

The White Box Approach – Algorithmic Trading for FX



Dr John Bates, Vice President Apama Products, Progress Software

In today's hyper-competitive trading world, financial institutions feel the mounting need for technology that aids their unique trading style. The continually shifting competitive landscape means both buy- and sell-side firms need to adapt to the effects of change. Sell-side institutions are exploring ways to augment the talents of their traders and optimise their client services, while buy-side firms are persistent in their endeavour to control their trading strategies and to hide them from the competition. Algorithmic trading has played a significant part in this. During 2006, the benefits of algorithmic trading techniques have been seen in asset classes outside of equities and in particular, foreign exchange (FX). Technology firms have recently noted interesting advances in the FX space, with some currently reporting more enquiries in FX than any other asset class. Through the remainder of the year and into 2007, this trend will continue to gain momentum.

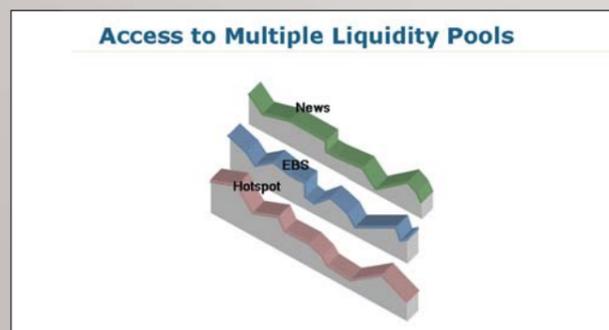
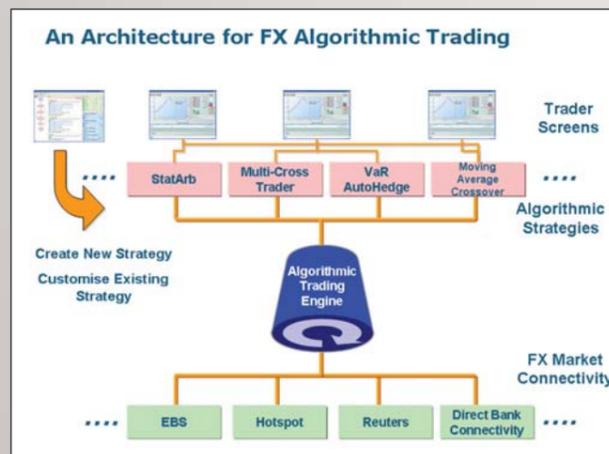
Algorithmic trading in FX is still in the early stages of growth; however there is a growing adoption of algorithmic techniques. A major factor in FX is that each firm has different requirements, so rather than purchasing pre-built 'black boxes' – offering packaged trading strategies or capabilities – firms are adopting a 'white box' approach. This enables them to rapidly build and customise algorithms as they grasp the full potential of their own capabilities.

The answer is algo – an FX fit for the buy- and sell-side

The characteristics of the foreign exchange market differ somewhat to those of the equities market. Despite the differences, algorithmic techniques, although often used in different ways than they are in equities, are ideal for FX trading by both buy- and sell-side firms.

FIX has become the standard protocol for connecting to markets in equities; however there is a multitude of proprietary ways to connect to various pools of liquidity within FX. To gain competitive benefit, algorithms need to have visibility of all of the pools of FX liquidity, together in a single view.

Buy-side firms that are focused on evolving their strategies are creating innovative algorithmic techniques built upon this aggregated view. This enables algorithms to route an order to the market with the best price and allows potential arbitrage across markets. The challenge here is to provide a system that can connect, monitor, analyse and categorise liquidity across multiple sources.



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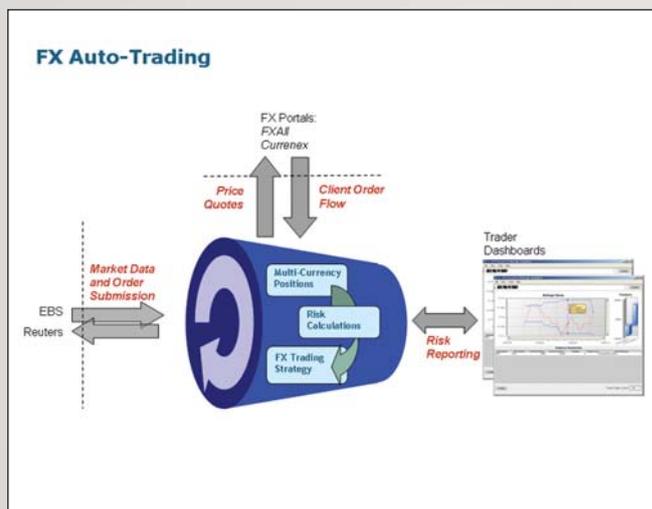
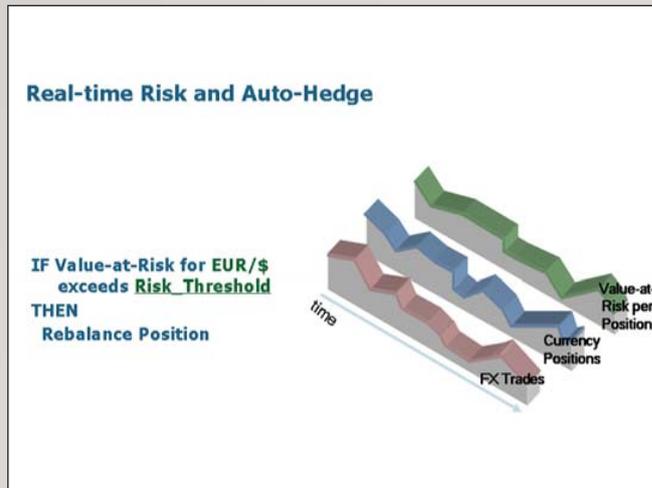
Forward-thinking buy-side firms are also using ‘synthetic crosses’, made up of multiple currency crosses stretching across multiple liquidity pools, variants of which may be traded like regular currency crosses and arbitrated. An example is the CHF/JPY, composed from EUR/CHF, EUR/USD and USD/JPY. A complex requirement here is the need to continually recalculate the synthetic instruments whenever the underlying instruments move and to break down orders into the underlying products across the appropriate liquidity pools.

Example Multi-Cross Scenario

Derive CHF/JPY from: EUR/CHF, EUR/USD and USD/JPY
 Derive resistance and support thresholds
 IF spread between resistance and support is greater than required
 Followed by
 The price of CHF/JPY is greater than resistance + trade threshold
 OR
 The price of CHF/JPY is less than support - trade threshold
 THEN
 Buy/Sell CHF/JPY AND use dynamic stop/loss limit of X pips to signal reverse

Financial institutions will always look for ways to improve productivity and this could not be more pertinent than in the largest, most liquid market in the world. For the sell-side banks that provide FX liquidity, the use of algorithms to help complement human spot traders is becoming popular for improved productivity and profitability.

With the pressure on for traders to concentrate on the larger, more profitable deals, banks must find alternative, more cost-effective ways to handle lower value transactions on the FX floor. Auto-trading, made possible by algorithms, complements human traders by automatically responding to changes and recalculating metrics autonomously. For example, autonomous algorithms are now being widely used to manage changing currency positions, to continuously calculate metrics like a measurement of Value-at-Risk and autonomously trade on FX markets, to try to maintain a risk-neutral position.



Beyond the black box – white box trading for an FX edge

The emergence of the white box approach to algorithmic trading has spawned an increasing number of systems that allow traders, quants and analysts to build and customise algorithmic strategy models to suit a firm’s individual requirements, specific to particular asset classes. There has been a move away from the use of third party, pre-packaged algorithms, where users are unable to determine exactly how they work and are limited by fixed ‘factory fitted’ capabilities.

In white box trading systems, it is possible to rapidly compose or evolve algorithms to monitor, analyse and respond to market events in a specific way. The ability to customise this to a firm’s unique requirements means there is an increased opportunity for competitive advantage. The rapid development and evolution of these algorithms is also a key requirement – the market changes so frequently and ‘first mover advantage’ is critical.

The white box approach has been taken on within FX and employed by a wide range of applications – including high-frequency trading, position management and risk management.

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Unique strategies can now be applied to any single stage of the trade, providing a huge benefit to financial institutions looking to gain a competitive edge over their rivals. As well as a stand-alone asset class, FX is often a component in algorithmic cross-asset class strategies.

The technology behind the box

To empower the platforms that enable the white box method for algorithm creation and management, a new technology approach was required – Event Stream Processing (ESP). ESP is a new software paradigm that allows organisations to quickly respond to data that is continuously changing. It allows firms to monitor, analyse and act on events in sub-millisecond timeframes. Traditional data processing typically is database-driven and requires the storage and indexing of data prior to query. ESP allows traders to determine the queries in advance by setting certain parameters and then ‘streaming’ the data through them. In FX, this may involve the use of a rule such as: ‘When the spread between EUR/GBP and the EUR/GBP moving average is greater than the required spread, then place an order to buy EUR/GBP.’

FX Trading Rule Example

IF GBP/EUR < GBP/EUR Moving Average and GBP/EUR Velocity is Negative
Followed by
GBP/EUR Velocity Levels Off
AND
Spread of GBP/EUR & GBP/EUR Moving Average is greater than the Required Spread
AND
Required Amount for GBP is available
THEN
Request Buy GBP/ EUR
IF Spread of GBP/EUR & GBP/EUR Moving Average is less than the Required Spread
THEN Cancel Trade
OR
IF Trade is not Completed in 2 seconds
THEN Cancel Trade

Using ESP, traders can take algorithms from the concept to deployment stage – where they can be managed efficiently once live – in a matter of hours. Customisation of existing algorithms can occur just as quickly. Sub-millisecond trading decisions can be made as the algorithms run in real-time engines which are fed by streaming market data and can place orders directly.

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Strategy backtesting, tuning and evolution

Today’s ESP technology offers a variety of approaches to discovering which algorithm configuration works well, examining past successes and failures and suggesting new approaches, so traders may customise their algorithms to suit their own unique requirements. These approaches include:

- ‘What If’ Analysis, which backtests, profiles and tunes strategies before they go live. A system can replay historical data streams across prospective algorithms and simulate a trading strategy before deployment, comparing different techniques in bear and bull markets, for example, and simulating potential reactions to a trader’s moves.
- ‘What Happened’ Analysis, which examines the ‘cause and effect’ patterns of real trading and tries to learn from its victories and losses. ESP technology allows the trader to record the strategy in action and then later study actions and reactions within the market at every stage of the trade.
- Predictive Analysis, which finds interesting market patterns and is able to check the event history to see if the pattern has been detected in similar circumstances in the past. The system can suggest potential trading opportunities to the trader, who can decide to pre-configure the system to automatically trade when it detects this event in the future, thus staying one step ahead of the competition.
- ‘Genetic Tuning’, which has been likened to Darwin’s ‘survival of the fittest’ theory. Here, the trader may run several thousand permutations of an algorithm, swapping out the least profitable and replacing it with one more profitable. They will therefore ensure the configured algorithmic strategy continues to evolve, with only the fittest surviving.

The never-ending race for algorithmic supremacy

As the interest in algorithmic trading increases, particularly with the use of the white box approach, so does the understanding of e-trading practices. The FX market is continually changing and so the players within the market must evolve. Traders have been given the ability to customise their strategies and are managing to adapt to the rapid evolution of algorithmic trading technology. As innovative FX traders see the tangible benefits of leveraging today’s ESP technology, for greater control and reduced risk, the race for supremacy in the algorithmic trading market will continue unabated.

