BLACK & WHITE PAPER

Realities of Enterprise Modernization

Urgency Mounts for a Clear Path to Cloud

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COMMISSIONED BY

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

Enterprise IT modernization – and the cloud adoption that is core to digital transformation – is a complex process rife with confusion. While organizations are motivated to adopt cloud and modernize existing infrastructure, processes and applications, they are just as eager for a clearer path forward. A decade into the cloud era, enterprise organizations are still dealing with large, on-premises application portfolios. Technology leaders at these organizations want to move to the cloud, but many of their existing applications are both mission-critical and unsuited for hyperscale clouds.

Despite industry attention on the cloud, traditional, on-premises applications and infrastructure offer advantages for security, control and meeting internal expectations. Nevertheless, they come with their own significant challenges, including slow delivery of new capabilities, lack of knowledge, experience or skills to manage these applications and underlying infrastructure, and cost issues.

Because they're focused primarily on trying to rewrite and re-architect traditional applications, enterprises are introducing additional challenges. The most painful – and potentially self-induced – issue inhibiting enterprise cloud adoption is the skills gap that organizations create by pursuing the most arduous path to the cloud. Innovation occurring in the cloud continues to cause disruption for enterprises because they can't acquire new talent fast enough or transition existing staff effectively enough to take advantage of it. Organizations are also unsure which applications are best or least suited for the cloud, what migration strategies to use and what infrastructure – public cloud, private cloud, hybrid or multi-cloud – is best suited for their application portfolios.

In fact, companies are making assumptions that hyperscale clouds are the best option and thus limiting themselves when selecting infrastructure options. Enterprises are often so focused on the applications themselves that they fail to pay attention to the cloud environment in which these applications run. Therefore, they lack a complete picture and ignore specialized cloud infrastructure options that, unlike hyperscale clouds, are built to accommodate existing mission-critical applications.

Our survey found that most organizations have many applications that are still running on traditional, on-premises infrastructure. Yet, when asked whether their strategic, hyperscale cloud provider meets their needs to modernize their existing, traditional applications, the overwhelming majority said 'yes.' This begs the question, how could respondents know how well their hyperscale cloud provider supports modernization of their existing, traditional applications when hardly any of them are in the public cloud? We believe that this highlights how companies sometimes expect the same speed, scale and cost advantages that they get from cloud-native applications in their traditional applications, but these tend to fall short because of their on-premises roots.

As enterprise organizations struggle to modernize, technology leaders are placing a premium on finding staff with the skills to migrate and modernize existing applications – the top skills concern for all survey respondents. This highlights the skills gap that enterprises face, but also the need for the right platforms and tools to give existing teams a path to cloud agility for traditional applications.

Our survey uncovered significant complexity and confusion about how enterprises can best leverage the cloud to gain agility and competitive advantage. This paper aims to move past the hype and misperceptions to the enterprise reality, then begin charting a clearer way forward to successful modernization.

Introduction

There is no question that enterprises have immense interest in moving most, if not all applications, to the cloud in some form – SaaS, PaaS, public cloud IaaS, and private cloud or hybrid cloud, which might also include on-premises environments. However, enterprise organizations are dealing with large application portfolios that are full of 'other,' non-cloud-native applications, many of which are crucial to the success of the organization and running the day-to-day business.

Best execution venue, whereby applications run on the most appropriate infrastructure based on cost, performance, data sovereignty, geographic location and other factors, is highlighted as a key driver for multi-cloud. However, we are somewhat skeptical that organizations truly understand which applications should run on which infrastructure most efficiently.

Given enterprise technology leaders' confusion about which applications are best suited for the cloud and which are not, it makes sense that they did not identify a well-defined path to the cloud. There are several ways to go about determining the right course to the cloud, and those that think a lift-and-shift strategy alone will get the job done seem to be finding that it is neither efficient nor cost-effective. Furthermore, even though enterprises want cloud capabilities in their traditional, core business applications, they are still typically unsure of how to achieve this goal.

Despite the hype surrounding public cloud, our survey also highlighted how important on-premises and private cloud infrastructure still is to most organizations. There is a prevalence of on-premises and private cloud infrastructures in the leading multi- and hybrid cloud scenarios, where those infrastructure types are still used heavily for production applications, existing applications, internal business systems and data, and even pullback from public clouds – typically because of inefficient cloud utilization.

According to our survey, lack of skills is one of the biggest inhibitors of IT modernization, but we believe this pain may be mostly self-induced because many organizations are taking the complex and burdensome path of re-architecting and re-writing applications for the cloud, rather than refactoring or lifting and extending, which can be less painful.

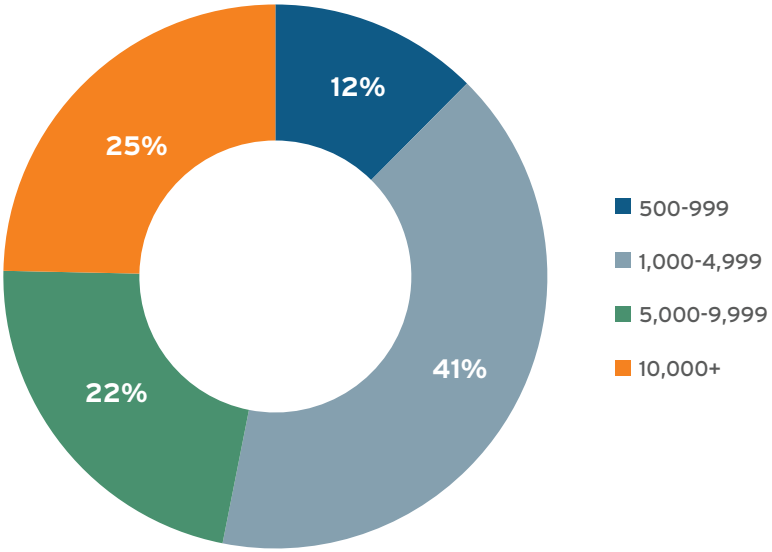
When it comes to the recruitment and retention of personnel with the right skill sets, enterprises are focused on the modernization of existing applications for cloud and migration of existing apps from on-premises to the cloud, as well as net-new, cloud-native applications. This shows that to stay competitive in today's market, organizations must balance management of existing, traditional applications and newer, cloud-native applications. Despite these very real challenges, enterprises can successfully modernize traditional, on-premises applications for cloud by understanding that different applications require different environments, and by establishing the proper infrastructures for each application.

Demographics

To better understand the drivers, challenges, perceptions and realities in enterprise IT modernization, we surveyed 450 enterprise IT decision-makers in the US, Canada and the UK. Respondents with various senior-level titles represented companies of 500-10,000+ employees across a variety of industries (see Figures 1 and 2).

Figure 1: Number of employees in respondent organizations

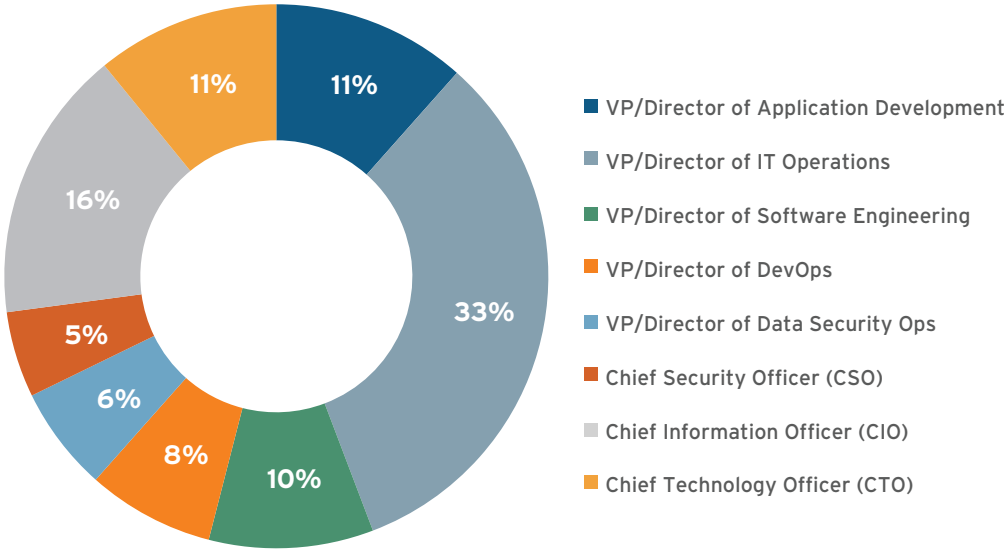
Q: Approximately how many employees work in your organization?



Source: 451 Research

Figure 2: Respondents' roles in their companies

Q: Which of the following best describes your role at work?



Source: 451 Research

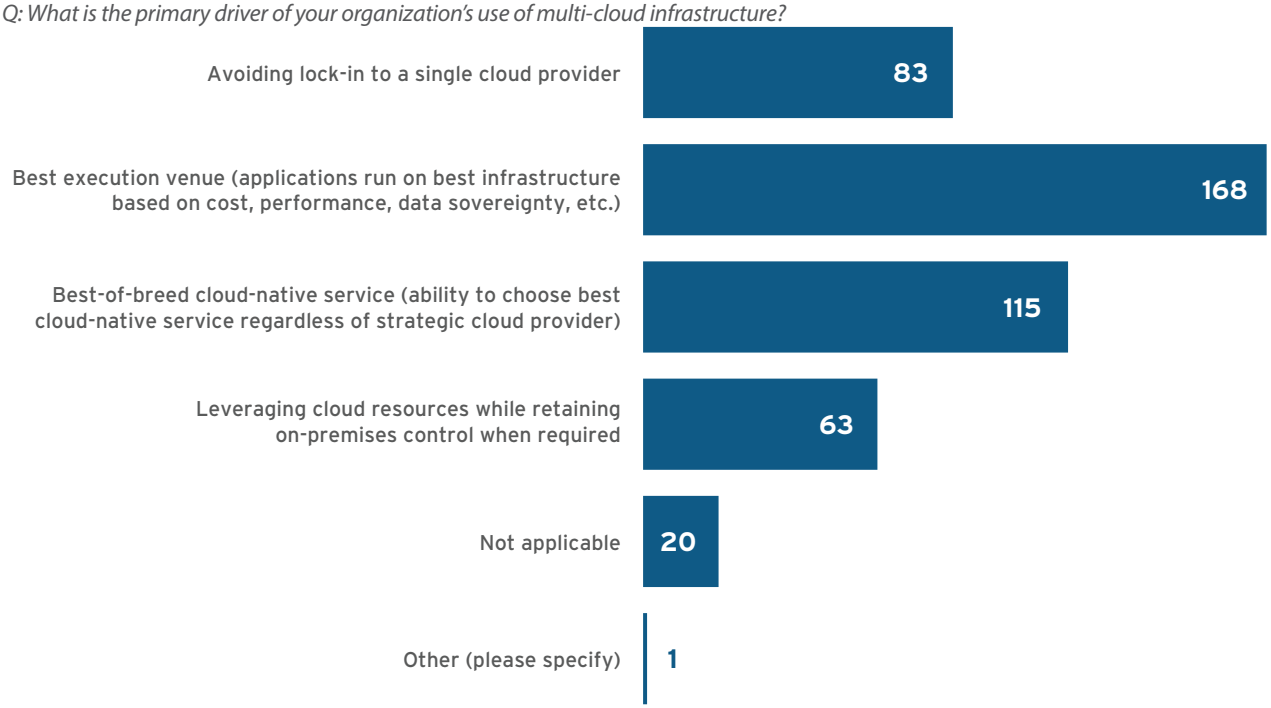
A Diverse Cloud Landscape

Our survey suggests that the perception among enterprises is that there is more to 'cloud' than public cloud and AWS. Respondents said they use private cloud more than other infrastructure options. But there were some variations in the use of public and hybrid cloud based on geography and industry. While AWS is the clear public cloud leader in terms of customers and revenue, our survey respondents indicated greater use of Google Cloud, IBM Cloud and Microsoft Azure. AWS use dropped dramatically in the UK compared to North America, but Google Cloud and Azure largely maintained their share in the UK. Across industries, use of a single public cloud is prevalent for organizations in retail and consumer packaged goods (CPG), healthcare and transportation, while many organizations in manufacturing and high tech use multiple public clouds.

In terms of a multi-cloud strategy, which we see growing consistently in the industry, most organizations say they are using a 'best execution venue' approach whereby applications run on the best infrastructure based on cost, performance, data sovereignty and other key factors (see Figure 3). Although best execution venue was highlighted as a key driver, we are somewhat skeptical that organizations truly understand which applications will best run on which infrastructures, partly based on the survey feedback regarding applications not suited for the cloud and the fact that respondents did not definitively highlight any specific types of applications. Other leading drivers for implementing a multi-cloud strategy included 'best of breed' cloud-native services that offer users the ability to choose the best cloud-native service regardless of strategic cloud provider, and avoiding vendor lock-in. The ability to leverage cloud resources while retaining on-premises control when required was also ranked among the leading drivers.

Figure 3: Primary drivers for use of multi-cloud infrastructure

Q: What is the primary driver of your organization's use of multi-cloud infrastructure?



Source: 451 Research

We also note that despite the appeal of features, capabilities and services with hyperscale public cloud providers, the path to get there is still unclear, as evidenced by this sentiment from an end user in government:

'The on-premises stuff is pretty well understood, at least within certain groups. I think a lot of people still don't understand what the cloud is and how to get to it, how to use it.' – Government End User

Complexity and Confusion

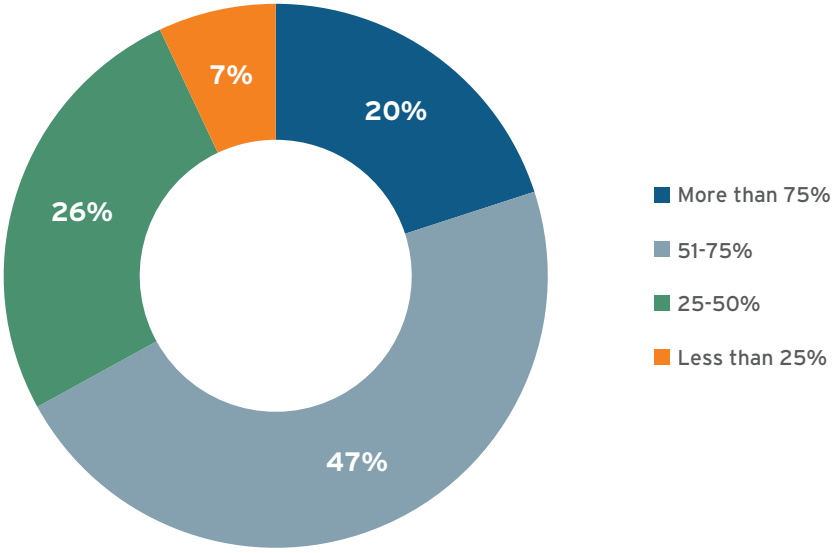
Adding to confusion on the various routes to cloud migration and modernization, enterprise IT organizations and decision-makers may also have some misconceptions about what they're getting with cloud. As illustrated in Figure 5, **most organizations have many applications that are still running on traditional, on-premises infrastructure. Yet, when asked if their strategic, hyperscale cloud provider meets their needs to modernize their existing, traditional applications, nearly 90% responded 'yes.' This begs the question, how could respondents know how well their hyperscale cloud provider supports modernization of their existing, traditional applications when hardly any of them are in the public cloud yet?** We believe that this highlights how companies sometimes expect the same speed, scale and cost advantages that they get from cloud-native applications in their traditional applications, but these tend to fall short because of their on-premises roots.

Our survey results also indicate that there are uncertainties about which applications are suited for the cloud and which are not. When asked which software is least suited for the cloud, respondents cited a range of applications – CRM, ERP, data and analytics, web and media (consumer-facing), email and collaborative. This data underscores that most organizations are still unclear where to start in identifying the right applications for migration, and those that will remain on-premises.

Even though technology leaders are unsure which cloud migration path to take or which applications to start with, they seem intent on moving most of their applications to the cloud (see Figure 4). Most organizations are eyeing half to three-quarters of their large application portfolios for the cloud, with many earmarking 75% or more of their applications for migration. Although there is clearly demand for cloud-driven modernization, the best way forward remains unclear for most organizations.

Figure 4: Percentage of applications being considered for cloud migration

Q: What percentage of your application portfolio is being considered for migration to or modernization for the cloud in the next 12-24 months?



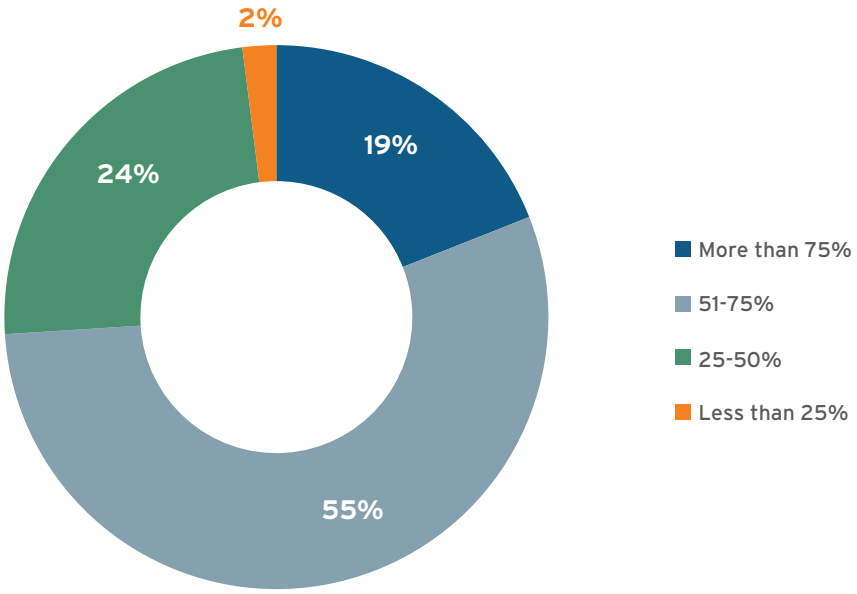
Source: 451 Research

The March of Applications to the Cloud

Enterprise organizations today are constantly developing new applications, as well as maintaining large portfolios of legacy applications – typically a few hundred to 500 or more. Although most organizations intend to move half to three-quarters of their existing applications to the cloud in some way – whether through rewriting, refactoring or simply lifting and shifting – the reality is that they are dealing with high volumes of traditional, on-premises applications that don't necessarily fit into hyperscale clouds and certainly won't perform the same way without modernization.

Figure 5: Percentage of on-premises applications

Q: What percentage of your application portfolio consists of traditional on-premises applications?



Source: 451 Research

Furthermore, most traditional, on-premises applications are deemed mission-critical by enterprise organizations, thus driving inertia and the sentiment that the current management of those applications is sufficient – mostly from fear of disruption or downtime from moving to the cloud. According to the survey respondents, traditional on-premises applications and infrastructure offer advantages, such as security, control, meeting internal expectations, and delivery of critical products and services.

However, these environments also come with significant challenges, such as the time it takes to deliver new capabilities, a lack of knowledge, experience or skills to manage these environments, and the cost to do so. These are the types of challenges and impediments that can preclude or impede an organization's cloud strategy and modernization initiatives, as well as its ability to compete. **Although organizations increasingly want cloud capabilities in traditional, core business applications, they are still unsure of how to achieve that most effectively and efficiently.** We should also point out that the public cloud services and experience do not typically align with what enterprises are doing on-premises and in private clouds.

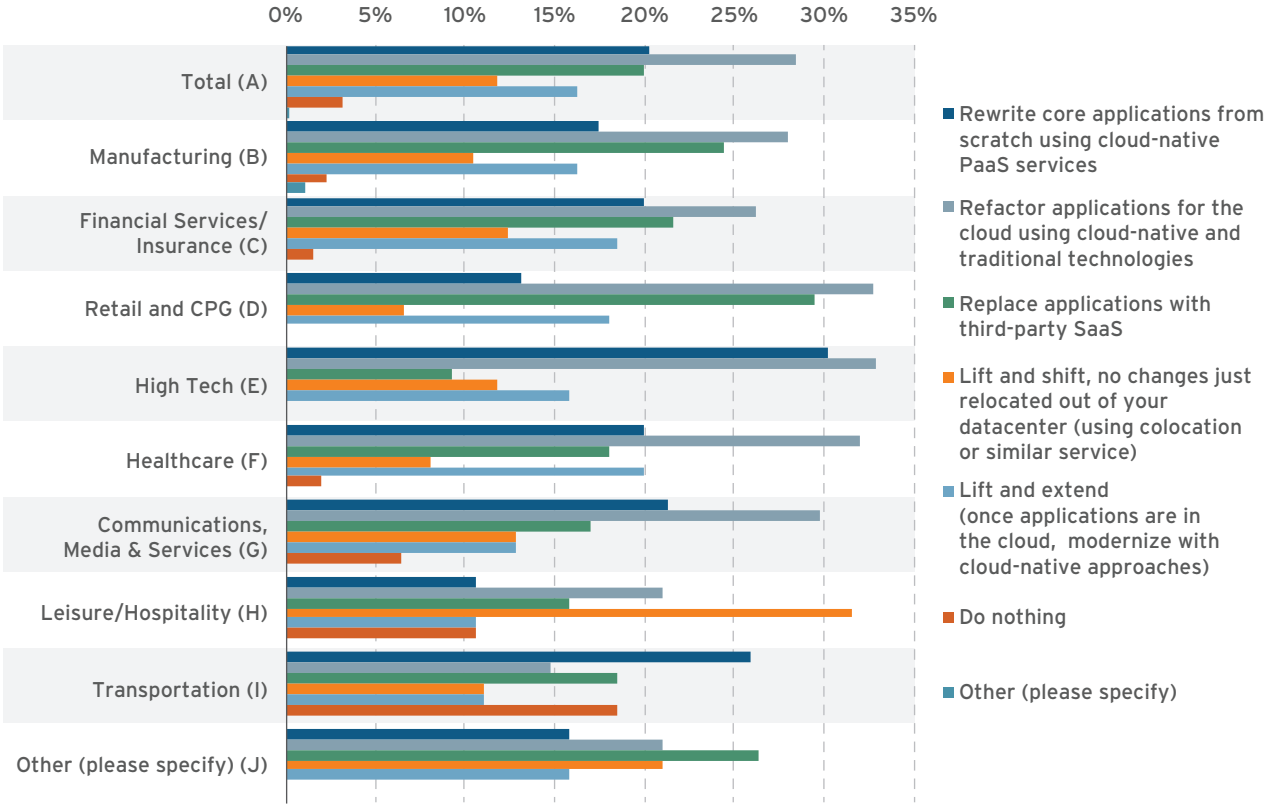
MIGRATION STRATEGY AND CLOUD USE

When considering the top enterprise strategies for cloud migration, our survey indicated that refactoring, rewriting, replacing with SaaS, and 'lift and extend' are the most prominent (see Figure 6). This is encouraging given the mainstream perception that 'lift and shift' – simply moving applications out of the traditional datacenter and placing them in the cloud – is an effective approach. The lower ranking of lift and shift from respondents also matches some anecdotal research from an end user in the education and training industry:

'In the lift-and-shift mode, we're changing as little as possible in order to accelerate the migration piece, and we recognize, based on the bills we're seeing, that it's not the optimum way to do it. So we'll go back and we'll automate and optimize.' – Education and Training End User

Figure 6: Application modernization strategy

Q: What is your primary strategy for modernization of traditional applications?



Source: 451 Research

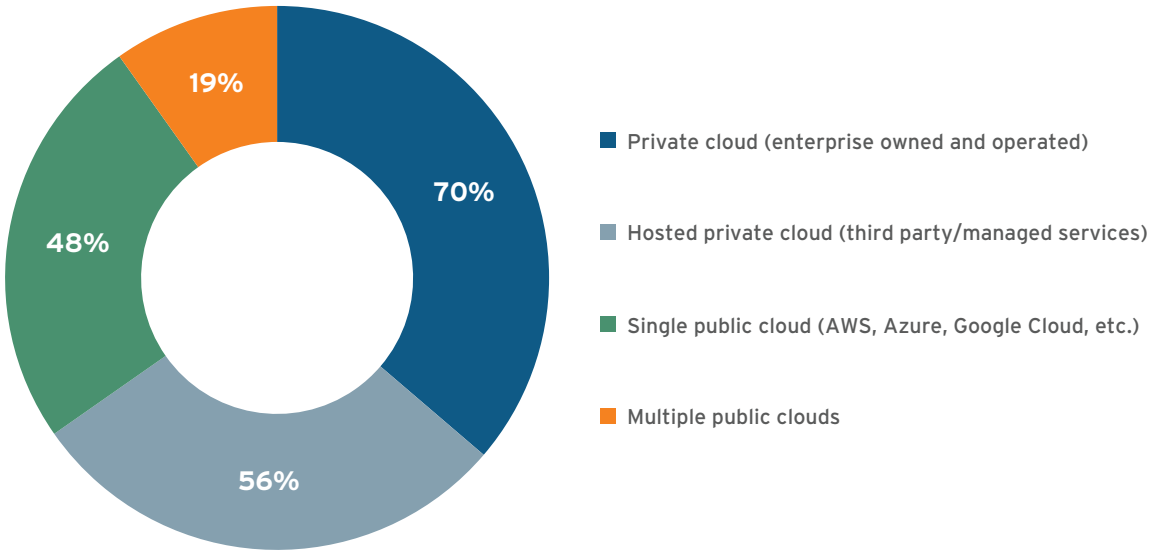
When we look at cloud-migration strategies across industries, we see that refactoring (changing application code before or as it is migrated to cloud) is the leading strategy across nearly all verticals. However, there are cases in several verticals – such as financial services, insurance, high tech and transportation – where companies are just as likely to 'lift and shift' (migrate existing applications unchanged to cloud) as to take a cloud-first approach (for net-new cloud-native application development). The differences in migration approach within and across industries underscores the confusion among technology leaders on the best route to cloud.

Despite the amount of hype around public cloud (on-premises and vendor-hosted) – private cloud is the clear leader in our survey in terms of enterprise cloud use (see Figure 7). Much of this is because private cloud has been available for much longer than other options and was the starting point for most organizations as the public cloud matured. We're also not surprised to see private cloud in the lead given enterprise priorities around security, control and compliance. (We note that survey respondents may equate running on-premises in their own datacenter with private cloud, regardless of whether

they are using cloud technologies.) There is also a prevalence of on-premises and private cloud infrastructures in the leading multi- and hybrid cloud scenarios, where they are still used heavily for production applications, existing applications, internal business systems and data, and even pullback from public clouds – typically due to inefficient cloud utilization. Cloud strategies are rapidly evolving, and the use of multiple clouds, each chosen to meet a specific use case, is on the rise. According to our Voice of the Enterprise: Cloud, Hosting and Managed Services, Workloads and Key Projects survey (January-March 2018) of 750 enterprise IT decision-makers, 69% of respondents said they plan to adopt a multi-cloud strategy by 2019.

Figure 7: Cloud computing use by type

Q: Which of the following best describes your organization's use of cloud computing?



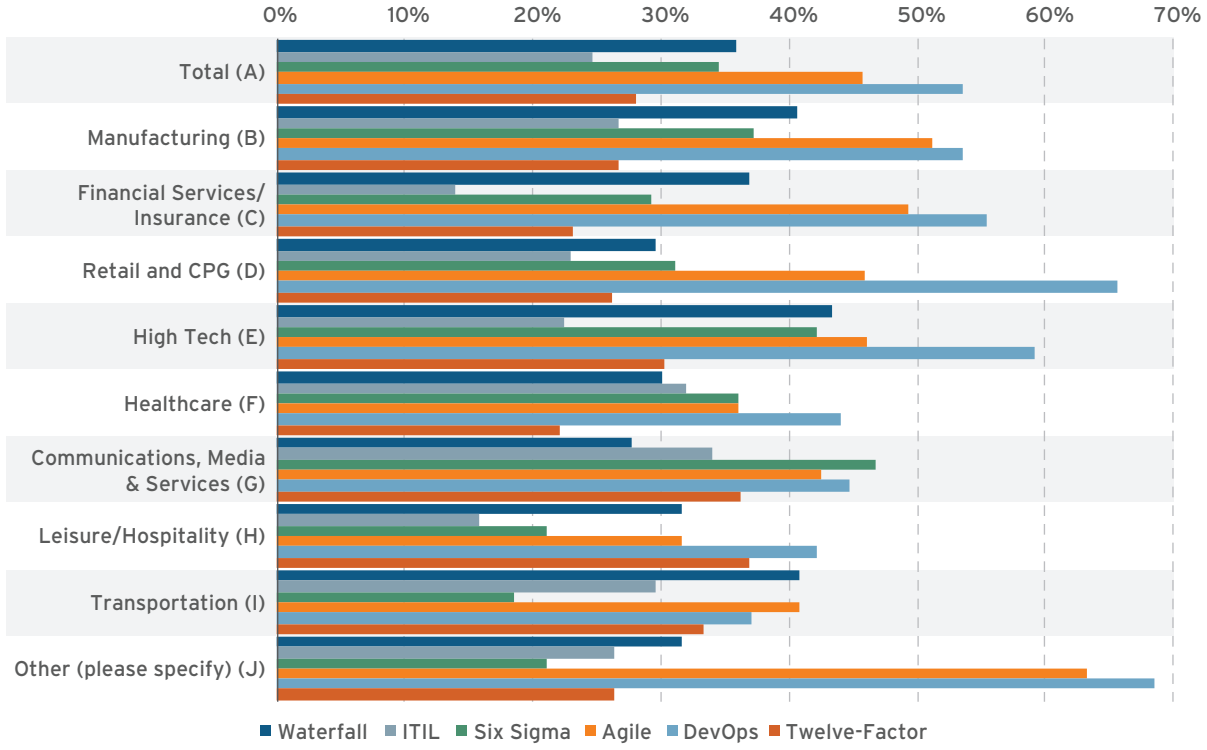
Source: 451 Research

Modernizing the Approach to Software Development

Enterprise cloud-migration strategies also illuminate trends in software development methodology. Survey respondents indicated their involvement in an array of methodologies led by DevOps and Agile, followed by Waterfall and Six Sigma, then Twelve-Factor and ITIL. These methodologies are spread across the different public cloud infrastructures, but we tend to see more Waterfall and ITIL with on-premises and private cloud infrastructures. As more enterprises migrate to public cloud, we expect this transition will correlate to increased adoption of progressive methodologies – DevOps, Agile, Six Sigma and Twelve-Factor – that are embraced by public cloud providers and many of their users.

Figure 8: Software delivery and management methodologies by vertical

Q: What methodologies are you using to deliver software and manage changes to applications?



Source: 451 Research

Self-Induced Cloud-Migration Pain and the Skills Gap

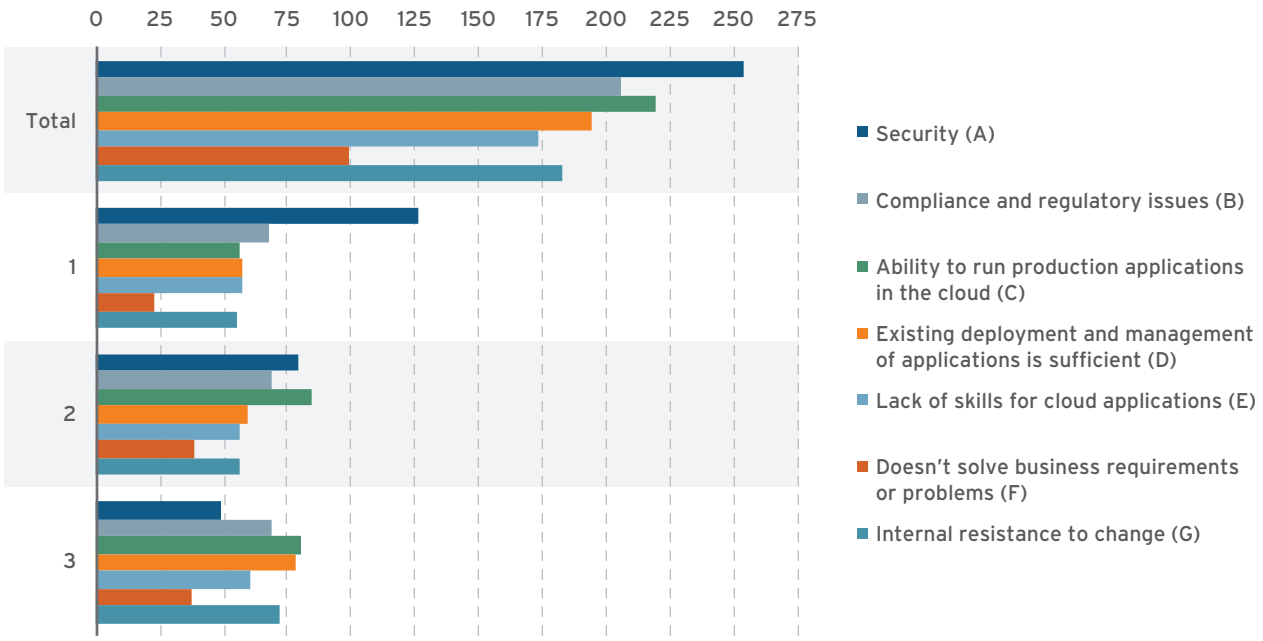
While lack of skills is among the biggest inhibitors to modernization (see Figure 9), we believe organizations may be perpetuating this problem by choosing a cloud-migration path fraught with the need for new skills and talent. Because they are focused on re-architecting, organizations are often forced to rely on time-intensive, complex and burdensome work when there is a simpler alternative: software and platforms that support both traditional application components and cloud-native application components. In addition, organizations should not focus only on modernizing applications, but take a broader view and modernize their infrastructure, processes and architecture in a progressive approach based on the needs of the business. In doing so, they may be able to alleviate some of the challenges from skills limitations and maintain the use of core, mission-critical applications in parallel to migration.

The most critical recruitment and retention needs varied across geographical regions. Although respondents in the US and UK prioritized migration of existing applications from on-premises to the cloud, those in Canada indicated a higher priority on deployment and management of net-new, cloud-native applications. We also saw the highest recruitment and retention needs around DevOps in the US, while UK and Canadian respondents put a higher priority on multi-cloud operations skills.

Survey respondents highlighted the common culprits – security, compliance and the ability to run in production – as key IT modernization challenges, but they also cited organizational challenges around lack of skills, internal resistance to change, and the belief that existing deployment and management is sufficient. These enterprise IT inertia issues, which we frequently find across our research, are all related, and if considered together, they outweigh the technical issues of security, compliance and production use. We note that the lower ranking of modernization not solving business requirements or problems indicates that many enterprises are still in the early stages of cloud migration and do not yet see cloud modernization as a viable way to address business issues.

Figure 9: Inhibitors of IT modernization

Q: What are the biggest challenges preventing IT modernization in your company?

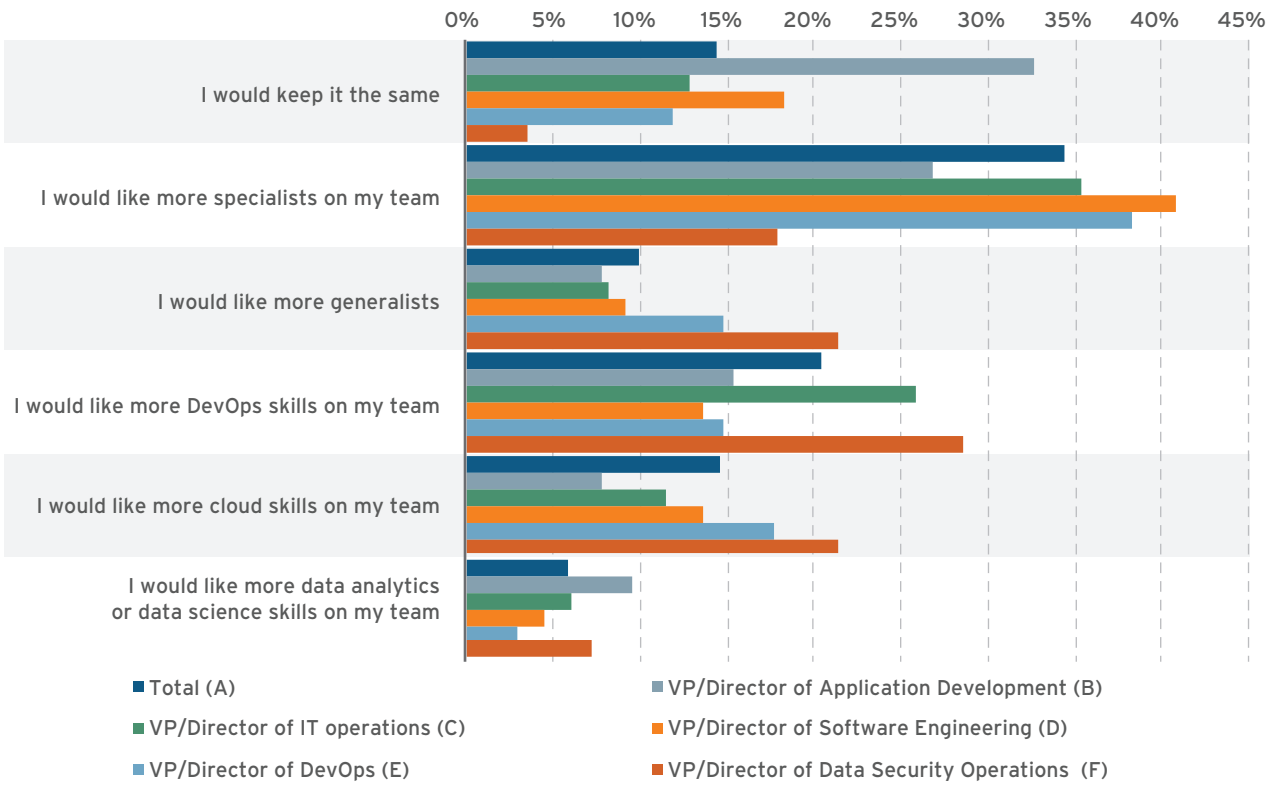


Source: 451 Research

The survey results demonstrate a need to modernize skills in parallel with applications and infrastructure. To keep pace with rapid innovation in cloud platforms and tooling, technology leaders are prioritizing the search for more specialists, and more personnel with DevOps and cloud skills. Only a small percentage indicated the need for more generalists or to simply maintain the status quo. Clearly, leaders recognize that modernization will require a combination of skills to be successful.

Figure 10: Preferred skill sets within technical teams to handle modernization

Q: How would you like the makeup of your IT technical teams to change as you modernize? –VP Level



Source: 451 Research

The status quo is a clear barrier to cloud; respondents reported that the belief that existing application deployment and management strategies are sufficient poses a challenge to modernization. They cited internal resistance to change as another noted hurdle; in contrast, however, the survey results also indicated a willingness to adapt to change and adopt new technologies. When we asked about the likely response among systems administrators and IT operators if the enterprise were to adopt a cloud-first strategy, nearly half of survey respondents said they would be 'somewhat apprehensive but eager to learn new skills.' A fair number (38%) indicated employees would be 'enthusiastic from the start,' while only 13% said the response would be 'very apprehensive and reluctant to embrace change,' and only 1% said people would threaten to quit. The survey results suggest that enterprise teams are ready to change, but they need a clearer, more manageable path to do so successfully.

As with any major change, it's important to consider human apprehension. Technology leaders understand the need for new skills to meet business demands, but they must give equal attention to how they guide their employees through the modernization process. This has been true in almost every technology evolution to date – new skills are required, but staff supporting existing processes and technology may be reluctant to change the status quo.

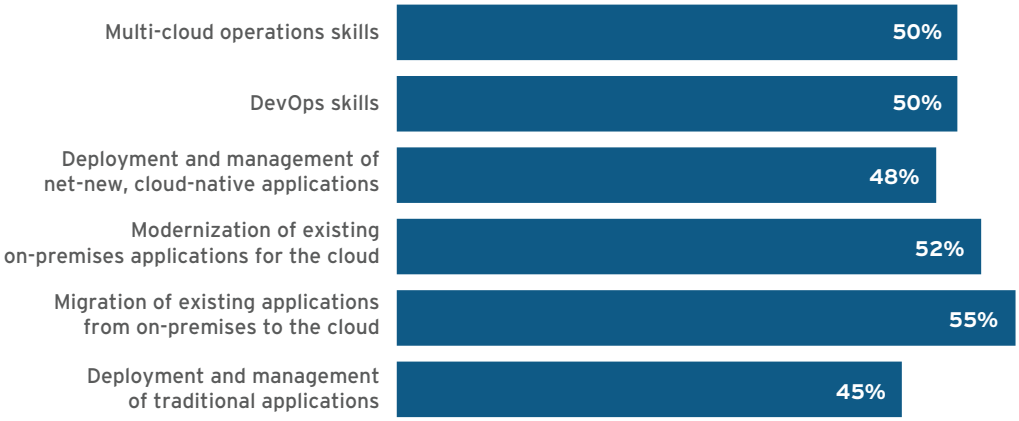
Other IT modernization challenges highlighted in our survey include security and compliance and regulatory concerns – which is consistent with some of the biggest challenges for enterprise cloud adoption in general – as well as containers, according to other 451 Research surveys. Containers are credited with accelerating development and driving efficiency, but as container applications move beyond testing and development and into production, overcoming security challenges and meeting compliance and regulatory requirements become a prominent hurdle. Respondents, particularly those charged with procuring and purchasing, at large enterprises tend to prioritize security and compliance/regulatory issues. This is largely because decision-makers are typically among those responsible for these concerns, and also because of high-profile security incidents and breaches that keep these issues top of mind. The ability to run production applications in the cloud – presumably in a similar fashion and with comparable performance and resiliency – was also identified as an impediment to IT modernization.

Recruitment and Retention Challenges

Contrary to the hype around public clouds, respondents placed a priority on traditional, existing applications when considering recruitment and retention of technology talent. They identified migration of existing applications from on-premises to the cloud as the most critical need (see Figure 11).

Figure 11: Critical tech personnel recruitment and retention needs

Q: Where are your most critical needs in terms of recruitment and retention of technology talent?



Source: 451 Research

Enterprises also highlighted modernization of existing on-premises applications for the cloud among the most critical needs, followed by multi-cloud skills and DevOps skills. Deployment and management of net-new, cloud-native applications was also a priority. This highlights the challenge organizations face in balancing a focus on existing, mission-critical applications that run the business with the potential disruption and innovation driven by cloud capabilities and newer methodologies.

There are also some interesting differences of opinion on recruitment and retention needs between VP-level and C-level respondents. For VP-level respondents, the most critical recruitment and retention needs centered on modernization of existing applications for the cloud and migration of existing applications from on-premises to the cloud, as well as multi-cloud operations skills. C-level respondents also highlighted migration of existing applicatios from on-premises to the cloud as most critical, but they deemed deployment and management of net-new, cloud-native applications and DevOps skills a higher priority. **This highlights how even subtle differences in perception and priority can have an impact on an organization's overall cloud-migration strategy. Executives closer to practitioners are more concerned with immediate execution, while the C-suite is already looking ahead.**

Conclusion

Today's enterprise organizations face a complex landscape of software components, infrastructures, methodologies and migration approaches as they build their cloud strategies. While modernization demands greater hybrid interoperability to span on-premises infrastructures and cloud, it can be challenging to redistribute applications to the best execution venue for each. Furthermore, as applications shift across distributed, disparate multi-cloud and hybrid cloud infrastructures, it may become difficult to ensure performance meets requirements. Nevertheless, there are some best practices that can help simplify and accelerate enterprise modernization.

Enterprise technology leaders need to understand the scope of their existing application portfolios. Clarifying how applications support the various business functions, the relationships between applications and associated teams, and each application's requirements is critical to successful modernization. Establishing and sharing the scope of existing applications across development and operations teams will create a strong foundation for change that doesn't risk business operations.

In gaining deeper insight into application requirements and dependencies, enterprises may well discover a wide range of infrastructure requirements that are unsupported in hyperscale clouds. Instead of diving headfirst into massive rewrite projects, organizations should use these insights to identify purpose-built cloud services that may provide a more straightforward route to migration and modernization. A more patient, comprehensive approach can also minimize time-intensive, complex and burdensome work associated with rewriting or refactoring applications.

Our survey found that enterprises are prioritizing the recruitment and retention of personnel with the skills for the modernization and migration of existing applications from on-premises to the cloud, but they are also looking for cloud-native skills. This means enterprise technology leaders must clearly understand their organization's needs so they can effectively balance the skills demands of existing, mission-critical applications that run the business with the disruption of cloud-native innovation focused on the future. Enterprise leaders are clearly facing a modernization skills gap, so they must broaden their thinking beyond a few hyperscale providers and the same cookie-cutter approaches to migration to achieve meaningful cloud benefits.

As enterprises make progress in modernization, they need to prioritize not only application migration and modernization, but they also need to focus on modernizing infrastructure, processes, people and architecture. Approaching modernization with a holistic perspective and targeted action will guard against the organizational challenges highlighted in this survey, including challenges around lack of skills and internal resistance to change.

No matter the cloud strategy, technology leaders must prioritize self-service and the ability for developers and operations teams to rapidly access secure, sanctioned infrastructure with minimal provisioning to streamline change management and eliminate deployment bottlenecks. Enterprises also need to plan to protect against the unintended consequences of workload degradation or even failure. Applications and workloads should be crafted to easily and readily shift to alternative execution venues when needed.

It is critical to support cloud-native applications, containers and microservices, but there is equal importance in leveraging existing VMs, infrastructure and applications. Continually assessing decisions from a business and skills perspective – not just technology – will help protect enterprises from overinvesting in the latest technology trend before teams are prepared to leverage it effectively.

Today's enterprises continue to struggle with complexity, talent and inertia challenges. The good news is there is an ever-growing ecosystem of innovative technology, methodologies and shared knowledge to power modernization. Furthermore, technology leaders' motivation and sense of urgency are now aligned on the primary benefits of cloud. To achieve their goals, they will need clear vision, deep application insight, and a holistic cloud strategy to chart the clearest way forward.