

451

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BLACK & WHITE PAPER

Multi-Cloud Fundamental to Financial Services Transformation

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About this paper

A Black & White paper is a study based on primary research survey data that assesses the market dynamics of a key enterprise technology segment through the lens of the “on the ground” experience and opinions of real practitioners – what they are doing, and why they are doing it.

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Executive Summary

Faced with a market transforming at the hands of new, cloud-native competitors, financial services businesses are actively engaging in their own transformation. They are adopting and integrating multiple cloud platforms and seeking to derive business value directly from emerging technologies such as artificial intelligence (AI), blockchain and container-based application architectures. The next few years will be a critical time during which market leaders will succeed in establishing a unified base of new technologies from which to operate.

Methodology

A Black & White Paper is a study based on primary research survey data that assesses the market dynamics of a key enterprise technology segment through the lens of the 'on the ground' experience and opinions of real practitioners. Throughout this Black & White Paper, we cite various data sources from 451's Voice of the Enterprise service, which combines industry-leading analysis with insights from our extensive community of mid-level and senior IT and line-of-business professionals. It draws on surveys of pre-qualified IT decision-makers based mainly in North America and Europe who have a detailed knowledge of their organisation's cloud strategy.

To identify trends specific to the financial services market, businesses in that category were segmented and compared against the total survey sample, which includes businesses across a variety of vertical market categories.

Key Findings

- Businesses in the financial services sector expect a significant shift toward public cloud (IaaS) over the next two years. They anticipate that public cloud will serve as the primary venue for 28% of workloads during that time.
- Although they have demonstrated a strong intent to use public cloud, financial services firms have been slow to reach maturity in its implementation, instead showing a preference for internal systems due to constraints put on them by security and compliance issues.
- About 60% of financial services businesses expect their IT environments to be multi-cloud, making integrated use of both on-premises and externally hosted cloud infrastructure. They regard this as a solution to compliance, performance and cost optimisation.
- Financial services firms are lacking key skills associated with cloud platforms and information security, a gap that will lead many of these businesses to seek out professional or managed services to enable effective use of cloud.
- Businesses in the financial services market lead the total survey sample in identifying emerging technologies such as AI, containers and blockchain as top IT priorities in the short term, contributing to the potential for both innovation and complexity that lies before them in the coming years.

Cloud is a Widespread Force for Transformation

Cloud computing platforms, once considered leading edge technology, are now part of mainstream IT, fitting into the IT plans of most organisations, and widely regarded as a vehicle for achieving business agility, cost savings, improvements to application performance and availability, and access to emerging technologies. Businesses are investing in cloud both as a means of cutting existing costs, and as a means of developing new revenue streams.

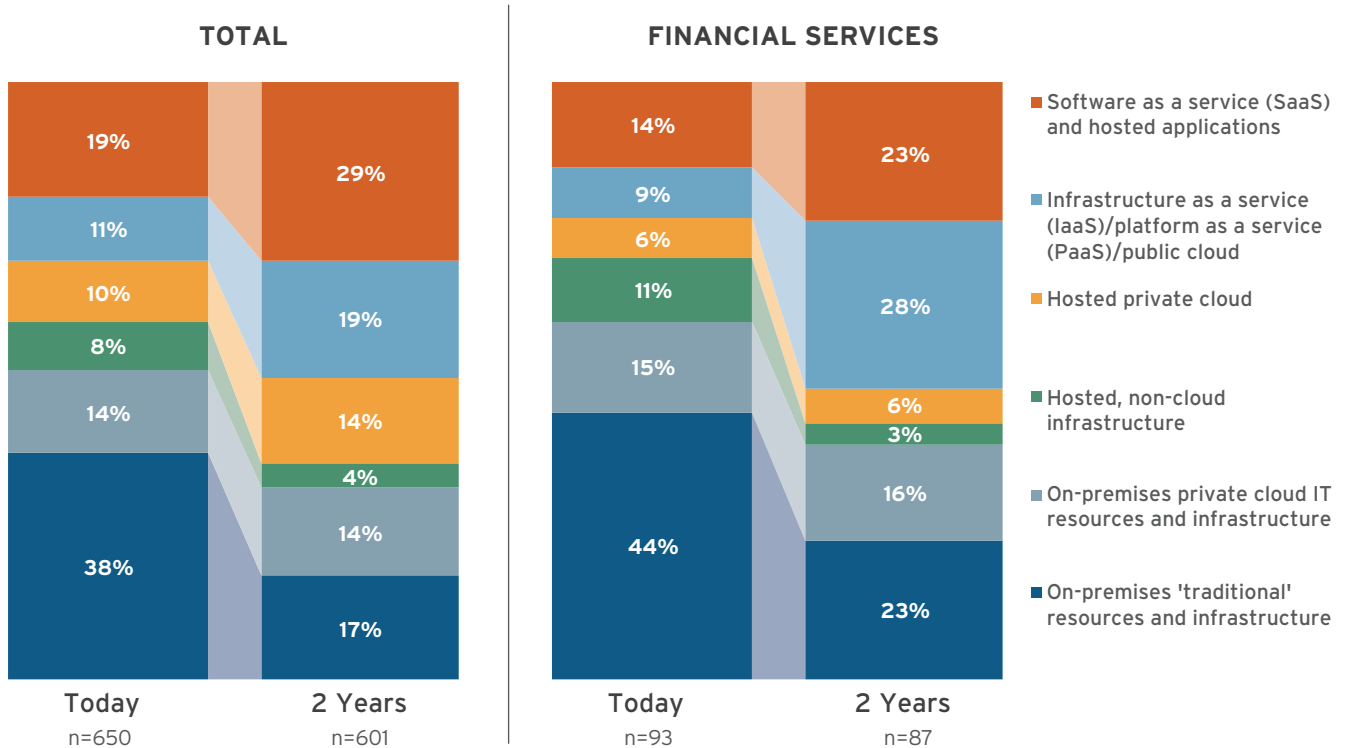
This is particularly true for companies in the financial services sector. Surveys of IT decision-makers conducted by 451 Research to inform our *Voice of the Enterprise* market intelligence service suggest the drive to innovate and modernise via cloud is stronger for businesses in the financial services market than for businesses overall, but the most significant part of that shift has not yet taken place.

Cloud platforms will assume a key role in the financial services market during the next two to three years, both as a platform for transforming existing IT infrastructure and as a vehicle for enabling new, technology-driven innovations. Results from 451 Research's *Voice of the Enterprise, Cloud Hosting and Managed Services* study show that financial services firms expect a major shift toward cloud as the primary venue for workload execution over the next two years (see Figure 1), with public cloud IaaS and PaaS serving as the primary environment for 28% of workloads in two years, compared to just 9% today. This is a markedly larger shift to public cloud infrastructure as a primary venue than the one expected by businesses overall (from 11% to 19%).

Figure 1: Major shift to public cloud for financial services

Source: 451 Research's Voice of the Enterprise: Cloud, Hosting and Managed Services: Workloads and Key Projects 2018

Q: Which of the following best describes the primary environment used to operate your organisation's (workload) today? Where will it be operated in two years?



For this transformation to take place, businesses across the financial services sector must find ways to address both technical and organisational risks and challenges. Some of these are common across all markets, and others are more prevalent in the financial services space. Up to this point, they have served as barriers to the widespread implementation of cloud as a primary production environment.

Many of these adoption hurdles have to do with requirements around cost, security, compliance and performance. Overcoming them is an engineering and management challenge that often reveals skills gaps within the organization. Resolution could come from the use of modern, container-based application architectures, use of hybrid and multi-cloud IT, and engagement with third-party managed service providers.

The technology challenges that financial services businesses are facing and the effectiveness with which they meet those challenges will determine how well they are positioned to capture the new opportunities cloud offers. The business of financial services is transforming quickly, and organisations that fail to capture these cloud-driven opportunities will struggle to compete in the near future.

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Of course, not every business is positioned identically for cloud transformation. Cloud represents a different opportunity for smaller, cloud-native challenger banks than it does for large, incumbent finance houses with large existing investments in legacy infrastructure and IT operations.

The financial services sector exemplifies this disparity well as disruptive software-driven startups enabled by new technologies and platforms are collectively driving the necessity for modernisation among large incumbent banks, insurers and other financial institutions. While this contrast between agile startups and slower-moving incumbents exists across many businesses, the reality is that most large businesses contain both agile, innovative teams (in departments or subsidiaries) and large, existing investments in legacy technologies. Addressing this larger picture and developing overall cloud and IT strategies that create integration, efficiency and opportunity company-wide is part of the challenge of digital transformation.

The Current State of Adoption: Proceeding with Caution

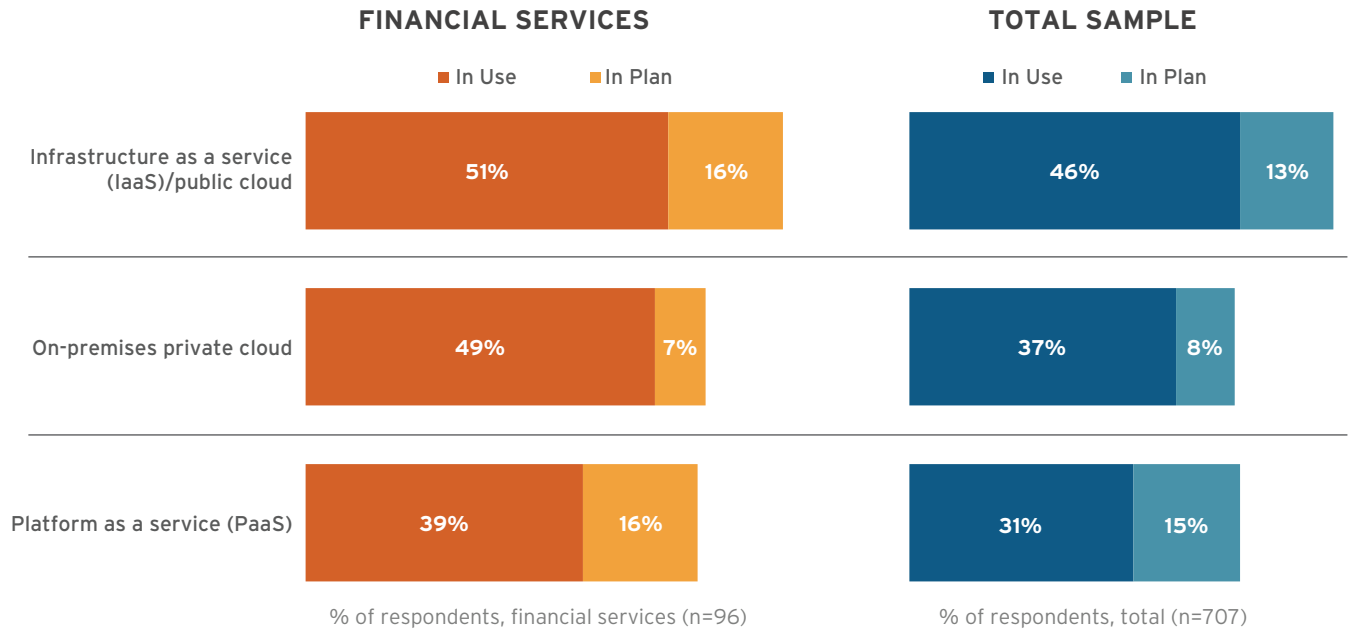
The pace at which financial services firms are adopting cloud platforms is a strong indication of their intent to rely on these platforms to build new services and modernise existing operations. However, the slower pace (relative to businesses across other sectors) at which they are putting these environments to widespread use in support of production applications suggests there are hurdles yet to overcome.

As Figure 2 shows, financial services firms demonstrate higher rates of adoption (when compared to the total survey sample) for public cloud IaaS (51%, compared to 46%), on-premises private cloud (49% to 37%) and platform as a service (39% to 31%). Each of these technologies is expected to be in place by more than half of financial services businesses within the next 12 months.

Figure 2: Cloud service adoption comparison, finance vs. total survey sample

Source: 451 Research's Voice of the Enterprise: Cloud, Hosting and Managed Services: Workloads and Key Projects 2018

Q: Which of the following services, if any, does your organisation currently use? In the next 12 months?



However, the simple fact of adoption does not account for the depth to which these platforms are integrated into the IT operations of businesses. In the case of public cloud IaaS, financial services businesses lag in the depth of IaaS implementation. Just 18% of financial services firms said they are broadly implementing IaaS for production applications today, compared to 25% of businesses overall. The largest segment of financial services firms is at the discovery, trial and testing stage (43%), or at the initial stage of implementation for production (26%). In many cases, these businesses are more confident with internal systems today, having focused on modernising them before making significant shifts toward public cloud.

Overall, financial services firms have indicated with the pace of initial adoption that they intend to rely on cloud platforms (especially public cloud IaaS and on-premises private cloud) as a means of modernising and optimising existing operations, and as a venue for developing new functions. However, the slower pace at which the use of IaaS has progressed past the proof-of-concept, testing or initial implementation stage into widespread production also suggests a degree of caution around the public cloud, and highlights the challenge posed by the technical hurdles and skills gaps associated with modernising existing applications.

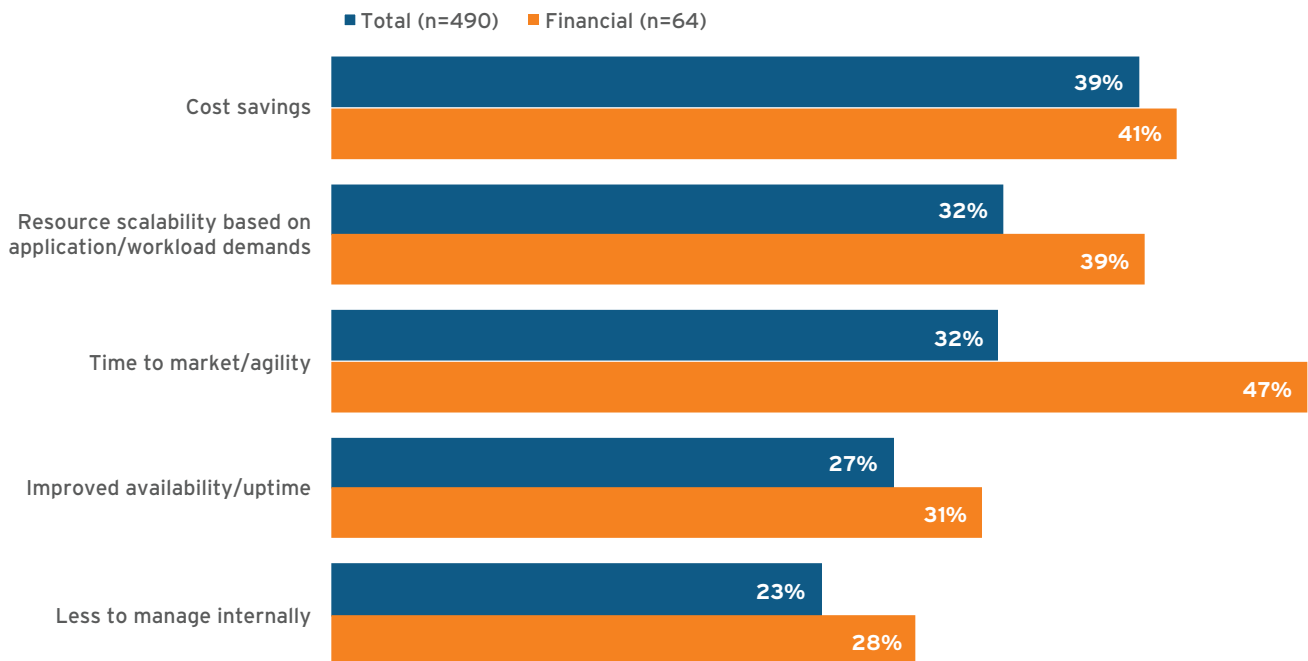
Drivers and Inhibitors of Cloud Investment

Among financial services firms, agility tops the list of cloud adoption drivers (cited by 47%, compared to 32% of businesses overall – see Figure 3) as they seek the means to innovate quickly to capture new market opportunities represented by emerging technologies, such as AI and blockchain. Cost savings (cited by 41%) is a key metric in the modernisation side of cloud implementation as financial services firms seek to remove cost through increased operating efficiency, data centre consolidation and the effective use of utility-billed resources. Performance and availability are also critical for financial services businesses where downtime is directly calculable in terms of dollars lost.

Figure 3: Drivers of cloud adoption, finance vs. total survey sample

Source: 451 Research's Voice of the Enterprise: Cloud Transformation, Organizational Dynamics 2017

Q: Which of the following IaaS features is your organisation planning to begin using in connection with IaaS/public cloud services during the next year?



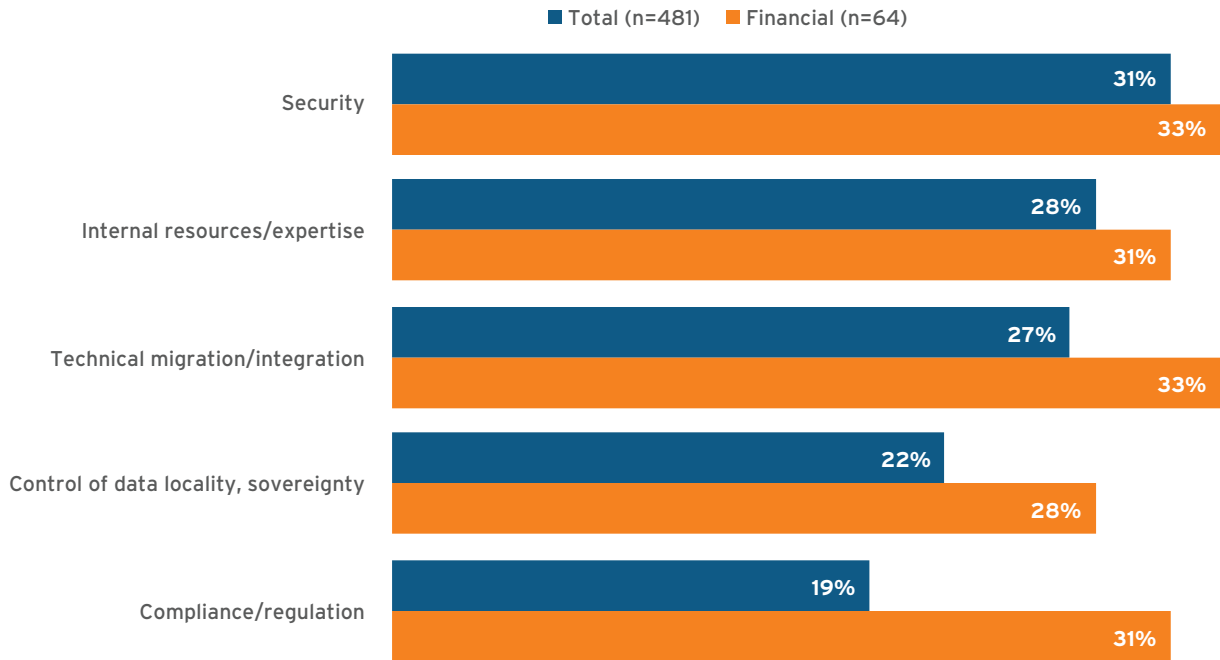
Cloud platforms, while certainly capable of delivering on these benefits, do not do so by default. Extracting the desired benefits from cloud platforms is the central challenge of cloud adoption, and one of the reasons the lack of internal expertise stands out among the most-reported inhibitors to cloud adoption (see Figure 4).

The list of the most prominent inhibitors to investment in cloud can be generally categorised as having to do with risk (security, control of data locality, and compliance and regulation) or with skills gaps (limited internal expertise or the challenge of migration and integration).

Figure 4: Inhibitors of cloud adoption, finance vs. total survey sample

Source: 451 Research's Voice of the Enterprise: Cloud Transformation, Organizational Dynamics 2017

Q: What are the key factors inhibiting your organisation's expanded use of cloud computing?



As with the drivers of adoption, financial services firms identified inhibitors to cloud adoption at roughly the same rate as businesses overall, with a notable and understandable difference being the frequency with which financial services firms cited compliance (31% compared to 19%) as an inhibitor. As they examine the prospects for moving core banking applications to cloud, vital considerations include data loss prevention and compliance with GDPR, PCI, SSAE 18, SOX, SOC 1 and SOC 2 – and potentially others such as FedRAMP. Solving compliance issues in the cloud will require specialised infrastructure configurations and skill sets. Further complicating this challenge is an increasing scarcity of IT skills associated with cloud platforms – a situation that will likely lead to greater engagement between businesses adopting cloud and managed services vendors enabling cloud adoption.

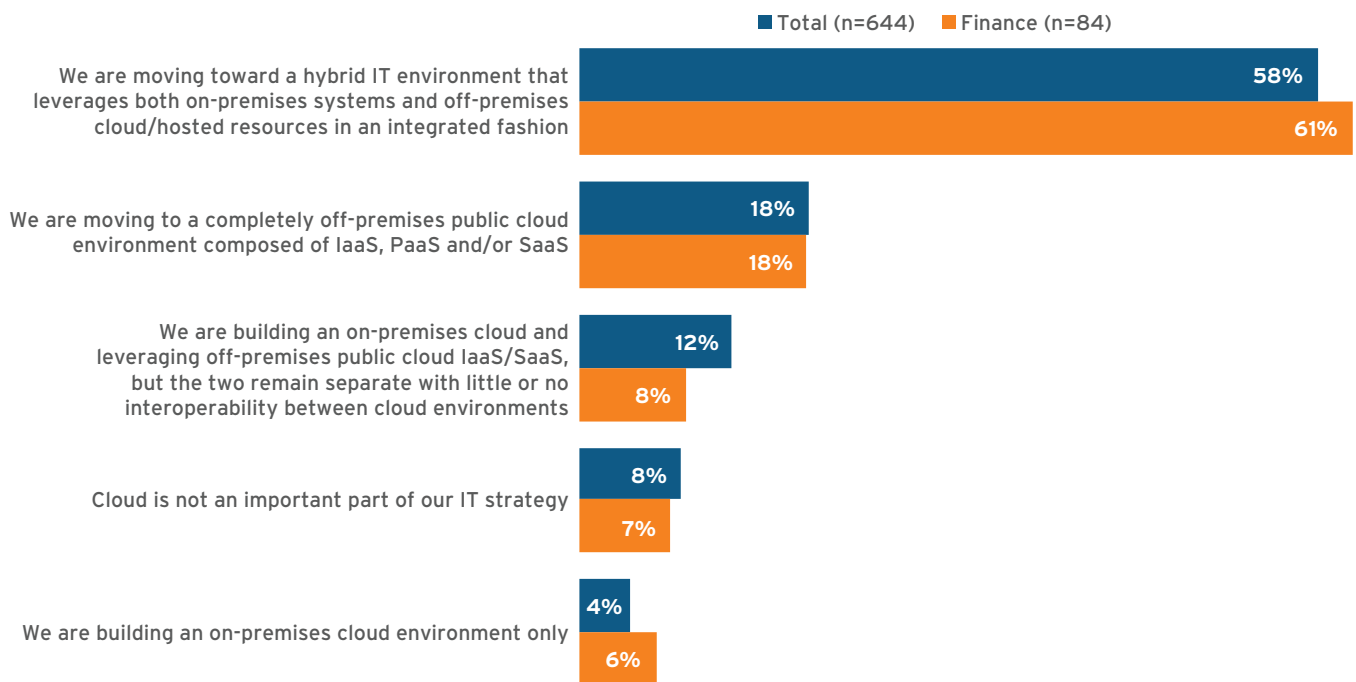
Multi-Cloud is a Path to Effective Execution

While public cloud platforms including IaaS and PaaS are widely in use, they don't represent the total cloud picture. Most businesses expect to arrive at a hybrid IT architecture in which different cloud environments – including on-premises private cloud and public cloud IaaS – are configured to enable workload portability and the seamless execution of workloads across environments. Financial services firms' expectations around multi-cloud architectures are similar to those of other businesses, and about 60% expect to operate multi-cloud IT architectures that incorporate both public cloud and on-premises private cloud and are integrated for workload portability, and for seamless execution of workloads across various environments.

Figure 5: IT strategy, hybrid and multi-cloud architecture, finance vs. total survey sample

Source: 451 Research's Voice of the Enterprise: Cloud Hosting and Managed Services, Budgets and Outlook 2017

Q: Which of the following best describes your organisation's overall IT approach and strategy?

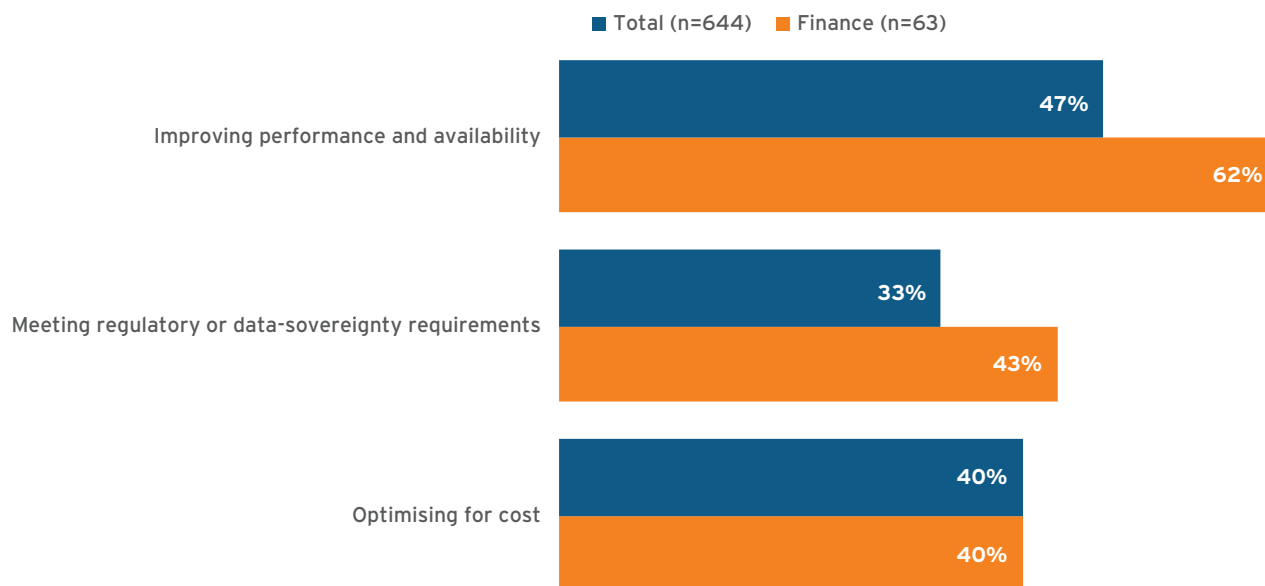


Despite the benefits of public cloud – elasticity, speed of provisioning, access to advanced platform functions – few businesses regard public IaaS as capable of addressing all their requirements for cost-effectiveness, security, performance and reliability. Just 18% of businesses surveyed (among financial firms and overall) said they are all in on public cloud. In the financial services market, expectation of a multi-cloud future is both an acknowledgement that certain workloads will remain internal or in private hosted environments for the foreseeable future, and an endorsement of multi-cloud setups as capable of benefiting application performance (62%), helping to address regulatory requirements (43%) and providing a vehicle for cloud cost optimisation (40%) (see Figure 6).

Figure 6: Reasons for using multiple infrastructure environments, finance vs. total survey sample

Source: 451 Research's Voice of the Enterprise: Cloud, Hosting and Managed Services: Workloads and Key Projects 2018

Q: Which of the following best describes your organisation's overall IT approach and strategy?



Multi-cloud architectures that incorporate private or dedicated infrastructure components are a means of achieving the benefits of agility, cost and performance while addressing security and compliance challenges. Replicating workloads across multiple public cloud zones or platforms, or across public and private cloud, is a means of architecting for availability. Placing workloads with a predictable load – those that do not benefit from the elasticity of pure utility infrastructure – on fixed-cost infrastructure has been demonstrated to be an effective strategy for reducing the overall cost of cloud deployments. Single-tenant infrastructure (such as hosted or on-premises private cloud) is frequently used to isolate workload components involving customer account information, company intellectual property or other sensitive data subject to compliance requirements or strict organisational security guidance. Eventually, container-driven application portability in a hybrid or multi-cloud IT architecture will enable the multi-directional movement of workloads to best execution venues on an ongoing basis for optimisation of cost and application performance.

Containerisation of legacy applications will be a necessary step in the large-scale migration of workloads to public cloud that financial service firms are predicting will occur over the next several years. Containerisation of new, cloud-native applications is necessary for those applications to benefit from multi-cloud architectures.

New Business Opportunities Tied to New Technologies

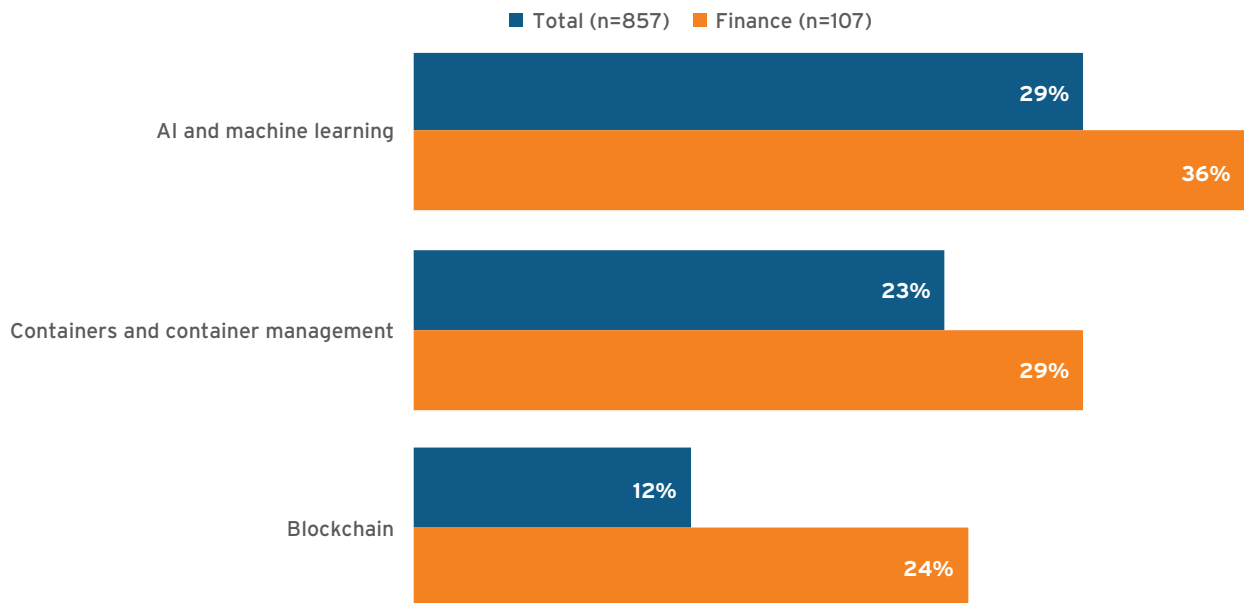
As a vehicle for innovation, cloud is central to plans for and experimentation with new and emerging technologies. Cloud provides the platforms on which to experiment with technologies such as artificial intelligence and blockchain, as well as the likely platforms on which businesses will ultimately execute the results of those experiments. As a result, interest in emerging technologies is another clear indicator of the importance cloud platforms will play in businesses going forward.

In survey responses, financial services firms outpaced the total survey sample in their prioritisation of AI and machine learning (36%) and containers and container management (29%) – see Figure 7. Although blockchain is less important to financial firms than these other technologies, at 24% to just 12%, it is nevertheless the technology for which financial services businesses show the highest affinity as compared with the total sample. Financial technology startups frequently work in AI or blockchain, and large incumbent financial services institutions are investing heavily in these areas as well.

Figure 7: Top IT priorities, finance vs. total survey sample

Source: 451 Research's Voice of the Enterprise: Digital Pulse, Budgets and Outlook 2017

Q: Which of the following IaaS features is your organisation planning to begin using in connection with IaaS/public cloud services during the next year?



Artificial Intelligence and Machine Learning

The potential of AI's impact on the financial services market is a matter for speculation. However, there are already proven use cases that contribute to the positioning of artificial intelligence and machine learning at the top of the list of IT priorities for financial services businesses.

Many of the financial services use cases for which AI is being effectively used today target labour reduction and automation of highly manual or time-consuming paperwork processing. Automating compliance with know-your-customer onboarding standards, risk analytics, credit scoring, customer segmentation, anti-fraud and anti-money-laundering work has a clear path to ROI by removing manual processes and cost. Customer-facing use cases for AI such as automated advice, service customisation, software-driven consumer investment tools and chatbots are more in development but are also common areas of investment for financial services.

In addition to these, emerging use cases for AI-powered infrastructure and cloud management have strong potential to impact the cost and effectiveness of operating IT. The complexity of large-scale cloud deployments and managed operations for internal systems is another case where AI has the potential to impact cost and effectiveness by automating a highly manual process. In many cases, AI-driven cost and performance-optimisation functions will be delivered by commercial optimisation tools.

Blockchain

Financial services use cases for blockchain tend to be more experimental than those for AI and machine learning. Even the well-known cryptocurrency use cases are arguably not mature or mainstream. They are, nevertheless, widespread because financial services businesses recognise the potential for the technology to be disruptive or transformative to the transactions that are conducted, or the way interactions between financial institutions take place.

Beyond digital currencies, emerging uses for blockchain include trade finance, money lending and loan trading, gold trading, cross-border micropayments and establishing customer identity for KYC (know-your-customer standards for customer identification) compliance. Projects in production include the we.trade platform – banks across 11 European countries collaborated to build a platform for tracking and managing trade transactions between SMBs that records interactions and guarantees payments across buyers, sellers, banks, and transportation companies and guarantees. Finastra's Fusion LenderComm is another, involving a collaboration of banks that offers a marketplace for syndicated lending and loan trading.

This type of collaboration across the IT infrastructures of financial institutions, often required by blockchain projects, is another contributing factor to the general commitment we see to multi-cloud and hybrid IT architectures.

Container-Based Application Architecture

Unlike AI or blockchain, containers are not enabled by cloud, but they enable more effective use of the cloud. Containers and microservices are key components of modern architectures that enable applications to better extract the benefits of cloud platforms, and to take advantage of multi-cloud environments. The fact that financial services firms prioritise container technology at a greater rate than companies in other vertical sectors suggests that the financial services sector is especially attuned to the demands of modernisation.

Container and container management technologies are of great significance to businesses designing new, cloud-native applications, as well as businesses reengineering existing on-premises systems for migration to cloud. Containerisation will be a critical step for any financial institution that is facing the challenge of migrating large volumes of applications away from legacy infrastructure over the coming years, and it will be a fundamental application development principle for these firms to take full advantage of multi-cloud IT environments.

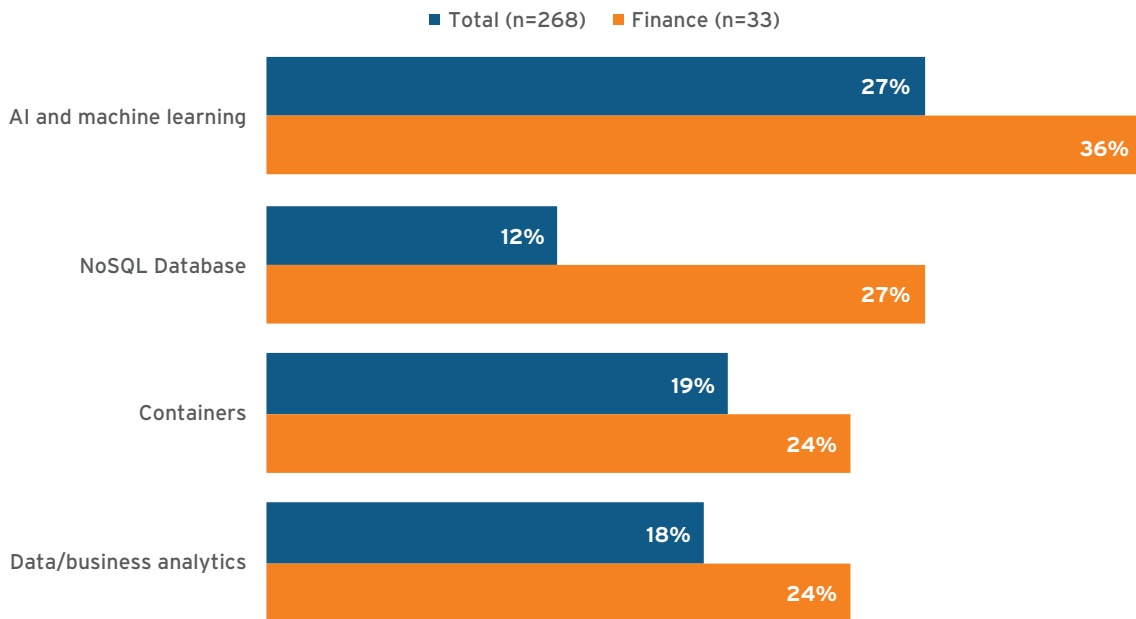
Public Cloud Functions Will Support Advanced Technology Plans

Many of the advanced public cloud IaaS functions financial services firms intend to enable correlate with the emerging technologies they have identified as top IT priorities, such as AI and machine learning (36%) and containers (24%).

Figure 8: Finance firms plan to engage advanced IaaS features

Source: 451 Research's Voice of the Enterprise: Cloud, Hosting and Managed Services, Workloads and Key Projects 2018

Q: Which of the following IaaS features is your organisation planning to begin using in connection with IaaS/public cloud services during the next year?



The use of public-cloud-based AI tools is partly driven by cloud being the simplest place to conduct initial experiments in building functions or services based on AI. Public cloud is likely to continue to serve as a platform as those AI experiments become production applications because it offers a simple and comparatively cost-effective means of accessing the GPU-accelerated compute resources that can best power machine learning. Additionally, other potential components of the same project – the database, the data analytics functions, the AI and machine learning functions, and the container management functions – are already designed to operate as part of the same platform.

Containers are distinct among these advanced features in that they represent an architectural choice. Containerisation not only supports effective migration to and execution in public cloud, but it is a key technology for supporting the multi-cloud architecture increasingly regarded by businesses as the most likely outcome of their efforts at cloud transformation.

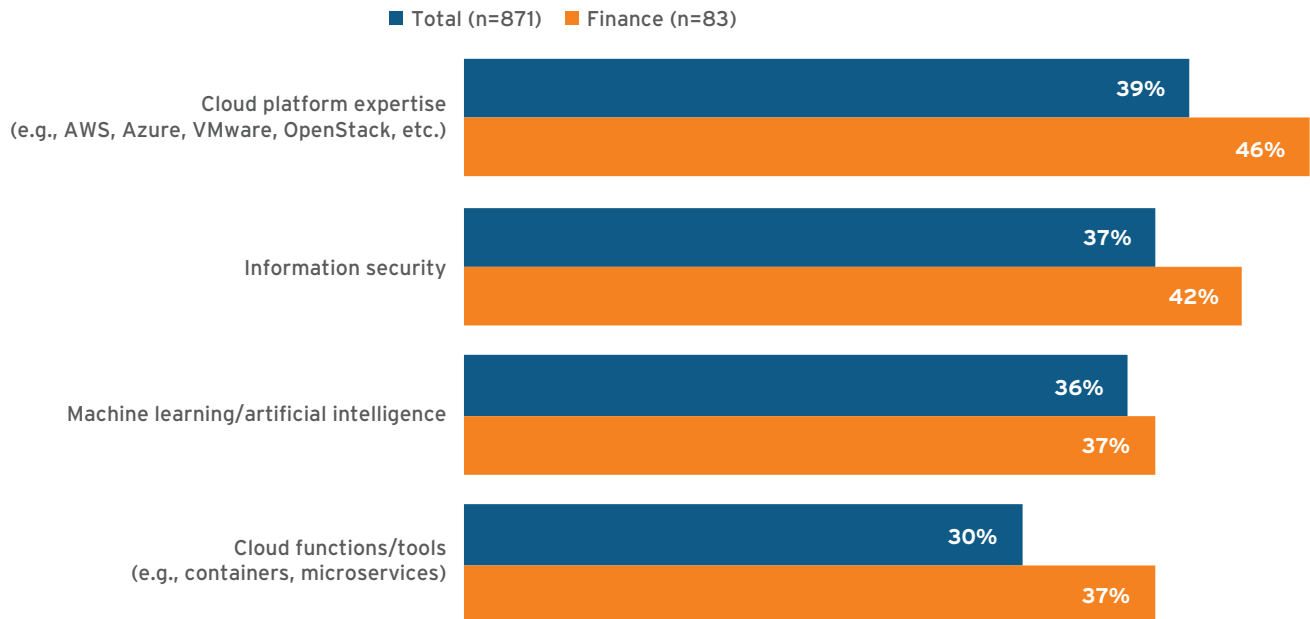
Cloud Skills Gaps and the Case for Managed Services

Cloud platform expertise, information security skills, and expertise in machine learning functions and in specific cloud platform functions (including containers and microservices) are in high demand, making skilled employees difficult to acquire and then difficult to retain once in place. The most commonly identified skills gaps are the same for financial services firms as they are for businesses in other categories; however, a greater percentage of financial services firms identified a skill as lacking in each case. As Figure 9 shows, the skill set most commonly identified as lacking by financial services was cloud platform expertise, named by 46% of financial services firms, followed by information security (42%), machine learning and AI (37%), and cloud platform functions (37%).

Figure 9: Cloud platforms and information security most lacking, finance vs. total survey sample

Source: 451 Research's Voice of the Enterprise: Digital Pulse, Organizational Dynamics 2018

Q: In which of the following IT categories, if any, is your organisation currently facing an acute skills shortage?

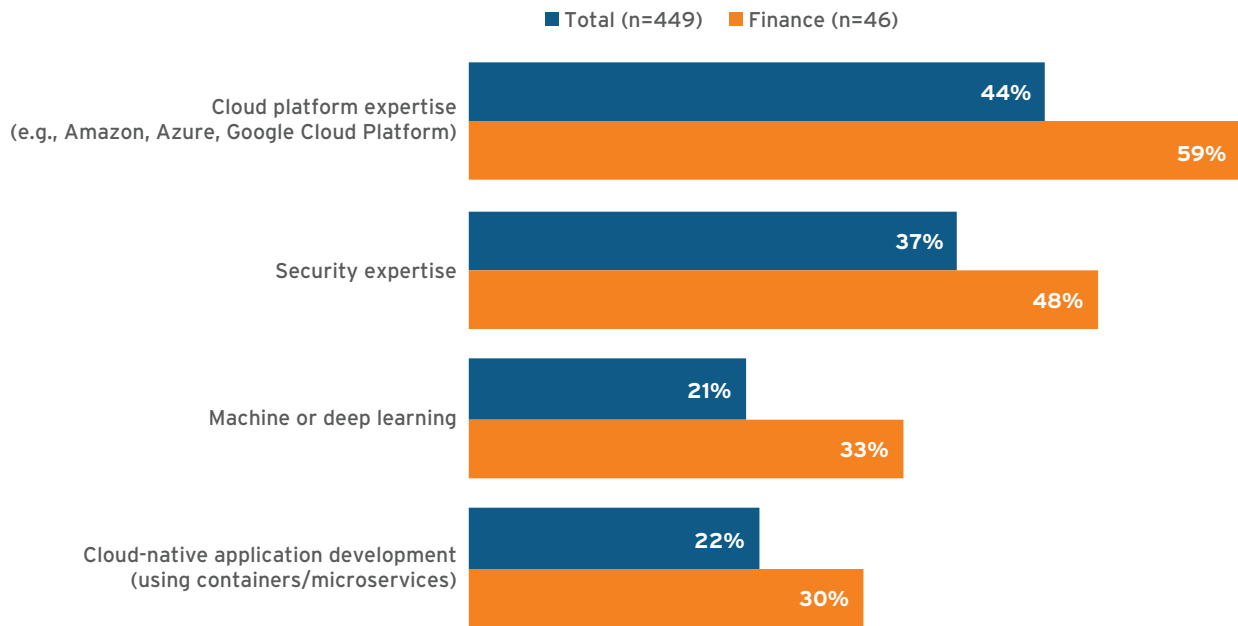


The fact that financial services businesses consider these skills gaps to be more acute most likely has to do with the immediacy of the need as these businesses make their anticipated shifts to cloud as production platforms. The demand for cloud-specific skills is an increasingly strong driver of engagement with cloud-enablement services, including managed or professional services businesses capable of delivering strategic and operational capabilities around both public and private cloud environments. As in the case of identifying skills gaps, financial services firms identified a select group of cloud-related skills for which they are likely to seek out enablement partners during the next two years (see Figure 10).

Figure 10: Skills sought from cloud-enablement partners, finance vs. total survey sample

Source: 451 Research's Voice of the Enterprise: Cloud, Hosting and Managed Services, Vendor Evaluations 2018

Q: For which of the following skills is your organization most likely to engage a cloud-enablement provider over the next two years?



The skills for which financial services firms most exceeded the average of all businesses surveyed in terms of demand map almost exactly to the skills they identified as most lacking in their own business – cloud platform expertise (59%), security expertise (48%), machine learning and AI (33%), and cloud-native, container-driven application development (30%). This appetite for services and skills refers to the next two years, which financial services firms have identified as the window in which they intend to make a significant shift to cloud platforms as primary venues for workload execution. To the extent that financial services businesses see cloud skills gaps as an inhibitor to the success of their short-term cloud transformation goals, they are looking to third-party managed and professional services for cloud enablement as a means of addressing that skills gap.

Conclusions and Recommendations

The next few years represent a critical stage of transformation for financial services firms, and of technology-driven innovation for the financial services market, which signals a major shift to cloud platforms as primary venues for executing workloads. This is driven by a need to modernise existing IT operations, and to innovate and implement new functions based on emerging technologies such as artificial intelligence and blockchain. These technologies, while considered experimental in other markets, are quickly being attached to business outcomes via credible use cases for financial services.

Security and regulatory compliance are viewed as barriers to widespread use of public cloud for production right now. Overcoming these barriers is an engineering challenge that demands cloud expertise many financial services firms said they currently lack.

Most financial services firms expect their IT environments will be multi-cloud, making use of both public cloud infrastructure and on-premises private cloud, designed to enable workload portability and seamless delivery of functions across platforms. They see multi-cloud environments as part of the solution to performance, compliance and cost-optimisation challenges.

Understanding multi-cloud to be the likely outcome, financial services businesses should engage in transformation efforts and be prepared to make decisions about platforms, partners and tools that support this outcome. Enabling a multi-cloud or hybrid posture should be a matter of benefiting from engineering decisions already in effect, rather than a significant refactoring effort. The multi-cloud strategy should inform choice of hardware components, automation tools, applications, database technologies, operating systems and other components.

Financial services businesses have identified cloud platform and security skills as acutely lacking and difficult to acquire. Addressing this skills gap will lead many to work with managed service partners and enablers for support in areas including solution design, application engineering, migration, application of DevOps practices and ongoing optimisation of cloud architecture for cost and performance.

Emerging technologies, cloud platforms, hybrid IT architectures and managed services are all individually valuable to businesses, but they also all complement one another. Financial services businesses should engage with all of them to create the best foundation for success. The financial services firms that are most successful in using cloud to modernise and innovate over the next few years will be best positioned to capture the new business opportunities created by the cloud ecosystem.

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Contact Canonical, the company behind Ubuntu, to discuss your best options to put your multi-cloud strategy on ramp in the financial sector, <https://www.ubuntu.com/contact-us>

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