

CELENT

NUMERIX ONEVIEW

Charting new frontiers for market and counterparty risk
management technology

Cubillas Ding

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INTRODUCTION: WHY IT MATTERS

Capital markets trading and investment firms are facing renewed imperatives to enhance market and counterparty risk capabilities in a digital age. This is happening at the juncture when past-generation risk systems are reaching a tail phase of obsolescence; they are often inept at meeting new expectations for quicker risk intelligence, higher organizational responsiveness, and optimal risk-based regulatory and business outcomes. Firms must chart their way toward new, fit-for-purpose paradigms and solutions to meet these future demands.

Opportunities, Demands, and Risks from Macro Disruptions

The financial industry is at an inflection point, shaped by a confluence of macroeconomic forces, sociopolitical repercussions, and renewed trading book / market risk capital requirements in a post-pandemic environment. Stormy conditions aside, future-oriented vectors are accelerating the ongoing transition to the sustainability/ESG agenda, digital assets, and the continued digitization of markets. Firms must face the risks, threats, and opportunities associated with these changes in a more proactive, responsive manner. Industry risk leaders and the office of the chief risk officer (CRO) often stand at the nexus of these changes.

Figure 1: Imperatives for the Future

Future business imperatives for the Risk function	Fit-for-purpose organizational posture
<p>1 Value chain optimization Risk value chain, operating model, and production management optimized for digital</p>	<ul style="list-style-type: none"> • Ready and responsive • Speed of intelligence keeps pace with ‘velocity of risk’ • Information empowerment for business users, risk owners, and risk controllers • Accelerated adaptation and time-to-market • High innovation quotient • Future-ready and future-proof
<p>2 Proactive, forward-looking risk coverage Proactive approach to handle emerging and cross risk dynamics</p>	
<p>3 Strategic risk advisory and insights Evolve the risk function to become a trusted partner advisor to the business</p>	
<p>4 Dynamic situational assessments Level of responsiveness to ad hoc signals and fast-moving business risk situations</p>	
<p>5 Rich data and advanced analytics Employ data science and machine learning approaches to develop, infuse, embed, and distribute “live” risk insights in real time</p>	

Source: Celent

Next-generation risk functions will necessitate different skill sets and organizational collaboration models, as well as more dynamic data and technology enablement strategies compared to the past. These change factors are reflected in the emerging and new demands placed on the risk organization to be fit for purpose for the digital age, such as organizational responsiveness, velocity of risk intelligence delivered, information empowerment for business and risk functions, and future readiness.

Solution Brief Context

This solution brief is part of our ongoing research into capital markets risk management and data enablement solutions. In our recent discussions, while deliberations around automation, better performance, and new functionality are routinely expected, forward-thinking firms have been exploring more strategic questions to envisage the future of what a digital operating model would look like for front office, market risk and control functions.

Responding to these questions will require firms to enhance their risk management capabilities to remain fit-for-purpose in a digital world, and for regulatory operations to attain a lean, predictable, and defect-free state. The ability to face off against market demands, adapt and respond to business imperatives, and capitalize on emerging opportunities, is inevitably intertwined with trading and risk management technology capabilities.

Over the years, Celent has observed Numerix's evolution from a pricing libraries vendor to a capital markets risk management service provider. Through a combination of interactions, meetings, and demos held in Q4 2022 / Q1 2023, relevant subject matter experts and senior product management leaders from Numerix briefed Celent about their new offering.

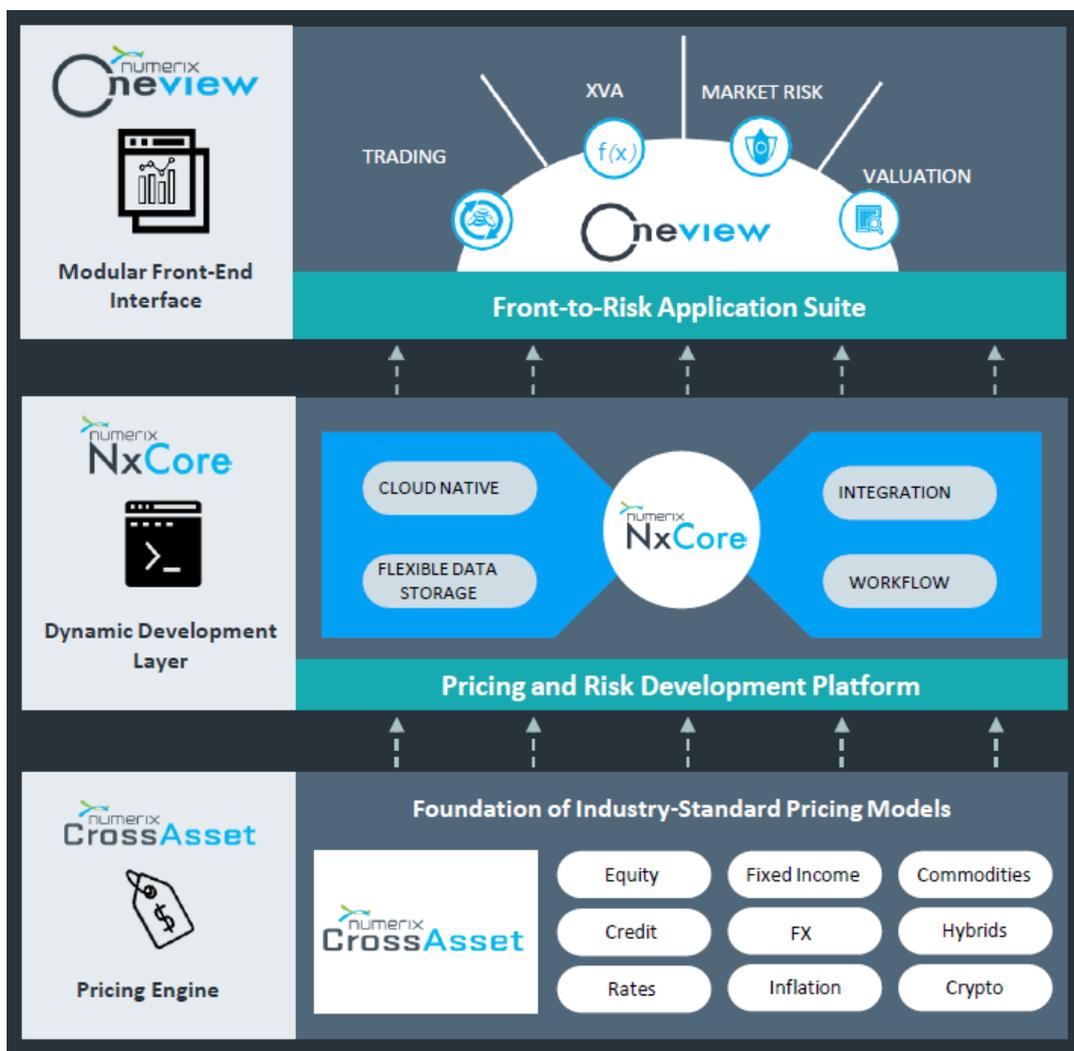
This solution brief explores what differentiates Numerix's strategy from prevailing approaches, the potential for scaled expansions, and opportunities for continued impact on the financial industry from innovative methods and technologies.

COMPANY AND SOLUTION OVERVIEW

Numerix Oneview

Numerix Oneview is a real-time capital markets risk management application suite for enabling sales, trading, and risk management functions to manage risk actively, accurately, and holistically.

Figure 2: Product and Solution Overview



Source: Numerix

The application suite comprises four modular offerings, underpinned by Numerix's cross-asset pricing and risk analytics and optimized for performance in the cloud. The platform has established capabilities for trading, market risk, XVA, and valuation of trading and investment books, especially for firms requiring stronger operational industrialization in managing swaps, derivatives, and structured products.

- **Oneview for Valuation:** This module enables an integrated approach for valuations, with applications and analytics that produce market-consistent pricing, valuations, and Greeks for large portfolios of trades, including complex exotic derivatives and structured products.
- **Oneview for Trading:** This module comprises a real time trading infrastructure designed for structured notes issuer businesses. This is underpinned by real time tradeable quotes and risk measures, automated RFQ and role-based workflows, and full trade lifecycle management and P&L of structured notes.
- **Oneview for XVA:** This module enables firms to manage counterparty exposures, integrate XVAs into deal prices, and execute the most complex deals at the right price. Designed for XVA desks, this module combines predeal impact analysis on XVAs, counterparty exposures, and regulatory capital in real time.
- **Oneview for Market Risk:** This module delivers on-demand market risk analytics at both the front office/desk and enterprise level, including Greeks/risk sensitivities for all trades and portfolios from liquid/exchange-traded cash positions to exotic derivatives. Customizable views of risk and configurable scenarios enable clients to make informed and timely risk management decisions.

Although this solution brief focuses on the next-generation paradigms and capabilities around market risk management technology, Numerix's approach to adopting a unified cloud-first approach across various layers of technology stack—cross-asset pricing components, quantitative development (financial engineering) platform facilities, and pricing and risk applications—means that the implications for innovation and change are more profound.

KEY BRIEFING ANALYSIS AND PERSPECTIVES

Numerix is executing on ambitions to change the paradigm for market risk and XVA management through a comprehensive overhaul of its technology stack natively in the cloud

For most sell-side and buy-side institutions, their risk technology and data ecosystems are viewed (and rightly so) as complex core systems that are painful and expensive to dislodge and replace. The most significant challenge lies in how (where possible) to incrementally evolve legacy risk technology and risk management practices to exhibit “digital by design” characteristics and reap significantly lower run costs.

Over the years, selective first wave improvements have been made to parts of the risk value chain to leverage cloud infrastructures. However, legacy market risk applications were designed for pre-cloud environments, and despite lifting and shifting components to the cloud, fundamental constraints and longer term questions around fit-for-purpose capabilities in an increasingly digital capital markets and investment landscape are still unaddressed.

In this regard, we analyze Numerix’s market and counterparty risk offerings and highlight the pertinent capabilities that we believe are worthy of mention:

1. Multi-/cross-asset coverage across cash securities, swaps/derivatives, and structured products in the trading book

Numerix’s Oneview offering covers a broad range of cash, listed, and flow products, in addition to the firm’s established track record in derivatives. Coming from a strong pricing and risk analytics heritage, Numerix has demonstrated its continued commitment to pursue a “whole book” approach to strengthen its ability to measure and combine linear and nonlinear positions within a consistent market risk, counterparty, and XVA framework.

Celent perspective: Coming from a strong derivatives pedigree, Numerix’s ongoing evolution toward “total trading book risk management” capabilities, continues apace for both liquid and flow products. This approach expands possibilities for more diversified institutions to employ a consistent framework to cover risk dynamics across multiple business units/divisions, such as Equity, Prime Brokerage, Rates, Credit, and FX (which tend to encompass listed/exchange-traded, flow securities, and OTC positions). On the field, Numerix already has live installations of more sophisticated clients that utilize this coverage, including its largest bank clients and asset management firms.

However, based on our experience, no solution in the market has yet to demonstrate total coverage out of the box. Solutions can range from those specific in terms of their instrument coverage and fit-for-purpose—for example, fixed income products within a treasury context—to ones that focus on exchange-traded markets. They can also include those that possess the sophistication to cover the entire portfolio directly out of the box, as well as with an extensible framework to

incorporate new instruments quickly (e.g., complex, structured assets and uncleared OTC derivatives).

Here, quantitative approaches and analytics within various solutions can vary when it comes to their support for vanilla versus exotics. Firms must also not only consider a vendor's functional front-to-back capabilities, but also solution flexibility, extensibility, and associated total-cost-of-ownership (TCO) considerations.

2. Integrated but modular technology stack that can underpin a firm's propensity for adaptation

Market and counterparty risk applications are becoming a critical information hub and decisioning resource in the broader technology ecosystem. In the present environment, the ability to respond dynamically to extemporaneous risk events or operational change requirements is a rare but prized premium that universally all capital markets participants are contending with. Market and counterparty risk feature sets, models, and technology capabilities need to be aligned with the dynamic realities of the new risk landscape and advances in technology.

However, the realities of leveraging agile risk technology underpinned by modular applications with componentized functional and analytical capabilities that can be assembled and integrated rapidly at the speed of change are still relatively new. In this regard, Numerix is pushing the envelope. Its modular application and architectural approach for its Oneview product suite, in line with the firm's heritage in the front office, is designed to have the necessary strategic technology foundations to be well matched for adaptation.

In many instances that we have observed, the conundrums (what we term as an "ambition gap") when embarking on change efforts are related to the perceived tactical risks of ripping and replacing relative to the payback of such efforts. As the curve for technology advancement and infrastructure modernization progresses, firms must consider to what degree (or lack of thereof) their legacy risk infrastructures can enable future ambitions and emerging requirements.

Celent perspective: Pursuing technology approaches that are modular, component-based, and open enables financial firms to support a best-of-breed IT strategy, or even a best-of-suite approach, for a firm's market risk technology ecosystem. Modern open APIs (e.g., microservice architectures) are allowing more dynamic interoperability and data exchanges across technology applications, reducing costs of integration. Modularity also enables financial firms to latch on to multiple entry points, employing modular components to coexist in a broader ecosystem to address their needs. This is the case whether it is through the angle of expanding a derivatives or structured products business or creating a shared market risk utility and/or centralized counterparty risk desk structures across the firm.

Looking forward, ecosystems-led approaches are opening up more avenues for firms to both buy and build on top of platform offerings, enabling firms to benefit from an amalgam of organic and inorganic routes to market. Firms can take full advantage of the vendor ecosystem and aim for more optimal outcomes related to build versus buy and standard versus best-of-breed procurement decisions.

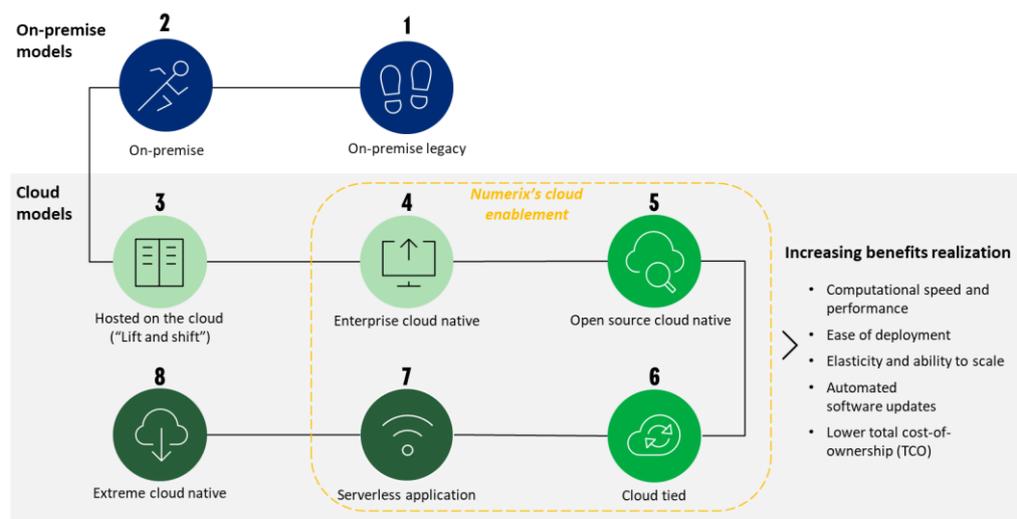
3. Cloud native: Designed from the ground up to fully exploit cloud capabilities

Numerix has designed this offering from the ground up to fully exploit cloud capabilities. For processing intensive areas like XVA and market risk, especially for derivatives and nonlinear portfolios, compared to traditional on-premise deployments, a solution natively built to leverage cloud infrastructures substantially improves performance and elastic computing efficiencies—and even improves applications migrated to a cloud environment that do not fully leverage cloud capabilities.

New computational needs and tasks can launch hundreds of cores for specific calculations. The analysis occurs in minutes—instead of days or hours—without the costs of internally configured IT infrastructure. Clients can expand and extend as needed, free from the large, fixed capital costs or long turnaround times associated with the traditional model of owning hardware in data centers.

Celent views cloud enablement activities across the industry as a wave that still has some way to run. The rapid evolution and maturity of firms’ and vendors’ cloud stacks, their underlying technological components, and organizational capabilities will drive multiple phases in the realization of business value. Here, we observe different flavors when financial firms and vendors pursue cloud enablement efforts.

Figure 3: Evolution (and Revolution) into the Cloud



Source: Celent analysis

Celent perspective: Every vendor we know is charting a migration path to the cloud, at different stages. However, not every offer that has a cloud title is always fully cloud-enabled. Firms typically lift and shift their software to be hosted in the cloud (as shown in Figure 3), which is already a relatively common practice across the industry. However, to exploit the cloud’s full capabilities (e.g., horizontal databases, middleware, APIs/microservices, containerization, etc.), the underlying software has to be redesigned natively.

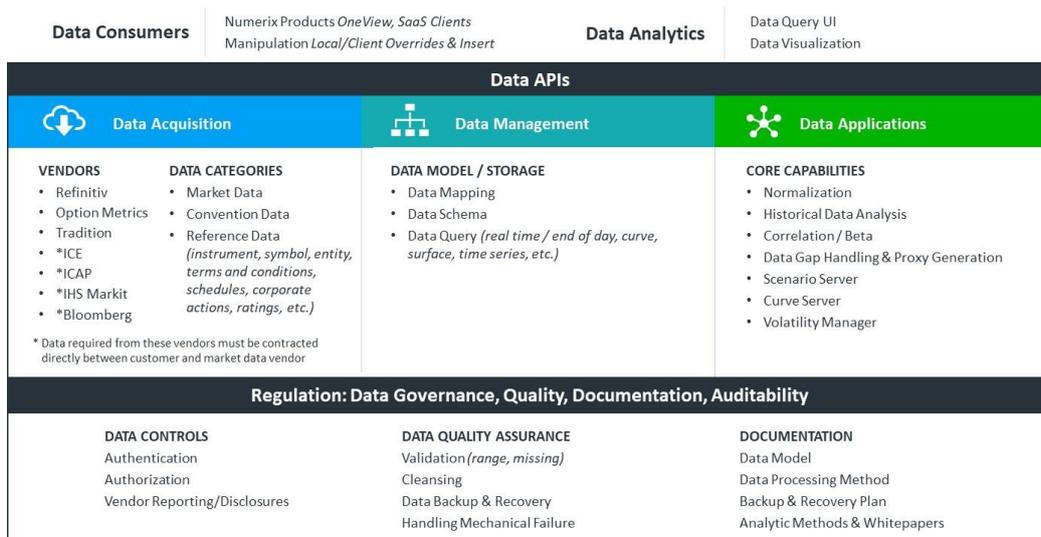
Across the landscape of legacy-oriented market risk systems, we view Numerix’s Oneview framework to be on the frontier of next-generation cloud-native technology. However, in terms of change frontiers and maximizing impact, financial firms must equally consider organizational factors and their evolutionary journey into the cloud for their overall risk management ecosystem (beyond technology), which may have different levels of maturity in terms of level of cloud readiness, suitability, and alignment.

4. “As-a-Service” proposition for technology and market data management

Numerix's Oneview for Market Risk platform can be delivered with prebundled market data (from Refinitiv, delivered in a SaaS configuration), but the underlying data management architecture and facilities allow firms to source management and bring their own data. The flexibility options for a firm to implement the hybrid/multisourcing of market data is an important differentiator for Numerix. Clients can choose to embrace managed market data arrangements while still maintaining the ability to source and manage alternative market data sets within the same framework.

Traditionally, when deploying sell-side oriented risk systems, in addition to the implementation of the risk framework, software models, and calculation engines, financial institutions need to stand up their own on-premises market data sourcing and delivery arrangements to feed into risk calculations (risk factors, yield curves, sensitivities). These solutioning approaches, while an onerous undertaking to implement and deploy, also deliver the necessary sophistication that a sell-side bank would need in terms of asset class coverage and bank risk capital – with the necessary granularity for regulatory purposes, into the market data supply chain, and having direct controls and governance associated with model validation activities.

Figure 4: Numerix: Data Management Building Blocks (NxDM)



Source: Numerix

Celent perspective: What is distinguished about how Numerix has designed its SaaS risk offering is that it combines elements of a shared market data infrastructure (which can be leveraged across multiple clients—in this case, the prebundling and mastering of multiple data feeds, such as from Refinitiv and other data vendors, which can be shared across multiple entities), yet the Numerix architecture is also designed to retain client-specific, proprietary trades/position/holdings data and processing environments.

This approach enables clients to embrace the best of both worlds. It provides the benefits of scale/cost mutualization through the shared market data elements, yet financial firms can tailor data, analytics, and workflows to suit their needs. For instance, tier 1 capital markets banks may have different levels of governance, control, and transparency requirements associated with in-house versus outsourced arrangements compared to nonsystemically important institutions. The manner in which Numerix has designed its offering gives clients room to shape how much standardization versus custom configuration is needed.

5. Integrated quant development environment

Numerix's NxCore platform (on which the market and counterparty risk application suites are built) contains an integrated modeling, quant development, and data environment for building capital markets apps. These facilities leverage the Python ecosystem of tools and data science facilities in conjunction with Numerix's established pricing engine and derivatives analytics. At the same time, they allow firms to bring in their own proprietary or third party analytics.

The platform is designed to coexist and integrate within a heterogeneous IT environment (e.g., with proprietary/in-house analytics, third party risk systems, etc.). It can also act as a platform for capital markets and investment firms to consolidate and house proprietary models, analytics, data, and research in a centralized, shareable, and controlled manner.

Figure 5: NxCore Cloud: Development Platform for Building Capital Market Apps



Source: Numerix

Celent perspective: Numerix’s quantitative development environment is integrated and architecturally consistent with the company’s risk applications, enabling quants, developers, and end users to collaborate, iterate, and share custom-developed apps, analytical components, reports, and data components. Existing market risk applications typically do not have this degree of composability in building/extending apps, especially for front office trading use cases, where faster time-to-market and responsiveness are paramount.

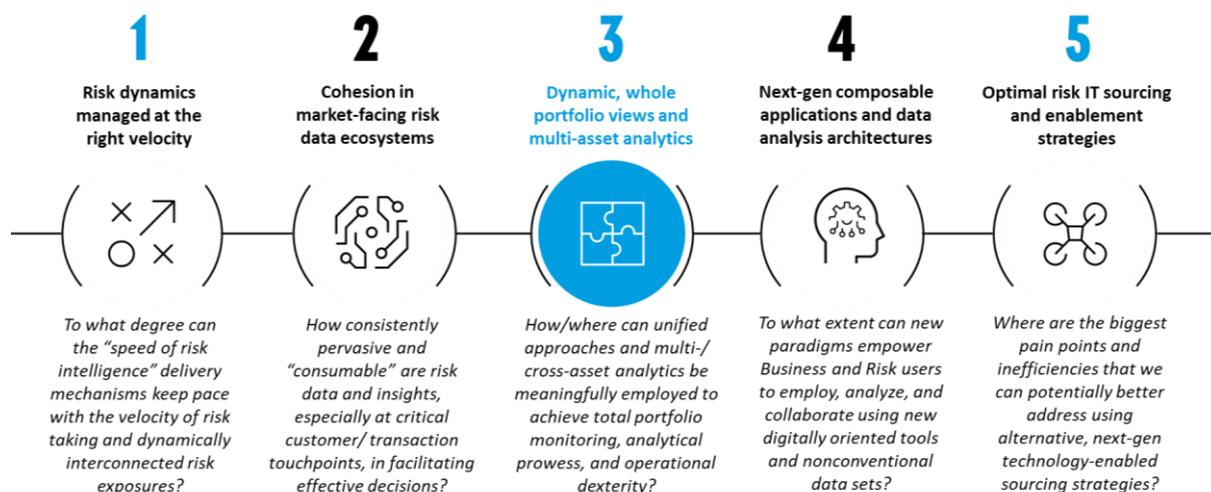
LEVERAGING NEW APPROACHES: EXECUTIVE TAKEAWAYS AND STRATEGIC CONSIDERATIONS



As we consider next-generation operational capabilities, we see competitive and regulatory pressures continue to drive the industrialization agenda around market and counterparty risk data and platforms, with enhanced requirements for infrastructure and platform capabilities to meet emerging standards toward a new financial ecosystem. This dynamic is already upon us, but firms on the whole still need to address maturity gaps in many parts of the information delivery value chain.

The following are executive takeaways and considerations when embarking on next-generation changes in risk technology ecosystem enablement. These are based on Celent’s research and advisory experience of helping clients.

Figure 6: The Chain of Success: Critical Considerations and Decision Factors



Source: Celent

1. Catch emerging risk dynamics at the right velocity.

Firms must look to identify and understand the velocity requirements and processing intensity for risk processes and information production to ensure that latency implications fit with future/emerging requirements.

Two dynamics increasingly characterize where the industry is headed. First, more intensive processing requirements are needed to enable greater sophistication, deeper granularity, and handling of higher volumes of data on a firmwide basis. Second, the velocity requirements are being compressed from weeks and days toward intraday and, at least, near real time for business transactions that involve the necessary monitoring and control requirements.

Firms should flex and “right speed” latency in accordance with the velocity of risk in different parts of their portfolios (e.g., cash equities and fixed income, futures and options, cleared versus bilateral derivatives) and the urgency of risk information under different market conditions (e.g., normal versus stressed). This should involve real time, intraday, and/or continuous assessment of live risks aligned with the velocity of risk taking and its potential impact, not merely based on yesterday’s stale data. Architectural components need to be designed to operate at different speeds, not merely in analyzing and reporting risk measures but also for controlling risk.

Critical decision factor: *To what degree can the speed of risk intelligence delivery mechanisms keep pace with the velocity of risk taking and risk exposure in different parts of the business?*

2. Pursue cohesion in markets-facing risk data ecosystems.

With risk information and insights playing into core transaction, business planning, and operational decisions, it is important for firms to chart a road map to ensure that architectural and data access facilities for risk systems are adept enough to enable data to be sufficiently pervasive and “consumable” (subject to the appropriate rights of access). That is especially the case at critical customer and transaction touchpoints where risk information is used to facilitate effective decisions.

For instance, through modern data science, modern API, and data integration paradigms, stronger information cohesion can be achieved across market making/trading, investment, treasury, and other areas, such as risk-derived regulatory and capital reporting. For example, firms can look to consolidate and converge market risk with counterparty credit risk, XVA management technology, and data frameworks in terms of pricing, monitoring, and reporting.

Critical decision factor: *How consistently pervasive and “consumable” are risk data and insights, especially at critical customer and transaction touchpoints for facilitating effective decisions?*

3. Evolve approaches to support dynamic, whole portfolio views and multi-asset analytics.

Different groups within the firm—traders, portfolio managers, investment planning committees, boards, and firmwide risk management functions—may have their own lens to analyze total portfolio performance and risk, yet their analysis needs to be based on consistent, aligned, and coordinated data supply chains. More often than not, portfolio and asset class composition, variety, and complexity, as well as various levels of asset characteristics (e.g., market-based versus model-based prices, from listed to bilateral and exotics positions), make it a challenging task to achieve a total portfolio view.

No one solution provider or internal organization can necessarily yet cover the intricacies and nuances of different markets and asset classes/instruments. However, financial firms can look to leverage modern tech paradigms to reimagine, in a unified manner, their architectural and enterprise risk data strategies to achieve “orchestrated interconnectedness” across asset class-specific transactional, processing, and analytical specializations.

Critical decision factor: *How/where can unified approaches and multi-/cross-asset analytics be meaningfully employed to achieve total portfolio monitoring, analytical prowess, and operational dexterity?*

4. Design and expand toward composable risk applications and data analysis.

The emerging frontier for market risk applications involves technology underpinnings that come with low-code features and “fast programmatic analysis” that facilitate greater flexibility and nimbleness under the hood, which allows dynamic interrogation beyond BAU reporting and dashboards. Increasingly, for leading firms, significant premiums are placed on a firm’s ability to assess, react to, and proactively respond to disruptive scenarios.

Critical decision factor: *To what extent can new paradigms empower business users, risk owners, risk modelers, quant analysts, and risk controllers to employ, analyze, and collaborate with new digitally oriented tools and nonconventional data sets?*

5. Optimize risk technology sourcing strategies.

New cloud-based apps and data architectures are changing where/how firms craft and reconfigure their sourcing strategies (data-as-a-service, hybrid managed services) to redress and rebalance priorities, through an emphasis on global cross-divisional coordination, technology standardization, and more effective hybrid centralized-decentralized data arrangements.

Traditionally, firms are faced with choices of building **or** buying technology solutions. In the present age, ecosystems-led approaches are opening up more avenues for firms to both buy **and** build on top of platform offerings, enabling firms to benefit from an amalgamation of organic and inorganic routes to market—the best of both worlds.

Critical decision factor: *Where are the biggest pain points that we can potentially better address using alternative sourcing strategies based on next-generation technologies to enable capital markets trading and investment activities?*

LOOKING FORWARD

Celent believes that the previous generation of risk systems are reaching the height of their obsolescence cycle. Capital markets firms are facing an important decision juncture.

In deciding on next-generation platforms and future-proofing considerations, we typically advise clients to not allow functional use cases and features to dominate change management discussions. Instead, look under the hood to consider elements that would enhance the maintainability, adaptation, and future-proofing of your technology investments (to the extent possible).

While legacy risk technology ecosystems contend with conventional drawbacks—strains on operational productivity and costs associated with software compatibility, maintenance/upgrades, security vulnerabilities, and a lack of flexibility—the real case for change must be guided by imperatives to embrace strategic capabilities to face off against new/emerging market dynamics.

Successful future-proofing requires taking advantage of the latest in technology and cloud replatforming, with a business-led focus on data enablement. Capital markets firms that execute with requisite discipline to create technology, platform, or application independence by decoupling data will, in essence, also create data independence and strategic optionality to incorporate new business capabilities.

Although not a panacea that will fully insulate against future developments, these approaches will enable a more open, interoperable, and flexible ecosystem with architectural and data building blocks that are less restrictive and more adaptive to change. In the longer term endgame, they will empower forward-thinking first adopter firms to **evolve faster, stay leaner, and get ahead.**

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Support for Financial Institutions

Typical projects we support related to policy administration systems include:

Vendor short listing and selection. We perform discovery specific to you and your business to better understand your unique needs. We then create and administer a custom RFI to selected vendors to assist you in making rapid and accurate vendor choices.

Business practice evaluations. We spend time evaluating your business processes, particularly in policy administration, rating, and claims. Based on our knowledge of the market, we identify potential process or technology constraints and provide clear insights that will help you implement industry best practices.

IT and business strategy creation. We collect perspectives from your executive team, your frontline business and IT staff, and your customers. We then analyze your current position, institutional capabilities, and technology against your goals. If necessary, we help you reformulate your technology and business plans to address short-term and long-term needs.

Support for Vendors

We provide services that help you refine your product and service offerings. Examples include:

Product and service strategy evaluation. We help you assess your market position in terms of functionality, technology, and services. Our strategy workshops will help you target the right customers and map your offerings to their needs.

Market messaging and collateral review. Based on our extensive experience with your potential clients, we assess your marketing and sales materials—including your website and any collateral.

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