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Turbocharging tech for next-level risk analytics

As regulatory demands and market conditions constantly change, investing in robust risk analytics is becoming not only a business necessity, but an essential compliance requirement

Robust risk management is critically important for capital markets firms – especially during volatile market phases. But extreme volatility makes it even more imperative for institutions to evaluate risk intraday and in real (or near-real) time. Seeking technological efficiencies while complying with shifting regulatory expectations is key to remaining profitable and competitive in the market today.

Demand for meticulous and frequent risk assessment is undeniable, coupled with an ever-evolving regulatory landscape moving towards risk-sensitive calculations for market and counterparty risk capital. Increasingly, financial institutions demand highly scalable, near-real-time analytics that enable drilling down and attributing risk to different units within the organisation.

Grasping the true costs of putting on trades is also pivotal, and combining cloud technology and advanced data analytics is empowering institutions to enhance their calculations and cut operational costs. Redirecting focus to critical business decision-making and profitability follows suit; however, challenges beckon.

In a *Risk.net* webinar, convened in collaboration with Numerix, experts examined how regulatory enforcement is changing, what financial institutions need to do to account for this, the move to cloud-based infrastructure and the challenges it poses. This article highlights the key themes covered in the webinar.

THE PANEL

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Dynamic regulations and risk analytics

Capital markets firms are evolving their technology and analytics capabilities now more than ever to navigate an increasingly complex risk and regulatory landscape.

Investing in robust risk analytics is, first and foremost, a business necessity, but it is also an essential compliance requirement. In most risk disciplines, the regulatory requirements have, over time, become increasingly onerous, frequent and granular, requiring complex models and formulae, and vast amounts of data.

Calculating counterparty credit risk exposures under the standardised approach to counterparty credit risk, market risk sensitivities under the Fundamental Review of the Trading Book (FRTB) or an alphabet soup of derivatives valuation adjustments (XVAs) are but a few of the complexities the industry is tackling. But other factors are at play too. Digitalisation and a more interconnected financial system have increased the speed at which markets move, circumstances change and crises evolve.

Lagging implementation of FRTB and the consequent technological demands are a case in point, explained Mayank Nanda, senior vice-president and head of risk analytics and product management at Numerix.

As such, FRTB is a comprehensive market risk capital framework designed to replace a series of reforms that were introduced following the financial crisis that began in 2007–08. It seeks to better capture tail risk, redraw the boundary between banking and trading books and raise the bar for internal models. While the official deadline for adoption was January 1, 2023, it has suffered fragmented timelines worldwide, now ranging between 2024 and 2025. The US, in particular, has been very slow to publish timelines and interpretations of the rules.

Timelines notwithstanding, FRTB is a very demanding test of internal risk analytics, and leads to challenges such as having to move to sensitivity-based approaches, handling computationally intensive advanced calculation methods, increased demand for frequent stress tests, and a heightened need for on-demand, highly elastic and cost-efficient compute resources.

"This requires firms to maintain large amounts of data and its lineage, and advanced technology to be able to analyse and support that data, said Nanda. "There are also profit-and-loss attribution tests that require alignment between front-office models and risk models, which is an ongoing challenge."

He added that financial institutions will need to calculate expected shortfall across multiple liquidity horizons and across asset classes, with scenarios where firms might need to perform several expected shortfall calculations, in the worst case.

"Moving towards a paradigm of sensitivity-based calculations under FRTB involves calculating credit valuation adjustment [CVA] sensitivities – which are compute-intensive. In our experience, firms are still grappling with calculating base XVA, and now we have the added complexity of calculating CVA Greeks – which are even more computationally demanding," Nanda warned.

Against this backdrop, firms' investments in robust cloud-based systems and analytics becomes not only a compliance necessity but a strategic imperative, enabling key data and insights to be delivered to the right people across the organisation at the right time, enabling faster risk-driven, forward-looking decision-making. It is also increasingly considered to be levelling the playing field for smaller banks and buy-side institutions.

Shift to cloud and scaling up analytic capability

Cloud technology and data analytics are reshaping risk management and regulatory compliance – especially in unpredictable and ever-changing market situations. The benefits of the cloud are manifold, Nanda explained, with computing, storage and automation advantages top of the pile.

Better computational power on the cloud provides the possibility to scale infinitely. "The whole idea is to have a set of advanced technologies to enable complex calculations at scale for end-of-day batch calculations," said Nanda. "It also opens the door for intraday and real-time calculations. Firms no longer need to run risk reports, XVA numbers or potential future exposure numbers with only end-of-day timeframes. Aligning front-office models and risk models is becoming a reality now."

Simultaneously, there is a crucial need to effectively analyse this vast amount of data. The challenge is substantial, with many firms facing a tenfold increase in data requirements as regulators, in certain cases, mandate a decade's worth of data. Substantial volumes of data necessitate robust storage solutions on the cloud.

Modern databases – such as Snowflake – emerge as high-performance cloud database providers, enhancing scalability for intricate queries involving large datasets. Notably, the cost of storage for all of this data is relatively inexpensive. "It could be market data or results data, depending on the use case and latency requirements, and choosing the right kind of database for the right kind of use case is incredibly important," Nanda said.

Cloud-based infrastructure can also be continuously fed with real-time data – something beyond the capabilities of many legacy systems. This makes pricing and risk models more accurate and precise, and helps traders and risk analysts make quicker, data-based decisions, which is especially important in volatile markets.

Furthermore, automation – a pivotal cloud requirement – not only provides time and resource efficiencies as firms tackle rising regulatory demands, but also enables firms to spin up environments on-demand to perform model validation testing and backtesting without cannibalising existing compute resources in production.

"Automation on the cloud can help continuous integration and continuous delivery pipelines to deploy environments on the fly and on-demand," Nanda added. "Quants can basically run their tests and produce results for the regulator in much less time than before."

The panel also highlighted that the cloud has the flexibility to grow and shrink with business needs, and this outweighs the costs of migration in many cases.

Migration challenges

For the most part, risk systems are not standalone – they thread through banks' core applications and processes. As a result, moving risk applications to the cloud may have implications for other systems and, ultimately, require reconfiguration of other applications or integration between systems. Thus, the migration journey for risk applications needs to be designed as part of the broader enterprise migration, which could involve hundreds of applications in total.

The move to the cloud from traditional legacy systems is not straightforward and certainly not without hurdles.

Panellists noted that some organisations have so far only used cloud solutions for specific purposes. In addition, security concerns contribute to extended approval times and the timelines for widespread adoption. Unfortunately, a targeted approach can result in a bifurcation between cloud-deployed and non-deployed applications, posing a barrier and a learning curve in some situations.

While real cost savings exist, the process is not straightforward – particularly when dealing with a limited number of applications on the cloud. Large deployments are efficient, but managing intermediate-sized ones can be challenging.

Compliance with global regulations for cloud systems – especially within organisations that conduct business across multiple jurisdictions worldwide – can prove challenging. Legacy technology and data complexity add to the challenges of transitioning from old to modern systems, making the coexistence of old and new a notable challenge.

Nanda says this could be attributed to a lack of knowledge regarding the power of the cloud and how to harness that power: "Cloud education needs to advance for the industry as a whole. We see clients slowly but surely moving to the cloud. I see a common regulatory framework that could be applied globally towards cloud security standards as well."

Future-proofing

The ultimate goal for organisations moving to the cloud is to have a modern risk analytics infrastructure that can grow, expand or shrink with business. Having readily accessible data and empowering everyone with the skills to utilise it will be key. The panellists are hopeful for an environment that would one day combine extreme automation with extreme explainability in the analytics space.

According to Nanda, as the industry stands on the cusp of greater cloud adoption, it would also offer tier two and three banks the valuable opportunity of levelling the playing field. "They won't need massive IT budgets to run all of their calculations and newer technologies will help them reduce capital. Advances in all the valuation adjustments and machine learning techniques such as algorithmic differentiation can help us get to that stage."

Conclusion

The inevitability of future market volatility and more regulations makes it imperative for institutions to continuously improve their risk and trade analysis capabilities. Regulatory demands and compliance needs – rather than being considered a burden – can represent an opportunity for market players to modernise infrastructure and take advantage of the cloud.

Risk functions at banks will undoubtedly need to adjust their operating models to enable this new architecture, while maintaining the rigour, control and governance required for risk management activities. But the shift to time- and cost-effective cloud architecture offers a potent solution – especially as businesses balance pressures to keep costs low while staying competitive in the marketplace. ■

>> Watch the full panel discussion, *The tech revolution: equipping institutions for risk and regulatory challenges*

The panellists were speaking in a personal capacity. The views expressed by the panel do not necessarily reflect or represent the views of their respective institutions.