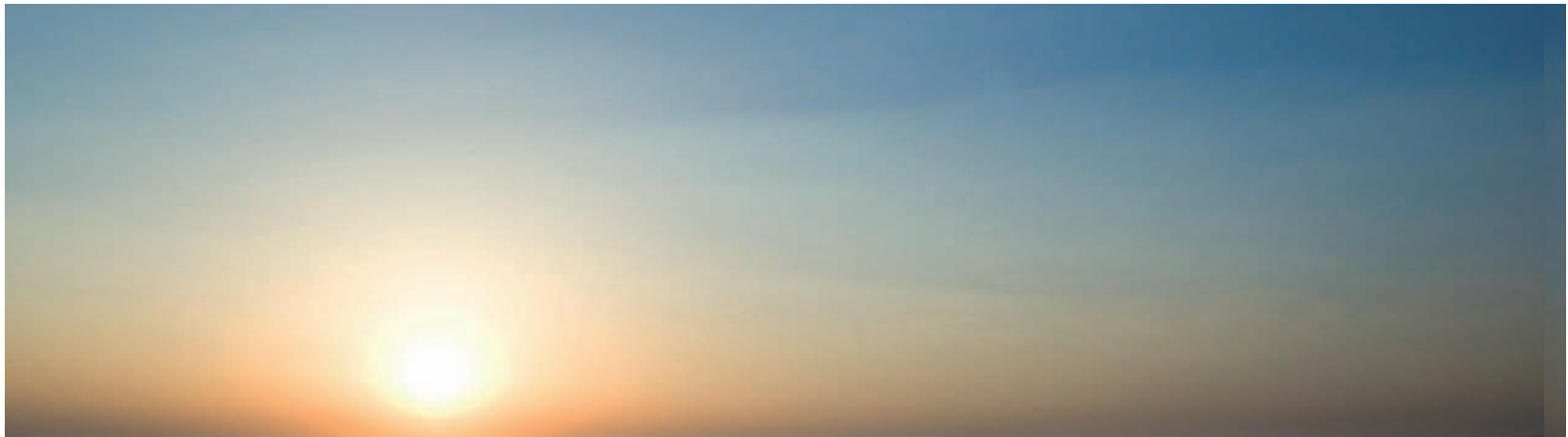




Blazing a trail

Since its inception, algorithmic trading has been powered by complex event processing (CEP) technology, designed to allow trading engines to make snap decisions on the basis of streaming data and market events. But although CEP is often perceived as the domain of the sell side, its most progressive use has come from tech-savvy, statistical arbitrage hedge funds that write their own algorithms and seek to keep their intellectual capital to themselves. By **Joel Clark** and **Victor Anderson**



The stereotypical image of a hedge fund consisting of three maverick traders in a garage with modest operating capital and a Bloomberg terminal never fails to capture the imaginations of those trying to understand the clandestine hedge fund world. Clearly this caricature is far from accurate, but of the estimated 8,000 hedge funds currently in existence, there is a large number of small, nimble organisations with minimal staff and resources, capitalising on the strength of their unique trading strategies. For such funds, and even some of their larger brethren, complex event processing (CEP) has enabled them to craft their own trading strategies and maintain their cutting edge.

Although CEP – the providers of which include Progress Apama, StreamBase, Aleri, TIBCO, and Kx Systems – is most often associated with large investment banks who have used the technology to power algorithmic trading and certain risk management functions, CEP vendors admit that it is the hedge funds rather than the brokers that have blazed the CEP trail and put it to the most innovative uses. While the sell side might often take the credit for educating their buy-side clientele on the use of advanced electronic trading tools, when it comes to the benefits of algorithmic trading this is not necessarily the case.

“I really wouldn’t subscribe to the idea that the sell side has educated the buy side on the use of algorithms,” argues CEP pioneer John Bates, founder of Progress Software’s Apama division. “Brokers might take their algorithms to traditional fund managers to explain how they work, but out there in the quantitative hedge fund world, there are some brilliant

guys who are extremely innovative and yes, in many cases they are blazing the trail with CEP and algorithmic trading.”

Bates’s sentiments are echoed by Mark Palmer, president and chief operating officer of StreamBase Systems, who, before joining StreamBase in June this year, was general manager of Progress Apama and who played a key role in Progress Software’s acquisition of Apama in April 2005. “The technology allows you to make faster decisions in a more automated way,” Palmer explains. “Certain vendors have built their products as a graphical development environment allowing funds to design and implement algorithmic trading ideas that might differentiate them from their competition. It’s really about automating decisions and making it easier to express the algorithm associated with that decision,” he says.

The Quant World

If the hedge fund world is complex, unknown and misunderstood, then the same applies to the world of quantitative hedge funds, or ‘quants’ as they are known. In a report published earlier this year, Boston-based Aite Group defined quantitative strategies as “those that leverage computing power and sophisticated mathematical and statistical models to identify alpha investment opportunities”. Such funds often use statistical arbitrage trading strategies that exploit inefficiencies in the market in rigorous pursuit of alpha. As an example, such a strategy might find two trading venues offering the same stock and choose to buy and sell through both venues continuously. To do this, the fund would rely heavily on CEP to make the real-time decisions in a matter of milliseconds.



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The Aite Group's research found that not only are total hedge fund assets under management (AUM) set to grow from \$2 trillion to well over \$2.5 trillion by the end of 2010, but stat arb strategies are also growing at a similar rate. From constituting barely \$200 billion of global hedge fund AUM in 2005, such strategies now account for well over \$400 billion.

As the quant world evolves, the demand for CEP to power stat arb strategies is likely to become stronger. As Bates explains, the shelf life of most quantitative strategies is so short that funds need their own CEP engines in-house so that they can continuously develop new algorithms. Funds having to rely on brokers or software vendors run the risk of losing their competitive advantage. "The average shelf life of an algorithm is three to four months," says Bates. "After that, it might become commoditised or arbitrated out of existence, or the phenomenon that it's tracking might no longer exist. So these funds need to create new algorithms quickly and CEP is one of the tools needed to do that."

It is this need to constantly monitor and tweak one's trading algorithms that make CEP technologies such a good fit for buy-side firms. And perhaps more crucially, the development framework wrapped around CEP offerings is equally compelling for small, highly focused funds as it is for larger ones. "You tend to see the smaller funds with a single developer doing a lot of quant stuff benefiting from CEP," says Palmer, who claims to have six of the world's top hedge funds (in AUM) on his firm's client list in addition to scores of smaller funds and a range of sell-side users. "As long as you have one developer you can apply the value of CEP, although

the more developers you have the more you will derive from it," he says.

Neat and nimble

For quantitative hedge funds that seek to make their returns through statistical arbitrage strategies, the three-men-in-a-garage analogy, while not necessarily representative of the industry as a whole, is appropriate in certain cases. But rather than relying solely on a Bloomberg terminal, they are likely to also be using a CEP engine in order to differentiate themselves in a fiercely competitive environment. For HG Trading, a Wisconsin-based boutique money manager specialising in what it calls 'high-velocity finance', CEP powers the entire organisation. The fund has only \$10 million under management and trades primarily equities, although its short term goal is to be 100% electronic and to use CEP to write its own proprietary strategies. With just three employees – a developer, a quant and a business user – the fund exemplifies the kind of quantitative fund to which CEP technology vendors pitch their wares.

Lou Morgan, managing director at HG Trading, was previously a floor trader on the Chicago Board Options Exchange but

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Lou Morgan, HG Trading



Mark Palmer, StreamBase Systems

founded the fund three years ago. From inception he knew that CEP would allow it to achieve its objectives and he selected Progress Software's Apama product, which provides order management functionality as well as a CEP platform. "Our intention is to use Apama to scale up, managing a large number of strategies with very few people," explains Morgan. "We like the technology because it enables us to set up a large number of queries and then flow the data over those queries, acting on any events immediately."

As an example, one of his strategies takes a technical profile of each stock in the market, matching it against certain pre-defined criteria. If the profile of a stock matches the criteria, it immediately triggers the orders necessary to execute the strategy in close to real-time.

While latency may not be a top priority for more traditional fund managers, it is the super-fast capabilities of its strategies that give HG Trading and similar funds a cutting edge. "From the time your brain decides to make a trade to getting the impulse to your fingertips takes 13 milliseconds," says Morgan.



"We've got trading strategies that can get in and out of the market during that period of time."

CEP beyond the front office

Although CEP is most often associated with the crafting of cutting-edge trading strategies, it has also evolved to support other processes. According to Bates, quantitative hedge funds have gained as much competitive advantage by using CEP for risk management as they have for algorithmic trading. "Hedge funds were the first to use CEP for real-time risk management, actually doing Value at Risk (VaR) on a trade-by-trade basis," he says. CEP has allowed funds to carry out real-time risk and compliance checking, says Bates, so that they can continuously make sure they are not breaching portfolio rules or making needless



Adam Honoré, Aite Group

At a time when it is becoming increasingly difficult to get IT investments signed off by cautious senior executives, it may be that CEP is used as a more cost-effective way to solve data issues

and costly mistakes such as incomplete order entries or incorrectly placed decimal points.

Again, Palmer echoes Bates's sentiments, but he goes further by describing an array of applications for CEP across the front and middle offices: "We have applications for smart order routing, real-time P&L, FX aggregation, and market data management," he says, a scenario backed up by recent research carried out by Adam Honoré, senior analyst at the Aite Group, who has encountered funds using the technology to power their post-trade portfolio valuations from disparate data sources. "Clients are pushing to see more data about their investments," explains Honoré. "So instead of posting end-of-day valuations, funds might tie real-time valuations into a sophisticated web portal that can be accessed by clients."

Another increasingly popular use of CEP is to evaluate the rapidly growing volumes of market data that must be digested and stored by all financial institutions in today's capital markets. At a recent London briefing on historical data hosted by *Buy-Side Technology's* sister publication, *Waters*, a business head at Mitsubishi UFJ Securities International (MUSI) explained that through a partnership between Sybase (MUSI's trading platform provider) and CEP vendor Aleri, the firm had used CEP to scrub historical data and decide quickly and accurately whether it needs to be stored.

"CEP allows firms to take in multiple data

feeds and exercise inherent logic to decide whose price is right," explains Honoré.

"Instead of implementing a fully blown enterprise data management (EDM) solution, buy-side firms might use CEP engines in this way to just take a bite of the EDM process." At a time when it is becoming increasingly difficult to get IT investments signed off by cautious senior executives, it may be that CEP is used as a more cost-effective way to solve data issues.

Real-time news analysis

For all the hype that comes from vendors and brokers about CEP, it seems the trail really has been blazed by small quantitative hedge funds that, by virtue of their small size and significant intellectual resources, have been able to bring new strategies to market well before any of the larger players.

An example of this phenomenon is news-flow algorithms; computer programs that can be programmed to make decisions on the basis of incoming news stories, detecting whether a story is good, bad, or indifferent to a particular stock in a portfolio. In early 2007, to much fanfare, Dow Jones Newswires introduced its Elementized News Feed, a service that effectively turns news stories into data that can be used much faster by time-sensitive traders. But according to Bates, hedge funds first began to experiment with news-flow

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Simon Garland, Kx Systems



algorithms more than five years ago. By the time Dow Jones introduced their product last year, it was already a commodity in some parts of the hedge fund world. “They’re very private about it, they often don’t even want to tell us what they’re doing, but CEP is the beneficial technology that has allowed stat arb funds to do what they do,” says Bates.

Given the obvious success of CEP among quantitative hedge funds, it would be natural to assume that the technology will now spread to more conventional funds and long-only asset managers. At HG Trading, Morgan believes that evolution to be inevitable, given the strength of CEP for creating strategies. But many buy-side firms have different priorities and may be more comfortable using broker-owned algorithms than home-made strategies.

Vendor buzz

If the CEP craze does spread to more conventional parts of the buy side, there are obstacles that need to be cleared, not least vendor selection. More than in any other part of the financial technology industry, CEP is populated by a large number of vendors and

an even larger number of strongly held opinions about what really constitutes CEP. According to Simon Garland, chief strategist at Kx Systems, whose Kdb+ database is used by many of the largest investment banks, the problem is that a lot of vendors have jumped on the bandwagon and re-branded existing products as CEP. In difficult economic times, such vendors are pushing their products hard just to stay afloat, to the frustration of traditional CEP providers.

“Some CEP vendors might say they can handle 500 million messages per second which sounds wonderful, but they might just

be running those messages against one or two business rules, which is not what true CEP is all about,” explains Garland.

Although he believes that fewer buy-side firms are using CEP than vendors might claim, there has been more interest than ever in using it for real-time, continuous risk management and compliance. If testing economic times persevere, buy-side firms may have no choice but to use the technology for risk management, before they can even consider deploying it in the front office. ><

Salient points

- Quantitative hedge funds have blazed the trail in using CEP to write their own proprietary algorithmic trading strategies that keep them on the cutting edge
- CEP has also been deployed to support processes such as real-time risk management, compliance, portfolio valuations and market data scrubbing
- If CEP spreads beyond quantitative hedge funds, conventional buy-side firms will have to overcome the hype and confusion that comes from the vendor community