

Quantitative framework and SDK

HyperQuant Quantitative Framework

Programming and quantitative research of statistical market patterns is a complex process that is hard to put into practice without professional instruments. The majority of services for the developers of algorithmic strategies give only a basic set for researching, testing and, later, launching these strategies. Usually, with these services, it is only possible to develop strategies based on technical indicators with a very limited risk management capabilities.

HyperQuant's Quantitative Framework is a cloud service (SaaS) for full-stack research and development of trading strategies.

It includes the following components:

1. the libraries of mathematical and statistical functions
2. the data flow engine through complex event processing and time series manipulation
3. powerful SDK for C# and Python
4. automated analysis and efficiency check of trading system signals executed in previous periods (historical data) and with the help of cloud technologies presented in a form of a specific financial strategy result
5. strategy optimization with the help of a broad range of tools

Framework tools include the following modules:

1. Multi Back Test – the possibility of testing a strategy in any time period with the addition of plenty of settings, and the possibility of using any benchmark for comparison purchases.
2. Optimizer – optimize a strategy using HyperQuant's server power; the possibility of using random asset prices.

A broad variety of framework utilities are also available:

- a. Basket price emulation – an application that calculates a price index as an average weighted price value for the basket components. It can also calculate the weighted average of prices in the basket's constituents. Additionally, it is capable of determining implied prices and volumes for any option combination, including delta neutrals.

- b. Spread tester - tests arbitrage and pairs trading strategies.
- c. Portfolio stress tester – a strategy basket stress test.
- d. Portfolio optimizer – a strategy basket optimizer.
- e. Depth visualizer – emulates an order book

HyperQuant SDK for automated trading systems

SDK is a set of open libraries for professionals in the field of algorithmic trading. These allow for the creation of absolutely any strategy. From position strategies with a long-term time frame to extremely short-term, high frequency strategies (HFT), HyperQuant's framework allows for the implementation of three main rules for algorithmic trading:

1. Universality – oriented at private algorithmic traders, small teams and banks.
2. Unlimited output capacity - simultaneous execution of hundreds of strategies with any tools.
3. High-speed transactions – request processing takes no more than several microseconds.

SDK is multi-lingual and allows strategies to be realised in the most popular languages for algorithmic traders: C# and Python. Here is a sample code of a simple trading strategy in C# language:

```
public static void OnNewBar()
{var ema1 = new ExponentialMovingAverage
{Length = 10};
var ema2 = new ExponentialMovingAverage
{Length = 100};
if (CrossAbove(sma1, sma2, 1))
{EnterLong();}
if (CrossOver(sma1, sma2, 1))
{EnterShort();} }
```

And in Python language:

```
strategy = MAStrategy(symbol, bars,
short=100, long_=400)
signals = strategy.generate_signals()
# Create a portfolio
portfolio = MarketOnClosePortfolio(symbol,
bars, signals)
returns = portfolio.backtest_portfolio()
```