CAPCO

# RIGHTSIZING THE LEGACY AND OPTIMIZING FRONT-TO-BACK COSTS

a **wipro** company

# SPEED READ

- Across all industries globally, companies face a legacy challenge: how to make the most of new technologies while keeping the existing business running profitably – often with an agenda to lower costs.

- The capital markets industry has a distinctive set of challenges: the period of growth, merger and acquisition activity, regulatory change and shifting business imperatives witnessed over the last 30 years has left many with overly complex and costly operating models and architectures, often duplicative and siloed in nature. At the same time, cloud-based, data-centric technologies offer new growth opportunities.

- We examined the distinctive ways in which the capital markets industry deals with these challenges. To quantify this, we gathered data and commentary across 120 firms, including broker-dealers, asset management firms, wealth advisory firms, private banks and investment banks, across the major industry regions globally and compared these to other industries.

- The following five themes were common to solving legacy platform challenges and reducing complexity:

    1. **Cloud** – firms are focusing hard right now on cost and profitability through deployment of cloud solutions, creating better customer experiences and automating manually-intensive processes, with a growing focus in the next two years on growing new market segments and on sustainability.

    2. **Data-centricity** – firms are focusing on the possibilities of cloud-based data architectures, opening up possibilities to solve some of the industry's long-standing processing and data challenges.

    3. **Process ecosystems** – a growing ecosystem of vendors, fintechs and utilities allows many opportunities to rationalize, standardize and simplify, consolidating down to fewer or even single platforms for one or multiple asset classes, front to back.

    4. **Custom engineering** – firms are building capability in cloud-native engineering; architecture patterns and tools allow them to fill gaps or rebuild afresh with custom solutions.

    5. **Security** – keeping data and infrastructure secure is an ongoing, multi-threaded challenge which requires scale and continuous improvement to govern, control and protect the underlying infrastructure and data.

- Global markets players will need to invest in architecture modernization to remain competitive, and this will require a multi-year focus. The prize is likely to be a 20-30% run rate reduction in IT spend and a lower change budget going forward on a like-for-like basis – plus the ability to cope with capacity volatility, a prize long desired by the industry – as well as security from external and internal threats.

# INTRODUCTION

Across all industries, companies are addressing their respective challenges with legacy technologies while capitalizing on new opportunities by embracing newer technologies and paradigms.

| Overall IT budget Comparison – Capital Markets Industry | | |
|---|---|---|
| **Past year** | **2022** | **2023** |
| $793.5m | +0.2% | +2.6% |

(Source: Capco/Wipro research)

The capital markets industry (broker-dealers, asset management firms, wealth advisory firms, private banks, and investment banks globally) faces these challenges and opportunities, plus some distinct industry-specific trends. These relate to how the industry works, changes in the business strategy, the customer and regulatory environment in recent years, as well as the rapidly developing capabilities of modern technology.

In this paper we set out to summarize these changes and how to tackle them with the support of data gathered from 120 capital markets industry firms, allowing us to draw comparisons with other parts of financial services and with other industries.

| Which are the main ways you are generating revenue from rightsizing? | Bank | CapMkts |
|---|---|---|
| **Create new products and services** | 8% | 7% |
| **Develop new business models** | 25% | 13% |
| **Grow revenue through greater productivity** | 65% | 60% |
| **Improved market positioning and branding** | 27% | 30% |
| **Increase customer retention and upselling** | 38% | 38% |
| **Penetrate new client segments** | 55% | 60% |
| **Reach new global markets** | 67% | 60% |
| **Speed up time to market** | 63% | 63% |

(Source: Capco/Wipro research)

## Industry Context

Rightsizing of legacy technology presents an urgent imperative and complex problem within the global capital markets industry. Many firms need to simplify and standardize their existing trading, cash and securities processing, and risk management systems. Businesses in revenue terms and coverage have often shrunk, so investment needs to focus on profitability. This could imply cost reduction targets of up to 20% or more overall on technology and operations budgets supporting these businesses, which today in many firms can exceed many hundreds of million dollars.

The industry's products, data, processes and regulatory challenges shape our priorities:

1. **Customized products and processes.** Financial products can be complex to model, can be resistant to standardization, and can have a high degree of real-time dependency on external data, services and parties (e.g. exchanges, execution venues, clearing, custodians). This means that they can require expensive and often in-house expertise to model and manage in addition to complex automation needs, and it means that they have very different requirements in terms of data, process flows and controls across different business areas.

2. **Historical growth models.** There has been a historical tendency to accept some degree of architectural inelegance and delivery risk and quality to meet business and regulatory pressures. From a global perspective, proliferation of similar and overlapping solutions have materially increased application estate complexity, costs and heterogeneity (and solution stickiness).

3. **Regulation.** The industry is under heavy scrutiny from regulators due to its central role in the economy and money supply. It is not the only heavily-regulated industry, but we have seen a very significant focus on regulation in the recent past which has in turn refocused business models and required the introduction of often highly costly compliance systems and processes. This is set to continue.

These firms face a number of important decisions. What should their architecture look like? What kind of technology organization do they need to create and support? What third-party services or products might support this journey? To drill down deeper:

- How does technology support the current business both functionally and capacity-wise? Can routine manual tasks be even further automated? How easy is the technology application to change?

- Where is that business likely to be in five years' time – and will the target technology continue to support it functionally, capacity-wise and from an outside world integration perspective?

- Can the technology provide the level of service and ease-of-use that clients and customers expect?

- What skills are required in-house and which should be outsourced?

## What needs to change?

There is no one right answer. Different businesses and institutions require different architectural solutions and patterns. However, there are some common themes. Developments in technology have changed the architectural options available. As a result, it has become easier to build and deploy customized technology, and it is becoming easier to engage with third party services. Target state technology is likely to involve some combination or all of the following:

- **The cloud.** At a simple level of infrastructure, the cloud removes the dependencies on sourcing and running data centers to support both legacy and new technology, and it provides scalability to adjust to changes in business volumes. The cloud not only delivers cheaper and faster infrastructure, but also provides underlying data capabilities, which allow firms to automate and improve the way in which they create and change technology.

- **Data-centricity.** In a world of growing automation, data needs to be accessible from authoritative data sources and to be correct; cloud-based data architectures help enable this, and allow data sources, controls and standards to be universal.

- **Process ecosystems.** Cloud technologies have changed the dynamics of how we engage with third-party software, utilities, service providers and in-house technology. In the recent past, the idea of merging multiple vendor platforms with custom-built components was complex and expensive. Now, in a world of cloud-based containers and interchangeable API-based Software as a Service (SaaS) offerings, external services can be quick to implement, responsive and flexible. The services provided by one long-term software vendor can be provided by a host of specialist fintechs

- **Custom engineering.** Cloud-based containerization has changed the possibilities of how systems can be architecturally designed and built. Legacy architectures can be enhanced, decomposed and/or replaced with more sustainable alternatives. The future architectures and solutions deployed in capital markets firms are likely to be based upon a combination of external services with in-house custom microservices filling key gaps and providing the competitive edge.

- **Security.** Keeping data and infrastructure secure is an ongoing, multi-threaded challenge that needs scale and continuous improvement to govern, control and protect the underlying infrastructure and data. Surrounding systems with a firewall may no longer be sufficient in a world of complex cloud-based ecosystems. Modern security strategies (e.g. Zero Trust) embed security throughout the architecture.

## HOW ARE FIRMS CURRENTLY ADDRESSING THESE CHALLENGES?

To bring this to life, let us examine the data across the global capital markets industry.

We looked at a sample set of 120 capital markets firms across the globe. These firms spend an average of $793.5m annually on IT to support their businesses and typically are expecting cautious business growth in the next two years, but also need to meet often ambitious cost reduction targets.

| Which of the following technologies is your organization using? And which is most effective? | Using | Effectiveness |
|---|---|---|
| 5G | 18% | 13% |
| Artificial intelligence | 53% | 26% |
| Data management warehouse/lake | 57% | 44% |
| Digital enterprise platform (ERP) | 55% | 36% |
| Edge (fog) computing | 10% | 6% |
| Grid computing | 12% | 7% |
| Internet of Things | 43% | 19% |
| Open-source data integration system (such as Talend) | 10% | 15% |
| Robotic process automation (RPA) | 38% | 23% |
| Workflow automation | 53% | 26% |

(Source: Capco/Wipro research)

We saw a heavy focus on cloud infrastructure and cloud-related architecture, tools and processes from these clients – data architecture, process ecosystems, custom engineering. Underpinning all this is a focus on keeping these data flows, processes and systems secure, and on the tools, processes and governance required to maintain and build this as an ongoing capability.

# THE CLOUD

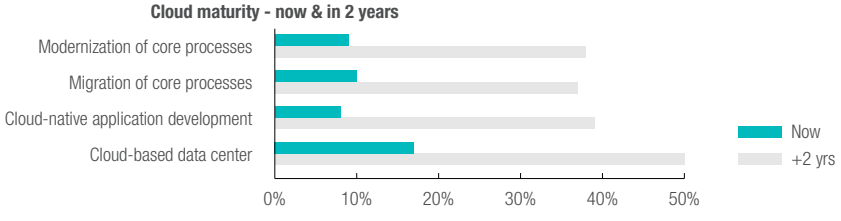
1. **Overall picture.** Across the industry we see a strong focus on the benefits of cloud in growing revenues as well as cost reduction; in the capital markets industry this is mainly through customer retention (48% highlight this as a priority), new client segments and greater market share (55%), and better internal controls (44%). Firms see these core benefits growing over the next two years.

2. **The business case.** The case for migration to cloud is strong: firms report payback periods for cloud investments averaging around 18 months for migrations. These are facilitated by investments from the hyperscale cloud vendors – fundamentally, the big cloud vendors are making it easier to adopt cloud, with fairly consistent delivery of the financials to meet the business case.

3. **Current progress.** The adoption of cloud is very much work-in-progress across the industry, with only 10-15% of banks describing themselves as advanced or fully optimized in cloud data centers and cloud-native development. However, looking just two years down the line, they anticipate an acceleration in this pace, with 40-50% of these initiatives expected to be advanced or complete.

4. **Cloud usage models.** Currently, 61% of firms use public cloud, 46% have a hybrid model, and 46% use private solutions. The number of such adoptions is expected to grow, but with the existing ratios remaining the same – capital markets firms see value in each of these distinct usage models and expect each to remain relevant.

| In general, which are the main benefits that your firm is seeing from using the cloud? | | Now | + 2 years |
|---|---|---|---|
| Financial | Better use of capital | 9% | 10% |
| | Decreased costs | 51% | 56% |
| | Greater shareholder value | 16% | 30% |
| | Improved profitability | 55% | 59% |
| | Increased revenue | 50% | 66% |
| Operational | Accelerated time to market | 25% | 28% |
| | Greater and faster innovation | 18% | 23% |
| | Greater teamwork and stronger corporate culture | 30% | 29% |
| | Improved employee engagement/productivity | 34% | 40% |
| | Increased customer satisfaction and retention | 48% | 48% |
| | More effective risk management and compliance | 44% | 44% |
| | Reduced carbon footprint | 3% | 24% |
| | Streamlined operations/improved quality | 24% | 30% |
| Strategic | Greater ability to scale across business/global markets | 27% | 29% |
| | Greater innovation/new business models | 28% | 23% |
| | Greater market share/expanded client base | 55% | 56% |
| | Improved planning and decision-making | 40% | 49% |
| | No benefits | 0% | 0% |
| | Stronger reputation and brand equity | 7% | 19% |

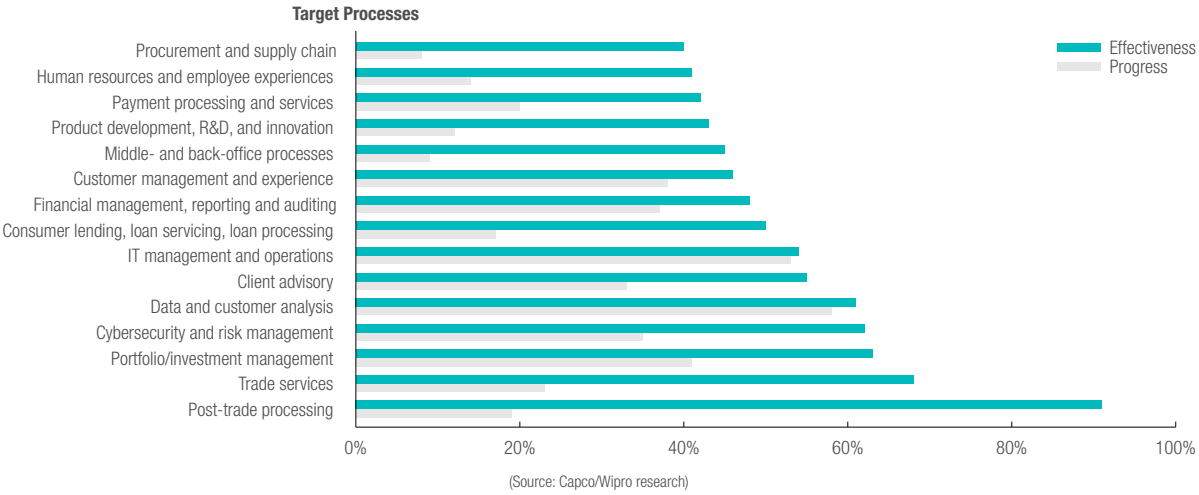



(Source: Capco/Wipro research)

# PROCESS ECOSYSTEMS

1. **Target processes.** Firms across all industries are focusing on improving and automating their processes, and are looking at a wide range of options to achieve that outcome. The most effective use of cloud across any industry process we analyzed is in capital markets post-trade processing: 91% of clients see that as the function where cloud has been most effective. Other key areas of focus are customer analysis (58% highlighted this), customer management and experience (38%), and portfolio and investment management (41%) – and these areas will continue to be the focus of cloud enablement going forward.

2. **COVID.** The pandemic has to date seen an increased focus on customer experience across the banking industry, with 70% of banks and 63% of firms in the capital markets industry saying it has been elevated as a priority as customers moved to almost entirely digital interactions. Capital markets stands out for an especially strong focus on making processes more efficient and agile (67% of capital markets players highlighted this – higher than any other industry) – as COVID abruptly made it difficult to carry out the manual intervention required to process trades.



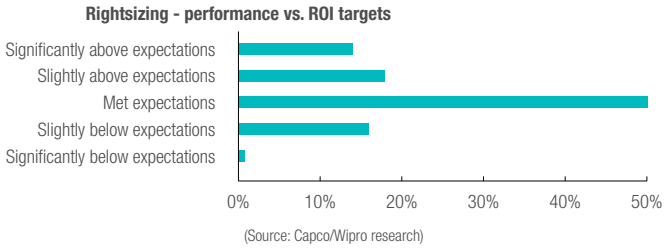

(Source: Capco/Wipro research)

# CUSTOM ENGINEERING

1. **Cloud-native skills.** Capital markets firms are investing in creating cloud-native engineering capability, and are expecting payback periods of 24 months for cloud-native application developments.

2. **Operating models.** Capital markets firms recognize the required changes to their operating models and ways of working to achieve that cloud-native engineering capability, with a heavy focus on training (within both IT and the business), and with strong senior-level sponsorship.

3. **High-impact technologies.** Capital markets firms highlighted workflow and process automation (50%), data technologies (44%), and enterprise platforms (36%) as key to their automation and consolidation initiatives. Artificial Intelligence is also widely used (56%, in line with the average for other industries) but at the moment is not yet seen as fully effective (26%, lower than in any other industry).



(Source: Capco/Wipro research)

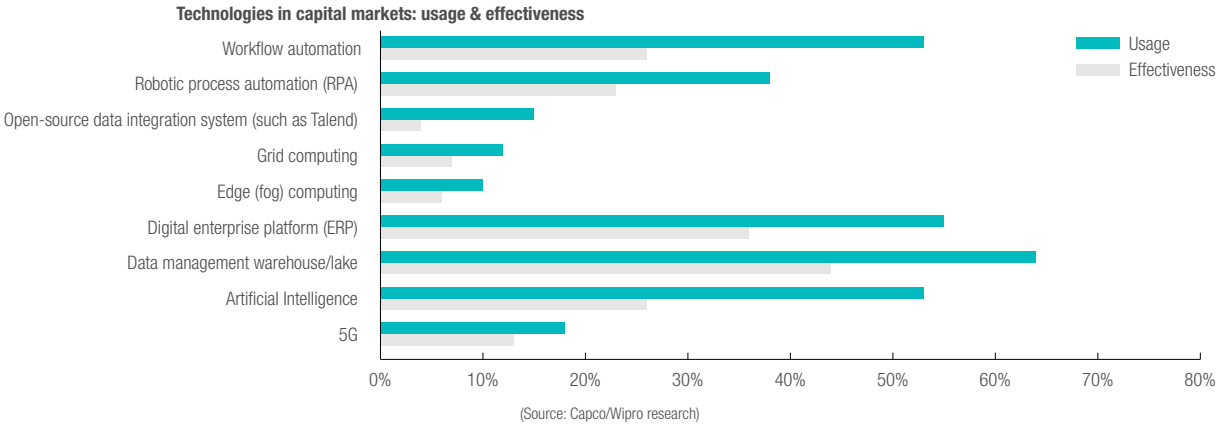
# DATA-CENTRICITY

1. **Data technologies.** 64% of capital markets firms are using cloud computing for data management and warehousing capabilities. This is the highest across any industry (the average is approximately 50%; the insurance industry is lower at 39%). Clearly, players in the capital markets industry are turning to cloud-based data technologies as a solution to the complexities and duplication of key processes.

# SECURITY

1. **Monitoring and controls.** Capital markets firms have a stronger focus than all other industries when it comes to auditing and measuring the effectiveness and control of automated processes (56% of firms vs. a cross-industry average of 40%). This is also reflected in a greater focus than other industries on improving cybersecurity processes.

2. **Regulatory considerations.** This focus is supported by a generally more positive view of the regulatory environment as it pertains to allowing automation than in other industries. Outside the capital markets and banking industries, firms perceive greater regulatory constraints as they move towards cloud-based technologies. When asked about the challenges of moving to the cloud, 24% of banking and capital markets clients identified regulatory and compliance constraints, while for insurance and other industries that figure averaged 36%.



(Source: Capco/Wipro research)

# RENEWAL & RIGHTSIZING: THE PATH FORWARD

## THE CLOUD

Any discussion about architectural renewal and rightsizing should begin with the cloud. Technology spending continues to shift towards cloud computing. By 2024, it is estimated that more than 45% of IT spend on infrastructure, software, applications and BPO will shift from traditional solutions toward those based upon the cloud.[1]

Over the last decade, many firms have progressed with adopting a cloud-first strategy to replace significant parts of their legacy technology, to enable their digital transformation journey, to enhance customer experience, to reduce costs, and to improve operational resiliency. This strategy is enabled through the use of Open Access/APIs, fintech ecosystems, microservices, modern data (mesh) architectures, internal product/service ecosystems, and more efficient delivery practices such as DevOps, continuous integration/continuous delivery, and test automation.

Not all firms can (or will want to) replace their entire legacy technology in the short or medium term. This is due to the complexity of their tightly-coupled systems and business processes, which have matured over many years, as well as the likely prohibitive cost and risk of replacement versus likely benefits. However, the latest cloud-based containerized technology provides an opportunity for firms to tackle, deconstruct and replace legacy monolithic systems.

Delaying the adoption of a cloud-based legacy replacement strategy can entail increasing costs for firms:

- Maintaining or changing legacy technology is expensive because of suboptimal workflows, functional complexity, data sourcing and processing duplication (evidenced often by multiple platforms for similar functions and products), which collectively impact business and technology functions.

- Capability and client offering gaps will continue to widen between those firms who are cloud-enabled and those who are not. Firms that have not yet developed and or executed a cloud-first strategy are more likely to fall behind their competitors.

1. Gartner.com, October 2020

When developing and implementing an architectural renewal strategy, firms should look to: (i) simplify their platform architecture; (ii) build-in agility, scalability and flexibility to deal with future business and technology requirements; and (iii) regularly review and adapt their strategy and roadmaps to achieve the desired benefits. In particular, the following should be considered:

1. **The target state ratios for hosting platforms** should be set for the three hosting types below:
   - Public cloud.
   - Private cloud (on-premises).
   - Non-cloud (legacy e.g. mainframe / dedicated infrastructure).

   For example, 50% public cloud, 20% private cloud and 30% non-cloud by end of 2026 is a reasonable target and aspiration. To support these hosting targets, architectural roadmaps for interim and target state adoption should be defined, planned and executed accordingly.

2. **The key business workflows, processes and functionality** which are required for migration to the target state and how these can be serviced. Often the key regulatory changes required can be combined and accommodated with multiple architectural renewal efforts.

3. **The sequence in which key business workflows and processes are migrated** to the target state. Architectural roadmaps should clearly articulate this and the associated financial benefits case(s).

4. **The cloud strategies of key platform vendors and fintechs (current and potential)** – it is important to consider how cloud strategies and approaches align to target state.

## DATA-CENTRICITY

Perhaps the most critical driver for legacy architectural renewal is the need for firms to improve their usage and management of data. We are heading into a world of increasing automation, and we are seeing regulators take a much closer interest in the lineage and quality of data in firms' internal processes that support this increased automation.

Legacy capital markets organisations' architectures tend to hold dozens of different representations of the same trades, transactions, positions and customer information. Cloud-based data architectures allow firms to solve this problem, enabling easier and governed access to authoritative data sources and negating the need to create application-specific representations at each stage of processing. These architectures, along with data technologies such as knowledge graphs, allow firms to sidestep some of the notoriously difficult challenges which require accurate customer and transaction data. The industry is just beginning to explore the possibilities of these technologies.

Event-sourced architectures can be a powerful tool for achieving data availability, discovery and governance by design. Hallmarks of this approach include the establishment of authoritative data sources to avoid data silos, splitting the read and write sides of the architecture to allow independent scalability, and employing a write-once and read-many pattern that codifies clear data ownership and the single responsibility principle.

We are increasingly seeing firms adopt a 'decompose and decommission' approach when renewing their monolithic, tightly-coupled legacy data architectures. This is achieved by implementing loosely-coupled microservices and modern data (mesh) architectures, and by breaking release cycles into independent releases to enable engineering teams to rapidly build processes and products. This allows the decomposition of legacy calculators and data processes, piece by piece, onto the modern cloud-based architecture.

Data can be sourced and shared securely across various business and function domains (e.g. IB, Global Markets, Wealth, Risk, Finance, Treasury, Operations, Compliance) within an ecosystem of data products. As new or replacement products come online within the new architecture, the old legacy components are decommissioned in a piecemeal fashion. The business benefits for adopting these kinds of architectural patterns include superior data integrity, increased real-time availability of data, improved robustness and throughput, decoupling of systems, and rapid re-platforming and decommissioning of legacy applications.

When adopting this approach, firms should consider the following:

1. **Review business processes front-to-back** and technically design solutions with the cloud in mind.
2. **Embed modern data management processes** at the heart of the target state architecture.
3. **Integrate DevOps** and test automation best practices from the start.
4. **Implement engineering and development tooling** to source data and build new (automated) products rapidly.
5. **Define and implement a clearly defined operating model** with robust (yet flexible) governance across distributed agile teams.
6. **Align architectural governance, budgeting, and legacy decommissioning** to quantitative benefits.
7. **Assess impact and manage relationships** with vendors and fintechs according to third party frameworks and related policies.

## PROCESS ECOSYSTEMS

Practically all capital markets firms have deep dependencies on external processing and data services such as vendor software platforms, utilities and fintechs. A major part of rightsizing is evolving such dependencies. Our view is that these dependencies will not disappear. However, firms will adapt and simplify how they interact with the services provided by vendors whilst still benefitting from the mutualized expertise that they bring.

Adopting vendor platforms carries risks and trade-offs. Platforms bring mutualized product, analytics and workflow expertise and standardization (e.g. leading potentially to a reduction in dependency on in-house quants). However, the trade-off is a loss of control over the architecture and direction of the product, together with a dependency on platform-specific technical skills.

This can be a difficult balance to strike, because in reality vendor platforms always require a degree of client-specific customization. Over-customization can lead to difficult and more expensive initial implementation and upgrade paths, negating some of the mutualization benefits.

This means that existing vendors also need to adapt in order to play a long-term role in the industry. Vendor platforms are moving to the cloud and moving towards providing their services through SaaS models. They are also improving their DevOps capabilities, in particular automating their development, testing, deployment and support processes, making the initial build and subsequent support and upgrade processes faster and cheaper. This is a long journey due to the need to bring existing customer bases on the same journey. However, it is an essential one.

## SECURITY ARCHITECTURES

Traditional security approaches revolve around creating high barriers, establishing trust and working hard to prevent threats with strong deterrents like firewalls, VPNs, IP whitelists and robust authorization services.

However, as Google found after a major breach over a decade ago, relying on privileged networks, or single points of authority can result in catastrophic incidents with very large blast radius. Henceforth, many in the industry champion Zero Trust approaches where every service is individually secured, failures are contained, and great effort is spent on the detection and remediation of threats as much as on prevention.

In practical terms this means discarding dedicated connections, VPNs and trusted services in favor of token-based (e.g. JSON Web Token) based federated security and the use of certificates to establish authorities. Benefits include a reduced security attack surface, an improved containment of incidents, better extensibility and an approach that is more appropriate for deployment in microservices in the cloud or even cross-environment.

Some best-in-class tooling or approaches for creating secure platforms, solutions and distributed working include:

- Comprehensive and real-time security information and audit event monitoring (SIEM, e.g. Sumo Logic).
- AI-enhanced web application firewalls and DDOS protection (WAF, e.g. Signal Sciences).
- Infrastructure-as-code and immutable infrastructure approach (e.g. use of Terraform).
- Pull deployment models, splitting CI from CD (e.g. use of Flux and Helm) to create environments where injection (push) by an attacker is impossible.
- Distroless containers and native images to eliminate OS and VM-level injection or mutability of workloads.
- Unphishable multi-factor authentication (e.g. WebAuthN) and SSO (e.g. OneLogin).
- Attribute or role-based access control authorization approach (ABAC/RBAC) whilst applying the principle of least privilege to access control.

- Public internet-friendly TLS/mTLS 1.2+ data encryption in transit with certificate pinning.
- Regular blue, red and purple team security events or game days.
- Continuous bug bounty program/security research in dedicated prod-like environments.
- Bring Your Own Device (BYOD) with browser isolation instead of managed devices and remote desktops.
- Sensitive data discovery and management using tools such as AWS Macie.
- CI scanning for dependency risks, malicious code and vulnerabilities (e.g. Synk, Clair).
- OIDC / SAML integration of third-party interfaces, preferably with SCIM.

## WHAT THIS MEANS FOR CAPITAL MARKETS FIRMS LOOKING TO RIGHTSIZE

The cloud, cloud data, fintechs, custom engineering and security dimensions collectively mean that firms have a growing range of options and opportunities to deliver rightsizing and cost reduction alongside enhanced efficiency. It is no longer a binary decision between 'buy versus build' and it does not have to be a multi-year all-or-nothing transformation.

This trajectory leads towards a world where interchangeable and interoperable cloud-based services can solve many of the complexities existing within the industry today. In addition, firms will be able to enhance systems, products and customer offerings without breaking downstream systems. This can be achieved in a way that is at once transparent and secure.

Currently, we are seeing cases where firms are consolidating around vendor platforms and solving many of these challenges via these solutions. Platform vendors possess years of expertise in industry-specific products and analytics and this will be an ever-present trend.

In many cases, it may still remain attractive to standardize around a vendor platform – for instance, where a particular organization has multiple solutions for multiple asset classes and also different solutions between front and back office environments. This is particularly true where the target vendors' DevOps journeys continue to evolve towards genuine continuous integration and/or continuous delivery, and if they are able to evolve their services to optimize the use of cloud infrastructure.

However, we are also seeing some firms adopt a strategy of decomposing and rebuilding their existing monolithic architectures (whether in-house or legacy vendor technology), especially where they have heavily customized vendor platforms and are facing a very complex upgrade journey. As fintech services (and cloud-based SaaS models more generally) evolve and grow, this may become a more common approach. As vendor platforms become more cloud-based, DevOps-driven and open, one can clearly envisage an industry where they can provide their expertise without many of the disadvantages and costs currently associated with using them as part of a broader ecosystem of cloud-based services.

## AUTHORS

**Peter Kennedy,** Partner
peter.kennedy@capco.com

**Simon Cook,** Associate Partner
simon.cook@capco.com

## CONTACTS

**Owen Jelf,** Global Lead Capital Markets, owen.jelf@capco.com
**David Kay,** Partner UK Capital Markets, david.kay@capco.com
**George Black,** US Lead Capital Markets, george.black@capco.com
**Andreas Pfeil,** Europe Lead Capital Markets, andreas.pfeil@capco.com
**Steve Halliwell,** Asia-Pacific Lead Capital Markets, steven.halliwell@capco.com

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