OS.ENGINE

MANUAL

(TRADER /TESTER)

O-S-A.NET

Table of content

1. General information

1. Os.Engine is a library for creating trading robots.
2. Developer and copyright holder: LLC "SibAlgo"
3. Language: C#.
4. .Net version: .Net 4.52.
5. Written in: Visual Studio 2013.
6. Architecture: x64 .

Connectors:

1. Quik
2. SmartCom
3. Plaza 2CGate
4. Interactive Brokers
5. Finam
6. Asts Bridge
7. Bitmex
8. Oanda
9. Kraken

Implementation language:

1. C#

Disclaimer:

The authors of the program are not responsible for the correct operation and technological risks associated therewith.

2. Preface

- For several years, a team of professional programmers worked on the creation of a universal MTS Builder, which would be able to meet the needs of a wide range of users. From the creation of slow robots on indices to the most complex inter-exchange shunters capable of building their indices in two clicks. And we managed to do this!

- In November 2016, we decided to make the project fully open. Now you look at the manual for the terminal written in the first CIS professional library for open-source algorithmic trading.

- **Traders**

- In the first place, our project is created by programmers for users. This means that the level of entry into programming robots on the Os.Engine is incredibly low!
- We've created a handy and incredibly powerful compatibility layer for building robots that can be mastered in a couple of weeks, even if you're not a programmer at all.
- The project contains dozens of built-in robots that can be launched and upgraded.
- In addition, the terminal itself sometimes contains necessary functionality for the trader, such as the ability to bind trades to inclined channels or automatic profit orders and stop orders.

- **To programmers**

- In our source code, you will not find closed parts and you will no longer have to suffer waiting for updates and fixes. Now you hold the keys!
- We are well aware that a large "turnover" in our business (trading) of not only those who trade manually but also of those who write robots. Therefore, our main rule when writing code: **not to complicate**.
- We have an open Plaza 2 connector, Chart to render graphics, Finam connection and other stuff. Now it's available to any algo trader! Take it to your projects, create new terminals and drives!

- Go ahead!

3. Main menu

When starting the program, the user initially gets to the main menu, with a choice of 4 main modules:

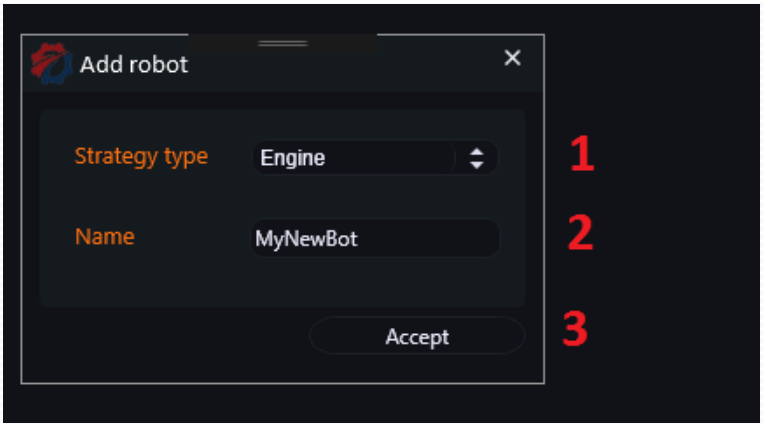
1. Data is a module for downloading and storing historical data of candles, ticks and glass slices using connectors, as well as Finam server (this module is considered in a separate manual).
2. Converter is a module that allows converting data from ticks to candles with a given timeframe (this module is considered in a separate manual).
3. Tester is a module for testing strategies, trading simulation (see section 12 for details).
4. Optimizer is a module for optimizing strategies.
5. Miner is a module for the automatic search for profitable strategies.
6. Robot is a module for real trading on the stock exchange (see section No.4, No.14)

4. Launch of the platform in the test mode

In this section, we consider the process of connecting an already created trading algorithm in the tester. Connecting robot

To create a new panel, click "Add panel" button:

There will be a selection window of the created panel:



Select the type of the created panel. In this case, this is a robot on the CCI indicator

Specify a unique name for it.

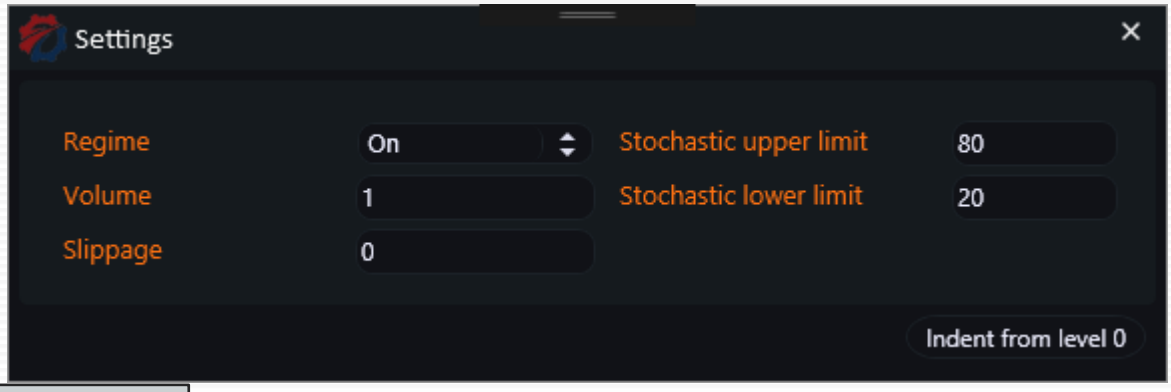
Click accept.

After that, we create the selected panel, and we can start configuring it.

4.1 Panel setup

Not all panels have individual settings. For example, the drive does not have them. But since we created a robot based on the CCI indicator, we can customize our robot:

There is a panel with individual settings:



IMPORTANT

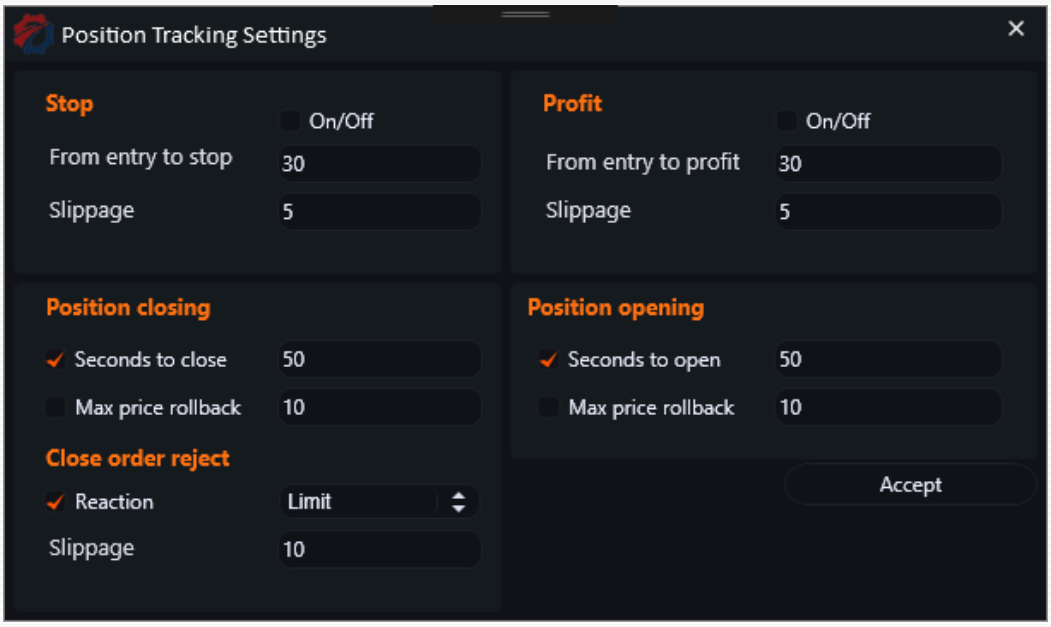
In Os.Engine architecture "panel" is a generalized name of trading robots, drives and semi-automatic machines. With the help of panels, the user can implement various trading systems within this library. It can be both individual robots and a whole individual trading terminal.

When developing your own solutions, the main work is done in this "layer". You can learn more about it in the Bot Create manual devoted to the creation of robots.

4.2. Position maintenance

For any position opened within the panel, you can assign standard methods of maintenance.
To call these settings, you need to click "Position maintenance"

The following window will appear:



Stop

- The usual stop order, which will be placed at the real price of entry to the position +/- value "From entry to Stop". Additionally, you can set the slippage, with which the final order to buy/sell will be put in the system.

Profit

- The usual profit order, which will be placed at the real price of entry to the position +/- value "From entry to Profit". Additionally, you can set the slippage, with which the final order to buy/sell will be put in the system.

Withdrawal of applications on time

- These parameters can be used to control time for the execution of the request. After this, the order is withdrawn from the exchange.
- If this is an order for opening, then in the case of complete failure to perform, such a position will be rejected. If the application is partially performed, such a position will be considered open.
- Max pullback from the price is the distance in points by which the price can "move" from the order price, after which the order will be withdrawn.
- If the order is withdrawn from a previously opened position. It turns out that the close-out did not work. In this case, it is better to use the block below.

Reaction to the withdrawal of the close-out application

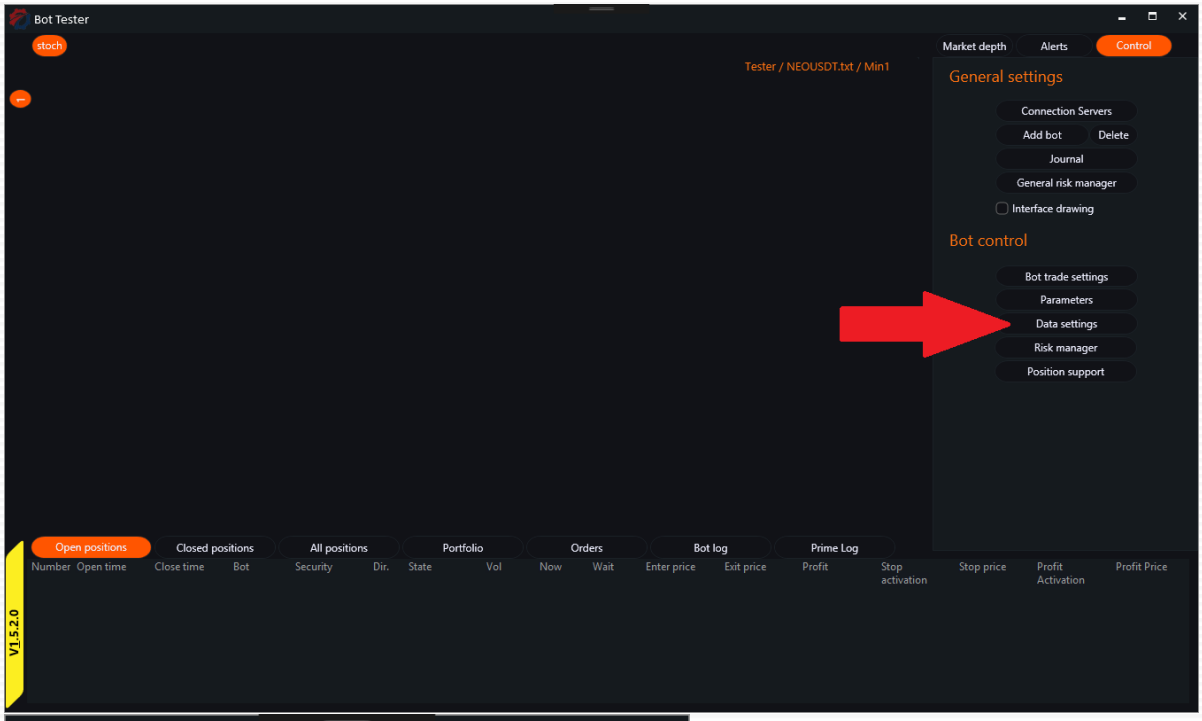
- It happens that the position is withdrawn or the close-out application does not work. For example, the stop order did not work, because the market left.
- In this case, it is possible to expose the reaction. Market - will close your position on the market. Limit - will close it by a limit order with a pre-set slippage.

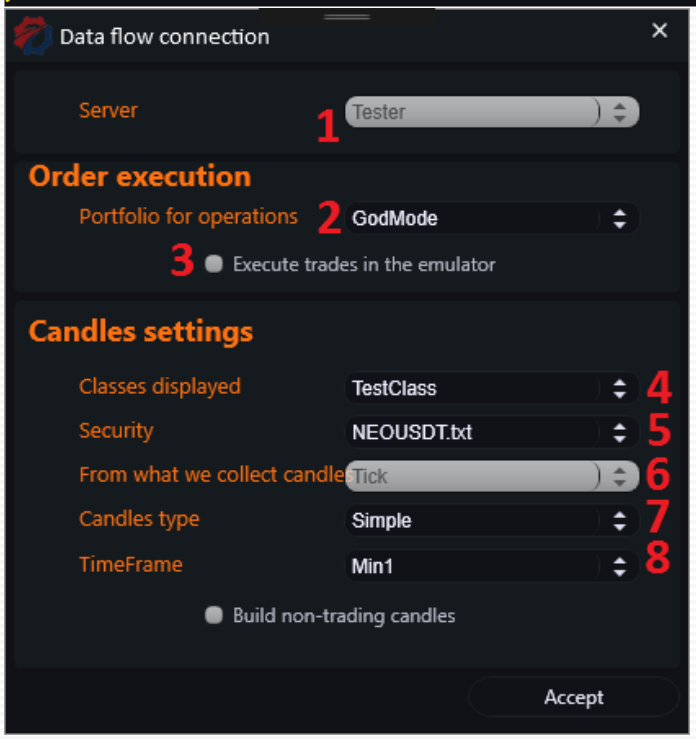
IMPORTANT

- These settings do not replace or configure individual tactics of placing stops and profits inside the robots. If the robot provides a stop and further configure this panel - there will be conflict!
- Do not disable the "Response to the withdrawal of applications for close-out"! In this case, you remain without defense during the sharp movements of the market!
- Each tab on the panel has separate maintenance settings! If your robot uses several instruments, you need to make sure that the maintenance is configured in all tabs.
- The FORTS market no Market applications. In order to guarantee the close-out of open positions in exceptional situations, you need to set the order type as Limit.

4.3. Connection

- In order to provide the panel connection to the server and start receiving data, you need to click on the "data settings":





1. The name of the server you are connecting to
2. Portfolio (Trading account) on which transactions are to be made
3. Execute trades in the emulator and do not send orders to the exchange
4. Displayed classes. Filter for the following fields with a huge
5. Instrument whose data will be taken and which will be traded
6. Price type for forming candles
7. Type of candles
8. Timeframe for candles

IMPORTANT

In this example and further, the functionality of the panel will be described when connecting to the test server. In order to start it, go to chapter 12 and then continue from this page.

5. Journal

- All statistics on trading or testing can be found in the Journal. The Journal is available by pressing the button with the same name in the main menu.

- Equity

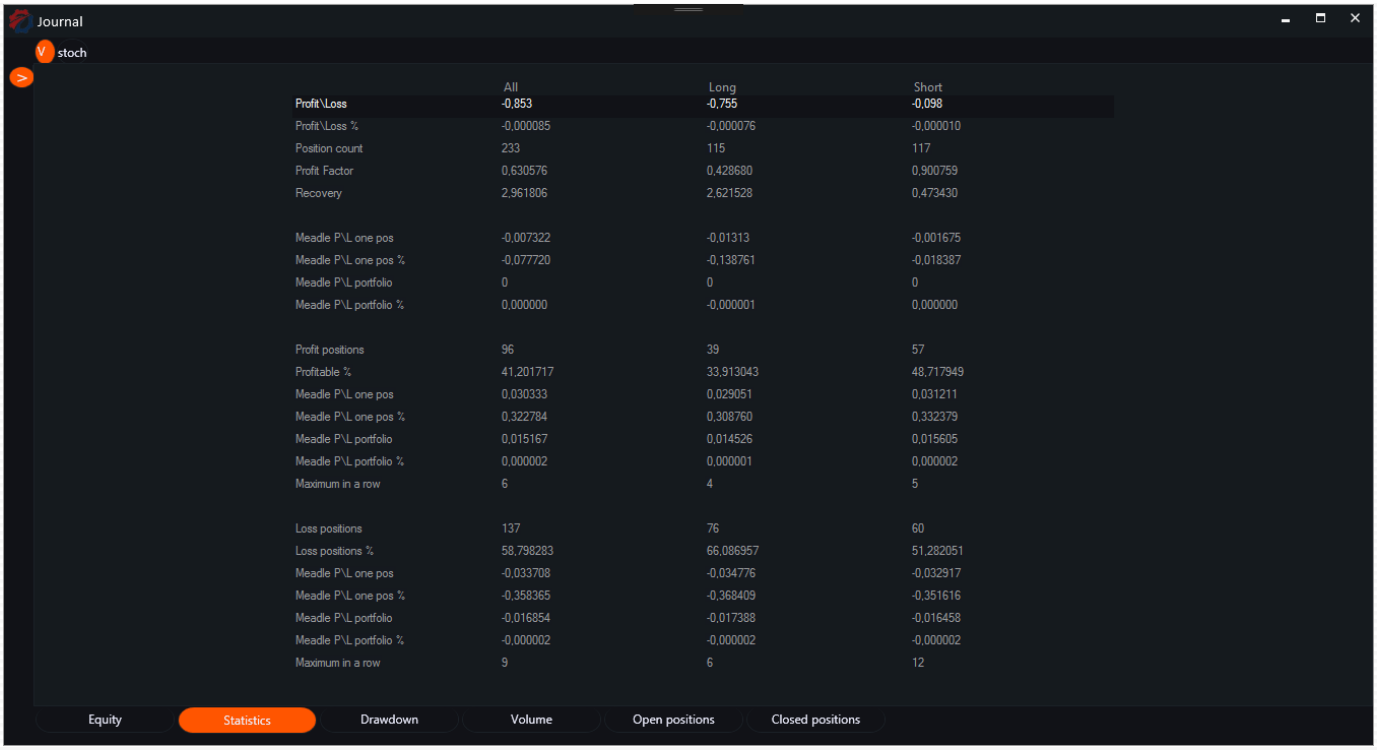
When opening the general log, we immediately get to the Equity tab (3).

This tab provides graphical information about the account growth. The total profit is displayed, as well as separate, for long and short trades.

1. General information on all tabs is displayed here
2. It is also possible to view information on each individual traded panel

5.1 Journal. Statistics

4.Statistics



- Net P/L – profit or loss as a result of all operations.
- Net P/L % – profit or loss in % in relation to the capital
- Number of transactions -...
- Profit Factor – the ratio of profit to losses for a certain time period
- Recovery – reflects how profit exceeds the depth of the maximum drawdown.

- Av. P/L movement - the average movement of the instrument, during the time we are in a position
- Av. P/L % movement - the average movement of the instrument in %, during the time we are in a position
- Av. P/L capital - average profit from the position
- Av. P/L capital % - average profit from the position in relation to the portfolio

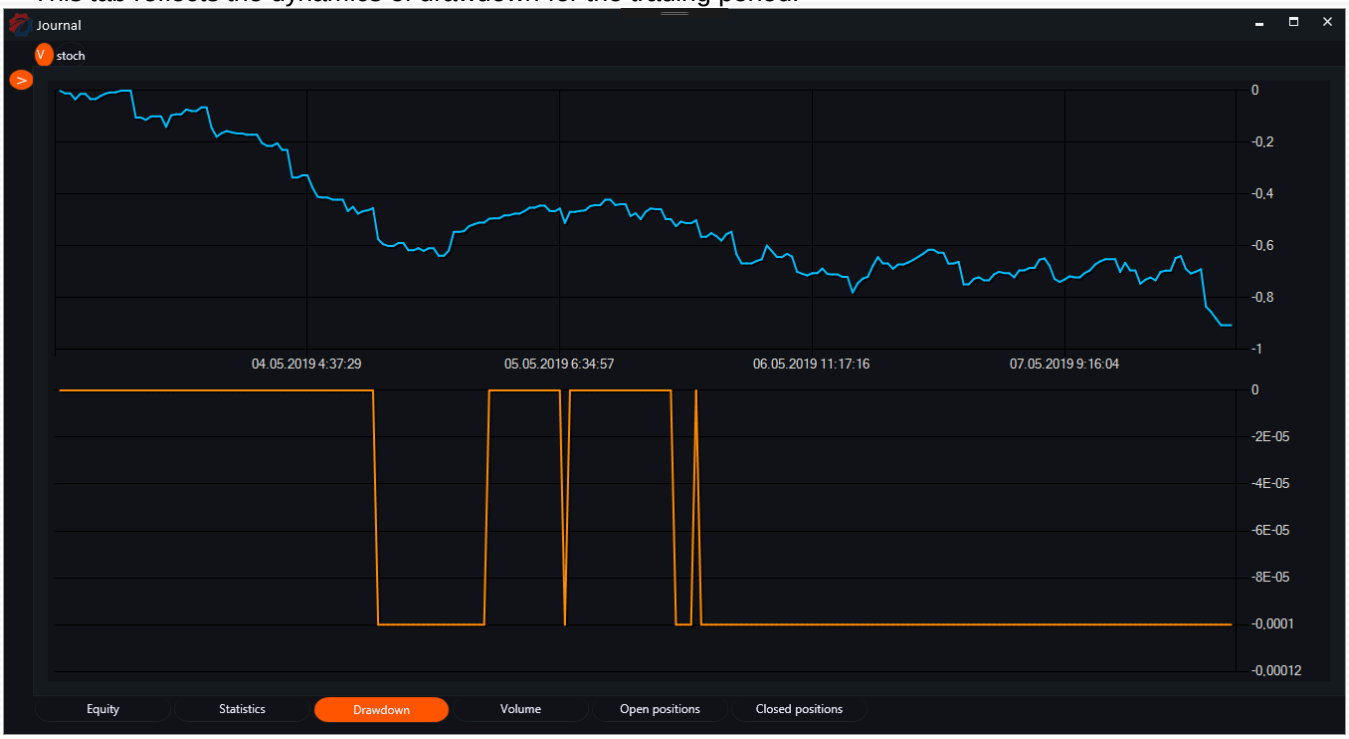
- Profitable transactions - ...
- Profitable % - percentage of profitable transactions relative to their total number
- Av. P/L movement - the average movement of the instrument, during the time we are in a position
- Av. P/L % movement - the average movement of the instrument in %, during the time we are in a position
- Av. P/L capital - average profit from the position
- Av. P/L capital % - average profit from the position in relation to the portfolio
- Max in a row - number of profitable positions in a row

5.2 Journal. Drawdown

- Losing trades - ...
- Losing % - percentage of profitable transactions relative to their total number
- Av. P/L movement - the average movement of the instrument, during the time we are in a position
- Av. P/L % movement - the average movement of the instrument in %, during the time we are in a position
- Av. P/L capital - average profit from the position
- Av. P/L capital % - average profit from the position in relation to the portfolio
- Max in a row - number of profitable positions in a row

5.Drawdown

This tab reflects the dynamics of drawdown for the trading period.



Blue – value of drawdown in points

Orange – value of drawdown as % of traded capital

5.3 Journal. Volume

6. Volume

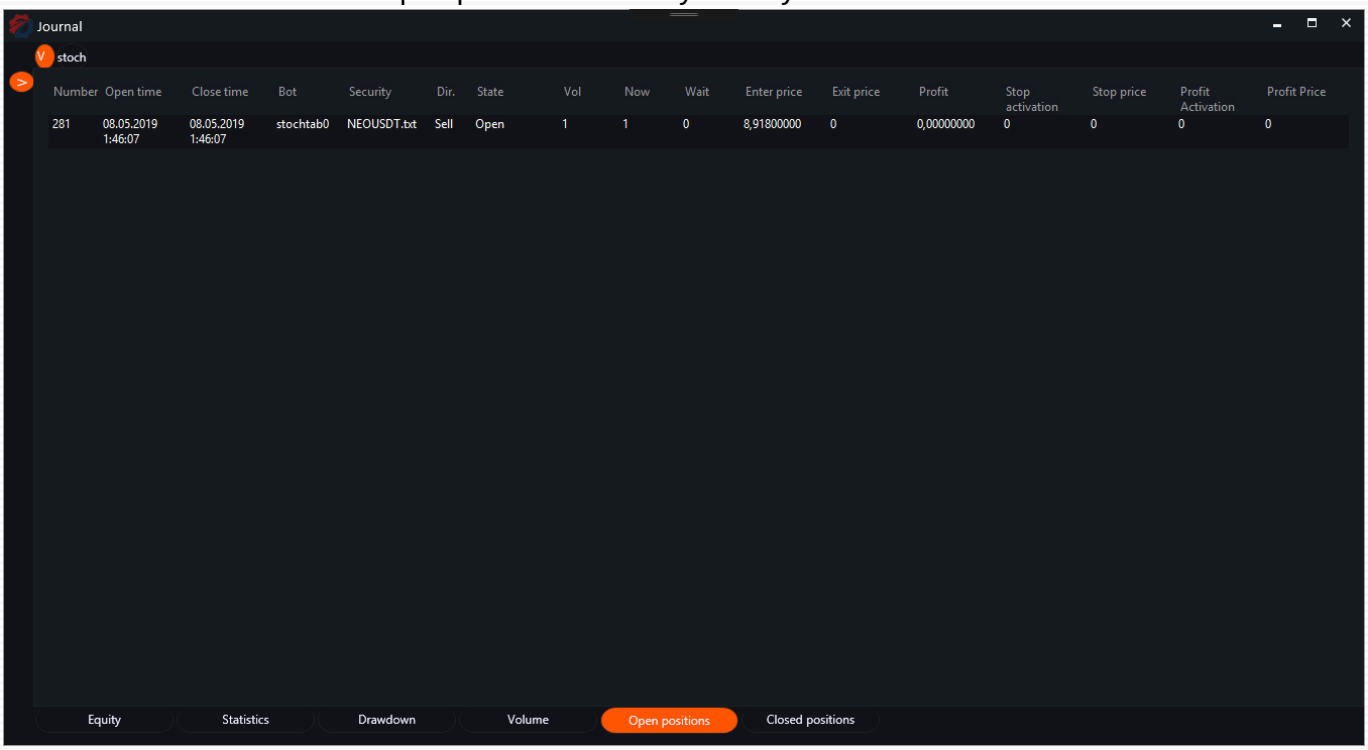
This tab shows the maximum traded volume.

This tab will be useful for controlling and monitoring trading volumes. This is convenient when a lot of different trading algorithms are connected and trading is performed using different instruments.

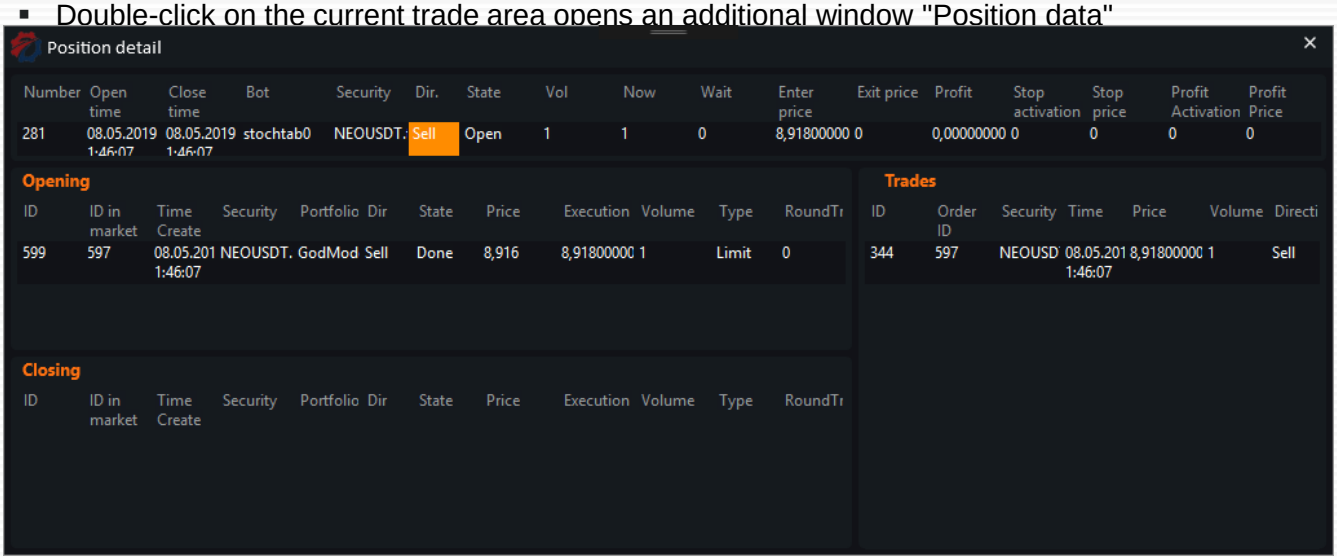
5.4 Journal. Open positions

7. Open positions

This tab shows the current open positions currently held by the bot.



- Double-click on the current trade area opens an additional window "Position data"



- Number – current number of a transaction in the system.
- Open time - date and time of transaction opening
- Close time - date and time of transaction close-out

5.4 Journal. Open positions

- Bot - the name of the tab that performs the trade
- instrument – the name of the instrument
- Direction – Buy or Sell direction
- State – current state of the trade
- Volume – the volume of the transaction by which the bot should enter the market
- Current – executed volume
- Expect – the volume that has not been performed, but awaits performance
- Entry price – the price at which the bot entered the position
- Exit price – the price at which the bot left the position
- Profit – variation margin from this trade
- StopActivation – activation price of stop order, after achieving this price the order will be placed
- StopPrice – the price at which the bot will execute the stop order
- ProfitActivation – activation price of profit order, after achieving this price the order will be placed
- ProfitPrice – the price at which the bot will execute the profit order

Opening, Close-out, Trades – all these tables are used to track all orders, trades and performance results for them. All this extended information gives a complete picture of the current situation with orders, trades, both within the system and of the performance at the exchange.

- ID – ID number in the system
- ID on exchange – ID number on the exchange

Trades – all trades by orders (Example: there can be 1 order to buy 10 contracts, and this order may be performed in 3 trade 2 contracts + 3 contracts + 5 contracts)

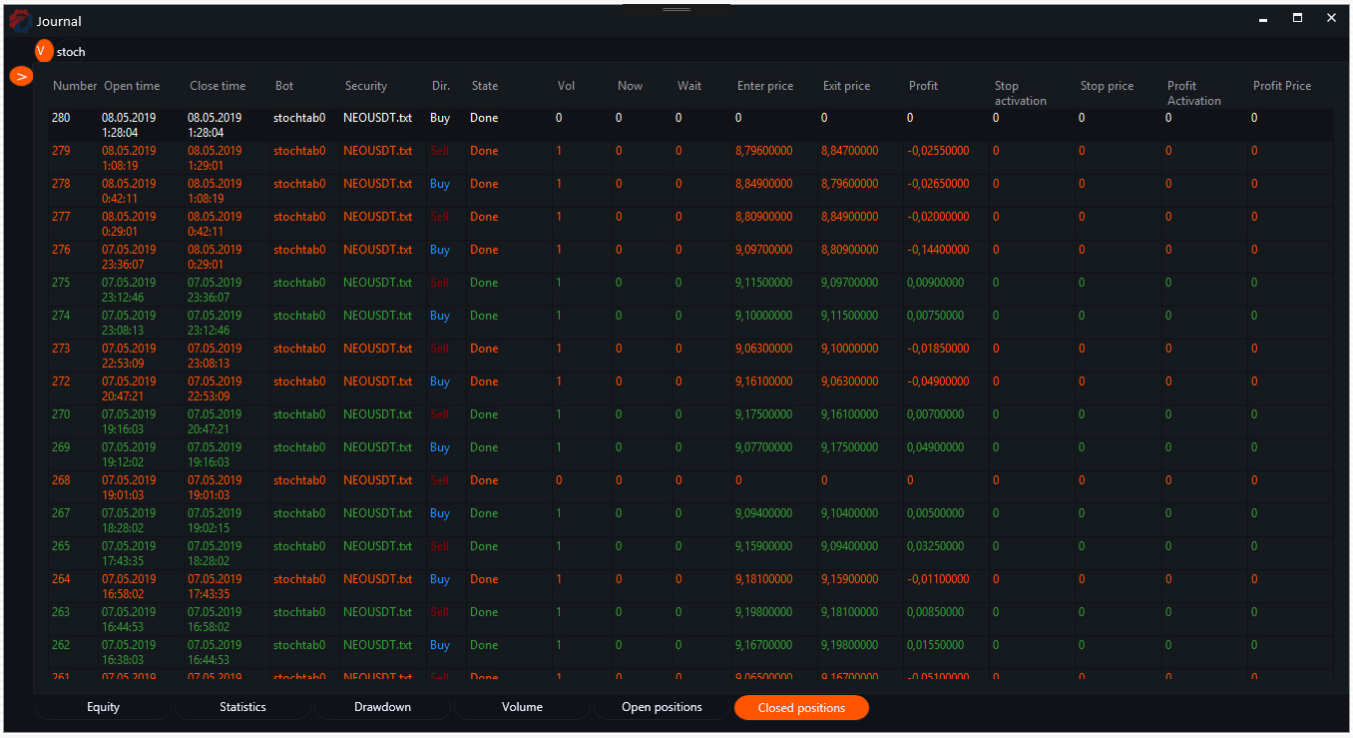
IMPORTANT

- Sometimes there are situations when open or close orders are not performed. This may be due to various reasons. In such cases, you can see the following labels in the Status column instead of Open and Close:
- OpeningFail – an error of opening a position occurs. Most often, the problem may be that the order was partially performed, and it was withdrawn. Also, an error can occur if for some reason the exchange refused the performance, or there is a logical error such as a negative volume.
- ClosingFail – an error of closing a position occurs. The reasons may be exactly the same as when OpeningFail, only this is connected with closing a position.
- ClosingSurplus – this error can occur when closing a position. Due to sharp movements on the stock exchange, there may be a situation when the position is moved to the opposite direction. Example: direction - Buy, Volume - 5.

5.5 Journal. Position close-out

8. Position close-out

This tab displays all closed trades, or otherwise, this is a table of all performed trades.



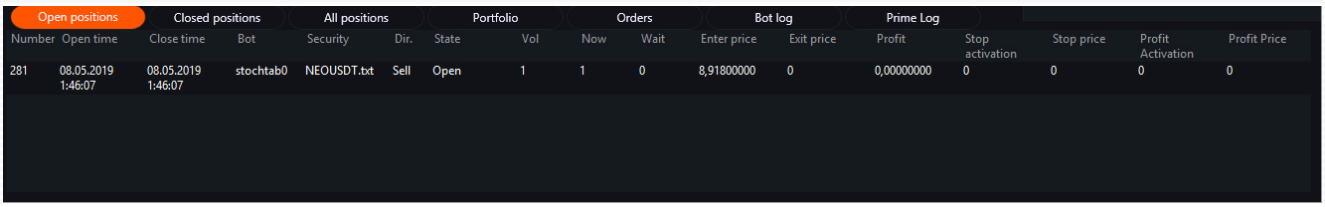
When you double-click on the line, you will also see full information about the position.

6. Data tabs

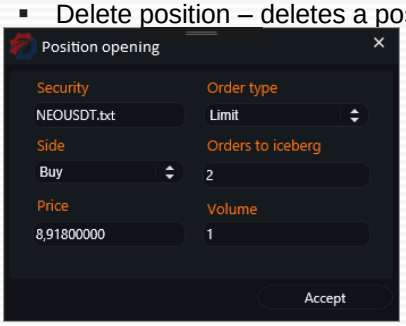
The bottom panel in the main menu is a convenient place to monitor and control the operation of all running algorithms. There are 7 main tabs:

1. Open positions

Displays the current open positions by the current bot. When you right-click in this area, the position management menu will be available:



- Close all by market – allows closing all open positions at the current price
- Open new – opens a new position manually, the bot will maintain this position
- Close current – close current position at the specified price
- Modify current position – allows adding or reducing additional volume to the current position
- Move stop – moves stop to the specified level
- Move profit – moves profit to the specified level
- Delete position – deletes a position from the system only.

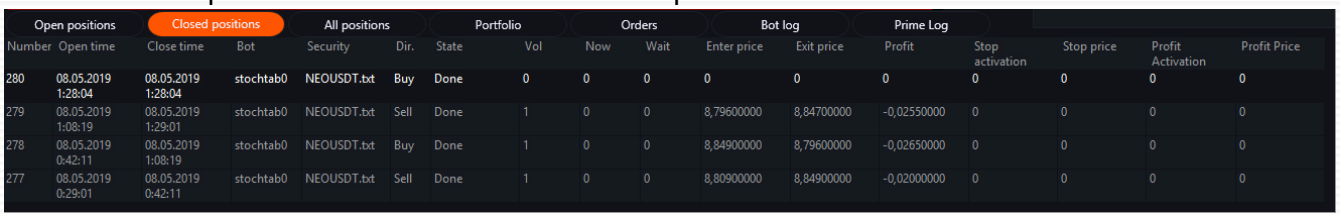


For most actions, an additional window will open to enter the required data for performance

6. Data tabs

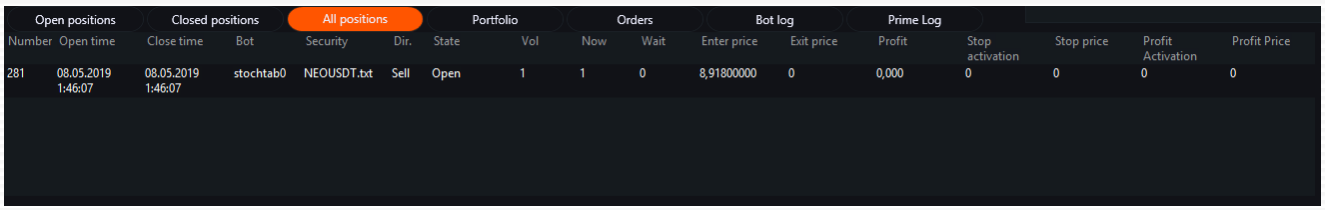
2. Closed positions

Shows all completed trades of the current bot with performance results:



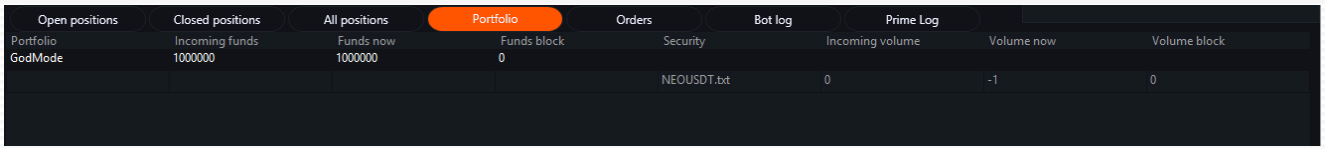
3. All position

Shows all current open positions for all working bots.



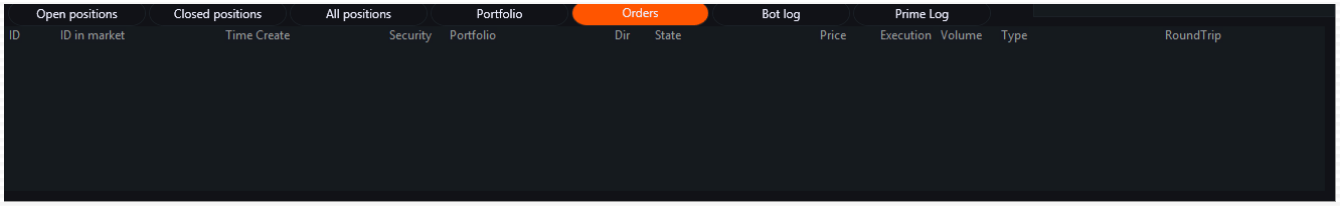
4. Portfolio

Shows information on all portfolios available for trading. As well as positions in this portfolio



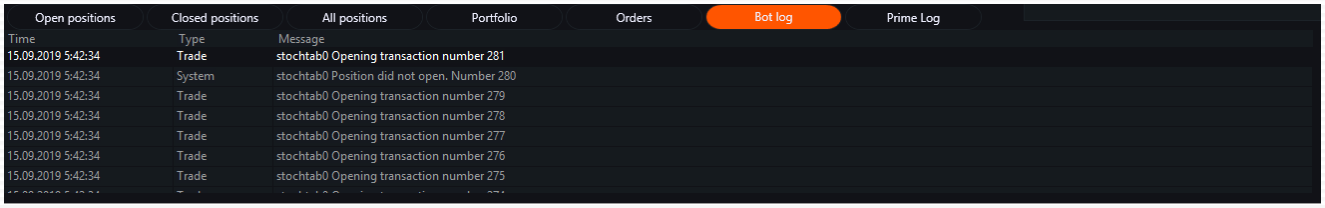
5. Orders

Shows information on current orders. Also, at the right-click, an additional menu appears to manage orders.



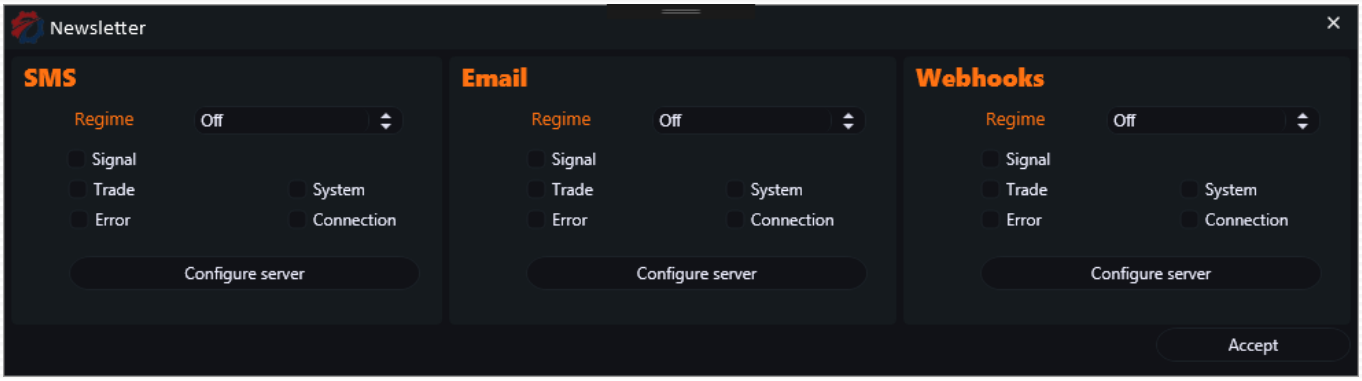
6. Bot Log

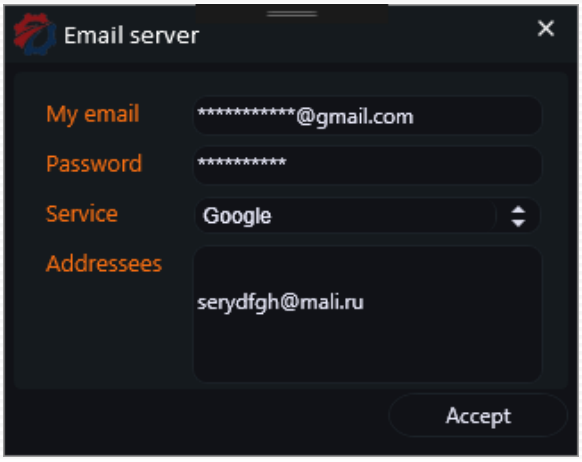
All information about the bot, as well as errors are displayed in this tab. When double-clicking, a window will appear to configure the distribution.



7. Distribution

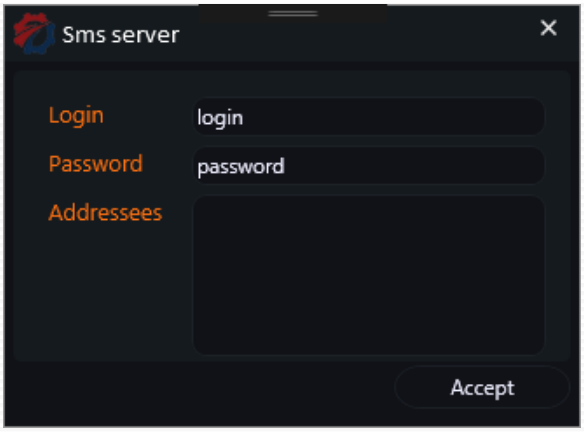
Called by double-clicking in the Bot Log tab. Allows configuring SMS and email notifications about bot actions in accordance with the selected tags:





To set up e-mail messages, you shall enter your e-mail address, password, and the name of the distribution server.

You can then enter it into the panel of recipients of the notifications.



In the login and password fields, you must enter the login and password to access your personal account from the site: http://smsc.ru/tariffs/

Recipients must be recorded, starting with the number 7, without the plus sign. The number shall be recorded without spaces.

8. Alerts

The system has the ability to set lines and link them to alerts and trading actions. There are 2 types of alerts: chart alert and price alert.

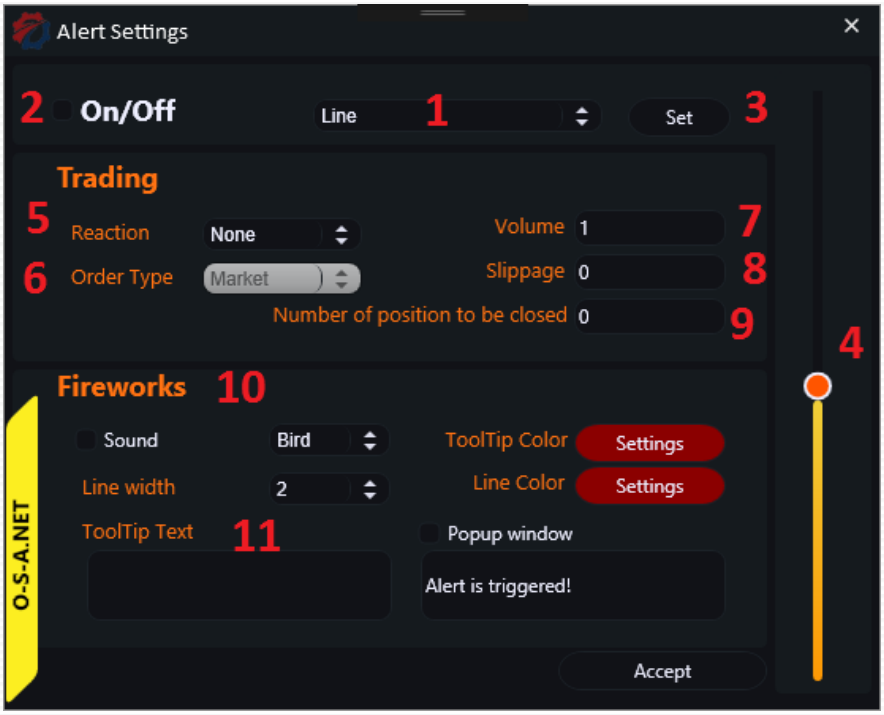
To open the alert creation menu, right-click on the left panel and click add:

IMPORTANT

- Alerts can be set only on the candlestick chart
- If there is a robot on the panel, the alerts do not replace its logic. They work regardless of the logic of the bot.

8. Alerts

This is how the Alert creation window looks like:



1. Pop-up menu to select the alert type.
2. Enable/disable the alert check.
3. After clicking the "Specify" button, it is necessary to specify 2 points on the chart by which this type of alert will be built.
4. Slider to change the angle of the construction. When creating an alert of "speed line" and "Fibonacci channel". You can adjust the angle of the first and the width of the second by moving this control.

5. Type of TRADING reaction at the intersection of the line: None – there will be no reaction, Buy – buy, Sell – sell, CloseAll – all positions will be closed at market, CloseOne – the position with the number shown in box 9 will be closed
6. Order type when opening a position: Market – at any price, Limit – at a certain price
7. Deal volume
8. Slippage from the best price. For Limit order types.
9. The number of the position to be closed. In case of the selected CloseOne reaction.
10. Acoustical signal setting
11. Width of the alert on the chart

You can also change the color of the signature, the color of the alert lines, customize the text of the signature and enable pop-up windows.

The "Price Alert" setting is configured in a similar way, except for the graphical application of the signal to the chart, the signal is executed when the price specified by the user is reached.

9. Market Depth

Columns of the market depth:

1. The accumulated volume from the best price
2. Volume at the level
3. Price of the level
4. Volume at the level in numbers

Quick input panel:

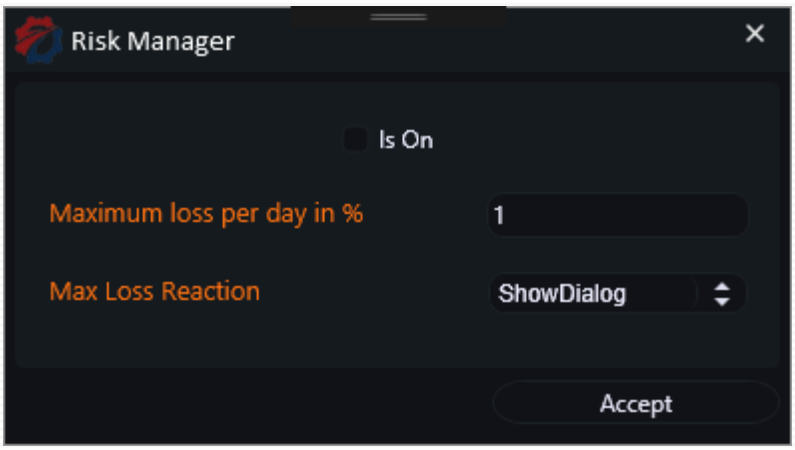
- To enter a position at any price, just enter the volume.
- In order to enter a position at a certain price, it is required to specify the price of the contract. This can be done by writing a number in the appropriate field or click on the desired price in the glass.
- Button “revoke limits" removes all active orders exhibited within this panel.

10. Risk manager

The platform implements two levels of risk management:

- Global risk manager monitors the drawdown of all panels.
- Local risk managers control the drawdown of a separate panel.

By calling the corresponding menus, you can configure their operation:



- The settings are intuitive and signed. Here you can set to the panel/platform loss limit per day and the type of reaction to this loss.

11. Creating an index

Using Os.Engine platform, it is possible to write strategies of varying complexity. An example of such strategies is the construction of the so-called synthetics or index. In Os.Engine architecture, there is a special module that allows building these synthetics. First of all, it will be interesting to those who trade arbitrage strategies.

The topic of how to write bots using the index is considered in a separate manual for the creation of trading robots. This section uses an example as a demonstration of the possibilities of this module and familiarization, namely the creation of the index itself. The topic of how to use it in trading will not be considered here.

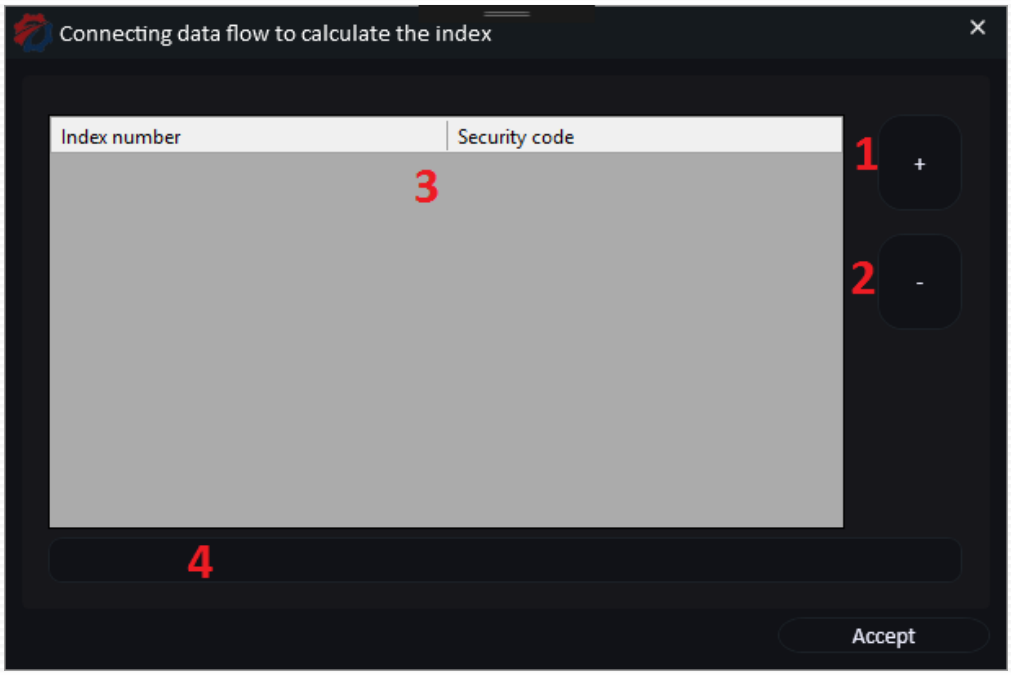
The example is implemented in the test mode. About the launching robots in this mode see the section "Launching the platform in the test mode"

To start creating an index, it is required to:

1. Connect the corresponding robot in whose logic this module is connected
2. Click on the "Data setup" button

11. Creating an index

The following window will appear:



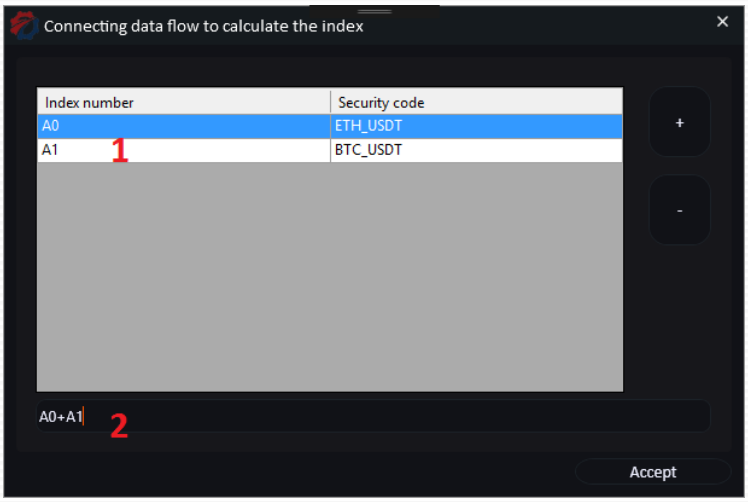
1. Button to add securities to the list
2. Button to remove securities from the list
3. The list of securities
4. The input line of the formula for calculating the index

In order to add the security to the list, the button 1 shall be used

Add some securities:

11. Creating an index

When adding a security, it is assigned with an index number. This unique name will be used in the formula:



We have added several securities to the list (1). Now let's build an index out of these securities. To do this, use the formula string.

As an example, enter the following formula in line (2) and click accept:

```
A0+(A1*2-A2*3)-A2
```

The following operations and symbols are available: +, - , /, *, ()

There will be an index

12. Testing

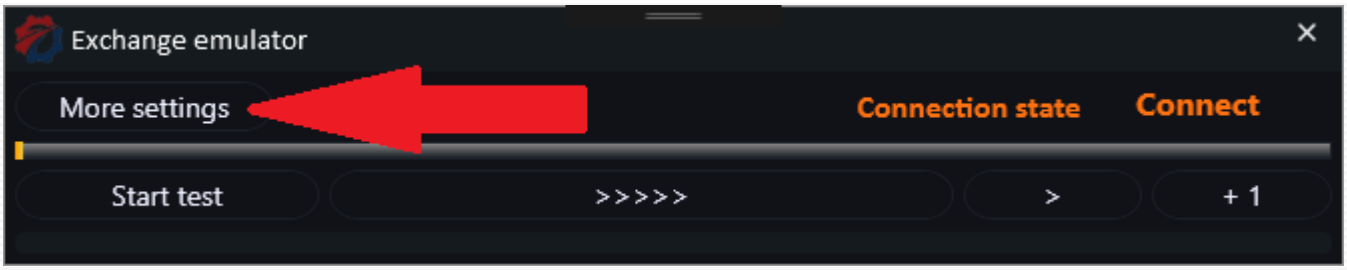
Testing is conducted by a fully functional bot copy, which uses the exchange emulator as a server.

Below we consider the launch of a test server and trading in it.

Stock emulator

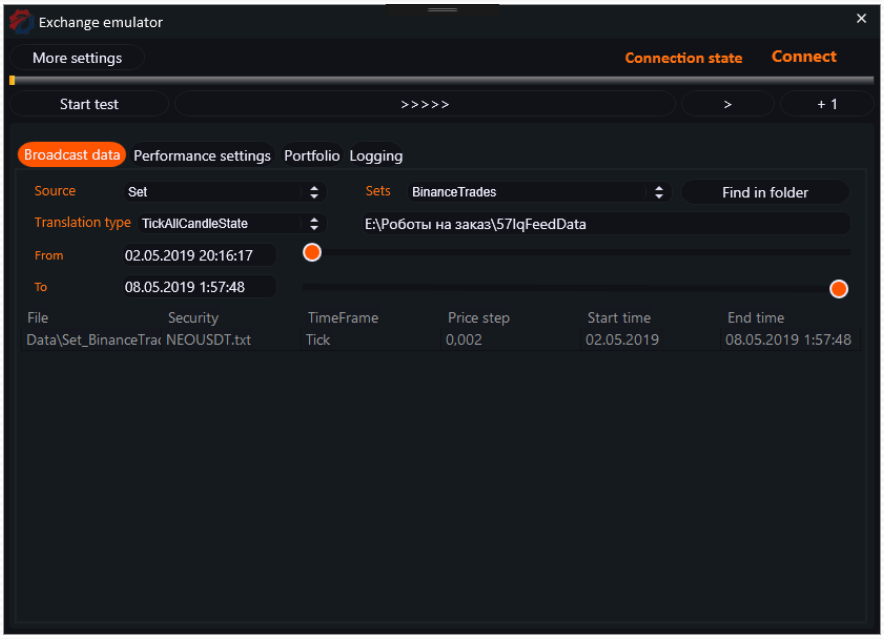
First of all, we need to understand how the stock emulator works. What it can be fed at the entrance and how to configure the securities. To do this, click on the "Connection Servers" button, which is located in the upper left corner of the previous screen.

You will see the control panel of the test progress. It is useful for supplying data to the tester. Now, click on the "Advanced" button:



12. Testing

Here is the emulator settings panel. On the left, there are two panels for displaying data, as well as a data control panel. On the right, there is a graph of the increment of the portfolio, the timeline for testing and installation window for slippage.



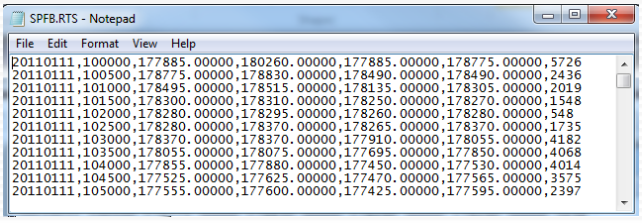
In order to run the test, it is required to connect the historical data of the ticker we need.

Source.

In Os.Engine there are two options for connecting historical data:

1. Folder – download of pre-downloaded data from a folder. It is required to specify the path to the folder with the downloaded tickers using the "Specify in folder" button. In the folder, only tickers of one timeframe can be stored.

Storage format is a text file as in the example:



2. Hercules is a module for downloading and storing historical data of candles, ticks and glass slices using connectors, as well as data from Finam server. More details about the work of this module can be found in a separate manual.

Sets.

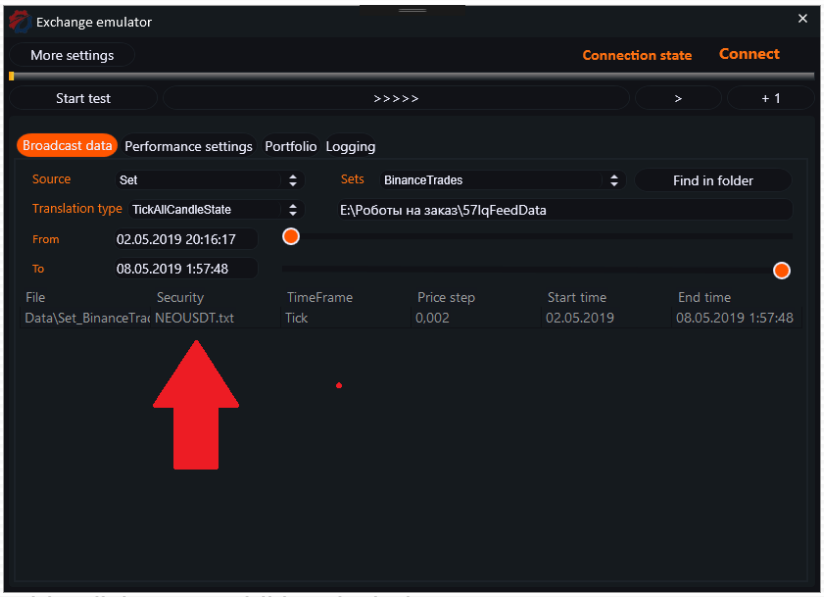
When working with Hercules, you can create so-called sets by yourself

12. Testing

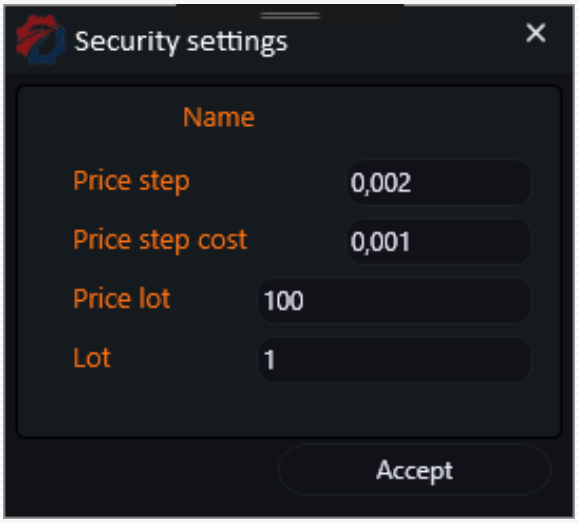
Translate: (different kinds of data are needed for different tasks and optimization improvement)

- Candle – complete candles
- TickAllCandleState – ticks, and all changes of the candles
- TickOnlyReadyCandle – ticks and candles only after they are completed
- MarketDepthAllCandleState – glasses and all changes of the candles
- MarketDepthOnlyReadyCandle – glasses, and candles only after they are completed

After selecting the data and successful loading them, the tickers will be visible in the lower-left screen.



When double-clicing, an additional window appears.

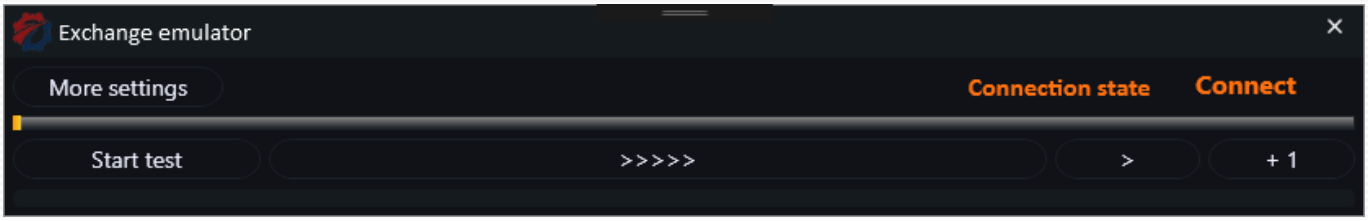


While loading data from files, the robot takes all possible data from it. TF, price step, title. But there are also types of data that can not be obtained from the file. They must be specified manually by double-clicking LMB on the security of interest.

- To test securities from the stock market, it is necessary to specify the number of lots. Otherwise, test results would be wrong.
- Data on issuers can be found on the exchange's website: Moscow exchange

13. Test management

In order to start the testing process, you need to connect one of the panels to the server. See chapter 1. If the data server does not have signed panels, the test will end before it began.



- When clicking on the "Start test" button, the testing begins again. At this point, all your old positions will be erased in the emulator. The portfolio turns to its original state. And data feed by bars/ticks begins from the server.

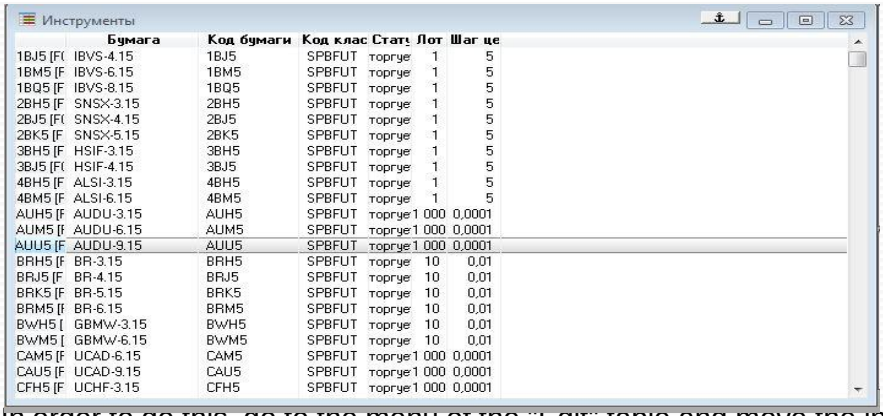
- "||" button stops and starts the data submission process again.
- "+1" button loads one candle and goes into a pause state.
- The ">>>>>>" button allows enabling the test in the rewind mode. In this mode, all visual representations of the panel disappear. In this mode, testing is ten times faster, since the reflection of the elements is the heaviest part in the robot.

14.1 Quik DDE. Configuring Quik.

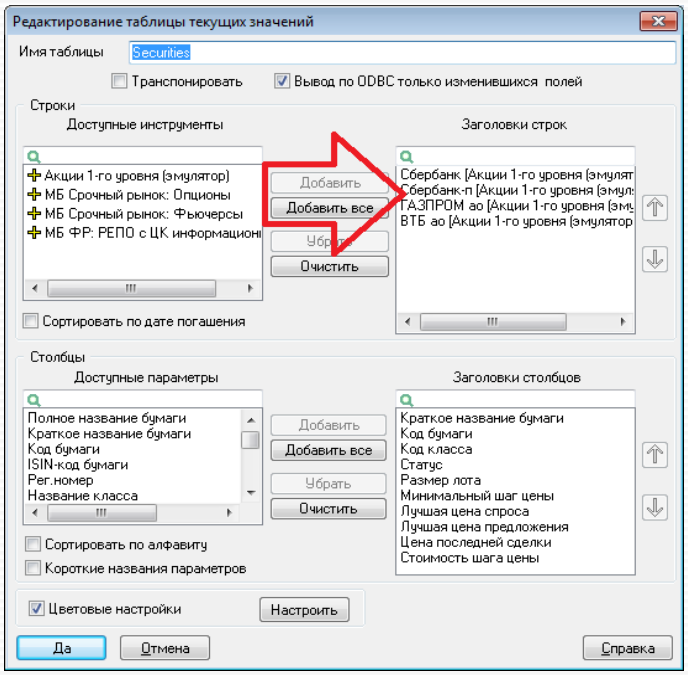
In order to upload data via DDE, it is necessary to load settings from the InfoOSA.wnd file

- ATTENTION! This will erase the old settings of Quik!
- Using DDE, you can connect starting from version Quik 7.0

1. Go to the main menu System / Load settings from the file
2. Select the InfoOSA.wnd file
3. Add the instruments we need to the "instruments" table, as shown in the example:



In order to do this, go to the menu of the "Edit" table and move the instruments:



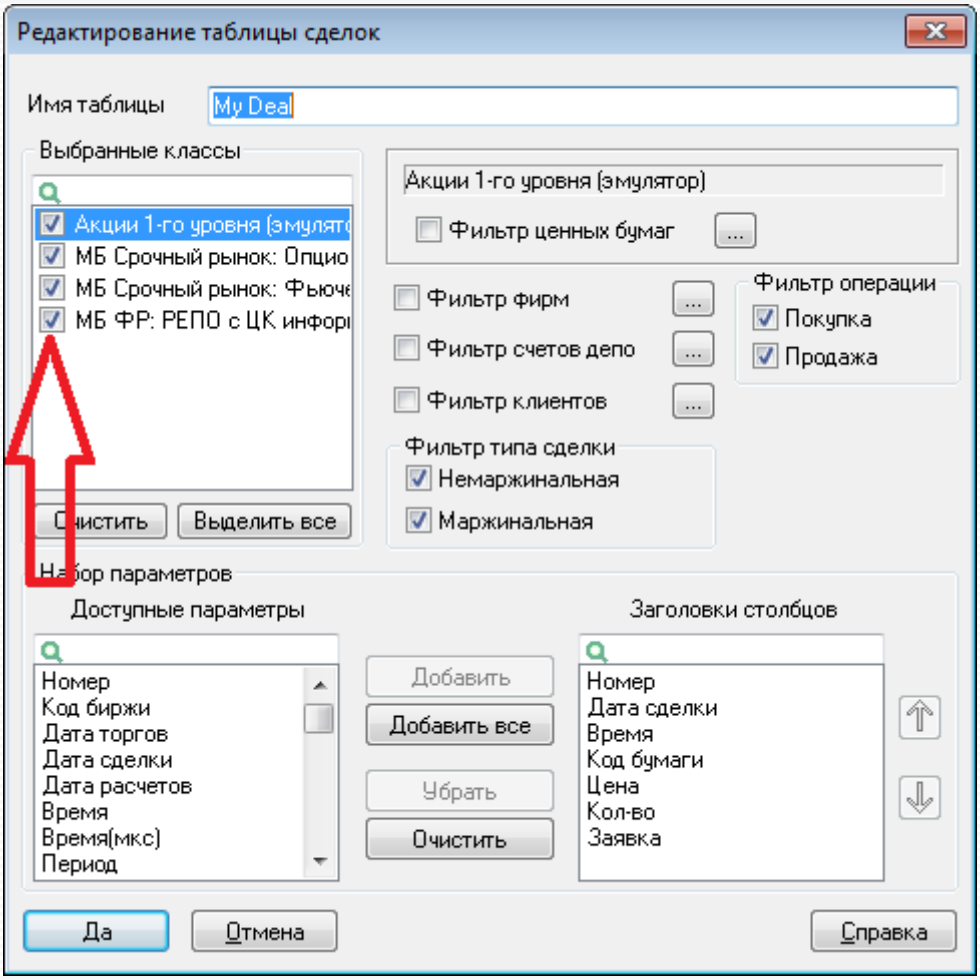
IMPORTANT

- Do not move to this window unmarketable instruments and debris! This can break the export of data from Quik, since data on the last trading time is taken from this table inclusive.

14.1. Quik DDE. Configuring Quik.

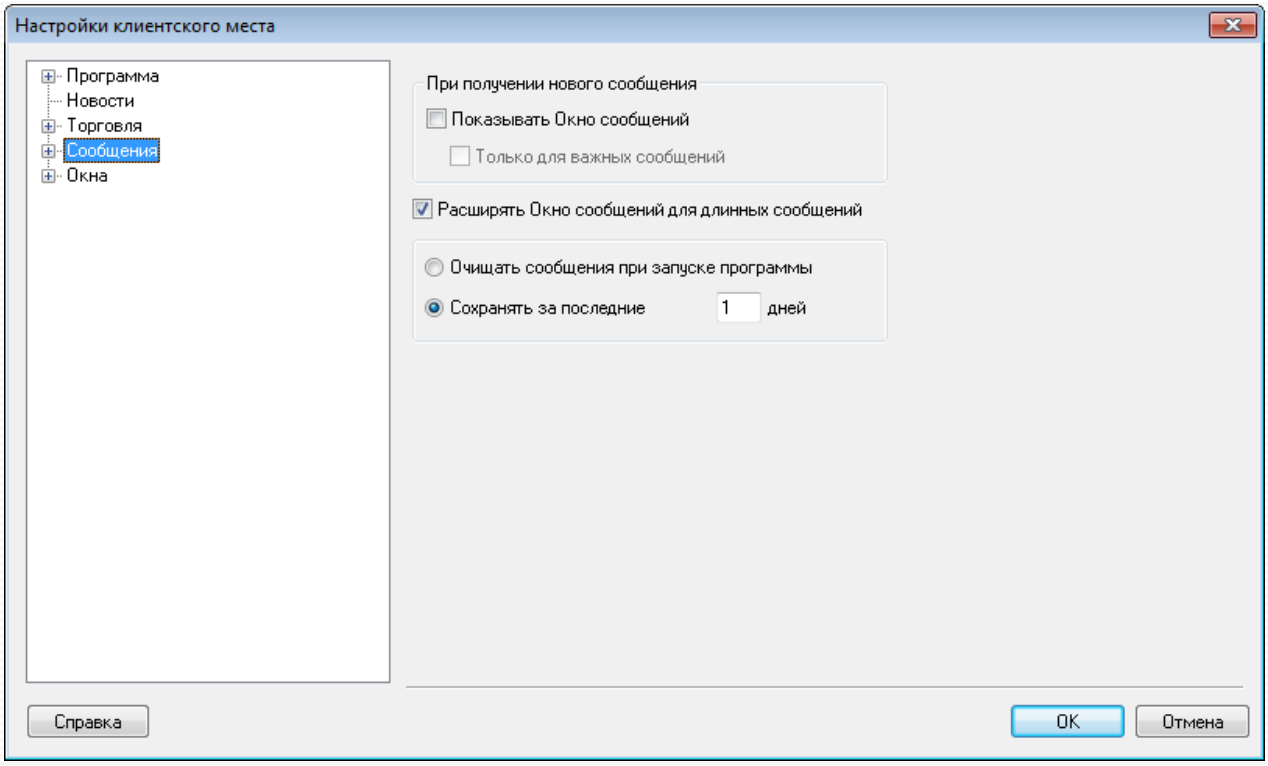
4. In the main menu of quik go to: Services/exportImport/ExternalTransactions and click in the popup menu "Start output". Tick "automatically"
5. **For all tables in the opened window, it is necessary to remove restrictions on the translation of markets. Right-click on each table and select "Edit table":**

It is necessary that in the "Selected classes" table all fields were ticked. Check the boxes and click YES.



14.1. Quik DDE. Configuring Quik.

6. In the main menu of quik: System/settings/basic and click on the drop-down menu "Start output". Then go to the "Messages" column and uncheck "Show message window"



7. Important! In order to provide the correct export operation, the system on which the quick is running must be configured with regional language settings: "Russian"

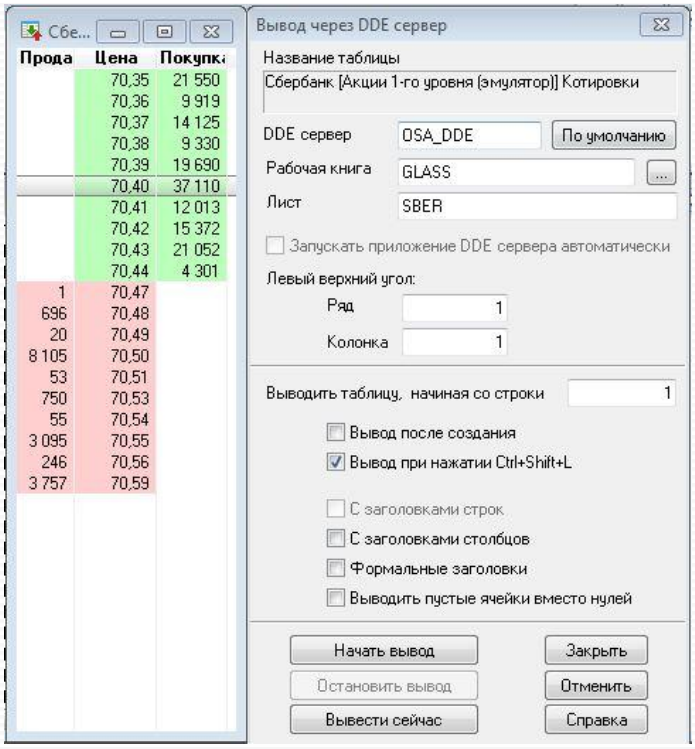
In order to do this, go to control panel = > "Language and regional settings" = > in the opened window select the Format: Russian(Russia)

14.2. A market Depth in Quik DDE

A glass in quik is not created by default. If you do nothing, the robot will take the best Bid and Ask prices as price benchmarks, which is enough for trading.

- If you need a full glass, you will have to create it in the system and configure the output by DDE. For this purpose:

1. create a glass of the desired instrument in quik
2. right-click on it
3. choose "output through DDE server", and do it as in the picture below

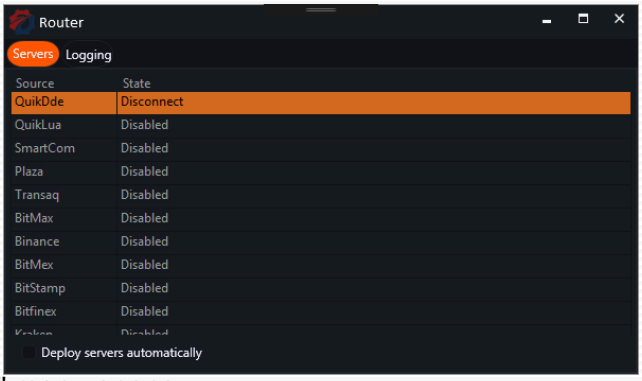


In the Sheet field, enter the "Code of security". All the rest is configured as in the picture and click "start output". That's it. The next time you connect this instrument, the robot will start taking data from this glass.

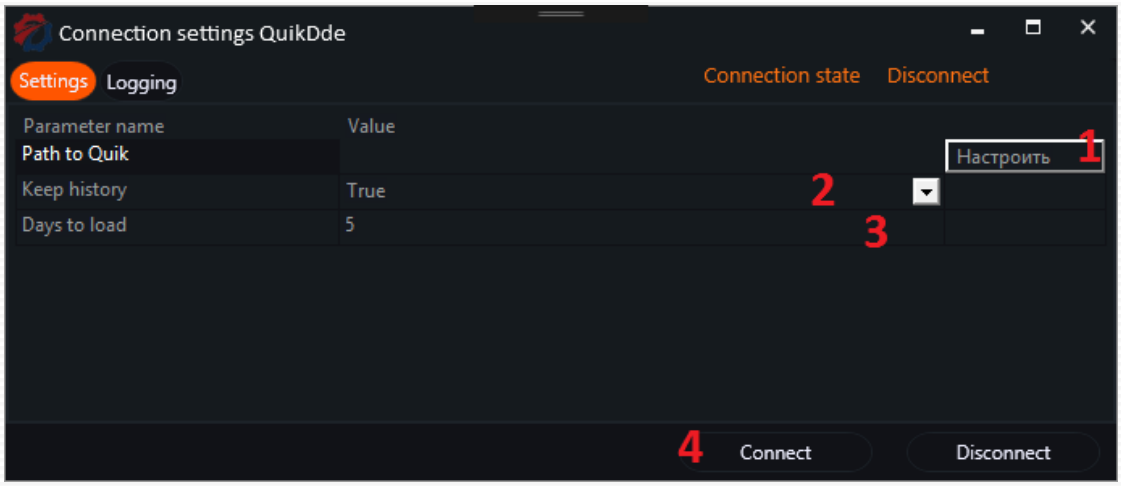
14.3 Configuring the robot to connect to Quik DDE

Before connecting the robot to quik, it is required to enable quik to configure it in accordance with the previous menu item settings

Next, in the main window of the platform click "Connection servers" and choose it as a platform to connect Quik.



"Connect to Quik" menu opens



1. Specify the path to the FOLDER with the working directory of Quik.
2. Is it required to save the history for further loading
3. Number of days for loading
4. Click the connect button.

14.3 Configuring the robot to connect to Quik DDE

IMPORTANT

- Once connected, the robot will try to connect to Quik and start exporting data from the tables. In order to provide the procedure passing without complications, after pressing the "Connect" button, it is advisable not to do anything for a few seconds.
- To provide the platform connection to Quik, you shall close all pop-ups in Quik. Otherwise this connection will not be made.
- After the first connection of Quik to the trading server, the ticks will be loaded into the table with all trades. It is necessary that it is completed before connecting the robot to Quik. OTHERWISE, ROBOTS WILL BEGIN TO RECEIVE UNCONTROLLED EVENTS ABOUT THE COMPLETION OF THE LAST CANDLE. And they will probably start bidding!
- During the connection of the robot to Quik, you need to provide that the tab with windows is opened in Quik.

Training servers of Quik

1. Training server of Quik creators: link Arqatech

This server works 24/7, but only with the Spot market. Futures do not fully work and the robot can't be connected to the Forts market.

2. Training server of BCS broker. link BCS Demo

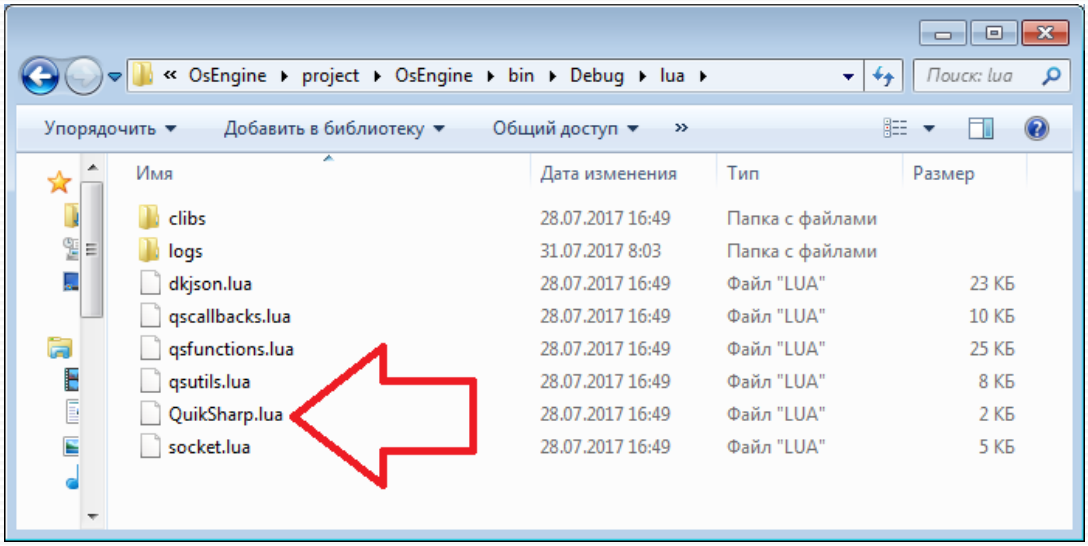
Great training server, with futures and a bunch of other markets. The broadcast is neither interrupted nor noisy, but it works only on weekdays. On other days it gives noise.

14.4 Quik LUA

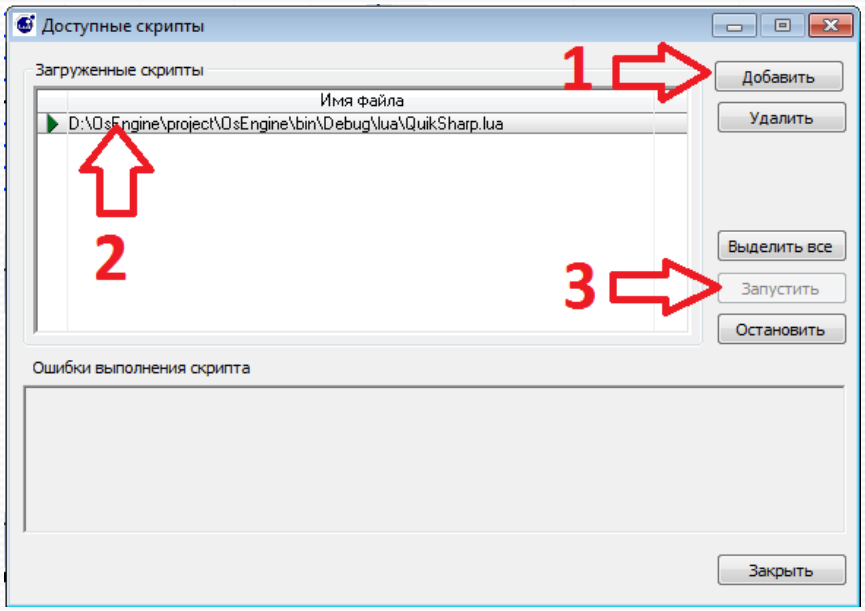
Quick Setup

Go to the main menu: Services / Lua scripts

In the pop-up menu, click "Add" and select the script which is located in the Lua folder, next to the OsEngine exe file in the root of the project:



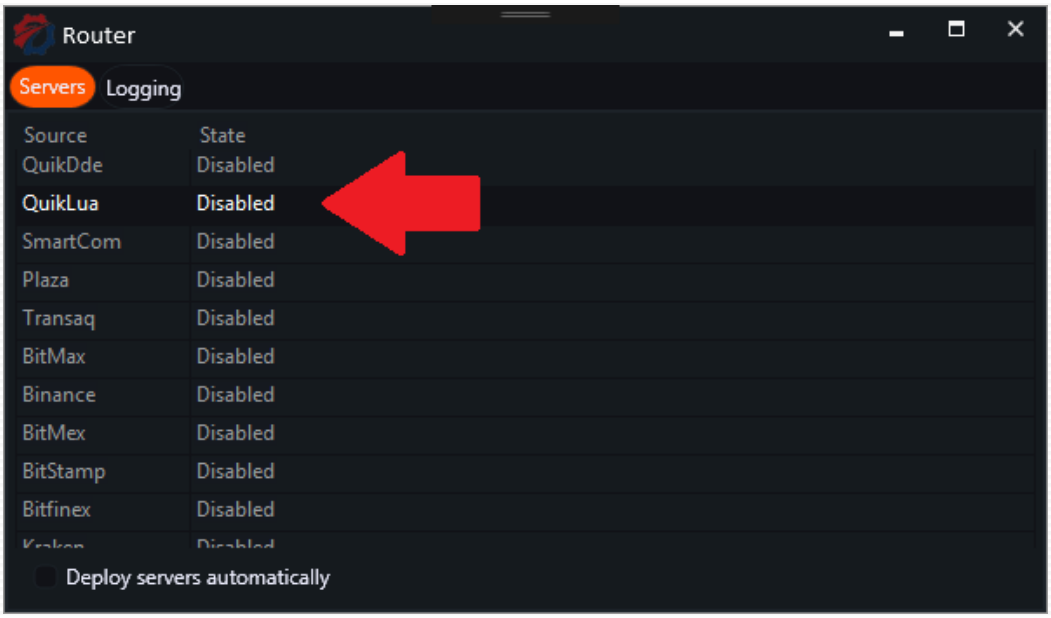
Next, in the script window, select the script that appears and click "Run":



14.4 Quik LUA

Setting up the Robot

Select the "Management" tab and click "Connection servers". Then select the QuikLua^ connection



In the opened window click "Connect"

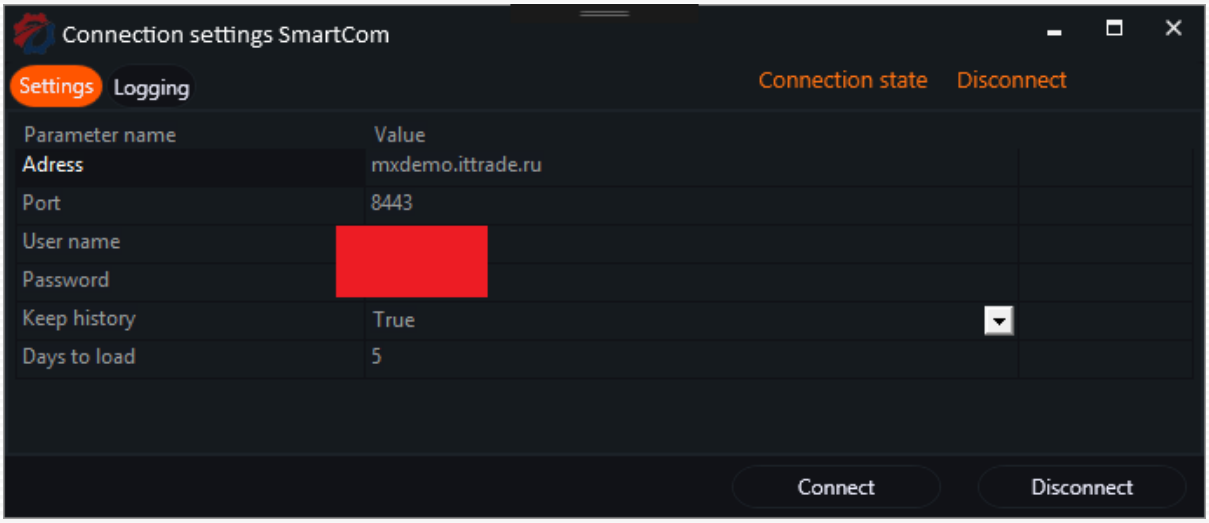
15. SmartCom

Smartcom is programming interface for access to the Russian stock market. Developed by It Invest broker. Of free platforms that provide access to the MICEX, this is the fastest solution. It is 10 to 50 times faster than Quik.

- Description on the broker's website: SmartCom

In order to connect to trading, install SmartCom distributions. They are next to the instructions. File: SmartCOM_Setup_3.0.146.msi

Next, in the main window of the platform click "Server" and choose it as a platform to connect SmartCom.



In order to start the SmartCom server, it is required to configure:

1. Server address and port. They can be taken from the SmarX terminal, from the connection window that appears immediately after loading.
2. To access the system you need to enter a password and a user name.
3. Click the "Connect" button.

You can order test access keys on the page: It Invest There is a corresponding field at the bottom.

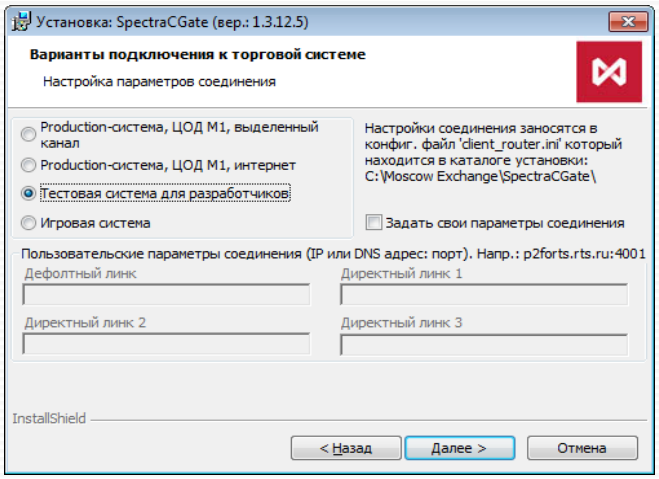
16 Plaza 2 CGate

Plaza II Gateway — Software that provides data exchange between the Server part of the software - Trading and clearing system of the Derivatives market (SPECTRA trading system) and the certified brokerage system under the Plaza II Protocol.

- The leader in the speed of access to the Moscow stock exchange.
- In order to connect to trading, install Plaza II distribution. It is next to the instructions. File: setup_SpectraCGate_x86_v1.3.12.5.exe

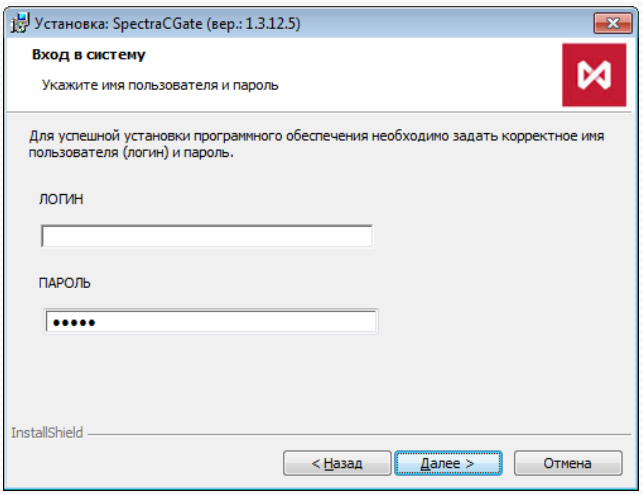
Installation of Router and distributions

Run the installer. Click "next" a couple of times, do not change anything. And so up to this window:



Select the connection type. If you ordered test keys on the exchange website, then choose a Test system. Game system - for tested and certified systems. The keys to it can be requested from the broker after certification.

On the next page, enter your password and username:



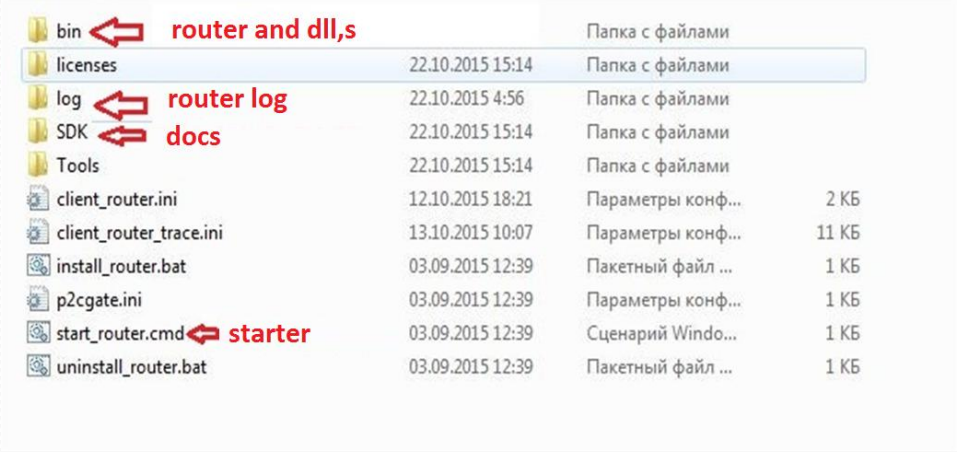
Next, we agree with the registration of Plaza as a service. And then click next until the installation begins.

If everything is done correctly, then after each restart of Windows a router will run, ready to contact to stock exchange at any time.

16. Plaza 2 CGate

What we have installed

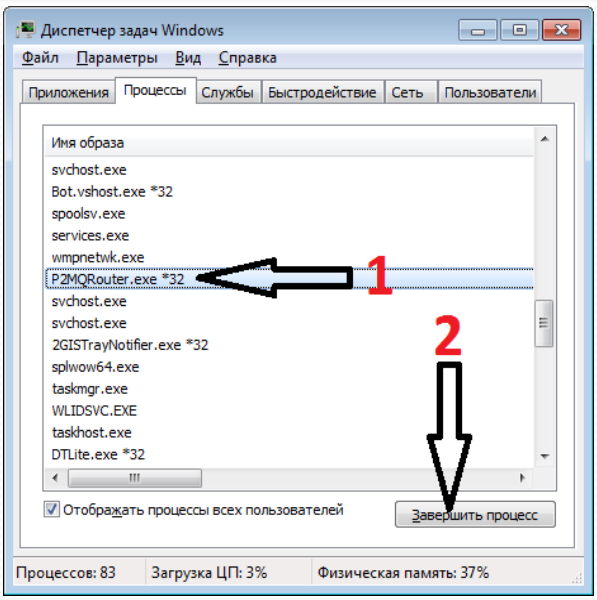
Go to the installation directory. And feel joy! We have everything a programmer needs in one place:



Status of the router

- The router is a thing installed in the operating system that allows you to communicate with the exchange. Access to the router can be obtained using special libraries from the archive that we have installed. It (router) has no visual interface and to understand if it is switched on or off, it is necessary to observe its logs, or look in the task manager, whether the P2MQRouter.exe process is started

- Every start of Windows, the router would have to start itself and wait for the commands of our programs. In my case this process failed. It is not clear why, but the router itself could not avoid running at the start of Windows. Sometimes it ran but was not active. It was impossible to connect the program to it and it showed errors when trying to connect. Maybe it was antivirus, I don't know. It was solved by stopping the process from the Task manager and manually turning the Router on.



16.1 Plaza 2 CGate. Test trading

Access to the test server is provided by the Moscow exchange. To gain access you need to:

- Send message to support of the exchange and ask for a test connection. link
- The letter should look somehow like this:

Hello!

I need test access to Plaza. I'm moving my bots from Quik to Plaza, and I need them to be tested.

By points of the questionnaire:

1 The company represented by the user or the name of the individual.
Answer: Uncle Feodor. Natural person. Algo trader

2 The goal of connection is to test the new version or development of the gateway.
Answer: I would like to move my robots from Quik to Plaza.

3 Which market do you want to access.
Answer: Forts 4

The user's preferences regarding connecting login to the level of the firm or the client (when connecting to time market).
Answer: "Linking login to the company or client level is REQUIRED".

5 Specify the selected connection protocols
Response: PLAZA2 CGate

6 How the connection passes through the Internet or through a network of the Moscow Exchange.
Answer: through the Internet.

7 E-mail address to which trading reports will be sent, if necessary.
Answer: ancleFeodor@gmail.com

Additionally, please deposit to a virtual account 500 thousand rubles.

Thanks in advance. Uncle Feodor.

After that, you should receive an email with access keys and account number.

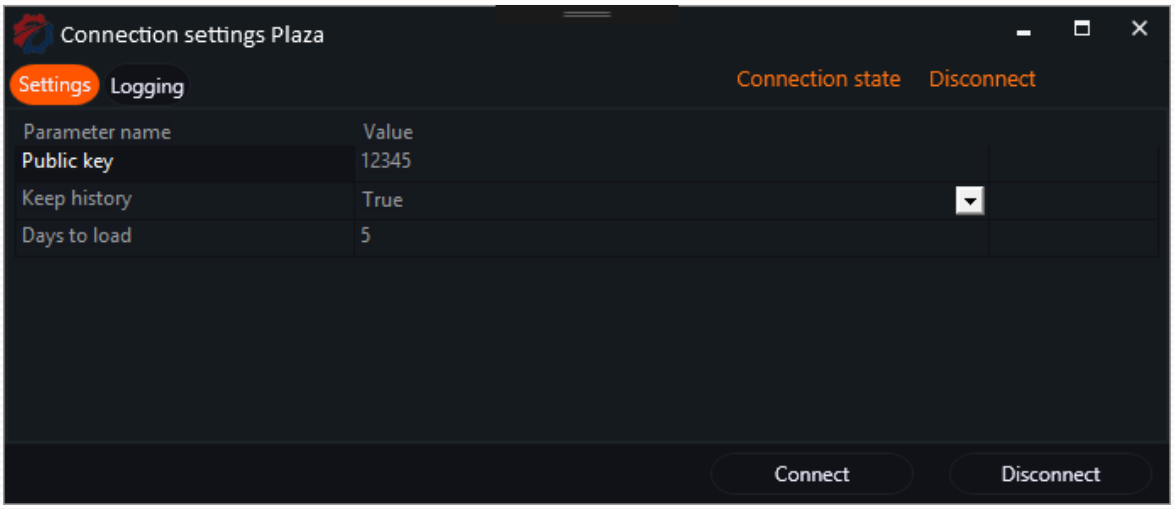
ATTENTION!

1) it is possible that you will not receive money directly into your virtual account. You would have to contact support to add a trading login.

2) When receiving new keys, it is recommended to reinstall the router in the system!

16.2 Connecting to Plaza II

In the main window of the platform click "Connecting servers" and choose it as a platform to connect Plaza2.



Then:

1. Enter a unique program key that is issued during certification. For testing the server it is 8 units.
2. Click on the connect button.

16.3 Real connection to Plaza II

Selecting hoster and broker

First, you need to select a broker that provides access to the exchange through Plaza protocol.

Next, you need to select the Windows virtual server to install the robot. Among the cheapest:

1. one of the most popular Russian hosters.
2. broker's server in an undefined location
3. broker's server on the exchange
4. purchased post on the exchange server

Virtual/private server

- Private Windows server - regular windows, most likely Windows Server, which is accessed by means of the standard program "Remote desktop connection".
- After gaining access to Windows, do not go to broker right away. Install a training Plaza on it and make sure that everything works properly on the test contour. That nothing slows down, fall and resources are enough.

Connection request from broker

To provide a broker with access to Plaza2, in most cases you need to contact technical support and ask how to access Plaza2.

There following will be asked:

1. Your type of server.
2. What is the IP address of the server from which we will trade and what is the emergency IP address? Let's google: "how to learn your Windows IP"
3. The name of the program(VPTS/development environment/robot/terminal/software) on which the robot is written - "Os.Engine"
4. Program developer: Alex Van
5. Type of intermediate server. Exchange (RTS) or broker. Better exchange, as a rule, commercial server of the broker is cheaper and slower by 10-20 mls. Choose according to your wallet.

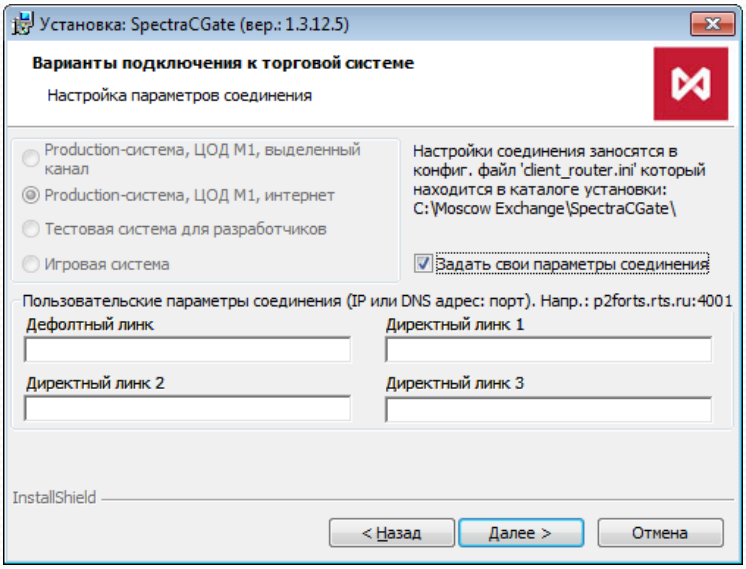
What the broker should send after connection of Plaza2:

1. login and password to connect the program to Plaza
2. server address you should connect to
3. that's it!

16.3 Real connection to Plaza II

Connection to the working contour

1. if you connect to the test contour, you need to remove Plaza. Go to the control panel "programs and features" and demolish it.
2. beside the user manual there is a router distribution setup_SpectraCGate_x86_v1.3.12.5.exe. It is not necessarily the case that at the time of installation it will be the latest version, so you can check it here: http://ftp.moex.com/pub/FORTS/Plaza2/CGate/ We are interested in the setup_SpectraCGate_x86_v..... file with the biggest number.
3. Run the installer. Agree to the full installation and use the default installation!



4. set the connection parameters received from the broker
5. in the next window, enter the user name and password.
6. that's it! Next, we monitor the status of the router, as in the test connection.

Attention!

Keep an eye on the portfolio from home, with quik. MICEX is famous for problems and technical failures of different kinds. No one will take responsibility for technological risks

17. Interactive Brokers

International broker. Trading is available on more than 100 sites in 24 countries

Interactive Brokers

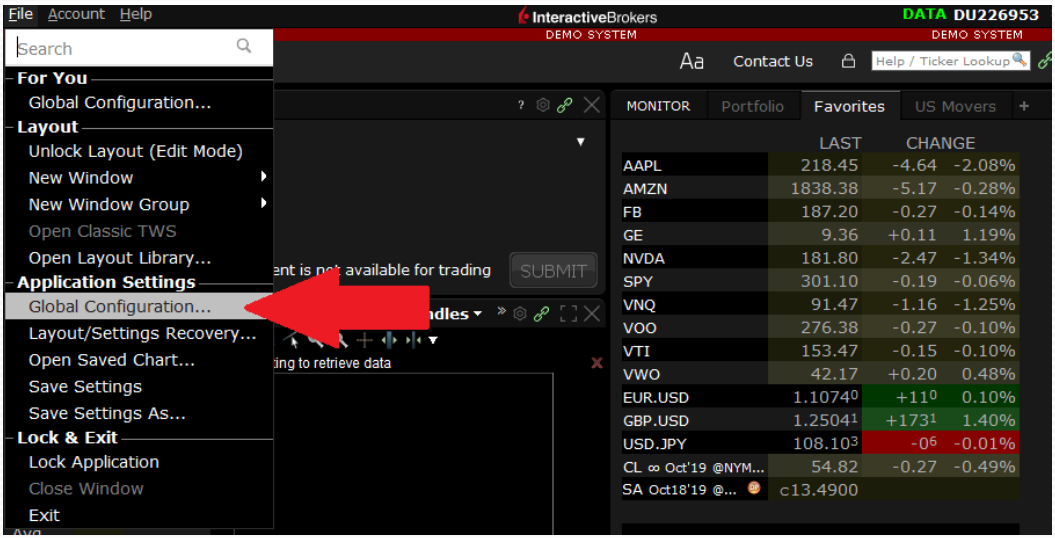
Provides connection to the exchange via TWS terminal. The terminal has API. Simple and fast. Although with a number of interesting limitations.

- API home page: link

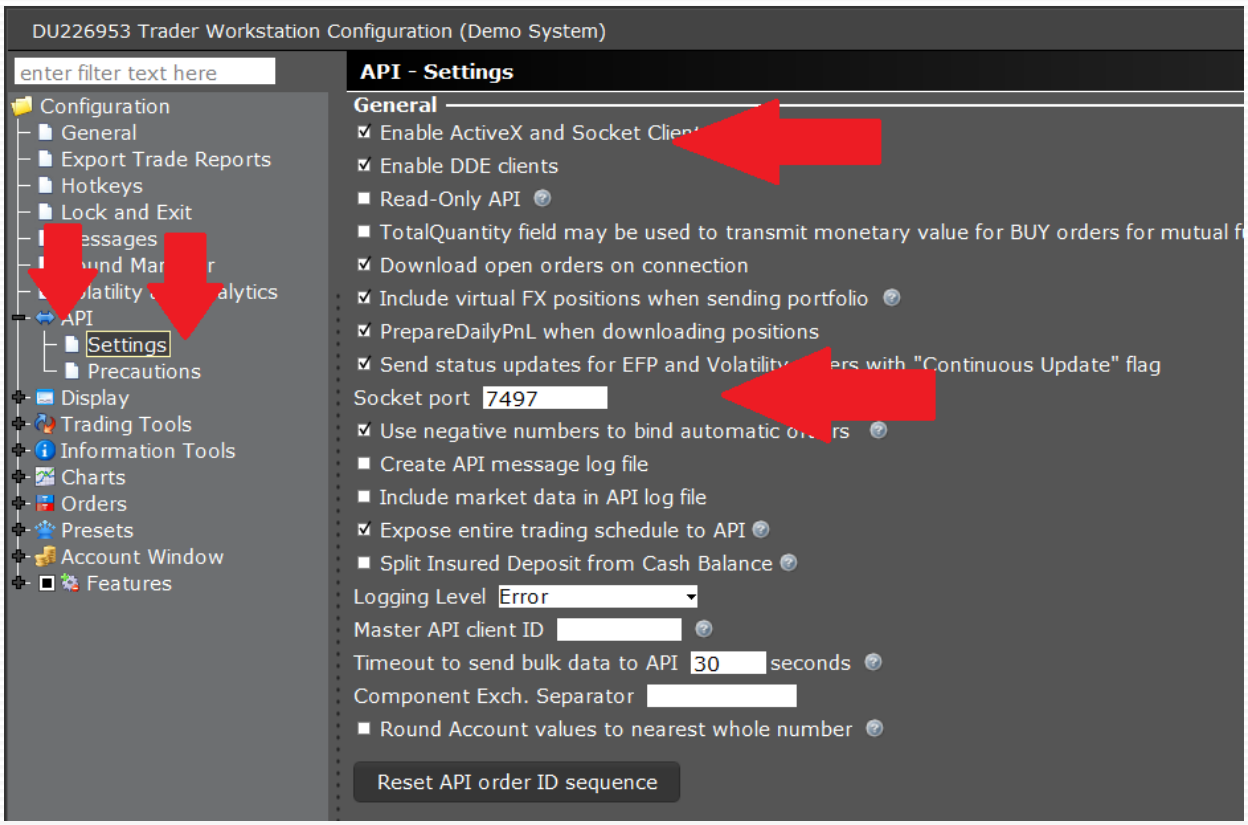
- Tick data from TWS are without time signatures. Therefore, the candles in Os.Engine terminal may vary. All ticks are numbered by the current PC time. Therefore, it is recommended to set on your PC the time of the exchange on which you are going to trade.

17.1 IB. Terminal setup

You must open configuration settings:

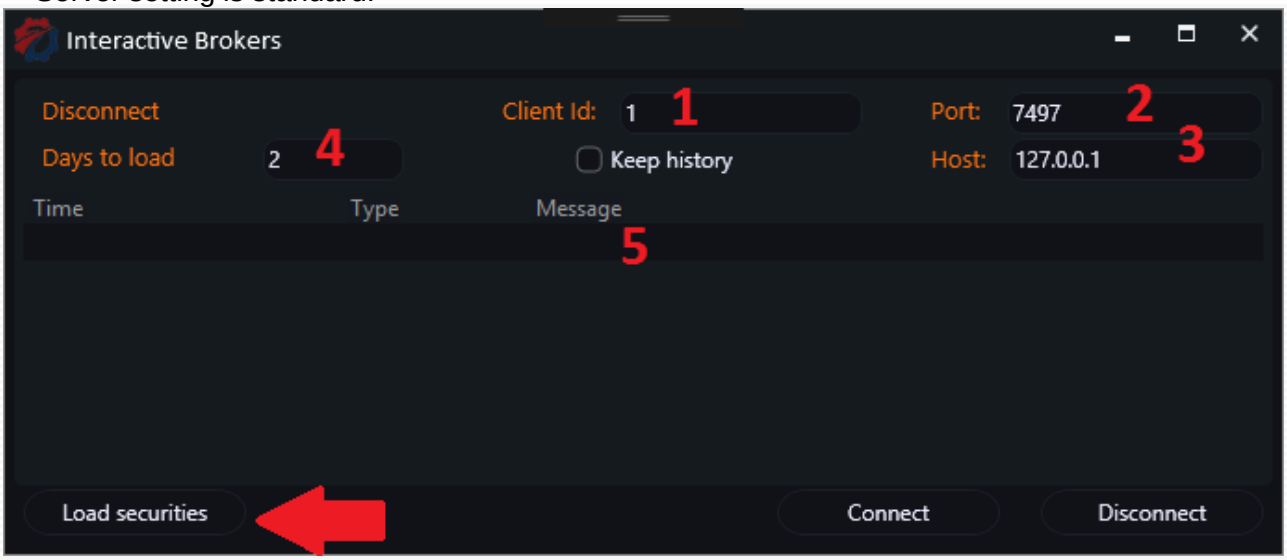


- Then
- 1) select API / Settings
- 2) check the boxes as well as in the picture



17.2 IB. Server setting

Server setting is standard:

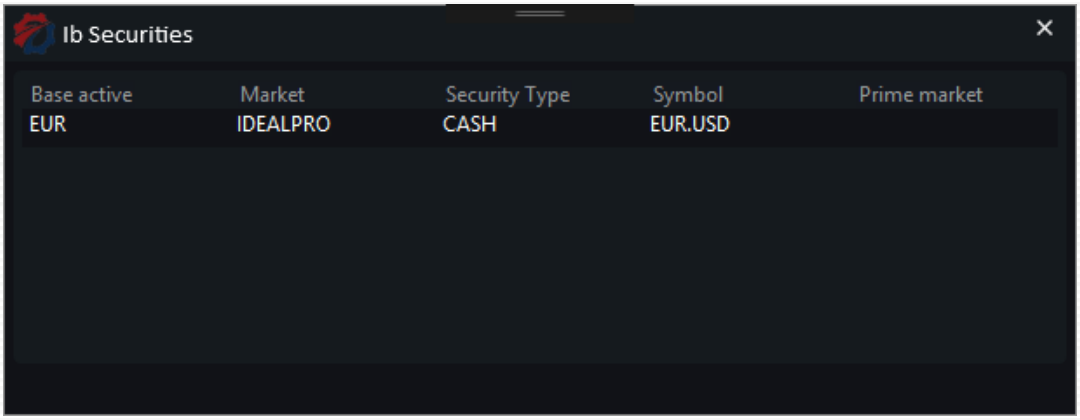


1. Several connections can be made to the terminal. In this window, specify the desired number
2. Port to connect to the terminal. Available in the terminal settings. "Socet port"
3. The host shall be standard.
4. If we store data, then how many days ago we loaded them at the launch.
5. Whether to keep the transactions.

- **ATTENTION!**
- Before switching on, it is necessary to configure the list of connected instruments. This server does not display the entire list of available securities. You have to find them by yourself. Read more in the next chapter.

17.3 IB. Setting up instruments

Open the instrument settings window in the server:



- In this window, in the table, you need to enter the appropriate information about the instruments that you want to connect.
- Information about the instruments should be viewed in the TWS terminal. In a special window:

17.4 IB. Test server

The page where you can get a test score link

After registration you need to download TWS and then you can connect.

ATTENTION!

Not all data types are available on the test server. Some classes for downloading ticks are missing. Therefore, they can not be connected.

18. ASTS Bridge

- 1) ASTS Bridge
- 2) Teap
- 3) "gateway"
- 4) and somewhere just msterLib, by the name of the access library...

The lowest-level protocol of access to the core of the Moscow exchange, its stock and currency sections.

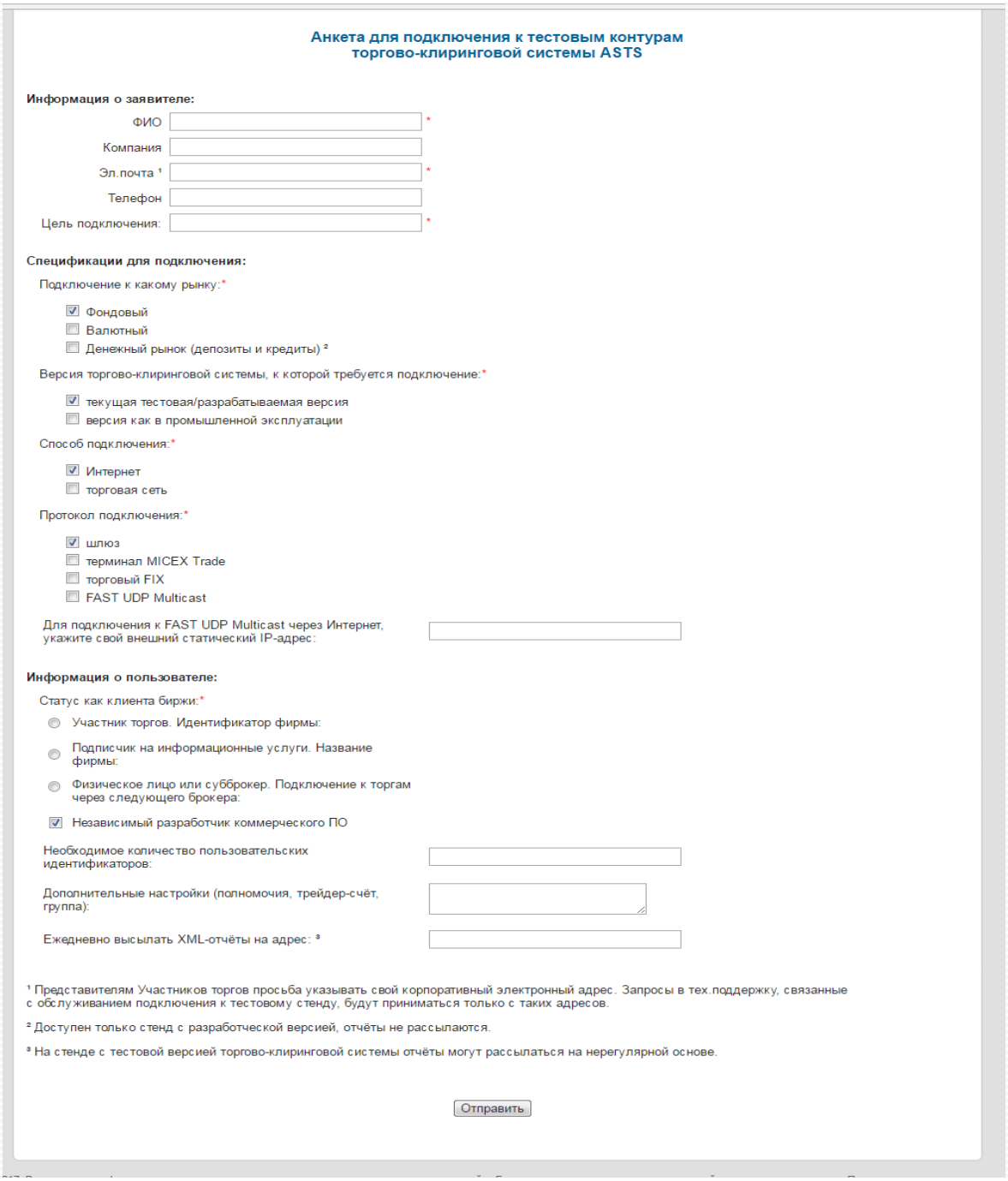
Test access

The first thing to start with is a letter to the exchange with a request to provide you a test access to this connection.

Go to the next page: http://moex.com/s443. This is where the exchange posted basic information on this connection method. You can go through links, and see, but we have to go here:

Where you will be asked to fill out an access form. This is how it looks like:

18. ASTS Bridge



Анкета для подключения к тестовым контурам торгово-клиринговой системы ASTS

Информация о заявителе:

ФИО *

Компания

Эл.почта [1] *

Телефон

Цель подключения: *

Спецификации для подключения:

Подключение к какому рынку:*

- [x] Фондовый
- [ ] Валютный
- [ ] Денежный рынок (депозиты и кредиты) [2]

Версия торгово-клиринговой системы, к которой требуется подключение:*

- [x] текущая тестовая/разрабатываемая версия
- [ ] версия как в промышленной эксплуатации

Способ подключения:*

- [x] Интернет
- [ ] торговая сеть

Протокол подключения:*

- [x] шлюз
- [ ] терминал MICEX Trade
- [ ] торговый FIX
- [ ] FAST UDP Multicast

Для подключения к FAST UDP Multicast через Интернет, укажите свой внешний статический IP-адрес:

Информация о пользователе:

Статус как клиента биржи:*

- ( ) Участник торгов. Идентификатор фирмы:
- ( ) Подписчик на информационные услуги. Название фирмы:
- ( ) Физическое лицо или субброкер. Подключение к торгам через следующего брокера:
- [x] Независимый разработчик коммерческого ПО

Необходимое количество пользовательских идентификаторов:

Дополнительные настройки (полномочия, трейдер-счёт, группа):

Ежедневно высылать XML-отчёты на адрес: [3]

[1] Представителям Участников торгов просьба указывать свой корпоративный электронный адрес. Запросы в тех.поддержку, связанные с обслуживанием подключения к тестовому стенду, будут приниматься только с таких адресов.

[2] Доступен только стенд с разработческой версией, отчёты не рассылаются.

[3] На стенде с тестовой версией торгово-клиринговой системы отчёты могут рассылаться на нерегулярной основе.

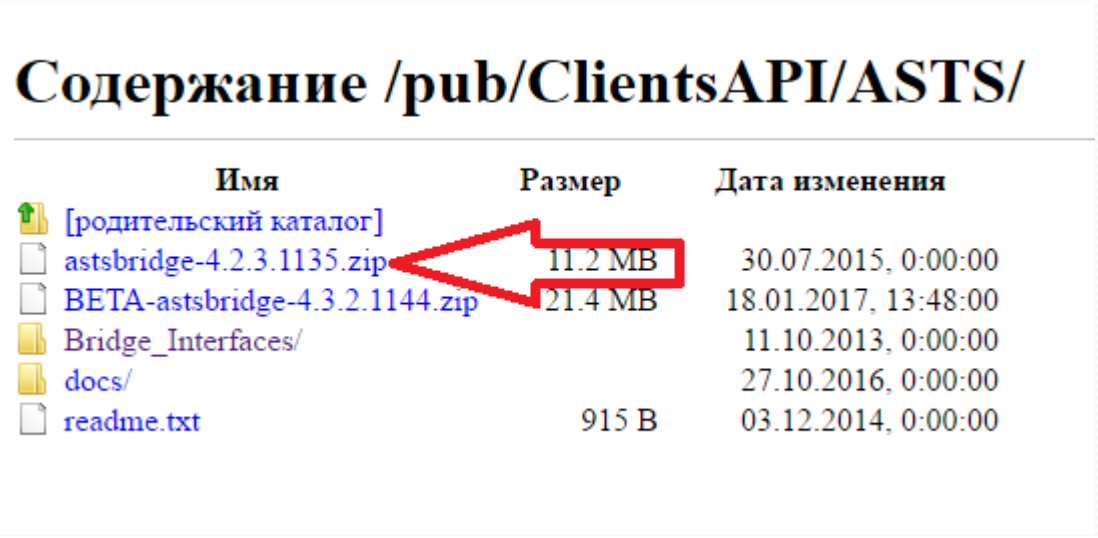
Отправить

18. ASTS Bridge

- in order to connect we say: "testing my own bot"
- connect to which market: "stock"
- connection method: Internet
- protocol: gateway
- Well, all the rest is standard. Name and mail.

After you receive an answer with the keys, you can additionally ask to put more money into a stock trading account. Since I had zero, I couldn't figure out for a long time why no warrants were issued.

In response to the test connection request, we will receive the connection parameters, login and password, as well as a link to the distributions. Here it is: ftp://ftp.moex.com/pub/ClientsAPI/ASTS/



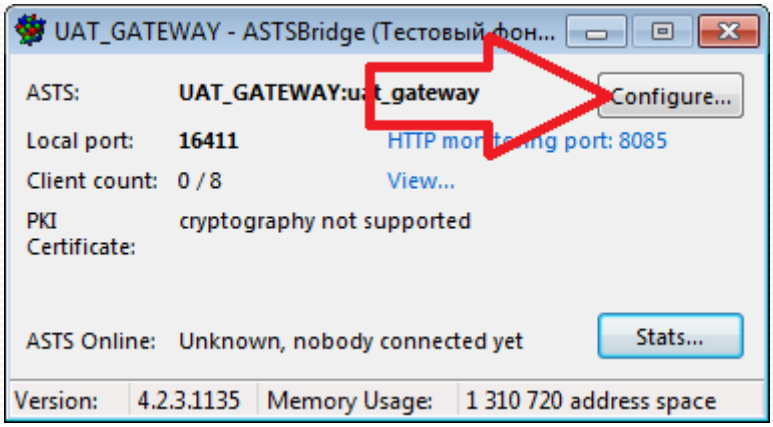
Содержание /pub/ClientsAPI/ASTS/

Имя	Размер	Дата изменения
[родительский каталог]		
astsbridge-4.2.3.1135.zip	11.2 MB	30.07.2015, 0:00:00
BETA-astsbridge-4.3.2.1144.zip	21.4 MB	18.01.2017, 13:48:00
Bridge_Interfaces/		11.10.2013, 0:00:00
docs/		27.10.2016, 0:00:00
readme.txt	915 B	03.12.2014, 0:00:00

In this distribution, we are interested in the server folder and the ASTSBridge.exe file, which is responsible for connecting to the exchange

18. ASTS Bridge

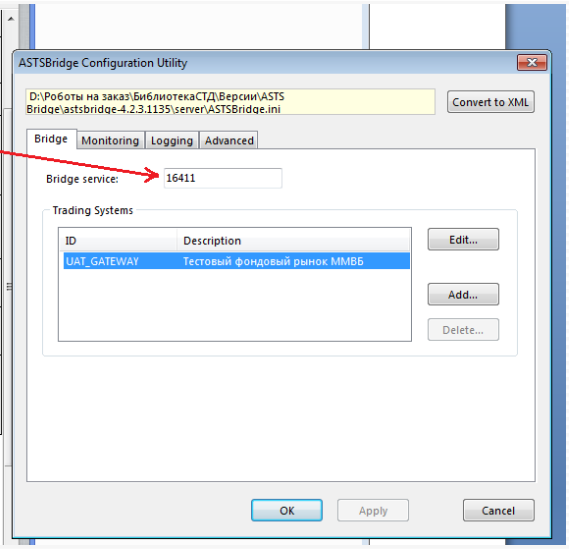
Run the executable file from the server folder: ASTSBridge.exe
In the opened window click Configure:



Settings shall be taken from the table which was sent from the exchange.

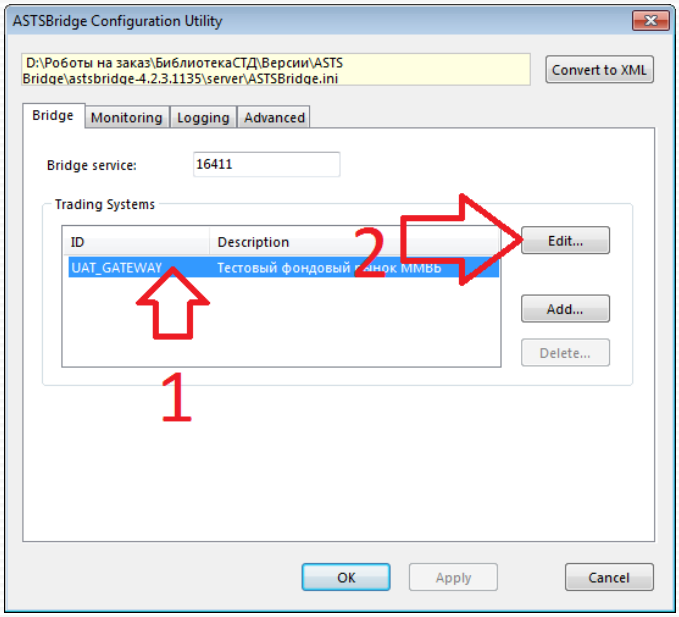
Fiest:

	Протокол подключения	ASTS Bridge TEAP
Настройки:		
1	**Ссылка на скачивание шлюза**	ftp://ftp.moex.com/pub/ClientsAPI/ASTS/
2	**Прописать в файле C:\WINDOWS\system32\drivers\etc\services следующие параметры (в конце файла поставьте пустую строку)**	uat_gateway 16411/tcp uat_gateway 16412/udp
3	**Настройки шлюза**	Broadcast: 91.208.232.211 Server: UAT_GATEWAY Service: uat_gateway
4	**Тестовый(ые) идентификатор(ы) для подключения**	[redacted]
5	**Пароль (одинаков для всех идентификаторов)**	[redacted]
6	**Дополнительные параметры**	Для корректного подключения необходимо открыть порты 16411/tcp, 16412/udp, и добавить программу в исключения брэндмауэра/ антивируса/файервола.



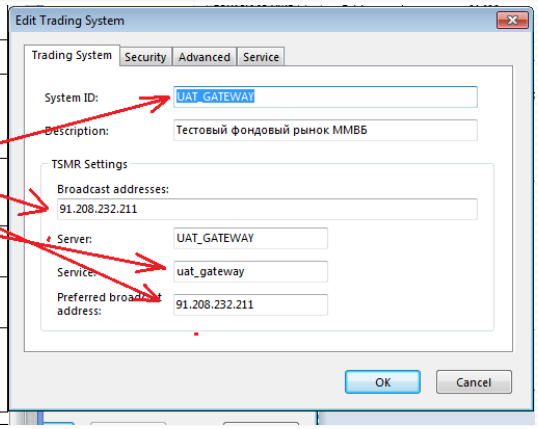
18. ASTS Bridge

Next, go to other settings, like this:



And transfer here the new settings to the letter from the stock exchange:

Настройки:		
1	**Ссылка на скачивание шлюза**	ftp://ftp.moex.com/pub/ClientsAPI/ASTS/
2	**Прописать в файле C:\WINDOWS\system32\drivers\etc\services следующие параметры (в конце файла поставьте пустую строку)**	uat_gateway 16411/tcp uat_gateway 16412/udp
3	**Настройки шлюза**	Broadcast: 91.208.232.211 Server: UAT_GATEWAY Service: uat_gateway
4	**Тестовый(ые) идентификатор(ы) для подключения**	[redacted]
5	**Пароль (одинаков для всех идентификаторов)**	[redacted]
6	**Дополнительные параметры**	Для корректного подключения необходимо открыть порты 16411/tcp, 16412/udp, и добавить программу в исключения брэндмауэра/антивируса/файервола.

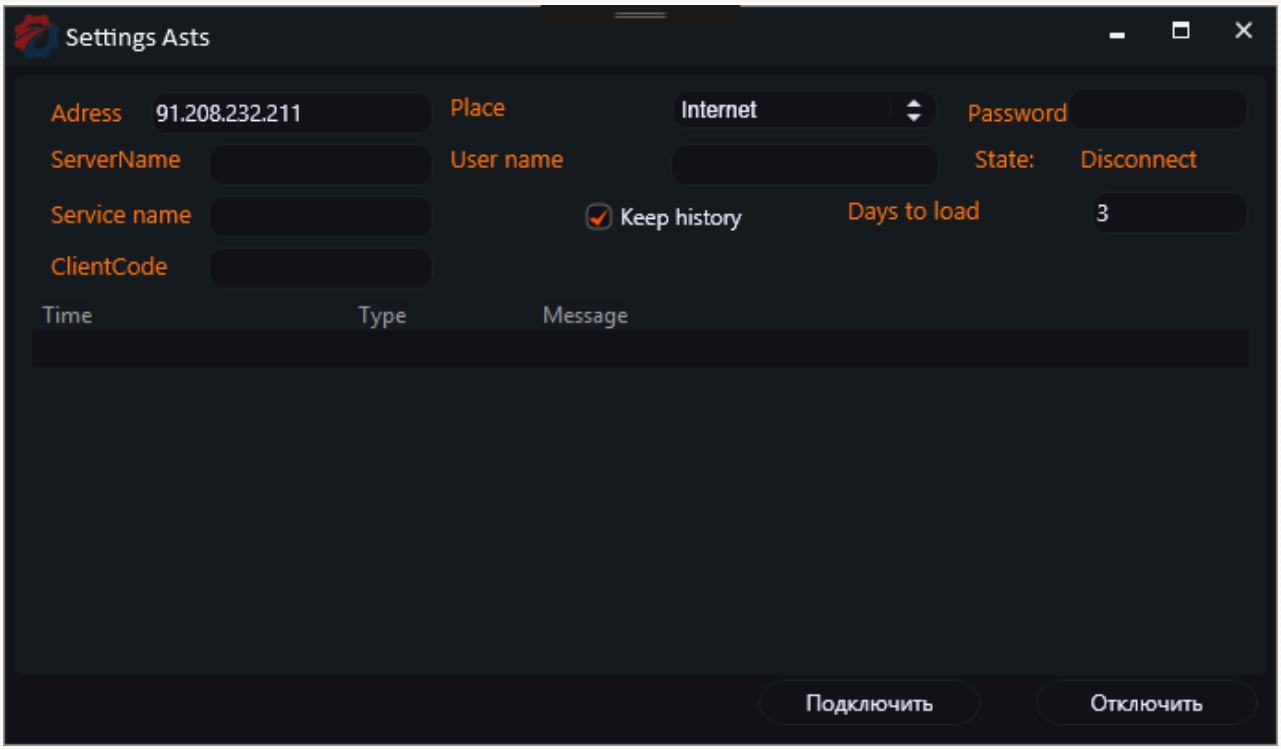


Then click OK in all fields and leave the server open.

18. ASTS Bridge

Connect to Os.Engine

As a standard, we select ASTS Birdge server in the selection of access servers and settings put the settings that we received from the exchange:



It's easy. Do not forget that at this point ASTS server must be deployed.

I will only add a few words about the "Location". ASTS Bridge has a limit to receive updates from the exchange, if we are outside the colocation zone. And here we shall specify where we are. Based on this, the server will choose one or other number of updates for data per second.

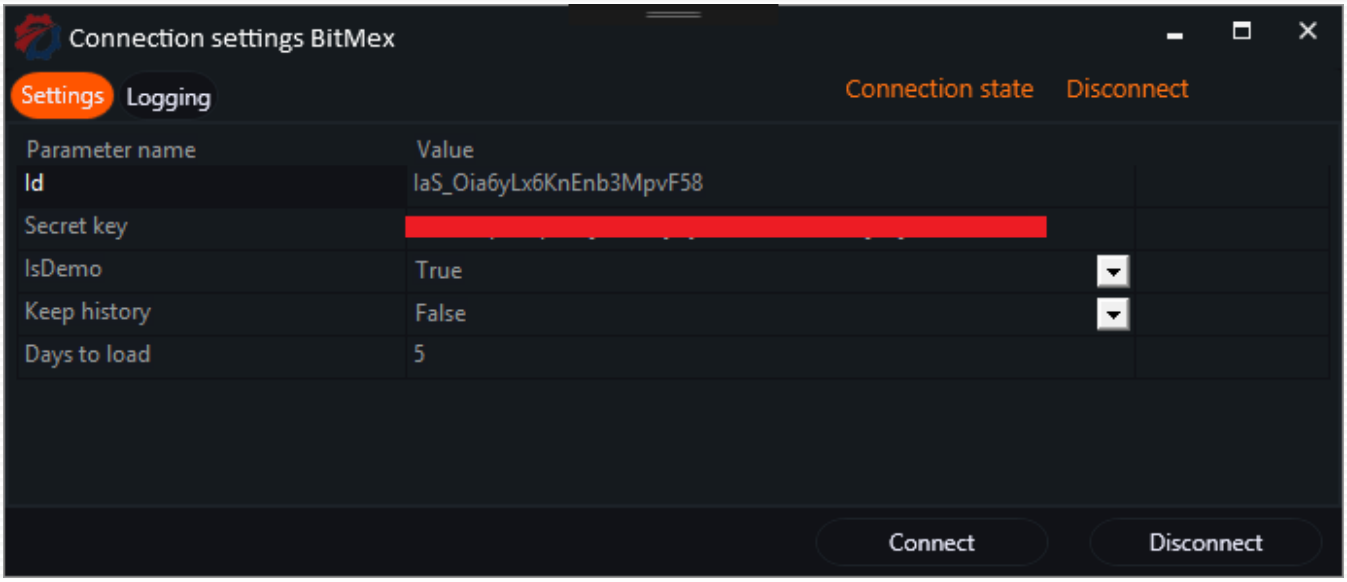
19. Bitmex

Get the keys:

1) You can get it by this link: https://testnet.bitmex.com
2) Register on the website.
3) Go to the page: https://testnet.bitmex.com/app/apiKeys
4) Generate a pair of keys

Working connection is available at: bitmex.com it is the same, but you will need to transfer money to the real account)

Then go to OsEngine and select BitMex in the connections:



Enter the keys that are generated in paragraph 4. And click connect.

Do not forget to select the demo / not demo checkbox. It will influence what addresses the connector will address.

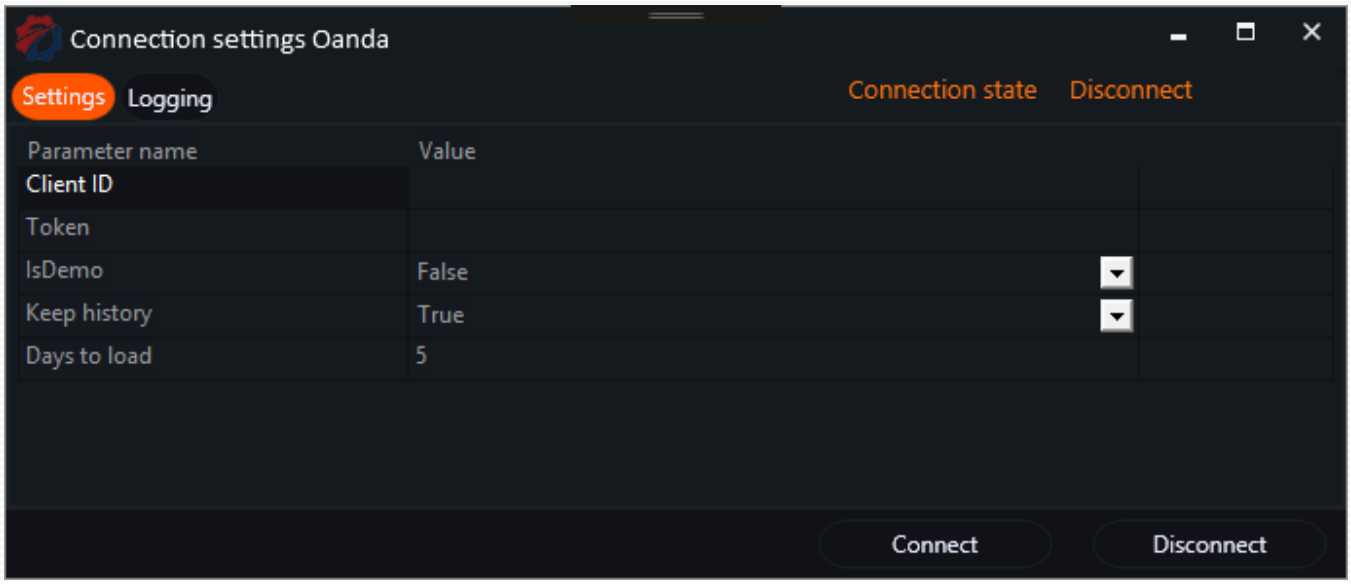
20. OANDA

Get the keys:

1) You can get it by this link: https://www.oanda.com/demo-account/login
2) Sign up on the website by selecting the type of account: "Free demo version"
3) Go to the page: https://www.oanda.com/demo-account/tpa/personal_token
4) Generate a pair of keys

Working connection is available the same way, but when you register you need to choose a normal working account. Then do the same, but you will need to transfer money to the real account)

Then go to OsEngine and select Oanda in the connections:



Enter the keys that are generated in paragraph 4. And click connect.

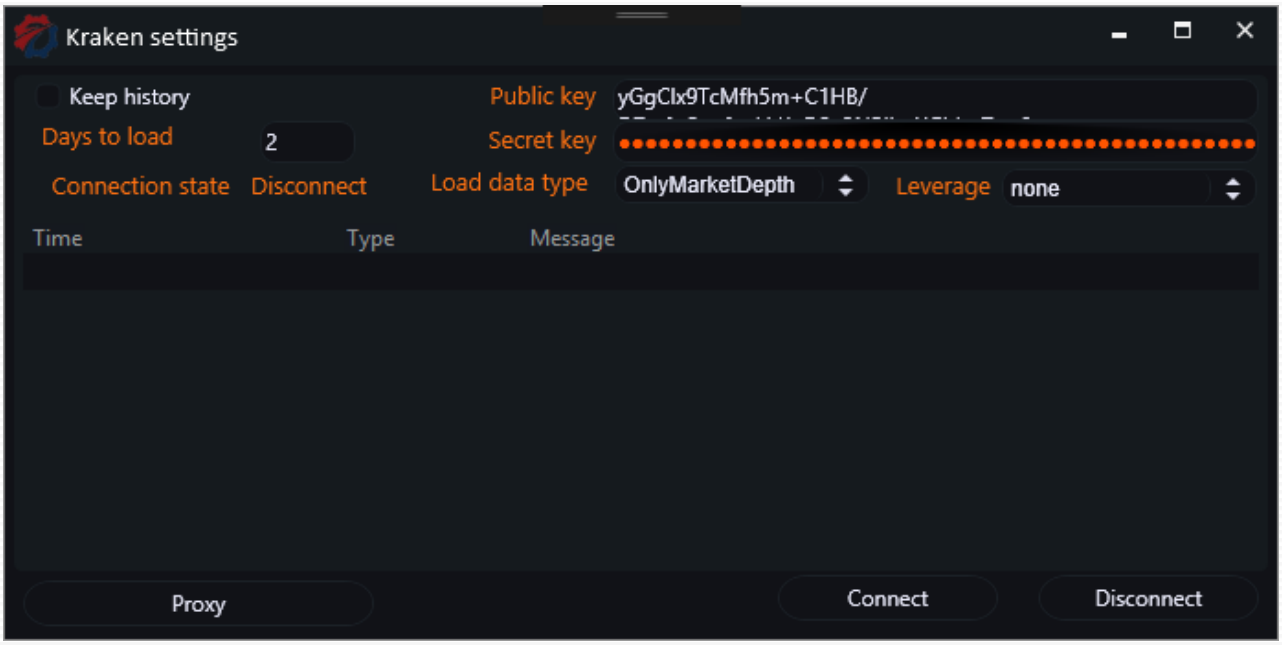
Do not forget to select the demo / not demo checkbox. It will influence what addresses the connector will address.

21. Kraken

This cryptocurrency exchange has no educational connection and here is the working method of connection. This is not the most convenient exchange, it has speed limits on obtaining data. Up to the fact that the glass should be ordered no more than 1 time in two seconds.

Get the keys:

1) Sign in: https://www.kraken.com/login
2) We get 3 levels of trust by adding information about yourself in your personal account. If you don't have level 3, you won't be able to trade
3) Credit money to your account.
4) Generate a pair of keys. Public and secret.



Enter the keys in OsEngine connect to Kraken and click "Connect"

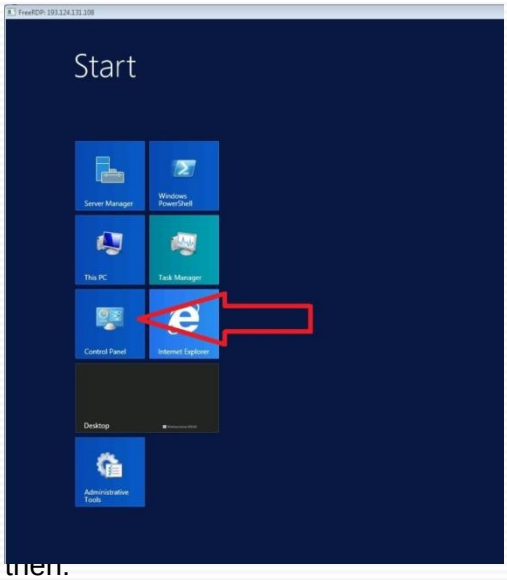
Important! Select the type of data you want to receive. Either glasses or trades. This is necessary because this connector has strict restrictions on the time intervals of the data request.

19. Windows Server and Windows in non-Russian region

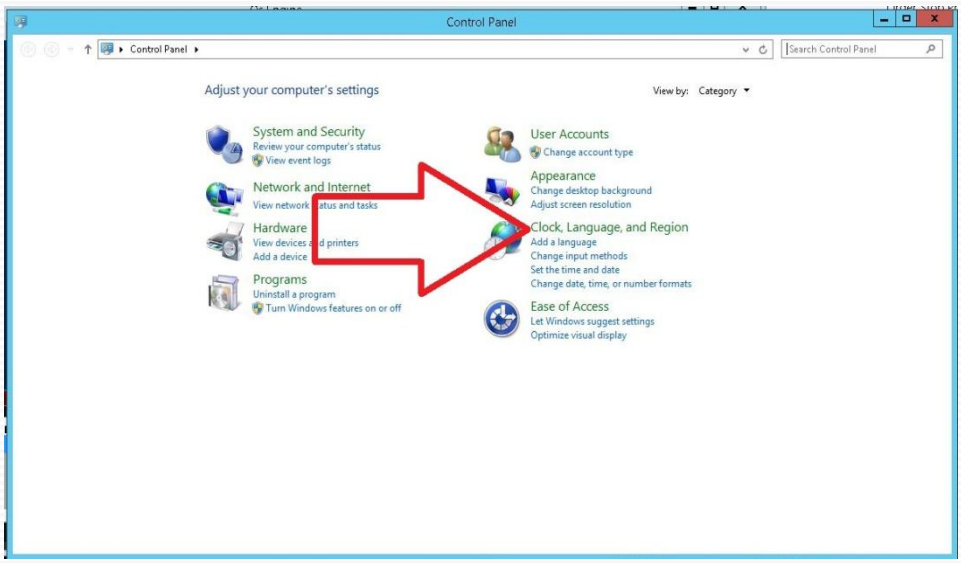
The program is implemented in the Russian region and to work in a different environment, you may need additional settings.

This manual shows you how to do this in Windows Server 2012

The first thing to do is to get into the control panel. To do this, click on the start menu and:

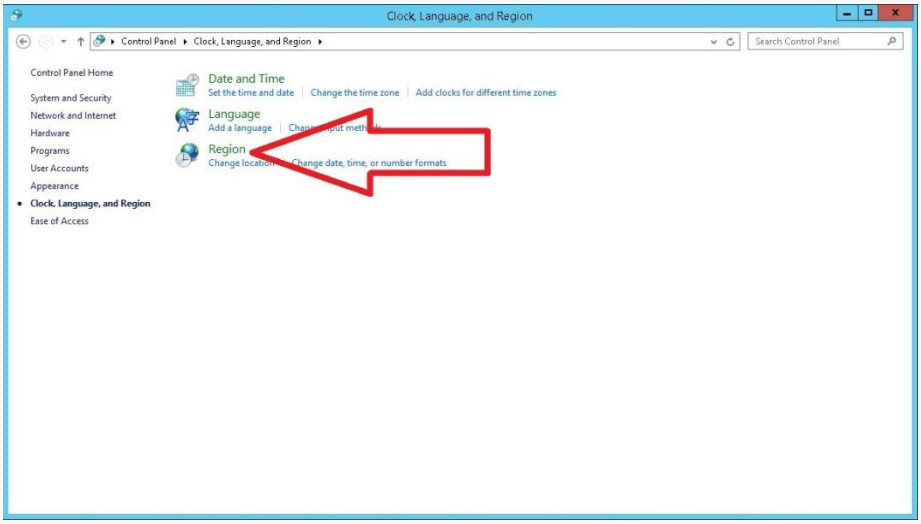


then:

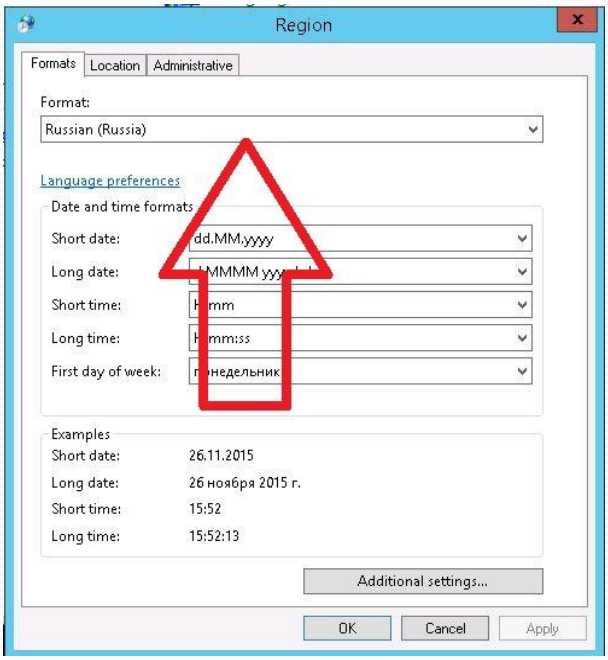


19. Windows Server and Windows in non-Russian region

then select the region settings:



And select Russian data format:



ATTENTION!!!

Quik has systemic problems with working in a foreign environment! Data transfer between Quik and Os.Engine can be delayed up to 1 minute!

20. Windows and .Net requirements

- To run the program you need Windows from the 7th version. If you have an older Windows, do not try to run Os.Engine. It won't work. Everything written before will never be acceptable for Os.Engine.

- The program is written in .Net 4.5.2. And it will not run in earlier versions. To install the appropriate update, use this link.

- To be able to work you need to update C++ Windows: update

- If after that you have a compatibility problem, you should buy a licensed Windows.

Miscellaneous

1. Do not run the program in real trading, not having tested all its features on the training connection!
2. Before cursing the developers, make sure you have read the manual.

- The developer is not responsible for any loss and/or damage (including a loss in connection with lost profits, interruption of business or production activities, loss of business information and other property damage) arising from the use or inability to use the software.

ATTENTION!!!

Quik has systemic problems with working in a foreign environment! Data transfer between Quik and Os.Engine can be delayed up to 1 minute!