Risk publications

Risk Markets Technology Awards 2019

Risk.net

Winners' review

Risk Markets Technology Awards 2019

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Risk publications

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The winners in full

Buy-side market risk management product of the year
Axioma

Performance attribution product of the year
StatPro

Best execution product of the year
BestX

Buy-side ALM product of the year
RiskFirst

CCP support product of the year
Sernova

Collateral management and optimisation product of the year
CloudMargin

Mifid II product of the year
Droit

FRTB product of the year
IHS Markit

Solvency II product of the year
Moody's Analytics

Regulatory reporting product of the year
NEX

Market risk management product of the year
Beacon
FIS

Market liquidity risk product of the year
IHS Markit/MSCI

Counterparty risk product of the year
FIS

XVA calculation product of the year
FIS

Pricing and analytics: Commodities
Lacima

Pricing and analytics: FICC
Fincad

Pricing and analytics: Structured products/cross-asset
Beacon

Trading systems: Commodities
Allegro

Trading systems: FICC
Nasdaq

Trading systems: Structured products/cross-asset
Numerix

Pricing and analytics: Equities
Hanweck

Market data vendor of the year
Refinitiv

Alternative data vendor of the year
Four Twenty Seven

Risk data repository and data management product of the year
AxiomSL

Electronic trading support product of the year
MarketAxess

Best vendor for system support and implementation
Murex

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Vendors enter the pick-and-mix era

Modular tech and micro-services – plus new risk and regulatory needs – are creating openings for insurgents and incumbents. Clive Davidson reviews the winners

The pressures and constraints under which institutions have been operating since the onset of the financial crisis have forced trading and risk technology to evolve. In the old world, vendors offered standalone specialist systems; in the new world, they have been forced to become more flexible, by integrating with existing infrastructure, and more modular. Instead of taking everything, customers increasingly want to pick and mix.

This is creating openings and opportunities for narrowly focused financial technology – known as fintech – firms, for example, in the fields of collateral management and buy-side risk management.

Ongoing regulatory change and emerging risk types are also opening up opportunities for new technology providers to step in, or for nimble incumbents. The Fundamental Review of the Trading Book (FRTB) is redefining market risk in a way that has allowed one previously credit risk-focused provider to get a foot in the door, for example. The absence of climate change data that can be applied to asset portfolios is a pressing need being addressed by one new entrant translating scientific projections into market signals.

This year's *Risk* Markets Technology Awards reveal a sector in flux. The judging panel of practitioners and *Risk.net* editorial staff recognised a mix of incumbents and insurgents that were able to demonstrate they had responded to the market's changing needs.

CloudMargin spotted the potential of cloud in 2013. By hosting a single instance of its software on a cloud platform, the firm could slash maintenance and upgrade costs, and compete at the lower end of the market. But it is one thing to pick up smaller clients around the fringes of the buy side – as CloudMargin did initially – and another to go head-to-head with incumbent providers at the top of the sell side. That's what the vendor has succeeded in doing this year, signing up two tier one banks for its service – and not just as an add-on to their existing capabilities. In one case, a bank is moving its entire collateral programme to CloudMargin in its first venture into public cloud deployment.

"We have not rested on the fact we had a first-mover advantage in this area," says Simon Millington, head of product management at CloudMargin, winner of the collateral management and optimisation product of the year award. "We have continued to invest in the platform and have changed tack quickly where we have needed to in terms of features and functionality, as well as our development road map. And we have taken advantage of the regulatory tailwind in the industry."

CloudMargin has doubled its staff each year for the past three years and has boosted resources for product development following a $10 million investment this year from LVC, the venture investing arm of Jeffries Financial Group, IHS Markit and existing investors including Illuminate Financial. It also changed strategy two years ago to go after larger institutions, both buy and sell side. "That has paid dividends. Having large marquee clients on the platform enables us to further invest because we have the confidence and references in this space," says Millington.

The key difference between servicing a small collateral client and a large one is the volume of data that must be handled, says Millington. To support greater data volumes, 18 months ago the company re-engineered the back end of its platform to become a 'microservices architecture', where functionality is packaged as a menu of independent, interacting services. Furthermore, the microservices are designed to automatically scale up, monitor and replicate as required. "This means the platform is inherently scalable – up and down – and that is a key differentiator for us in the market," says Millington.

CloudMargin is also redesigning the front end of its platform to give users more access to information on their workflows and improve straight-through processing, in addition to other changes that address the needs of the new, larger clients.

CloudMargin's penetration of the top tier shows even the largest sell-side institutions are now looking to cloud-based services to help reduce costs, simplify technology infrastructure and improve the services they can offer to their clients via the cloud's online accessibility.

Cloud-first technology policy

The buy side, meanwhile, has taken this a step further – to the point where many firms now have a 'cloud-first' technology policy and accept installed software only where there is no cloud option, says Ian Lumb, global head of risk solutions at Axioma, which won the buy-side risk management system award.

"This is a validation of our strategy when in 2011 we decided to build Axioma Risk first on the cloud, with open application programming interfaces (APIs) that are also accessible to clients," says Lumb. "Cloud was a tough sale seven years ago, but now it is at the forefront of what firms are looking for – open systems with web service-driven APIs."

Risk is highly suited to cloud computing because it requires bursts of intense computation for regular or intermittent – but not necessarily continuous – reporting, says Lumb. Having a full computational capability in-house is not only expensive, but also sits idle much of the time; the compromise approach of reduced hardware constrains performance and limits reporting abilities.

"Being able to scale up compute resources at will enables firms to produce reports in the time they want instead of being beholden to legacy technology and a limited set of central processing units that dictate how many hours a report will take. That is a complete change of capability for the industry," says Lumb.

Axioma offers a modern, multi-asset risk platform that provides top-down as well as bottom-up revaluation views of risk, but does not purport to be all things to all people, he says. Asset managers are turning away from systems that attempt to offer a full stack of asset management functionality, Lumb claims – such systems tend to be satisfactory at everything but excellent at nothing – and instead are opting for best-of-breed applications for each function in a modular format that they can plug into their infrastructure to suit their individual requirements. Cloud-hosted, web services-based applications with open APIs using open standard technologies facilitate this, he says.

A data and technology FRTB solution

The changes to market risk introduced by FRTB have also encouraged banks to look for modular functionality they can integrate with existing elements of their infrastructures. When the proposals for FRTB were first aired, observers suggested banks might use the opportunity for a wholesale replacement of their market risk infrastructure. "Some of that has come to fruition, but we have seen more banks wanting to leverage what is working well supporting their Basel 2.5 and other requirements – rather than ripping out and replacing their entire market risk systems," says Andrew Aziz, global head of financial risk analytics at IHS Markit, recipient of the FRTB product of the year award.

The financial risk analytics group at IHS Markit traditionally focused on applications for counterparty credit risk and various valuation adjustments – known as XVAs – so had little chance of competing in a system replacement market. "However, where we had an advantage is that FRTB, as distinct from previous regimes, focuses on modellable risk factors and the risk factor eligibility test," says Aziz. "IHS Markit is fundamentally a data company that also has technology, so we were able to approach the market with a bundled data and technology solution, which gave us an entry point we otherwise wouldn't have had."

In 2016, IHS Markit introduced an FRTB modellability service in the form of a utility that was relatively low cost and therefore competitive. Once this gained traction in the market, IHS Markit realised there were other components it could provide. Since it is modelling risk factors, it could move reasonably easily into providing proxies for non-modellable risk factors, as well as scenario generation. In addition, banks need an aggregation engine that sits downstream of their valuation engine, enabling them to explore the impacts of decisions about such things as risk factor taxonomy and risk bucketing. Although IHS Markit does offer a valuation engine, banks that are not already using it generally prefer to stick with what they have.

Aziz says: "Market risk is a tough market with a lot of competition. Banks already have many components in place, such as valuation engines, that they are happy with, and very few want to do a radical restructure. Our strategy, which has been effective, is to provide modular solutions that are not so intrusive and can co-exist with a bank's existing architecture."

Like IHS Market, Refinitiv, formerly the financial and risk business of Thomson Reuters, was fundamentally a data company, but has been redefining its business to meet institutions' needs for not only data, but also the mechanisms to more easily integrate the data, and tools to analyse and apply the data to their operations. Over the past two years, the company has been transforming its technology from a traditional model of data centre deployment to public cloud. In July this year, the company made its Elektron Data Platform accessible via a cloud API.

The platform has also become more open and inclusive. Elektron has been broadening the range of data it offers – for example, adding data from all Authorised Publication Authorities under the revised Markets in Financial Instruments Directive (Mifid II) – and also allows clients to integrate their own data on the platform as well as third-party data.

"Our strategy has evolved to include not just market data and many other forms of financial data, but the platforms that allow customers to integrate market data from many sources, and services such as Velocity Analytics that enrich content with analytics," says Brennan Carley, global head of enterprise at Refinitiv, which won the market data vendor award.

Pricing and analytics are fundamental to trading and risk management and there is a long tradition of specialists offering packaged libraries. Here too there is growing emphasis on not just providing content, but packaging it alongside tools that make it easier for firms to customise and integrate the libraries into their operations.

James Church, vice-president for products and research and development at Fincad, winner of the pricing and analytics award for fixed income, currencies and credit, says: "It is a principle of Fincad to get our analytics into the hands of as many users as possible and embedding them into their workflows right at the point where they are making valuations and risk decisions." The company categorises users into three main groups – quants, IT developers and end-users such as traders and risk managers – and incorporates facilities and tools for each into its F3 pricing and analytics solution.

For example, for quants wanting to model new markets, Fincad has introduced market definitions for the top 30 liquid currencies. "But it is not just about giving people ready-made definitions – it is also important to give them the flexibility to take a view on markets. We provide tools that allow financial engineers to take their own view on a market, change model parameters, test their models and then publish them into our enterprise platform where they are under audit control, the data is managed and the models can be passed down the line to other users," says Church.

For developers, Fincad has created standard APIs with the aim of making it easier to integrate the firm's analytics into other systems. It has also added a development kit for the increasingly popular Python programming language and for building microservices. These facilities allow developers and quants to extend F3 to create customised analytics and reports for services such as hedging strategies, portfolio optimisation, backtesting and external limit testing, says Church. For end-users, Fincad has built an application in the HTML 5 web interface language, enabling users to package workflows for activities such as what-if scenarios and pre- and post-trade portfolio analysis and reports.

Making sense of climate change research

One area where there has been a dearth of capabilities is the application of climate change data to asset portfolios. It is not that the fundamental information has been lacking – global warming and climate change research are among the largest scientific endeavours ever undertaken and there is an abundance of studies and models globally. What has been missing is the ability to translate the scientific research into data that financial institutions and asset owners can use. Into this vacuum has stepped Four Twenty Seven.

"Rapid intensification of the effects of both acute climate events like hurricanes and wildfires and chronic effects such as sea-level rise and increases in temperatures present a new and meaningful type of exposure for investors," says Emilie Mazzacurati, founder and chief executive officer of Four Twenty Seven, named alternative data vendor or the year. "This risk is currently only priced into the market ex post – we see corrections in asset prices in the wake of events only to the extent their exposure is known."

To enable firms to price the risk ex ante, Four Twenty Seven extracts data from five leading climate models to project future climate states for 25 x 25km grid cells across the world, and assesses the risk presented by climate changes to relevant assets within those grid cells. To do this, the company has built a proprietary database of more than one million corporate facilities owned and/or operated by 2,000 of the world's top companies, covering almost all of the MSCI All Country World Index, and maps the facilities onto the global grid.

"We score each facility for its exposure to climate change risk and then roll that up into a view of risk for a company," says Mazzacurati. Four Twenty Seven also looks at the governance of host nations and states, and to what extent this might mitigate the projected impact of climate changes, and has plans to extend its analysis to companies' governance of climate resilience as well. What Four Twenty Seven does differs from catastrophe risk modelling as used by insurers, which uses historical data to determine short-term probabilities of events and their impacts and focuses only on acute and not chronic events such as increasing heat and water stress, and rising sea levels.

Four Twenty Seven clients include corporations, pension funds, asset managers, development banks and regulators. "Clients use our data-driven analytics to understand risks in their existing portfolios, to assess risks of potential asset acquisitions and to engage with management teams to build resilience in supply chains and physical assets," says Mazzacurati.

Overall, the awards show the fintech sector adapting to the needs of institutions operating in the constrained and pressurised environment that the financial crisis precipitated. But technology providers also need to acknowledge the mistakes they have made along the way and learn lessons from them, says Joanna Davies, head of regulatory reporting at Nex, now part of CME Group, which won the regulatory reporting product award.

Institutions and technology providers underestimated the impact of regulation such as the European Market Infrastructure Regulation and Mifid II and took their foot off the pedal when regulators delayed deadlines, says Davies.

"[Compliance with] Mifid II was a painful process for both clients and vendors, and the industry has reeled in the wake of the implementation of that regulation," she says. "For clients to continue trusting a vendor – and particularly a vendor they have chosen for their global reporting obligations – it is vital they feel lessons have been learned."

Nex Regulatory Reporting is determined to demonstrate it has taken the lessons on board in its response to the forthcoming Securities Financing Transactions Regulation (SFTR). "Although the regulatory technical standards are not yet confirmed and signed off, we have decided we will not put ourselves, our existing or potential clients at risk and are now in full development mode to have our SFTR solution ready for user acceptance testing by June 1, 2019," says Davies. "SFTR requires 148 data fields, which is a lot of information for companies to store, and we are very keen to make sure we are one of the first vendors to get to market with a viable product."

Nex Regulatory Reporting is also addressing the uncertainty around Brexit and preparing for all eventualities. It has established a European trade repository in Stockholm and will open a corporate office in Amsterdam in February. "We have made preparations in advance of Brexit and have communicated our strategy to our clients and are now focusing on helping them figure out what they need to do and how they onboard new legal entities to meet all potential Brexit scenarios," says Davies.

"We all have to get a bit smarter at ensuring we are ready and able to commit to any regulation, large or small, as they come to light," she adds. ■

METHODOLOGY

Technology vendors were invited to pitch their products and services in categories covering traded risk, front-office regulation, pricing and trading, buy-side technology, back office, data and other specialist areas. Candidates were required to answer a set of questions within a maximum word count about how their technology met industry needs, its differentiating factors and recent developments. A total of 176 entries were received and shortlisted.

A panel of industry experts and *Risk.net* editorial staff reviewed the shortlisted entries, with judges recusing themselves from categories or entries where they had a conflict of interest or no direct experience. The judges scored and commented on the shortlisted entrants. The majority of the judges met to review the scores and, after robust discussion, made final decisions on the winners. Where there was no credible winning candidate, a category was scrapped.

THE JUDGES

Sid Dash, research director, Chartis Research
Clive Davidson, contributor, *Risk.net*
Ian Green, chief executive officer, eCo Financial Technology
Fred Grentzel, co-president and chief operating officer, Capula Investment Management
Jenny Knott, chief executive officer, FinTech Strategic Advisors
Simon Lumsdon, head of technology, Hermes Investment Management
Ray O'Brien, global risk chief operating officer and head of global risk analytics, HSBC
Hugh Stewart, research director, Chartis Research
James Turck, IB IT, BNP Paribas
Tom Wilson, chief risk officer, Allianz
Duncan Wood, editor-in-chief, *Risk.net*

droit

The Operating System for Regulation

Mifid II product of the year

Droit

In January, a number of large financial institutions had a smooth go-live with Droit's Adept platform for their primary revised Markets in Financial Instruments Directive II (Mifid II) trade-by-trade decision-making. Mifid II and Markets in Financial Instruments Regulation (Mifir) mandates covered by Adept include pre-trade transparency for trading venues, firm quote obligation for systematic internalisers, post-trade transparency, transaction reporting and best execution.


Joceline Zheng, Droit

Mifid II is one of a growing list of regulatory mandates, including business conduct, electronic execution, clearing, reporting, uncleared margin, risk mitigation, taxation and banking insolvency across regulatory regimes aligned to the Group of 20 that Adept covers. The platform generates full global cross-regulatory implications and obligations of trades in real time and provides auditability and traceability by visualising each step of the regulatory decision-making process and by linking the decision steps to their sources in the digitised regulatory texts.

Droit's approach to generating executable regulatory logic starts by digitising regulatory texts using a format designed specifically for statutory and regulatory documents. Each portion of the digitised text is annotated to specify which data elements are required, the logic inherent in the regulation and the applicable Droit taxonomical scopes with the annotations linked directly to the implementation. This approach supports traceability, and complete and consistent implementation. The company monitors all sources of regulation and related market microstructure changes, providing ongoing rule and data. Users of Adept can identify attributes of any given transaction that might be adjusted to optimise trading.

Droit has also developed Liquid Markets Service, a centralised source for the European Securities and Markets Authority's reference data necessary to meet regulatory requirements under Mifid II and Mifir.

The service provides seamless integration with the Adept application programming interface (API) and its Mifid II mandates suite. It performs calculations to evaluate transactions for factors such as whether they are above or below threshold status, which deferrals or waivers are available, and financial instrument liquidity status.

Droit has a number of strategic investors, including Goldman Sachs, while clients include global and regional banks and asset managers, such as BNP Paribas, Crédit Agricole CIB and UBS.

Judges said:

"Droit's list of tier one bank users going live on Mifid II this year is impressive, as is the scope of the company's functionality. It is positioning itself explicitly and purposefully to add more applications and solutions through ambitious data management and self-documenting API."

"Smart automation that integrates regulatory impacts into trading decisions."

"Droit was talking itself up last year, and it seems like it has delivered."

Joceline Zheng, head of product at Droit, says:

"Droit is proud to be a critical component of a successful Mifid II go-live for a wide range of global banks, processing millions of trades per day. We support 18 global regulatory regimes, with logic representing industry consensus, generating the full global cross-regulatory implications and obligations of a trade in real time. Our platform provides complete auditability and traceability through to fully digitised regulatory text; our clients find it invaluable to prove to themselves and regulators that their decision-making for each transaction is accurate and complete with respect to the laws in force at that time." ■

Solvency II product of the year

Moody's Analytics

Moody's Analytics' RiskIntegrity Suite offers an end-to-end solution for Solvency II that delivers out-of-the-box capabilities for standard formula and internal model compliance, including solvency and minimum capital requirement calculations. The solution has comprehensive risk module coverage for standard formula and offers flexibility for Monte Carlo aggregation to support internal model calculations. This is combined with robust data management and integrated reporting, including Solvency II quantitative reporting templates.

The suite's Proxy Generator module calibrates proxy functions to model metrics such as asset and liability values, reducing insurers' reliance on full asset-liability management cashflow models for a range of applications, including interim valuation, capital calculations and hedge effectiveness. A datamart specifically designed for insurers consolidates risk and finance data from various source systems.

The company also offers a number of scenario-generation solutions, with packages of software, models and content to meet the business challenges of Solvency II preparation and compliance.

In April 2018, Moody's Analytics launched RiskIntegrity Insight, the result of more than three years' engagement with the market around business projections, business planning, own risk and solvency assessment, and stress-testing issues. This strategic tool allows insurers to project financial and risk metrics under alternative forward-looking economic and insurance scenarios. It provides a configurable modelling and analytics platform that helps management visualise the impact of scenarios on key metrics and provides insight into the dynamics of the business.

RiskIntegrity Insight can project multiple financial statements in combination with a flexible dashboard that enables management to perform drill-down and comparison analyses across different business forecasts. The module leverages output from Moody's Analytics' existing modelling infrastructure, such as the AXIS actuarial system and economic scenario generator.

Colin Holmes, Moody's Analytics

Judges said:

"Moody's Analytics offers clarity of purpose and breadth and depth of coverage, as well as impressive innovation and road map."

"A comprehensive suite of components leading to an overall reporting framework."

"Moody's Analytics sets a high bar for Solvency II support, with an impressive client list and testimonials."

"Compelling user references for the company's Solvency II solutions, such as its economic scenario generator for investment modelling, stress and scenario testing."

Colin Holmes, managing director of insurance solutions at Moody's Analytics, says:

"The compliance element of Solvency II is largely in place; insurers have the process and tools to complete their regulatory submissions. What is also clear is that Solvency II, and similar regimes, have added complexity to managing the balance sheet. The ability to assess the impact of management actions and external factors on a range of financial metrics is key to insurers' ability to make decisions that create value for their organisation. For example, we recently completed work with a large European life insurer to model the impact of strategic-asset allocation on their Solvency II balance sheet, helping them to assess investment decisions." ■

Trading systems: FICC

Nasdaq

Nasdaq operates fixed income markets in the US and Nordic and Baltic regions, and its Nasdaq Market Technology division provides trading platforms to 24 fixed income, credit, foreign exchange and crypto markets, as well as interbrokers and broker-dealers, among others.

Lars Ottersgård, Nasdaq

Nasdaq completely re-architected its trading solutions recently, introducing the Nasdaq Financial Framework (NFF), and converted its legacy Genium INET and X-stream Trading solutions to be compliant with the framework and leverage its benefits. NFF enables exchanges and brokers to handle the full range of trading functions across multiple asset classes in a single system with specialised functionality tailored to meet particular asset-class behaviours. Performance and reliability requirements are met through a single high-speed messaging, operations and resiliency layer, which acts as an operational hub driving all business functionality across the trade lifecycle in a unified manner. Nasdaq's platform consistently sustains an order rate of more than 200,000 orders per second at sub-40 microsecond average latency, and transacts more than 150 million orders in a four-hour window.

NFF's open and flexible framework makes it easy to add, remove, replace, upgrade and quickly test functionality and new applications, integrate proprietary or third-party components such as pricing or index models, or incorporate new financial technologies – for example, a blockchain application was integrated within NFF to run the New York Interactive Advertising Exchange in 2017. The framework is cloud-ready, with customer cloud implementations already under way.

The company offers a range of matching engines for all types and sizes of exchanges, including multi-asset class, ultra-high-volume venues. The new Nasdaq Fixed Income Matching Engine is specialised for fixed income with support for user-defined calculations, configurable reference data, many market and fixing auctions, and fixed income derivatives.

Several matching engines can run in parallel, enabling exchanges to add new markets – such as over-the-counter (OTC) derivatives – at low cost and with one infrastructure. The engines seamlessly link via the NFF to Nasdaq's applications, such as pre-trade risk, market surveillance, index, clearing, central securities depository, reporting, testing and market intelligence.

Judges said:

"Powerful proven technology for exchanges as well as banks and brokers, with some interesting additions in the last year, such as blockchain integration."

"Nasdaq has 55 customer exchanges covering multiple asset classes, and two large investment bank customers already using the Nasdaq Financial Framework. This is a successful business."

"Nasdaq displays a clarity of purpose with technology that is robust and progressive and a product road map that is meeting clients' needs. Interoperability of their technology with clients' ecosystems is excellent."

Lars Ottersgård, executive vice-president and head of market technology at Nasdaq, says:

"As a technology partner to the global capital markets and the largest trading systems provider to the market infrastructure space, we must enable our customers to support more asset classes so that they can remain competitive – whether existing assets evolving from OTC to on-exchange or completely new, such as digital assets and tokenised markets. This year, we have proven NFF's flexibility by implementing a global investment bank on a single-dealer forex platform, five new crypto-markets and derivatives upgrades to three of our major clients. We're proud of these developments and look forward to moving the needle further in evolving the technology that powers the global economy." ■

Trading systems: Structured products/cross-asset

Numerix


Steve O'Hanlon, Numerix

Numerix offers outstanding support for structured products and cross-asset instruments through its broad asset-class coverage, which includes rates, foreign exchange, credit, equities, commodities, inflation, volatility and life products, as well as a multi-asset hybrid model for exposure simulations.

The Numerix Oneview Enterprise Platform provides pricing, risk, analysis and trade management, and its functionality is now also hosted on the Amazon Web Services cloud, offering the flexibility to expand capabilities to support any trade volumes and compute requirements. In addition, Numerix has enhanced the performance of Oneview through continued exploitation of graphics processing unit (GPU) parallel processors, as well as the use of adjoint algorithmic differentiation (AAD) techniques for automatically calculating sensitivities when pricing. The company is currently working on delivery of backward Monte Carlo on GPU.

As well as offering hundreds of industry-standard, predefined templates and closed-form pricers that represent commonly traded deals, Numerix provides an easy-to-learn proprietary scripting language that allows users to innovate new products rapidly. Users can specify the details of any instrument's payout and cashflows, as well as create robust trade templates for the new deal types and upload them into Oneview's trade repository. This enables users to bring new product types to market in days instead of months.

Numerix also offers a flexible credit support annex (CSA) scripting language that allows users to incorporate all a deal's CSA terms, so CSA optionality can be priced accurately. CSA terms handled include single collateral versus multi collateral, cash versus non-cash collateral, cheapest-to-deliver collateral, minimum threshold amount, rounding and haircuts.

Judges said:

"Numerix shows a consistent focus on flexibility for handling new products, complex CSAs and multi-curve modelling, as well as on performance with the implementation of AAD, GPUs and cloud."

"Good parallel development of pricing, modelling, trade processing and order management, as well as technology."

"Numerix has a strong anchor client and strong analytics, and a platform in transition – all components for developing a long-term solution."

Steve O'Hanlon, chief executive officer, Numerix, says:

"Our pedigree is in pricing and valuation. For the past 15 years, we've dominated the multi-asset class pricing business by increasing the depth of asset-class coverage and responding with the scalability and performance enhancements the evolving market has demanded. Why are we being named the best pricing and structured products provider today? It's because we've also innovated the technology underpinning our analytics. Through a powerful platform of dynamic microservices that can serve up the Numerix Oneview front-to-risk application for XVA, market risk, margin and regulatory calculations, or provide end-users with the customised business logic and development tools needed to build their own capital markets apps amplified by diverse cloud deployment options, we've solidified our place as a market leader in front-office risk." ■

Four Twenty Seven provides financial institutions with powerful insights into the impacts of climate change on their portfolios.

Our easily accessible analytics, powered by proprietary databases and cutting-edge research, provide insights into the physical impacts of climate change for thousands of listed financial instruments, real assets, and over one million corporate facilities globally.

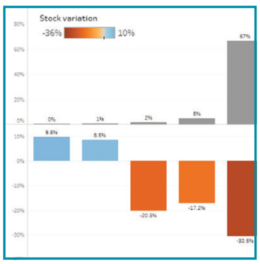
Country Name	Building Ty..	Total Score	Heat Stress	Water Stress	Extrem
INDIA	data center	100	58	49	
MALAYSIA	office	99	100	45	
INDIA	office	78	57	38	
QATAR	office	76	79	90	
SAUDI ARABIA	office	73	86	100	
UNITED ARAB EMI..	office	72	80	81	
CHINA	data center	68	15	25	
CHINA	data center	67	15	24	
THAILAND	office	65	67	24	
SINGAPORE	data center	62	83	34	
UNITED STATES	office	59	58	43	
INDIA	data center	58	58	51	
INDIA	office	58	60	49	
CHINA	office	58	43	42	
INDIA	data center	57	43	83	
CHINA	office	57	45	12	
SINGAPORE	data center	57	78	28	
UNITED STATES	office	57	54	43	
UNITED STATES	data center	56	58	35	
NETHERLANDS	office	55	18	29	
BRAZIL	data center	52	46	28	
CHINA	data center	50	46	23	
INDIA	data center	48	59	51	
SINGAPORE	office	48	81	28	
CHINA	data center	47	42	22	

Real Asset Screening

We deliver detailed projections of floods from extreme precipitation and sea-level rise, exposure to hurricane-force winds, as well as water and heat stress for each site in our clients' real asset portfolios. For high risk sites, we provide additional assessments of local risk mitigation measures and adaptive capacity.

Listed Instruments: Equities, Fixed Income, Sovereigns

Our climate risk scores for listed instruments build on assessments of a wide range of climate-related risks across companies' corporate sites and value chains. Our scores help investors and banks identify potential hotspots in their equity and corporate loan portfolios, and develop targeted engagement and risk management strategies.



Portfolio Analytics & Reporting

We deliver portfolio analytics via a secure, interactive dashboard that empowers data-driven investors to explore our data, benchmarks, and trends. The dashboards can be customized, and charts and tables downloaded or exported for client presentations and investor reports.

Contact Us For a Demo

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Alternative data vendor of the year

Four Twenty Seven

Climate change presents increasing risks for corporations and investors in markets today. However, the risk is currently only priced into the market ex post – there are corrections in asset prices in the wake of events only to the extent that their exposure is known. Four Twenty Seven combines leading-edge climate science with a unique proprietary database of more than one million corporate facilities to provide investors with insights into the physical risk exposure of corporations.

The company leverages outputs from an ensemble of sources, including climate, drought and flood models, and hurricane and cyclone storm tracks. The outputs are delivered in an array of arcane formats not readily usable by investors. Four Twenty Seven applies its engineering and research capabilities to gather, transform and distil the outputs into metrics that are accessible to the investment industry's risk and portfolio management processes.

The source models, all from leading research institutions, assess future climate states worldwide and are mapped onto a 25 x 25km grid overlaied onto the earth. The risk of corporate assets within the grid cells is assessed in the light of the climate state projections to give forward-looking risk exposures to heat stress, water stress, sea-level rise, extreme precipitation and extreme weather events such as hurricanes, cyclones and typhoons.

Clients – which include Fortune 100 corporations, asset owners, pension funds, asset managers, multilateral development banks and government institutions – use the analytics to understand risks in their existing portfolio and assess risks of potential asset acquisitions, as well as to engage with management teams to build resilience in supply chains and physical assets.

Four Twenty Seven's analytics are already available to equity markets, municipal bonds and real assets, and will soon also be available to real estate investment trusts. Coverage includes almost the entire MSCI All Country World Index and is growing.

Emilie Mazzacurati, Four Twenty Seven

The company's risk insights are 'sector aware', incorporating sensitivities of different industries to different types of physical climate risk. They also include market and supply chain risk components.

Judges said:

"Deep datasets and sophisticated analytics, setting a high bar in what will become of increasing concern to investors."

"Four Twenty Seven has market presence, good clients, substantial research, professional execution and a noteworthy team and advisors.The topic is very relevant to financial institutions' risk management."

"Niche, but smart."

Emilie Mazzacurati, founder and chief executive officer, Four Twenty Seven, says:

"Four Twenty Seven's mission is to bring climate intelligence to financial markets, investors and regulators. We believe the pricing of climate risk is an essential component of efficient markets, and that climate data should be used to inform investment decisions and build resilience. Our science-driven analytics deliver unrivalled transparency on climate change impacts to asset valuations. We are committed to building solutions that enable users to quantify the climate risk implicit in their investments and empower the flow of capital to resilient solutions that mitigate that risk. Our solutions inform dialogue between asset owners, asset managers, lenders, multinational corporations and international development banks." ■

Pricing and analytics: Equities

Hanweck

Hanweck analytics cover equity derivatives instruments traded on all major global exchanges with tick-level, up-to-the-millisecond pricing, and corresponding ticking history including historical and T+0 reference data.

The company's Options Analytics product provides streaming real-time analytics and prices, including sensitivities and volatilities for use in pre-trade decision support and risk management, as well as real-time scenario analysis for risk management and margin computations. The product is delivered as a data feed at the individual security level, with all data archived and accessible via a queryable database.


Gerald Hanweck

Portfolio Analytics builds upon calculations produced by Options Analytics to provide real-time calculation of portfolio scenario and exposure risk, taking into account the unique positions of a client to calculate aggregated portfolio-level risk.

Margin Analytics is a new product suite that includes real-time monitoring and comparison of the Options Clearing Corporation's System for Theoretical Analysis and Numerical Simulations (Stans) and Theoretical Intermarket Margin System (Tims), as well as providing margin attribution, collateral optimisation and stress testing.

Trading Indicators is a new suite of derived analytics in a concise and readily accessible real-time data feed that can inform trading and risk decisions beyond options trading. Hanweck computes risk vectors in real time according to the clearing-house margin methodology, enabling up-to-the-second margin requirements that fully capture current market conditions.

The company delivers its analytics as a service, thereby minimising time-to-delivery, integration costs and reliance on internal support resources. The analytics are available in a variety of formats, simplifying integration into customers' risk frameworks. The company provides an application programming interface and multicast feed via cross-connect at major co-location centres.

Hanweck works with customers to tailor solutions, such as incorporating its data feed directly into the customer's own graphical user interface or another product, or co-existing with another risk software tool.

Judges said:

"High performance, modelling sophistication and low total cost of ownership distinguish Hanweck, as well as attention to client service. The company has a strong analytical and technology research and development culture, and a loyal client base."

"Hanweck's technology is progressive and its real-time performance is viable, which is challenging given the volumes and low latency needs in this area. It enjoys good client retention because it is innovative and easy to use."

"Innovative risk as a service, backed up by a good range of recent enhancements across data and functionality."

Gerald Hanweck, chief executive, Hanweck, says:

"It's exciting to see that our newly launched suite of portfolio and margin analytics for the listed derivatives markets is already receiving serious industry attention. Hanweck is uniquely positioned to deliver these products due to our extensive experience in calculating clearing house margin in real time, including Stans, Tims and Standard Portfolio Analysis of Risk. As firms confront higher capital costs and new regulatory requirements, our suite of portfolio and margin analytics becomes an indispensable tool for effective risk management and capital deployment." ■

Best vendor for system support and implementation

Murex

Murex Services provides clients with premium support at every step, from implementation, evolution, upgrade and extension, to day-to-day and after-hours activities. The company's approach is based on a set of core principles, starting with client-centric organisation, personalised service and expert advice.

Elise Gagneux, Murex

In addition to in-house support, each client is allocated a dedicated services team and named support co-ordinator. Client services teams also play an advisory role, highlighting how the latest technology and delivery methodologies can provide benefits. In addition, Murex has a strong global implementation partner network with a deep knowledge of the company's products. Murex actively facilitates a flow of knowledge from its experts to its clients through a combination of hands-on experience, classroom learning, e-learning and extensive supporting materials.

Murex's MXpress implementation methodology aims to accelerate time-to-market and substantially reduce project risk. Market best practices and implementation experience gathered over hundreds of diverse client projects are documented and configured, creating 'out-of-the-box' business processes that can be adopted directly by clients or customised to fit their specific requirements. For extension or upgrade projects, Murex's MXPlus methodology helps clients define a clear development scope and concrete deliverables, and plan the budget, staffing and timing of a project.

MXtest is a comprehensive testing tool that includes pre-packaged testing to help reduce implementation and system evolution costs, facilitate scope extension and ensure smooth day-to-day running of the MX.3 platform.

Launched in 2017, Murex Operate delivers fast and effective technical support to global users of MX.3 outside standard working hours. The service helps restore normal operations if a technical incident affects the availability, stability or functionality of the system, and identifies why an incident occurred to prevent it from happening again. For clients considering cloud as a means of reducing complexity and total cost of ownership, Murex has developed a service covering exploration and migration to cloud, with assistance also available from integration partners with the skills and experience to run efficient MX.3 cloud projects.

Murex is currently piloting a delivery approach that enables a continuous flow of value to clients, from the initial request for development, to the development itself, its packaging, release and final integration into the production environment.

Judges said:

"Murex offers a detailed structured approach to implementation and support with several formalised methodologies and tools."

"Murex has a proven, highly experienced, well-resourced support and implementation team – both its own employees and through partners. Processes, roles, responsibilities and service-level agreements are well defined. The company offers multiple delivery and support models to suit different client requirements."

Elise Gagneux, head of client services, Murex, says:

"We know that successful projects are built on two pillars: expertise and alignment with the long-term interests of clients. For more than 30 years, Murex has been working alongside clients to ensure they have the skills, resources and support they need to get the most out of our platform. Our services teams have deep capital markets knowledge and are MX.3 platform experts with a wealth of project experience. They can also provide advice to clients when planning their next steps, like moving to the cloud or replacing a legacy system." ■

Electronic trading support product of the year

MarketAxess

The increased need for buy- and sell-side firms to more efficiently manage fixed income execution costs has given rise to greater adoption of electronic trading and wider use of automated trade processes and strategies. The lack of liquidity in bond markets has traditionally made predicting bond prices difficult. To help buy-side traders be more confident as price makers, and to support best execution policies, MarketAxess has developed Composite+, a proprietary algorithmic pricing engine for corporate bonds that leverages a range of proprietary and industry data sources, with updates up to every 15 seconds.

Composite+ combines public data from the Trade Reporting and Compliance Engine of the Financial Industry Regulatory Authority with MarketAxess proprietary data from its trading platform and Trax post-trade pre-settlement trade matching and regulatory reporting system for over-the-counter markets. The solution applies artificial intelligence (AI) and machine learning to predict accurate two-way reference prices for more than 24,000 bonds globally. When the most proximate signals are missing, the Composite+ algorithm can still learn to triangulate less predictive features successively.

Prices are updated every 15 to 60 seconds depending on liquidity of instruments, with nearly 20 million market levels generated per day covering 90–95% of trading activity in relevant markets. In December 2017, more than half of all pre-trade Composite+ market levels were less than 1.1 basis point (yield) away from the executed level, the company claims.

Composite+ is designed to support a variety of trading functions such as pre-trade price discovery, liquidity provision, transaction cost analysis, auto-execution and crossing. The pricing engine is incorporated into all aspects of MarketAxess's trading workflow, including within its request for quote inquiry screen. It is integrated into the company's BondTicker and Axess All web-based data platforms, as well as its Open Trading all-to-all marketplace. Composite+ can also be streamed directly to clients' systems via a financial information exchange application programming interface feed.

David Krein, MarketAxess

Judges said:

"MarketAxess has progressive technology and a clear purpose. The scope of the product is narrow, but it does exactly what it sets out to do."

"Smart AI-based toolkit. Interesting integration with trading and data platforms in the past 12 months."

"Intelligent application of machine learning to the challenge of fixed income pricing, accessing comprehensive data sources."

David Krein, global head of research at MarketAxess, says:

"Buy- and sell-side trading desks are increasingly needing to efficiently access liquidity and demonstrate best execution. Buy-side traders are also taking on new roles and becoming price makers, which requires key information at their fingertips. Our Composite+ pricing engine is helping fulfil these requirements with pricing data on more than 24,000 bonds updated up to every 15 seconds. We are starting to scratch the surface of the possibilities for AI and how it can transform data in the trading workflow – the intersection of data, trading and technology is a key part of the market evolution." ■

Pricing and analytics: Structured products/cross-asset Market risk management product of the year

Beacon

Beacon's pricing and analytics platform includes a suite of front-office tools and enables users to unify pre-trade analytics, real-time pricing, booking and post-trade risk management.

For sell-side users, Quote Tool facilitates efficient sales and trading workflows by allowing salespeople to quickly structure and price trades accurately, iterate with their clients to find the optimal trade or hedge, and to be responsive to client needs. This is particularly important for global sales and trading businesses, where sales personnel might be in a different region or time zone from the trading desk.

Structuring Tool is geared toward sales, strategists and structurers, and complements Quote Tool by offering functionality for more complex trades, including the ability to customise fields, add fees and create complex transaction packages using a portfolio wrapper. Structuring Tool offers the capability to explore what-if trades, save multiple potential structures and run risk analytics on a set of pre-trades.

A financial object model enables in-house developers to create new instruments and add them to Quote Tool and Structuring Tool for seamless integration with Beacon's booking and reporting workflows.

Through Beacon's high-performance grid scheduler and cloud service, users can distribute complex calculations to any number of 'elastic compute' units without worrying about the underlying infrastructure.

Beacon provides clients access to its full set of source code, as well as the same set of enterprise technology tools its developers use to create the platform's financial logic and applications.

These tools include an integrated development environment with controls, a job scheduler for batch jobs, a grid scheduler for parallel and elastic computation, and Beacon's Glint web application development framework. Over the past 12 months, Beacon has incorporated the open-source Plotly and Apache Superset visualisation tools into its platform for business intelligence and other analytics.

Mark Higgins, Beacon

Judges said:

"Extensive tools for structured products in a DIY platform."

"Beacon has made a number of interesting enhancements to its platform over the past year, including a new user interface and a stress tool, as well as adding cross-asset valuation and support for Plotly and Apache Superset data visualisation and dashboards."

"Beacon's philosophy is to empower the client so they can optimise the technology for themselves."

Mark Higgins, chief operating officer and co-founder, Beacon, says:

"Beacon offers a unique combination: cutting-edge, cross-asset trading and risk management solutions that leverage decades of experience at some of the biggest financial institutions in the world, plus an integrated full-stack developer platform that lets your developers and quants extend functionality and build your own. Beacon lets your institution move quickly to take advantage of pay-as-you-go elastic cloud compute, closely integrate your developers with the business while being controlled and secure, and react at the pace of the market to changing opportunities." ■