The New Age of Analytics

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HOW REAL IS REAL-TIME ANALYTICS?

‘BEST EX’ RAISES BAR ON ANALYTICS

CORRALLING ‘BIG DATA’

ANALYTICS AHEAD

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MARKET PARTICIPANTS across the institutional buy side and sell side are pulling forward their analysis of trading, risk and compliance, to appease ever-more-demanding regulators and clients and to keep up with the competition.

In other words, first thing in the morning is no longer good enough as an analytics delivery timeframe.

“Firms are increasingly having to use real-time analytics for a range of different purposes,” said Rodney Taylor, Market Development Manager, Europe at technology and data provider Thomson Reuters. “That has changed the way they consume data, the way they analyze data, and the way they disseminate data, throughout the organization.”

For the end-user institutional trader, data is massive and multidimensional, spanning areas such as liquidity provider, trade venue, execution strategy, trade size, and time zone.

“Cleaning, managing and analyzing data is a significant challenge,” said David Biser, senior FX trader at Campbell & Co., a systematic, quantitative investment firm with $4.3 billion under management. “The difficulty is exploring this data at its maximum granularity to achieve the best assessment of implicit costs.”

Trading desks leverage data to achieve a number of specific objectives, such as determining implicit and explicit execution costs, deciding how to size and time individual trades, and evaluating algorithms and counterparties. “Conducting this statistical analysis allows traders to make more informed decisions,” Biser said. “From a best-execution standpoint, it also allows one to inform the decision-making process of the firm, and then use the data to justify trading decisions.”

Analytics turns data into actionable insights. Real-time analytics does the same thing, but on the spot rather than minutes, hours or days later.

BIG BUSINESS
Raising the bar on ‘big data’ and analytics is big business, and it’s rapidly getting bigger. IDC forecasts a 50% increase in revenues from big data and business analytics software, hardware, and services between 2015 and 2019, from about $122 billion last year to $187 billion in three years’ time. Banking and manufacturing-led industries were poised to spend the most, according to the research firm.

Companies throughout the corporate landscape are seeking to exploit cutting-edge analytics to effect digital transformation, adapt to disruption, and gain a competitive edge. Drilling down from that commonality, each industry has its unique drivers as well. In the capital markets business, one primary driver of the demand for real-time analytics is regulation.

Pertinent rule sets include Markets in Financial Instruments Directive (MiFID) II in Europe, which is meant to go into effect in
January 2018, and Dodd-Frank in the U.S., which was signed into law in 2010 but remains a work in progress.

Regulation does not explicitly call for market participants to install or upgrade to real-time analytics. But there are a number of regulatory thrusts that make, or will make, real-time analytics a virtual necessity, at least for certain asset classes in certain regions.

For example, a broad aim of MiFID II is to boost transparency in securities trading, especially in over-the-counter (OTC) markets in which swaps and other derivatives change hands. Drilling down into the rule set, MiFID calls for trading venues, investment firms, and systematic internalizers to report pre-trade bid and offer prices on a continuous basis. On a post-trade basis, trading venues and investment firms will need to report price, volume, and time of trade at as near to real-time as possible.

The complexity, detail and interpretations of the voluminous regulations are still being sorted through, but at least one assertion is broadly accepted, and that is that legacy analytics systems aren’t capable of clearing the higher goalposts.

Adding to the challenge is that certain regulatory provisions, such as those around encryption and customer privacy, may force market firms to make fundamental design changes to their data systems. “How you architect your analytics and still meet regulatory requirements is key,” said Taylor of Thomson Reuters. “Some large organizations think they’re going to have to completely re-architect the way they store customer data.”

OTC TCA

A primary subset of analytics in capital markets is transaction cost analysis, which measures the efficiency of trades. Historically disseminated via next-day reports highlighting price slippage and quarterly meetings to assess longer-term trading-strategy performance, today’s state-of-the-art TCA enables a trader to optimize in-progress executions, rather than just providing data on trades that already happened.

That’s in the equity market, which has led on TCA since the inception of electronic trading decades ago. In OTC and other markets that have less standardization, shallower liquidity and limited historical data compared with listed stocks, TCA is in its early stages. But with regulators steadfast that best-execution standards be applied more broadly across markets, its development is being fast-tracked.

Whereas real-time analytics was once a curiosity that begat the question of ‘what do I do with this?’ market participants are increasingly seeing the value. “Asset managers are recognizing that in order to do their jobs better — whether that’s in terms of monitoring costs, looking for trading opportunities, or having better-informed overall trading procedures — they need to have access to real-time analytics,” said Spencer Mindlin, an analyst at Aite Group.

“There’s a decreasing tolerance for batch-process or overnight analysis of exposure,” Mindlin said. “There’s just an insatiable desire to know your market and counterparty exposures as close as you can to real-time. That is being driven by regulation.”

Regarding the hosting of Analytics as a Service (AaaS), observers note that the trend is moving toward the cloud — slowly.

“With real-time analytics, we still mostly see people capturing data in their own data centers, typically on one machine, because they can add all the data together in one space,” said Fintan Quill, global head of sales engineering at in-memory streaming analytics database provider Kx Systems. “It’s just faster. If you’re doing very latency-sensitive processing or analytics, you get results straight away whereas if it’s distributed you have the network latency.”

Cloud offers the advantages of IT cost savings and reduced capital expenditures, and security concerns have eased a bit. For some market participants, a hybrid model with the most proprietary information staying on the ground makes the most sense. “People might have their market data servers in the cloud, but they’re probably a little reluctant to put their own order and execution data in the cloud as well,” Quill said.

DEMAND DRIVERS

The emergence of real-time analytics holds different implications for different market constituencies. Institutional investment managers want real-time analytics, but they may not have the expertise or budget to support it. ‘Bulge bracket’ broker-dealers have the resources to develop real-time analytics, but they aren’t the technology leaders they once were, and they have multiple other business lines to tend to.

That leaves an opening for managed-service providers, who focus on technology and can provide a top-shelf offering at a reasonable cost.

“When you look at something like pre-trade analytics, firms are
looking for vendors to provide the same quality of service that they have in-house, especially around latency,” said Tom Kennedy, global head of analytics at Thomson Reuters. “Getting a feed for that and managing the analytics is critical within their workflow.”

Business conditions are also driving demand for real-time analytics. In capital markets, that starts at the top of the food chain with alpha-challenged and cost-constrained institutional investors and asset owners, who are asking more from their brokers and technology providers.

“As clients continue to emphasize the need for best execution at the lowest cost, this demands ongoing investment in information systems and capabilities to parse and analyze the underlying data,” said Matthew Rowley, chief technology officer at agency broker WallachBeth Capital.

Such capabilities can provide a competitive advantage by enabling traders to trade better. “As firms take a more data-centric approach, traders will be supported by evidence-based decision-support systems,” Rowley said. “This is the crux of the ‘real-time analytics’ slogan — actionable analytics. Numbers are meaningless unless they have a decision attached to them.”

As for the future, Rowley said “brokers’ prospects are tied to the strength of their technology and vision, and their proprietary modelling ability to take advantage of the massive amounts of real-time data, both public and internal.”

Biser, the Campbell & Co. trader, stated: “As technology and analytics improve, so too will the feedback loop of execution decisions. Trading is a process more than it is one single outcome.”
SHOW, DON’T TELL.

That’s the widening regulatory mandate to securities brokers regarding executing client trades as efficiently and as fairly as possible. De rigueur claims of best execution in marketing materials are all well and good, but brokers will soon (if they don’t already) need to prove ‘best ex’ empirically, faster, and for more asset classes.

The requirements — as set forth by rule sets such as Markets in Financial Instruments Directive (MiFID II) and Alternative Investment Fund Managers Directive (AIFMD) in Europe and the U.S. Securities and Exchange Commission’s Rule 605 — raise the bar on institutional trading desks’ data and analytics suites.

Trading itself — the front office, in Wall Street parlance — has been on the fast track for years, via algorithms, smart order routing, co-location, and other optimization mechanisms. It’s the less-glamorous tracking and measurement of trades — the purview of the middle and back offices — that is now being scrutinized for its capacity to meet more stringent regulatory demands.

There is a lot of room for improvement.

“We’re seeing a shift where compliance is beginning to need more sophisticated solutions for high-volume and high-velocity trading,” said Tom Kennedy, global head of analytics at technology and data provider Thomson Reuters.

“Traditional tools such as relational databases aren’t a fit anymore. People need state-of-the-art technologies like what is deployed in the front office.”

Practitioners note that it’s less about the analytics being complex per se, and more about the ability of the analytics to integrate the right data, both market and proprietary. Key attributes of an analytics system include a seamless interface with multiple sets of data, plus robust storage and back-testing capabilities.

“A technology platform is use-case agnostic,” Kennedy told Markets Media. “You can use the same technology to
process high volumes of data, which could then go into an algorithm or a customer’s own application, perhaps a surveillance system or a risk system.”

**THEN, NOW**

Best execution is the core of the sell side’s value proposition to the buy side; all other brokerage products and services can be considered ancillary to getting the trade right. This posit applies across asset classes.

The essentials of best execution are straightforward, and have remained fairly static through market evolution.

For example, in a May 2011 equities communiqué, the SEC said: “Brokers evaluate the orders they receive from all customers in the aggregate and periodically assess which competing markets, market makers, or electronic communications networks (ECNs) offer the most favorable terms of execution. Some of the factors a broker must consider when seeking best execution of customers’ orders include: the opportunity to get a better price than what is currently quoted, the speed of execution, and the likelihood that the trade will be executed.”

Five-and-a-half years later, the word ‘periodically’ jumps out as quaint, as does the subsequent text that calls for broker-dealers to provide quarterly reports on routing of customer orders, and for market operators to supply monthly reports on execution quality. But in a broad sense, the regulatory explanation remains intact. and it applies across asset classes.

In over the counter (OTC) markets, historically the purview of ‘high touch’ trades conducted via bilateral telephone negotiations, best execution is considerably less advanced. But, that is changing as regulators in Europe and the U.S. push for market transparency, which means more electronic trading, new market data feeds, and enhanced capabilities to benchmark trading performance.

“New regulations and industry-wide initiatives such as MiFID II in Europe, and CAT (Consolidated Audit Trail) in the U.S., will provide all market participants access to substantially more granular and detailed information regarding the order life cycle,” said John Zecca, head of U.S. market regulation at Nasdaq.

“Sell-side firms benefit from detailed execution information and time stamping. Buy-side firms have the ability to properly investigate execution quality across all sell-side execution desks and venues,” Zecca continued. “This new level of data granularity and detail will open the opportunity for novel investigative tools and visualization capabilities, and will empower all market participants to leverage significantly increased market transparency to achieve best execution.”

Achieving, and showing, best execution is helpful for all parties — buy-side market participants preserve investment return, sell-side brokers gain trust and repeat business, and regulators do their job of maintaining fair and efficient markets.

But getting there can be a heavy lift. This is especially the case in OTC markets that are characterized by fragmentation, a paucity of standardization, and new and comparatively illiquid trading venues with sparse datasets. An institutional broker may need to connect to venues they wouldn’t ordinarily connect to in order to meet best execution requirements; another complexity is ensuring analytics can determine an order’s eligibility for pre- and post-trade price waivers.

**MULTIPLE INPUTS**

“Being able to say what’s the best price at a given time is one thing, but regulation is demanding that you look at a number of different factors, including probability of execution and speed of execution, and you need to do that in real-time,” said James Corcoran, head of engineering, EMEA at streaming analytics database provider Kx Systems.

“Best ex entails reconstituting the trade lifecycle,” Corcoran continued. “A market maker will need to be able to explain exactly how he constructed his price. This means storing all of the inputs — including both internal and external data streams.”

One especially granular aspect to best-execution mandates is clock synchronization, in which trading venues and their members sync to coordinated universal time (UTC), an internationally recognized scientific standard for timekeeping that does not require time zone or daylight saving adjustments. This will require an investment, but once it’s in place it will enable clients to see a record of trade times, and also boost the value of the data.

“When synchronization is in place, that means we can start joining different data sets together,” Corcoran said. “That unlocks an enormous amount of analytical capabilities.”

Market participants need to determine what role cloud will play in meeting best-execution mandates in the OTC space. Practitioners note there are regulatory differences across borders — for instance, the SEC and the U.K.’s Financial Services Authority have indicated an open-mindedness about deploying cloud for data
storage, but other regulatory regimes are wary, especially with regard to private data.

In August 2016, The Economist reported on the rise of cloud computing, which it defined as the provision of all kinds of number-crunching services over the internet. An upshot of this trend is that global networks of huge data centers have become one of the world’s most important infrastructures.

Cloud enables Data as a Service (DaaS), which enables market participants to perform real-time analytics without having to deploy their own infrastructure or collect data. “That’s what we see gaining traction next year and beyond,” said Gautam Verma, head of market development for enterprise in Asia at Thomson Reuters. “That’s the direction I see clients looking to us for.”

As an example of a sell-side firm taking to the cloud, earlier this year Singapore-based DBS Bank tapped Amazon Web Services to provide cloud services. One of the first use cases will be DBS’ treasury and markets business, which will leverage AWS to price and value financial instruments for risk management.

GLOBAL RELEVANCE

MiFID II is a European regulation, but its best-execution stipulations are relevant across borders. That is because Europe, with its multiple developed economies driving generation of about one-third of the world’s GDP, is a trading destination for any financial firm with global aspirations.

Asset classes under the umbrella of MiFID II include foreign-exchange and interest-rate derivatives, as well as structured products. The raw material is the data, which will include new sources, feeds, benchmarks and trading protocols.

“It introduces transparency and a level of care across non-equity asset classes,” said Kennedy of Thomson Reuters. “It is quite different from what is produced in the equity space, because the trading venues are different. Understanding how to analyze information from an RFQ (Request for Quote)-based platform is a challenge.”

There is also the issue of unbundling investment research from trading commissions, which changes the nature of the buy side-sell side relationship. “The buy side needs to be agnostic in where their trades get the best fills,” Kennedy added. “That’s a big shift. It means that the buy side, whereas before they were given tools for free, now have to invest in infrastructure and be more sophisticated and on-point about their trading.”
FOR TRADING AND INVESTING FIRMS, so-called big data — the extremely large data sets that flow through the business every day — provides a hoard of information about markets and their own market activity.

But going from simply owning the data, to exploiting the data, is no mean feat in today’s high-speed electronic markets, in which immediate computer responsiveness is prized. That’s especially the case given that a substantial amount of data is unstructured and first needs to be cleaned up and reformatted before being processed.

The value proposition of making the leap from possession to utilization is twofold. One, a proper harnessing of big data complies with increasingly ponderous and data-hungry financial regulation, most prominently Markets in Financial Instruments Directive II. Two, big data can be used to improve pre-trade, at-trade and post-trade analysis, and by extension, trading performance.

“There is a need for more cross-asset, real-time risk management,” said Tom Kennedy, global head of analytics at technology and data provider Thomson Reuters. “Look at MiFID II’s reporting obligations across asset classes. How do you pull that content together to publish to your reporting platform? It’s a huge project just to join up disparate databases, and then you have to run an analytics platform on top of that.”

Added Kennedy, “The winners will be those who achieve that, and in turn use those capabilities to drive business opportunities, new product development, and alpha.”

INTENSE DATA
Banking and financial services is data-intensive. The sector has 1.51 installed terabytes per $1 million of revenue as of 2016, topping 16 other industries including #2 media and entertainment at 1.18 terabytes and #3 healthcare at 0.91 terabytes, according to technology-economics research firm Rubin Worldwide. Banking and financial services’ data per $1 million of revenue has increased 61% since 2012, when it was 0.94 installed terabytes.

‘Data/revenue in financial services has surged 61% over the past five years’

Much of the data that comes across a trading desk is structured, in the form of numbers from databases or spreadsheets. But there is also unstructured data in the form of text and voice — this can originate from sources as disparate as e-mail, chats, IMs, texts, PDF reports, conference-call transcripts, news articles, phone calls and voicemail.

So the first challenge is to make unstructured data usable.

“The goal is to bring to unstructured data the power of programming languages and query languages that you normally associ-
ate with structured data,” said Dan Seal, senior vice president at in-memory streaming database provider Kx Systems. “It’s about being able to make sense of the content and use of the content by bringing structured data processing to an unstructured landscape, and doing that quickly and efficiently.”

Under MiFID II, which comes into force in January 2018, the European Securities and Markets Authority and national regulators are charged with ensuring that trading firms maintain a complete and accurate list of all trades, including those conducted in over-the-counter derivative markets that are thinly traded compared with screen-based equities markets.

Big data is characterized by volume, variety and velocity, a 15-year-old observation by industry consultant Gartner that applies many times over on today’s institutional trading desks.

“Customers have different data in different places,” said Adam Garrett, North Asia head of enterprise capabilities and content for Thomson Reuters. “A key part of the big data challenge is getting all the data in one place and making sense of it. That can be done using an enterprise data warehouse solution or with a visualization layer linking different databases.”

Stakeholders in markets worldwide are turning to technology to help corral unstructured data, with an eye toward scalability — that is, ensuring that a fintech solution that works on a small data will not break down with a heavier input.

The Securities and Futures Commission of Hong Kong sees artificial intelligence as a way to manage unstructured data, according to James Lau, acting secretary for financial services and treasury for the government of Hong Kong.

“AI can analyse not only text messages but also social media footprints, including voice messages,” Lau said in a Nov. 7 speech at a fintech event in Hong Kong. “AI can do the parsing of myriads of regulatory rules and guidance notes from different jurisdictions, and relate them to reporting, surveillance and enforcement mechanisms.”

REGULATORY CATALYST

MiFID II is acting as a catalyst for the disruptive and innovative force of big data, by pushing buy-side and sell-side market participants to get their arms around their data. That’s according to Christian Voigt, senior regulatory adviser at Fidessa in London.

“Trading firms search for solutions that allow them to meet new regulatory requirements while protecting their bottom line,” Voigt told Markets Media. “Implementation has many challenging components such as ensuring data accuracy, aggregation across disparate systems, traceability or data security, which all firms need to get right.”

“But while many financial institutions will extend their already bulging data warehouses, being able to extract meaningful business intelligence will separate the wheat from the chaff,” Voigt continued. “In order to master the big data challenge it is crucial to see the collection of amassed data not as a regulatory burden but as the key to understanding markets and customers better than ever before.”
Capital-market firms are getting better at mining and extracting value from 'big data,' but there is considerable room for improvement.

Observers and practitioners say the ramp-up of analytics capabilities will be a prominent theme for buy-side investment firms and the institutional brokers that execute their trades for the foreseeable future.

"It is an increasingly data-driven industry," said David Sobolewski, product manager for cross-asset analytics at Thomson Reuters. "Getting deeper insights through analysis of data will be critical in efficiently and compliantly operating your organization, generating value, and differentiating yourself from peers."

The vision is seamless access to all types of data, supplemented by visualization tools that enable everyone in the organization to understand what they are seeing. This next evolution of data access moves from the comparatively inefficient model of database administrators tapping 'data lakes' for information by request, to real-time access at the fingertips of those who need it.

TECH + REGS + BOTTOM LINE
The wind at the back of data analytics blows from technological advances that enable it, as well as the regulatory actions and competitive pressures that necessitate it. Trading and investing firms are able to analyze more data than ever before quicker than ever before, but the rate of advance is such that the current state of the art may be looked back upon as quaint in five years' time.

The processing power of the world's fastest supercomputer is 40 times more than that of the world's fastest machine of six years ago, McKinsey noted in a December 2016 report. And the rise of cloud-based platforms has democratized analytics to an extent, by making it cost-effective for smaller firms to store data and process it on distributed servers.

"Companies are placing big bets on data and analytics," the report said. "Data and analytics are already shaking up multiple industries, and the effects will only become more pronounced as adoption reaches critical mass."

On the regulatory side, one future date that's highly pertinent for market participants and purveyors of data and analytics is January 3, 2018. That's the go-live date for Markets in Financial Instruments Directive II, the European rule set that moves trading of more asset classes from OTC and onto organized trading venues, and mandates that participants collect, organize and report a bunch more of their trading data, as close to real-time as possible.

MiFID II will be central to data-and-analytics upgrade efforts this year, according to Dan Seal, senior vice president at in-memory streaming database provider Kx Systems. "MiFID really pushes institutions, both buy side and sell side, to centralize their data repositories and their analytics," he said. "From a data perspective,
what’s important are things like transaction cost analysis, and ‘best ex’ reporting that needs to be published to their governing bodies.”

The future of analytics is about making information available now rather than later. “A big part of it will be real-time,” said Jerry Hanweck, founder and CEO of the eponymous real-time risk analytics firm. “There are some firms that take multiple days to calculate their exposure to changes in a major currency — that can’t happen.”

There is also the more mundane need to ensure that the right data gets in front of the right people internally. “This is not just the conventional challenge of managing big data,” Hanweck said. “Organizational behavior is about getting the right structures in place within a large organization to make sure the data is available in a timely fashion and available to the groups that need it.”

**AI IN SIGHT**

Further out, “machine learning is going to play a big role in analytics within financial markets,” Hanweck continued. “It could be automation of certain tasks which to date have been people-oriented. It could be back office, or it could be risk management…Machine learning will also impact less conventional areas like surveillance.”

The expansiveness of the future of analytics is drawing in players of all sizes, ranging from the biggest investment houses and Wall Street banks to startups.

London-based fintech entrepreneur Alpesh Doshi is working to build an investment firm based on data-driven decision making, which he envisions as a “BlackRock for the 21st century.”

“Investors are not getting the return they want,” Doshi said. “Processes are not really driven by data analytics. Most of it is based on fund managers’ portfolio selection, which involves older, traditional techniques. We want to drive change — by building big data, by building analytics with multiple sources of data and by building proprietary risk models and algorithms.”

Regarding the state of analytics on Wall Street today, Doshi opined that market firms are doing what they need to do, but with some short-sightedness. “There is a huge amount of activity trying to meet regulation,” he said. “There are pointed solutions, but there is not a real coherence on thinking about it holistically and understanding the data better.”