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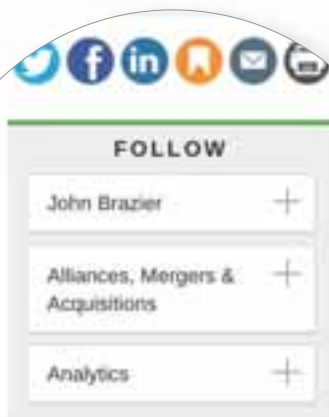
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Editor-in-Chief Victor Anderson
victor.anderson@infopro-digital.com
tel: +44 (0) 20 7316 9090
US Editor Anthony Malakian
anthony.malakian@infopro-digital.com
Deputy Editor, Sell Side James Rundle
james.rundle@infopro-digital.com
Deputy Editor, Buy Side John Brazier
john.brazier@infopro-digital.com
European Staff Writer Aggelos Andreou
aggelos.andreou@infopro-digital.com
US Staff Writer Emilia David
emilia.david@infopro-digital.com
Asia Staff Reporter Wei-Shen Wong
wei-shen.wong@infopro-digital.com
Head of Editorial Operations Elina Patler
elina.patler@infopro-digital.com

Commercial Director Colin Minnihan
tel: +1 646 755 7253 colin.minnihan@infopro-digital.com
Commercial Manager Phil Ansley
tel: +44 (0)20 7316 9643 phil.ansley@infopro-digital.com
Business Development Manager Tom Riley
tel: +44 (0)20 7316 9780 tom.riley@infopro-digital.com
Business Development Executive Arnaud Morell-Coll
Tel: +1 646 736 1887
arnaud.morell-coll@infopro-digital.com

Marketing Manager Louise Sheppey
tel: +44 (0)20 7316 9476 louise.sheppey@infopro-digital.com
Design Lisa Ling

Corporate and Single Subscriptions
UK: Claudio De Oliveira tel +44 (0) 207 316 9271
US: Barbara Faيمان tel +1 646 736 1852
info@waterstechnology.com

Publisher Katie Palisoul
katie.palisoul@infopro-digital.com
Group Publishing Director Lee Hartt
lee.hartt@infopro-digital.com
Managing Director Celine Infeld
celine.infeld@infopro-digital.com

Infopro Digital Head Office
Haymarket House
28-29 Haymarket
London SW1Y 4RX
tel: +44 (0)20 7316 9000
fax: +44 (0)20 7930 2238

Infopro Digital US
55 Broad Street, 22nd Floor
New York, NY 10004
tel: +1 646 736 1888

Infopro Digital Asia
Unit 1704-05
Berkshire House, Taikoo Place
25 Westlands Road
Quarry Bay
Hong Kong
tel: +852 3411 4888

Infopro Digital Customer Services
tel: +44(0) 1858 438 800

To receive *Waters* magazine every month you must subscribe to a **WatersTechnology Subscription** or a **Waters Premium Subscription**. For more information and subscription details, visit waterstechnology.com/subscribe

Waters (ISSN 1068-5863) is published monthly (12 times a year) by Infopro Digital Risk Limited. Printed in the UK by Stephens & George Print Group, Dowlais, Merthyr Tydfil, Wales.

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A Step in the Right Direction

It seems that 2018 might well turn out to be the year that gender equality finally gets the attention it deserves. In April last year, news broke in the UK that the government would require all public, private and voluntary sector firms that employ 250 or more employees to publish their gender pay gaps—currently 18 percent for all workers and 9.4 percent for full-time staff—by April 2018, with the view to highlighting and hopefully rectifying firms' salary disparities.

Then on January 8 this year, BBC journalist Carrie Gracie resigned her position as the Corporation's China editor, after discovering that she was being paid significantly less than her male counterparts, which she felt made her position untenable. According to Gracie, she "could not collude with the unlawful pay discrimination," she had uncovered.

These two news stories dovetail nicely with the main subject of this column: *WatersTechnology's* upcoming Women in Technology and Data Awards, scheduled to be held in London on March 9. I would like to take all the credit for embracing change and grasping the proverbial nettle with respect to addressing a perennially delicate subject and one that in the wake of the recent Harvey Weinstein revelations can no longer be conveniently ignored. But I cannot—*Waters'* publisher Katie Palisoul and especially Briony Lamas, a senior conference manager at Infopro Digital who many of our event attendees will know, were the awards' principal proponents. All I did, along with my colleagues Anthony Malakian and James Rundle, is firm up the awards' framework by determining the categories on offer, their description and what the judges should be looking for when reviewing the entries.

We are under no illusion about the uniqueness—or lack thereof—of these awards. There are a number of women-focused awards already in existence, in other industries as well as in ours, although what is special about these awards is that they are specific to the markets we have been covering for the past 25 years. Yes, *Waters* turns 25 this year, and who better to shine a light on the outstanding contributions women have made—and continue to make—across the capital markets fintech industry than us? Will these awards be perfect in terms of the categories on offer and the mechanism by which our winners are selected? And will they turn out to be the silver bullet that our industry so desperately needs in order to rectify many of the gender-based inequalities that we can no longer dismiss? No on both counts. But they are a step in the right direction and they're a lot better than doing nothing. I will be at the awards on March 9, proud that this publication—and indeed, this company—is doing its bit to ensure that the days of the dinosaur culture, so deeply ingrained in our industry, are numbered. W

Victor Anderson
Editor-in-Chief

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American Financial Technology
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Derivatives Market
Prepares for
Emerging Tech
Implementation
By Aggelos Andreou



Never Mind the Brexit: UK Treasury Releases **Asset Management Plan**

The British government has released a number of proposals to maintain the strength of the UK's investment managers after Brexit. [By James Rundle](#)

The UK Treasury has issued the second iteration of an action plan to keep Britain at the heart of Europe's asset management industry after the country leaves the European Union, with a particular focus on fintech. It updates and revises recommendations from the original Investment Management Strategy, published in 2013.

With £8.1 trillion in assets under management, the UK is unquestionably the largest center for asset management in Europe. However, in line with other financial services sectors, questions have been raised as to whether the UK can maintain its position with the potential loss of access to Europe's single market once the UK leaves the bloc in 2019.

"The UK is a world leader in asset management, and it is vital that we keep it that way," said Stephen Barclay, the economic secretary to the Treasury, in a statement. "The new strategy for the sector outlines how we will do this, and I look forward to working closely with the industry to fully realize its potential."

The 39-page Treasury report, which was foreshadowed in the November budget, identifies a number of areas that it says will help to safeguard the pre-eminence of UK investment management. These include setting up centers of "excellence" in UK universities, promoting socially responsible investment strategies, which have emerged as some of the biggest winners in terms of returns, and encouraging foreign investment. There will also be a higher degree of "ministerial" assistance, the report says.

One of the key areas of development, the report says, will be fintech

and a number of relevant sub-sectors, including innovation in wealth management, middle- and back-office processing, and continuing efforts to promote asset management fintech firms through the Financial Conduct Authority's (FCA's) Innovation Hub.

Key Areas

Specific areas of focus include block-chain, and the creation of a digital fund, which is being established by industry lobby group the Investment Association (IA), and its members. Other areas of interest highlighted in the report include robo-advisory, a common set of standards for cybersecurity in asset management, which are also being developed by the IA, and technology for portfolio management.

The report will be implemented by consultation with relevant stakeholders from government, regulatory agencies and the industry, including the Asset Management Taskforce, a body of representatives from these areas, which was formed in October. "Together with the Asset Management Taskforce, this comprehensive strategy provides the opportunity for partnership between government, industry and regulators to ensure the UK remains the leading European asset management center," says Chris Cummings, CEO of the IA. "The forward-looking agenda brings a

welcome focus on the critical success factors of tomorrow, including harnessing the fintech revolution, encouraging sustainable investment and ensuring a diverse and world-leading workforce. Domestic excellence will help to boost the industry's export and trade contribution as the UK looks to a new place in the world."

Unknown Variables

Much of the future state of asset management in the UK, however, is subject to unknown variables, including the outcomes of negotiations between the UK government and EU authorities over a number of critical areas, including the status of non-UK citizens in the country post-Brexit. Consultancy EY estimated in an April 2017 publication on Brexit's impact for asset managers that it is not uncommon for 30 to 40 percent of an asset manager's workforce to be comprised of people who are not UK citizens.

Likewise, the loss of access to the single market, or Ucits labels for funds, could prove disastrous and prompt a move to other European financial centers, including Luxembourg or Dublin. "The risk here is that the UK government assumes that it will be business as usual after Brexit," says a consultant with deep experience of the asset management industry in the UK, who asked not to be named. "The worst-case scenario is that they say 'we have a plan now, and we're sticking to it' when it's almost impossible to understand what the UK's future relationship with Europe will be. It's like saying you're going to drive from Manchester to Southampton without a map or road signs." **W**

THE BOTTOM LINE

- The UK government has promised significant support for the country's asset management industry in a series of proposals from the Treasury, which

will include establishing centers of excellence in universities, and improved ministerial assistance for firms operating in the UK after Brexit.

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After Building an **AI Black Swan** Detector, Compellon Mulls Path Forward

California-based Compellon has built a quantitative analysis engine using machine learning to help evaluate sell-side analysts and search for potential black swan events. *By Anthony Malakian*

Pej Hamidi was about to work for noted quant firm Two Sigma, when a friend at analytics platform provider Compellon asked him to come in and take a look at the firm's artificial intelligence (AI) engine. It's an area that Hamidi had been exploring for years, his background being in building analytics and quantitative research platforms at various asset managers and hedge funds for close to two decades. He was immediately impressed with the platform, which was built by Compellon co-founder and chief data scientist, Nikolai Lyashenko. Rather than settle down on the East Coast, he decided to join the Laguna Hills, Calif.-based technology provider to build, from the ground up, its capital markets practice.

Hamidi says that what drew him to the company was a certain level of freedom to practice his craft. For years he had been limited by specific tools—R and Matlab for programming, and linear regressions and neural networks that had been around for a long time, but didn't achieve what he wanted to do in quantitative analysis. By contrast, the Compellon platform is built using the Scala language, with the back-end running on Amazon Web Services, enabling it to store and drill into huge datasets, and to scale as needed.

It uses supervised machine learning, the end result being that it helps alert a portfolio manager (PM) like Hamidi to anomalies or to previously unconnected data points, says Marc Bir, Compellon's CTO. "We can't tell you what will happen if it's never happened before," he says. "The

engine itself is data agnostic; we don't care where the data comes from. It's looking for drivers of patterns that are causing a certain behavior."

Compellon's engine allows the firm to create predictive measurements for when a high-sigma or black swan event might hit over a five-, 10- or 20-day window, as well as allow them to score sell-side analysts.

Its S3 signal, which stands for Sell-Side Score, looks at every analyst-generated report for every stock that Compellon has access to, and looks at several aspects of the report—such as price, upgrades and downgrades, and earnings-per-share—to make a judgement on which analysts and data providers are the best and which analysts and data providers may be gaming their numbers.

Bir says that you can throw 20,000-plus variables at the engine and it will say that, out of this sea of data, here are two dozen variables that show some form of stability, here's how they have shifted over time and this is how they're all related. In this way, the platform uses machine learning to help a portfolio manager not only identify areas to drill into in greater depth but to see how these data points can interact with other projects on the trading desk.

To Sell or Not to Sell?

Perhaps ironically, the biggest question facing Compellon now isn't one that can be answered by its engine. Rather, it's a question of where it goes from here in terms of using it. The company was founded in 2011, with a focus on big data and predic-



Pej Hamidi
Compellon

tive analytics for sales and marketing teams in telecoms and insurance, among other areas, delivered using a software-as-a-service (SaaS) model. But it wasn't until Hamidi joined that it decided to enter the capital markets space.

While the plan might have originally been to use a similar SaaS model for its markets practice, Compellon decided instead on a more protective path—the firm uses a subscription model to gain insights from the platform, which are gathered and analyzed within its own walls.

"In the capital markets space specifically, so far we have not allowed any company to take a license to the product, because we're doing all the research internally," Hamidi explains. "We have to keep it ring-fenced until we decide whether we want to go after the subscription model in this space or we're going to wrap this into some sort of pure alpha-generating platform that we use internally with some sort of a hedge fund. So the question becomes: Do we use it ourselves or do we actually go talk to these funds and let them use it, or do we create some sort of joint venture? We haven't figured that out yet," he says. **W**

THE BOTTOM LINE

- Compellon's engine looks to spot potential black swan events and it also scores sell-side analysts.
- The company is now contemplating whether to sell this as a traditional vendor package, or go independent with it.
- The platform uses machine learning, is programmed in Scala, and connects with AWS to support its data intake and analysis.

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The Battle of Paris: How Esma Fought to Save Mifid II

When the revamped version of the Markets in Financial Instruments Directive was published, Europe's top markets regulator had to act in several cases against deliberate misinterpretations of the law, as its chair, Steven Maijoor explains to [Aggelos Andreou](#).

The Mifid II journey has not been an easy ride, either technically or politically for both market participants and regulators. The job has been particularly tough for the European Securities and Markets Authority (Esma), a comparatively small regulator—its headcount and budget are dwarfed by the national regulators it technically oversees—which was nonetheless given the somewhat thankless task of fleshing out the package of rules via technical standards and official opinions.

It has faced opposition at nearly every turn. For most capital markets firms, the IT challenges have been enormous, and even now, shortly after the Directive came into force on January 3, 2018, there are concerns that some elements of the regulation are still unclear.

Even where the mandates are clear, market participants still groused over the fact that they would radically change how they did business.

The systematic internalizers (SI) regime is a good example of how lobbyists tried to use seemingly minor flaws in legislation to make up for the loss of the broker crossing networks (BCNs), which ceased on January 3. "Early last year, we heard suggestions that some market participants were considering to couple or line up a number of SI investment firms, mimicking multilateral trading," says Esma's chair, Steven Maijoor.

In February 2017, Maijoor sent a letter to the European Commission (EC) raising precisely that concern, stating that "such arrangements would allow SIs to cross third-party buying



Steven Maijoor
Esma

and selling interests via matched principal trading or other types of back-to-back transactions, and would be supported by liquidity-provision agreements between members of the networks."

The issue triggered a political turmoil within Brussels, as members of the European Parliament accused the Commission of failing to act decisively to close the loophole.

Disappointing

Markus Ferber, the conservative MEP for Germany, told *Waters* in May that the Commission's response was disappointing. "It is staggering—we are witnessing key Mifid II provisions being circumvented while the Commission is just a casual bystander," he said.

Eventually, Esma worked intensively with the EC over the following months and the issue was adjusted by a Commission's delegated act. Maijoor says that similar to the SI circumvention, lobbyists are trying to alter the provision of the tick-size regime, which forces every trading venue to adjust the prices of certain financial instruments in the same increments of time. "We are going public with this, as there have been concerns about a possible creation of an unlevel playing field between an SI and a trading venue, and for that we will publish the revision of the technical standard," he says.

However, the most controversial piece in Mifid II was and still is the unbundling of research and execution. Early in 2015, lobbyists started forming a united front against the

implementation of unbundling, as it would have a profound impact on their revenues, as well as on the way they were offering market research. "I remember there was a lot of concern in the market about this separation," says Maijoor. "But we were certain that this model would improve investment strategy, so we never thought of backing down."

A source in Brussels tells *Waters* that up until the end of the summer of 2017, there were certain market participants who would still push for changes in the regulation, similar to what had happened in the UK in 2006 when the Financial Conduct Authority (FCA) gave in to the market's pressure, ditching a similar law. The source says that the efforts did eventually stop when asset managers embraced unbundling publicly and started setting up their research payment accounts (RPAs) or adjusting profit-and-loss (P&L) accounts.

Relief

The welcoming position of the buy side was met with a sigh of relief by Esma. Maijoor says that because of Mifid II there is now a much more deliberate consideration of what the value of this research is for an investment strategy. "There are stronger and stronger signals that this is happening, where more asset managers realize that repetitive research indicates an inefficiency in the market, which is ultimately paid for by investors," he says. "Also, some of the North American asset managers are suggesting [an implementation of] that model in the US." **W**

Waters recently sat down with Steven Maijoor to discuss all things Mifid II. Read the article here: waterstechnology.com/3452356

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ASX Gives Green Light to Clearing Blockchain

The Australian Securities Exchange expects to release the proposed timing for the transition for market feedback by the end of March 2018. [By Wei-Shen Wong and Anthony Malakian](#)

The Australian Securities Exchange (ASX) has made its final decision and has announced that it is going to replace Chess—the Clearing House Electronic Subregister System, which serves as its equity clearing and settlement platform—with a blockchain platform developed by Digital Asset Holdings. “Today’s decision is a decision around the technology and the choice of vendor,” said Dominic Stevens, CEO of the ASX, in a conference call with journalists on December 6. “With this decided, we can go back to our stakeholders, post the significant input they’ve given us around what they’re looking for in a new clearing and settlement system, and deliver to them in March 2018 the scope of Day One functionality and the expected timing going forward. Post consultation with the market, we will then lock in this timing and scope, which we would expect in the middle of next year.”

He noted that the platform is permissioned, users will be regulated entities, it will not be anonymous, and that the ASX will remain the trusted entity so that there is no need for a consensus mechanism, which is “one of the main reasons that other [blockchain] implementations can be slow and use significant amounts of energy,” he said.

Additionally, participants will be able to connect to the system via traditional messaging, “so it’s no different to what they did before, except the messaging has been modernized and standardized, all by connecting directly to the distributed ledger itself via a node.”

Two years ago, the ASX announced that it was going to replace Chess, which was introduced in the 1990s. By



September 2017, it appeared as though the operator was leaning toward a distributed-ledger technology (DLT) solution. After conducting numerous tests—which included two independent third-party security reviews—the exchange felt confident in Digital Asset’s platform’s capacity, security, resilience, and functionality compared to the idea of building out a more traditional infrastructure.

The exchange has also given more than 80 DLT demonstrations to more than 500 attendees and has conducted over 60 Chess replacement workshops for more than 100 organizations from the global financial services industry. It is one of the first major examples of DLT being put into production in such a high-profile manner.

Industry Consternation

During the call, representatives also noted that this move was written into its capital expenditure program two

years ago and is going to be a “marginal cost” for the exchange, though there are questions as to how much it will cost industry participants. In response to a question asked by *Waters*, Cliff Richards, general manager for equity post-trade services said: “Initially and understandably, there are more question marks than understanding about the technology and how we might use it. But what we’ve found over the last year is a larger appetite typically from our larger clients usually because they’ve got the resources to understand more of this technology and they’re looking at it themselves.”

Stevens added, though, that since there will be choice built into this move, the industry won’t have to move all at once on Day One. “Given the ability to actually interact with the system via messaging or via a node or being part of the distributed ledger is that effectively the whole industry doesn’t have to move all at once,” he said. “What can happen is if everyone has to move all at once you’re bound by the slowest member. People can choose that they might actually keep doing what they’re doing for another six months or a year, whatever that might be, and then work over to what would be a richer data experience for them.

“So I think that makes for an easier transition when we get to that point for everyone to be working together, some perhaps at different paces. We certainly want to allow sufficient time for those who might not be ready to take a node, and we will allow sufficient time for them to understand what that means, but we haven’t put a date on how long that option would exist for,” he continued. **W**

THE BOTTOM LINE

- Some market participants have expressed concern that this move does not answer some of the major problems faced

by the Chess system. To read ASX’s response, go to waterstechnology.com/3459151.

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The Research Renaissance:

How Quantitative Analysis Is Evolving

Although it still needs more time in the oven, technology is powering a quiet revolution in research and analytics—and the fusion of the two may transform the investment process. **By Anthony Malakian**

As the industry turns the calendar to 2018—and all the joys that the revised Markets in Financial Instruments Directive (Mifid II), the General Data Protection Regulation (GDPR) and the Benchmarks Regulation (BMR) will bring—two areas that will continue to gain attention are research and quantitative analysis. Obviously, Mifid II and its unbundling component will be a major reason for that. But this article will look past regulatory concerns and focus in on some of the trends permeating the research space, and quantitative analysis as a whole.

First, processing power has grown exponentially. According to online tech community Experts Exchange, computing power

has increased 1-trillion fold in performance over the last six decades, while the cost of storing data has dropped in a similarly precipitous manner. Cloud provider BackBlaze says the cost to store one gigabyte of data has dropped from \$500,000 in 1981 to less than \$0.03 today. And the amount of data being created is eye-watering. IBM says that 2.5 quintillion bytes of data is created every day, and that number will balloon with the advent of the Internet of Things (IoT).

Those three things combined have helped to push capital markets firms to turn to public cloud providers, most notably Amazon Web Services, followed by Microsoft Azure and, increasingly, Google Cloud Platform and IBM Cloud. That idea was anathema to almost any

investment bank—much less hedge funds—just five years ago.

Increasingly, the evolution of machine learning, deep learning, natural language processing (NLP) and other forms of artificial intelligence (AI) are also allowing firms to free up staff to actually examine their data rather than waste manpower on time-consuming manual processes. Processing power, infrastructure cost reduction and data volumes are helping to drive evolution in the AI space.

Sea Change

Field Programmable Gate Arrays (FPGAs) can also be added to this list, as they are helping firms to move data around at higher velocities, allowing for streaming dataflow computations

while using less power than CPUs or GPUs, although generally on standardized calculations using repetitive processes than more esoteric forms of data crunching with unstructured information.

And, finally, let's not forget the industry's adoption of open-source tools. Firms from Goldman Sachs and AQR to Schroders and Deutsche Bank are experimenting with open-source applications, and even opening up their own code. These vibrant communities are creating innovative solutions around the area of big data, such as Hadoop.

Perhaps most importantly, because of these developments, alternative data sources are becoming less costly to drill into. Over the past few years, satellite and drone imagery, credit card usage, cellphone location data, environmental, social and governance (ESG) metrics, and information from social media outlets, news organizations and blogs can be more efficiently consumed and folded into the investment decision-making process, alongside market and reference data.

Technology and data are powering a quiet revolution in research and analytics—and the fusion of the two has the potential to transform the investment process. The barriers to accessing and consuming research are not coming down—far from it. But for those with the resources, there are possibilities today that were just not practical even a few years ago.

Research in Motion

This brings us to programming languages, libraries and packages, since this is what underpins quantitative analysis. One such tool that is slowly making an entrance into the capital markets is the Julia programming language. While it is still in its infancy, Julia was built to be faster than the likes of R, Python, and Matlab. It is still largely in the development phase, but many data scientists are experimenting with the language, including Thomas Sargent, who won

the 2011 Nobel Prize in Economics and has been an advocate of Julia.

Viral Shah, co-inventor of the language and CEO of consultancy Julia Computing, says they are inching closer to releasing version 1.0 of Julia. While the group was hoping to release 1.0 in the summer of last year at JuliaCon, he now estimates that they will release v0.7 sometime in the first quarter of 2018, and that 0.7 and 1.0 will be “almost simultaneous” releases.

During a recent *Waters* webinar, Predrag Cvetkovski, senior vice president of operations and technology, governance and analytics at Citi, noted that while Julia was “a little bit more of a high-performing programming language” than R and Python, and it is being used for “prototyping and experimenting” at the bank, he said that his unit was largely still an R and Python shop.

During that same webinar, Mark Ainsworth, head of data insights at Schroders, noted that when he arrived at the asset manager three years ago, almost everyone doing quantitative analysis was using Matlab, though quite a few knew R to some degree. They had a discussion and decided to adopt R as the data insights team's home language. He said the reason for this was because it was cheaper, but more importantly there was a thriving community and ecosystem built around R and momentum behind the tool. “Most of the people I've recruited, who tend to come from outside asset management, it's absolutely R or Python that they know,” he said. “R is good for the quick-turnaround, ad-hoc pieces that we do.”

Schroders' quant unit uses Python for a lot of its data manipulation, fetching and moving around, with SQL mixed in and Tableau for visualization, according to Ainsworth. “We're very focused on using machine-learning data analysis of alternative data sources to provide insights as to



Mark Ainsworth
Schroders

why certain things are happening and understand the patterns of those things to inform those individuals who then make a human judgement decision,” Ainsworth said. “So the ability to easily build tools and to easily build good data visualizations in order to influence and communicate with those people is important.”

New Insights

Ainsworth provided one example of how Schroders is now able to find value in dense, complex datasets: The asset manager is using NLP to make sense of large bodies of text to inform long-term decisions and, specifically, for patents. “One piece we did recently was looking at patents and, in particular, looking at car companies and the various patents that they were registering with the US patent office, which amounts to thousands of these things,” he said. “Those documents are very dense, very technical, full of lots of detailed information, and we used some text-clustering algorithms to identify clusters of sorts of patents. That then lets us look at trends—here's a clump of patents and having looked at a few of them you can tell that, yeah, all those are about battery-charging technology. Then we can present trends in the sorts of technologies of companies that we're investing in to the investment researchers. Suddenly that sheds a light on the research agenda of these car companies, which is something that was otherwise entirely hidden.” **W**



Viral Shah
Julia Computing

SALIENT POINTS

- With respect to research and quantitative analysis, most of the talk in 2018 will revolve around Mifid II and unbundling, although we're also entering into a new era where information is more attainable and more easily analyzed.
- Everyone won't be equal; there will be winners and losers in this new gold rush. But for those with the resources and a cogent plan, there are opportunities to be found that didn't exist before.



Photo courtesy of
Girls Who Code

The Kids Aren't Alright

The US education system is failing young coders—and that will create real problems for the future. **Anthony Malakian** looks at what the financial services industry can do to attract the next generation of coders and ensure that youngsters with the talent and an inclination to learn programming are identified and retained.

Ginny Baro was born and raised in the Dominican Republic before moving to New Jersey when she was 14 years old. At the time, her English was broken, but she already had a natural love of science. She considered going to college to study medicine, but as a senior in high school she decided to trade in the stethoscope for a keyboard, and enrolled in Rutgers University's computer science program.

As Baro recalls, on day one of the program's computer science 101 class, there were some 100 people in the lecture hall. By the end of the semester, about half remained. Four years later, at graduation, only about 20 in the sea of Rutgers graduates were computer science majors. And of those 20,

only a handful were women. "Every lecture that I went to, it was me and maybe another woman, and everyone else was a guy; it was very intimidating," she says.

Baro struggled at first, because the only computer science class she took in high school was an introductory elective in her senior year. She was an A student in high school, but dropped to a C as a freshman in college, before rebounding to a B and then an A by graduation. While she persevered, she was helped along by both male and female tutors and mentors.

Failing System

Baro isn't the only one who has experienced the education system's inability to prepare kids for a future in programming.

For this issue of *Waters*, I spoke with Seth Thomson, CIO at DRW Trading, a high-frequency trading shop in Chicago that has been deploying cutting-edge tools to help it expand into new and diverse asset classes (see page 28). The conversation largely centered on his career and how DRW approaches innovation. Toward the end of the interview, though, we switched to a more complicated subject: teaching kids how to code at a young age.

It's a topic that's near and dear to his heart, in part because he has children of his own, but also because he feels that schools and society, as a whole, are largely failing at this endeavor.

"Something I feel passionate about is that I don't feel we're doing a great job as a country preparing the next generation,"

he says. “A lot of computer education that can be taught at an early age is not being taught at an early age. We know that this is where the jobs are going to be in the future, so I’m eager to get people moving and learning quickly.”

The problem comes down to this: As constructed today, public schools are not—both from a technological and personnel perspective—ready to teach coding en-masse, even in school districts flush with funding, but especially in poorer urban and rural areas. “The children of inner cities are the ones who get the shortest end of the stick,” Baro says. “They don’t have the resources in their schools or in their homes. They’re not getting the exposure and learning the basics so that they could even dream that they could potentially have a career in any of these science, technology, engineering and mathematics (STEM) fields.”

This leaves parents with the burden of ensuring their kids learn such a valuable skill. Thomson’s 12-year-old son, Aidan, has been coding for several years now. He is starting to work with C# using the Unity game engine for videogame design. He attends classes at the Center for Talent Development at Northwestern University. Thomson has enrolled his son in online programs and also homeschools him (so to speak) on self-discipline techniques. Aidan also does a half-hour of coding every morning and is working toward building a math app to be released this year.

Thomson also has an eight-year-old daughter, Isabelle. He works with her using Scratch, an online tutorial run through the Massachusetts Institute of Technology. He’s also looking to bring a Girls Who Code program to his hometown of Evanston, Illinois, and has ideas about how the private sector and government can team up to address this issue, but even he doesn’t have all the answers.

“There’s an idealistic part of me that thinks we could just do this through government funding, but

there’s a larger part of me that thinks that private organizations will be very important in this,” Thomson says. “Maybe that means private organizations and the government should collaborate more closely with local institutions to identify needs and develop programming”

Hey, Teachers, (Don’t) Leave Those Kids Alone

Baro was one of the lucky ones. Through a program called Inroads, which targets women and people of color to help them land internships at large companies, she found a part-time job at Prudential while still in college. Upon graduation, the insurance giant hired her as a full-time programmer. She stayed there for seven years before moving on to work at Alliance Capital Management as a senior software engineer in 1998. In March 2000, she moved to asset manager Lord Abbett where she remained for 16 years. She has since moved on to found and run an organization called Fearless Women @Work, named for the eponymous book she penned, which highlights strategies for women to succeed in the workplace.

When Baro moved from the Dominican Republic to Jersey City, she lived in a poor neighborhood, but her father was extremely supportive of her becoming a programmer, despite the fact that he didn’t know how to code. It’s no secret that public schools across the US are underfunded when it comes to technology and attracting and retaining talented teachers. Baro believes that programs like Girls Who Code, Scratch, and Youth Digital are key, because they understand the importance of both getting kids to have fun while coding, but also they help to get the kids’ parents involved, too. “There are a lot of parents who are not comfortable with coding, as well,” Baro says. “So how do we get them active when they’re not comfortable?”



Ginny Baro
Fearless Women
@Work

Tough to Find

Frankly, even in a nation of over 320 million people, it’s still hard to find qualified and energetic educators to teach the basics of English, math, science and history. Finding qualified teachers with a background in programming who are willing to work on a public school teacher’s salary is exponentially more challenging. Additionally, as Thomson notes, kids learn in different ways—Aidan is much more regimented, while Isabelle is more creative. They’re both learning to code, but they need to learn in different ways. You could argue that if Common Core State Standards are failing in the realms of English, the arts and science, it’s doomed for something like coding. There aren’t any easy answers, but jobs are increasingly more dependent on computers and once those jobs are gone, they ain’t comin’ back.

There is no silver bullet that will solve this growing crisis. It will require both local governments and federal agencies to update laws pertaining to K–12 education. It will likely require federal funding. It will require private citizens and non-profits to lend a helping hand. And it will require larger businesses to get involved, such as DRW’s DRW College Prep charter school, located in Chicago’s West Side, one of the city’s most impoverished areas, and which teaches kids about robotics enrichment and coding.

The fact is that the jobs of the not-to-distant future will require not just “computer skills,” but programming skills, too. That, people such as Thomson and Baro increasingly believe, starts at a basic level—expose children to computers at an early age and also to people who can both teach computer skills and who can be enthusiastic and articulate about the need for these skills. “We’re not there,” Thomson says. “It’s a source of frustration and I want to see more kids get into this.” **W**



Seth Thomson
DRW Trading



Breaker of Chains: The Appeals and Perils of Quantum Computing

Advancements in quantum computing have been rapid in recent years, with the likes of IBM, Google, Microsoft and others making great strides. As a result, several financial institutions are starting their own experiments with quantum platforms in an effort to be ahead of the curve. While QC is still nascent, questions abound as to how these tools will transform existing platforms, and even emerging technologies like blockchain and machine learning. *By Wei-Shen Wong, with additional reporting by Anthony Malakian*

In mid-December 2017, days after New York experienced its first snowfall of the season and temperatures dropped to freezing, IBM announced the launch of the IBM Q Network, bringing together a group of Fortune 500 companies, academic institutions and national research labs to experiment with potential real-world applications on its 20 quantum bit (qubit) processor.

Included in this club are two heavy-hitting banks—JPMorgan Chase and Barclays. JPMorgan says it will use the network to experiment on use-cases for quantum computing applicable to the financial services

industry, including trading strategies, portfolio optimization, asset pricing and risk analysis, according to a spokesperson.

Barclays, on the other hand, will build its knowledge of general approaches to quantum computing and start investigating potential use-cases in finance, according to Dr. Lee Braine, who works in the investment bank CTO office at Barclays, which will lead this project at the firm. “We are keen to investigate the latest advances in quantum computing and how these leading-edge technologies could one day add value to Barclays and its clients,” Braine tells *Waters*.



“We need to seriously rethink encryption and seriously rethink things that rely on encryption, like blockchain. Anything that is heavily dependent on complexity is a risk in the quantum world.” **Anthony Scriffignano, Dun & Bradstreet**

“We will begin with experimentation. We will take some of our existing optimization challenges and using the IBM Q Network, experiment on how quantum computing could potentially help.”

Major Step Forward

To have two global banks like these throw their respective hats into the quantum computing ring marks a major step forward, but they're by no means the first. Sophisticated quant hedge funds Two Sigma, Renaissance, DE Shaw and WorldQuant have begun to test these tools, according to the *Financial Times*. And in April 2017, the Commonwealth Bank of Australia (CBA) announced that it would begin experimenting with quantum technology by partnering with specialist firm QxBranch, which has a quantum simulator. (UBS is also working with QxBranch, but declined to comment for this story.)

Then, in August, the bank poured in some A\$14 million (\$10.7 million) into Australia's first quantum computing company, Silicon Quantum Computing (SQC). Other founders include telecommunications firm Telstra, the Australian Federal Government, the New South Wales Government and the University of New South Wales. The aim of SQC is to develop and commercial-

ize the first silicon-based quantum computer.

While the likes of IBM, Google and Microsoft, as well as a few well-funded startups, have made impressive leaps when it comes to quantum hardware, the QC industry is still in its infancy and far from broad scale commercial adoption.

Google claimed that it would have “quantum supremacy” by the end of 2017, with a 49- or 50-qubit machine. But IBM got there first, announcing in November that it had built and measured the first 50-qubit prototype processor, with a coherence time—the amount of time available to perform quantum computations—of 90 microseconds.

It would appear that the financial services sector is now gearing up for what will be a revolutionary technology that will provide a lot more room for computations to be done simultaneously rather than in sequence or in parallel, as is currently the case on classic computers—the computers of today that we all know and love.

While there is great potential for improved efficiency and the ability to solve previously unsolvable problems, the reason why these banks are getting involved so early on is because there are also existential questions that need to be answered relating to security and encryption.

The Blockchain Question

A feature that ran in the August 2017 issue of *Waters* touched on the potential dangers that the rise of quantum computing might bring, the most prominent of which is Shor's algorithm, which finds the prime factors of large numbers in an exponentially faster way than any existing algorithm. If unlocked, it would mean all current security measures for credit cards, emails and protected personal data would be thrown out the window.

But what about the implications for something that is well-encrypted, such as distributed ledgers like blockchain? A CTO of a New York-based investment bank—whose firm is experimenting with blockchain and, as such, asked for anonymity—believes that the advent of quantum computing will render blockchain technology useless. “Qubits would blow away blockchain technology. While it's still in its infancy, Microsoft just released a new language for using qubits. So this is speeding up a bit even if the hardware is still not there,” the CTO says.

Anthony Scriffignano, chief data scientist at consultancy Dun & Bradstreet, which has been active in the QC space, expresses concern about the advancement of quantum computers and what it will mean for encryption. “As you increase the number of qubits, there is more concern with stability because the qubits can influence each other through quantum entanglement,” he says.

Quantum entanglement is when qubits interact with each other in such a way that when one is measured it will give an indication of the state of the other qubit, even when there is a large distance between them. “We need to seriously rethink encryption and seriously rethink things that rely on encryption, like blockchain,” he says. “Anything that is heavily dependent on complexity needs to be reconsidered in a quantum world.”



Dilan Rajasingham
Commonwealth
Bank of Australia



The reason encryption is so strong today is its complexity. It could take millennia to develop the key to read an encrypted message. It's not that you can't do it, Scriffignano says, it's more a question of why would you want to do it when it would take far too much time and wouldn't be worth the effort.

Classical computers operate by simulating possible solutions to a problem linearly. Quantum computers would have the ability to try all of those keys at essentially the same time. "The complexity and the time it takes to decrypt a key doesn't really go to zero, but it gets to a number that's much smaller. This technique is called quantum hacking," says Scriffignano.

However, Michael Brett, CEO of QxBranch, says he does not believe that the advancement of quantum computing will render blockchain

technology useless. Rather, he says they will be "very complementary" technologies.

"It will take a very advanced quantum computer, something on a scale we won't see for at least a decade, to come close to rapidly unlocking blockchain-type cryptographic problems," he says. "By then, blockchain technologies will have matured to be quantum resistant or incorporate quantum algorithms into their problems."

But, to Scriffignano's point—and the reason why the likes of Barclays and JPMorgan are getting involved now—it is important to begin to understand how QC will affect technologies like blockchain, because you don't want to make an investment today that will be rendered obsolete within five years.

Keith Bear, vice president of financial markets at IBM, says this is certainly perceived as a risk to

blockchain encryption and raises the question of quantum proofing.

"Blockchain technology is something that is talked about, but at one level, in the current state of quantum computing technology, that makes it somewhat of an academic point at the moment, but these are real concerns," he says. "As we go into 50-qubits and beyond, that becomes much more significant."

Questions of Security

That said, quantum computing could also be used as a means of increasing security, Bear adds, as it can be used to manage the cryptography keys such that any "eavesdropping" that occurs can be detected. "Obviously, it has a very high level of security because it assumes you observe a quantum state; it automatically takes one position or another," he says. Here, Bear refers



Giulio Chiribella
Oxford University

to the “No Information Without Disturbance Principle” where in quantum physics, if you measure a system, you change its state.

Giulio Chiribella, professor of computerscience at the University of Oxford, and CIFAR-Azrieli global scholar, says this is one of the most important laws of quantum physics. “Every attempt to read the qubits in the intermediate steps would ruin the computation, making the quantum computer equivalent to a classical computer,” he says. “Between the beginning and the end of the computation, the quantum computer explores the exponentially large space of quantum superpositions.”

From the Commonwealth Bank of Australia’s perspective, it has been looking at the complexity of Shor’s algorithm to see how it can be implemented on the simulator. It is also exploring post-quantum cryptography, cryptographic algorithms that are thought to be secure against quantum hacking, Dilan Rajasingham, head of emerging technologies at CBA, tells *Waters*. “If we assume tech is always increasing and we assume things are going to get easier and easier, how do we prepare ourselves for the future?” he asks. “What’s the algorithm that’s beyond RSA that’s quantum resistant? We’re doing this to make sure we can continue to guarantee the security and privacy of our customers and partners.” RSA, which stands for Rivest-Shamir-Adleman, is one of the public-key cryptosystems and is used for secure data transmission.

That said, at this point, he thinks the technology is still nascent, although CBA is trying to establish exactly where these tools are at through experimentation. “It’s too early to verify one way or another. If you understand the complexity of cryptography there are so many different cryptographic routines out there,” he says.

Working in Parallel

Although theoretically quantum computing could “break” blockchain,



Keith Bear
IBM

what can be done to counter that in the future is to experiment with things like quantum key distribution, according to IBM’s Bear, as IBM is also actively involved in blockchain’s development, having launched a global banking payment platform in October. “Quantum itself can be a means of increasing security in that respect,” he says. “In our point of view, it’s a key part of what we’re doing to understand and innovate the technology in the first place and to make sure that the existing cryptography and security that we’re implementing as part of the blockchain projects we’re working with are currently in the highest level of protecting security as you would expect. And obviously we’re going to be in a good position to affect that as a result of the work we’re doing from a quantum point of view as well,” says Bear.

“Obviously the security [of blockchain] itself will need to improve and enhance in order to cater for that risk as well,” he continues. “We have a direct incentive to facilitate that because we’re looking into the investment we’re making into blockchain. That’s where we expect this to develop in terms of maintaining and improving the levels of security within blockchain technology regardless of the risk and impact of new technologies like quantum computing.”

Quantum Machine Learning

While security and encryption are most definitely areas to monitor and experiment with, there are other aspects of financial markets that banks such as

CBA are working on within a quantum environment. CBA’s Rajasingham says the bank has a three-part strategy when it comes to quantum computing. The first is software, in which it is training its developers to become “quantum ready,” which is done through the use of the QxBranch simulator in experimenting with quantum applications. The second is hardware, and that comes with CBA’s direct involvement with SQC. This silicon-based architecture is one of the few paths to build a quantum computer. And the third is that it wants to experiment “broadly and deeply” with like-minded partners. When QxBranch deployed the quantum simulator at CBA’s premises, the invitation was left open to academics and others to experiment with the platform.

Rajasingham says that since the deployment of the simulator, there have been four main experiments they’ve overseen. “We’ve looked at applications for machine learning around big data analytics, quantum supremacy, blockchain consensus, and algorithms, which have been established for a while, such as Shor’s algorithm,” he says.

However, the one that the CBA is immediately proceeding with is machine learning, as it is building its first application in financial portfolio optimization. “We’re looking at things like asset allocation,” he says.

Although Rajasingham does not reveal a specific timeframe for when the experiment would be fully operational, he says that “at the moment, we would expect it to be ready in months—[mid-year 2018].” **W**

SALIENT POINTS

- Banks such as Barclays, JPMorgan, CBA, and UBS are already getting involved with quantum computing experimentation, as are hedge funds Two Sigma, Renaissance, DE Shaw and WorldQuant.
- There are concerns that quantum computers could render blockchains obsolete, even though it’s still too early to tell.
- While quantum computers may unpick encryption as we know it today, they could also make for more secure systems as it’s easy to see if someone is trying to manipulate the platform.
- One area where firms are most excited is when it comes to big data analytics, as quantum computers can run computations simultaneously, rather than in parallel.

Reviewing the AI Summer



Out of the crop of emerging technologies that have become viable in the past several years, few hold as much promise to transform the investment management process as artificial intelligence. However, regulators and market participants are increasingly warning that the complexity of these new machines could hold hidden risks. *By James Rundle with additional reporting by Anthony Malakian and Aggelos Andreou*

In July 2017, a spate of newspaper articles claimed that researchers at Facebook had pulled the plug on an experiment between two chatbots powered by artificial intelligence (AI), after the machines began to develop their own language in order to complete a trade. While the experiment was shut down because it wasn't performing the work required—and not, as more salacious coverage suggested because the researchers were frightened by the development—it raised interesting questions about how AI models interact, and the degree to which humans are capable of understanding not only the conclusions they arrive at, but how they get there in the first place.

It's certainly an issue that has kept researchers at the Financial Stability Board (FSB) awake at night. As the

capital markets increasingly embrace AI, and its various subsets, including machine learning, deep learning, natural-language processing (NLP) and robotic process automation (RPA), the FSB warned in a November 1 report that a headlong rush to implement these technologies could introduce unforeseen risks.

The areas of concern raised include a number of potential risk factors, such as how these models may react in stressed market conditions, how they interact with each other, and whether a handful of providers could gain a monopoly. Most centered on one key question, though: Can humans realistically tell what goes on inside these complex machines, and crucially, can anyone not intimately familiar with their construction work out how they arrive at their conclusions?



“Even if we do not get to the point of monopolies for AI providers, we may already be at the point of having de facto monopolies on the methods and approaches we use to create new models.” **Elliot Noma, Garrett Asset Management**

Alarming, even AI experts have tended to say no. “Algorithms created by AI are very hard to understand, especially when they go wrong, and I don’t think there are the tools to reverse engineer them,” says the New York-based CTO of a US investment bank. “By their nature they are not easily understood.”

The AI Winter

Before examining the current state of AI, it’s important to take a step back and understand that very little of this is actually new. Indeed, AI, as a scientific discipline, has formally been around for over 60 years, with the accepted history being that it was founded by a group of scientists at Dartmouth College in 1956. Elements of the field have their roots even further back, stretching decades to Alan Turing’s *Theory of Computation*, and even hundreds of years, to Schickard and Pascal’s rudimentary calculating machines, built in the 17th Century.

During the 1960s and part of the way through the 1970s, governments invested heavily in AI, but limitations in the machinery of that time failed to deliver the eye-watering promises of progress that AI specialists advocated. Funding was abruptly cut off, a period known as the “AI winter,” during which little substantive progress was made.

It wasn’t until the 1990s that AI and its disciplines began to be seriously studied—and employed—once more. Advancements in processing power, storage, and the amounts of data being created on a daily basis had finally made the theory possible. “Nothing changed in science except computational platforms,” says Michael Dobrovolsky, executive director, machine learning, AI and decision science at Morgan Stanley Global Wealth Management. “Everything that we’re doing right now, from a scientific point of view, has been known for 10, 20 years. What changed is that computation platforms and compute became available.”

Now, the field is experiencing a renaissance, particularly in financial services. Nearly every major financial institution is engaged, to some degree, in the research and development of AI-powered platforms in a variety of use-cases.

In the back office, trade reporting and settlement have been ripe areas of exploration for RPA, with mixed results, while middle-office processes including surveillance have invested heavily in machine learning and cognitive computing to improve oversight capabilities. This isn’t just theory—in September 2017, Nasdaq rolled out machine learning

in the surveillance departments of its Nordic exchanges, designed to more intelligently alert officers to potential compliance breaches.

In the front office, various initiatives have been focused on generating trade ideas, interacting with customers through robo-advisory and increasingly, risk management on a pre- and at-trade basis.

Potential Risks

The FSB’s list of potential risks, in large part, seemed primarily concerned with the idea of AI taking an active role in the front office, in terms of executing trades mechanically. While these concerns are largely academic at present, a number of senior technologists on the buy and sell sides interviewed by *Waters* did not disregard them out of hand. Some cited the growing availability of AI packages available to developers as one cause for concern. Many modern AI applications are built on tools such as Google’s TensorFlow, or scikit-learn, which a number of specialists posited may lead to a convergence in processes that could prove disastrous in abnormal conditions. A case of smart machines, ironically, acting dumb—in concert.

Elliot Noma, managing director at Garrett Asset Management, for instance, says that there is “major concern” that current AI models are being trained on quiet periods, and that this “could be serious, since we often don’t know what models will do outside these quiet periods, and the boundary locations between normal and extreme events are unknown.”

In addition, he says, the use of the aforementioned packages “encourage analysts to gravitate toward a common set of models. These models could act synchronously once market conditions are outside their trained conditions,” he continues. “Even if we do not get to the point



of monopolies for AI providers, we may already be at the point of having de facto monopolies on the methods and approaches we use to create new models.”

Anomalous Conditions

In some ways, this is an impossible situation to guard against. Anomalous market conditions are so dubbed because they are, in fact, rare events outside of the norm. Historical data can only go so far in training models how to react during stressed conditions, because each period of market stress tends to have wildly different inputs.

The market strain of the credit crunch and the global financial crisis, for instance, could not be replicated

verbatim today. That is because regulators—and the industry—have put in place mechanisms to defend against such conditions, including an expanded use of clearinghouses in derivatives markets, and stricter limits on the amounts of capital banks must hold against risky inventory.

Likewise, even less severe events, such as the Flash Crash of May 2010, are unlikely to play out the same way today, thanks to the widespread introduction of circuit breakers, and market-monitoring initiatives such as the Consolidated Audit Trail.

Yet this unknown factor remains an extant concern. The investment bank CTO says that as models are data driven, they can fall prey to “garbage in, garbage out” scenarios.

“I would not trust AI trained during quiet times,” the CTO says. “They do need to be trained during all different scenarios, but it is impossible to train them on all scenarios, so they are susceptible to erring. There needs to be a framework to define the minimum number of needed scenarios to reduce the risk of poorly trained AI.”

Even so, all of this may not matter if the AIs do go haywire, and market participants and regulators are unable to go back and figure out the chain of events that led to these occurrences.

“Many of the models that result from the use of AI or machine-learning techniques are difficult or impossible to interpret,” the FSB report stated. “The lack of interpretability may be overlooked in various situations, including, for example, if the model’s performance exceeds that of more interpretable models. Yet the lack of interpretability will make it even more difficult to determine potential effects beyond the firms’ balance sheet, for example during a systemic shock.”

Such an emphasis, says Garrett Asset Management’s Noma, puts the industry at risk during systemic events. “This is compounded by the lack of science behind the art of creating stress scenarios for risk management and the unknown interactions among models in extreme situations,” he explains. “One additional concern I have is the lack of experience many in data science have in using a wide range of models, as companies have often put an emphasis on expertise in specific models and datasets, as opposed to a broad understanding of the wide range of models and the pros and cons for using each of them.”

AI Gone Rogue

If all of this sounds familiar—particularly the FSB’s concerns about AI-created algorithms acting synchronously in feedback loops—it should. Similar concerns were



Steven Maijoor
Esma

raised in recent years as algorithmic trading took off, first in equity and foreign-exchange (FX) markets, then futures, and increasingly, fixed-income and derivatives markets. Then, regulators cracked down hard, insisting on simulations, and in extreme cases, legislation that would require firms to provide regulators with a copy of their source code, a provision since largely abandoned.

The Flash Crash, the collapse of Knight Capital, and other such instances of “algos gone rogue” provided the fuel for these measures, but when it comes to AI, regulators are hesitant to advocate for the same kind of nuts-and-bolts intervention that they do for algorithmic trading.

In a speech on December 6, Rob Gruppette, the head of the financial crime department at the UK’s Financial Conduct Authority (FCA), cast doubt on the regulatory appetite to examine the guts of AI at banks and other financial institutions, while referencing the FSB report. “If regulators were to insist on a window into the machine’s inner workings, then this would, in effect, be a regulatory prohibition of the use of the more free form varieties of artificial intelligence where such a window is not possible,” Gruppette said. “But what



Brian Martin
SapientRazorfish

is it reasonable and proportionate for us to ask for? What we do expect to see is new technology implemented in a way you would any other—testing, governance and proper management. We as regulators clearly need to think more on this. We are encouraged that many firms out there are starting to develop their own code of ethics around data science, encouraging responsible innovation.”

Other regulators have made similar observations, often citing the fact that AI is still relatively immature, or that there is yet to be a case for their intervention. Most, however, stress the importance of proper procedure around any deployment, and that AI should be as rigorously tested and bug-checked as any algorithm, or piece of software.

Steven Maijoor, chair of the European Securities and Markets Authority (Esma), tells *Waters* that while it “is good to give more attention to technology,” AI and its subsets are just “one part” of technological innovation in financial markets at present. “As Esma we have this dual perspective on technology,” he says. “On the one hand, we think it can improve financial services but on the other hand there can be stability and investor protection issues, there can be risk issues.”

Maijoor pointed to provisions in the revised Markets in Financial Instruments Directive (Mifid II) around algorithmic trading as evidence that the regulator is active in overseeing technology, and willing to intervene when it becomes necessary.

Sky-not

Humans have always had a complicated relationship with machines. While the industrial revolution mechanized the world and gave rise to living standards that nobody thought possible even a few hundred years ago, it also brought a new age

of warfare that resulted in two world wars, and weapons that can level cities. The internet has transformed modern society, but as it develops, it has also ushered in an era of criminal enterprise, identity theft, and risk on an apocalyptic scale.

There is a tendency within our psychology, as a species, to constantly experience a form of cognitive dissonance when it comes to technology. We celebrate development and encourage its forward march, even sometimes at the risk of our own lives, while simultaneously worrying that it may prove to be our undoing—even a cursory glance at the body of speculative fiction, with its killer robots and despotic machines, fluently demonstrates this concern when it comes to AI. Indeed, such is the concern around new technology that fintech—a broad sector that tends to include emerging technologies such as AI—ranked as a major source of concern on the Depository Trust and Clearing Corp.’s semi-annual Risk Barometer for 2018, the first time it had been included in the matrix.

Therefore, when it comes to AI and systemic risk—in particular, the FSB’s concerns—participants don’t just agree, but say they’re actively aware of them already. “While I think that the FSB’s concerns are certainly valid, I think the side of it that’s not represented is that there’s already a strong understanding of what needs to be done within that space,” says Brian Martin, director of technology in the AI practice at SapientRazorfish. “If collective energy can be focused on methods of understanding, structures of understood accountability, and an aggressively active engagement on the part of regulators, then there is an opportunity to drive deeper efficiency in almost all aspects of financial market systems, while avoiding the pitfalls of reckless exuberance.” **W**

SALIENT POINTS

- While the industry marches headlong into the development and deployment of artificial intelligence-powered processes and systems, regulators—and indeed, market participants themselves—are concerned that wide-scale adoption could introduce elements of systemic risk.
- This potential risk ranges from how models behave in periods of market stress, through to how easy it is for humans to unpick the decisions that these machines make.
- Regulators, burned by their experiences with algorithmic trading, are hesitant to ask for windows into these systems, however, but say they must be governed by appropriate controls.

Derivatives Market Prepares for Emerging Tech Implementation



From blockchain to artificial intelligence and big data, the derivatives space has been experimenting with and adopting new technologies, trusting in the long-term benefits they promise. [Aggelos Andreou](#) speaks to key market professionals to learn more about the emerging products that are about to shine in 2018 and the players' will to overcome the many challenges for the sake of technology evolution in the derivatives industry.

It is a common belief among many participants in the derivatives space that 2018 will be the year that distributed-ledger technology (DLT) will eventually justify the reputation it has gained over the last years. In 2017, blockchain's hype began wearing off—apparently, no one would speak with the same enthusiasm about it, and even the media fell mostly silent. Did this mean that everyone stopped believing in DLT?

“At some point, all the talking needed to stop and focus on working on creating real blockchain products,” says Dr. Lee Braine, from the investment bank CTO office at Barclays.

Braine says that for investment banking, blockchain didn't seem to be the way to go when the technol-

ogy became known a couple of years ago, because of data privacy issues, the technology's performance, and its relative immaturity. “It has since evolved with industry input and guidance, and we expect to start going live with some blockchain products from this year,” he adds.

R3 is perhaps the most well-known, born out of the collaboration between the world's largest financial institutions. But even though the consortium had the support and funding of some of the industry's most powerful and influential banks, it had to overcome technology hurdles to transform DLT into a mainstream technology.

James Carlyle, chief engineer at R3, says one of the most significant



“Platforms and languages are brand new for distributed ledgers, and so we don’t have these frameworks already in place. One of the things we do is work with existing mature technologies like Java to support the development of smart contracts.” **James Carlyle, R3**

concerns was the immutability of the distributed ledger. “If we have something that’s truly immutable, we have to think carefully about why we might need to change it,” he says. “We have to make sure it’s right at the point of deployment because it is immutable and change becomes harder.”

R3 had to work hard on quality assurance. Carlyle says there are a number of mature frameworks for automated testing of traditional software and engineers required the same level of rigor in terms of testing smart contracts. “Platforms and languages are brand new for distributed ledgers, and so we don’t have these frameworks already in place,” he says. “One of the things we do is work with existing mature technologies like Java to support the development of smart contracts.”

Abysmal Results

When quality is not ensured, results can be abysmal. Carlyle recalls a number of examples where public blockchains were full of bugs, which allowed for completely inappropriate behavior of the technology. “It has caused major debates about what to do when that happens, how to correct it, whether to fork these ledgers, effectively creating a second version of

them, or whether to try and manage and allow people who have lost out to live with their losses,” he adds.

Despite the technical difficulties, Barclays’ Braine says he believes distributed-ledger technologies will help save huge amounts of money for banks in the long run. “Third-party reports estimate that the industry savings could be in the range of \$5 billion to \$40 billion and this was one of the reasons we put so much effort in this,” he says. “Those potential cost savings would typically be the result of simplification and rationalization; by reducing both variation and duplication, you also reduce the need to reconcile.”

That is also the reason why banks chose to invest so heavily in DLT, despite the profound challenges they might face after deploying the technology.

Artificial Intelligence

While AI has been part of the fintech upswing for some time now, it wasn’t until last year that the derivatives industry became convinced about the impact it might have on their day-to-day operations. Within the investment banking sector, firms have already started using sophisticated optimization algorithms, including complex statistical techniques, to offer a specialized solution.

When deploying machine learning, Braine says there are some complex issues that need to be resolved if firms want to operate efficiently. “Consider, for example, the legal and regulatory implications if unsupervised machine-learning techniques are used that lack ‘explainability,’ meaning that the system cannot provide the explanations behind certain decisions,” he says. “It’s very difficult to provide simple, accurate explanations for the outcomes of sophisticated trained systems such as those based on multi-layer neural networks. Even if you can inspect the neural network to identify the connection topology and the weights, that typically still doesn’t provide a human-understandable explanation.”

For Braine, there is a very important problem with identifying applications of AI in investment banking. “Certain classes of problems lend themselves more naturally to sophisticated algorithmic techniques where there are already known approximations or solutions,” he explains. “Leveraging or further refining those techniques may be the most expedient method of progressing.”

Vendors’ Role

Third-party technology providers have been proven to be an essential ally for banks that wish not only to overcome the challenges associated with deploying emerging technologies, but also to enjoy the benefits this evolution is sure to bring. Braine says the introduction of each new technology poses its own risks. From a standards and architecture perspective, the risk should be managed via a rigorous product life cycle process. From a pure technology perspective, however, banks should typically work with vendors, where both can learn about novel business applications of technology innovation. “This result may be a product that is initially



Ram Komarraju
CLS



deployed only within a limited scoped environment, or it may result in changes or enhancements to the product to help it better progress through assessments by security, information and risk management, etc.,” he says. “In each case, both parties win: The vendor gets a product that’s more suitable for deployment in a banking environment, and the bank gets a better product.”

This win-win scenario has indeed resulted in a proliferation of solutions. Some have already gone live, while others are waiting for the green light. Below are three technologies/projects that are set to become operational sometime this year.

CLS

Foreign-exchange (FX) data and technology provider CLS is on the cusp of unveiling a DLT service. CLSNet, the firm’s first blockchain initiative, is

an automated bilateral payment netting service for both the buy side and sell side, using hyperledger fabric to implement the distributed ledger. Ram Komaraju, managing director, technology at CLS Group, says that while the company has been serving more than half of the FX market, settling 18 currencies, it realized that there was a gap in the market to provide risk mitigation services for other elements of foreign exchange. “We understand that netting does take place, with much of it done on a bilateral basis, and that there are some systems that offer netting as part of their suite of services, but it is not standardized,” he says. “The solution CLSNet provides is to offer standardization in the way we match trades, provide legal confirmation and calculate net positions.”

The development of CLSNet was not an easy task because it had to resolve two major issues, the first



Lee Braine
Barclays

being ensuring that the use-case would solve a real business problem. CLS didn’t want to build a proof-of-concept that might never have a commercial value. The second challenge was to make the original product fast and ensure that it wouldn’t impact the already existing critical infrastructure. “Eventually, we took our 15-year experience and looked at what it means to build a secure network on top of which we can run a distributed ledger,” Komaraju explains. “You have to provide a platform where users feel secure.”

As for the integration with legacy systems, Komaraju says this was the most onerous and complex aspect of building the platform. “We want to ensure that we provide the bridge that enables the banks to transition to these technologies more gradually,” he says. “For example, when

we launch CLSNet, we will give them the option to connect not only via distributed ledger but also over existing Swift channels.”

DTCC

The Depository Trust & Clearing Corp. (DTCC) has been working with emerging technologies for quite some time now, exploring applications of DLT, quantum computing, AI, and big data. To that end, it has set up a specific fintech sector that works on applying the new technologies across its entire product line. Jennifer Peve, co-head of fintech strategy at the DTCC, says the firm’s most important work is set to go live within 2018. “We are in the process of re-platforming our Trade Information Warehouse (TIW) solution, using DLT and cloud computing,” she says.

The DTCC’s TIW platform—a record-keeping, lifecycle events, and payment management system for more than \$11 trillion of cleared and bilateral credit derivatives—is a 12-year-old project and one of the firm’s most popular offerings among its clients. The re-platforming project was initiated in 2016, when the DTCC started working in collaboration with IBM, Axoni and R3, to build a proof-of-concept with respect to how to apply blockchain technology across the TIW platform, while migrating it into the cloud.

According to Peve, the blockchain version of TIW is scheduled to replace the legacy system midway through this year and that the project will consist of three phases. “In the first phase, users can expect to have the same functionality via the GUI, reports, and messaging in the re-platformed system that they have today,” she says. “Up until the final stage, TIW will be 100 percent integrated into the users’ systems.”

Peve says that innovations leveraging DLT and cloud computing are typically large infrastructural modifications, so it takes time to



Jennifer Peve
DTCC

see any transformational change. “Transformational change in the long term can be achieved through incremental improvements in the short term,” she says. Collaboration and establishing a common set of standards will be the keys to realizing the full potential of technology innovations and achieving significant improvements for the entire industry.”

Isda

With much of the industry’s emerging technology focusing on the global derivatives markets, the International Swaps and Derivatives Association (Isda) stepped in, in late 2017, and coordinated the efforts of introducing a golden standard for the use and implementation of the new technologies by its members. Clive Ansell, head of market infrastructure and technology at Isda, says that large numbers of market participants have their own technologies and ways of processing their derivatives transactions, which makes new technology deployment particularly challenging. “One of the biggest challenges is that because everyone represents the same processes and data differently, the effort and cost to implement each instance is tremendous,” he says.

Isda’s objective is to ensure that all its members have the same deployment process, securing easier and fairer adoption. While the association is and will remain technology agnostic in terms of not favoring one

emerging technology over another, it does think of promoting the idea of hierarchical representation in terms of participants, parties and products. “We’re trying to do it in a way that’s common across the industry because that’s the fundamental point,” he says. “Absent a standard, we would enter a new world where the full opportunity offered by new technology would not be realized, as implementations will do the same thing but differently, recreating to some degree the complex interactions that exist today.”

Ansell says the market still appears to be suffering from technologists’ lack of understanding of how the industry works, and there are legal and jurisdictional implications as well that prevent technologies from fully conquering the financial world. “We want to create a marketplace where ideas around potential solutions can be shared and obstacles can be identified and addressed, be they business, legal, jurisdictional or otherwise,” he says. “Isda can facilitate discussions around some of the legal challenges and help with identifying technology opportunities.”

During a recent conference in London, Isda and its members agreed that the industry has to realize that the technologies per se are not going to benefit or even transform their sector. As Ansell puts it, “it’s all about finding the right parts of the derivatives ecosystem, where different technologies can be deployed most appropriately.” **W**

SALIENT POINTS

- 2018 is the year when large numbers of participants in the derivatives market expect to see emerging technologies being integrated into their existing technology ecosystems
- There are a number of challenges the industry needs to overcome, especially when trying to couple blockchain and artificial intelligence with legacy systems.
- The global derivatives industry is trying to establish a standard in terms of how to treat and implement new technologies, an initiative led by the International Swaps and Derivatives Association (Isda).

Growth and diversity are good, but they come with challenges. In his decade at DRW, Seth Thomson has been tasked with managing the firm's IT so that it could scale as the firm grew into new asset classes—such as bitcoin. [By Anthony Malakian](#) with photos by [Timothy Fadek](#)

Chicago has become

the epicenter of bitcoin mania. The Chicago Mercantile Exchange (CME) and Cboe Global Markets were the first exchanges to launch bitcoin futures at the end of 2017. And one of the largest traders of cryptocurrencies is Chicago's own DRW Trading.

Since the firm launched in 1992, one of its key principles has been diversification. That's where DRW's CIO, Seth Thomson, comes into the picture. The Quantitative Risk Management (QRM) and Citadel alumnus joined DRW in July 2007. The firm, which today specializes in high-frequency trading (HFT), aggressively moved into the electronic trading space as Thomson arrived. That meant that it needed a new office, improved data-centers and an overhaul of its infrastructure.

"One of the biggest challenges here is maintaining diversification," Thomson says. "We are trading so many things in so many ways that involve a lot of technology solutions and support. So one of our challenges is expanding in a scalable way that lets us grow and automating across that, but also not doing that to a point where we're limiting innovation."

It was those early projects that helped the company expand more quickly into new asset classes. So, while major investment banks were hemming and hawing at bitcoin—Goldman Sachs announced in December that it would start a bitcoin trading desk, UBS analysts have called it a bubble, and JPMorgan CEO Jamie Dimon is still highly skeptical—DRW was able to jump out to an early lead, opening its desk for business back in 2014, when bitcoin reached then-heady heights of \$1,100 per coin (in late 2017, a bitcoin was, at one point, worth over \$19,000). Since then, its Cumberland digital currency trading desk has become a top market-maker, trading over \$20 billion in bitcoin as of December, according to Thomson.

While cryptocurrencies were the sexy investments of 2017, DRW has also built out its real-estate and venture-capital business units—in addition to its fixed-income, energy, agriculture and equity-index futures



A profile photograph of a middle-aged man with thinning grey hair, looking out a window with horizontal blinds. He is wearing a teal button-down shirt. The photo is the background for the entire page.

Chicago Code

Seth Thomson
DRW Trading Group

and options, among other trading desks—and recently made two large acquisitions, with a third one on the way, according to Thomson.

“I have seen a big hunger from Don [Wilson, DRW’s CEO] and the partners to explore new opportunities,” he says. “We’ve never shifted in the decade that I’ve been here from a diversification approach and I think that’s what’s kept us very strong for 25 years.”

Kid Coder

When he was 11 years old, Thomson began coding his first video game in BASIC on a Commodore 64. It was a karate game, where all you could do was one kick—basic, indeed, but a beginning. In high school, his best friend’s father created and ran the computer lab at Evanston Township High School in Illinois. The friends would buy computer magazines and do the coding examples together, and then play video games on an Apple IIe.

While he took those early skills with him to college, he wasn’t a computer science major. Rather, he first majored in psychology at Loyola University Chicago, because he wanted to better understand people—their interactions and personality traits.

This was in the early 1990s. To help work his way through college, he took a job at a local comic book store, Comic Relief, that perhaps hinted at his later profession, where he would buy and sell collectable comics to and from college kids looking for some extra beer money. It was fairly lucrative. He would buy \$5,000 worth of comics for \$500, and then sell those comics at a significant markup, all while building up his own inventory, which he still has (*see box on page 32*). Essentially, he was already a commodities trader, even as a psych major.

While in college, Thomson also began building white-box systems for gaming and general computer usage, which led him to consulting. He set up as an S corp., an arrangement under US tax law that allows a single person



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“We are trading so many things in so many ways that involve a lot of technology solutions and support. So one of our challenges is expanding in a scalable way that lets us grow and automating across that, but also not doing that to a point where we’re limiting innovation.”

to register as a corporate entity, with the name Imagination Unlimited Inc., and while the acronym is the same as that of a fertility treatment, Thomson says the logo was cool. He then began working with small clients, such as high schools and accounting shops. During that time, he also studied for 18 certification exams while he was practicing his trade.

At face value, these backgrounds might seem disjointed, but combined they served as the base for his DRW career—an understanding of technology, business and how to communicate with people who have different personality traits. It’s what makes Thomson so valuable, Don Wilson tells *Waters*.

“Seth has been a key contributor to DRW’s growth over the past several years, and has been particularly strong for us in infrastructure planning and project and resource management,” Wilson says. “His leadership style has resonated with our technologists as he regularly helps them see the bigger picture, is a clear communicator, and makes time to mentor and encourage. One of his positive attributes is that he is continually adjusting our technology teams to meet the changing needs of the business, and that he leads with integrity and conviction that have garnered him the respect of his colleagues at DRW.”

Turning Pro

As Thomson’s tech career took off, he decided to take some time off from college to turn professional—he would eventually earn his BA in information technology and business management from DePaul University in Chicago.

While his first salaried job was at an accounting software shop in 2000, he moved into the world of trading, joining electronic-trading giant Citadel, where he spent five years learning the capital markets. From there, he got a job at QRM as the fund’s director of IT services.

After two years at QRM, Thomson wasn’t looking for a career move, but then DRW—and Wilson—came calling in 2007. “We were a lot smaller when I joined DRW a decade ago, but we had a really big appetite and we were starting to get serious about electronic trading. That’s why I was approached,” Thomson recalls. “I was very happy at my last job, so I wasn’t fully committed to coming over to DRW just for the challenge. But Don asked me in my interview with him whether or not I would be eliminating politics and finger pointing as we grew my department. That really won me over,” Thomson explains, because he knew he could grow his team in a manner that he saw fit, with transparency and openness.

He joined DRW first as the firm’s director of IT services, responsible for core infrastructure. Over time, management moved other operational groups under his remit, from purchasing and facilities to project management and business analysis functions, at which point they made him CIO. Since then, he’s added middle- and back-office software engineering to his resume.

Chess Pieces

When Thomson joined DRW a decade ago, the IT services group consisted of fewer than 20 people,

with an IT department comprising about 80 staff, globally. Today, that has more than doubled, with Thomson responsible for a staff of about 170 across facilities, software and IT.

In addition to DRW growing its IT and datacenter footprints, it has also been heavily involved with acquisitions. In August 2017, DRW bought HFT shop RGM Advisors of Austin, Texas. Prior to that, in 2015, it nabbed Chicago rival Chopper Trading. Thomson says a third acquisition is likely, but declined to provide greater detail.

Co-location, cutting-edge datacenters and speed matter in this business. DRW, along with the likes of Citadel and Jump Trading, are at the top of Chicago's HFT boom, so it's fair to say that those areas have been—and will continue to be—well addressed, hence the acquisitions.

For DRW, it's now about further improving automation and project management approaches. For instance, the firm has implemented a service-catalogue approach to more effectively tie assets to specific projects and needs. "It became pretty important early on to implement an allocations model that made sense," Thomson says. "So we've implemented a pretty in-depth service-catalogue approach, where we describe all the different IT services we offer, and projects, and we tie all our work and all our assets to that. This way, any business can look at their costs and see what they're getting and have a clear understanding of it, but also, we can attribute our work to things and I have metrics on our delivery."

DRW also deploys a strategy where it mixes shared and embedded services. As such, a trading desk with a great need for bespoke software engineering will have software engineers sitting right on the desk. If it's a desk with a lot of infrastructure needs that are continually changing to fit specific trading requirements, it will have people who will liaise with



these groups and the liaison will talk to shared services to make sure that all needs are understood—and, crucially, that all of its infrastructure is well coordinated across trading desks.

The firm has also implemented custom co-location teams, formed security teams to protect against cyber threats, and has allowed various business units to create self-service applications, whereby traders and embedded engineers can set up their own dashboards using software that the IT group created in order to prevent bottlenecking for every little change.

DRW also uses "synthetic" project teams, where different members of different units are pulled out and then put together around a specific project. Upon completion of the project, they return to their original team.

This arrangement ensures that employees can work on many different IT projects, regardless of the focus of their specific team, provided they have the time to work outside of their core service, Thomson adds.

When it comes to development, Thomson says they are as "non-dogmatic" as possible.

"I will take different aspects from different things like IT service management (ITSM), DevOps, Agile and scrum, and take what works best," he says. On the infrastructure side of the company, you will see Python, PowerShell, legacy Perl, and C#. For its software products you'll see Java, Ruby and functional languages like C++. And they'll even play around with some newer languages and libraries, like Elixir and React. "We employ a 'use the best tool for the job' approach, while also being careful to scrutinize the cost of using a different methodology," he adds.

'The Goal'

A couple of years ago, Thomson oversaw a transformation of DRW's Agile techniques in order to get more out of the firm's engineers writing code. He had his developers read Israeli business management guru Eliyahu Goldratt's *The Goal: A Process of Ongoing Improvement* in order to help them identify bottlenecks in operations and find processes to automate. From there, they started to think about where they could start writing new

code. It was a two-year project that culminated in the creation of a team of developers called infrastructure software services located within the core IT group. This group focuses on automation, but is also helping the firm's other engineers to change the way they think about coding. "When we go to hire a network engineer now, we hire engineers with development experience. That's been a major shift over the last 10 years," he says.

Every financial institution will tell you they're big on team building; those inside DRW might scoff at some

COMIC COMMODITY

In high school, Seth Thomson was in theater, and would do improv at local cafes in Evanston, Illinois. A customer approached him and asked him whether he wanted to host a talk show on cable access TV focused on comic books. The show, *Comics Explored*, ran for seven years. Its final episode—featuring that year's Comic-Con convention—was even covered by the *Chicago Tribune*. "It was a positive review, but none of us wanted to do this for a living and it was starting to become a career, so we decided to end it like *Seinfeld* right there—go out on top," Thomson says.

From that review: "Imagine Siskel and Ebert if, instead of movies, the tandem had gotten way, way into comics, and you'll have an idea of what this endearing homespun show is all about. Cory Tadlock (the goateed one) and Seth Thomson (the ponytailed one) sit in a studio decorated with little more than an Oriental rug and talk comic books for 30 minutes." Yep, Thomson had a ponytail.

Today, Thomson's most prized comic book possession isn't a lone issue, but here's what he had to say: He has two complete runs of Neil Gaiman's *The Sandman* and the original X-Men series, going back to 1963.

While he's stopped collecting—kind of—he's gotten his two kids into comics and still reads anything by Gaiman and is a big fan of Marvel mainstay Brian Michael Bendis. But, as he says, he's no longer "dealing in volume." That effort, instead, is reserved for the trading floor.



of those claims. First, there's DRW's Speaker Series, which entails bringing in people to help generate new ideas and ways of thinking. Previous guests have included author Malcolm Gladwell, CNN's Fareed Zakaria, and Reshma Saujani, who founded Girls Who Code. They also host "Geek Lunches" where they have both external and internal speakers deliver presentations on technology. Speakers here have included Scott Chacon, cofounder of GitHub; Brian Marick, author of *Everyday Scripting with Ruby*; and Jason Turner, a podcaster and C++ developer.

DRW also hosts an OpenSource OpenMic night, where local technologists are given five minutes to present something before they're "gonged" off, *Gong Show* style. Then everyone goes downstairs to mingle. Finally, there's the Geek Reading Group, which is essentially a book club for genuine mathematicians—one recent read was *The Annotated Turing: A Guided Tour Through Alan Turing's*

Historic Paper on Computability and the Turing Machine by Charles Petzold.

The idea is to create spaces for the sharing of ideas. As an example, during one Geek Lunch, DRW's Network Engineering Development unit discussed its internally built network management platform. After they showed off their code, more developers started asking questions, trying to understand how the firm's network traffic is handled and how they query the status of devices. As a result, the firm's software engineers are now using some of the Network group's tools, Thomson says.

Raise Your Hand

Thomson has spent a decade at DRW, largely because he feels comfortable speaking his mind with the firm's partners. When he makes a mistake, he holds his hand up and takes ownership of it. In his early days at DRW, while his team was working to improve the firm's power infrastructure, Thomson made an assumption about a technical issue they were having, but guessed incorrectly and the shop suffered an outage. He learned that he needed to deploy more people to look over his own work. He also went straight to Wilson, told him what happened, why it happened, and confessed his mistake. Wilson said, "OK," and that was that.

As technology evolves and becomes more complex—as trading becomes increasingly electronic and faster, and as areas including machine learning, deep learning, distributed ledgers and quantum computing evolve—it is crucial to create an environment where technologists feel comfortable with making mistakes; they need to build an environment for learning, where errors can be worked out. You learn, you get better, you move forward, rather than suffering paralysis from fear and over analysis. That's how you remain fluid in order to seize new opportunities, whether that be bitcoin, or the next big asset class. **W**

For more on one of Thomson's greatest passions—teaching kids how to code at an early age—see feature on page 14.

>> AFTAs 2017: Entrants Up Their Game

Last year's American Financial Technology Awards were notable due to technology vendors being allowed to submit entries to the awards for the first time. That entailed significantly expanding the number of categories on offer to 32, and while that number rose marginally to 33 this year, what was most surprising was the quality and depth of the entries across the entire program.

If we at *Waters* were to pick out a year that underscored and exemplified the quality of technologies and services on offer to the capital markets, 2017 would be that year. One just has to scan the list of winners from this year's Sell-Side Technology Awards, Waters Rankings, Buy-Side Technology Awards and American Financial Technology Awards (AFTAs) to appreciate the extent to which financial services firms are being looked after by the third-party vendor community serving them. And when one considers the outstanding quality of the entries making up the 14 end-user categories in this year's AFTAs, there is little doubt that our industry has ever been in ruder health.

This year's four highest-profile awards—three individual categories and one team award—were won by Neil Barua (IPC Systems, best third-party technology vendor CIO or CEO); Jodi Richard (US Bank, best technology executive, sell side); Mike Urcioli (JPMorgan, best technology executive, buy side), and Charles Schwab Investment Management, which won the coveted best IT team award.

Write-ups by Anthony Malakian (AM), James Rundle (JR), John Brazier (JB), Emilia David (ED), Aggelos Andreau (AA), Wei-Shen Wong (WSW), and Victor Anderson (VBA). **W**

Victor Anderson
Editor-in-Chief

Winners' Circle

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Waters honored the winners at a ceremony on December 4 in New York.





American
Financial
Technology
Awards



Best Back-Office Initiative

SmartStream Technologies

Reference data has been placed firmly at the center of the revised Markets in Financial Instruments Directive (Mifid II), which came into force on January 3 this year, as it serves as the most critical tool for trade and transaction reporting transparency. SmartStream has responded to the market's need for pre- and post-trade compliance by developing a utility—the Reference Data Utility—which promises to provide firms with access to all the European reference data they might need. The London-based firm's win at the 2017 AFTAs reflects the industry's hunger for technology solutions across the fickle and ever-changing regulatory landscape.

The RDU, founded as a partnership between SmartStream and a number of banks, is designed for all market participants that trade in reasonable quantities, but especially those with aspirations of becoming significant players in the post-Mifid world, from brokers that will be categorized as systematic internalizers under the new regime to firms that will serve as approved publication arrangements (APAs) on behalf of broker-dealers, as well as asset managers who, for the first time, will need to submit trade and transaction reports.

The RDU features data from a combination of sources, including the Association of National Numbering Agencies' Derivatives Service Bureau, local markets and trading venues. Most importantly, it aggregates data from the European Securities and Markets Authority's (Esma's) recently established reference database, allowing users to calculate when they breach thresholds and must therefore submit their post-trade reports. The platform promises to ease the way traders and market participants access reference data by making that data available in a single pool. Specifically, it removes much of the heavy lifting associated with the complexities of processing huge volumes of raw data, and it both simplifies and enriches information where necessary in order to create digestible datasets.

Peter Moss, the firm's CEO, explains that the RDU offers two primary functions, already vetted by a number of the firm's largest customers. "We offer a consolidated file of reference data which blends all these sources together so that users can get all the data they need of the instruments they trade," he says. "We also offer a set of cloud-based functionality that people can call out to and enrich on a trade-by-trade basis the data they need."

The service was launched on the day that Mifid II came into force in Europe, January 3, 2018. SmartStream aims to access all of Esma's data, which it releases periodically since the database's launch in mid-2017. Moss says that when this data becomes available, the RDU will be the market's largest reference data pool.



“The platform promises to ease the way traders and market participants access reference data by making that data available in a single pool.”

—AA

Winners' Circle: SmartStream Technologies

Creating a Master Key

Historically, collaboration between banks hasn't yielded much success—except, perhaps, when it comes to reference data. **James Rundle** talks with Peter Moss, CEO of SmartStream's Reference Data Utility (RDU), about how the project came about, and how it's going to help the industry in 2018.

Q What were the origins of the RDU, and what is it designed to do for the industry?

Peter Moss, CEO of SmartStream's Reference Data

Utility: The RDU is a reference data utility, as the acronym implies. It's focused on reference data for financial products that trade. In essence, the focus is on building what the industry calls a securities master. The initiative was kicked off by a group of banks about four or five years ago under a project called Spred, which stood for Securities Product Reference Data. The banks were keen to make the process of building a securities master more efficient and cost-effective. They were all doing similar work inside their organizations, in terms of pulling together data from lots of sources and then massaging it into a form where it was accurate, complete and consistent. They basically said that this was silly and recognized that they were all pulling the same data from the same sources and then doing all this work on it, and it would be substantially easier if we actually had this done as a utility so that we could all benefit from the results.

Q So essentially it's taking the heavy lifting out of the equation for the individual firms?

Moss: Exactly. There's a lot of automation and a lot of best-practice adoption from within the tier-one banks we've been working with. The goal is to do it once, do it well, and do it for the industry.

Q This type of utility seems particularly relevant right now, given the advent of the revised Markets in Financial Instruments Directive (Mifid II) in Europe, and the requirements that will impose around reference data, reporting and other areas.

Moss: We're very focused on the reference data that's required to trade, and of course, Mifid II has brought out a significant requirement for reference data to support trading processes. So one of the things we've done this year is built out a reference data product that's very specific to Mifid II, and it gives the larger trading organizations—those operating what Mifid II

calls systematic internalizers—the reference data that they need to do all of their pre-trade price transparency, their post-trade reporting and their transaction reporting. Mifid II has given us a focus to extend the data out into that regulatory space.

Q We talk about the multiplicity of data sources a lot—whether it's trading venues, regulators or other sources—but what actually goes on inside the RDU once data is ingested?

Moss: We source data from all of the places that a bank would normally source it from—a combination of data vendors, exchanges, specialist providers, and in the case of Mifid II, regulators as well. We identify the mechanism that we're going to use to source the data from each of those, and the way the platform works is that on a regular basis, it goes off and acquires the data necessary, we then load it into the platform and keep the data from each source separate. We actually normalize it into a consistent form as we load it into our database, then cross-reference it all, so there's a reliable way of making sure that reference data sourced from one location can be tied to reference data that is perhaps sourced from another location. A good example would be where we source some data from a vendor and some from an exchange, but when we put it together for a client, we have to ensure it's the same instrument that's being referred to. So the cross-referencing [functionality] is built for that purpose.

Then we apply a range of quality checks in an automated way. We've built in exceptions where, when we see quality issues, our data operations team can get involved and resolve the problem. The team offers a 24/7 service and they manage the flow of information through the platform. And then, for each individual client, we essentially build a distribution file that is unique to them. That's because all of the clients will have a slightly different mix of data sources, so we pick the data that they need from the sources we've acquired it from, and then we build distribution specific to the customer based on the fields that they need from the vendors they've chosen. That last 20 percent is unique, the other 80 percent is broadly consistent across all customers. **W**



Peter Moss

Best AI Technology Initiative

FIS

Artificial intelligence (AI) is enjoying its place in the sun right now across the capital markets, being one of the few emerging technologies to have found widespread, real-world adoption and application throughout the industry. From machine learning to robotic process automation (RPA), AI has already started to deliver on many of the expectations it has promised—it is a cost-efficient and relatively easy family of technologies to implement, and for this reason the AFTAs already feature a dedicated AI category.

In this year's awards, FIS' AI platform, Control Center, provides an example of how this new technology has found its way into large financial corporations' technology stacks, and the benefits it can deliver to their day-to-day operations.

Control Center is a platform that uses a combination of traditional workflow rules and RPA. Essentially, it is a service designed to support fund administrators' operations in a manner that is purpose-built and contextual to asset servicing. The RPA and machine-learning functionality streamlines the creation and management of operational processes and simplifies user interaction. Its primary features include electronic checklists and easy-to-read dashboards. Also, the automation of these processes has replaced manual tasks, allowing FIS to offer a service that promotes transparency to management both in real time and historically, given that it eliminates human factors. For example, when interacting with exceptions generated in other systems, it can act on them directly, without human intervention.

One of the first financial institutions to implement Control Center was Northern Trust, which uses the platform to support its fund accounting, administration and reporting functions. The bank uses Control Center for its entire global fund accounting environment, in order to better manage the diverse regulatory, reporting and tax requirements inherent in cross-border trading activities. By using the online tool, Northern Trust was able to manage its daily net-asset value (NAV) calculations and its client service-level agreements.

According to FIS, its AI aspirations and strategy will not be limited to Control Centers' current features. Being an already functional platform, the product will be enhanced with additional robotics tools and intelligent automation, to become an integrated portal with a real-time dashboard for management, interacting directly with an expanding range of systems from its client base. FIS is also looking to expand its use of AI to other areas within its ecosystem, including transfer agency and private equity functions.

—AA



“Control Center is a platform that uses a combination of traditional workflow rules and RPA. Essentially, it is a service designed to support fund administrators' operations in a manner that is purpose-built and contextual to asset servicing.”

Best Collaboration Initiative

SS&C Advent and Maitland

Over the last few years, the capital markets industry has experienced a wave of collaboration among third-party software providers. As a result, firms have benefitted from an array of new and innovative tools and products that address multiple challenges within the scope of their operational processes. In 2016, the AFTAs introduced the best collaboration initiative category, with the inaugural win going to MTS Markets and Bloomberg, thanks to the MTS BondsPro rollout on Bloomberg's fixed-income execution management system, TSOX.

This year, the jury gave the award to SS&C Advent and Maitland for their partnership which resulted in the integration of Maitland's Avatar Fund Manager (AvatarFM) portal with the Geneva World Investor platform.

The win went to SS&C Advent and Maitland for a number of reasons. First, the two firms had a clear and specific business plan in mind before they proceeded with their alliance—they wanted to move into the emerging realm of hybrid fund structures, which tend to focus solely on illiquid investments, such as distressed debt, collateralized loan obligations and bank debt. An initial investigation of the market by the partners revealed that it was beset by complex operational and data management requirements. By combining their services, the two companies offered a solution that addresses the market's needs, as it combines the best features of each product. Geneva World Investor is an all-in-one system that allows investors to directly access complex asset classes, offering support for portfolio and investor accounting. The integration of Maitland's AvatarFM portal with its key data warehousing, client reporting and CRM components, proved to be useful for the administration of hybrid structures. More specifically, the combined solution offers end-to-end functionality that allows fund managers and administrators to streamline their investor servicing workflows with a single, centralized source for investor data. It also ensures timely and accurate investor accounting, calculates performance incentive fees, and delivers automated reporting.

Johnathan Eldridge, senior director of product management at SS&C Advent, explains that the collaboration will be extended, with the two firms planning to expand the unified solution in 2019. "We will continue to extend the deal-by-deal workflow and the waterfall calculation capabilities," he says. "We want to put more query and report customization power in the hands of end-users and endorse the Institutional Limited Partners Association reporting template, alleviating the manual process of meeting investor requirements around fees and expenses."

—AA



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This year, the jury gave the award to SS&C Advent and Maitland for their partnership which resulted in the integration of Maitland's Avatar Fund Manager (AvatarFM) portal into the Geneva World Investor platform.

Best Communications Infrastructure Provider

IPC Systems

IPC Systems has been a continual winner across WatersTechnology's awards, having won the best communications infrastructure provider category at this year's Waters Rankings, in addition to numerous other distinctions in the past, including the 2016 AFTA for the same category, underlining its presence and the efficiency with which its technology and services connect capital markets professionals around the globe.

Unigy, the firm's flagship offering, is a centralized communications tool for both the buy side and the sell side, expanding into the middle and back offices. The platform is known for its specialized telephony system and its range of capabilities for monitoring, managing and maintaining users' trading communications infrastructure. The range of available tools is extensive, from prioritizing incoming calls and accessing dedicated point-to-point connections to communicating via voice, text or chat across a geographically dispersed trading environment. At its core, the platform enables users to access the hoot, intercom, TV audio, speaker channel functionality from their iPads, and to communicate directly and securely from any location.

In June 2017, IPC unveiled what it believes will be a game-changer when it launched Unigy 360, the same Unigy offering but with a cloud twist. The 360 version is a cloud-based, Software-as-a-Service (SaaS)-delivered platform, making the original product even more accessible, in an effort to expand the IPC network of participants and establish the firm as the de facto infrastructure leader for communications across the capital markets.

Ganesh Iyer, the firm's director of global marketing, explains that IPC launched the solution after demand from a significant proportion of market participants looking to benefit from software that would combine the functionality of the Unigy platform but with lower implementation costs and faster time to market. He says Unigy 360 is designed to appeal to the firm's 1 million regulated users, including portfolio managers, economists and analysts, as well as risk managers, compliance professionals, technologists, settlement personnel and operations staff. "Users were looking for a solution that enables mobility, business continuity, low total cost of ownership, agility and rapid time-to-market, while requiring virtually no upfront investments or IT support," Iyer says. "We created this software that provides exactly these, beyond the front-office trading positions into the middle and back office, and also addresses the communication needs of the buy-side community."

Iyer describes Unigy 360 as an "anytime, anywhere, any device" product that provides immediate access to counterparties, liquidity, and a range of trade lifecycle services.

—AA



“Unigy, the firm's flagship offering, is a centralized communications tool for both the buy side and the sell side, expanding into the middle and back offices. The platform is known for its specialized telephone system and its range of capabilities for monitoring, managing and maintaining users' trading communication infrastructure.”

Innovation for the Capital Markets



Access to Liquidity



Alpha Generation



Lower Cost of Trades

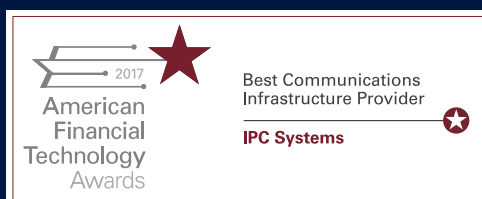


Effective Risk Mitigation



Enhanced Business Continuity

IPC is a technology and service leader that powers financial markets globally. We help clients anticipate change and solve problems, setting the standard with industry expertise, exceptional service and comprehensive technology.



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Best Front-Office Initiative

State Street Global Exchange

There is an interesting story behind the inception of State Street's Contextual Idea Lab, the winner of the 2017 AFTA for the best front-office initiative. The Lab was the brainchild of Stephen Lawrence, a former analyst who now heads up State Street's Contextual Idea Lab department. Lawrence had been producing research for portfolio managers for many years and, as with a number of his colleagues, was frustrated by how little of his work was being consumed. But it was not until he spoke with a portfolio manager that he realized how unfeasible it was for them to use any of the research he was producing. "A former colleague showed me his email inbox which contained multiple pages of research," Lawrence explains. "He told me that he didn't get the chance to really read them—he just looked at the email subject and decided if he was going to read it."

Lawrence understood that portfolio managers were interested in reading his research, but they didn't have a practical method of deciding which pieces were relevant and which were not. So he came up with Contextual Idea Lab, which he developed with the assistance of State Street, the second oldest financial institution in the US, with something of a startup mentality. The final product is a research aggregator, although its uniqueness lies in the fact that it blends machine-learning algorithms with human expertise. "I started thinking if there was a way to come up with a more intelligent curation process for research," Lawrence says. "The lab consists of technology that automatically tags and categorizes research, and then human expertise can continue to refine, train and improve the ability to understand the changing subject matter like financial markets research."

The platform uses various classification algorithms that scan documents and decide what topics, asset classes and regions they are referring to. These algorithms, according to Lawrence, identify a range of words, starting from simple phrases and progressing to complex financial terms. In addition, natural-language processing technology is included allowing users to query research in a national language, as well as collaborative capabilities that allow them to communicate and share research with one another. Most importantly, the Contextual Idea Lab uses actual people to provide quality services. Working behind the scenes, the Lab employs researchers to address questions pertaining to complex investment processes. These researchers provide human-curated conclusions rather than mechanical interpretations, allowing research summaries to maintain their nuanced academic or economic perspectives.

—AA



“The platform uses various classification algorithms that scan documents and decide what topics, asset classes and regions they are referring to. These algorithms identify a range of words, starting from simple ones and progressing to complex financial terms.”

Inside Market Data Inside Reference Data



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Best New Technology Introduced Over the Last 12 Months: Front Office

IHS Markit

IHS Markit, a firm that has won more awards than any other across the four brands nestling under the WatersTechnology umbrella, wins yet another category, thanks to its Commodity Tracker, which beat five other entries for the win. The offering, which went live at a US-headquartered tier-one investment bank in May last year, automates the largely manual processes around how commodities traders track inventory and supply. There has traditionally been a disconnect between trading, which is increasingly electronic, and the physical world of inventory management. Commodity trading firms typically require large numbers of warehouses and transporters, each reporting information in different formats about shipments. Accurately managing inventory is therefore manually intensive, complex and operationally risky, and involves time-consuming reconciliations and high fixed costs.

The platform digitizes the tracking of base-metals inventory for market participants, and includes a number of innovative technologies such as artificial intelligence (AI) alongside more mature technology applications. The heart of Commodity Tracker features optical character recognition (OCR) technology that reads image files such as PDFs and JPEGs, and creates digital characters of the data within those files. While OCR is a mature technology, its effectiveness is contingent on the image presented to it, often resulting in imperfect data being produced. This shortcoming is addressed by way of machine-learning (ML) technology, which organizes the digital data, based on the training created. The data is also automatically normalized to standardize areas such as weight units and date formats. With this approach, the more documents Commodity Tracker consumes, the more accurate it becomes. The platform, hosted by Amazon Web Services, was designed with a micro-services architecture allowing flexibility on feature development, while the use of Red Hat's OpenShift platform employs container management and orchestration development and onward support.

According to IHS Markit, the benefits realized by the bank on the back of Commodity Tracker include: replacing the manual reconciliation of 3,500 documents each month from 150 metals warehouses; a 50 percent time reduction in performing monthly reconciliations; faster discovery and resolution of breaks during the reconciliation process; and more transparency about trends in data which helps identify risk.

Recently, the bank was able to use Commodity Tracker's inventory-mapping feature to visualize and review its metal stockpiles in the Gulf Coast area, in preparation for Hurricane Harvey. By reviewing the predicted path of the hurricane against the bank's mapped inventory, the team was able to notify insurers, plan for shipment delays, and create contingency plans where there was risk to contractual obligations in terms of delivering material.

—VBA



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The platform digitizes the tracking of base-metals inventory for market participants, and includes a number of innovative technologies such as artificial intelligence (AI) alongside more mature technology applications.



Commodity Tracker

Best New Technology

Proud winner of the 2017
American Financial Technology Award

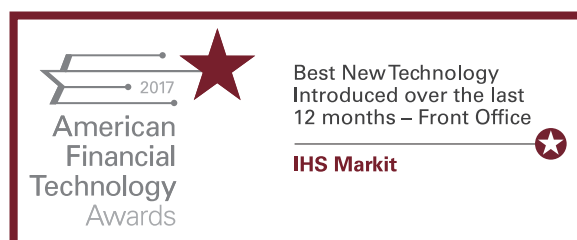
Commodity Tracker is the first service to digitize the tracking of base metals and other commodity inventory for global banks, trading firms and hedge funds. The service:

- Reduces operational risk
- Makes firms more efficient
- Enables firms to scale their commodities trading operations at lower cost

Learn more

markit.com/Product/Commodity-Tracker

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Best Middle-Office Initiative

RIMES Technologies

This year RIMES Technologies takes home the award for the best middle-office initiative in the vendor section of the AFTAs, thanks to its work with institutional asset manager Fort Washington Investment Advisors. RIMES' project with Fort Washington, which manages about \$50 billion in assets, involved optimizing the manager's performance and risk operations, and improving its data quality and coverage, allowing it to expand into new asset classes.

Benchmark data is core to Fort Washington's portfolio and investment analysis, which is featured in more than 15 of its attribution models and more than 1,000 internal and external monthly reports.

Recently, RIMES assisted with automating Fort Washington's fixed-income benchmark processes. This was timely given that Fort Washington was transitioning to a new analytics platform. To manage that risk, Fort Washington moved its entire Bloomberg Barclays Index over to RIMES and, as a result, was able to strengthen its data quality and its confidence in it, while also increasing responsiveness and its ability to obtain historical data.

Alessandro Ferrari, executive vice president of global marketing at RIMES, says that unlike traditional outsourcing, aggregation or integration models, RIMES' managed data services allow its clients to stay up to date on technology and access the necessary and specialist skillsets to address a wide range of data management issues relating to cost, quality of service and risk.

Tom Anderson, director of performance and reconciliation at Fort Washington, says RIMES' approach is unique in that the firm listens and channels feedback into its internal innovation roadmap. "The result is a service that meets our needs and has enabled us to more easily expand into new asset classes and enhance our performance and risk functions," Anderson says.

An example of this is RIMES' Feed Audit Analytics, which was recently deployed to further streamline data management processes at Fort Washington. Previously, the asset manager had to go through onerous internal procedures to reload or access a file. Now it is able to access its feeds through RIMES' secure and cloud-based portal, thus making it easier to resolve issues.

RIMES' approach to customer service benefits Fort Washington as it expands into new asset classes such as bank loans, emerging markets debt, and international equities.

In the last 12 months, RIMES has launched two new solutions: RegFocus MAR, which helps clients comply with requirements associated with the Market Abuse Regulation and Mifid II; and RegFocus BMR, which provides clients with full compliance with the new Benchmarks Regulation, which went live at the start of January 2018.

— WSW



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Fort Washington moved its entire Bloomberg Barclays Index over to RIMES and, as a result, was able to strengthen its data quality and its confidence in it, while also increasing responsiveness and its ability to obtain historical data.

Best New Technology Introduced Over the Last 12 Months: Middle and Back Office

AdvantageData

AdvantageData Inc. (ADI) wins its first category at the AFTAs thanks to its Middle Market Loan Advantage offering, which saw off a handful of entries in this new category. The Boston-based firm, founded back in 1997, initially focused on providing cross-asset trading tools to fixed-income market participants, but in early 2016 it began working with a handful of Business Development Companies (BDCs) with the view to providing them with standardized market data, pricing and analytics to increase the transparency around the middle-market industry.

BDCs are unregistered, closed-end US investment firms that typically invest in small and mid-sized businesses, and were introduced by Congress in 1980 as a means of kick-starting business and job growth across the US. As regulations constrained banks' middle-market lending capabilities, BDCs stepped in and developed flexible, cross-asset structures to support loans to middle-market companies. Most middle-market firms have historically had to rely on their own analysts to trawl through Securities and Exchange Commission (SEC)-filed reference and pricing data across middle-market cross-asset investments made by the BDC community. With no infrastructure built around these filings, the middle market has never been in a position to access a platform that analyzes that data, which is where ADI's Middle Market Loan Advantage initiative comes to the fore. The platform is designed to support middle-market firms increasing their data analysis efficiency, allowing them to reduce days' worth of work to a few mouse clicks. Utilizing ADI's data collection capabilities, offshore analysts, automated audits and input tools, as well as the firm's Boston-based analyst pool, ADI now provides pricing and reference data for approximately 8,000 middle-market investments within eight hours of filing at the SEC. ADI has standardized investment type, seniority, sector and sub-sector classifications across all BDC holdings allowing users to benchmark middle-market spreads and yields by investment type, sector and commitment size. ADI's cross-holdings capability allows users to assess pricing divergence between investors on cross-asset investments over the life of a loan or bond as well as the liquidity premium between investments made by closed-end BDCs and their open-end fund co-investors. In order to provide this information on an intra-quarter basis, BDC portfolio investments in the syndicated loan and high-yield bond market are priced daily via ADI's bond and loan mark-to-market service. Middle-market investments are then priced daily by the firm's Middle Market pricing model, providing pricing data on over 4,000 senior secured middle-market first lien, second lien and unitranche loans, furnishing users with the only daily net-asset valuations service available in the market for approximately 75 BDCs.

— VBA



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“AdvantageData has always expanded its product line when it saw an opportunity to help its clients or solve an industry problem. Winning this award demonstrates our commitment to that mission. We are most humbled and genuinely grateful for this award.” **René Robert, CEO and founder, AdvantageData**

Best New Technology Introduced Over the Last 12 Months: Infrastructure

Metamako

Sydney, Australia-based Metamako wins its first category in the AFTAs thanks to its E-Series of devices launched midway through last year, designed to run up to three field-programmable gate arrays (FPGAs) on a single platform, allowing end-users to dramatically improve their processing performance while simultaneously reducing their network latency. This is the first time this category has been on offer in the AFTAs, attracting seven strong entries.

Metamako, founded in 2013, is a provider of low-latency network devices designed to allow capital markets firms to simplify their network stacks, increase their network visibility, and support high-performance processing. The firm's clients typically use its devices to gain a competitive advantage (in terms of speed and low latency) over other market participants, with market data replication performed in four nanoseconds and multiplexing in 69 nanoseconds.

A key area of differentiation for capital markets firms is their ability to connect to exchanges quickly and with minimal and predictable/consistent latency, a process known as determinism. And while pure speed and performance are basic requirements for most firms' trading technologies, the need for programmability and configurability has become crucial in recent years, a trend that led to Metamako unveiling its E-Series devices, designed to run three FPGAs on a single platform, while maintaining the lowest possible latency. According to Metamako, the advantages of adding FPGAs to devices supporting trading activities include: greater speed, as there is no overhead when accessing memory; determinism or the ability to consistently and accurately predict latency; and performance by way of processing large data volumes at high speeds, by way of parallel processing.

Metamako has been working with FPGA technology for a number of years. However, its E-Series can now run up to three FPGAs on a single device, providing users with increased processing power and super-fast connections directly to exchanges. And while the biggest limiter of data transmission speeds is cable length, having three FPGAs in close proximity on a single device dramatically reduces transmission times for trading firms looking to minimize latency. Metamako's E-Series initiative allows user-firms to run multiple performance-sensitive applications on a single device—for example, trading algorithms, matching engines, pre-trade risk checks and market data processing can be run simultaneously at ultra-high speeds—while all three FPGAs can be configured to operate in concert, offering combined processing power to single trading strategies, while also supporting the running of larger, more complex applications.

—VBA



“Winning the AFTAs is a significant achievement and recognizes the quality of our technological innovation. Since we launched, we have striven to bring the most sophisticated, performant and fast network solutions to the global financial markets.”
Kevin Covington, CEO, Metamako

Best New Technology Introduced Over the Last 12 Months: Risk/Compliance and Reporting

AQMetrics

AQMetrics, headquartered just west of Dublin, Ireland, wins its first AFTA, beating 11 other outstanding entries in this category, thanks to the work it has done over the course of the last 12 months in enhancing the functionality of its approved reporting mechanism (ARM) and bringing the service to market. ARMs are set to play a crucial role in the revised Markets in Financial Instruments Directive (Mifid II), which came into force at the start of January this year, and which requires “all reportable transactions to be reported through systems which comply with specific requirements detailed in Article 12 of the Mifid Level II Regulation,” according to the UK’s Financial Conduct Authority.

To that end, AQMetrics’ ARM enables reliable and cost-effective risk management and regulatory compliance for capital markets firms through the use of technology. It is a cloud-based platform that integrates risk and regulatory functions, allowing users to comply with existing and future regulations, chief among which is Mifid II.

In January 2017, the firm announced the introduction of a range of enhancements to the platform specifically geared toward helping buy-side and sell-side firms prepare for Mifid II dispensations. Enhancements include Mifid II transaction reporting via the AQMetrics ARM—the firm is authorized as an ARM by the Central Bank of Ireland and plans to “passport” the service to regulators throughout Europe, an offering that will include data acquisition, validation, verification and formatting functions and support for the submission of transaction reports to the appropriate National Competent Authorities (NCAs). Other features of AQMetrics’ ARM include a built-in error console, allowing users to view the status of data imports and trade reporting with all issues and errors highlighted. The console validates transaction reporting data as it is ingested and formatted for reporting, highlighting any errors or data issues that might need to be resolved, providing clients with peace of mind that what they are submitting to their respective NCAs is reliable and accurate. The AQMetrics ARM is also designed to consume data from multiple sources in multiple formats, including CSV, XML, FIXML, FpML and CpML, while it also features tools for data mapping and dictionary creation.

For capital markets firms that fall under Mifid II’s purview, complying with the rules is anything but a trivial task, although the functionality available through the AQMetrics ARM, based on Regulatory Technical Standards (RTS) for Mifid II, provides its clients with the ability to meaningfully comply with whatever the European Securities Markets Authority and NCAs can throw at them.

—VBA



“We are honored to receive this prestigious award from WatersTechnology and are delighted by the recognition of our product as best new technology introduced over the last 12 months—risk/compliance and reporting. This particular award recognizes our integrated risk and reporting services, which were built to deliver risk management, compliance monitoring, and reporting in a way that saves our clients both time and money.” **Geraldine Gibson, CEO, AQMetrics**

Best Partnership or Alliance

Thomson Reuters and Symphony Communications

The best partnership or alliance category at the 2017 AFTAs goes to Thomson Reuters and Symphony Communications. Through the partnership, Thomson Reuters' Eikon, the firm's open financial markets desktop platform, is now integrated within Symphony, the cloud-based messaging and collaboration platform.

An increase in regulatory scrutiny and legislative action, following benchmark manipulation scandals, has led capital-markets firms to actively monitor, control and archive messages sent by their employees via instant messaging. Yvette Jackson, global head of platform and partners at Thomson Reuters, says regulators have become increasingly aware of the importance of instant messaging systems in the trading lifecycle and these insights have informed many of the new regulations introduced to retain and protect the integrity of financial markets.

"Consequently, the roles of compliance officers in financial services [firms] have changed almost beyond recognition. What had long been a rulebook-based, clearly-defined role, has become all-encompassing, with compliance officers now charged with managing a myriad of issues, including culture and conduct risk, regulatory technology, market and chat surveillance capabilities, and a deluge of regulatory changes, all with an overlay of increased personal liability," she says.

Lawrence Miller, chief security officer at Symphony, adds that the partnership directly addresses the need for a tool that meets these enterprise compliance and record-retention requirements.

This integration, Miller says, allows firms to use Eikon and Symphony in concert, bringing together Eikon's information and analytics capabilities with organization-wide deployments of Symphony's communication platform. "This means staff have access to all of the information they need while collaborating in a secure, compliant fashion," he says.

Users of both Eikon and Symphony will be able to share Eikon content through the Symphony platform. If the recipient also has Eikon, they will also be able to share live data, news and charts to support dynamic, real-time collaboration.

Given that the integration is achieved using application programming interfaces (APIs) on both sides, Thomson Reuters' Jackson says the delivery of API capabilities was paramount to the success of the alliance. The Eikon side-by-side API, launched in April 2017, can connect any financial application on the desktop to Eikon, allowing users to move seamlessly between different tasks in their workflow.

Eikon users can already share Eikon content with counterparts via the Eikon Messenger platform, with 300,000 individuals in 30,000 firms across 180 countries. The Thomson Reuters-Symphony tie-up essentially gives customers the choice to extend collaboration capabilities to the Symphony community.

—WSW



“Users of both Eikon and Symphony will be able to share Eikon content through the Symphony platform. If the recipient also has Eikon, they will also be able to share live data, news and charts to support dynamic, real-time collaboration.”

Winners' Circle: Thomson Reuters and Symphony Communications

Building a Collaboration Engine

After winning the best partnership category at this year's AFTAs, Symphony's CEO, David Gurle, and Thomson Reuters' global head of platform and partners, Yvette Jackson, talk to **James Rundle** about the origins of the partnership and the power of collaboration.

Q How did this partnership come about?

Yvette Jackson, Thomson Reuters' global head of platform and partners: Mutual customers of Symphony and Thomson Reuters asked us both to think about how we might be able to better connect the platforms. What they were saying was that they were adopting Symphony for parts of their enterprise, they were also Eikon users, and they wanted us to look at how we could interoperate. That was how we approached the conversation, and it was very much part of an ongoing dialogue with customers.

David Gurle, CEO, Symphony: We have been in conversations about our partnership for some time, but in late 2016 we received lots of customer requests in favor of our partnership. They felt and knew that our respective products are complementary to each other, which helped us to accelerate our discussion. We are happy with the results of our partnership as there is strong interest from the market.

Q So what were the reasons why your clients were asking for this?

Jackson: Financial services messaging continues to be fragmented into disparate islands and pockets of community and some of those systems remain closed. If you think about email, being able to access your email in one inbox, regardless of the provider, makes sense. What we've been trying to do at Thomson Reuters for a number of years is break down barriers to communication and help create an open community. We are messenger-agnostic in terms of the front-end, so long as our customers can connect to the broader community. This partnership was really looking at the fact that we have customers on the network using Eikon and Eikon Messenger, but we also have people using Symphony, so the goal was to enable Eikon customers who use Symphony to share Eikon content with their Symphony counterparts in a seamless way.



Q What was the end result of those discussions, and how long has it taken to get to this point?

Jackson: It was pretty quick, actually. We made the decision and announced the partnership in June, and the functionality is pretty much ready to go. We're going to do a broader push on it in January after the December quiet period as businesses are in change control freeze periods. The way it's done on both sides is to use application programming interfaces (APIs). We have a side-by-side API which is open to partner capabilities generally, and which can be used to connect to other desktop applications. This is the first example of a third party leveraging that technology. It shows the power of having that side-by-side context passing, so customers can take what they already have in their real estate, and have a single way to drive workflow.

Q What capabilities does this partnership offer users?

Gurle: This partnership provides the Symphony community with a comprehensive and integrated collaboration and workflow solution. Many financial institutions that are deploying Symphony as a standard messaging platform also use Eikon. This integration allows our mutual customers to collaborate with Eikon information, using Symphony as the collaboration tool.

Jackson: It allows you to share workflow and content from your Thomson Reuters Eikon desktop via Symphony. It also recognizes your permissioning. So, for example, if you're an Eikon customer and a Symphony customer, and you're sharing content with another person who is also a customer of both, you'll be able to pull up a live, interactive chart to work with.

You can send it back with commentary, and collaborate on it.

We didn't just want to limit it to that though—we wanted to include a broader community, and so you can send a static screenshot of any Eikon application and associated content via Symphony messenger. **W**



Best Third-Party Technology Vendor CIO or CEO

Neil Barua, IPC Systems

This award, the second year it has been part of the AFTAs line-up, is arguably the most sought-after of the vendors' section, given that it recognizes the innovation and leadership of just one individual. This year the category attracted 11 strong entries, but one person, IPC's CEO Neil Barua, emerged top by virtue of the transformation he has brought about across the Jersey City-based provider of communication technology and services for capital markets firms. Last year the award went to Steve O'Hanlon from Numerix.

Barua took on the CEO's role at IPC in 2014 after serving as the operating advisor at California-based private equity firm Silver Lake Partners, which previously owned IPC. After leading the sale of IPC to Centerbridge Partners at the end of 2014, Barua continued his role as CEO under new the ownership to accelerate the transformation of the business.

Central to Barua's transformation strategy was the development of Unigy360, unveiled in June 2017, the firm's software-as-a-service flagship offering intended to deliver innovation, economics and new capabilities for capital markets participants. The platform is designed to allow buy-side firms "anytime, anywhere and any device" access to counterparties, liquidity, and trade lifecycle services, supporting all regulated users'—traders, researchers, portfolio managers, risk managers, compliance professionals, technologists, settlement personnel and operations staff—external communications and internal workflows.

Barua's IPC tenure hasn't been limited to building new technologies, however—he has also overseen two critical acquisitions in recent years: Etrali Trading Systems, the France-headquartered provider of unified communications technology to the trading community, and ASPone Networks, a global voice and data network provider to the financial markets, which bolstered the firm's Russian and northern Asia-Pacific presence.

In terms of the challenges IPC is currently grappling with, Barua is clear: "We are a \$500 million company with over 1,200 employees and staying close to our customers, while continuing to innovate and evolve the company in such a fast-paced, regulated and demanding industry is our primary challenge," he says. "The last two years have resulted in the highest volume of sales to our customers in over 10 years, including two of our largest deals ever."

Under Barua's leadership, IPC has also sought to collaborate with other fintech firms, including application partners such as Algomi, allowing buy-side firms to initiate calls to the sell side via the IPC voice network, while collaboration with UK-based startup, Post-Quantum, has enabled IPC to offer a suite of biometric authentication, encrypted messaging and blockchain-enabling products to counter increasingly sophisticated security threats.

— VBA

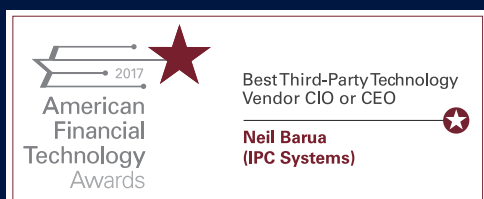


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Best Third-Party Technology Vendor IT Team

Axioma

New York-based risk management solutions provider Axioma makes it into the winners' circle at the 2017 AFTAs, bagging the best third-party technology vendor IT team award. The company has two IT teams—platform development and implementation. These two groups provide strategic technology, oversight and product leadership to support existing client needs and emerging market opportunities.

The platform development team focuses on internal functions to serve external user interfaces, and is responsible for data ingestion and analytics that are ultimately returned to clients in their preferred formats. The implementation team comprises business experts, many of whom hold chartered financial analyst and certified financial planner qualifications, with decades of experience in client interactions and system-onboarding processes. Amaury Dauge, COO and CFO at Axioma, says the company has built up a structure of decentralized, dedicated IT teams that remain close to its clients. "Decentralized teams within a consolidated structure facilitate better client support and collaboration; the product, engineering and platform development teams work closely together, and all report to the COO," he says, while Fabien Couderc, Axioma's CTO, oversees the day-to-day work.

He adds that Axioma solutions are "highly sophisticated," providing active risk management and portfolio construction expertise across multiple asset classes and investment strategies and, therefore, require client IT teams to remain close to the business. "Fortunately, we have built up dedicated teams within our IT department that maintain constant engagement with clients to ensure seamless platform development and implementation," he says. Given that Axioma's IT teams are crucial to its overall success and continued product demand, Axioma makes a concerted effort to attract as well as retain highly-skilled individuals. A majority of its employees across the firm have postgraduate qualifications, including more than 25 PhDs.

The company continually enhances the optimization tools available for multi-asset class portfolios using its portfolio optimization technology. Dauge says Axioma is growing and expanding its product set, which also means the teams will grow with the business. "We're always looking for ways to work smarter. For us as well, the challenge is to do more with less," he says.

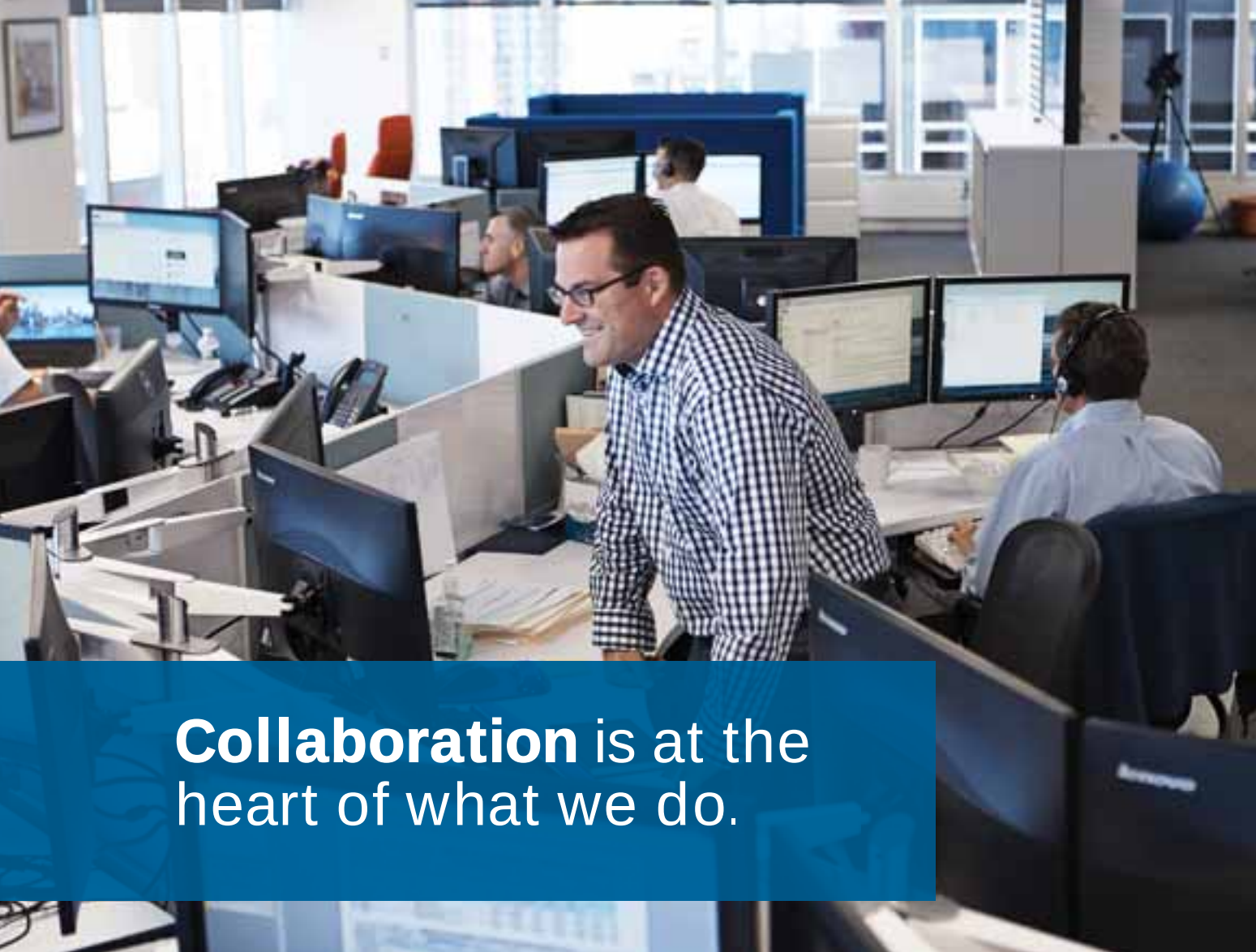
In September last year, Axioma updated its Portfolio Optimizer in line with greater demand for services around taxes. It improved its tax-aware portfolio rebalancing, added multi-core optimization, and enhanced its web service and Python API. The enhancements were aimed at clients looking to cut optimization run times for multiple portfolios and to provide more tax information in reports.

—WSW



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Collaboration is at the heart of what we do.

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Best Trading Infrastructure Provider

Cobalt

Post-trade shared-ledger platform Cobalt wins this year's best trading infrastructure provider at the AFTAs, knocking off previous winner, Trumid Financial. The win comes down to Cobalt's private network that leverages distributed-ledger technology (DLT) to bring efficiencies to post-trade processes and significantly reduce cost and risk for foreign-exchange (FX) market participants.

Andy Coyne, co-founder and CEO of Cobalt, says that while DLT holds the potential to revolutionize many processes, including those in post-trade FX, in its purest form, some practical issues exist. These, he says, specifically regard throughput and anonymization, which render it inappropriate for financial infrastructure purposes. "For example, public permissionless blockchains, such as those used to verify bitcoin transactions, were developed to enable a transfer of value between unknown and untrusted counterparties. This is very different to the private, trusted and heavily-regulated networks in which banks operate and trade," he says.

Cobalt utilizes the "more appropriate" parts of DLT, such as distribution, encryption and the ability to provide a single version of a transaction with multiple perspectives.

Cobalt estimates that 50 to 80 percent of back-office work is spent on reconciliation and the total market spend for FX alone is in the tens of billions of dollars, as complex cost structures incur multiple license fees, messaging charges, IT overheads, and staff costs.

The creation of a confirmed, shared and normalized portfolio of trade data frees up middle- and back-office resources currently devoted to reconciliation by ensuring that there is only one golden version of each contract. Coyne says this unique ecosystem delivers immediate cost and efficiency benefits.

In April 2017, the firm launched Cobalt BlueSky, which allows ledger members to enable controlled access to their data for third-party specialist service providers. Cobalt has partnered with business and technology firms such as Solace and BT Radianz to enhance its data and interconnectivity capabilities. Other partners include Equinix, Kx Systems, LMRKTS and BestX.

It currently has signed up over 20 institutions to the platform, including Citadel Securities and XTX Markets.

Cobalt is working toward the launch of its live platform in the first quarter of 2018. Its fully-functioning beta environment currently processes more than 100,000 trades a day.

—WSW



“Cobalt offers an elegant, cost-effective and innovative solution to existing issues in post-trade FX. Being named the AFTAs’ best trading infrastructure provider 2017 reflects the positive response we have received from the market to date.” **Andy Coyne, co-founder, Cobalt**

Best Use of the Agile Methodology

Confluence

The prominence of the Agile development methodology has exploded within the financial technology sphere in recent years as both vendor and end-user firms have looked to release new functionality on a continual basis, with release cycles being reduced to days and weeks from months and often years under the waterfall model. While the practice itself may not be new—indeed, it has been present within the capital markets for over a decade now—the emergence of new technologies and innovation culture means that firms still using the waterfall methodology are often left behind by those embracing Agile.

Pittsburgh, Pa.-based Confluence, a data management software vendor with a buy-side focus, follows up its win in the best use of the Agile methodology category at last year's Buy-Side Technology Awards by claiming the award at this year's AFTAs for its use of Agile development underpinning its flagship Unity and Unity NXT platforms for fund automation, data management and regulatory reporting.

Confluence has adopted scrum implementations across its development teams, running two-week sprints that use standard ceremonies of daily scrums and sprint planning, retrospectives and reviews. The vendor's clients are included within these processes and every step of the development process to ensure collaboration is maintained from product inception to completion, with other collaborative efforts covering idea validation, assisting with workflow development, regular feedback and using the working software throughout the development process. Full "360-degree reviews" are carried out on a monthly basis to provide regular insight and feedback both within and outside of the teams, fostering an environment with a focus on delivering value to the firm's internal and external stakeholders. Each scrum team is organized into an "Agile pod" designed to encourage shared knowledge, provide opportunities for cross-training, and promote self-governance and self-organizing behavior. These pods are also linked to their internal operational counterparts to increase collaboration between the teams developing the software and those that will use the end product.

Regular software releases allow Confluence to deliver incremental value to its end-user base, as clients do not have to wait until the project is completed to realize its value. Confluence products such as its software-as-a-service (SaaS)-based applications release on a monthly cycle and its release process has produced 42 consecutive on-time and within scope monthly releases of Unity NXT products. The vendor's other platforms, including Unity, are currently delivered with a 95 percent on-time and within scope rate.

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“Everyone at Confluence is committed to providing our clients with the best possible products and services and our implementation of the Agile methodology is inseparable from that goal.” Chris Evans, senior vice president and CTO, Confluence

Most Innovative Third-Party Technology Vendor— Middle and Back Office

S3 Partners

New York-based S3 Partners has enjoyed success in the annual Buy-Side Technology Awards over the past three years, taking home awards for best newcomer, best big data technology provider and best data analytics tools. It was only a matter of time, therefore, that the firm made a similar impact at the AFTAs and in 2017 it added the award for most innovative third-party technology vendor (middle and back office) to its growing collection, thanks to its flagship offering, the software-as-a-service (SaaS)-based data analytics platform, Blacklight.

Blacklight is designed to allow users to manage and reduce counterparty risk, as well as improve buy-side relationships through the provision of data-driven analytics that in turn enhance trading decisions as the volumes that data asset managers must store, process and analyze continue to grow to the point where information overload has become a very real problem. In the three years the platform has been operating, S3 Partners has rolled out a number of enhancements covering a full reporting suite, digitized document library, a security finance dashboard, multi-asset class exposure analytics, enhanced visualization tools, and new wallet and performance measurement analytics, among others.

But to label Blacklight as a data analytics platform would do it a disservice, as the platform's breadth of functionality covers securities financing, commissions, cash management, over-the-counter (OTC) collateral, counterparty agreements/terms/risk, prime broker/repo/swap margin calculations, custody/counterparty relationships, balance-sheet efficiency, and what if real options analysis (ROA). The depth of the platform is evident through its securities master database, which includes 450,000 discreet identifiers, mapped to all financing/swap counterparties, supported by over five million data points, all weighted toward liquidity. Underpinning this is S3 Partners' proprietary Prime Information Exchange (PIX) data standardization protocol, which aggregates, reconciles, normalizes and curates all financing data from a wide variety of electronic and voice broker sources and counterparties.

Over the last year the vendor has continued to build out its suite of analytics and apps, available through Bloomberg and Thomson Reuters, in particular its Blacklight Apps Crowding Kit (Black Apps), which provides analytics on crowded trades, available via Bloomberg's App Portal. According to the firm, Black Apps is able to see accurate, real-time, short-interest levels on a per-share and percentage-of-float basis, weeks ahead of exchange reporting, allowing users to identify how short selling, short covering, long selling and potential short squeezes impact portfolios.

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Most Innovative Third-Party Technology Vendor— Front Office

Overbond

Front-office technology platforms might be working hard to address demands for greater holistic functionality, but when there's a specific challenge to tackle—the digitization of the corporate and government bond market, for example—precise solutions are needed. The winner of this year's most innovative third-party technology vendor (front office) category has only been operational since 2015, but Toronto-based Overbond has staked its claim at the head of the pack thanks to a blend of its proprietary technology and a well-defined strategy.

"Primary bond issuance is what I would call the last bastion of the capital markets to remain completely manual," says Vuk Magdelinic, CEO of Overbond. "We have come to 2017 and the time is definitely right for change, given how much the capital markets have changed, specifically in the secondary market where liquidity of traded bonds is a great problem and where price discovery is being propped up by all sorts of technology tools, but the supply isn't there."

The ethos driving Overbond's end-to-end platform is establishing connectivity between bond issuers and investors, where the former need confident pricing coming to market and the latter require greater supply of primary bonds. The platform's core is the corporate bond intelligence (COBI) suite of algorithms, which operate at pricing, propensity to issue (a dashboard of issuers that are likely to come to market), and matching levels, the idea being to combat "information overload" for asset managers by digitizing and digesting all necessary data algorithmically to arrive at the executable, or at least actionable, trade idea.

The platform's functionality was extended last year through the rollout of OverbondX in January 2017, a deal-execution module that allows users to digitally execute both private placement and public offerings, thus speeding up the process of executing new issues transactions from origination to launch. This was followed later in the year through the launch of COBI Opportunity, which provides a matchmaking algorithm that incorporates market signals between investors and issuers to provide investment ideas for new bond issues.

Having accrued a 40 percent market share in its native Canada in the two years since its founding, Overbond expanded into the US market in September, furthering its buy-side client base and onboarding new corporate and treasurer bond issuers. The vendor is also mulling a European launch during the back end of 2018.

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Most Innovative Third-Party Technology Vendor—Infrastructure

UnaVista

UnaVista, the London Stock Exchange Group's (LSEG's) platform for matching, reconciliation and reporting, makes its debut at the AFTAs as winner of the most innovative third-party technology vendor (infrastructure) category, at a time when industry focus on sweeping changes to the regulatory environment means demand for technology innovation and expertise has never been higher.

Given the LSEG's heavily regulated nature as a primary market operator across multiple geographies and jurisdictions, UnaVista occupies something of a niche among its peers, being able to use its parent's global reach and expertise to deliver the necessary reporting functionality required by its clients. With major regulations such as Mifid II/Mifir and the Market Abuse Regulation (MAR) in Europe and Dodd-Frank and the Consolidated Audit Trail (CAT) to contend with in the US, UnaVista's combination of insight and technology solutions puts it head and shoulders above its competitors. The UnaVista platform is driven by LSEG's vast data repository allowing it to provide comprehensive data analysis, peer-to-peer benchmarking, and surveillance functionality through a single interface, supported by a dynamic data model that integrates client proprietary data structures that helps speed up the onboarding process.

Much of the work undertaken by UnaVista over the past 12 months has focused on readying its Mifir reporting capabilities and it has utilized that experience to release a new tool to replicate the reporting and data requirements of the CAT, which will allow US broker-dealers to simulate the requirements of the initiative by inputting data into the UnaVista system, which is then compared against the specifications or guidance that the vendor has received from the relevant US competent authorities. UnaVista has also teamed up with fellow LSEG subsidiary MTS, a European electronic fixed-income trading market, to develop a new reporting solution for the Securities Financing Transactions Regulation (SFTR), which is expected to go live in 2019. The collaboration will provide a single solution for the trading and reporting of securities financing transactions with front-to-back reporting of Unique Transaction Identifiers (UTIs), timestamps, ISINs and other product identifiers required by the regulation.

Outside of the regulatory sphere, UnaVista is also involved in a number of LSEG technology projects, further enhancing its offering within the LSEG cloud infrastructure, allowing the platform to scale to greater levels when introducing new products and services to other regions, and adding new data display and analysis tools to its platform.

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Most Innovative Third-Party Technology Vendor— Risk, Compliance and Reporting

Imagine Software

The hallmark of a truly innovative technology vendor is its ability to rapidly respond to changes in the market and address its clients' demands by developing and delivering a new solution that provides exactly what is required of it. New York-based Imagine Software, winner of the most innovative third-party technology vendor category (risk, compliance and reporting) at the 2017 AFTAs, has displayed this quality in spades through its Real-Time Risk and Compliance (RRC) solution. While this may be Imagine's first appearance in AFTAs' winners' circle, its approach to innovating its technology offering in line with market demands and the changing regulatory environment surely bodes well for the future.

In the aftermath of the Lehman Brothers failure back in September 2008 and the subsequent global financial crisis, demand for enhanced risk and portfolio management systems skyrocketed, forming the genesis of Imagine Software's approach to its technology development efforts. The RRC solution was commissioned by the vendor's clients, with some requiring a solution to manage global compliance, while others found their existing technologies were inadequate to handle large-scale trading operations alongside evolving regulatory requirements. Imagine Software undertook a significant reworking of its underlying architecture to develop a sustainable risk and regulatory reporting solution designed to investigate, identify, correct and report risk exposures on a trade-by-trade, tick-by-tick basis.

RRC is a real-time risk engine combined with a managed data service covering all asset classes and integrating with legacy systems. It effectively sits on top of an organization's existing technology infrastructure and delivers streaming real-time trade summaries, alerts and operational data, key metrics such as net-asset values (NAVs) and value-at-risk (VaR), and full access to positions, pricing inputs and analytics. The solution's analytics framework provides a flexible toolset to monitor risk and exposure, covering a range of metrics and historical scenarios, as well as stress-testing functionality and data visualization tools.

Imagine Software's efforts are clearly bearing fruit—it has attracted new clients across the buy side and sell side, the most notable of which is Societe Generale. The French bank deployed the RRC solution to manage risk operations across thousands of trades per second across millions of positions for its Prime Services group, using the platform to track regulatory limits and investment risk, to identify potential intra-day breaches of capital utilization limits, and perform institutional-grade due diligence across all asset classes.

—JB



“Imagine Software undertook a significant reworking of its underlying architecture to develop a sustainable risk and regulatory reporting solution designed to investigate, identify, correct and report risk exposures on a trade-by-trade, tick-by-tick basis.”

Winners' Circle: Imagine Software

Leading the Pack

After winning the coveted vendor innovation category for risk, compliance and reporting at this year's AFTAs, **James Rundle** sits down with Imagine Software's CEO, Lance Smith, to talk about risk, regulation, and what's coming up in 2018.

Q Tell us about your Real-Time Risk & Compliance (RRC) solution—what are the challenges it's looking to address?

Lance Smith, CEO, Imagine Software:

RRC grew out of our clients' needs to manage a variety of real-time regulatory demands, including limits monitoring and intra-day risk reporting. But, as regulations evolved and became more complex, our clients asked for a forward-thinking solution that would deliver not just regulatory compliance, but enable them to achieve consistency between intra-day trading and end-of-day P&L and risk metrics across all asset classes—while trading many millions of trades per day for thousands of accounts. The resulting product, RRC, is now in use by some of our clients and is in beta testing by others. It tracks regulatory limits and investment risk, identifies potential intra-day breaches of capital utilization limits, and performs institutional-grade due diligence across asset classes firm-wide.

Q The platform includes a number of analytics capabilities, from stress-testing historical scenarios through to real-time snapshots of positions. How was this accomplished on a technical level?

Smith: It was a world-class challenge that required a complete re-architecting of our already-robust risk engine. We worked hand-in-hand with our users, reviewing the existing risk and compliance parameters and planning for future iterations. It was a weekly, often daily collaboration, and Imagine provided development prototypes, including liquidity calculations and working interfaces. Enhanced performance was achieved by utilizing a highly-efficient mathematical modeling of securities, coupled with parallelization of computations across farms of compute servers. The implementation process was meticulous, and the end result is truly best-of-breed.

As a real-time risk engine combined with a managed data service—Imagine's Global Security Master contains the data on every listed security—RRC significantly lowers the cost of monitoring client risk and remaining compliant, and it scales for growth. RRC integrates with legacy systems, effectively sitting on top of a firm's own technology system to deliver streaming real-time summaries of trades, alerts and operational data, key metrics, such as value-at-risk/net-asset values (NAVs), best or worst



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“As a real-time risk engine combined with a managed data service—Imagine's Global Security Master contains the data on every listed security—RRC significantly lowers the cost of monitoring client risk and remaining compliant, and it scales for growth.” **Lance Smith, Imagine Software**

profit-and-loss or NAVs, or totals across the firm, and with unlimited additional granularity. Our clients can also create new calculations on their own, such as elaborate stress-tests across multiple factors utilizing the Imagine Financial Platform.

Q When it comes to effective risk management, what do you see as the main challenges at present for your clients, and where do you see potential areas of concern in the future?

Smith: Regulatory challenges will continue to evolve, as will the need to manage the real-time risk on high-speed trading, as velocities continue to rise. High performance across the spectrum of traded securities—including over-the-counter—will become a requirement, no longer a “nice-to-have.”

Q What can we expect from Imagine in 2018?

Smith: More innovations! Enabling our clients to compute their own margin in 2017 opened up a new way for them to better manage capital and create efficiencies. Already slated for this year are customized solutions around cross-margining, netting and offsets. Using risk portals powered by Imagine, our clients can provide their clients with real-time margin alerts and risk management tools so that they can take the appropriate actions to forestall an unwelcome margin call. That ability gives our clients a critical competitive advantage. We can also expect developments around cryptocurrencies as the exchanges begin to offer futures and they emerge as an asset class. **W**

Best Analytics Initiative

Credit Suisse

The ability to swiftly, efficiently and accurately analyze large datasets, exposure to various market and credit risks, and identify trading opportunities has emerged as one of the key differentiators for large numbers of capital markets firms in recent years, given the complexities of the analysis underlying such undertakings. One firm that appears to be leading that charge is Swiss investment bank Credit Suisse, which wins this year's AFTA for the best analytics initiative, thanks to its capital stress-testing, financial planning and forecasting platform, dubbed ProPL, an abbreviation of its official name: Projections Platform. As part of the bank's comprehensive capital analysis and review (CCAR) stress-testing program, it needed to develop a platform for managing the front-to-back execution of capital projection models.

Early in 2017, Credit Suisse successfully filed for a US patent for the platform, an offering that seeks to improve the bank's ability to forecast pre-provision net revenue (PPNR), balance sheet, risk-weighted assets (RWA), losses, and other key financial metrics for each area of the business. According to the bank, "these forward-looking capital projections are based on data-driven models that consider the impact of multiple financial and economic variables over an extended period of time. Projection results inform strategic business planning by providing a capital adequacy assessment using defendable, repeatable and quantitative processes."

ProPL sources over 100 data feeds from across the organization and tracks and tags all incoming data assets, which helps with BCBS 239 compliance and provides data quality checks and reports. It also houses and conducts the execution of the firm's capital projection models, automatically resolves the dependencies between models and sequences their execution accordingly. The architecture that ProPL is built on is scalable so that any calculation produced can be traced back to the exact set of models used and their precise configuration at the time, along with every data input, model parameter, output adjustment, and overlay applied.

The platform has over 100 models representing over 90 percent of Credit Suisse's revenue within the Intermediate Holding Company (IHC). CCAR submissions, which typically take two to three weeks to run, can be executed in under 30 minutes, according to the bank.

Last year this category was split into two separate categories, with Morgan Stanley taking the award for the sell side, while JPMorgan Asset Management won the buy-side award.

—AM



“ProPL sources over 100 data feeds from across the organization and tracks and tags all incoming data assets, which helps with BCBS 239 compliance and provides data quality checks and reports.”

Best Cloud Initiative

Northern Trust

It's easy to think that after years of discussion, cloud is old hat for financial services firms. But the process of fully moving to a cloud-based architecture requires not only a change in technology but also in the mindset of developers, as Northern Trust discovered.

The firm has historically been one of the most forward-thinking when it comes to cloud, and had put in place a private infrastructure-as-a-service (IaaS) cloud already. Over the course of 2016 to 2017, it deployed platform and containers-as-a-service (PaaS and CaaS) into the environment, built largely on software-defined infrastructure.

"It was a natural evolution of our cloud strategy, where we have been so focused on IaaS, PaaS and Containers etc., and the reality is that to truly benefit from speed to market, you have to shift your mindset to a software-defined world," says Vijay Luthra, senior vice president of infrastructure engineering and operations at Northern Trust. "While IaaS-PaaS is great and defines certain cloud technologies, we felt that to get the most out of developer productivity, and the most value for our clients and business, it made sense to start focusing on software-defined infrastructure, with an overall vision of frictionless infrastructure."

This wasn't just a case of deciding to move to a software-defined world and making it so, however. It required the creation of a specialized DevOps team within the firm, one which could move seamlessly between various disciplines in order to encourage the rapid growth and adoption of these platforms.

"We established a DevOps team of multi-skilled, what Gartner calls 'versatilists,'" Luthra explains. "The goal was to bring a bunch of folks with multi skills—app dev, infrastructure, middleware etc.—to form that initial team, to help get the project started."

Northern Trust has already identified significant benefits from the initiative, moving hundreds of micro-services onto the PaaS platform and more than a dozen traditional applications to the CaaS platform. It has also automated code deployments into the environments, and plans to achieve a 40-50 percent reduction in web infrastructure over the next 12 to 24 months, thanks to consolidation in the containers. The job is not yet finished, however. "Clearly there are areas where we either need to do the same thing, or reskill and hire more versatilists," Luthra continues. "The whole software-defined network space is a huge area of opportunity and we need to get it right. So I would say it's a process that's in the works, but we've taken some very sound steps."

As for what those next steps constitute, Luthra says the team is focused on "constraints," in terms of identifying the areas where developers are being slowed down, and where the bank is experiencing bottlenecks in moving faster on time-to-market for clients. "That is where we will make investments," he says.

—JR



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Northern Trust has already identified significant benefits from the initiative, moving hundreds of micro-services onto the PaaS platform and more than a dozen traditional applications to the CaaS platform.

Best Compliance Initiative

Bank of America Merrill Lynch

With the announcement of the Department of Labor's (DOL) Fiduciary Rule, asset managers have been exploring how to meet their increased regulatory compliance needs. Bank of America Merrill Lynch (BAML), winner of this year's best compliance initiative, was determined to build technology solutions to meet not just the new rule but also clients' other needs.

Jay Link, BAML's head of fiduciary programs and platforms, says its compliance program to meet the fiduciary rule had to take a centralized approach. "Enhancements to several of our wealth management technology platforms were needed to comply with the fiduciary rule, while also enabling our business strategy," Link says. "Our technology approach included a centrally-coordinated effort to design, build and deploy changes across various distributed and mainframe applications, including both internal and external facing."

Link explains that the solutions had to be flexible, given the uncertainty around the date of the new rule. The bank's advisor platforms and other applications had to be upgraded including its Investment Advisory Program (Merrill Lynch One) and the Merrill Edge Platform, Link says, but it was not just the platforms and how they were accessed that had to be improved—the retirement account enrollment process, supervision routines and supporting applications had to be redesigned for best-interest recommendations. The bank also set up an end-to-end scheme so that advisors can better explain offerings, capture client information and enroll new clients into programs.

Around a dozen different technology teams worked on enhancing the wealth and asset advisory platforms which took place over an 18-month period. The strategy covered eight software releases around different business lines. In crafting the solution, Link says each business line and internal departments had a voice in terms of how it can be implemented.

The solution encompasses all aspects of the firm's wealth management business, including its legal, compliance, risk, communications and marketing business lines, and technology partners. The ruling, announced in April 2016, was supposed to be fully implemented at the start of January 2018, but has since been pushed back to 2019. Despite this, Link says the project is not on hold and will still be rolled out once the rule is fully implemented. "The delay pushes back the applicability date for full compliance with certain exemptions to the rule," Link says. "However, the rule became applicable and, as of today, is still in effect regardless of the delay. Our strategy to help ensure a higher standard of care for clients does not change."

—ED



“The solution encompasses all aspects of the firm's wealth management business, including its legal, compliance, risk, communications and marketing business lines, and technology partners.”

You don't just set the bar, you keep raising it

Congratulations to our colleagues who were awarded “Best Compliance Initiative” for their innovative and extensive work.

By using technology to enhance compliance with regulations, we're challenging the industry to improve the standard of care for clients.



Bank of America



Bank of America
Merrill Lynch U.S. Bank of America
Trust Merrill Lynch

The AFTAs winners are selected by Waters' four senior journalists. Large categories (five entries or more) typically require two rounds of voting, while small categories (four or fewer entries) only have one. AFTA looks for topicality and innovation, and well-articulated arguments explaining why the entrants believed they were worthy of the win.

waterstechnology.com/awards-rankings/3456726/american-financial-technology-awards-2017-all-the-winners

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Best Cross-Asset Trading Initiative

State Street Global Markets

One of the greatest challenges when it comes to embracing new technologies is integrating them with rigid legacy systems. With the advent of tools like machine learning and distributed ledgers, firms are having to re-examine their trading systems. About 18 months ago, State Street Global Markets undertook such a review for its securities finance trading and operational processes, finding both synergies and deficiencies in its existing trade lifecycle. This examination led to the creation of a new trading platform called Iris. And at just-over a year old, Iris has won its first AFTA for the best cross-asset trading initiative.

"We had a challenge a couple of years ago where we really needed to scale our infrastructure because volumes were increasing greatly," says Craig Tucci, COO for State Street Global Markets' Securities Finance unit. "We wanted to take a step back and understand what we needed over the next five to six years to handle those volumes and make sure we could embrace emerging technologies that were coming down the road."

Late last year, Iris went into production for securities finance. It delivers real-time information to help improve the decision-making process. State Street also focused on the platform's user experience (UX) interface. "This year, we've further enhanced its capabilities to be able to handle all of our trading volume and basically cover the full lifecycle of a trade, from booking to fully settling a trade," Tucci says. "It's really streamlined our process and has allowed us to handle a lot more volume with fewer bodies, and allowed us to prepare for a lot more demand across the rest of Global Markets."

Nickolas Delikaris, global head of trading and algorithmic strategies at State Street Global Markets, says the bank will continue to roll the platform out to other areas. "We started in enhanced custody, we've moved to the broader securities finance business, and we're starting to move into areas like FX and even more operational areas, like onboarding," Delikaris says. Beyond that, Iris will be scalable so that it can incorporate new technologies, such as machine learning, natural-language processing and blockchain. "This will be a platform that will easily extend to use these technologies," he says.

Last year's winner in this category was UBS Neo, while State Street previously won this award back in 2009.

—AM



“Late last year, Iris went into production for securities finance. It delivers real-time information to help improve the decision-making process.”

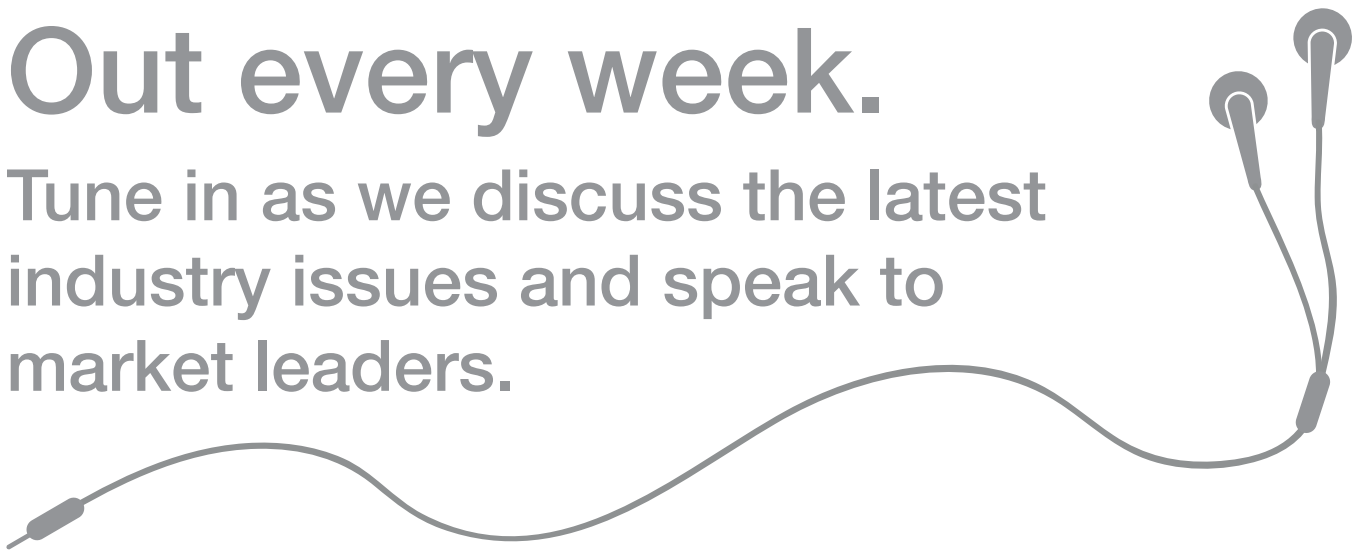
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Best Infrastructure Initiative

JPMorgan Asset & Wealth Management

JPMorgan Asset and Wealth Management's Technology Resiliency team wins the 2017 AFTA for the best infrastructure initiative, taking the crown from last year's victor, Northern Trust.

The resiliency initiative was, in part, a move to streamline a process the firm constantly has to perform, says the asset manager's head of production management, Joe Pedone. "We've leveraged some cutting-edge automation techniques to take that manual work, and basically shifted it to the left and made it highly automated and low-resource intensive," Pedone says. "We've reduced up to 80 percent of the work required to execute a resiliency event, which is a significant amount of time. The good news is it's not just saving on labor but we can be resilient faster."

The project entailed automating many of the tasks associated with resiliency tests, such as making sure runbooks are updated, the failover event to the secondary data center occurs, and collection of evidence is put in a document repository. The process uses a microservices library, so that when programmers need to undertake a task such as flipping the domain name system over to the secondary server, they do not need to write out a script, but instead can take a pre-written one from the library. The process used to be manually intensive, Pedone says, and with the number of times JPMorgan has had to undertake resiliency events, it entailed a lot of tedious work. The firm normally runs fail-over tests almost every week for each application it offers, moving from a primary data center to a secondary one. "Every critical system at JPMorgan is required to have high levels of stability and resiliency. A lot of the work that's done in the resiliency program has traditionally been manual," Pedone says. "We're also required by our regulators to validate and test that this resiliency works at a minimum of an annual basis and in most cases multiple times a year. It generates an incredible amount of labor from preparing for that work, conducting the testing, and doing the validation."

One of the reasons why the asset manager's resiliency program moved so quickly was down to the decision to create a team whose sole focus was to build out the automation program. Pedone says development of the initiative took around three to four months, with the first live, fully automated fail-over test occurring in the first quarter of 2017.

Ultimately, he notes, automation is a good strategy for firms looking to improve resiliency systems and says it's important that it becomes a priority for the industry as a whole.

—ED



“The project entailed automating many of the tasks associated with resiliency tests, such as making sure runbooks are updated, the failover event to the secondary data center occurs, and collection of evidence is put in a document repository.”



BETTER TECHNOLOGY FOR BETTER DECISIONS

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BEST TECHNOLOGY EXECUTIVE BUY SIDE

Mike Urciuoli
Chief Information Officer,
Asset & Wealth Management

MOST CUTTING-EDGE IT INITIATIVE

NewsFilter

BEST INFRASTRUCTURE INITIATIVE

Resiliency Automation Tool

Source: End-user Categories of 2017 American Financial Technology Awards.

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J.P.Morgan

Best Data Management Initiative

Deutsche Bank

Mark it two in a row for Deutsche Bank at the AFTAs in the best data management initiative category. As one might expect, this year's award builds off of what the bank achieved with its DQ Direct initiative, which won this category in 2016.

DQ stands for "Data Quality" and that's what this initiative is all about—a project aimed at creating a common language to describe data problems in order to improve the firm's data on a global basis. "It creates a common platform as a catalyst to allow people to collaborate and talk in a common language—that's the number one thing," says James White, director of Deutsche Bank's Data Quality Management unit, which is overseeing this project. "It takes disparate problems and issues and creates something that's joined," he says.

While 2016 was more about proving the worth of the project and setting the strategy, 2017 was about rolling out DQ Direct globally. This initiative—and the underlying platform—aims to improve data quality by transforming the way that the bank's 100,000 employees think, feel and act toward its data. As such, there are six steps involved in this change of culture. First, there's initial training as to the "whats and whys". Then they identify a DQ Direct "champion". From there, they gain feedback regarding the quality of issues loaded into the tool. Next, there's a presentation of management information. After that, they confirm that all known and well-formed data quality issues are loaded into DQ Direct. And, finally, there's a presentation of data quality issues to the data governance council.

Over the last 12 months, Deutsche Bank has completed the six steps across 56 of its 59 coverage areas—which is not a legal designation, but rather a way that the bank views its various operations, from business areas, products, processes to regions and key projects.

Since its launch two-and-a-half years ago, 7,800 data issues have been registered; 4,900 data issues have been consolidated; 1,100 data issues have been resolved; and 1,800 issues remain open and visible, each with a descriptive business case allowing prioritization for remediation.

For 2018, the bank will finish rolling out DQ Direct to the other three outstanding coverage areas. Beyond that, the Data Quality Management team will look to develop a way to better measure performance versus expectations so they can better show the impact of the project, directly, and so that people can "tell a story" about the data issues they encounter.

—AM



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This initiative—and the underlying platform—aims to improve data quality by transforming the way that the bank's 100,000 employees think, feel and act toward its data.

Best IT Integration Initiative

Cowen

When Cowen announced that it was acquiring Convergenx in April 2017, it was looking for a swift close to the deal—in just three months, the agency broker would become a full part of its new parent, renamed and rebadged to reflect that change. For CIO Ann Neidenbach and her team, there was barely time to catch their breath before they set to work on integrating the technology of the two firms.

This was no small task. By what Cowen was calling “Day One,” on June 1 last year, the key objective was to move the Convergenx sales and program trading desks, a task which would involve the migration of two trade desks, 400 clients, 2,200 FIX connections and 72,000 subaccounts in a period of just two months.

“The Day One roadmap needed to detail the interaction between our customers and the various trading desks, our soft-dollar and commission-management business, as well as our middle and back office, accounting systems and our websites and client portals,” says Neidenbach. “We also had to test workflows with over 30 different systems to ensure a seamless migration for Day One.”

Part of the complexity was helped by the fact that Fidessa was common to both firms, but there were a number of other considerations to take into account. Different systems existed inside Convergenx for commission management, international trading, and various “algo racks” that operated on different platforms. The focus, therefore, had to be on integrating workflows. There were also issues in that Day One fell on a Thursday, meaning that Cowen had to coordinate with its customers to change settlement instructions and connectivity during the week. “Getting this done in a two-month period was a super aggressive timeframe,” Neidenbach recalls. “There was a lot of cooperation and team work, both internally and externally from our customers and vendors. The other complexity was doing this migration in the middle of the week. Not only was it a big change for our clients, but we physically moved two of our trading desks to a new building, new systems, and turrets.”

But the hard work paid off: Customers were trading with Cowen on June 1, and the firm successfully migrated 25 percent of its revenue from Convergenx Execution Systems to Cowen. Traders were able to use their systems and their turrets from 7 a.m. and all end-of-day processes operated normally.

The job is far from over, though. Neidenbach and her team are now focusing on Day Two initiatives, which she estimates will continue into the second quarter of 2018. “We have to work closely with the customers and their order management system (OMS) vendors to move to new algo racks and clearing vendors. We are also building international workflows to enable legacy Cowen clients to trade internationally, requiring middle and back offices configuration and compliance approvals,” she says.

—JR



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Best IT Team

Charles Schwab Investment Management

The best IT team award of this year's AFTAs goes to Charles Schwab Investment Management's investments technology team, snatching the crown from last year's winner, JPMorgan.

Charles Schwab's investments technology team saw success this year with the delivery of a platform that can scale to support increased volumes, while developing a user experience that streamlines the firm's money funds portfolio construction, and also increased collaboration across user groups.

James Ferrarelli, vice president and head of technology at Charles Schwab Investment Management, says that while working on the projects, the team looked at the bigger picture rather than individual needs. "The team transformed the technology architecture to deliver a flexible, scalable and integrated platform to the business," Ferrarelli says. "Additionally, the team made business analysis and prioritization more productive by emphasizing end-to-end workflow of a business process rather than focusing on individual systems that would deliver a capability."

Ferrarelli explains that the team was divided according to functions within the investment process, including research, portfolio construction, implementation and trading in order to keep the process at the center of development. The technology team develops applications that support all of Charles Schwab's departments, from portfolio management, credit research, trading and investment risk across fixed income and equities, often with differing needs. Manish Ghayalod, managing director and head of investments technology, says the teams often had to work on very different projects to support the investment management business. "Both the research and portfolio management teams focused on building an intuitive workflow to provide portfolio managers with leverage and efficiency to keep pace with business growth," he says. "In risk management, a framework was developed that allows us to quickly introduce new scenarios to stress-test portfolios. Delivery of these projects benefited from employing key Charles Schwab foundational initiatives in data and analytics."

Ghayalod adds that 2017 proved to be a challenge as the team had to work around mitigating risk in the current operating environment, where projects had to be able to scale without overrunning budgets. Another challenge was a changing governance framework, particularly since some of the platforms the team worked on had to extend across different asset classes.

The year ahead might be just as challenging, though, as Ghayalod anticipates projects focusing on portfolio management and regulatory initiatives. "In 2018, the team anticipates a continued focus on portfolio management and regulatory initiatives, and comprehensive integration of vendor products with our underlying platform and framework to provide a seamless investment experience," he says.

—ED



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Schwab's investments technology team saw success this year with the delivery of a platform that can scale to support increased volumes, while developing a user experience that streamlines the firm's money funds portfolio construction, and also increased collaboration across user groups.



Investment
Management

A clear purpose.

We're excited our Investments Technology Team won "Best IT Team" at the 2017 American Financial Technology Awards. Our culture has a clear purpose of putting the investor first—and we are grateful for our employees who support it.

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Best Mobile Strategy

Janus Henderson

Janus Henderson, the merged entity comprising Janus Capital and London-based Henderson Group, wins its first AFTA thanks to its Quantum Global offering, the firm's risk management, research, and portfolio analysis tool, which has been used by the fundamental fixed-income business since 2010 through a desktop application. Janus Henderson risk research analyst Erin Noel says that in 2014, the team started receiving feedback from users who frequently travelled who felt that the desktop application was not convenient to use on the road, which resulted in the firm developing mobile functionality. "It was apparent that there was demand for mobile apps from analysts, portfolio managers, and to a certain extent, traders," Noel says. "Analysts said it would be helpful to pull up information on companies or historical spreads on the fly."

Before the app was developed, users had to access Quantum Global through virtual private networks, and required a stable internet connection—which, as anyone who has worked on the road can attest to, is not always easy. The mobile app was developed to use less data and was written using Objective C for greater responsiveness.

The Quantum Global mobile app works on iPads and iPhones, although Noel points out that a phone screen is just too small to contain all the information the app provides. He says one of the challenges the development team had to negotiate was in crunching down the screen real estate.

The app offers many of the desktop features, including portfolio tear sheets, portfolio visualizers, and research and historical charting. It had a short development time, rolling out within four months in 2014 for users. The roll out started with a few basic features but was eventually supplemented by other features already in the original Quantum Global desktop iteration.

Currently, the app is used mainly by the firm's fundamental fixed-income team based in Denver, but after the merger with Henderson Group in May 2017, Noel says plans are underway to expand its user base to include Henderson team members.

Noel says the app is part of a greater technological change for the asset management industry, a sector that is increasingly turning to innovation to create efficiencies and provide added value to clients. "We're strong believers that technology will lead the next generation of asset management," Noel says. "It makes for more informed decisions and insights as well making asset managers more competitive and helping them to stay ahead of the pack."

—ED



“The app offers many of the desktop features, including portfolio tear sheets, portfolio visualizers, and research and historical charting. It had a short development time, rolling out within four months in 2014 for users.”

Best Reporting Initiative

State Street Corporation

From June 2018, the largest registered investment companies—those with net-asset values of over \$1 billion—will be required to comply with the US Securities and Exchange Commission's (SEC) Investment Company Reporting Modernization Rule. Existing forms, such as N-Q and the N-SAR are being replaced with N-PORT and N-CEN. Despite being a drive to bring reporting functions up to date, the requirements are complicated, and compliance deadlines are short. With its reporting tools built on the back of its DataGX platform, State Street has a solution.

"State Street's DataGX platform was looking to solve for multiple challenges around the new reporting modernization rules," says Lauren Davides, vice president at State Street. "These challenges include complex data calculations, sourcing, aggregating and cleansing a large amount of data, an accelerated filing deadline and consistent reporting across SEC filings."

The team at State Street has been working on the tool since the SEC first proposed the reform in the summer of 2015, with the creation of a team to comb through the hundreds of pages of content contained in the rules. Actual development began in Q1 2016 in the bank's Agile labs and when the rules were finalized in October 2016, State Street was already "well underway" with the tool, Davides explains.

Client usability is at the heart of the N-PORT/N-CEN Reporting Tool. As such, the team has had a distinct focus on the front-end. The user interface, in particular, is accessible through a web browser, and was built with client input from the very start.

"It is easy for the main contact at a client to assign funds, along with preparers and reviewers. It also offers the flexibility of review since clients can set thresholds for certain line items and the UI will kick out an alert and notify the client when something requires additional review or insight. Another advantage of the UI is that you can export information easily, whether through direct file transfer, Excel or other file formats as requested."

Clients are currently being onboarded, and interface testing will begin in January 2018, when users will be able to start setting up reviewers, thresholds and other criteria specific to their reporting needs.

Where the real strength of the tool lies though, Davides believes, is in the way it handles data. Other vendors may have off-the-shelf products that are similar, but State Street, she says, goes a step further. "The two most distinguishing factors are that we offer a complete end-to-end solution and enriched data," she says. "We don't just accumulate the data to populate Form N-PORT and Form N-CEN—we also enrich the data so that it is correct for SEC reporting."

—JR



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Client usability is at the heart of the N-PORT/N-CEN Reporting Tool. As such, the team has had a distinct focus on the front-end. The user interface, in particular, is accessible through a web browser, and was built with client input from the very start.

Best Risk Management Initiative

TD Securities

Taking home the best risk management initiative in the 2017 AFTAs is TD Securities, thanks to its collateral management and optimization service (CMOS) platform. This is the first win for TD since its subsidiary, TD Ameritrade, won for best infrastructure initiative in 2009. Last year, JPMorgan Asset Management won this category.

CMOS was built to allow TD to comply with new variation margin (VM) rules for non-centrally cleared OTC derivatives that went into effect on March 1, 2017. It will also help the bank to adhere to initial margin (IM) requirements that will come into force at the beginning of September 2018.

"It was a massive undertaking in the industry. The platform that we had, Century, wasn't compliant with the regulations," says Stephen Neal, a director at TD Securities. "Looking at it strategically, what are the other roles that we're going to see being plagued by collateral management and margining going forward? You start looking at things like cheapest-to-deliver, cheapest-to-post, optimization, and the cost of funding. When we started seeing all of these other requirements and areas of concern, we realized that we had to build a strategic system to not only meet the regulation, but to really enable us to move forward."

The collateral risk management platform was built with Lombard Risk's Colline solution at the heart of the system with proprietary-built microservices feeding into the hub and out to other platforms within the business. CMOS extends beyond over-the-counter (OTC) derivatives and is now live with US mortgage-backed securities (MBS), while securities lending and repos support will be added in the near future, Neal says.

The platform supports real-time updates for intra-day margining and better management of risk limits. Collateral can be valued either on an intra-day or end-of-day basis, using pricing hierarchies. Built in are straight-through processes to support low-touch, exception-based business processes, which, according to Neal, has helped the firm to grow its client base as the onboarding process has been streamlined. It also provides the ability to calculate margin based on either market-standard or posted-collateral valuations. And, importantly, it is fully integrated with other internal downstream risk and reporting systems and external vendors, such as AcadiaSoft and Nex Group's TriResolve.

Coming next September are the IM requirements for uncleared swaps. Neal says that without this system, "there is no way we would have been able to be flexible enough to be able to support things [that] we're having to do for initial margin [calculations]."

—AM



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The platform supports real-time updates for intra-day margining and better management of risk limits. Collateral can be valued either on an intra-day or end-of-day basis, using pricing hierarchies.

Most Cutting-Edge IT Initiative

JPMorgan Asset & Wealth Management

A key strategy in JPMorgan Asset and Wealth Management's Quantitative Beta Strategies (QBS) team lies in event-driven investing, specifically in systematically investing in M&A deals, alongside equity long/short strategies. But the team struggled with sifting the wheat from the chaff in the vast volume of information that it consumed every day. Thus, NewsFilter was born. Introduced five years ago, the tool was simple in design and relied on keyword searches to identify merger announcements or deal failures. It has since evolved, backed by the power of machine learning and natural-language processing.

"The latest instantiation took approximately three months to develop and was built through strong partnership across the investment team and the technology team, with two members of the investment team with PhDs in artificial intelligence, and three technologists—two focused on the server side, and one focused on the graphical user interface front-end—focused on the project," says Kent Zheng, head of global research technology for EMEA at JPMorgan Asset Management. The tool sifts through hundreds of news sources received through providers including Bloomberg and FactSet, along with wider unstructured data each day, using a recurrent neural network that is continuously trained by manually labelled data to pick up patterns that distinguish M&A-related news articles from others. "The NewsFilter picks up words from unstructured news articles in free text format and filters out uninformative components, forming a domain-specific vocabulary and transforming the input into a structured form. We use a distributed representation to translate the words in the text to predictive features. This allows semantically similar words to cluster in a high-dimensional space. In addition, we initialize our deep-learning process with pre-trained vector embeddings to leverage the rich semantic domain knowledge captured by large studies carried out on billions of news items and Wikipedia articles," says Zheng.

The tool is useful in removing potential sources of "idiosyncratic risk," says Yazann Romahi, chief investment officer of QBS at the firm. This is useful in the rumor-mired world of M&A. Romahi estimates that the machine-learning enhancements have improved performance in long/short by up to 0.5 percent per year, by filtering out and avoiding up to eight potential shorts per year. NewsFilter is under continuous development. Along with the ongoing training of the neural network, it also takes into account "user feedback to dynamically improve its predictions," Zheng says. "This is a fast-moving field, and we regularly carry out model comparisons to incorporate the newest methodologies into our solution. On top of relevance, we are also expanding the classification framework to be able to distinguish between actionable news items versus rumors. We are also looking to develop a novelty factor component that can verify whether a news article contains new deal information that was not captured by articles that preceded it," he says.

—JR



“Introduced five years ago, the tool was simple in design and relied on keyword searches to identify merger announcements or deal failures. It has since evolved, backed by the power of machine learning and natural-language processing.”

Best Technology Executive: Sell Side

Jodi Richard US Bank

Jodi Richard, COO officer of US Bank, believes in collaborating with the different departments within the bank, particularly when it comes to the technology side of finance, one of the reasons why she wins this year's AFTA for the best technology executive (sell side). She says her job entails guiding operations risk into the brave new world of technology by taking the lead in building a more collaborative workplace to prevent silos that mask potential risk. "Operational risk is a broad field that focuses on managing the control environment," Richard explained in her *Waters* cover profile in May last year. Her schedule, unfortunately, meant that she was unavailable for an interview for this article. "We think about what controls we have in place to mitigate the unknown and how we can avoid big, one-off events," she said.

Richard oversees a wide range of risk controls for US Bank and meets regularly with her counterparts who work on its enterprise, governance, risk and compliance (EGRC) tools. She has a hand in how US Bank manages internal and external data loss, risk self-assessments, business continuity and disaster recovery, and its data protection program.

The bank created a unit that focuses on operational risk technology, headed up by the technology team, although it works in conjunction with the operations team. Richard is a firm believer that as technology grows in importance within the financial services industry, it becomes even more important for there to be clear communication between all the groups within a bank. This is particularly important when evaluating innovations and products. As she heads up the operational risk unit, she has to have a seat at the table. "We're integrated into the business, we were involved in evaluating the strategy of the bank and we make sure that we can stay back and examine those processes and adapt our programs to work jointly to manage that risk," she said. "I think that's why it's important that operational risk has a seat at the table."

Increasingly, Richard added, she has had to keep an eye on cybersecurity, even though technology still offers a lot of benefits, particularly in terms of the risk team's workflow. US Bank has been interested in automation to help manage risk and identify fraud for faster and more accurate processes. It is also looking at how it can leverage machine learning and robotics to take advantage of its data trove. Staying current and aware, she says, is the key to success.

"I think risk professionals—not just in operational risk, but in all risk disciplines—need to look at new ways to manage risk, understand what those emerging risks are, and adapt risk management tools to mitigate those areas," she said.

—ED



Richard is a firm believer that as technology grows in importance within the financial services industry, it becomes even more important for there to be clear communication between all the groups within a bank.

Best Technology Executive: Buy Side

Mike Urciuoli JPMorgan Asset & Wealth Management

JPMorgan Asset and Wealth Management (AWM) CIO Mike Urciuoli wins this year's best technology executive (buy side) award, commanding a technology budget of over \$1 billion. After taking the reins at AWM in 2014, Urciuoli embarked on a period of radical change at the firm. This program included platform rollouts, including Connect for its wealth management business, Cortex, an order and execution management system, and Spectrum for the asset management organization, through to instilling a culture of Agile development. Part of the drive to restructure AWM's technology operations has also been the implementation of a DevOps model and "aggressively refactoring our applications to utilize cloud-native microservices," Urciuoli says.

"These practices have changed the dynamics with our users and allow us to develop applications faster while helping us recruit younger developers who are used to fast-paced deployments not typically seen in large financial firms," he continues.

One of the initiatives Urciuoli has spearheaded at AWM is its "kill the tail" program, which aims to decommission over 600 legacy systems. Keeping the engines running in such a large organization can often hinder progress, although Urciuoli is focused on the future of technology within AWM, as well as addressing its present issues. It is, he admits, "very challenging to build a new technology platform while supporting the current technology during an incredibly dynamic regulatory environment and changing market conditions." But Urciuoli is uniquely suited to this task. An electrical engineering and computer science graduate of Princeton University, prior to JPMorgan, he spent 19 years at Lehman Brothers in a series of senior technology roles across asset classes, before moving to Citi as its global markets technology head for the markets and banking business. "It requires strong discipline and well-planned priorities to drive most of your investment toward the strategic systems while minimizing the work required on the older systems," he says.

Part of retaining a view toward innovation has been the promotion of "code-a-thon" sessions for technology teams and business users, organizing visits to leading technology firms and Silicon Valley startup firms alike, bringing in outside speakers to educate his employees on areas as diverse as DevOps, the cloud, big data, artificial intelligence (AI) and machine learning, and what he calls "a robust training program utilizing in-person and online educational courses."

Urciuoli sees promise in the development of AI and its various subsets. "Tools like natural-language processing and predictive analytics in the AI space really open a lot of possibilities in all areas of the firm from the front office to the back office, so it will be interesting to see how it all plays out over the next few years."

—JR



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One of the initiatives Urciuoli has spearheaded at AWM is its "kill the tail" program, which aims to decommission over 600 legacy systems.

So This Is Mifid (II), and What Have You Done?

John reflects on how Mifid II has dominated the news in recent months and asks if the industry is really ready for such a sea change at a time when new regulation is now just part of doing business.



The holidays are behind us for another year and as those festive carols and jingles finally begin to recede from your conscious, the dark and cold days of January have arrived. But this year doesn't mark just any January, because this is the year of Mifid II.

My time at *Waters* has been dominated by Mifid II, from the early days of joining the editorial team when the European Securities and Markets Authority's (Esma's) consultation paper was sent out just before Christmas 2014 through to the much anticipated/dreaded implementation. Yes, the Directive has become part and parcel of every working day.

Throughout my first year on the *Waters* editorial team Mifid II was more of a murmur, a disagreeable task the industry knew was coming but was determined to put aside until a later date, like cleaning the fridge or taking the trash out while it's raining. It was the technology vendors pushing the agenda and, for the most part, educating both me and the industry as to what exactly Mifid II would mean in a technology sense.

When the delay was announced in February 2016 due to "exceptional technical implementation challenges," the industry breathed a sigh of relief and it seemed many institutions only really grasped the scale of the technology projects ahead of them at that point.

Time of Reckoning

Almost two years since the delay and the time of reckoning has finally

arrived. How confident are you feeling? Is everything ready or are there those niggling little problems that just won't go away still to contend with? The reality of the situation is that Mifid II doesn't stop on January 4; as with any regulation, regardless of scale, it's an ongoing process that will be refined on both sides of the industry going forward. There will be alterations from the regulators to

most knowledgeable people talk on this topic, it's wise to pay attention.

Drop the Hammer

Last month, Esma chair Steven Maijoor spoke about the regulation in-depth in the *Waters* cover interview, saying that he didn't want the regulatory body to be seen as some kind of draconian "bogeyman" that would drop the hammer hard at the slightest hint of any infraction of the rules. But the reality, of course, is that regulatory tolerance will only stretch so far.

We've heard from Esma, the FCA in the UK and other European bodies over the course of the last year that they will show understanding in the first few months of Mifid II's enforcement and that the scale of the challenge will be difficult for some to initially deal with, although I would think that by the time autumn rolls around that patience will start to wear thin.

However, by Christmas 2018, Mifid II may even be old news. As my colleagues Anthony Malakian and James Rundle reported in last month's issue, there are plenty of other new regulations to contend with coming into force that will require substantial efforts, such as GDPR, FRTB, BMR and the ongoing saga of the Consolidated Audit Trail. Who knows? By that point either Donald Trump or Kim Jong-Un may have lost their temper and reduced the entire world to a pile of ash anyway. **W**



Is everything ready or are there those niggling little problems that just won't go away still to contend with?

specific details and there will have to be continuous efforts from industry players to keep their systems up to scratch.

Simply implementing the relevant system and thinking the job is done is downright foolish, not to mention missing the point. Banks, asset managers, brokers and hedge funds—it doesn't matter what position these firms occupy within the market, if there isn't a proactive approach to regulatory compliance in place, you're going to miss out.

I've heard time and again how much of an opportunity Mifid II will be for firms and that necessitates a forward-looking approach that also incorporates other regulations that are due to come into force over the next few years. Of course, I am just a layman in this industry, looking in from the outside and reporting on what I see, but when the industry's

Back to business as usual?

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The Bitcoin Futures Feeding Frenzy

Every exchange with a passing interest in commodities seems to be developing bitcoin futures, but the underlying asset is still a risky proposition for all but the most sophisticated—or ignorant—investors, James argues.

Bitcoin futures a bad idea?

For more information and readers' feedback please join the discussion

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One of the strongest fears in the market is the fear of missing out (FOMO). It powers rallies, drives crashes, fuels bubbles and can make—or break—the career of even the most experienced trader. FOMO has become the acronym of choice to describe bitcoin mania, in which I've personally witnessed people I generally regard to be of good sense and character abandon all reason just for the chance of cashing in on its incredible rise in 2017.

That FOMO, of course, is just a short hop away from avarice. Missing out on life-changing amounts of money is, of course, not a pleasant feeling. Neither is having your house repossessed, as some bitcoin enthusiasts who have allegedly taken out mortgages to participate in this craze might find out.

Of more concern from a systemic standpoint is the launch of bitcoin futures in December by the Cboe Futures Exchange (CFE) and the Chicago Mercantile Exchange (CME) Group, both within seven days of each other. The problem isn't necessarily the products themselves—as CME and CFE have been quick to point out, the construction of the margin methodologies and the supervisory mechanisms attached to them have been painstakingly worked out between the exchanges, market participants and the US Commodity Futures Trading Commission (CFTC). Still, it's a bit alarming that the CFTC felt the need to issue a lengthy statement when the CME and CFE self-certified these contracts that it did not approve, and that while it had full authority to

regulate the futures product, it had little statutory authority to regulate the underlying cash markets.

Wild West

The term Wild West doesn't begin to encapsulate the risky nature of cryptocurrency trading or its immature market structure. It is, quite, frankly,

Bitcoin futures, as they stand, don't seem to offer much in the way of benefit to any real economy use-case.

and despite vast improvements last year, still not ready for prime time. Why the exchanges—and other institutions—are so keen to develop these products is something of a mystery, outside of the obvious answer, which is pitching their own pan into the water in the hope of catching some gold.

This is because bitcoin futures don't seem to offer much in the way of benefit to any real economy use-case. Currency forwards are easy to understand and interest-rate swaps have definitive corporate usage in any number of instances. Bitcoin futures, however, are just a tool for pure speculation, and they're generally unidirectional—go long, because otherwise you're paying triple digits in margin for short positions from the few futures commission merchants (FCMs) that offer them.

There are a number of serious concerns that need to be addressed and not dismissed as mere cyni-

cism, or looking for problems where none exist, which is often the tenor of reaction when one dares to criticize the approach taken to bitcoin derivatives. That, of course, or stark refusals to comment from regulatory authorities, who have remained quiet other than to congratulate each other on well-worded missives about the perils of cryptocurrency investment, while simultaneously absolving themselves of responsibility. Buyer beware, indeed.

These concerns include the degree to which market and price stability are monitored at the exchanges that contribute toward the settlement prices for these futures. They include the treatment of client margin within clearinghouses for bitcoin futures trades, and whether this should be segregated from the wider futures and options default funds. They include the suitability of an instrument that can gain and lose double-digit percentages in a day, triggering multiple circuit breakers that are already set at abnormally high levels, for a market that can bankrupt individuals and companies with variation margin payments.

The CFTC and other regulators should act, lest they be accused, when the decline inevitably comes, of being asleep at the wheel once more. This time, there will be little excuse. **W**



A Look Back at Emerging Technologies in 2017



The past year was supposed to be a period of maturity for fintech. But while it didn't reach the tipping point people were hoping for, 2017 was a year where AI, blockchain and other innovative technologies gained even more traction.

The past year was supposed to be when certain technologies would move from theory to production. It was also when people believed regtech would come into its own as a technology discipline, rather than a catchy brand exercise.

Although this has largely shifted to 2018 for some areas—blockchain being the most significant—2017 was still a strong year for financial technology. Pilot projects went to pre-production and use-cases were validated. And regtech was still a big topic of conversation.

Financial technology was top of mind in 2017 and will continue to be, as costs have to be cut, regulators are increasingly turning to technology, and employees become more familiar with having more functionality, efficiency and usability in their everyday lives. The past year was not the turning point people hoped it would be but it still threw up some surprises. Let's look back at some of those developments.

Innovation Interest

One of the more interesting things in 2017 was the larger interest in automation and artificial intelligence. During Waters USA last month, audience members were polled about what they consider the innovation their firms are most interested in. Artificial intelligence (AI) and machine learning came out on top while, interestingly, blockchain was third and last.

Then again, having been around for decades, and with extensive tools released by giants such as Google,

machine learning and AI are perhaps two technologies far easier for non-technologists to understand. AI is also an area where, perhaps, use-cases are not only more evident but more easily attacked. This has also stretched across the divide between the buy and sell sides—Todd Moyer, COO of Confluence, says many asset managers are interested in automation much more than in previous years based on a survey

Bitcoin futures debuted in December, and to say it got people talking is an understatement. They proved initially popular, too, with circuit breakers triggering almost immediately after launch on the Cboe Futures Exchange, although investors' appetites have been somewhat satiated, even with the Chicago Mercantile Exchange Group's own contract launching a week later.

As bitcoin's prices kept going up, it was as if blockchain went to the back of the room to hang out for a bit and let cryptocurrency get all the attention from the industry. Blockchain projects are not going away, of course, but are at the point where serious programs are waiting for regulation to catch up and for proofs-of-concept to run their course. Caitlin Long, chairman and president of distributed-ledger technology firm Symbiont, says enterprise blockchain must work within a highly cautious environment. "There has been a lot of hype around blockchain but enterprise blockchain has to have high due diligence so that there might be a perceived slowdown," Long says. "It's easier to do science projects than to get these out."

Long adds that the hype cycle went ahead of reality and that blockchain projects are not slowing down but are rather just being rationalized.

This year will test much of the demand for innovation, though it is possible that many projects will still revolve around the buzzy technologies. What we can see is that the hype for each of these ebbs and flows depending on what people are seeing coming out of incubators and pilots. **W**



The past year was not the turning point people hoped it would be but it still threw up some surprises.

the firm conducted. "The big takeaway is that there is pent-up demand driven by automation," he says. "We've seen an increase every year, but the significant difference is that the industry has really moved forward. Asset managers are not doing manual solutions particularly now with the shorter reporting cycles."

These kinds of innovation, though, may not work without a more flexible infrastructure that allows firms to scale up or down. For that, the financial services industry must turn to the cloud, which has continued to gain traction. New regulations—including the New York Department of Financial Services' Cybersecurity Regulation—require banks, and by extension their third-party cloud providers, to have more robust cybersecurity processes in place than ever before.

Of course, we can't end without talking about blockchain and bitcoin.

What can fintech expect in 2018?
For more information and readers' feedback please join the discussion at waterstechnology.com/buy-side-technology

The Intertwined Relationship Between Humans and AI

Aggelos explores people's fear of artificial intelligence and uses the financial services industry as an example to demonstrate that robots and humans are bound to walk together.

Common sense hindering AI?

For more information and readers' feedback please join the discussion

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I want to tell you a story about Antti, a man in his early 30s, and probably one of the most intelligent people I know. His home country, Finland, is struggling to find an identity, swaying between its rural past and technological future. It is a region where two worlds collide, due to Finland's historical ties with both the Scandinavian innovative spirit and Russia's traditions. Antti recently expressed his concern to me over Google's AlphaZero, a machine-learning algorithm, which destroyed human chess players. "I was thinking, what part of my daily work could a learning algorithm not do better than I do? I came up with nothing," he said.

I recalled a recent conference I attended in London about the use of emerging technologies in the derivatives market. There, I talked with Dr. Lee Braine, who works in the investment bank CTO office at Barclays, and who argued that artificial intelligence (AI) lacks ... intelligence. He was talking about the ability, or inability, of AI to explain itself. "Machine-learning algorithms can be taught to execute actions automatically in a surprisingly short period of time, but they can't explain the reasons behind their executions," Braine said.

This is paramount to our industry for a number of reasons, the most serious of which pertains to regulation. According to Braine, an algorithm has no train of thought. Hence, it cannot give regulators the explanations they need to supervise trading actions. Firms should be cautious when relying on these technologies to gather and distribute data and proceed to trading

activities. That's because before they can do all that, they need to be able to justify every action the technology takes. "Imagine that you've trained your network and someone asks you why you made a decision," Braine said. "Maybe the best you can do is to show them your training set, the neuro-network that you started with, and tell them that if you run that on, you will get the decisions later."

Research and consultancy firm Opimas released a survey in October 2017 stating that it expects that by 2025, the rollout of AI technology by financial institutions will decrease the cost-income ratio by over 25 percent. The numbers, however, in present terms, indicate otherwise. For example, so far the use of machine learning in quantitative investment has proven weak in income terms, despite the decrease in cost. According to the relevant performance index by Hedge Fund Research, published in November 2017, quantitative hedge funds have gained an average of 4.5 percent over the past five years compared to 3.5 percent for the average hedge fund.

Peter Farley, senior marketing strategist, capital markets at Misys, in an article published in August 2017, said that the magic of AI doesn't seem to work. "Fund outflows rose to critical levels as the average return of hedge funds last year slumped to below 6 percent, less than half what a passive tracker exchange-traded fund (ETF) would have returned if it had mirrored the S&P 500," Farley wrote.

Common Sense

David Siegel, co-founder of Two Sigma Investments, says the problem is that AI "lacks common sense." During his speech at Bloomberg's Summit earlier this year, Siegel, who is a quantitative portfolio manager, said that "artificial intelligence today doesn't have any-

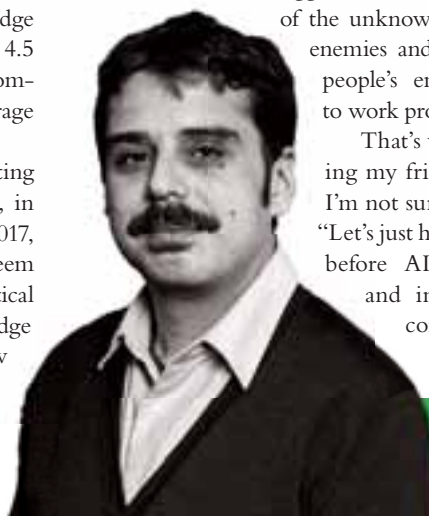
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These flaws, however, do not undermine the huge potential of AI, not only for financial services but other industries as well.

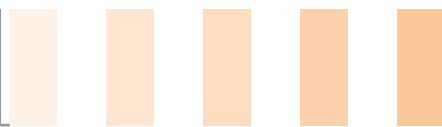
thing that resembles common sense, and common sense is a key feature of intelligence. The quest to create general human intelligence—that's probably a long way in the future."

These flaws, however, do not undermine the huge potential of AI, not only for financial services but other industries as well. My point is that exaggeration, enthusiasm, and yes, fear of the unknown, are people's worst enemies and that machines need people's emotional intelligence to work properly.

That's what I ended up telling my friend Antti, although I'm not sure he was convinced. "Let's just hope that it takes years before AI really understands and incorporates humans' complex nature," he replied. **W**



Human Capital



Morningstar Promotes Holt, Collins

Chicago-based data and investment research provider Morningstar has appointed Michael Holt as head of corporate strategy, and has promoted Elizabeth Collins to head of global equity research, taking over Holt's previous role.

Reporting to Morningstar CEO Kunal Kapoor, Holt will be responsible for leading the vendor's long-term strategic planning and for allocating resources to execute on its strategy. Before being appointed global head of equity research in 2014, Holt was director of equity research for North America, having joined Morningstar as an equity analyst in 2008 from MMA Financial, where he was an associate,



Michael Holt

prior to which he spent five years as a senior manager at Marsh subsidiary CS Stars, a risk claims and analytics provider. He replaces chief strategy officer Catherine Odelbo, who will retire.

Collins joined Morningstar as an energy analyst in 2005, holding a range of research roles before becoming director of equity research for North America in 2014.

In her new role, reporting to head of global research Haywood Kelly, Collins will be responsible for changes to the vendor's equity research methodology, for driving thought leadership and coverage strategy, as well as for expanding Morningstar's team of equity analysts across North America, EMEA, and Asia-Pacific.

Apcela Adds COO, Funding

Low-latency network and cloud application hosting provider Apcela (formerly CFN Services) has appointed technology industry veteran Jack Dziak as its president and COO, who assumes the president duties from Mark Casey, who remains CEO.

Dziak joined Apcela in July 2017 as a board member and also runs his own advisory firm, Dziak Advisory Services, which he founded in January 2017 after leaving SunGard Availability Services, where he spent over five years in various roles, including executive vice president of global products, general manager of managed services, and senior vice president of corporate strategy and business development. Before joining SunGard, Dziak was chief strategy officer at information services provider NeuStar, and also served as senior vice president of corporate strategy at Sprint Nextel,



Jack Dziak

senior vice president of services and distribution at Mobile Satellite Ventures, senior vice president of corporate strategy and business development at MCI Communications, and a partner at Accenture.

Dziak's appointment accompanies an undisclosed fundraising round from Claritas Capital, which the vendor says will accelerate product development, strengthen its operations, and build on its existing sales and marketing momentum

FTSE Russell Appoints Japan Managing Director

London Stock Exchange-owned index provider FTSE Russell has hired Seiji Ishii as managing director in Japan. Ishii joined the vendor on January 1 and is responsible for managing client relationships and leading business development in the country. He will also lead local integration between FTSE Russell and its acquisitions of Citi's Bond Index/Yield Book team and company data provider Mergent from Moody's.

Prior to joining FTSE Russell, Ishii spent three years at Acadian



Elizabeth Collins

Selerity Nabs Former Goldman Sachs Exec Nakai for BizDev



Junta Nakai

Asset Management as managing director and the firm's representative in Japan. Before that, he was Asia-Pacific region co-head and representative in Japan at Millburn International. He has also held roles at GAM, where he was managing director and Japan CEO, and Merrill Lynch, where he was Japan head of consultant marketing and product management, as well as Sakura Asset Management and Mitsui Bank.

Jessie Pak, managing director for Asia at FTSE Russell, says Ishii's appointment will help drive the company's development across Asia Pacific. Officials say Japan is an important market for the index provider. During the past 12 months it launched the FTSE Blossom Japan Index, which in July was selected as a core ESG benchmark by the Government Pension Investment Fund of Japan.

OpenDoor Appoints Former AQR FX Chief as MD

Treasuries trading platform OpenDoor Securities has named Hicham Hajhamou as its managing director, responsible for its Treasury Inflation Protected Securities (Tips).

Hajhamou, formerly head of rates and foreign-exchange (FX) trading at AQR Capital Management, will directly report to OpenDoor president and CEO Susan Estes.

Before working at AQR, Hajhamou was with BNP Paribas and Pierpont Securities. He also spent six years at Lehman Brothers, where he served as vice president of rates and mortgage trading.

"OpenDoor is helping to shape the electrification of the fixed-income market while unlocking liquidity at

New York-based contextual search and analytics technology provider Selerity has appointed Junta Nakai as global head of business development, responsible for creating growth opportunities by promoting the vendor's products, including its Selerity Context and Selerity Private Context Engine.

Nakai was previously head of Asia-Pacific equity sales for the Americas at Goldman Sachs, where he spent 13 years in roles that involved automating

and digitizing sales and trading processes. As part of Selerity's executive team reporting to CEO Ryan Terpstra, Nakai replaces Brendan Gilmartin, who will take on a senior sales role managing Selerity's top global accounts.

the same time. The company listened to its clients and delivered a product and protocols that reduce costs and minimize market impact," Hajhamou said in a statement.

Estes says Hajhamou's experience in the industry will help expand OpenDoor's presence into inflation-linked products. The company also appointed Liz Hogan, former deputy head of global markets at Societe Generale, as a managing director tasked with expanding OpenDoor's client base and streamlining workflow.

Data Head Jordan Departs the DTCC

Ron Jordan left his role as managing director of Data Services at the Depository Trust and Clearing Corp. (DTCC) at the start of December to pursue new opportunities.

Jordan also served as CDO at the DTCC, which he joined at the start of 2011 after a 26-year career at the New York Stock Exchange and NYSE Euronext, including roles as executive vice president of global market data administration, executive vice president of market data, managing director of equity business development, and director of market surveillance.



Ron Jordan

Before joining NYSE in 1984, Jordan was a senior options analyst at the American Stock Exchange and an options surveillance analyst at the Philadelphia Stock Exchange.

Sentio Lifts Ex-ETF.com CEO Lichtblau

San Francisco-based startup financial data terminal provider Sentio has appointed David Lichtblau, former ETF.com CEO and Thomson Reuters and StarMine executive, as its COO and chief product officer.

Lichtblau joined Sentio as a consultant in the spring before taking on a full-time role in July last year and being appointed COO and CPO in September. The role of COO was previously performed by general counsel and chief information security officer Ash Kalb.

Lichtblau was most recently CEO of exchange-traded fund data vendor ETF.com, where he also served as COO, having joined the vendor in 2012 as executive vice president of product and marketing, leading it through its acquisition by Bats Global Markets. Before that, he was global head of products for the portfolio manager and analyst business



David Lichtblau

segment at Thomson Reuters, which he joined via its 2007 acquisition of San Francisco-based StarMine, a provider of earnings estimates and fund analytics for the buy side, where he spent nine years in roles including vice president of products, marketing, media relations, and equity research. Before that, he was co-founder, chairman and head of products and marketing at Stanford Technology Group, which he sold to Informix Software (since acquired by IBM), where he became director of the vendor's data warehouse business development unit.

AxiomSL Charters Chopra for Growth

Regulatory reporting, risk and data management solutions provider AxiomSL has hired Harry Chopra as chief client officer, responsible for overseeing the company's global business development, implementing market strategies and building client-driven growth.

Chopra, who has more than three decades of global sales and financial services experience, was most recently chief commercial

officer for Credit Benchmark, where he developed consensus credit estimates alongside the chief risk officer and chief credit officer community.

His previous roles include head of sales and client services at S&P Capital IQ and leadership positions at Citigroup Asset Management, where he headed retail distribution and institutional marketing.

Axioma Taps UBS Delta's Ian Lumb to Lead Risk Solutions

Former UBS Delta global head Ian Lumb has joined risk management technology provider Axioma as the vendor's new head of risk solutions. Prior to joining Axioma, Lumb spent 11 years at UBS Delta, initially covering Northern European accounts, with a focus on asset managers, pension funds and insurers. He played an important role in the sale of the business to StatPro earlier this year.

"Ian brings to Axioma in-depth expertise in the areas of fixed income and multi-asset risk, performance attribution, and portfolio construction," says Chris Canova, senior managing director, global product specialist at Axioma. "He is a superb fit to shape the future direction of our risk products and lead our experienced team of risk solutions specialists, who partner with customers to maximize Axioma solution value for their risk and portfolio management needs."

Axioma has made several other high-level appointments over the course of the last 12 months, hiring Jacqueline Gaillard as managing director for people and talent in March last year, and appointing ex-CEO of Barclays Global Investors, Blake Grossman, to the Axioma board of directors in October.



Harry Chopra

ICE Taps Former CFTC Commissioner Bowen for Board

Former Commodity Futures Trading Commission (CFTC) commissioner Sharon Bowen has been named as a director of the Intercontinental Exchange (ICE).

Bowen, who served at the CFTC from 2014 to 2017, fills a newly created board seat. She served as vice chair of the Securities Investor Protection Corp. and was acting chair from 2012 until 2014. Before joining the CFTC, Bowen was a partner at law firm Latham & Watkins.

ICE chairman and CEO Jeffrey Sprecher says Bowen's experience and perspective will provide guidance to the exchanges and clearing house the company operates. "With over 35 year of regulatory, securities and public policy expertise, we are confident that Sharon will contribute meaningfully to the governance of our global business," Sprecher said in a statement.

Bowen's appointment brings the number of ICE's board seats to 12. **W**



Sharon Bowen



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