Which platform is best for testing forex strategies?

Jovi Simons

Fontys Hoge School

Table of Contents

Introduction

Our Automated Trading Model platform automatically tests strategies for our customers with different parameters, we give our customers an advice based on the results of the tests. We need a platform that can back test for us and forward test. We have several platforms that can test strategies. Therefore, the main question: Which platform is best for testing forex strategies?

In this research it becomes clear which platform suites the needs for our Automated Trading Model platform. The following sub-question are initiated:

Which platforms are available for testing forex strategies?
- Literature Study
- Expert interview
- Available product analysis

What are the criteria for the selected platforms?
- Peer review
- Stakeholder analysis

Which platform is best for back testing, can run in a container and returns the most data with a usable file type?
- Literature study
- Prototyping
- Peer Interview

Which platform fits the stakeholder and development team needs?
- Peer review
- Literature study
- Prototyping

Which platforms are available for testing forex strategies?

Trading View

Trading View is a popular web-based charting platform that provides real-time market data and advanced charting tools for traders. It is widely used by both individual and professional traders to analyze financial markets and make trading decisions.

Ninja Trader

Ninja Trader is a popular trading platform that offers advanced charting and analysis tools, as well as automated trading capabilities. It is commonly used by retail traders, day traders, and institutional traders alike. Ninja Trader includes a built-in strategy development and back testing platform, as well as support for custom indicators and third-party add-ons. This allows traders to automate their trading strategies using Ninja Trader's proprietary programming language, Ninja Script.

Zorro

Zorro is a high-performance trading platform that allows you to backtest and trade your own trading strategies using a scripting language. It is a lightweight and easy-to-use platform that is ideal for traders who want to build their own trading systems.

Meta Trader 4 / 5

The MetaTrader platform includes various features such as charting tools, technical analysis indicators, and customizable trading strategies. It also includes a programming language called MQL (MetaQuotes Language), which allows traders to create their own custom indicators and automated trading systems (known as "expert advisors" or EAs).

MetaTrader is available in two versions: MetaTrader 4 (MT4) and MetaTrader 5 (MT5). MT4 is the more popular version, but both versions are widely used by traders around the world. The platform is available as a desktop application for Windows and Mac, as well as a mobile app for iOS and Android devices.

What are the criteria for the selected platforms?

The selection will be checked by criteria we have come with.

The platform should be free to use or has some sort of demo account because we don't have a budget.

The strategy tester must be free to use, no Premium accounts etc. Because again we don't have a budget. The strategy tester must be fast 10 sec average per test because our platform will perform hundreds if not thousands of tests in a containerized environment.

Our stakeholder has the wish to use historical data, but not from the platform/broker self because that data is not reliable. We need to check we can use historical data obtained by other parties.

Platform and or strategy tester can be started from outside the platform. E.g., via CLI or API, because we need to start the tester inside our containers.

Our stakeholders want us to generate advice based on the returned data, therefore we need proper test results that we can read.

Summary of criteria:

- Free to use platform.
- Free to use strategy tester.
- Use of historical tick data
- performance, fast tester avg. of 10 sec.
- Tester can be started externally by CLI or API etc.
- Usable test results

Which platform is best for back testing, can run in a container and returns the best useable test results?

Each platform is assessed based on the above criteria. All platforms must be free to use as described above. For back testing the performance, use of historical data and starting strategy tester/platform externally is important.

We want to containerize the platforms so that it can be scaled up or down based on the demand. We will check if the platforms can run inside containers and the strategy tester runs inside the container started from code or other, either way it should run without GUI interaction. We do this by creating prototypes.

The platform should also return data in a usable format e.g., html, csv, or txt. Preferably CSV and HTML, because these file types are structured and contain delimiters or tags that make it easier to extract data with code.

Trading View

Trading View has no documentation to start a test via API or cli, and nothing on the community websites either. Running it in a container has no use anymore because we cannot start it without GUI.

As for backtesting TradingView provides two different types of data for backtesting: bar data and tick data. The accuracy of the backtest results depends on the quality of the data used. TradingView uses high-quality data for backtesting, and the quality of the data is indicated by the number of bars/ticks available for the time frame being tested.

For example, if you are testing a strategy using daily bars, TradingView provides data with up to 10 years of historical data, which is typically sufficient to provide accurate backtest results. If you are using tick data, the number of ticks available for backtesting depends on the data provider and the specific instrument being tested.

Unfortunately, Trading View does return a wide variety of choices such as .csv and .html files but is only for PRO+ and Premium users. This is a no go since our criteria said that it should be free.

Ninja Trader

No account could be made for this platform.

Zorro

Zorro claims to be high-performance and lightweight, which is perfect for running in a container.

To Start Zorro trough command line, you need to use the following command:
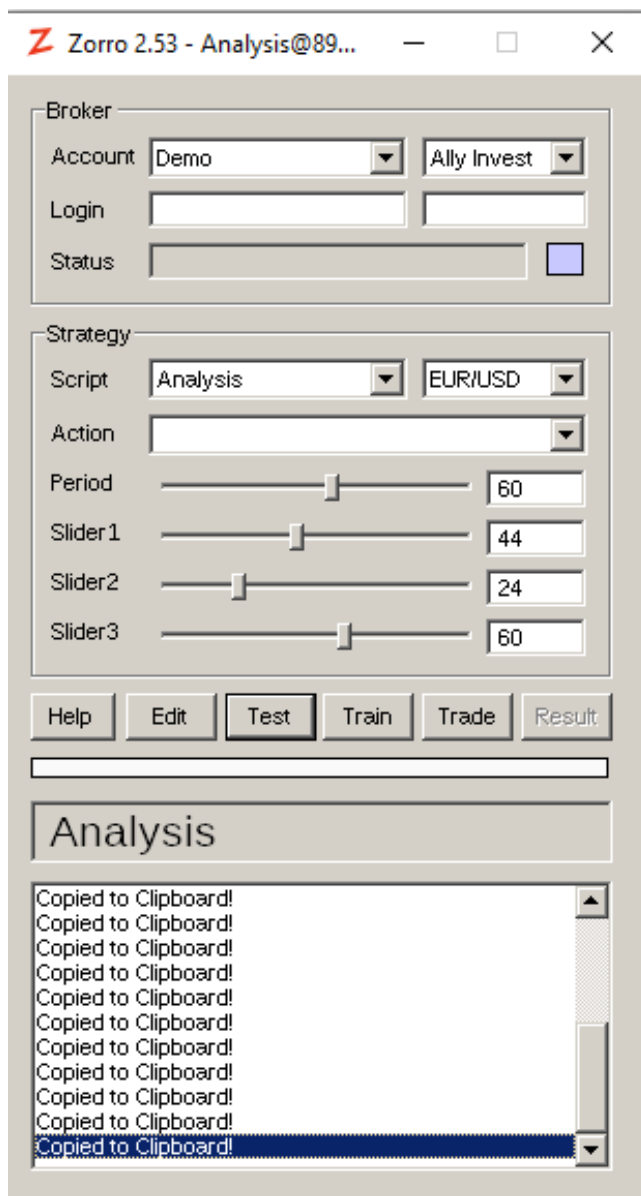"d:/ zorro/Zorro.exe zorro.ini -b"

More can be found here https://zorro-project.com/manual/en/command.htm
But I was not able to find them which makes me wonder about reliability of the software. Zorro returns .txt filetype with all the ticks also a .html file.

As seen in the prototype you can run Zorro in a container:
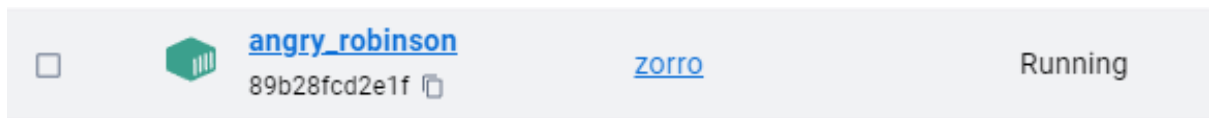
Zorro back tests fast, it takes approximately 2S between the executed command and test results.

In Zorro, the backtest modeling quality is determined by the quality of the tick data used in the test. By default, Zorro uses the highest quality tick data available for the test, resulting in a modeling quality of 99%.

Zorro returns .txt file containing result info such as: Gross win/loss and Average profit. See picture below for .txt file:

```
Simulated account    AssetsFix
Bar period           24 hours (avg 2016 min)
Total processed      1460 bars
Test period          2019-07-22..2022-12-31 (896 bars)
Lookback period      141 bars (39 weeks)
Montecarlo cycles    200
Simulation mode      Realistic
Avg bar              53.8 pips range
Spread               1.5 pips (roll -0.10/-0.11)
Lot size             1000.00

Gross win/loss       40.56$-16.10$, +145.7p, 1r 20.21$
Average profit       7.10$/year, 0.59$/month, 0.0273$/day
Max drawdown         -16.55$ 67.7% (MAE -16.55$ 67.7%)
Total down time      0% (TAE 1%)
Max down time        67 hours from Aug 2019
Max open margin      44.77$
Max open risk        21.65$
Trade volume         12278$ (3565$/year)
Transaction costs    -1.65$ spr, -0.11$ slp, -0.33$ rol
Capital required     60.22$

Number of trades     7 (3/year)
Percent winning      71.4%
Max win/loss         20.31$ / -10.68$
Avg trade profit     3.49$ 20.8p (+48.3p / -47.9p)
Avg trade slippage   -0.0155$ -0.1p (+0.2p / -0.9p)
Avg trade bars       2 (+3 / -1)
Max trade bars       7 (9 days)
Time in market       2%
Max open trades      1
Max loss streak      2 (uncorrelated 2)

Annual return        12%
Profit factor        2.52 (PRR 0.82)
Reward/Risk ratio    1.5
Sharpe ratio         0.51 (Sortino 0.69)
Kelly criterion      2.21
Annualized StdDev    23.11%
R2 coefficient       0.608
Ulcer index          17.3%
Scholz tax           6 EUR
```

Zorro does return an .html file. However, this one is empty, and I am not able to get it filled in. The title of the page also says trading status. See Picture below for .html file:

Martingale Trading Status

System Start: 04-20 09:34 UTC (11:34 Local)
System State: 000001
Last AE: 66.94$ (7.1%) in 25 days

Trade	ID	Lots	Entry Time	Entry	Price	Stop	Trail	Target	Risk	Profit	Pips

Meta Trader 4

To start Meta trader 4 with CLI you can type in the command:
"${PATH}/terminal.exe"
That will start the meta trader instance.

To run a test, you need to specify the config.ini file like this:
"${PATH}/terminal.exe /config: ${PATH}/config.ini"
The config.ini file contains all the information needed to run a test for example, Strategy name, Date of testing period, instrument (Currency) and tester input variables etc.
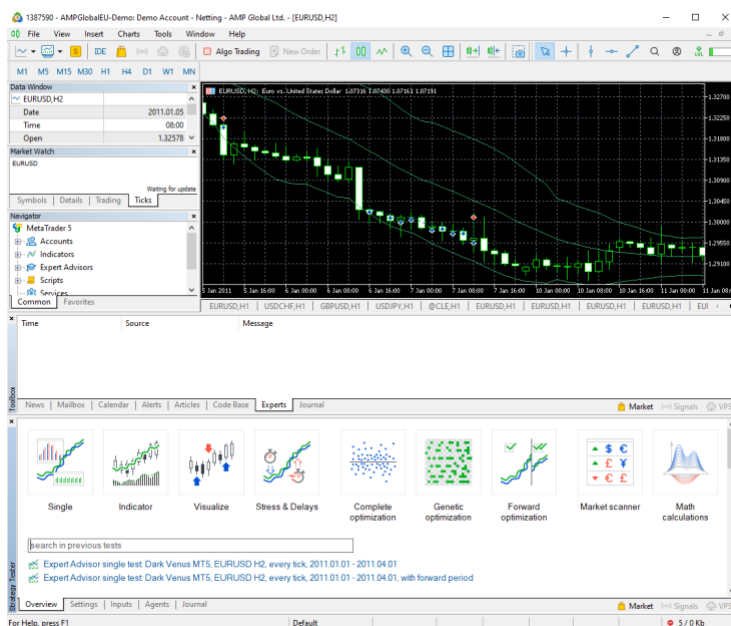
This all and more can be found in the documentation:
https://www.metatrader5.com/en/terminal/help/start_advanced/start

As seen in the prototype you can run Meta Trader in a container:
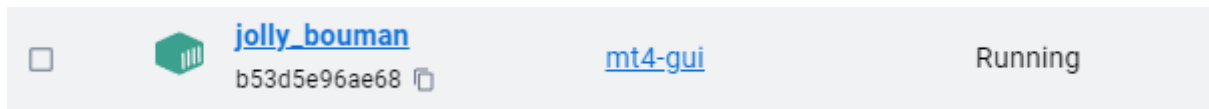
Running tests inside the container:

In MT4, backtesting uses a 90% modeling quality, which means that the platform uses the highest quality available historical data to test the strategy. However, this modeling quality is based on tick data that has been interpolated from the available 1-minute bars. This means that the backtest results in MT4 may not be as accurate, especially for strategies that require precise entry and exit timing.

To give some extra proof here are the files in the container:

Only thing with this prototype is that you need a host computer that has X server running. For deployment that is not ideal, for that we have the option to run it in headless. Which also improves the performance of testing.

Downside is that you need to run portable mode otherwise you cannot import or export files that Meta Trader uses or needs to the container. To know when it is working you can see the test reports appear in the container's files.

After running the strategy test Meta Trader returns an .html file containing the test results The test results contain the settings in which you have run the test, results with graphs and all the Orders and Deals it made.

Meta Trader 5

MetaTrader 5 is equal to MetaTrader 4 with some slight changes:
To start Meta trader 5 with CLI you can type in the command:
"${PATH}/terminal64.exe"
Instead of *"terminal.exe"* it is *"terminal64.exe"*, that will start the meta trader instance.

Containerizing is the same:

☐	📦	**eloquent_greider** a9625cba3267 📋 ⚠ AMD64	stockbrood/mt5_gui	Running

Also headless is possible

☐	📦	**mystifying_sutherland** e07a8c609ace 📋 ⚠ AMD64	stockbrood/mt5_nogui	Running

Meta Trader 5 comes with some extra options for back testing such as:
MT5 Allows multi-threaded testing, which can significantly speed up the testing process for complex strategies.

In contrast to MT4, MT5 uses a 99% modeling quality, which means that it uses all available historical data, including the tick data, to test the strategy. This provides more accurate backtest results, especially for scalping and high-frequency trading strategies that require precise timing.

After running the strategy test Meta Trader returns an .html file containing the test results The test results contain the settings in which you have run the test, results with graphs and all the Orders and Deals it made, but probably more detailed as it has a higher modeling quality.

Test results
I decided to peer review the results with my colleagues because they are the ones working with the returned data. Together we will determine which results are suited for our needs.

I handed over the test results to team and said to have a look at the structure and which one you think is easy to extract from code.

TradingView does not return any data.

Zorro returned 2 files. .txt and .html, the result for Zorro is that it is hard to manage two different files. One file with basic data and the other with detailed data. Both files are needed for the team to extract data. Therefore, Zorro is not returning the best option.

MetaTrader 4 and 5 both returns .html, the result for them are that they return only 1 file containing all information. But there is a difference, when using the same test MetaTrader 5 does return more data. This is because MetaTrader 5 has 99% modeling quality and MetaTarder 4 has 90%, although it does depend on the tick data given. Therefore, MetaTrader return the best data.

Conclusion
As for running in a container and starting the tester only Zorro, MT4 and MT5 can do that. Which automically makes TradingView and NinjaTrader not a choice anymore.

As for backtesting we can conclude that the quality of the test is based on the tick data that is given. All of them have 99% modeling quality but only MetaTrader 4 has 90%.

Test results, MetaTrader 4 and 5 is convincingly the best at it. They return structured .html file with all the data needed for the team and stakeholder. Zorro also returns .html but is not populated, not reliable? TradingView returns for paid members only.

So, the best platform is MetaTrader 5, it checks all the boxes although it's not fast in testing it does provide multi-threaded testing and you can specify steps for each parameter which does increase in the speed.

Which platform fits the stakeholder and development team needs?

Meta Trader 5 suits the best of our needs with its multi-threaded testing, which is a powerful feature since we need to run a significant amount of test as fast as possible.

Conclusion

The following platforms Trading View, Ninja Trader, Zorro, and Meta Trader 4/5 are selected because they are well known in the trading community and based on advice of our stakeholder.

Criteria has been drawn up based on the needs of the stakeholder and our development team.

Prototypes are made for all platforms to validate that they meet the criteria.

Trading View and Ninja Trader are the first two to fall off, because Ninja Trader is not accessible and Trading View strategy tester cannot be started from an API, cli or any other way outside of the platform. It also exports data only for premium and PRO+ users.

Zorro and Meta Trader 4/5 are remaining. Zorro claims to be a lightweight platform with high-performance and that is true, the tester is extremely fast compared to other platforms. Unfortunately, that test results were bad, they return empty .html file.

MetaTrader 4 and 5, they both are containerized and run tests. They both return structured .html files but MetaTrader 5 does beat MetaTrader 4 because of the following:
MetaTrader 4, has 90% modeling quality which is the lowest of all platforms, Metatrader 5 has 99%. This means that the backtest results in MT4 may not be as accurate as those in MT5, especially for strategies that require precise entry and exit timing.
MetaTrader 5 supports multi-threaded testing, which can significantly speed up the testing process for complex strategies.

So, MetaTrader 5 is the best for testing forex strategies.