



# Algorithmic FX trading: technology - moving hype to reality

The FX market has been talking about Algorithmic trading for some time now and we are now reaching a stage where traders can expect to see some very definite and concrete benefits in deploying this new trading methodology. e-Forex invites Jesper Alfredsson, Head of Algorithmic Trading North America, Orc Software, Steve Oppenheimer, Director of Marketing at Aegis Software and Lee Ratner, Vice President and Global Head of FX, FlexTrade Systems to discuss some of the technology issues associated with taking Algo FX to the next stage in its evolution.

**Some commentators have suggested that securing the right technology to facilitate fast and reliable pricing and execution capabilities should be viewed by Active traders seeking to utilise and deploy Algorithmic FX trading solutions as equally important as the development of the underlying strategies and models that generate the trading signals themselves. Do you think that's true or possibly an exaggeration?**

**Alfredsson:** For algorithmic FX trading to be successful, firms must ensure that both their strategies and their data and execution capabilities supporting these strategies are implemented correctly. Algorithmic trading requires the decisioning and the execution to come together rapidly and correctly. Any piece missing in this equation will make trading less successful. For flow side

participants the requirements for offsetting client orders quickly and efficiently on multiple sources requires the right technology and an effective algorithm. Those more on the macro and trend side of the market do not as much require hardware but sophisticated algorithms.

**Oppenheimer:** It may have been an exaggeration in the past, but it's quickly becoming true. FX markets are becoming faster and more automated. Until very recently, some of the very biggest ECNs would only refresh prices twice a second. At that rate, you don't need very sophisticated technology to trade. But the landscape is changing, and we see trading moving through three phases: from phone-based, to screen-based to algorithmic-based. Although the majority of FX



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trading is still in the former two categories, as markets become faster, better technology will be imperative. In high-frequency FX trading, the right technology will be just as critical as the underlying strategies that generate the trading signals. The large number of trades, huge volumes of data and extremely short trade duration typical of high-frequency trading imposes a number of demands on the applications that they are running on, and weak/slow applications often don't have the "horsepower" to successfully run these types of trading strategies.

**Ratner:** This is true. People spend a great deal of time developing models. However, without the proper technology, testing and implementing them in a production environment is extremely difficult. The "right" technology needs to be reliable, mature, fast, flexible and accessible. Without these components, time to market and execution accuracy will be severely diminished.

**It's early days for Algorithmic FX trading. Do you expect most common algorithms to overlap in terms of their basic functionality or does the FX market lend itself to the rapid development of more innovative and customised types of algorithms?**

**Alfredsson:** Traders have become increasingly sophisticated with the algorithms they are using outside of FX. For example, alpha-seeking algorithms like futures spreading, arbitrage strategies, etc. are being well used in other asset classes. We believe that many traders will enter the FX space using similar sophisticated algorithms to the ones that they are already using. However, one point to note is that with the extremely large liquidity in the major currencies, execution-based algorithms using VWAP/TWAP type strategies may not have much impact. Enormous trades are already possible with almost no impact today and execution focused algorithms are not as necessary as they are in other asset classes. While it's difficult to create algorithms for a simple market such as spot FX, the market itself is evolving with new products such as synthetic spots based on 3 currency pairs being used to derive a dollar/yen price/position. This in turn creates the need for constant monitoring and execution as the pairs move throughout the trading period and present opportunities.

**Oppenheimer:** Certainly across asset classes there is some overlap within the basic functionality of common algorithms including, TWAP, VWAP and Iceberg. Depending on what the trader is looking to achieve (i.e. trade across ECNs, trade with a single bank, or



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platform) will help determine the strategy deployed. FX market participants looking to route orders to the best liquidity pool, minimize market impact, or maintain anonymity can benefit by utilizing common algorithms developed for other asset classes. However, keep in mind that FX is a bit more challenging than certain other asset classes because it lacks a central exchange. It's more an OTC market than an exchange-traded market. A large part of the FX business is still conducted over the phone and the markets need to reach an increased level of transparency for algorithmic traders to take full advantage. As banks and hedge funds become more familiar with and derive benefit from algorithms it is likely that more customised strategies unique to the nuances of the FX marketplace will be developed. The ability to customise algorithms according to a firm's unique requirements and quickly develop algorithms for first mover advantage brings increased opportunity for competitive gain.



**Lee Ratner**

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**Ratner:** Initially there is always some overlap in the basic functionality within algorithms. We see this especially with clients that are relatively new to the FX algo space and the products within that space which are extremely powerful and offer a substantial amount of functionality. Most of our clients initially tend to work with the pre-packaged algorithms that are available out-of-the-box. However, once they become accustomed to the system, we find that they begin customizing the pre-packaged algorithms and even create their own. At FlexTrade, we also help clients build algos specifically tailored for their model and execution needs in FX, not just algos ported over from other asset classes like equities. As such, they are becoming much more adept at customizing and testing algos today than they were just three years ago. In that vein, I'd say we are definitely at the beginning of the algo era within FX, and are seeing rapid growth in this space as more buy and sell side firms become accustomed to the available FX algo platforms available in the market.

There are now a multitude of FX trading platforms, portals and ECN's and of course many traders are also looking to hook up to exchanges such as the CME. This presents complex connectivity issues. Could the nature of the fragmented FX market actually hinder the uptake of Algorithmic trading and if so, is standardising on FIX the only practical solution or would developing more proprietary and customised API's provide satisfactory alternatives?

**Alfredsson:** Actually, we believe the fragmented nature of the FX market is exactly what will attract many algorithmic traders. Fragmentation by its very nature offers opportunities to traders looking for liquidity or indeed arbitrage opportunities. Spreading and arbitrage strategies typically require that similar instruments be traded on different exchanges. The multiple exchanges of the FX market will facilitate the uptake of algorithmic trading. That being said, connectivity is absolutely an issue that must be addressed. Those that require speed will most likely develop native connections. Those that are less latency dependant will be drawn to the market by the ease of a simple FIX connection. The FIX protocol's incorporation of FX functionality will ease this burden and allow firms to rapidly connect to numerous FX venues.

**Oppenheimer:** The fragmented and somewhat inefficient nature of the FX market encourages the uptake of algorithmic trading rather than hinders it. Many FX market participants have already adopted FIX technology and more and more buy side firms are



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requesting FX connectivity through the FIX protocol because it's the fastest to integrate. Gateway design and order routing is core to the business model of ISVs, such as Aegis Software. Platforms such as AthenaTrader provide substantial benefits of exchange normalization and independence from exchange interface changes. Hedge funds in particular are increasingly relying on FIX to integrate their black box trading systems with commercial trading platforms because they gain immediate access to electronic markets globally. This provides tremendous business agility to the buy-side looking to start trading a new product or exchange immediately, since the high speed infrastructure is already in place and their algorithms require no modification to trade the new product or market. We don't really see the benefit in trying to create a new industry standard and then attempt to get people behind it. It's more efficient to spend the time/effort improving the existing connectivity/messaging solution.

**Ratner:** I don't believe fragmentation hinders growth within the FX algo markets. In fact, it is quite the opposite. Fragmentation is what initially generated the demand for Algo trading within FX. The first execution algos, which were specifically designed around smart routing, are becoming more sophisticated as additional venues become available and the need to manage the various rules-of-engagement on these venues become more diverse. How clients connect to these venues is something the industry is currently reviewing. We are also finding more liquidity sources (banks and ECNs) are beginning to offer (or looking to offer) access via FIX. Being FIX compliant for over 10 years, FlexTrade is a firm believer in standardizing message protocols. If the FX industry follows what other asset classes have done by moving towards FIX, then it makes it much easier to integrate not only technology platforms, but also cross asset class trading as well. This will certainly benefit the FX industry.

**In a market where speed is of the essence traders will be looking to optimise their e-trading infrastructures to help reduce latency. Compared to other markets, volumes of quotes in FX**

**are usually relatively low which means bandwidth requirements can be quite modest. Does this mean efforts to reduce latency are likely to mainly focus on reducing Application latency or is Network latency equally important given the physical distance between trading venues and the emergence of intervening systems such as FIX servers etc?**

**Alfredsson:** Latency will always be an issue for firms using speed based strategies. Application latency and network latency will be important for these types of firms and strategies. As algorithmic trading takes off in the FX space, you will see that the trading firms that achieve the lowest latency (both in connections and in order execution turn-around time) will be the ones to succeed. In the short term, we would expect that the FX market will act like other markets where latency becomes of increasingly greater importance as more entrants join. In the long-term, all firms will be able to achieve similarly low-latency by co-location, for example, and the strategies deployed will be the differentiators for these firms to be able to make money in the FX market. Statistical arbitrage strategies, momentum strategies, and others based on market



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understanding will be more important for those seeking alpha than simple arbitrage strategies based on latency.

**Oppenheimer:** Application latency generally accounts for a much larger proportion of the trade life-cycle compared to network latency. So far, we think that the majority of the industry's focus has been on reducing network latency. But, network latency is becoming fairly commoditized as a result of co-location and hosting solutions, and the limitations as to how much it can be reduced by (i.e., the speed of light). There's no barrier in reducing application and

Latency Source	Initial Latency Measurement	Improved Latency Measurement	Net Latency Reduction	% Latency Reduction
Application	40ms	30ms	10ms	25%
Network	16ms	12ms	4ms	25%

Provided by Aegis Software Inc.



**Lee Ratner**

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algorithmic latency and that’s where the competitive edge can be found. We believe traders will see a much higher ROI (in terms of reducing net latency vs. capital expenditures) if they focus their development efforts on reducing Application latency. The example below illustrates that although both of these projects would reduce latency by 25%, the trading company that chose to reduce application latency would have reduced latency by 6ms more than the trading company that chose to focus on network latency.

**Ratner:** Being a multi-asset trading platform, we are always striving to optimize our technology to handle an enormous amount of data in the least amount of time. Right now we have equity clients who will put through entire depth of books for every stock in the S&P 500 within milliseconds. Being able to process that amount of data quickly has huge benefits for our FX clients since the data flow is much less in

FX, thus substantially increasing the processing speed. Network latency is also a main focus for many of our FX clients. The need to connect to multiple venues, using various message formats and global locations, has many clients using top-end network providers to host their servers. Many banks and ECNs use services like Radianz and TNS, so many buy side clients are naturally gravitating towards these networks to reduce latency. This would be the FX equivalent of co-locating servers with an exchange.

**Access to high quality and reliable data is crucial for traders looking to validate, back test and refine their models. What would you say are currently the key technology challenges associated with the provision, storage and maintenance of FX market data?**

**Alfredsson:** Many trading strategies require depth of book data. To collect and store all this information from multiple venues is a significant challenge for firms. Price aggregation is already available in different formats and this is fundamental to those involved in execution / hedging or require depth of market. The ability to collect and store historical data is imperative to the momentum / technical trader and whilst this is not fully available right now, it arrive either by availability of clean sources of market data and the evolution of the technology to capture this.

**Oppenheimer:** The biggest challenge is standardizing all the data from various market sources into a unified format and then re-

aggregating the data for analysis or backtesting. Another difficult challenge is a means of collecting real-time data from live sources, as well as the ability to integrate/import historical market data, either collected internally or obtained from a third party. Also, the ability to process historical data of different quality and granularity levels, from fully transparent (complete history of market depth and trades) to very coarse (best bids and offers or trades only) is another obstacle to overcome.

**Ratner:** Clean, accurate data is hard to source for FX, and it is expensive. Not all data is created equal. Some data is an aggregation of end of day prices from 50 plus global banks, while other data is each tick produced by a particular venue. In addition, some venues are able to show volume data as well. How to reconcile this data, clean it, and use it is an enormous task for many clients. Storing it depends on how you want to reference it later. As such, the platform where the data is replayed will most likely dictate the format in which it is stored. We believe the best data is the tick data that a client is able to capture directly from their liquidity providers, which is the clients market. In this instance, each client gets their own unique market depending on the types of venues they are connected to and how those venues decide to spread or skew that client. We encourage our clients to capture and store this data for later use internally, as this is the most accurate tick data they will ever get.



**Jesper Alfredsson**

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**Increases in transaction volume as a result of high frequency and Algorithmic FX trading is likely to severely stress the middle and back office environments of sell-side banks. This could have implications for operational risk. What measures from a technology perspective should banks be taking to address this problem?**

**Alfredsson:** Operational risk per se is unlikely to go away given the technology and the very nature of FX as a high volume business. Counter-party risk however is being dealt with at a different level and we see this going away as trading venues emerge and take this risk from the banks. Moves to trading platforms like FXMarketSpace, where the clearing is handled directly by the ECN, will help firms mitigate some of their risk exposure.

**Oppenheimer:** There’s no doubt that bank’s offering algorithmic trading to clients will have to invest beyond front-end trading systems. There is certainly more pressure on middle and back office

systems to perform well. If sell-side banks only consider the front office technology, they can easily run into problems further back and end up exposed. Algo trading places heavier loads on various systems, which require an evolution in robustness of the underlying infrastructure. The ability to automate downstream processes and eliminate the need to re-key orders in the back-office will reduce operational risk. From a technology perspective, you don’t want to be forced to turn people off or turn customers away because of capacity constraints. The sell-side needs to take a good hard look at all of their systems, from the click of a trade through the actual settlement, execution and the splitting of the trade on the backend. Any bottlenecks in processes need to be addressed. The sell-side needs to horizontally scale out solutions with additional hardware or software components that can queue up data more effectively and treat more urgent business quicker and optimise process flow.

**Ratner:** Banks have already recognized that this is a technology issue and that throwing bodies at this problem will not solve it. As such, they are already building faster, more reliable middle and back office systems to handle the ever-increasing volumes in FX. In addition, technology vendors such as Traiana are also looking to help in this area by offering solutions to relieve the burden on these systems.

**In what ways can technology vendors help their FX sell-side clients improve the adoption of algorithmic trading amongst the buy-side? For example, could the provision of improved web tools for measuring or benchmarking**



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**performance of algorithms be one useful way for the sell-side to add value?**

**Alfredsson:** First, let’s point out a difference between order execution algorithms and automated proprietary trading strategies. Firms that are adopting order FX algorithms will need to validate their algorithms with their clients. However, firms that are adopting automated proprietary trading strategies are doing so typically on their own account or without divulging specific metrics to their clients. These firms are using algorithmic trading to find alpha and are less concerned with reducing market impact.

**Oppenheimer:** The provision of web tools that illustrates benchmark performance data in a simple and intuitive manner would add value. For example, if a bank has been chosen to execute a trade, the buy-side would be able to track a graphical representation of that trade versus the benchmark they have selected. If there is a market event that causes a price spike - then this would also be represented. Therefore, when the



sales trader and buy-side dealer have a conversation about a trade they can both do so in a transparent and well-informed environment. Technology vendors like Aegis Software, can also help their sell-side clients by facilitating ways in which the sell-side can deliver its proprietary execution tools in order to become more entrenched with the buy-side customer. Vendors can help by creating a good balance between the proprietary tools the sell-side builds and the applications the vendor builds. The sell-side has built proprietary tools and offers quantitative research that could be extended through a vendors system. It's mutually beneficial to the sell-side and vendor to form an "execution consultancy model." The sell-side knows its customer's requirements and could work closely with the vendor to write the algorithms, host a joint consultative discussion before the buy-side client actively begins using algorithms to ensure they understand how the strategies work, when to use them, and that we also understand their objectives and trading styles.

**Ratner:** Simple. FX banks should look to offer algo orders over e-channels for their clients to use. This is something the equity brokers did years ago and has proven to be an effective way to capture client business, offer unique ideas to the market and to differentiate themselves from other liquidity providers.

**Everyone agrees that Algorithmic trading promises to have a big impact on the FX market. Do you see technology as being pivotal to its future evolution and what role could it play in helping to extend Algorithmic trading beyond Active traders to other FX market participants?**

**Alfredsson:** The evolution of FX as an asset class in its own right will attract new players to the market. Additionally the technology in terms of ECNs and algorithms allows institutional investors the ability to be more transparent and in turn validate risk to their own investors. Algorithmic trading in the proprietary trading desk will always be focused on the active traders looking to make money from implementing proprietary trading strategies. We do expect that as the proprietary traders increasingly adopt automated trading solutions, other market participants – especially FX click traders and automated traders from other instruments such as commodities, fixed income, etc. – will move to automated trading in FX as another way to deploy alpha seeking strategies. We would expect adoption of algorithmic trading at the prop trading desk to continue to accelerate as more and more trading firms adopt technology to compete.

**Oppenheimer:** As companies continue to deal with the challenges presented by the booming FX industry, they will need to invest in technology to ensure they have workflows that are scalable, and have sufficient infrastructure capacity, not only for current volumes but, also for peak activity and redundancy. Technology solutions will certainly play an important role in the evolution of algorithmic trading. Examples of how technology will advance strategies include: electronic connectivity and DMA to multiple venues, price aggregation across multiple venues, and multi-asset execution systems to support FX alongside equities and derivatives. Investment managers seeking best execution across asset classes will deploy FX algorithms. More and more asset managers will bring FX



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trading in-house to support best execution across asset classes resulting in an increased demand for algorithms to more effectively manage execution costs and achieve alpha. With the continued growth in electronic trading and the fragmentation of FX liquidity, FX algorithms will become standard fare on desktops.

**Ratner:** Algo trading already plays a major role in the FX markets on both the buy and sell side. This includes quote engine technology, trading models, execution of those models, risk management, flow management, etc. And extending beyond active traders has already begun. In addition to hedgefunds, we are starting to see a real pick up of FX algos on the sell side (spot desks, sales traders), money managers as well as the trading rooms with sophisticated corporate desks. More recently there have been efforts to extend Algo trading to the retail investor as well. However, it is difficult to imagine that one can trade in this market without the assistance of, or touching upon, some type of FX algo already.