

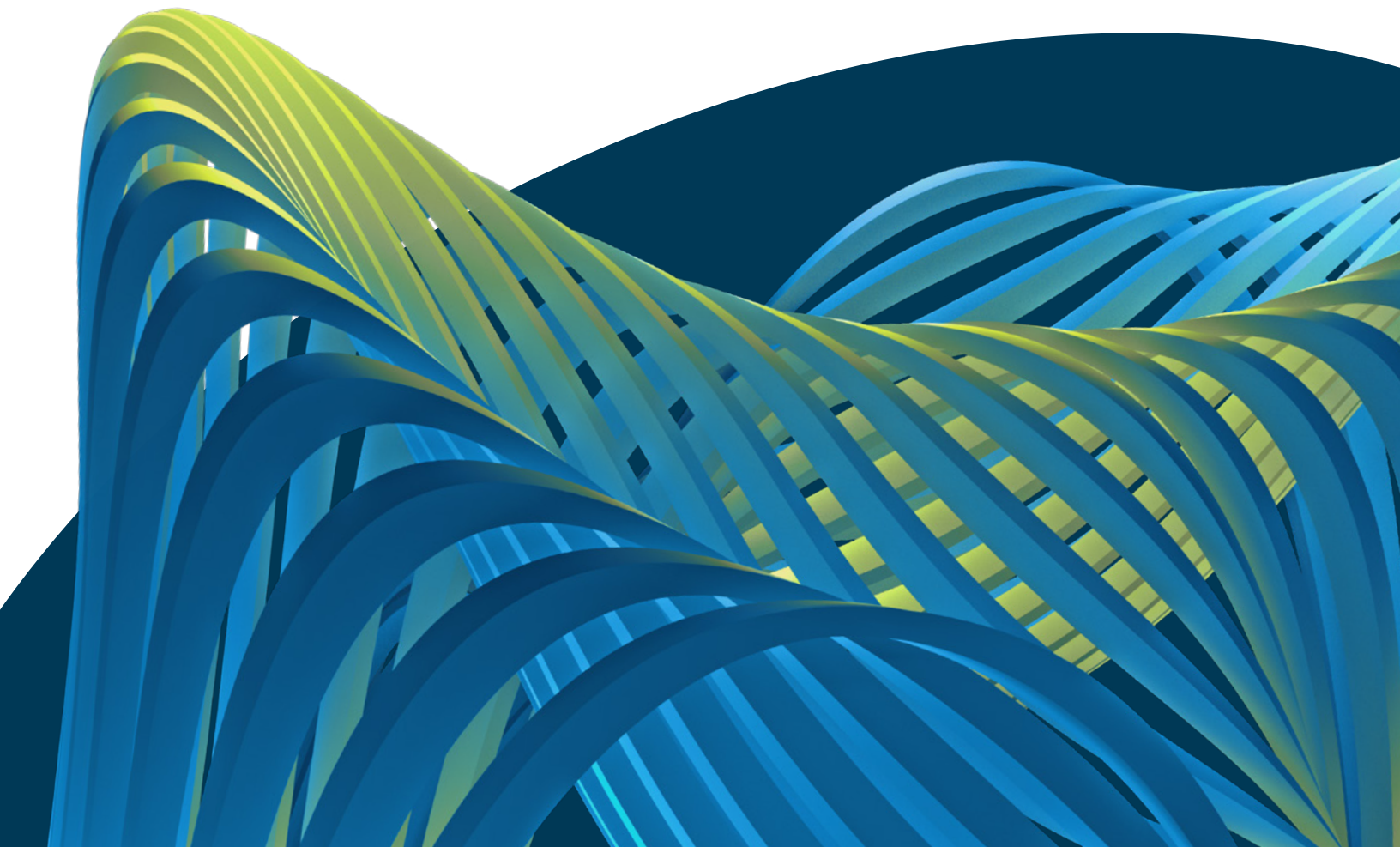


DTCC

SEPTEMBER 2022

PREPARING FOR A CLOUD-ENABLED, DATA-DRIVEN WORLD

2022 Securities Industry Technology Study:
Cloud, Mainframe, Data



ACCELERATING FINANCIAL SERVICES TRANSFORMATION

Aligning the industry on shared challenges and opportunities



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The financial industry is rapidly evolving with the convergence of many factors, including an accelerated shift to digital services in response to the needs of clients and a post-pandemic workforce. Amid changing regulatory requirements and an increasingly volatile cyber threat landscape, these drivers shine a bright light on the criticality of maintaining high standards for technology resilience and security.

DTCC, like many other financial services firms, is on a modernization journey. The large scale shift to public cloud platforms, combined with the digital-driven paradigm transformation of business operating models, provides a generational opportunity for the industry to align on a shared vision that responds to the changing technology landscape and delivers a world-class client experience. We engaged Celent to look under the hood of the financial industry engine room; to ask the more probing and detailed questions about some of the most pressing issues confronting many of our clients. As an enterprise providing critical post-trade infrastructure services, DTCC is uniquely positioned to view these challenges on behalf of all our clients and partners.

Cloud adoption continues to ramp up across the industry, serving as the shared infrastructure for firms to build on. To realize the full benefits of this technology, we must continue promoting best practices and approaches, as focuses shift from customizing full technology stacks to enabling modern platform governance, controls and security. With cloud emerging as a foundational platform powering the entire industry, we can unlock value and introduce new services by enhancing and strengthening data exchange capabilities. In this paper, we explore our clients' plans for the cloud and mainframe, and how they're approaching the ever-increasing amount of data that moves between firms. We believe continued cloud adoption and commitment to a shared data fabric will enable greater business agility and faster time-to-market, with regulatory compliance remaining a top priority.

The best opportunities often arise when a shared good can provide benefits for all. DTCC, born out of innovation nearly five decades ago, has been a key contributor and leader of many successful, industry-wide transformative efforts – such as establishing common standards and advancing shortened trade settlement processing. Our commitment to enabling collective objectives, especially with a focus on technology modernization, can strengthen resilience, elevate the client experience, and ultimately advance the financial markets. What's more, we must consider that Generation Z, born digital, is rapidly entering the workforce and expecting financial services that are always-on and always-available.

Our goal with this paper is to spark further conversation about these key topics as firms embark on their own modernization journeys. Industry-wide transformation requires investment, coordination, and collaboration. Together, we can realize the full potential of new technologies and capabilities, introduce efficiencies and reduce risk for the markets.



CELENT

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2022 Securities Industry Technology Study:
Cloud, Mainframe, Data

Monica Summerville, Head of Capital Markets

September 2022

**This Celent report was commissioned by DTCC, at whose request Celent developed this research.
The analysis, conclusions, and opinions are Celent's alone, and DTCC had no editorial control over the report content.**

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EXECUTIVE SUMMARY

The securities industry has experienced a great upheaval since the Great Financial Crisis over a decade ago. Changes to regulation, market structure, business models and technology have driven the financial industry to embark on a massive transformation of industry processing models. While the pace of general technology innovation is accelerating, the pace of change in technology supporting those models is steadier—perhaps even seeming slow from certain vantage points. The sudden shift to working from home acted as an accelerant to cloud adoption efforts across capital markets, but legacy applications and architectures can remain difficult to modernize. This has played out against a backdrop where the value of data is rising—but only for those with the technology and capabilities to exploit this.

To help understand how its clients are preparing for this cloud-enabled, data-driven world, DTCC commissioned Celent to conduct extensive research over the end of 2021 and early 2022 into technology adoption and future plans of select clients. DTCC's clients play a critical role in reimagining and building the financial marketplaces of the future and so are uniquely placed to share views on the evolution of technology across the securities industry.

Celent's research found that while great progress has been made to digitally transform and modernize technology estates, especially regarding cloud adoption, key challenges remain. Securities firms are having to support parallel technology infrastructures which adds to costs and, more critically, restrains full digital transformation.

The area showing the most potential for transformation was around data exchange mechanisms. While our study found that utilization of data marketplaces, application programming interfaces (APIs) and distribution ledger technology (DLT) is expected to accelerate, legacy mechanisms such as fax, email, and spreadsheets continue to enjoy high levels of support despite a decreasing pool of clients utilizing them. Building a business case for true transformation of data exchange is likely to require cross-industry coordination.

Key Findings from Our Research:

- **Cloud adoption is nearly universal** albeit to varying degrees, with “cloud-first” and “cloud-native” approaches now widespread across financial institutions in the securities and investment management space.
- **Nearly 50% of all study participants can be categorized as “Cloud Leaders,”** and we expect this to grow to the majority of firms, with many being cloud native for all new development.
- **The top three drivers for cloud adoption** across the buy and sell sides were: **increasing business agility, increasing operational efficiency, and improving security and resilience.**
- **Most study participants took a federated approach to cloud adoption,** with a core central Center of Excellence (CoE) set up as an expertise and advisory center but with flexibility for business technology teams to innovate and deliver cloud-enabled applications within standards and policy set by and overseen by the CoE.
- With more than half of study participants still using a mainframe, it is clear **mainframe continues to support firms’ core processing and is not likely to disappear.** Recent technological advances such as mainframe containerization are addressing historical core concerns and allowing the mainframe to support modern applications.
- **Full migration to modern methods of data exchange is effectively gridlocked** due to the need to support less sophisticated clients; firms are increasingly leveraging vendors to offload and intermediate non-conforming clients without disrupting service.
- **Data exchange remains stubbornly mired in manual and batch-based approaches,** but our study found methods for real-time data transfer/exchange such as **data marketplaces, DLT, and APIs are expected to dominate in the next two years.**
- **Building a business case for true transformation** across data exchange will require **cross-industry coordination.**
- **Most firms consider themselves relatively immature in the use of artificial intelligence and machine learning (AI/ML),** although they are heavily experimenting and addressing underlying data management issues.
- **AI/ML seems rather more focused on mundane** than cutting edge use cases. Currently, AI/ML development is allocated a **small portion of enterprise technology budget (1–5%).**

This Celent study was conducted during 4Q21 and 1Q22 in the form of analyst-led interviews and data collection via surveys with 28 technology and operations executive leaders across 19 North American financial institutions. Topics for discussion included their firm’s current and future technology state across three key areas: cloud adoption, mainframe migration, and the ways firms are leveraging data exchange mechanisms and artificial intelligence/machine learning. Research participants included investment banks and broker-dealers on the sell side, and investment managers on the buy side, as well as a smaller number of other institutions focus on retail banking, post-trade servicing, and asset/securities servicing.

Who Should Read This Report?

The report shares primary and secondary research on the prevailing views and strategies related to technology adoption by financial institutions operating in capital markets (securities firms and investment managers) across the US and Canada. The focus is on cloud, mainframe modernization, and data topics such as data exchange mechanisms/data management and AI/ML. The report addresses the needs of:

- CIOs: Chief Information Officers and senior staff responsible for long-term technology strategy, vision, development, and maintenance.
- CISOs: Chief Information Security Officers responsible for assessing IT risks and other security risks that impact the business.
- CROs: Chief Risk Officers responsible for compliance, operational, financial, asset, and other forms of risk.
- LOBs Heads: Line of Business Heads responsible for revenue generation and key securities support functions such as Operations.

About this Research

This report is part of Celent's ongoing coverage of capital markets technology trends and drivers. The key findings reflect the insights from detailed qualitative interviews as well as additional surveys that collected both quantitative and qualitative data on the adoption of usage of four main areas of technology: cloud, mainframe adoption, data exchange mechanisms, and AI/ML usage.

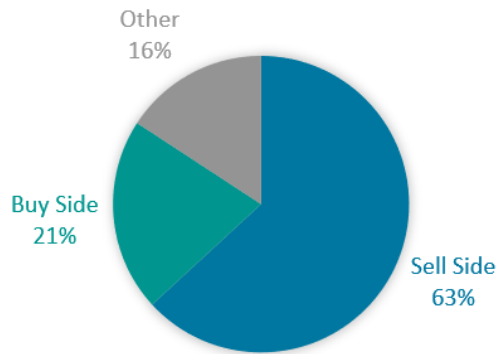
DTCC commissioned this research with Celent retaining editorial control. DTCC's goal in commissioning this study is to provide an overview of industry progress on its transformation journey. Only aggregated, anonymized data was shared with DTCC and outreach participants.

This extensive outreach was supplemented with Celent's proprietary research and expertise to build a picture of the current and future state of the securities industry's information technology across the four focus areas. This report discusses how adoption and plans to leverage new technologies are often balanced against the reality of needing to maintain legacy approaches due to both technology and business drivers, including the readiness of a firm's own clients to adapt to change.

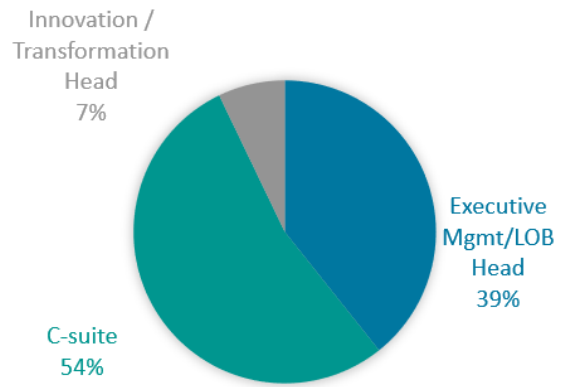
This research greatly benefitted from detailed discussions with 28 senior technology and operation leaders at leading North American financial institutions. Figure 1 illustrates the balance of outreach participants across buy side, sell side, and other financial institutions, and by role.

Figure 1: Respondent distribution for Celent's 2022 Securities Industry IT Roadmap Survey

Entities by FI Type



Participants by Role



Source: Celent. Interview and survey outreach conducted 4Q21 through 1Q22, N=19 (entities), N=28 (executives). In some cases, multiple executives were interviewed at the same FI to adequately explore the different technology and operations areas covered by this research.

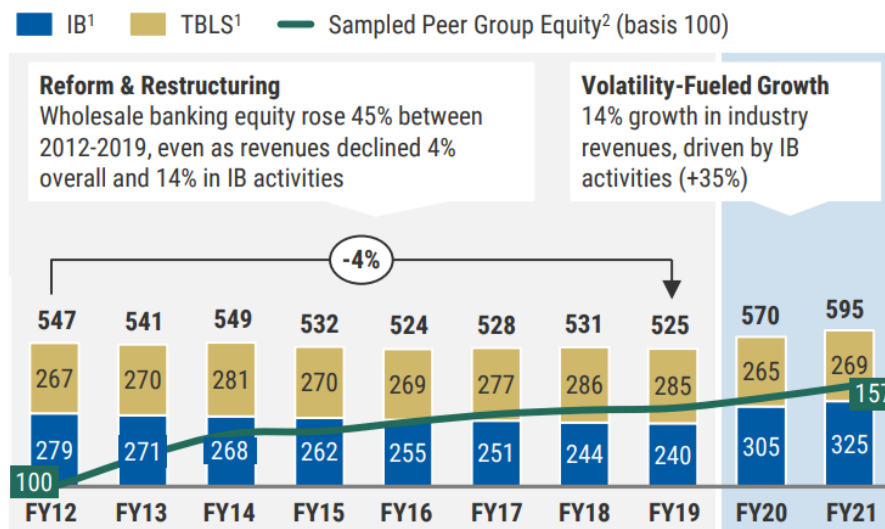
INTRODUCTION

The securities and banking industries have faced massive changes in the last decade. The regulatory and business model changes in response to the great financial crisis of 2007–8 resulted in a period of securities industry reform and restructuring. Regulators focused on improving transparency through a massive set of ever-increasing oversight and regulatory requirements, driving an equally massive investment in risk management systems. Growing risks from both natural and cyber-threats have brought a new focus to resiliency, requiring huge investments in provisioned production and backup processing.

Meanwhile, the increasing pace of technological innovation has resulted in dramatically changed user experience and expectations. Technology is being pushed to the edge of networks through mobile devices, immersive technologies, AI, and ML. Massively improved interconnectivity (speed and bandwidth) between global systems and network means real time access to the latest events, data, and news is considered table stakes across the financial industry.

The recent impact of the worldwide pandemic has continued to introduce change. The impact on wholesale banking's revenues has been largely positive due to unprecedented volatility and coordinated governmental fiscal and monetary stimulus (see Figure 2).

Figure 2: Banking Industry Revenue & Capital, \$bn, 2012–21



1. IB (Investment Banking), TBLs (Transaction Banking, Lending, Security Services). 2. Basis 100 industry equity with growth modeled on an index consisting of publicly reported figures from the following peer group: J.P. Morgan, Goldman Sachs, Bank of America, Morgan Stanley, Barclays, UBS, Societe Generale, BNP Paribas, Deutsche, CACIB, HSBC and Credit Suisse. Source: Coalition Greenwich Competitor Analytics, Banks’ disclosures, Oliver Wyman analysis.

Source: “Climate, Crypto, and Competing in this Cycle,” April 2022, Oliver Wyman

As the securities and banking industry adjusts to a post-pandemic world and reacts to new geopolitical and economic risks, it must also be ready to leverage new opportunities presented by investment trends, including the embrace of ESG, digital, and private assets. While more resilient to market shocks and experiencing accelerated digital transformation in the last few years, work by financial services to align existing business and technology strategy against industry change and greater socioeconomic change is still in early days. The ability to flexibly leverage technologies at scale will be a key capability to support this.

Overall, the securities industry has been driven to embark on massive transformation of industry processing models and the technology that supports those models.

DTCC, a premier post-trade market infrastructure, committed to ensuring the safety and soundness of industry markets, commissioned Celent to conduct extensive research over the end of 2021 and early 2022 into the technology roadmap of select clients. By virtue of its role as an industry utility, DTCC is required to be at the front edge of industry transformation and to ensure it is aligned with industry progress and capabilities so that new services it implements can be easily adopted. DTCC’s clients play a critical role in

reimagining and building the financial marketplaces of the future and so are uniquely placed to share views on the evolution of technology across the capital markets industry.

DTCC's goal in commissioning this study is to understand and share an overview of industry progress on its transformation journey. Three primary areas of transformative focus were chosen—cloud adoption, mainframe modernization, and data topics including data management/exchange and AI/ML—as the target for this research.

Celent's research approach comprised both in-depth telephone interviews as well as surveys with executive-level technology leaders at a range of North American financial institutions (see Figure 1, Executive Summary) to better understand the current state of adoption and plans around the three target areas of focus. This report summarizes findings and insights drawn from quantitative and qualitative data gathered during this effort, combining this with other Celent/Oliver Wyman research in order to offer a view of the path forward.

CLOUD JOURNEY

Cloud has certainly arrived in the securities industry and is here to stay. The pandemic is credited with an acceleration of public cloud adoption across all of financial services, but the groundwork was already in place, [with 19 of the top 20 banks in the US having already announced public cloud initiatives](#) in 2020. Early cloud adoption often centered around non-business-critical or non-regulated workloads, including corporate systems, business applications such as word processing or document management, and customer engagement software.

JPMorgan modernizes Athena with cloud

JPMorgan's Athena is the foundation of its Markets business, processing millions of trades and completing billions of risk calculations daily. The risk calculation application within Athena has been recently refactored and is now run on AWS. The application can now scale up to 14,000 servers on demand. The company claims that this modernization work has delivered a 30% reduction in risk calculation times and an 80% reduction in calculation cost per hour.

Source: JPMC Investor Day, March 23, 2022

Customer relationship management (CRM) systems have, for example, been the primary focus of public cloud investment and innovation. As public cloud maturity progressed, application development and testing, and the use of so-called "burst compute," which can automatically leverage cloud to process compute related to sudden peaks in volume (e.g., certain risk management use cases) also became early areas of focus.

The cloud journey in capital markets often starts with private, not public cloud. Celent's most recent study found that most of the securities and investment firms we interviewed (70%) began their cloud journey pre-pandemic (see Figure 3) and that this was more likely to be by embracing private cloud, cloud technologies (e.g., microservices), and cloud development approaches such as DevOps.

The study's data also highlighted how recent events are turbocharging adoption timelines. We found a majority of firms (67%) now expect to be "cloud first" (meaning new applications are built as cloud native) or have fully adopted cloud by 2024 (see Figure 4).



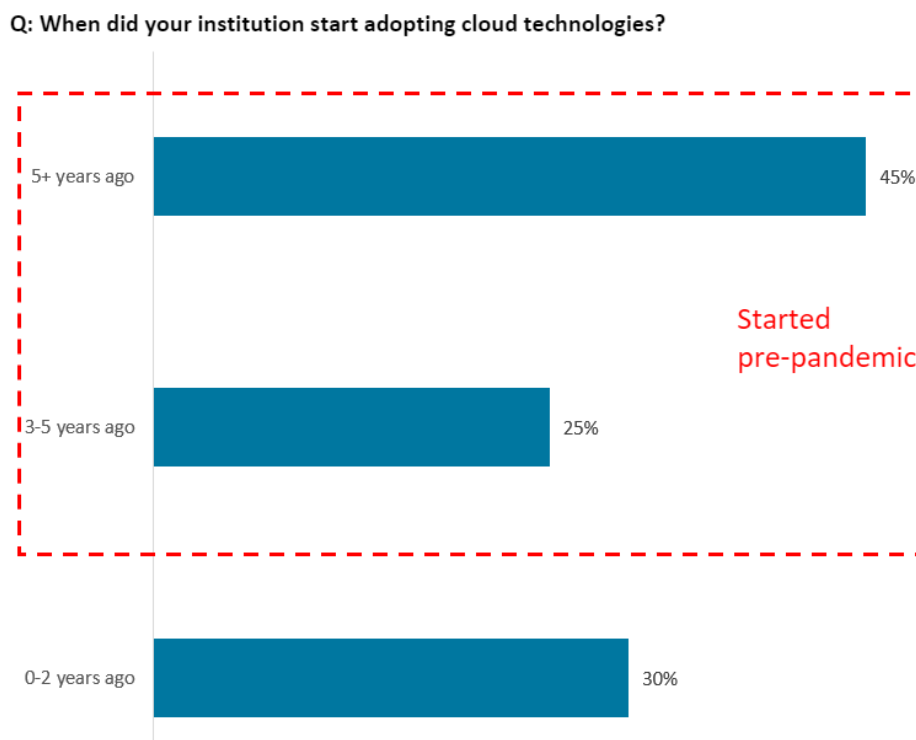
Most respondents are expecting to be cloud first or have fully adopted cloud by 2024.”

Celent 2022 Securities Industry Technology Study

Adoption and Timelines

Cloud adoption has accelerated in the last two years as the pandemic-imposed restrictions on movement resulted in a previously unheard-of shift to work from home (WFH) across the financial services industry. However, most securities firms had already started working with cloud technology pre-pandemic.

Figure 3: Most securities firms started cloud journey pre-pandemic



Source: Celent interviews and surveys with senior technology and operations leaders, conducted 1Q21/2Q22

Respondents told us that in most cases firms started with a private cloud, which involved utilizing cloud technologies such as virtual machines, service-oriented architectures, and containerization to enable more efficient and elastic use of on-premises compute and data resources, which may be owned and managed by the firm or managed by the CSP. Where public cloud is being widely utilized in the financial services industry, it is for specialized commodity corporate function services such as Customer Relationship Management, HR, Finance, and Email, services which are delivered through SaaS.

Celent’s research found firms falling into three camps (see Figure 4):

- **Cloud Leaders:** Many firms interviewed, including several large global banks, were on the journey toward or already possessed a fully cloud-native stack, with new application development largely utilizing cloud-native technologies and legacy applications targeted for modernization. Most companies are working with multiple public cloud vendors to achieve this, pairing business use case to suitable CSP, as opposed to partnering with one CSP across their securities operations or developing applications to be cloud agnostic.

The latter approach precludes a true “multi-cloud” approach, meaning a workload can be easily shifted between different public cloud providers as necessary—for example, due to an outage or in response to price increases—but this was often by choice. Firms told us that the technology and data management expertise required to master multiple cloud service providers by all teams and the need to build core functionality around things like cloud security, orchestration, and monitoring far exceeded any potential gains from the reduction of vendor lock-in risk.

- **Cloud Advancers:** These firms are likely to deploy some applications on cloud (public and private), but also retaining on-premises infrastructures, in some cases for the foreseeable future. The latter involve use cases where data privacy, latency, or performance are key requirements and the in-house expertise or comfort with public cloud is lacking. These firms are still in the earlier stages of their cloud journey, either developing their strategy or still largely relying on legacy technology that is being cloud-enabled rather than rewritten or replaced with cloud-native equivalents.
- **Skeptics:** A minority of firms expressed no desire to migrate to public cloud, citing either concerns around external data sharing, need for high performance compute, and/or cost and CSP-lock-in concerns. Firms in this category included proprietary trading houses, where specialist and customized hardware such as field programmable gate arrays (FPGAs) and graphical processing units (GPUs) provides competitive advantage, or firms with large cost-effective mainframe deployments who did plan to migrate away from these. These latter firms in most cases were pursuing cloud-native strategies for non-mainframe applications and workloads.



Nearly 50% of all firms interviewed fall into the Cloud Leaders camp, and we expect this to grow to a majority of firms in the next two years.”

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Nearly half of firms interviewed fall into the “Cloud Leaders” camp, and we expect this to grow to a majority in the next two years (see Figure 4).

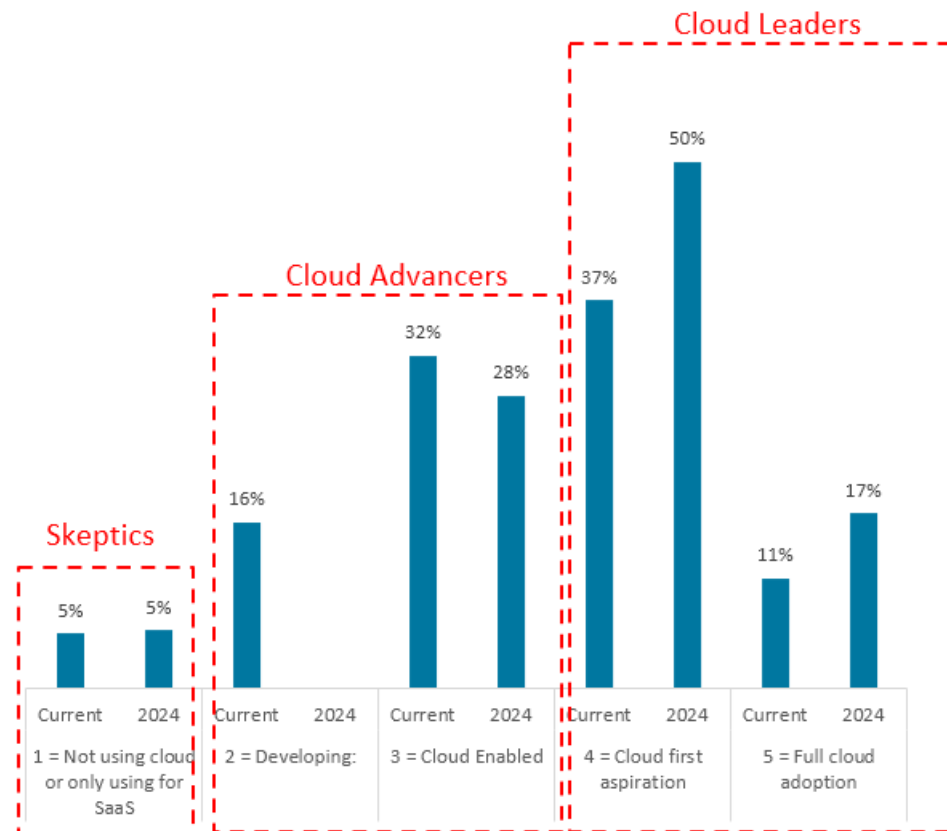
Outside of the small percentage of firms with specific business use cases justifying an on-premises approach (the Skeptics), the trajectory is clearly aiming at widescale hybrid private/public cloud-first adoption in the next two years.

By 2024 the percentage of Cloud Advancers will reduce from half to one-quarter of firms—an improvement but still a sizeable group. With use cases for cloud-based applications and data expanding rapidly, these firms risk missing out on capturing this innovation potential for their businesses.

Firms that are migrating to cloud are doing so aggressively. One firm in our study that started in 2020 now has 35–50% of applications in the cloud with the intent to be fully cloud native by 2025.

Figure 4: Cloud Leaders are most common archetype with nearly half of firms (48%) in this category today, tipping to a majority (67%) by 2024

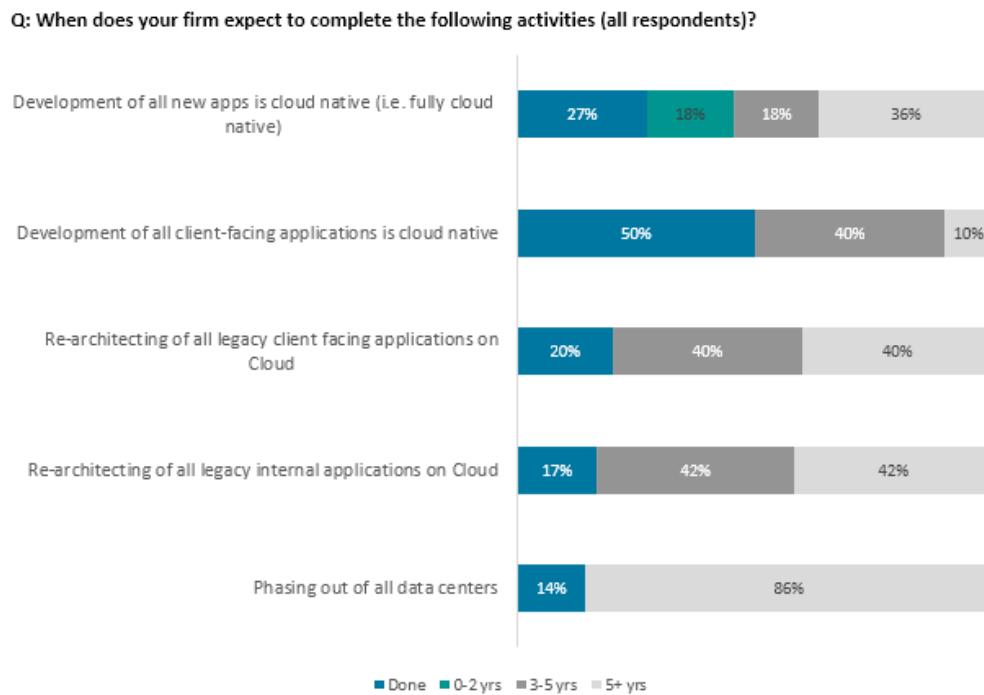
Q: How would you rate the state of maturity at your institution now and where are you aiming to be in two years?



Source: Celent interviews and surveys with senior technology and operations leaders, conducted 1Q21/2Q22

Diving further into specific areas of cloud adoption, our study found that the biggest advances to date have been made around cloud native development of new client facing applications, with half of respondents already doing this. Unsurprisingly, re-architecting legacy applications for cloud and phasing out all data centers is much further behind, with the vast percentage of firms seeing these activities as five or more years away. (See Figure 5.)

Figure 5: While new apps are more likely to be cloud, re-architecting legacy is slower



Source: Celent interviews and surveys with senior technology and operations leaders, conducted 1Q21/2Q22

The findings also revealed differences between sell side and other securities and investment firms in terms of progress and focus when rearchitecting for cloud (see Figure 6).

While it may appear that sell side firms are slower overall to embrace cloud—for example, only 14% of legacy client facing applications are being re-architected currently—our conversations painted a more nuanced picture. In our detailed discussions with senior technology executives on the sell side, it was clear that these firms tend to be more sophisticated and experienced in deploying the underlying cloud technologies to fully embrace the benefits of scaling and native cloud development.



It’s not just about moving applications to the cloud. It’s what you do with them and how you run them once you get there.... We are focused on the areas that have a high business impact and the applications which will see the most value by moving to the cloud.”

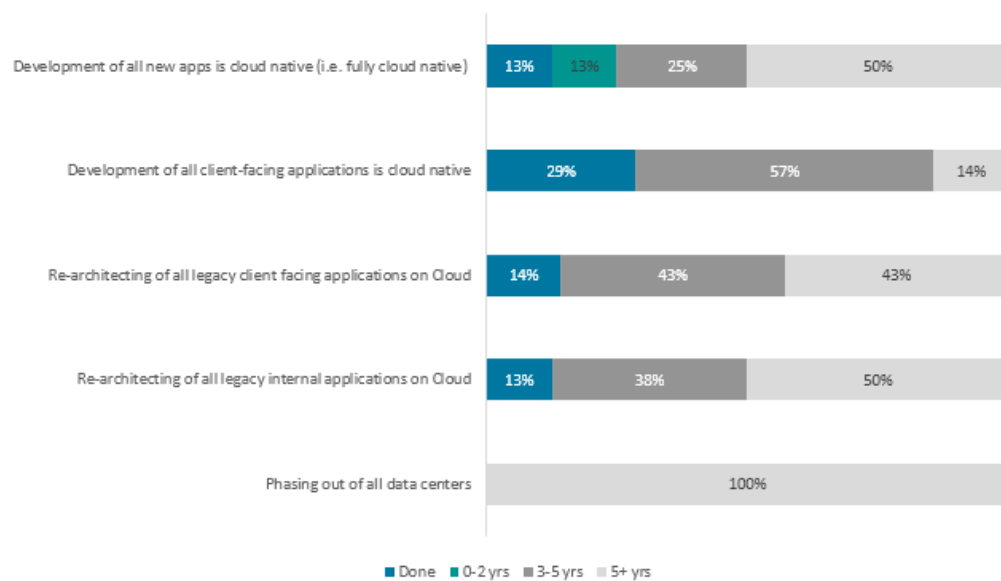
Lori A. Beer, Global Chief Information Officer, JPMorgan Chase & Co.,
Investor Day March 2022

While buy side firms have led the embrace of SaaS cloud deployment models, many sell side firms have experience with (and in some cases still maintain) grid computing approaches to maximize use of on-premises compute infrastructure. Others have been operating on-premises private clouds for some time. This have given them valuable

insight into “hidden costs of public cloud” such as costs related to moving data into the public cloud and back to the firm’s premises (data egress/ingress) and understanding around the levels of utilization of on-premises grid compute which trigger higher total costs if the same workloads were moved to a public cloud. Finally, in a few cases, firms on the buy and sell side who have a need for high performance compute utilizing specialist hardware generally believed an on-premises approach was superior due to increased control and choice re: hardware, monitoring, etc.

Figure 6: Sell side may seem to be taking a slower approach, but we found they are applying lessons learned along the way

Q: When does your firm expect to complete the following activities (sell side only)?



Source: Celent interviews and surveys with senior technology and operations leaders, conducted 1Q21/2Q22

Strategy

A common strategy across the firms in our study involved the creation of a cloud center of excellence (CoE) and investment in developing in-house cloud expertise to ensure new applications are built utilizing cloud technology, including microservices, APIs, and containerization. Building this expertise is critical, as cloud is not a panacea. As one global CTO we spoke to noted, “Cloud is just another platform, and you can have badly written apps on cloud as you do on distributed platforms.”



Cloud is just another platform, and you can have badly written apps on cloud as you do on distributed platforms.”

Global CTO, Top Tier Global Asset Servicing Bank

There were divergent practices and views around whether cloud expertise and development capabilities should be fully centralized, or more federated and distributed. Firms with the fully centralized model did so to pool talent and ensure standardization of efforts and reuse of application patterns, with a view toward improving security and resilience. However, many CTOs we spoke to at firms with this approach, particularly business-aligned CTOs, cited frustration with the centralized model given its propensity to create development bottlenecks at the center.

The majority of firms we spoke with took a federated approach, with a core COE set up as an expertise/advisory center, typically aligned with their architecture teams but with flexibility for business technology teams to innovate and deliver cloud-enabled applications within standards and policy set by and overseen by the center.

Another key part of the strategy involves deciding what is “lift and shift” versus “rewrite as cloud native” versus “SaaS.” However, interest in “lift and shift” was in the minority as most firms realize that unlocking cloud’s benefits for the business requires adopting a cloud-first approach.

Legacy applications are being evaluated for migration or replacement. In some cases, an obsolescent application will be allowed to wither as new functionality is built as cloud-native while the core legacy application is accessed via an abstraction layer. The goal is to eventually retire the legacy-code altogether.



A majority of firms took a federated approach [to managing cloud adoption] with a core Center of Excellence set up as an expertise/advisory center, typically aligned with their architecture teams but with flexibility for business technology teams to innovate and deliver cloud-enabled applications.”

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Drivers

The top three drivers for cloud adoption across the buy and sell sides were: increasing business agility, increasing operational efficiency, and improving security and resilience (see Figure 7).

Figure 7: Business-related drivers spurring cloud adoption

Q. What are the top drivers for embracing cloud at your institution (please rank)?



Source: Celent interviews and surveys with senior technology and operations leaders, conducted 1Q21/2Q22

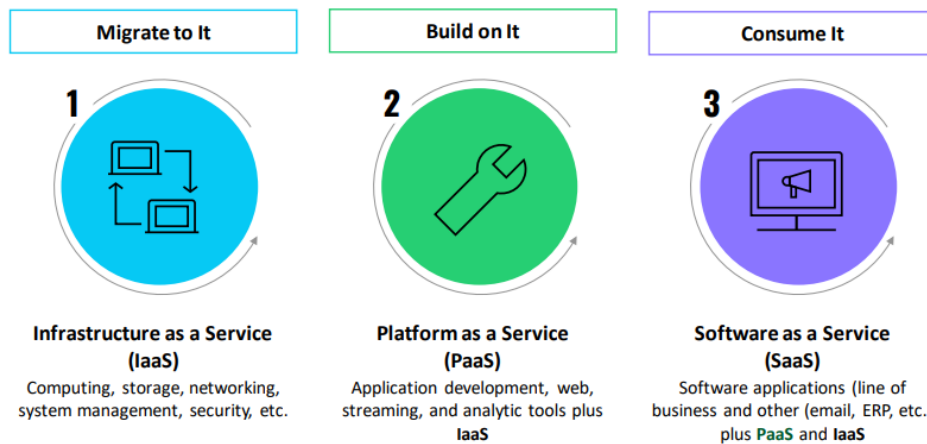


The top three drivers for cloud adoption across the buy and sell sides were: increasing business agility, increasing operational efficiency, and improving security and resilience.”

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The top drivers reflect the increased maturity of cloud adoption, with business drivers taking priority and in turn driving demand towards use of more sophisticated cloud computing services models (see Figure 8).

Figure 8: Cloud Computing Services Model Summary



Source: Celent

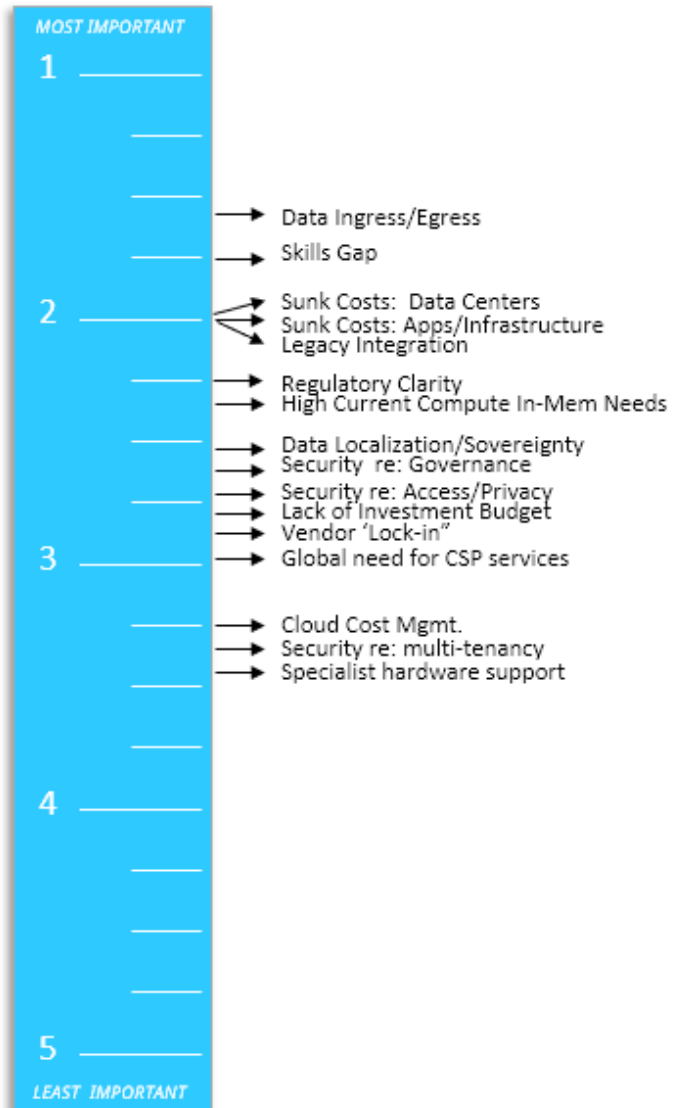
The move from Capex to Opex, which relates to the savings made when “lifting and shifting” on-premises, FI-owned compute, and data infrastructure to the cloud, was firmly in last place. This driver was behind early cloud adoption of the Infrastructure-as-a Service (IaaS) cloud delivery model, further reinforcing the finding that FIs are increasing maturing their cloud strategy in order to extract more business benefits beyond simple Capex cost reductions.

The emphasis on business agility underscores the increased maturity around understanding of the benefits of cloud. Many of the technology and operations executives we spoke with were focused on the business use cases and adopting cloud native technologies such as microservices and containerization that enable agile approaches to application development and support—for example, DevOps and DataOps.

When it came to inhibitors to cloud adoption, there were four clear standouts cited by study participants (see Figure 9). Concerns over costs data ingress/egress and the skills gap were ranked first and second. There was a tie for third place relating to sunk costs across existing data centers and infrastructure and concerns around legacy integration of key applications. (Again, see Figure 9.)

Figure 9: Key inhibitors to cloud adoption focus on costs of data movement, concerns about skills gap and sunk costs around existing infrastructure

Q. What are the top inhibitors for embracing cloud at your institution (please rank)?



Source: Celent interviews and surveys with senior technology and operations leaders, conducted 1Q21/2Q22

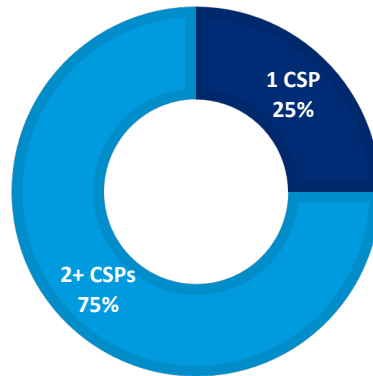
There were slight variations across financial institutions depending on cloud adoption archetype. Cloud Leaders, for example, found sunk costs related to data centers to be their main concern, while Cloud Advancers were most concerned about the costs involved in moving large amounts of data in and out of the cloud. However, concerns around skills gaps were common, occupying the number two spots in terms of top inhibitors for both Cloud Leaders and Advancers.

Cloud Solution Providers

Our study found most firms (73%) currently use two or more CSPs (see Figure 10).

Figure 10: Most firms use multiple cloud vendors but are not “multi-cloud,” meaning cloud agnostic

Q: How Many CSPs Are Being Used by Your Firm?



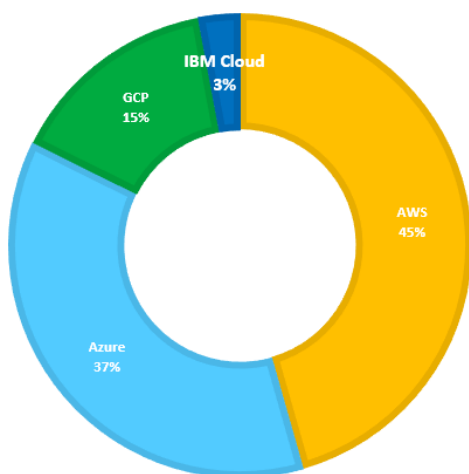
Source: Celent interviews and surveys with senior technology and operations leaders, conducted 1Q21/2Q22

The study further found that in most cases, these two firms are likely to be AWS and MS Azure. But while it is mainly a two-horse race, there are “[horses for courses](#).”

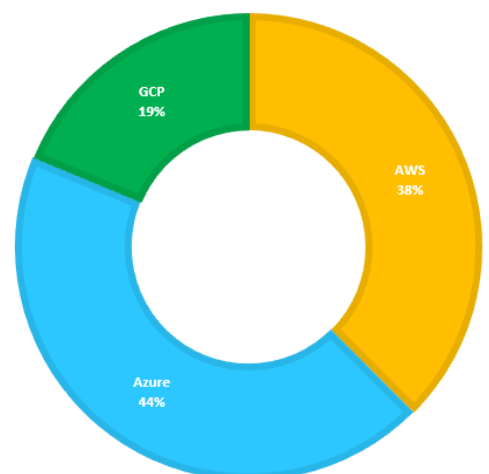
Both AWS and MS Azure can claim to be leading in the capital markets vertical across different metrics. Staying with British idioms, MS Azure [pips AWS to the post](#) in terms of being a primary provider (although not usually the only provider), while AWS has the lead in terms of overall market share across capital markets FIs (see Figure 10).

Figure 11: AWS is marker share leader; however, MS Azure is most commonly the primary CSP

Q: What CSPs does your firm currently use (include all CSPs)?



Q: Which CSP is your primary provider (if you have one)?



Source: Celent interviews and surveys with senior technology and operations leaders, conducted 1Q21/2Q22

While Google and IBM were a distant third and fourth, each CSP can claim high profile partnerships with leading financial institutions across capital markets, indicating a desire to stay in the race when it comes to securities firms' business, e.g., Deutsche Bank and Google Cloud's "[innovation partnership](#)," which included enhancements to DB's [Autobahn](#) platform, the gateway to its products for Corporate and Institutional clients, [GCP's strategic partnership with CME Group](#). However, in our conversations the two CSPs mostly were associated with two distinct uses: data analytics and AI for GCP and regulatory compliance for IBM.

Looking Ahead

Industry acceptance of cloud approaches for application development in financial services is now widespread. As we have discussed, most firms are adopting a cloud-first if not cloud-native approach. An early focus on IaaS and "lifting/shifting" to the cloud has given way to the realization that the true benefits of cloud will require firms to fully embrace cloud technologies and ways of working. We expect DevOps, DataOps, and agile approaches to continue to spread through capital markets. However, hybrid cloud, meaning a mix of on-premises private cloud and smaller pockets of public cloud, will remain a popular model for some time.

Moving data in and out of the cloud was flagged by survey participants as expensive, while storing data in the cloud without clear control of global location can run afoul of local regulations around data privacy and sovereignty. Regardless, we are starting to see market infrastructures move critical workloads to the cloud, such as is the case with Nasdaq's [partnership with AWS](#) announced last November, where the exchange has announced a plan to move a matching engine "into the cloud" (although the clever reality is that Nasdaq is bringing the public cloud to its own data center). As market infrastructures, solution providers, and market participants put more of their data and services on the cloud, the need to port data back on-premises diminishes and confidence in public cloud increases.

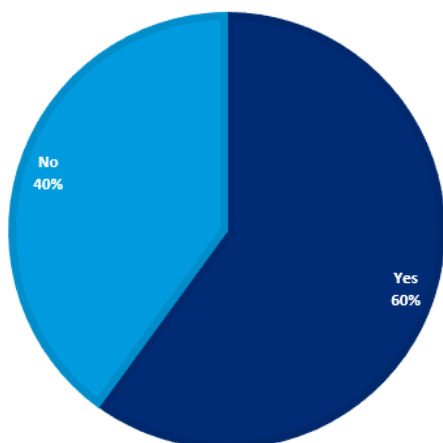
APPROACH TO MAINFRAME

Most regulated financial institutions were born on the mainframe computer, not in the public cloud, so it not surprising to find these worlds can seem far apart. However, years of evolution in general purpose business computing—from mainframe computers to personal computers, to client servers, to N-tier web-based servers and N-tier servers located anywhere—have been closing the gap between cloud and older computing platforms.

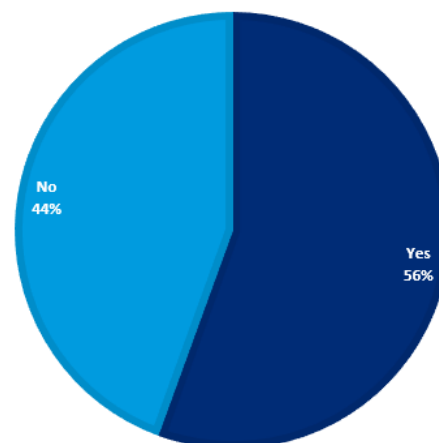
IBM, which is the most common mainframe manufacturer in use among our study participants, has been evolving the mainframe beyond the old COBOL batch machine to running Linux in order to run private cloud workloads and to interface with modern platforms. This has made migration to cloud from mainframe easier but has also maintained the mainframe’s relevance (see Figure 12).

Figure 12: Mainframes are still prevalent across capital markets – and will continue to be so for some time

Q: Does your firm currently utilize a mainframe?



Q: Are you planning to retire your mainframe(s)?



Source: Celent interviews and surveys with senior technology and operations leaders, conducted 1Q21/2Q22

The mainframe is far from dead across securities services and investment managers. Today, 44 of the top 50 banks use mainframes. However, use is often focused on retail banking operations. In our study we found slightly more than half the firms participating in our study still had a mainframe (see Figure 12). Across our respondents, the buy side retained the lower percentage of mainframes (25%).



Slightly more than half the firms participating in our study still had a mainframe.”

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While this might seem surprising on first glance, Celent has found that FIs see mainframes as remarkably good at doing what they were built for: speed, reliability, security.

Modern mainframes have evolved to meet the needs of hybrid cloud deployments, leveraging investments in data and applications. Our study found IBM to be the prominent mainframe manufacturer used across capital markets. Within a hybrid cloud, the mainframe can be positioned to support the use of mixed development between on-premises, private cloud, or public cloud applications. For example, OpenShift, a container-based orchestration platform built on Kubernetes, which itself is an open source project originally developed by Google, is supported by IBM, demonstrating the company’s support of open source. OpenShift offers to bring cloud-native application development to the modern mainframe.

Sell side firms such as investment banks and broker-dealers have traditionally looked to retain a high degree of control over their systems and processing, primarily because they are highly regulated and due to the competitive differentiator advanced technology can offer. Areas like securities processing have evolved to highly mixed environments of mainframe, on-premises, hosted, and cloud-based solutions. However, as we found in our cloud conversations, most firms want to be cloud-first or cloud native, so there is work to do in modernizing mainframe applications. Buy side firms have varied technology stacks as well, but mainframes most often can still be found in the account management process.

One study participant, a US G-SIB which described itself as fully cloud native, still runs a mainframe. However, senior technology leaders told us the bank does have a plan to modernize all the mainframe applications over the next five years (20% are already modernized) and then retire the mainframe over a five- to 10-year window.

Adoption and Timeline

The study participants who currently have a mainframe are evenly split regarding future plans, with just over half saying they expect to retire their mainframe while the rest plan to maintain and modernize it. (See Figure 12 on the previous page.)

However, change will not come quickly. The majority (80%) of those retiring their mainframe expect this to take five years or more. A full 40% of study participants are working at an even slower pace, expecting it will take 10 or more years before their mainframe is retired.

Strategy and Drivers

Key drivers influencing strategy around mainframe (whether that is to retire or modernize) are largely focused on technology needs and concerns (see Figure 13)

although requirement for agility in applications development could be read as both a technology and business driver. Concerns around scaling, skills gap and ROI were all highly ranked drivers when it came to influence strategy decisions on mainframe. The concerns over skills gap could be considered as a business risk as well as a technology/resourcing issue.

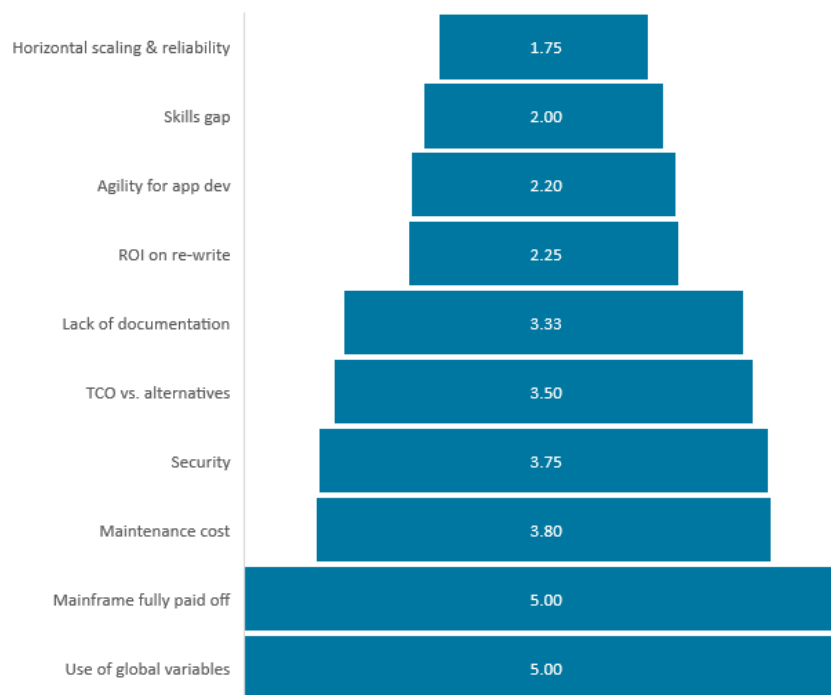


We have got lots off our mainframe, but the number of MIPS isn't going down. Our demand goes up even though we have removed quite high profile things off the mainframe."

CIO, Global Asset Servicing Bank

Figure 13: As with cloud, business drivers are key to influencing mainframe strategy

Q: Please rank order the top mainframe considerations that are influencing your mainframe strategy (1= the highest, 5 = the lowest)



Source: Celent interviews and surveys with senior technology and operations leaders, conducted 1Q21/2Q22

In our conversation with study participants, proponents of modernizing as opposed to retiring their mainframe cited the relatively low running costs, a perceived low ROI on rewrite efforts, and in some cases a view that mainframe skills will continue to be available in the market.

Firms that were able to retire their mainframe recently did so with strong C-suite level commitment and associated budget. Our research revealed a mix of in-house resources

and consultants utilized to help with this. Firms on this journey told us the timeline to retire their mainframe was less dependent on worries around lack of mainframe skills (e.g., COBOL) than on the complexity of effort, the level of existing documentation, and the in-house knowledge around systems and application running on the mainframe.

A “big bang” approach was not viewed as successful, with one CTO citing an “0 for 4” success rate over the attempts with which he had been involved previously. Instead, a more successful approach was one where applications could be “peeled off” and ported over to the new stack over time. The subject of “institutional knowledge” was raised multiple times, and if this is lost, then porting becomes challenging.

In such cases where the knowledge is missing, re-writes may be the only solution, to recreate the IP and institutional knowledge. As one enterprise CIO told us, “It is domain experience that is more important than the COBOL experience. People are getting good at reverse engineering.”



It is domain experience that is more important than the COBOL experience. People are getting good at reverse engineering.”

Enterprise CIO, Leading US Banking and Financial Services Company

Tier 1 Bank Case Study—Using Mainframe in a Digital Transformation Strategy

The bank started a technology transformation strategy five years ago, focusing on tech stack modernization and rationalization among other areas. Over the next five years it will continue to focus on maximizing use of public and hybrid cloud. Using DevOps, teams within the bank establish new development delivery pipelines for the internal delivery of applications.

At the enterprise level, the bank has a multi-cloud strategy. They use private cloud, leveraging OpenShift and Cloud Foundry PaaS, and both AWS and MS Azure for public cloud depending on the needs of the applications.

Mainframe handles many workloads on the internal stack. The bank’s experience was that it made sense to work with existing assets.

As part of its transformation program the way the bank uses the mainframe has evolved. Key lessons for the bank:

- Specific languages have a big impact on cost. A mainframe running 100% COBOL is expensive. It found that moving 20% of applications to Java on z/OS significantly reduced costs.
- Some things make sense for the mainframe, others do not. Apps and workloads make sense in certain deployment models; it took the time to figure out an optimal balance.

Benchmarking can show what type of infrastructure is superior. For example, resiliency requirements of active-active-active for distributed made core processing expensive to back up. Likewise, lifecycle of servers or physical space required was often a weakness. Benchmarking of costs over lifetime paid off in considering the complete lifetime value of hardware.

Source: *The Future of the Mainframe in Financial Services*, Celent

Looking Ahead

Mainframes are the workhorse of the back office and may have been around for a long time, but they are tried and tested. Leading vendors are offering tools and pathways to

integrate with cloud. Our study confirmed that half the firms that currently have a mainframe are looking to retain these “legacy assets” while also transforming or shifting some workloads to the cloud. Drawing on this and other Celent studies, we see common approaches regarding mainframe modernization:

- Our study participants and other Celent clients are finding ways to **modernize while retaining their mainframe**, thereby leveraging this asset; new toolsets allow for innovation on top of existing assets. For example, the popular source code management system GitHub has specific toolsets for the mainframe. Some banks have found developers that can work in Java and COBOL environments.
- **Accept that some workloads will come at a premium:** benefits to security, reliability and availability may justify the costs of retaining and modernizing a mainframe as opposed to retirement. The TCO between different deployment models is not always apples-to-apples; many factors may need to be considered.
- It is possible to **find quick wins for mainframe evolution**—for example, looking into easy-to-deploy tools could expedite the discovery of value drivers.
- **Culture is an issue:** There are divergent views on how to deploy applications and infrastructure between on-premises and cloud. Greater awareness of the various tools and paths to modernizing the mainframe may help build support across the organization for incorporating this asset into the digital transformation strategy. Alternatively, a clear understanding of costs for both the modernization and retirement approaches may help build business case to invest in rebuilding the internal knowledge necessary to migrate the application. In this way, you can develop a culture which allows for a best-fit approach.

DATA EXCHANGE, DATA MANAGEMENT, AND AI

Becoming a digitally enabled, data-driven organization is a highly prized goal and, along with cloud adoption, an enabler for widespread adoption of artificial intelligence (AI) approaches such as machine learning (ML), Natural Language Processing (NLP), and deep learning. The road to get there, however, is long and winding, and you have to walk before you can run. Our study found that both the areas of AI and the less glamorous but keenly important area of data exchange are on the cusp of significant change.

Our conversations on the latter focused on data exchange mechanisms used by the firm when sharing and exchanging data with external clients and counterparties. This is an area that stubbornly keeps hold of manual and batch-based approaches. We found fax, spreadsheets, and flat file transfers still commonly and widely supported. But new methods offer an opportunity to leapfrog to digitally transformed workflows whose data can then be fully leveraged.

Digging deeper into our study, the data revealed that modern approaches allowing efficient and real time data transfer/exchange, such as data marketplaces, distributed ledger technology (DLT) and APIs, are expected to dominate in terms of utilization over the next two years. While older methods will continue to be supported in parallel to ensure all clients are catered for, the shift to these new data exchange mechanisms is exciting. It brings the potential for improved client experience and even new revenue opportunities.

“

Data exchange is on the cusp of exciting and significant change. Modern approaches to data exchange such as data marketplaces, DLT, and APIs are expected to dominate in terms of utilizing over the next two years. However, at present, fax, spreadsheets, and flat file transfers are still common.”

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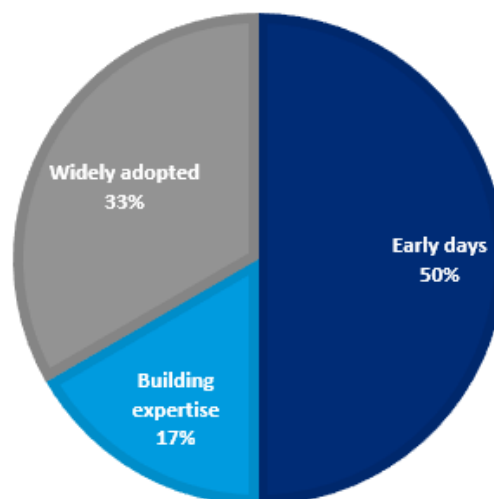
Adoption and Timelines

Enabling broad use of data for insight, whether the data is internal, client, or third party, will require successful enterprise data management. As with cloud, the prevalent approach to manage and leverage data was through a center of excellence (CoE), either focused on data management, data science (AI/data analytics), or both.

With the hype around AI continuing to grow, it can be easy to imagine a world where machines control most financial services processes. However, as our study confirmed, this is far from the current reality. Our study found that most firms still have a good deal of work to do around data exchange and data management. It is no surprise then that most firms rated themselves as in the “early days” of AI adoption across their firm (see Figure 14). While there are certainly pockets of activity in certain areas, often focusing on intelligent automation or process improvement, there was a lack of enterprise level application or oversight of AI.

Figure 14: Securities and investment firms are in early days of AI

Q: How would you rate your level of adoption of AI?



Source: Celent interviews and surveys with senior technology and operations leaders, conducted 1Q21/2Q22

Although in early days, firms are casting a wide net in terms of the types of AI they are exploring, including NLP, which is popular for use in chatbot development; robotic processing automation (RPA), which is more prevalent in post trade workflows; and

optical character recognition (OCR). While some participants are working with neural networks/deep learning, this was ranked as one of the least prevalent.

AI Use Cases

When it came to application of this technology, our study found that the typical use cases were often in discrete and sometimes mundane areas rather than enterprise use cases.

The wide number of potential specific use cases cited were largely focused on creating efficiency in operations. Although chatbots and predictive analytics were discussed as areas of exploration, the most progressed use cases included:

- AML compliance/onboarding
- Fraud detection
- Fail rate predictions and middle office reconciliations
- Managing email traffic
- Cybersecurity

A Chief Transformation Officer at a Tier 1 Investment Bank told us that they use AI primarily for predicting fails in securities processing and for “boring” tasks like processing emails to more efficiently read and route them to improve workflows. Another Chief Technology Officer at a US Equities Electronic Broker-Dealer confirmed, “We’re not doing anything I’d consider AI; it is all ML,” adding, “everyone forgets Google spent \$10 million+ to have people judge results to train models. Their models are not self-learning.” Indeed, last October Microsoft and Nvidia [announced](#) they trained one of the largest and most capable AI language models, the Megatron-Turing Natural Language Generation model (MT-NLG). [Experts estimated](#) the cost was in the millions.



We’re not doing anything I’d consider AI; it is all ML.... [Regarding progress,] everyone forgets Google spent \$10 million+ to have people judge results to train models. Their models aren’t self-learning.”

CTO, US Equities Electronic Broker-Dealer

Some respondents noted that despite excitement around AI, what “business really wants is analytics” and the focus should be on specific analytics use cases rather than any particular technology approach.

Within AI, study participants’ focus was not entirely on ML, with firms citing a range of common AI technology in use, including NLP and RPA.

There were a range of enablers of AI highlighted by our study participants, and mostly this returns to the topic of good data management, including data quality, governance, and lineage. Having high quality and centrally available data for use by AI and data science team was cited as the core enabler for AI success. Study participants from US G-

SIBS were more likely to have a focus on AI model risk management and governance. This included tight tracking of model performance and maintenance requirements.

There are of course always outliers, and some firms are utilizing AI in the front office. During its latest Investor Day in March, JPMorgan Chase's Head of Global Sales & Research, Corporate & Investment Bank, Marc Badrichani, shared, "In sales and trading, our business generates a ton of data, but data-rich is often information poor unless you invest in it. And this is what we're doing. Two examples: in sales, real-time market share alerts for our sales force, in trading hit rate optimization."

Across the wider group of study participants, we heard a focus on both defensive internal data management, such as lineage and controls, and offensive data management—e.g., leveraging data for commercial use cases.

Acquiring talent is considered key but universally viewed as very challenging, and while this was true at all firms, those further down the prestige spectrum felt it more acutely.

Focus on Data Exchange

Similar to AI, application programming interfaces (APIs) are another data-related technology approach that has received heavy promotion and investment across the financial services industry—again, certainly key to digital transformation efforts, better data access, and potential for data monetization.

While adoption of APIs is certainly expected to increase, we found that securities firms expect to keep supporting a wide range of data exchange mechanisms. This was particularly true for large banks. The study participants do not see much change in this over the next two years, with all current data exchange mechanisms, including inefficient manual and batch-based mechanisms, continuing to enjoy broad support. In many cases, inefficient mechanisms, such as flat file and shared spreadsheet, are expected by study participants to enjoy the same level of support across the industry as a modern API approach. It may be tempting to simply conclude that nothing is likely to change in this area.

The view forward changes, however, when we asked which methods of data exchange are in most frequent use and which enjoy the highest levels of end user satisfaction. As Figure 15 (see next page) shows, the picture becomes more positive regarding more modern approaches. Marketplaces, DLT, and data feeds are all predicted to increase in use in the next two years, and API use is expected to remain popular, but all inefficient mechanisms, including shared spreadsheet, email, flat file, and fax, are expected to decline in usage.

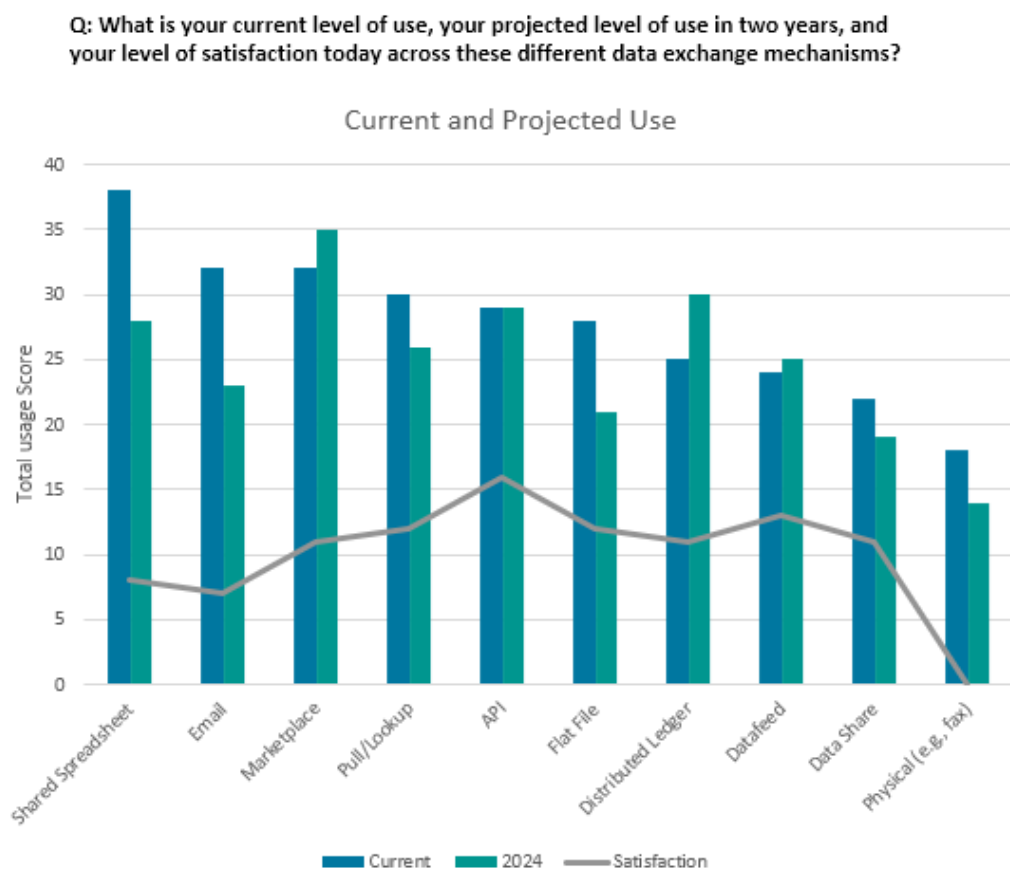
Concerns around data privacy were a frequent topic in our conversations around data, with firms keenly aware of their increasing obligations around this and the heightened risks—both reputational and regulatory—for mishandling client data. This is a concern with AI as well, in that client permissions and access safeguards must be in place when utilizing data to train AI/ML models, and data (and the models) must be free of bias. It is also a keen concern in data exchange. It should come as no surprise that study participants expect methods that support more secure data transfer will increase in use.

Of all the data exchange methods, and despite showing a steady rate of utilizing over the next two years, APIs received the highest rating regarding customer satisfaction (see Figure 15).

With inefficient mechanisms like shared spreadsheets, email, and fax all predicted to decrease in usage over the next few years, this begs the question: “Why continue to support them?” While study participants highlighted the importance of being able to exchange data in standardized formats that can easily be swapped and not formats required internally such as XML, most modern approaches will support this.

A number of survey participants told us that they feel obliged to support legacy data exchange mechanisms, even manual ones like fax, simply out of a desire to provide a high level of customer service for clients that have yet to modernize themselves. Without a strong business case for change, finding budget to help clients migrate away from legacy data exchange methods is unlikely.

Figure 15: Utilization of modern approaches is predicted to increase in next two years, with Marketplaces, DLT, and APIs expected to be most used



Source: Celent interviews and surveys with senior technology and operations leaders, conducted 1Q21/2Q22

Strategy and Drivers

The topics of data exchange, data management, and AI are inexorably linked.

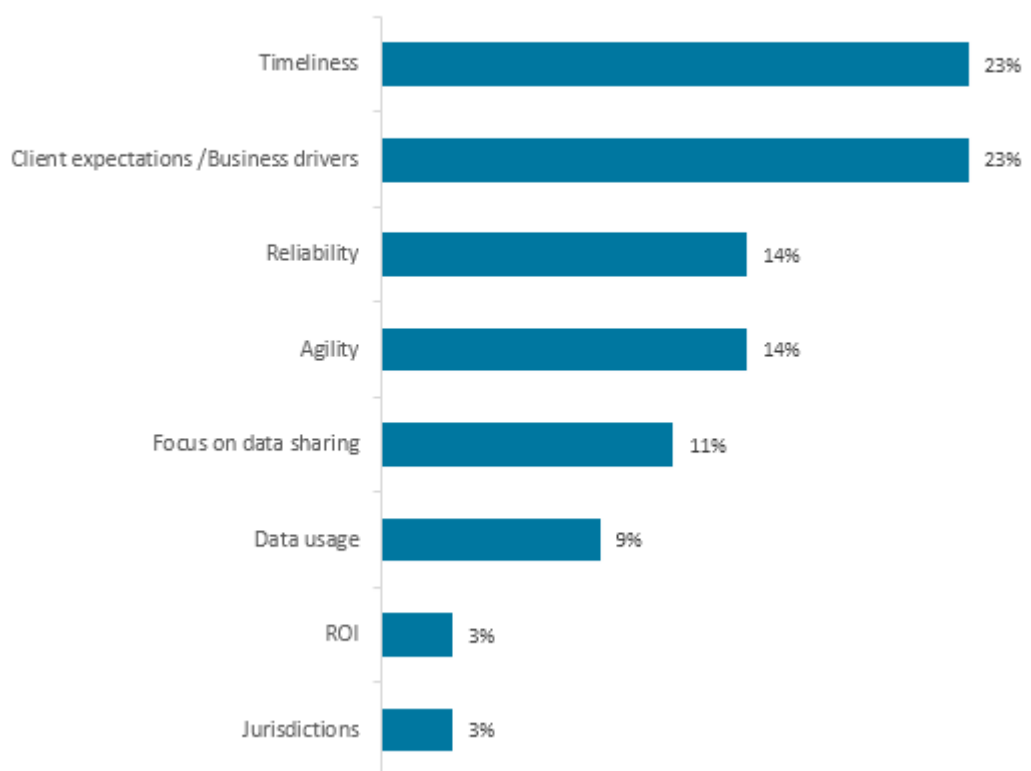
When it came to data exchange and data enablement strategy, our study found that timeliness of data and client expectations are key drivers as areas of focus (see Figure 15). In our conversations, study participants described business drivers supporting investment around enterprise data enablement initiatives as commonly including:

- The need for better quality data to feed analytics and as a foundation for AI applications.
- Desire for better quality data for reporting, particularly regulatory reporting.

Reliability and agility, two qualities that sometimes can be at odds with each other, occupied the 3rd and 4th spots, illustrating the organizational tension IT executives must manage when meeting their clients and end user needs.

Figure 16: A focus on client needs is driving data exchange strategy

Q: What drivers are influencing your efforts around data exchange?



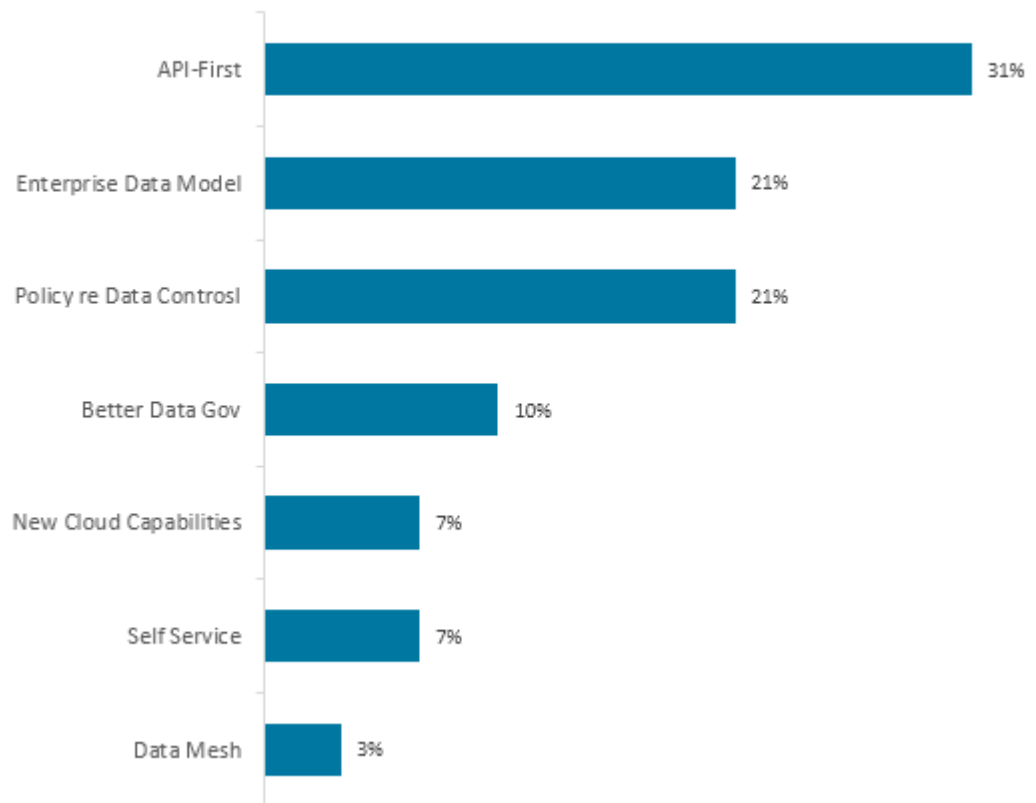
Source: Celent interviews and surveys with senior technology and operations leaders, conducted 1Q21/2Q22

With regards to data management, most firms we interviewed have a central data management function reporting through on the technology side to the CTO or similar. In larger institutions, each line of business will often also have its own data management officer or equivalent.

Almost all firms we spoke with are investing in API initiatives to access data, with some already having an “API-first strategy.” Other key initiatives driving change include implementing an enterprise data model and introducing a policy around data control (see Figure 16). Some study participants highlighted that refactoring applications was seen as an opportunity to move to API-based architectures.

Figure 17: API-first is a key initiative influencing efforts around data exchange

Q: What change initiatives are influencing your efforts around data exchange?



Source: Celent interviews and surveys with senior technology and operations leaders, conducted 1Q21/2Q22

In our discussions with both senior business and technology leaders, we asked about key success factors when deploying an API strategy. There was a focus on API’s ability to enhance the client experience by improving access to functionality or data on frequency that suits the client. Common success factors cited included:

- Enabling API management gateways internally and externally to improve partner integration.
- Releasing open APIs with SDK libraries and sandboxes to foster rapid customer adoption.
- Mandating use of decoupled components in any new applications design.
- Cloud adoption for all new and existing applications.



External APIs provide more flexibility to clients when sending and receiving information. Over the next two years we expect to utilize more cloud services.”

CTO, Global Operations, G-SIB

We also discussed example enterprise initiatives in place that are related to data management, which included:

- Digital workspaces for data science which are integrated into a DevOps capability.
- Data catalogues spanning lineages and meta data management.

Most study participants told us that the poor state of their data estate was holding back AI development. The one-third of firms who said AI was widely adopted across their firm (see previous Figure 14) tended to be large universal banks.

Overall, AI oversight remains highly siloed. While most firms we spoke with had a Center of Excellence (CoE) approach (see Figure 18) of some sort, this was often as a complement to in-business capabilities.

Two-thirds of respondents told us oversight was siloed, either across the technology division or, more often, the Lines of Business (LOB). Only one-quarter of firms have a centralized AI team, but those that did reported to business, not technology divisions. Finally, there was no direct correlation between those that had a centralized approach and state of maturity around adoption.

Some firms extend the CoE with additional support from business-specific technology departments focused on AI. One study participant, the Chief Transformation Officer of a Global Investment Bank, described it as a “hub-and-spoke model” where the hub, which is their CoE for AI, data, and analytics, is focused on the technology platform and standardized stack (library, mesh, marketplace, analytics libraries) but each business has teams that make up the spokes.



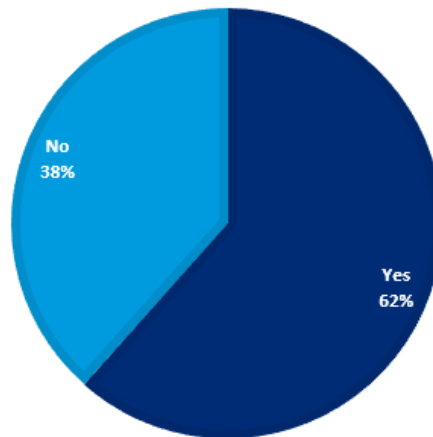
We have a hub-and-spoke model [for AI] with the hub which is our CoE for AI, data, and analytics, is focused on technology platform and standardized stack but each business has teams that make up the spokes.”

Chief Transformation Officer, Global Investment Bank

However, with most still in relative early states of maturity, they acknowledged that their approach was under development. This is underscored by the relatively small portion of enterprise IT budget allocated to this area (1–5%) across our study participants. At one Tier 1 Investment Bank, for example, with about 20,000 employees across the IT division, only 80 are dedicated to AI or Data Science. (Note, however, that quants are separate from this, as they work in business divisions, not the technology division.)

Figure 18: API-first is a key initiative influencing efforts around data exchange

Q: Has your institution established an AI Center of Excellence (CoE)?



Source: Celent interviews and surveys with senior technology and operations leaders, conducted 1Q21/2Q22

Attracting and retaining talent in this area was flagged as a particular challenge when building out AI expertise. One CIO for Global Banking and Markets at a Tier 2 multinational bank, shared that they designate roles as “blue” or “green” where the latter is “reusable and can exist in any location.” Meanwhile, blue roles are key specialist across business and technology. For these roles, the bank broadens the location to “go where the talent is.” About 10–15% of roles across the technology division are classified as “blue.”



Our study found that AI/ML development is still a relatively small portion of enterprise IT budget at approximately 1–5%.”

Celent 2022 Securities Industry Technology Study

Looking Ahead

While there is investment and senior level attention on the topic of data management and excitement about AI application, the lowly data exchange/transfer area has been largely left to its own devices. Study participants indicated it has been difficult for back offices to make a case for modernizing data exchange mechanisms, as this is not viewed as a priority by the business and so it is difficult to source investment for upgrading these mechanisms. An “if it ain’t broke, don’t fix it” mentality is pervasive.

However, the result is that legacy data exchange mechanisms are being supported in parallel despite the fact that modern approaches are ultimately cheaper to run, scalable, more secure, and offer more opportunities for both parties to make better use of data. With our study finding that modern approaches are set to increase in utilization, this is the time to start retiring legacy approaches once and for all.

Study participants highlighted this as an opportunity for DTCC as a market utility to take a proactive role in effecting change in this area. Several participants commented that without a central body pushing for change, for example through a T+1 initiative or equivalent, material improvement is unlikely to occur. It was also noted that industry initiatives are useful to securing budget in lieu of a perceived business case.

Data security in relation to data exchange may be another route to building firm-wide support for change in this space. Older data exchange mechanisms such as fax and shared spreadsheets are very insecure and will be likely to integrate into enterprise data collection efforts with the right governance and lineage controls. In addition to cyber and data quality issues, there are additional concerns around client privacy controls. Modern approaches such as APIs offer full protection and controls.

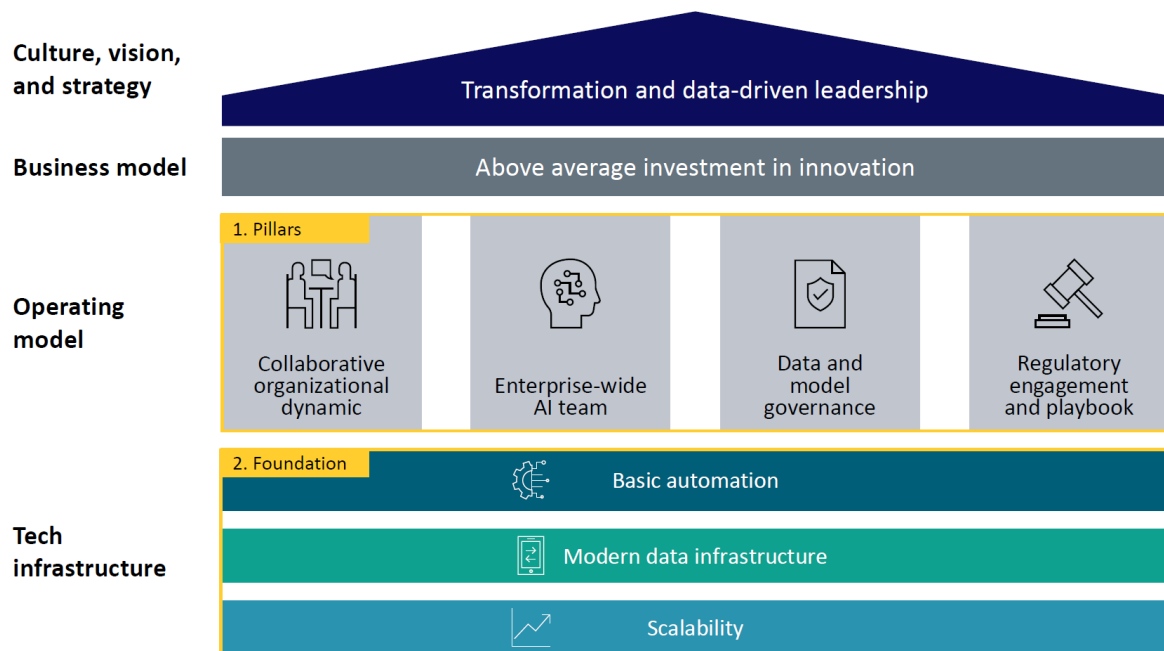
One area that does not need help in building support is AI. Our study found palpable excitement around AI technology but also a pragmatism that recognizes foundational work around data enablement and organization is required. To fully leverage AI, firms know they must get their data house in order, but once they do, they are prepared to push forward in leveraging AI.

Results from this and other Celent studies have found that firms need to invest in four key pillars and a modern tech foundation (see Figure 18). Success also requires investment in three foundation areas:

- **Basic automation:** AI is just one of several technologies to reimagine workflow and processes.
- **Modern data infrastructure:** A “single source of truth” and scalable data platforms are key requirements.
- **Scalable tech stack:** Firms are often partnering with tech and cloud partners to achieve results here.

Firms can learn from their cloud journey in terms of adopting an organizational approach that works for their firm. Study participants who had a centralized technology team offering support and frameworks to the business but not gatekeeping seemed most satisfied with the approach. We see this as a useful model to consider going forward.

Figure 19: Unlock AI Potential with Four Pillars and A Modern Tech Foundation



Source: Celent research, interview, and analysis

PATH FORWARD

If there is one message to draw out of this research study, it is that technology is moving faster than many securities firms are comfortable with—or, in some cases, ready for. Investment in understanding and supporting the best cultural approach to technology innovation across the firm will be key. At the same time, a deep and clear understanding of the hurdles to digital transformation presented by their legacy technology estates will be required to compete with newer, digitally native firms.

The easy battles in many cases have been won, leaving a long tail of legacy applications and approaches that require a certain element of ruthless decision-making. In the past, it was perhaps too easy to defend maintaining legacy systems through vague references to regulatory, legal, and/or technology hurdles. However, as leading financial intuitions successfully clear these hurdles, the rest will run out of excuses. In some cases, such as with data exchange, we believe a collaborative approach is needed to help break the gridlock of clients demanding parallel systems be maintained indefinitely.

Our study indicates that cloud and AI will continue to be areas where financial institutions enthusiastically embrace and invest. While AI maturity is still fairly low, we expect the investments currently being made in enterprise data management will soon come good. Combining this access to the firm's data with the power of cloud means the practical application of AI is poised to quickly accelerate.

We predict that decisions around mainframe modernization or retirement and data exchange will increase in priority across the organization. While historically viewed as supporting back office functions, the shift to client-centricity and client enablement is bringing these technologies closer to the front office. Investment in truly understanding hurdles and modern approaches will be needed to avoid making decisions based on potentially outdated views.

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Typical projects we support 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 and requirements. 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 front line 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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