



Surveillance

A report for  **software** AG  **APAMA**



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Introduction

The Q1 2014 Mondo Visione Surveillance Seminar was held shortly after the publication of Michael Lewis's book 'Flash Boys'. With publicity that Phineas Taylor Barnum would be embarrassed by, the book – which alleges that US markets are rigged in favour of certain firms – sparked a rash of investigations by the Federal Bureau of Investigation, the Commodity Futures Trading Commission and the Securities and Exchange Commission into the activities of high-frequency traders. New York State Attorney General Eric Schneiderman also declared an investigation into whether the traders are gaining an unfair advantage over other investors, in what he called "insider trading 2.0".

Despite a sharp increase in attention to

high-frequency trading (HFT) sparked by the publication of 'Flash Boys', regulators may still be struggling to collect and analyse data from markets to spot sophisticated market abuse across market centres with fast moving data.

At the spring seminar the discussion was lively as usual and informative with insights from the providers of surveillance technology, the operators of market centres, regulators and market practitioners.

Among the takeaways from the seminar was a consensus that irrespective of the market, whether auction or algorithmic trading, FX, equity or derivative, the technology is there to be deployed for risk and compliance monitoring in the challenging low-latency world of HFT, with large volumes of fast moving data.

Panel One: The tools for the job – *The impact of technology on markets and surveillance*

Moderator/



HERBIE SKEETE,
Managing Director,
Mondo Visione

Panellists/



THEO HILDYARD,
Product Marketing,
IBO and Big Data,
Software AG

JEAN-PHILIPPE MINET,
Market Supervision,
UBS MTF

DAVID MURPHY,
Head Of Operations,
Equiduct

CLEMENS BAADER,
Chief Data Scientist,
BIPB

Theo Hildyard opened the discussion with an explanation of the challenges that market supervisors in gathering large volumes of data from disparate sources and providing a meaningful analysis of them.

“Complex event processing (CEP) technology is extremely good at taking streams of data, detecting patterns within that data and acting upon them,” he said. “In order to conduct effective market surveillance, a system needs to be able to do exactly that and perform at extreme scale as well as work with historical data and real-time data.”

Chair, **Herbie Skeete**, observed that the term ‘big data’ was frequently used to describe the collection and analysis of the information at the scale described in capital markets. However, he asked, “Is it anything more useful than a marketing term?”

Clemens Baader, replied that ‘big data’ is not new in the sense of analysing structured data, for which very good methods have been established to search it.

“What is new and is not just a fad is unstructured data,” he explained. “We are now able to collect and analyse data points that historically have just been discarded. Commonly discussed things are Twitter feeds and social media sources – although they are less useful in a financial services context. However if one takes into account the huge amount of data being generated by the internet of machines, such as tickertapes, it is significant. One study indicates that 80% of data that exists globally has been produced in the last three years. Of course that doesn’t mean it is all valuable, but it no longer has to be discarded.”

Jean-Philippe Minet, said that managing information is not a simple task, requiring as it does collection and standardisation so that it can be useful.

“Once you have it you can run all sorts of queries, but we have to keep months of information and we need to look at orders as well as trades,” he said. “There is a challenge in storing and accessing and querying that massive database.”

David Murphy concurred with **Minet**, adding that from a market operator’s perspective the issue is one of bringing in data as regardless of a surveillance tool’s functionality, it is limited by the quality of data.

“We provide a consolidated tape that is used for trading and in that respect we have possibly more data than a lot of the markets out there,” he said. “We have tick-by-tick data from every market around Europe since May 2008 so we have a whole wealth of data to look at. As an operator we are interested in trades and orders and that is the way one interrogates the market, looking for examples of behaviour that could be prohibited.”

Skeete then asked whether regulators have the right tools to perform the task of market surveillance adequately.

Murphy argued that they do, however the market they are observing has the capacity to change rapidly, making their task more challenging.

“The industry has innovators on the trading side who move incredibly quickly,” he said. “They have a hell of a lot of resources, they can scan the market very quickly, and they can scan newsfeeds for words that indicate market sentiment. The recent ‘Flash Boys’ book by Michael Lewis describes how some firms can react so fast they can trade against a firm before its order has reached the market. The regulators have a tough job keeping up with a business that moves that quickly.”

This prompted **Skeete** to question whether they really had the resources that they needed, or if high-frequency trading (HFT) firms have an unfair advantage.

Baader said that they do have an advantage, but that whether or not it is unfair was a “political question.”

“There is obviously a mismatch between the spending to make money in the world of hedge funds and that of regulators,” he said. “There are three ways to make money: better technology, knowing more or getting better information. The problem with making money by using better technology is that you not only invest enormous amounts of money, you have to keep investing so the expenses are always there.”

The question was then asked as to whether having a better ‘engine’ was unfair to other participants, using Formula1 as an example.

Hildyard said, “Formula1 is a great comparison. It is not unfair that someone has a better engine than someone else in F1. What levels the playing field are rules that are consistently applied for all teams. That is not true of capital

markets where a sizeable section of the market feels a very real threat of prison, but others parts do not feel anywhere near the same pressure. Consequently they are more likely to cross the line between proper and improper behaviour. If HFT firms felt the same kind of pressure as many institutional sell-sides do, then we might be having a different conversation.”

“But is it the case that the regulators can’t get the tools they need to keep up?” asked **Skeete**. “Or is it the people that they lack, because banks can afford to pay their staff better?”

Hildyard replied that the Australian Securities and Investment Commission (ASIC) have great tools and do a great job with them so it is not impossible for regulators to have the tools.

“The question of people is interesting,” he agreed. “If we get to the point where they needed sophisticated quants, then there would not be enough to go around, and in a bidding war for quants, the regulators would lose.”

Rather than competing to catch the HFT shops ‘in the act’, some regulators are demanding greater oversight of the technology that is being used, **Skeete** said. “Would it be useful if firms had to register their algos?” he asked.

Baader replied, “No, it is very difficult to audit algos, even internally at a trading firm. You could hand over 30 million lines of code to the Financial Conduct Authority in a PDF file, but what is the value of that. It would take six to eight months to figure out one algo.”

Minet noted that an exchange or multilateral trading facility (MTF) should understand how their members interact with the market, adding that the Swiss exchange used to visit the traders and talk to them about how their systems worked.

From the audience, **Mike Aitken** said, “Really technology is not the issue; the SEC has demonstrated through the website it has built on its own MIDAS platform that it has a lot more market control. So technology is not the issue, it’s the data that goes into the technology that is the issue. There are two key problems; firstly we don’t have client ID on orders, secondly we don’t have the ability to monitor front-running properly and we don’t have the rules to distinguish between a broker trading as a principal or as an agent.”

Murphy said that new rules in the German market went some way to addressing this anonymity by required anyone who posts an

order on a venue to identify any algorithm that has been used. The data is then held by the exchange and, if subsequently someone decides that the activity is suspect, the identity of the algorithm that is being used by that firm will be known and further information can be requested.

Minet then noted that watching activity on a single market would not necessarily provide a complete picture of trading activity, even with insight into the trading tools.

“You could buy stocks from eight markets without triggering surveillance, so I think there is a need for more information, perhaps shared across all venues,” he said.

“Why is that not done?” **Skeete** asked.

“It is not just a question of having terabytes of data to monitor trading,” **Baader** said. “We already have that. It is a question of looking at the consequences of being caught. If as a trader you have insider dealing opportunities you would look at the upside, which might be to make a few hundred thousand pounds, and then the downside, for which you get seven years in prison and you could lose your license. There is a strong incentive not to engage in that behaviour. Something similar could be done in the HFT world. If you have a certain risk then however small that risk is the data can be looked into as an incentive for them to get their act together. It is largely about incentives.”

Hildyard added, “I think piling more regulation on top of regulation that is yet to be implemented causes inertia, and with inertia comes frustration and knee-jerk reactions like sending in the FBI. If HFT firms felt the pressure to abide by existing market conduct rules it would go a long way to addressing the problem.”

Behaviour modification

Market supervisors are challenged to maintain oversight of an often-changing market structure, but equally to deliver effective punishment across firms of all sizes.

With the panic from ‘Flash Boys’ still swirling about, market regulators, American or otherwise, are keen to prove themselves through demonstrable vigilance or publicly punitive measures. Market stability, the core of regulatory activity is based upon two pillars; functional resilience and reliability. A failing in either can reduce market confidence, thereby undermining the investment that supports industry.

Electronic order execution has disrupted established trading dynamics, by enabling an asset’s price to fluctuate within microseconds, and enormous volumes of orders to be filled within milliseconds. Regulators cannot humanly observe these trading patterns without similar tools to those used in trade execution. However the budget for a trader’s systems will be constrained only by his potential profitability, while a regulator must budget according to political pressures.

However this technology imbalance should not seriously impede regulators seeking to reinforce these two pillars, says Theo Hildyard, Product Marketing, IBO and Big Data, for system provider Software AG.

“It is true that a firm using the very latest technology can walk a fine line between what is considered market manipulation and what isn’t,” he says. “Occasionally they might cross that line. They employ very high tech and expensive systems to walk that line and a regulator cannot compete with that scale of investment. However regulators can still be effective in this environment. The aspect of HFT that makes it so high cost for market participants is that it interacts with the market at extremely high speeds.”

Regulators, provided they have the same data, can perform the appropriate analysis - still in a timely fashion - but after-the-fact. Where a HFT focuses on the speed at which market participants need to analyse data to trade, regulators are able to take a step back.

The regulator challenge becomes one of data volumes and not speed of interaction with the data.

“So regulators don’t need the bleeding edge colo options, microwave links and so on that some trading firms employ,” says Hildyard. “What they do need is the same data that traders use, time-stamped to the same level of accuracy,

and to process that for suspicious behaviours effectively - what is critical is that they have complete data to the same granularity as the market in order to perform the appropriate behavioural analytics.”

US market supervisor, the Securities and Exchange Commission (SEC) set up a platform in 2013 called MIDAS, which uses similar technology to high-frequency trading firms and is allowing it to analyse publicly available trading data to provide insight for the public via a website and for itself in order to identify trends and behaviours in market activity.

Getting to grips with these is enormously important, Hildyard notes, as electronic trading and supervision become more sophisticated. This requires flexibility in the systems used to supervise the markets.

“I believe we have a clear understanding of what is and is not acceptable in trading; for example front running, insider trading and layering are not acceptable,” he says. “However, two critical dimensions affect our view of what is acceptable. Firstly, as technology evolves new behaviours emerge and secondly as we survey more and more asset classes, behaviours manifest themselves differently due to different market structures. There is a constant evolution of what is and isn’t acceptable and that line in the sand as to what is acceptable does move.”

When electronification of trading is extended into other asset classes, the methods of observing abusive behaviours changes in line with the different market structure.

“The wide range of behaviours that constitute market manipulation are well understood, but how they manifest themselves might vary from asset class to asset class,” he says. “As regulation expands beyond cash equities and beyond derivatives and into FX, commodities and gold, it is dealing with markets which have fundamentally different market structures and therefore the way that abuse and market manipulation is conducted itself may vary. Understanding that is a challenge for the market and regulators alike.”

Understanding of abusive behaviour can become apparent even with well-established markets. Hildyard points to the way that the London Interbank Offered Rate (LIBOR) and other benchmarks have been set over time, as an example. LIBOR and similar rates were long

used for pricing derivatives and other debt-based instruments, yet the rate of interbank borrowing was based purely upon reported prices from banks, rather than actual trading prices. When it was discovered that the rates were being reported to provide a financial benefit on deals on which the reporting banks were engaged, rather than on actual borrowing rates, the system had to be completely redesigned.

“There is an element of regulators not knowing what to look for when it comes to observing certain asset classes and there is going to be a period of learning how market abuse and manipulation occurs and how do they build systems to monitor for it,” Hildyard observes. “The trick is to have systems that can be rapidly adjusted to meet a new requirement.”

A more recent example has been the exposure of alleged manipulation of foreign exchange rates by brokers, working together. By routing orders through the London market at 4pm, a 60 second window upon which a benchmark price is set, traders were able to move that benchmark, but only in collusion across institutions. Several are now working with authorities investigating cartel activity and many FX traders have been fired following the allegations.

“As you peel back the onion on FX, one realises that the 4pm price fix can be manipulated in a certain way, our understating of what should be survey for evolves and the question for regulators must be; is that something compliance departments can respond to in a matter of weeks, months, or years? Months or years is just too slow.”

Regulators must consider which activities they are to monitor and how to respond to manipulation when it occurs. Fines appear to have little effect on the management team of big firms and certainly offer no punitive effect for the individuals involved in trading.

The Monetary Authority of Singapore announced a new framework for currency benchmarks in June 2013 as a result of manipulation allegations, but also introduced a new model for punishing the 20 banks that were found to be engaged in the practices.

“The Singapore regulator became aware of manipulation of non-deliverable forwards (NDFs), which is analogous to manipulating a ‘fix’ price and derivatives based on that fix price were traded for highly dubious profits. When

it discovered what was going on, the MAS took the unprecedented step of forcing the worst offenders to leave cash reserves with the central bank at zero interest,” Hildyard explains.

The duration of the statutory reserves that had to be held with the MAS “varied depending on MAS’ assessment of the adequacy of the measures put in place by each bank to address the deficiencies and risks identified,” but the sum was reported to be US\$1.5 billion for the three worst offenders.

“A firm using the very latest technology can walk a fine line between what is considered market manipulation and what is not.”

Theo Hildyard, Product Marketing, IBO and Big Data, Software AG

This overcame a challenge of evolving behaviour that Hildyard sees as presenting the real hurdle to regulators. However, in many cases, he believes the risk lies not just with new behaviours developing which some parts of the market are exploiting, but with many types of behaviour that are universally considered to be unacceptable, but certain market participants do not fear engaging in.

“Some market participants do not feel the same pressure to comply with these norms,” he says. “The pressure that is felt is skewed toward institutional sell-sides when in fact all market participants, including high-tech proprietary trading shops and HFT need equal scrutiny. That is not to say we need a witch hunt by the way. We need equal enforcement of the rules. Of course, we need to check if new market structures or technologies lead to previously ill-understood unfair behaviours, but the greatest gains toward a fair and orderly market can be made by monitoring known knowns equally across all market participants and effectively across the entire market.”

Panel Two: Optimum surveillance: Viewing the whole market

Moderator/



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Mondo Visione

Panellists/



DAVE TOLLADAY,
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DANIEL WRAGGE,
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AVIV HANDLER,
Principal, ETR
Advisory

SIMON APPLETON,
Director, Regulatory
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The event's chair, **Herbie Skeete**, introduced the day's second panel by noting that the New York District Attorney (NYDA) had begun cracking down on firms who were perceived to be getting an informational advantage, whether from messaging speeds or specific direct data feeds.

"The question then is whether money should be able to buy an advantage, or whether there should be a level playing field," he said.

Simon Appleton observed that the press and the public see this as big issue, particularly around the release of corporate news, broker ratings, and similar pieces of investment information.

"The pursuit of a level playing field, with market participants receiving this sort of price sensitive information at the same time is a sensible one and could help restore confidence in market," he said. "Another issue is the use of models of connection with trading venues via different order management systems. The key point is to allow all kinds of clients to get access to [high-speed] co-location facilities."

Skeete said that the challenge is to allow that high-speed access without providing special treatment; the NYDA had expressed a preference for everyone to use the same information.

Appleton agreed that everyone should have the ability to have the same information and to pay the same price for it, however technology innovation had been a constant in the market, in the shift from open outcry to screen-based trading and now automated trading.

"Should the people who invested in that innovation be punished?" he asked. "Equal access is the key."

Dave Tolladay said, "We know that there are some embargoed announcements that seem to be released earlier to some people; there is no argument about that not being allowed, the question is; How far should we be able to go in controlling this information? Should we have audits and locks outs?"

A member of the audience working for a large custodian bank which issues investment research voiced astonishment that the rules around information release had been bent as far as they had by exchanges and some brokers.

Daniel Wragge said that these issues were familiar to his own work, although he focuses on REMIT, a huge energy and gas regulatory

infrastructure project.

"We hope that it will come to a conclusion by the end of 2014, at which point the rules on what has to be published when, where it is published and what is an efficient way to publish information and what is the relevant information, will have been decided for the gas and energy market."

The project had started some years ago when electricity prices rose; any suspicion that there might be something wrong with prices led to politicians being asked to do something about it. Energy markets were interconnecting all over Europe, but as each exchange was only able to look at their own market a new set of cross-market surveillance rules were required to check for trading irregularities.

Aviv Handler said, "It is the Market Abuse Directive (MAD) for physical gas and power markets and for their derivatives. The energy market doesn't experience the same level of regulation as the financial market industry, so things that seem very simple for banks under the European Markets and Infrastructure Regulation (EMIR) are quite new for energy firms. There isn't much of an issue with latency in the energy markets but there is with access to information. What happens with REMIT is an identification of things like inside information; an example might be a power station going down. If it has an outage that has an impact on the market price of energy. REMIT is about the outlawing of the use of that information and making sure that you publish it before you do anything with it."

Under REMIT, that sort of information must be published onto a REMIT web page which shows the generation statistics of any assets that a company has, so if there is an unplanned outage it is immediately in the public domain and therefore acting on that information is permissible.

Skeete asked whether the data could it be published on an obscure website, however **Handler** said that professionals are well aware of where to look and that a Bloomberg service aggregates data. The next stage of REMIT will include explicit information on how it should be published and EEX has a platform that it will publish that information to.

Wragge explained that ACER is the relevant body for implementing the rules and has recently published guidelines about the publication, settling on posting fundamental data on

transparency websites.

Skeete then asked whether there surveillance systems that are also monitoring the markets.

"ACER collects all of this data via the registered reporting mechanism (RRM) and the regulated information service (RIS)," **Wragge** said. "One has to comply with the standards for these two constructs and then one can report information to ACER via these mechanisms. We get this data from our market participants and send it to ACER on their behalf."

When asked if this model be used for other markets, **Appleton** noted that as it is a nascent market it is hard to evaluate.

"ACER uses the SMARTS market surveillance platform and [surveillance platform provider] b-next has made has also made positive noises about getting into this market," he said. "Before you can really monitor this trading effectively you need to work out what abnormal is and I think that with some of these products it is quite tricky for various reasons. Some are less liquid making it difficult to establish what normal is. The complexity of energy products is another reason - there are overlapping contract periods, cross-commodity complexities and cross-market tendencies so the impact that the underlying physical has on derivatives - with Enron there was a stopping of production of the underlying asset, so how do you monitor the underlying of the derivative as well?"

"Would REMIT have stopped Enron?" **Skeete** asked.

Handler replied that it would have helped with the prosecution, but there have been more recent cases to which it would have been effective.

"There was a story regarding alleged manipulation of gas prices in September 2013 and if REMIT had been in force then OFGEN would have had greater powers to investigate this," he said. "There is a perception that prices are high due to manipulation."

"I would like to think that increased transparency in the market would lead to fewer suspicions [about price]," noted **Wragge**.

The audience then asked what measures were underway to increase transparency in the wholesale capital markets. The panel agreed that swap execution facilities in the US had outsourced surveillance to the NFA, and launched investigations based on NFA queries.

Brokers in the FX market were still under investigation for collusion and the markets are unregulated, so surveillance measures were not yet being discussed.

Appleton explained, "We have seen in the press the two main issues are the front running of client orders, both a firm's own clients but also allegedly colluding with other banks to trade together at the point when the market price is fixed - 4pm in London. There is a randomised pricing structure but the banks were slicing and dicing their clients orders up in that second window order to get the price higher or lower for their own benefit."

"The two main issues are the front running of client orders, and allegedly colluding with other banks to trade together at the fix."

Simon Appleton, Director, Regulatory Consulting, Kinetic Partners

Tolladay added, "There have been a number of disciplinary measures and fines on the basis of the FX incidents. We have built and deployed FX monitoring systems at banks."

An audience member asked how, if there is so much legitimate trading going on at the 4pm FX price fix, can monitors hope to identify where collusion is taking place?

Skeete said that chat rooms had proven to be the main source of information.

Tolladay said, "You need to look at the trade but also the messaging and email and voice recordings to get a full picture."

Handler then noted that ACER are only collecting trade and order information at present, however, "I would have thought in time, [information on chat and email] will come as well."

