| 8  |        |   |   |   |   |   |   |
| 9  |        |   |   |   |   |   |   |
| 10 |        |   |   |   |   |   |   |
| 11 |        |   |   |   |   |   |   |
| 12 |        |   |   |   |   |   |   |
| 13 |        |   |   |   |   |   |   |
| 14 |        |   |   |   |   |   |   |
| 15 |        |   |   |   |   |   |   |
| 16 |        |   |   |   |   |   |   |

In case of automated trading, the LTP will get updated after specific time interval as defined by the trader.

In case of manual trading, the LTP gets updated every time the trader places an order.



|   | A                | B       | C       | D            | E        | F       | G      | H          | I |
|---|------------------|---------|---------|--------------|----------|---------|--------|------------|---|
| 1 | Import           | INFY EQ | IDBI EQ | ICICIBANK EQ | IBPOW EQ | ICIL EQ | PNB EQ | ELIANCE EQ |   |
| 2 | 09-04-2014 17:45 | 3505.9  | 84.8    | 1443.4       | 11.25    | 142.9   | 926.6  | 989.75     |   |
| 3 | 09-04-2014 17:45 | 3505    | 84.8    | 1443.4       | 11.3     | 142.9   | 926.6  | 989.4      |   |
| 4 | 09-04-2014 17:45 | 3504.4  | 84.8    | 1443.4       | 11.3     | 142.9   | 926.5  | 989.25     |   |
| 5 | 09-04-2014 17:46 | 3509.55 | 84.65   | 1443.75      | 11.3     | 142.9   | 927.6  | 989.05     |   |
| 6 | 09-04-2014 17:50 | 3509.9  | 84.7    | 1444.45      | 11.35    | 143.7   | 927.5  | 989.15     |   |
| 7 |                  |         |         |              |          |         |        |            |   |
| 8 |                  |         |         |              |          |         |        |            |   |

**Log:** It allows you to view all the trades that are confirmed from the application and sent to the frontend application; once the order is placed successfully the data will get updated in the Log sheet.



|    | A    | B      | C         | D           | E          | F          | G         | H             | I           | J              | K            | L            | M |
|----|------|--------|-----------|-------------|------------|------------|-----------|---------------|-------------|----------------|--------------|--------------|---|
| 1  | TIME | Symbol | Market Id | Security Id | Order Mode | Order Type | Order Qty | Order DiscQty | Order Price | Order validity | Product Type | Order Status |   |
| 2  |      |        |           |             |            |            |           |               |             |                |              |              |   |
| 3  |      |        |           |             |            |            |           |               |             |                |              |              |   |
| 4  |      |        |           |             |            |            |           |               |             |                |              |              |   |
| 5  |      |        |           |             |            |            |           |               |             |                |              |              |   |
| 6  |      |        |           |             |            |            |           |               |             |                |              |              |   |
| 7  |      |        |           |             |            |            |           |               |             |                |              |              |   |
| 8  |      |        |           |             |            |            |           |               |             |                |              |              |   |
| 9  |      |        |           |             |            |            |           |               |             |                |              |              |   |
| 10 |      |        |           |             |            |            |           |               |             |                |              |              |   |

Below is an example of filled logs after the orders are successfully sent to front-end application.

|    | A                | B            | C         | D           | E          | F          | G         | H             | I           | J              | K            |
|----|------------------|--------------|-----------|-------------|------------|------------|-----------|---------------|-------------|----------------|--------------|
| 1  | TIME             | Symbol       | Market Id | Security Id | Order Mode | Order Type | Order Qty | Order DiscQty | Order Price | Order validity | Product Type |
| 2  | 09-04-2014 17:45 | INFY         | 3         | 1594        | 1          | 0          | 1         | 0             | 3505.899902 | 0              | 0            |
| 3  | 09-04-2014 17:45 | IDBI EQ      | 3         | 1476        | 1          | 0          | 1         | 0             | 84.80000305 | 0              | 0            |
| 4  | 09-04-2014 17:45 | ICICIBANK EQ | 3         | 4963        | 1          | 0          | 1         | 0             | 1443.400024 | 0              | 0            |
| 5  | 09-04-2014 17:45 | IBPOW EQ     | 3         | 17520       | 1          | 0          | 1         | 0             | 11.30000019 | 0              | 0            |
| 6  | 09-04-2014 17:45 | ICIL EQ      | 3         | 11987       | 1          | 0          | 1         | 0             | 142.8999939 | 0              | 0            |
| 7  | 09-04-2014 17:45 | PNB EQ       | 3         | 10666       | 1          | 0          | 1         | 0             | 926.5999756 | 0              | 0            |
| 8  | 09-04-2014 17:45 | INFY         | 3         | 1594        | 1          | 0          | 1         | 0             | 3505        | 0              | 0            |
| 9  | 09-04-2014 17:45 | IDBI EQ      | 3         | 1476        | 1          | 0          | 1         | 0             | 84.80000305 | 0              | 0            |
| 10 | 09-04-2014 17:45 | ICICIBANK EQ | 3         | 4963        | 1          | 0          | 1         | 0             | 1443.400024 | 0              | 0            |
| 11 | 09-04-2014 17:45 | IBPOW EQ     | 3         | 17520       | 1          | 0          | 1         | 0             | 11.30000019 | 0              | 0            |
| 12 | 09-04-2014 17:45 | ICIL EQ      | 3         | 11987       | 1          | 0          | 1         | 0             | 142.8999939 | 0              | 0            |
| 13 | 09-04-2014 17:45 | PNB EQ       | 3         | 10666       | 1          | 0          | 1         | 0             | 926.5999756 | 0              | 0            |
| 14 | 09-04-2014 17:45 | INFY         | 3         | 1594        | 1          | 0          | 1         | 0             | 3505        | 0              | 0            |
| 15 | 09-04-2014 17:45 | IDBI EQ      | 3         | 1476        | 1          | 0          | 1         | 0             | 84.69999695 | 0              | 0            |
| 16 | 09-04-2014 17:45 | ICICIBANK EQ | 3         | 4963        | 1          | 0          | 1         | 0             | 1443.400024 | 0              | 0            |
| 17 | 09-04-2014 17:45 | IBPOW EQ     | 3         | 17520       | 1          | 0          | 1         | 0             | 11.30000019 | 0              | 0            |
| 18 | 09-04-2014 17:45 | ICIL EQ      | 3         | 11987       | 1          | 0          | 1         | 0             | 142.8999939 | 0              | 0            |
| 19 | 09-04-2014 17:45 | PNB EQ       | 3         | 10666       | 1          | 0          | 1         | 0             | 926.5999756 | 0              | 0            |
| 20 | 09-04-2014 17:46 | INFY         | 3         | 1594        | 1          | 0          | 1         | 0             | 3509.550049 | 0              | 0            |

**OHLC:** When you click on import button placed on top left corner in LTP sheet the symbols in Order sheet automatically gets updated in OHLC sheet as well.

|    | A           | B      | C                 | D    | E    | F   | G                | H      | I | J | K                    | L |
|----|-------------|--------|-------------------|------|------|-----|------------------|--------|---|---|----------------------|---|
| 1  | Security Id | Symbol | Interval(Minutes) | Open | High | Low | Close/manual LTP | Volume |   |   | Default Interval = 1 |   |
| 2  |             |        |                   |      |      |     |                  |        |   |   |                      |   |
| 3  |             |        |                   |      |      |     |                  |        |   |   |                      |   |
| 4  |             |        |                   |      |      |     |                  |        |   |   |                      |   |
| 5  |             |        |                   |      |      |     |                  |        |   |   |                      |   |
| 6  |             |        |                   |      |      |     |                  |        |   |   |                      |   |
| 7  |             |        |                   |      |      |     |                  |        |   |   |                      |   |
| 8  |             |        |                   |      |      |     |                  |        |   |   |                      |   |
| 9  |             |        |                   |      |      |     |                  |        |   |   |                      |   |
| 10 |             |        |                   |      |      |     |                  |        |   |   |                      |   |

OHLC allows you to define time interval for updating OHLC values for individual scrips. For e.g. if you want to view OHLC values for different scrips at different intervals you may select the scrip and define time interval for getting OHLC values updated.





|    | A           | B            | C                 | D       | E           | F           | G              | H       | I | J | K | L                    |
|----|-------------|--------------|-------------------|---------|-------------|-------------|----------------|---------|---|---|---|----------------------|
| 1  | Security Id | Symbol       | Interval(Minutes) | Open    | High        | Low         | lose/manual LT | Volume  |   |   |   |                      |
| 2  | 1594        | INFY EQ      | 1                 | 3509.89 | 3510        | 3509.389893 | 3509.89        | 907409  |   |   |   | Default Interval = 1 |
| 3  | 1476        | IDBI EQ      | 2                 | 84.69   | 84.69000244 | 84.58999634 | 84.69          | 4446309 |   |   |   |                      |
| 4  | 4963        | ICICIBANK EQ | 1                 | 1444.44 | 1444.439941 | 1442.589966 | 1444.44        | 1713887 |   |   |   |                      |
| 5  | 17520       | IBPOW EQ     | 1                 | 11.35   | 11.35000038 | 11.35000038 | 11.35          | 1278776 |   |   |   |                      |
| 6  | 11987       | ICIL EQ      | 4                 | 0       | 143.6900024 | 143.6900024 | 143.69         | 29623   |   |   |   |                      |
| 7  | 10666       | PNB EQ       | 2                 | 927.5   | 927.789978  | 927.289978  | 927.5          | 826461  |   |   |   |                      |
| 8  | 2885        | RELIANCE EQ  | 1                 | 989.15  | 989.2000122 | 989         | 989.15         | 2295441 |   |   |   |                      |
| 9  |             |              |                   |         |             |             |                |         |   |   |   |                      |
| 10 |             |              |                   |         |             |             |                |         |   |   |   |                      |

## 10. Command Line

Command line allows trader to run their own strategies without using the front-end application. Client can directly run the strategy from back-end and deploy own algos.

You need to add following details:

- Server
- Server Port
- Client ID
- Password

Once you receive a successful login message

You will get a main menu as:

- 1) Load New Api
- 2) Start New Api Strategy
- 3) Terminate Strategy
- 4) Terminate All

\*\*\*\*\*

Use numerical to perform various task for e.g. to Start New Api Strategy, you need to input "2". Here is an example of how to run a strategy

->1

Load New Api

Please Enter .so file name

->libfutfut.so





Successfully added strategy libfutfut.so

->2

Start New Api Strategy

Current Loaded Strategy are

1) libfutfut.so

->1

## 11. Special Notes

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- ✓ Market data shall be subscription based, both TBT and snapshot feed can be subscribed by custom strategy. Latest data shall be provided.
- ✓ SDK type environment with a customer language to write strategy shall NOT be provided
- ✓ C++ API shall only be supported
- ✓ Backend will need to put checks on the data types of strategy parameters



# 12. Risk Management

## 12.1 Quantity Limits Check

The trading platform validates Order Quantity, and the order generation takes place only if it complies with the Surveillance Measures set for the User with respect to Maximum Single Order Quantity (both Buy/Sell), Maximum Total Order Quantity (both Buy/Sell) and Maximum Net Quantity.

The screenshot shows a window titled "Order Limits" with a "Login ID" dropdown set to "5001". The window contains two columns of input fields, each with a value of "1". The fields are: MAX SINGLE ORDER QTY, MAX SINGLE ORDER VAL, MAX TOTAL BUY QTY, MAX TOTAL BUY VAL, MAX TOTAL SELL QTY, MAX TOTAL SELL VAL, MAX NET QTY, MAX NET VAL, MAX BUY OUTSTANDING ORD VAL, MAX SELL OUTSTANDING ORD VAL, MAX BUY OUTSTANDING ORD QTY, MAX SELL OUTSTANDING ORD QTY, MAX M2M LOSS, and DEPOSIT. A "SUBMIT" button is located at the bottom right.

## 12.2 Order Value Check

The valid Order Value Generation takes place only if it complies with the Surveillance Measures set for the User with respect to Maximum Single Order Value (both Buy/Sell), Maximum Total Order Value (both Buy/Sell) and Maximum Net Value.

The screenshot shows the same "Order Limits" window as above, but with different fields highlighted with yellow boxes: MAX SINGLE ORDER VAL, MAX TOTAL BUY VAL, MAX TOTAL SELL VAL, and MAX NET VAL. All other fields and the "SUBMIT" button remain the same.

## 12.3 Price Range check

The order price generation mechanism strictly follows the specified Range provided to a trader to limit the risk within a pre-set percentage of the Last Trade Price (LTP). The percentage will be greater than



zero and less than or equal to the applicable circuit limits including dummy circuit limits in respect of all algorithmic/single orders.

| Global Risk Parameters      |                |
|-----------------------------|----------------|
| MAX ORDERS PER SECOND       | 999,999        |
| LIMIT PRICE PROTECTION (%)  | 20.00          |
| NSE INDEX PROTECTION (%)    | 10.00          |
| BSE INDEX PROTECTION (%)    | 10.00          |
| CASH MARGIN %age NSE        | 100.00         |
| CASH MARGIN %age BSE        | 100.00         |
| FUTURE MARGIN %age NSE      | 100.00         |
| FUTURE MARGIN %age BSE      | 100.00         |
| OPTION MARGIN %age NSE      | 100.00         |
| OPTION MARGIN %age BSE      | 100.00         |
| MARKET PROTECTION (%)       | 10.00          |
| BRANCH DEPOSIT NSE          | 9,999,999,999  |
| BRANCH DEPOSIT BSE          | 99,999,999,999 |
| TOTAL BUY QTY PER SECURITY  | 9,999,999      |
| TOTAL BUY VAL PER SECURITY  | 99,999,999,999 |
| TOTAL SELL QTY PER SECURITY | 9,999,999      |
| TOTAL SELL VAL PER SECURITY | 99,999,999,999 |
| BAD PRICE PROTECTION (%)    | 40.00          |
| CLOSE PROTECTION (%)        | 40.00          |

SUBMIT

## 12.4 Closing Price Check

The order price generation mechanism strictly follows the specified Range provided to a trader to limit the risk within a pre-set percentage of the Closing Price.

| Global Risk Parameters      |                |
|-----------------------------|----------------|
| MAX ORDERS PER SECOND       | 100,000        |
| LIMIT PRICE PROTECTION (%)  | 40.00          |
| NSE INDEX PROTECTION (%)    | 10.00          |
| BSE INDEX PROTECTION (%)    | 10.00          |
| CASH MARGIN %age NSE        | 100.00         |
| CASH MARGIN %age BSE        | 100.00         |
| FUTURE MARGIN %age NSE      | 100.00         |
| FUTURE MARGIN %age BSE      | 100.00         |
| OPTION MARGIN %age NSE      | 100.00         |
| OPTION MARGIN %age BSE      | 100.00         |
| MARKET PROTECTION (%)       | 5.00           |
| BRANCH DEPOSIT NSE          | 99,999,999,999 |
| BRANCH DEPOSIT BSE          | 99,999,999,999 |
| TOTAL BUY QTY PER SECURITY  | 9,999,999      |
| TOTAL BUY VAL PER SECURITY  | 99,999,999,999 |
| TOTAL SELL QTY PER SECURITY | 9,999,999      |
| TOTAL SELL VAL PER SECURITY | 99,999,999,999 |
| BAD PRICE PROTECTION (%)    | 40.00          |
| CLOSE PROTECTION (%)        | 40.00          |

SUBMIT

## 12.5 Trade Price Protection Check (Bad trade Protection)

By defining a field value in Bad Price Protection % Change, order price generation can be restricted within a set percentage of last two LTP (Last trade price). Algo trade generation beyond set price bracket will result into rejection/freeze of the respective Algo rule until consecutive LTP received is within the set % range.

| Global Risk Parameters     |         |                             |                |
|----------------------------|---------|-----------------------------|----------------|
| MAX ORDERS PER SECOND      | 100,000 | MARKET PROTECTION (%)       | 5.00           |
| LIMIT PRICE PROTECTION (%) | 40.00   | BRANCH DEPOSIT NSE          | 99,999,999,999 |
| NSE INDEX PROTECTION (%)   | 10.00   | BRANCH DEPOSIT BSE          | 99,999,999,999 |
| BSE INDEX PROTECTION (%)   | 10.00   | TOTAL BUY QTY PER SECURITY  | 9,999,999      |
| CASH MARGIN %age NSE       | 100.00  | TOTAL BUY VAL PER SECURITY  | 99,999,999,999 |
| CASH MARGIN %age BSE       | 100.00  | TOTAL SELL QTY PER SECURITY | 9,999,999      |
| FUTURE MARGIN %age NSE     | 100.00  | TOTAL SELL VAL PER SECURITY | 99,999,999,999 |
| FUTURE MARGIN %age BSE     | 100.00  | BAD PRICE PROTECTION (%)    | 40.00          |
| OPTION MARGIN %age NSE     | 100.00  | CLOSE PROTECTION (%)        | 40.00          |
| OPTION MARGIN %age BSE     | 100.00  |                             |                |

SUBMIT

## 12.6 Position Level Check

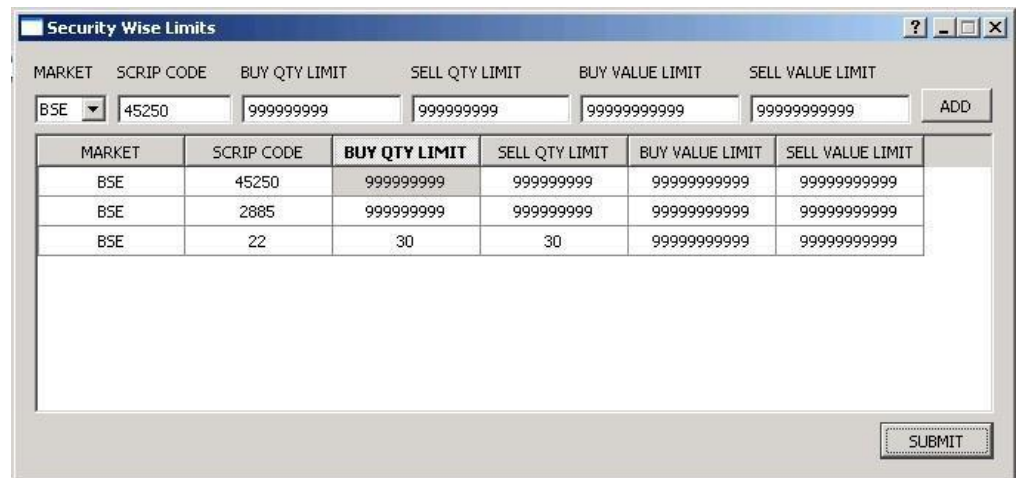
Position limit check at Client/User level can be established by defining the maximum permissible value in Net Quantity Field.

| Order Limits         |   |                              |   |
|----------------------|---|------------------------------|---|
| Login ID: 5001       |   |                              |   |
| MAX SINGLE ORDER QTY | 1 | MAX NET VAL                  | 1 |
| MAX SINGLE ORDER VAL | 1 | MAX BUY OUTSTANDING ORD VAL  | 1 |
| MAX TOTAL BUY QTY    | 1 | MAX SELL OUTSTANDING ORD VAL | 1 |
| MAX TOTAL BUY VAL    | 1 | MAX BUY OUTSTANDING ORD QTY  | 1 |
| MAX TOTAL SELL QTY   | 1 | MAX SELL OUTSTANDING ORD QTY | 1 |
| MAX TOTAL SELL VAL   | 1 | MAX M2M LOSS                 | 1 |
| MAX NET QTY          | 1 | DEPOSIT                      | 1 |

SUBMIT

## 12.7 Security wise limit

The checks validates the buy/sell quantity & value security wise & prevent the user from entering of any fresh orders in case specified limit is reached.



The screenshot shows a window titled "Security Wise Limits". It contains a form with fields for MARKET, SCRIP CODE, BUY QTY LIMIT, SELL QTY LIMIT, BUY VALUE LIMIT, and SELL VALUE LIMIT. Below the form is a table with the same columns. The table has three rows of data. The first row shows BSE, 45250, and 999999999 for both quantity and value limits. The second row shows BSE, 2885, and 999999999 for both quantity and value limits. The third row shows BSE, 22, and 30 for both quantity and value limits. There is an "ADD" button next to the form fields and a "SUBMIT" button at the bottom right.

| MARKET | SCRIP CODE | BUY QTY LIMIT | SELL QTY LIMIT | BUY VALUE LIMIT | SELL VALUE LIMIT |
|--------|------------|---------------|----------------|-----------------|------------------|
| BSE    | 45250      | 999999999     | 999999999      | 99999999999     | 99999999999      |
| BSE    | 2885       | 999999999     | 999999999      | 99999999999     | 99999999999      |
| BSE    | 22         | 30            | 30             | 99999999999     | 99999999999      |



# 13. Compliance Requirements

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## 13.1 Order Identification

The orders generated through Algo Platform are identified with unique order number as per the exchange criteria.

## 13.2 Non- Tamper able Audit Trial

Access to system is restricted to authorized person permitted by the system administrator. System has provision to create daily backup for trade log, Message log, and User maintenance back up, Order history back up, etc.

## 13.3 Orders per second

Maximum number of Order released per second by the Algo platform is in accordance with the exchange criteria.

## 13.4 Automated Execution Throttle

The Algo platform has In-built functions to ensure that next set of orders are generated only after fulfilment of first phase of Trade cycle.

## 13.5 System security

Access to system is restricted to authorized person permitted by the system administrator with valid User Id and Password. Some more characteristics are:

- ✓ *Automatic disablement of the user on entering erroneous password on three consecutive occasions.*
- ✓ *Automatic expiry of password on expiry of 14 calendar days.*
- ✓ *The Passwords are alphanumeric, instead of just being alphabets or just numerical. ✓ System doesn't allow the changed password to be the same as the last password ✓ Login id of the user and password cannot be the same.*
- ✓ *Minimum password length is eight characters and not more than twelve characters.*
- ✓ *The Passwords are stored in encrypted form to safe guard against any misuse*



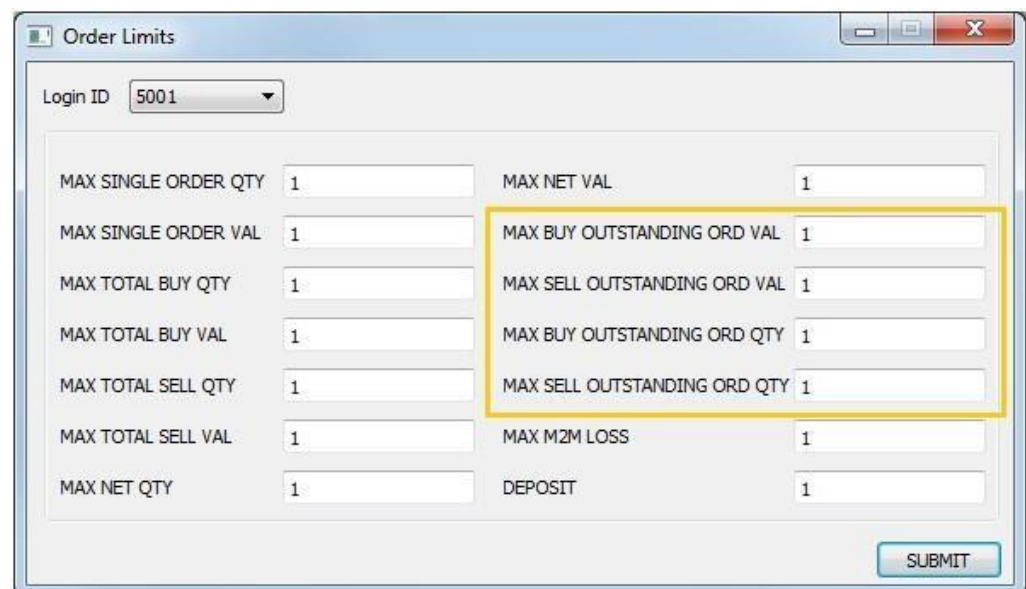
## 13.6 Control Values

Audit trail created in our system captures the record of control parameters, orders, trades and data points emanating from trades executed through algorithm trading. Field values are made mandatory for all risk control parameters, and no risk parameters have provision to accept unlimited value or Zero value.

Before sending any order to exchange trading system, the orders are mandatorily filtered through the Surveillance system. Those orders which are within the set parameters will only flow to the exchange.

## 13.7 Dysfunctional Algos

✓ *Surveillance measures to check total cumulative Buy/Sell Quantity, Total Net Quantity are built into the system to restrict/identify position building on one side or overall basis. Further orders in excess of set standards of Surveillance will freeze/rejected. System has functions to restrict the entry on number of rules.*



The screenshot shows a window titled "Order Limits" with a "Login ID" dropdown set to "5001". The window contains two columns of input fields, each with a "1" in the field. The fields are:

| Parameter                    | Value |
|------------------------------|-------|
| MAX SINGLE ORDER QTY         | 1     |
| MAX SINGLE ORDER VAL         | 1     |
| MAX TOTAL BUY QTY            | 1     |
| MAX TOTAL BUY VAL            | 1     |
| MAX TOTAL SELL QTY           | 1     |
| MAX TOTAL SELL VAL           | 1     |
| MAX NET QTY                  | 1     |
| MAX NET VAL                  | 1     |
| MAX BUY OUTSTANDING ORD VAL  | 1     |
| MAX SELL OUTSTANDING ORD VAL | 1     |
| MAX BUY OUTSTANDING ORD QTY  | 1     |
| MAX SELL OUTSTANDING ORD QTY | 1     |
| MAX M2M LOSS                 | 1     |
| DEPOSIT                      | 1     |

A yellow box highlights the four fields related to outstanding orders: MAX BUY OUTSTANDING ORD VAL, MAX SELL OUTSTANDING ORD VAL, MAX BUY OUTSTANDING ORD QTY, and MAX SELL OUTSTANDING ORD QTY. A "SUBMIT" button is located at the bottom right.

✓ *The algorithm shall pause if the Maximum MTM loss crosses the specified limit*



| Order Limits                 |      |
|------------------------------|------|
| Login ID                     | 5001 |
| MAX SINGLE ORDER QTY         | 1    |
| MAX SINGLE ORDER VAL         | 1    |
| MAX TOTAL BUY QTY            | 1    |
| MAX TOTAL BUY VAL            | 1    |
| MAX TOTAL SELL QTY           | 1    |
| MAX TOTAL SELL VAL           | 1    |
| MAX NET QTY                  | 1    |
| MAX NET VAL                  | 1    |
| MAX BUY OUTSTANDING ORD VAL  | 1    |
| MAX SELL OUTSTANDING ORD VAL | 1    |
| MAX BUY OUTSTANDING ORD QTY  | 1    |
| MAX SELL OUTSTANDING ORD QTY | 1    |
| MAX M2M LOSS                 | 1    |
| DEPOSIT                      | 1    |

**SUBMIT**

### 13.8 Market Price Protection

By defining a field value in Price % Change, order price generation can be restricted within a set percentage range of LTP. Algo price generation beyond set price bracket will result into rejection/freeze of the respective Algo rule.

| Global Risk Parameters      |                |
|-----------------------------|----------------|
| MAX ORDERS PER SECOND       | 999,999        |
| LIMIT PRICE PROTECTION (%)  | 20.00          |
| NSE INDEX PROTECTION (%)    | 10.00          |
| BSE INDEX PROTECTION (%)    | 10.00          |
| CASH MARGIN %age NSE        | 100.00         |
| CASH MARGIN %age BSE        | 100.00         |
| FUTURE MARGIN %age NSE      | 100.00         |
| FUTURE MARGIN %age BSE      | 100.00         |
| OPTION MARGIN %age NSE      | 100.00         |
| OPTION MARGIN %age BSE      | 100.00         |
| MARKET PROTECTION (%)       | 10.00          |
| BRANCH DEPOSIT NSE          | 9,999,999,999  |
| BRANCH DEPOSIT BSE          | 99,999,999,999 |
| TOTAL BUY QTY PER SECURITY  | 9,999,999      |
| TOTAL BUY VAL PER SECURITY  | 99,999,999,999 |
| TOTAL SELL QTY PER SECURITY | 9,999,999      |
| TOTAL SELL VAL PER SECURITY | 99,999,999,999 |
| BAD PRICE PROTECTION (%)    | 40.00          |
| CLOSE PROTECTION (%)        | 40.00          |

**SUBMIT**





# 14. System Requirements

## HARDWARE AND SOFTWARE REQUIREMENTS

| Hardware/Software | Minimum                                   | Recommended |
|-------------------|---|-------------|
| BACK END          |   |             |
| Processor         | 4 Core CPU                                | 12 Core CPU |
| RAM               | 8 GB                                      | 32 GB       |
| Operating System  | Linux OS 64-bit (Redhat/CentOS 6.0 / 6.4) |             |
| FRONT END         |   |             |
| Processor         | 2 Core CPU                                | 4 Core CPU  |
| RAM               | 4 GB                                      | 8 GB        |
| Operating System  | Windows Server                            |             |



## 15. Contact Us

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We would love to hear from you to understand your business needs and discuss how we could assist you in achieving your goals. Please contact us at [info@utradesolutions.com](mailto:info@utradesolutions.com) for further details.



## uTrade's Client presence



uTrade

[info@utradesolutions.com](mailto:info@utradesolutions.com)

[www.youtube.com/utradesolutions](https://www.youtube.com/utradesolutions)





uTrade

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