Market Surveillance

White Paper

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MARKET SURVEILLANCE WHITE PAPER

A new paradigm for market surveillance services

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1 Introduction

Today, market surveillance is predominantly focused on the public markets, with OTC trading largely overseen by regulators. The G20 through the Dodd Frank Act in the USA, the MiFID II and Market Abuse Directive/Regulation update in Europe and other local legislative changes, is regulating large segments of OTC derivatives markets in reaction to the 2008 crisis, while also harmonising standards across different venue types and introducing new types.

With the 2011 crisis centred on bond markets, it is likely that transparent market driven solutions will be created for these too, and indeed the MiFID II proposals address all asset classes, not just equities. Furthermore, the new rules put a greater onus on both venues and participants than hitherto.

Since all of these changes to market structure will require some form of surveillance, the requirement for services will grow significantly – by asset class, trading method, venue type as well as complexity, especially taking into account the effects of fragmentation. The old methodologies are not a solution for the future.

There is an opportunity to create an outsourced market surveillance service capitalising on legal and regulatory reform in the financial markets over the next few years.

1.1 Inadequacies of current processes and technologies

The introduction of competitive marketplaces may have brought innovation, reduction in spreads and lower transaction costs. It has also changed the landscape for market surveillance, such that the existing systems infrastructures are unable to provide adequately for investor protection. Established processes and technologies, focus on monitoring of activity at a single venue, complemented by end of day transaction reports. The investment in trading infrastructures is several orders of magnitude greater than the investment in investor protection. This does not meet today's requirements.

The European Commission estimates the illegal profit from market abuse across EU equity markets alone was EUR 13.3 billion in 2010. This is likely to be a significant underestimate since the research their estimate is based on takes a narrow definition of insider trading and neglects cross venue and cross asset class abuse.

The main objective of market surveillance is to protect investors by detecting and deterring market abuse. However, this objective is not well served now that markets in Europe and North America are highly fragmented, with trading in the highly liquid securities spread across several venues (and multiple asset classes), widespread use of internalisation engines and OTC platforms. While there has been significant growth in turnover, we are unaware of anyone having been convicted of cross venue market abuse post MiFID. Yet more than 40% of the equity market volumes are conducted OTC, and more than 30% on MTFs in Europe, and in the bond markets the figures are 85% and 10% respectively.

Oversight is fragmented and taking the European landscape as an example, it is highly unsatisfactory:

- Systemic risk monitoring and management is the responsibility of central banks;
- Some risk management is the responsibility of regulators;
- Real time market surveillance is generally the responsibility of public venues while transaction reporting monitoring is the responsibility of regulators;
- Best execution enforcement is the responsibility of investment firms (which incidentally is like asking drivers to manage speed cameras on roads);
- Market surveillance is largely absent for investment firms operating OTC and Systematic Internaliser markets as they do not fall within the scope of the Market Abuse Directive.
- The setting and maintenance of standards to create improved surveillance, is not owned by any stakeholder.

No single party has access to all data, not even the regulators or central banks. No party has access to the right tools to facilitate the detection of market abuse. These weaknesses exist in spite of significant expenditure on infrastructure and the velocity of markets.

1.2 Current cost benefit of market surveillance

The total global expenditure on market surveillance under current methods is in the order of US$ 1 billion per annum for regulators and central market organisations for on exchange equities (i.e. excluding the broker compliance costs for managing OTC platforms). The level of fines from successful convictions does not approach this amount.

The current investment in surveillance is difficult to justify notwithstanding the undoubted prevalence of abusive activity, as it is not generating results. Despite this expenditure, convictions for market abuse are extremely rare. However, the recent attention by the FSA has borne fruit in terms of a marked increase of prosecutions of insider trading. The number of successfully convicted market abuse cases remains very small.

1.3 Opportunity for a new approach

Although there are a few encouraging developments in terms of practice and technology, we have yet to see a collective effort to improve the quality of market surveillance. Venues and investment firms are not making strategic investments in market surveillance for five key reasons:

1. They are not required to under most regulatory regimes;
2. They cannot address the need individually due to the high level of fragmentation (in responsibility, data, technology, standards);

3. Venues are in a highly competitive price war, with pressure to maximise liquidity while minimising expenditure on operations such as surveillance which are increasingly perceived as peripheral;

4. Market surveillance quality has not been used, by the buy side in particular, as a criterion for directing order flow as it is has been assumed that all venues are equally "fair and orderly";

5. There is no broadly acceptable definition of fair and orderly markets - instead of market quality being quantified and improved it is moving more towards a "caveat emptor" approach with "work-arounds" via OTC, dark, waivers and other solutions.

2 Positioning of New Surveillance Service

2.1 Market Quality

Market quality and investor protection are critical success factors in building liquidity and confidence in securities markets. In the short run, venues may remain focused on cost cutting in an effort to compete on trading tariffs, while neglecting investment in market quality and surveillance infrastructures. However, the industry can avoid a zero (or negative) sum game by competing on the quality, as opposed to the price, of services provided to its customers.

Venues would be advised to take steps to resolve buy side concerns. Many buy side organisations today believe not only that they do not consistently receive best execution even in so called fair and orderly markets, but also suspect that their order flow is distorted by abusive market activity.

Similarly, many sell-side firms are equipping themselves with tools to detect when the markets they trade may have been abused, and to pre-empt any unwelcome attention from regulators on their own activity.

A surveillance solution must provide the tools and methods needed to embed quality and demonstrate that irregular activity is being detected and deterred.

2.2 'Multi-Everything' Surveillance

To remove the current constraints on effective market surveillance, it is vital to move beyond monitoring trading of an instrument at a single venue. Instead it needs to encompass:

- multiple asset classes, markets and alternative trading mechanisms (underlying, spread betting, derivatives, indexes, CFDs etc);
- the full integration of the primary markets, the monitoring of continuous obligations and secondary markets;
- the creation of standards to address a number of issues that plague accurate multi-market surveillance e.g. time-stamping, data formats, client identifiers;
- normalisation, within the surveillance system, of market models to facilitate like-for-like comparison;
- a time shifting capability to facilitate analysis of the interaction of market activity with market events; and
- a wider range of alerts, using new techniques handling huge data volume and complexity.

We are not alone in believing this. For instance, recent work by the Swedish regulator, Finansinspektionen, found considerable concern about market abuse … a "large portion of high frequency trading was being used to manipulate the market" … and there are concerns that abuse has become more extensive and difficult to identify as a result of the sharp increase in the number of orders and trades. They say Europe-wide supervision should come into force through MiFID II.

2.3 A Paradigm Shift

Market surveillance moving forward needs to radically improve on the status quo. It needs to be brought together into the optimal model for investor protection in some form of common service utility. The utility would be supported by:

- a governance model of co-operation between all venues including OTC covering data sharing, common counterparty identifiers, case investigation responsibility and service objectives and standards;
- a highly skilled workforce where cost sharing amongst trading destinations would enable high calibre technologists and forensic investigators to be affordable placing surveillance on a level playing field with investment firms and unregulated prop traders;
- infrastructure that shows what is happening right now, everywhere it's happening, and however it's happening (i.e. irrespective of market methodology, asset class, trading method);
- providing state of the art analysis and user interfaces to spot whatever should not be happening use both human intelligence and machine intelligence;
- dealing rapidly with vast and growing volumes of data, analysed with 20/20 hindsight;
- utilising technologies and disciplines from other industries that have had to deal with complex data management and pattern recognition;
- dealing with unstructured data, eg from social media, email traffic;
- understanding and using interpersonal relationships, insider lists, de facto trading relationships, etc.;
- a mandate to set standards to improve the quality of markets.
- a model that drives economies of scale into the business.

2.4 A Service, Not a Licensed Product

The proposition entails much more than the licensing of a software product, albeit more sophisticated and complex than anything currently available. Rather it is a full service offering.

3 Addressable Market

3.1 Stakeholders

The global marketplace today is around 1,200 entities covering regulators, exchanges, venues, OTC broker crossing networks and Systematic Internalisers. This will increase significantly, potentially doubling in size, due to the expected developments to harmonise the treatment of and Systematic Internalisers and crossing networks - becoming Organised Trading Facilities under MiFID II - as well as the launch of Swap Execution Facilities. The Dodd-Frank and EMIR proposals will also increase attention on surveillance of derivative markets.

Taking into consideration the greater complexity of the new markets and the need for "multi-everything" surveillance the annual spend could increase to US$3bn under current methodologies of single discrete point systems with no economies of scale.

3.2 Components of the offering

The next generation surveillance service needs to extend far beyond that of a market surveillance department of a regulator, or venue or the compliance department of a bank. In addition, it needs to cover for instance:

- Regulatory and enforcement development;
- Business processing outsourcing for third party venues;
- Investment firm trading algorithm accreditation;
- Collaborative case management;
- Multi-disciplinary research and development:
    - Market abuse detection methods and techniques;
    - Statistical analysis;
    - Technology development;
- Market execution independent "quality stamp";
- Standards creation, maintenance and enforcement; and
- Further services such as:
    - Regulatory reporting;
    - Position monitoring and reporting;
    - Added value business reports back to venues;
    - Post-match data analysis services supporting regulatory investigations;
    - Compiling information to support the monitoring of systemic risk.

3.3 Variable delivery model

The delivery model needs to achieve the following key goals:

1. A "single set of eyes" across the multiple dimensions of the markets - in effect, if not in fact - without necessarily changing the responsibility boundaries and market structures;

2. An architecture that supports the co-existence of existing surveillance infrastructures where participants so wish;

3. Guaranteed confidentiality, with no leakage of any commercially or legally sensitive information; and

4. Retention of authority on certain aspects of surveillance, for instance referral of suspicious transactions to regulators. The service provider could submit the report with the approval of the participant or responsibility could be delegated entirely.

Consequently, the model needs to be capable of being deployed for all market structures e.g. self regulation, centralised regulation, outsourced service model, accommodating different legal frameworks.

4 Weaknesses of Current Approaches

4.1 Fragmentation

Regulators are fragmented, with some connected by co-operative arrangements but few by on line, real time monitoring and surveillance. Securities markets are highly fragmented yet are globally interconnected, with trading in the liquid securities being scattered across several public and private venues. Even the global exchange platforms that are arising from merger mania have not centralised their surveillance functions.

The MiFID II proposals partly recognise these issues, requiring "operators of regulated markets, MTFs and organised trading facilities…which trade the same financial instruments to cooperate and exchange information in order to better detect market abuse or misconduct that takes place across different venues".

However, surveillance functions in each venue perforce focus only on their own traffic, a subset of the market. Even without MiFID II they can already request data from other venues where they observe abnormal behaviour from their own data sets. The problem is that no venue sees the whole picture of activity in each instrument, and the exchange of data is reactive. Under such circumstances, only by looking at the whole picture will there be evidence to provoke a reaction.

Further, fragmentation is not just across venues, but across asset classes, where for instance market manipulation may involve a set of equities, indices based on the prices of those equities, and options on those indices.

Regulators typically see the end of day transaction report. This is evidence of an event that happened some time before the report was received. It does not provide any contemporaneous proof of events surrounding the transaction. Therefore analysing transaction reports is unlikely to reveal information on market abuse, especially as there are no harmonised standards. The majority of cases that emanate from a transaction report is likely to fail in a court of law on the grounds of evidence not being beyond reasonable doubt.

Transaction reports are akin to a photograph of the scene of a crime, whereas what is needed is full CCTV of the events before and after the crime from all dimensions as this provides conclusive evidence understandable in court.

Investor protection is not ensured by regulators seeing end of day reports, while each venue sees only its own traffic and occasionally requests further information. Different parties are responsible for different areas of market quality – with no-one seeing the total picture in real time or near real time. Indeed the overall picture may never be seen by anyone, even in retrospect.

Cross market surveillance requires a surveillance officer to have a suspicion that something is not right without having access to source data from the third party market place. The probability of this happening in reality is infinitesimally small. Phishing requests to third party regulators need to be justified and cannot be done on everything.

4.2 Current Generation Surveillance Products

Traditional surveillance solutions suffer from three key problems

- they were not architected to handle the volume of order book transactions in today's markets, hundreds of millions, or billions per day
- presentation of this vast amount of fast changing data is inadequate to support human intelligence in spotting anomalies

- the use of machine intelligence to spot anomalies is both restrictive and prescriptive

New surveillance products are coming onto the market and longer established vendors continue to invest in R&D. However, these products typically exhibit several weaknesses as potential components of the next generation solution.

4.2.1 Data Volumes

The daily volume of trades, orders and quotes passing into such a surveillance system numbers in the billions, with several million for a liquid stock. Many existing products are simply incapable of accepting such volumes, while those that do may be able to process the data in near real time, but struggle to retrieve it or benchmark against it subsequently. For instance, to recreate the order book as at earlier times of the day, or to graph the activity in a stock can be extremely time consuming, while running analyses over several days is often completely untenable.

4.2.2 Anomaly Detection

The methods typically used for detection of anomalies use simple arithmetic and logical comparisons, while support for mathematical algorithms and statistical techniques are often rudimentary. Support for reflecting the connectivity between instruments or market participants, or time dependencies, in the detection methods is limited. Furthermore, these methods make concrete assumptions about the behaviours that may cause an anomaly, which leaves anomalies with unforeseen causes undetected.

4.2.3 Visualisation

The representation of information to users dates to an earlier era when there was far less information to represent, and graphical representation was crude. Simple tabular displays or two dimensional graphs are typically offered.

These provide very limited support to the human eye to spot something unusual, or for the human brain to comprehend complex and extensive sets of rapidly changing data.

Furthermore, representation is often limited to a single instrument, or perhaps two, so the user cannot readily visually assess for instance

- an equity and all its derivatives
- all members of a market sector
- components of an index
- all venues an instrument is traded on

4.2.4 Unstructured Data

As well as structured market data, surveillance systems must also accept, collate and interpret unstructured data, for instance from news feeds, emails, chat lines, blogs, voice.

Integration of all the data necessary to detect and analyse an anomaly is often poor.

4.2.5 Retrospective Assessment

While data can be analysed as it arrives in real time, at that stage it is often incomplete; for instance the beneficial owner may not yet be known, off market activity is unknown till it is reported later, and by definition in insider trading cases, the market moving news is not known till after the abusive activity.

As well as their problems with retrieving data for subsequent analysis, existing products often struggle to enrich the historical record as new information relevant to it arrives, so they struggle to perform retrospective assessments ("if I knew then what I know now", as it were)

4.3 Different regulatory models - self regulation versus centralised

In Europe, best execution enforcement and compliance with trading regulations is the role of the investment firm, while market supervision and surveillance is the responsibility of trading venues, and risk management and market surveillance using transaction report data is the responsibility of regulators and central banks. Further, in Europe in particular, the regulatory standards that govern trading venues are not uniformly defined let alone the level of enforcement, and so do not create a level playing field between different types of venue. Collectively, these issues allow for market abuse activity to remain undetected.

The MiFID II proposals partly recognise this issue, requiring "[alignment of] organisational requirements for MTFs with those for regulated markets so that regulated markets and MTFs operating similar businesses of a similar size are subject to equivalent organisational standards and regulatory oversight". Even with this requirement, a consistent and comprehensive approach to surveillance is not obtained. Each venue runs its own surveillance operation, while its competent authority agrees with it what that operation will do, and occasionally audits that it is being done.

With MiFID II potentially bringing new Organised Trading Facilities, and newly designated Systematic Internalisers, into the market abuse regulatory regime, and moving much OTC derivative activity on exchange, a more comprehensive coverage should result, but in practice the degree of inconsistency is likely to increase.

An alternative approach, which would also have many weaknesses, would be for the regulatory body to undertake surveillance including best execution monitoring, rather than in effect delegate it to the venues it regulates. Aside from the organisational and technical issues with this approach, it is still only a partial solution. Each regulator has a limited geographic jurisdiction, or coverage of only a subset of asset classes. Even a new pan EU surveillance function, if it were politically feasible to create one, would still not cover activity outside the EU and Third Country recognition and cooperation is critical.

5 Case for a Shared Surveillance Service

There is a significant opportunity for likeminded venues and regulators to cooperate in creating a shared surveillance service. The outcome will improve market surveillance and enable venues to provide a "market quality" stamp, thereby stimulating innovation and inter-venue competition as well as improving trading quality.

The participants in such a service would share the costs of market surveillance and create a consolidated service provider to process and monitor data to a new level. In the absence of legislation and agreement to create a shared service, one possible approach is for a lead party to create a commercial offering that covers business process outsourcing of the surveillance function for participating venues, and to build and operate the technology solution.

5.1 Cost sharing

The opportunity is to enable venues to compete on market quality via modern surveillance solutions without substantially increasing their cost.

For each organisation that is required by law to undertake some form of market surveillance or compliance, the investment needed to meet the increased standards of surveillance could be prohibitive. However, market and execution quality will be increasingly under scrutiny. Reconciling these two trends means that the ideal approach for all but a handful of organisations is to outsource to a surveillance service provider and thereby derive economies of scale.

5.2 Improved quality

Market quality and investor protection are critical success factors in retaining the store of value in securities. In turn that affects the value of the venues on which those securities are traded. Overall this affects the health of economies and the value of individuals' pension funds.

By working collectively with a surveillance service, providing a pooled "think tank" and consultation service, participants benefit from the creation of a set of best practice surveillance methods, standards and regulatory consultations, not to the lowest common denominator on the grounds of cost, but to the highest common factor on the grounds of optimising the chance of proving market abuse beyond reasonable doubt.

Common methods and comprehensive data coverage will also have the benefit of overcoming the challenges of today whereby separate venues and regulators may interpret regulations differently, creating opportunity for regulatory arbitrage.

No-one in Europe wakes up each day with either the responsibility or all the tools needed to detect market abuse and drive the cases into the courts. This is not because no-one has the ambition or capability, but because the current paradigm means that solutions cannot be found due to different agendas, lack of goal congruence, affordability and fragmentation. By participating in a shared surveillance service, the ambition of punishing and deterring market abuse can be better fulfilled.

Technological and methodological advances support next generation surveillance tools, able to deal with vastly greater transaction rates than traditional systems, and to detect and analyse market anomalies beyond current capabilities.

5.3 Comprehensive coverage

Participants in a shared surveillance service would take the spirit of the MiFID II requirement "to cooperate and exchange information" much further.

The shared surveillance service would surveill all traffic from participants, across all related instruments traded on them, all the time (and activity elsewhere could be partially inferred from commercial tick feeds, or a consolidated tape).

The more participants, the more comprehensive the coverage. And the more comprehensive the coverage, the better the market quality participants can offer their clients, in turn making it hard for non-participants to justify not getting on board.

5.4 Modular service

Not all functions and services will be capable of being outsourced by potential users of the utility. Therefore the service needs to be capable of being offered on a modular basis, with customised add ons for specific clients so they can make the transition and switch off their legacy environments. Also local expertise needs to be insourced by the utility.

5.5 Route to market

There are several potential starting points for the creation of a shared surveillance service:

- The most efficient would be for one or more of the global exchange platforms to centralise their own surveillance departments across different countries and use this as a basis to insource activity from regulators, other venues and investment firms;
- Co-operation arrangements between non competitive venues can also create a viable service;
- Those global exchange platforms with exchange technology arms could also continue to license applications to third parties or offer a leased insourcing service for the whole activity;
- Inter-regulatory MoUs and service co-operation.

Each of these models will lower unit costs, take advantage of a higher level more holistic service and will derive economies of scale. They will also provide an initial entry level proof of concept, which can demand a significantly upgraded technological and operational model.

These models are the simplest but achieving further scalability is more fraught with challenges and barriers to entry, however valid or not. Confidentiality, Chinese Walls, trust and independence will become critical.

At the high volume end of the marketplace where competition for liquidity is rife and where "Multi-Everything" surveillance is most essential, cost decisions could be overridden by other factors. For example, would a major MTF/ATS or Systematic Internaliser really outsource to a major exchange or vice versa when they are serious competitors? This is like asking would Pepsi Cola outsource to Coca-Cola? Will regulators really share this area of service, when many are also agents of national economic development competing for cross border investment.

We would argue that seeing surveillance as a common utility helps address these concerns. After all, how many of these players feel the need to generate their own electricity?

Ownership, governance and independence will therefore be the key and in the long-term maybe legislation or regulation. The route to market is not impossible but requires careful planning.

6 Why AVENUES?

AVENUES is a unique source of world-leading independent expert advice and assistance to securities exchanges and other trading venues worldwide, to market participants, regulators and solution providers with in excess of 100 clients.

We have extensive experience in ensuring successful and cost-effective supervision and surveillance in demanding regulatory and operational situations. Our involvement has ranged from executive management, through strategic development, to day-day-day operations and independent consulting services. We have assisted in the regulatory, business and IT domains, and are as adept at trouble-shooting and solving complex problems as at providing thought leadership to the industry, its practitioners and its suppliers.

We have assessed the current generation of surveillance products and their functional and non-functional capabilities, together with the likely medium term development of regulatory and business demands on the surveillance function, to define the specification of an idealised solution. This would form the basis for the requirements specification for the proposed shared service.

We have undertaken research and development in the application of advanced mathematical and statistical techniques to the detection of anomalies in multi-market activity, which would form part of the unique capability of the proposed shared service.

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