

## White Paper

# The Power of the Hybrid Cloud Strategy: Addressing the Breadth of Enterprise Workload Requirements

Sponsored by: Dell EMC, Intel

Chris Kanthan  
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Deepak Mohan

## EXECUTIVE SUMMARY

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Cloud computing has become an integral part of business strategy and IT architecture for enterprises over the past decade. The use of cloud has become pervasive as enterprises seek to adopt new business models, extract valuable insights from massive amounts of data, handle demanding workloads, deliver new products at scale and speed, and gain competitive advantage.

But cloud adoption has also introduced new challenges. This study of enterprise IT customers highlights the **top challenges with public cloud IaaS** are:

- **Security concerns**
- **Application performance**
- **Cost and billing**

Private cloud addresses many of the top challenges with public cloud, including security and application performance by offering environments consistent with traditional ones. At the same time, **private cloud customers' top challenges** include:

- **High operating costs**
- **Limited availability of higher-layer services**
- **Inability to scale quickly**

This complementary nature of capabilities and challenges is driving the growth of **hybrid** and **multicloud** usage where customers use a mix of public and private clouds to create a best-of-breed IT environment. The results of the study show that top benefits of hybrid cloud include:

- **Better security.** A majority of hybrid cloud customers observe improvements in security and risk reduction (average of 13%), addressing the top challenge with "all-in" public cloud usage.
- **Operating cost improvements.** A majority of enterprises benefit from lower annual operating expenses (average of 11%) as a result of hybrid cloud investments.
- **Speed and agility increase.** The median enterprise reported a 15% or more reduction in time to market as a result of hybrid cloud investments.

While hybrid cloud can eliminate trade-offs and offer the best-of-breed solution, the implementation and management of hybrid cloud can still be challenging. Different management tools for public and private cloud result in a fragmented IT environment that lacks interoperability and visibility, which is a

major challenge at scale. These gaps are addressed by the next generation of hybrid cloud platforms – **the consistent hybrid cloud**, which unifies public and private cloud capabilities under one management and operations umbrella. IDC believes that the consistent hybrid cloud will enable enterprises to meet the modernization and agility needs for business-critical workloads and innovation through emerging technologies.

## SITUATION OVERVIEW – CLOUD ADOPTION STATE OF THE UNION

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Cloud adoption – both public and private – has increased exponentially in the past five years. While public and private clouds are similar in the basic approach to infrastructure provisioning and agility, there are differences in the extent to which they address certain needs. These include the extent to which they allow scalability, access to new technologies, and compliance/control over the resources.

Public cloud offers numerous benefits such as cost savings through reduction in capital expenditure as well as access to next-generation technology. However, relying on only public cloud also has shortcomings, including concerns about security, compliance, and governance matters; applications not meeting service-level agreements (SLAs); steep price per performance; and increased operational costs in some situations (especially due to bandwidth consumption).

Private cloud can successfully address some of the areas where public cloud lags, especially in the areas of security, governance, and performance. According to a recent IDC survey, 86% of enterprises said they are considering "repatriation" – moving applications from public clouds back to the datacenter – for one or more workloads. This is further compounded by the early stage of cloud adoption today and the evolving regulations and customer preferences regarding data storage in the public cloud. One of the enterprises interviewed as part of this study called out the flexibility to move workloads and data as needed over time to meet customer preferences and regulations in specific geographies as a benefit of the hybrid architecture.

This duality of challenges and benefits has resulted in the hybrid cloud, which is becoming the de facto architecture for enterprise cloud adoption. To better understand the challenges with the "all-in" public and private cloud strategies and the benefits of hybrid cloud, IDC (sponsored by Dell EMC and Intel) carried out a study of enterprise IT organizations on the topic.

## METHODOLOGY

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The data for this hybrid cloud study came from a global survey of 1,000 executives from large enterprise IT organizations (5,000+ employees in the United States and 500+ employees in other regions) that have adopted cloud infrastructure for their applications. The organization may not be an entire corporate enterprise by itself but is often a business unit or division with its own IT boundary, within a large enterprise. The countries represented in this survey are Australia, China, France, Germany, India, Japan, New Zealand, the United Kingdom, and the United States. For comparison purposes, half of the organizations surveyed use either an all-in public cloud approach or an all-in private cloud approach. The other half use a hybrid cloud approach. The survey respondents were selected across the following industry verticals: healthcare, financial services, education, government, and software-as-a-service (SaaS) provider/independent software vendor.

## REASONS THAT ENTERPRISES ADOPT CLOUD AND CHALLENGES OF THE "ALL-IN" STRATEGY

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### Drivers of Public and Private Cloud Use

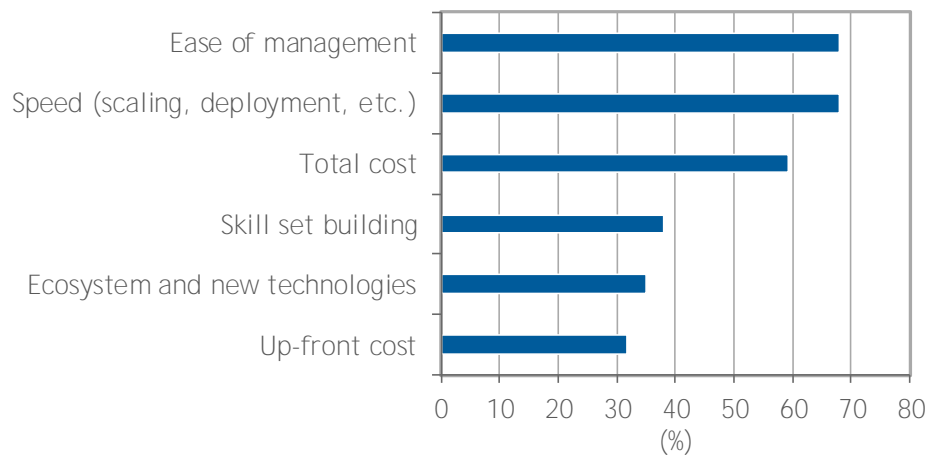
Public cloud offers organizations a simplified approach to acquiring and managing infrastructure. Furthermore, public cloud is increasingly seen as the source of access to new technologies – such as serverless computing, blockchain, artificial intelligence (AI), and quantum computing. The survey conducted as part of this study highlights that ease of management (68% of respondents), speed of scaling/deployment (68%), and reduction in total costs (59%) are the top factors driving enterprises toward public cloud (see Figure 1). Another key reason is the access to a broad ecosystem of new technologies and services (35%). One interesting observation here is that the lowest ranked driver was up-front cost (32%). Up-front costs are typically seen as one of the benefits of public cloud over dedicated infrastructure. This difference is likely a reflection of the more predictable IT investment needs and IT budget allocation processes at large enterprises compared with the broader public cloud customer base.

The priority of preferences – operational ease, agility, and lower costs – is reflective of typical preferences for explorative and growing workloads. These also include newer digital business initiatives or customer engagement pilot programs, which are a growing part of today's enterprise IT portfolio.

Private cloud platforms have evolved, and they now offer several of the management and agility benefits that public cloud offers. Organizations typically select a private cloud when they desire the agility benefits of the public cloud model but have tighter security and data compliance-related constraints for their workloads. The key areas where private cloud differs from public cloud are in the higher level of control over the infrastructure assets and services used in the organization, with the trade-off of more limitations on the magnitude of scalability and access to new emerging services. These aspects correlate strongly with the top drivers of private cloud use, which include more security and compliance (57%), the ability to ensure data is protected (50%), and higher flexibility to configure the platform and resources as needed (42%), compared with public cloud (see Figure 2).

FIGURE 1

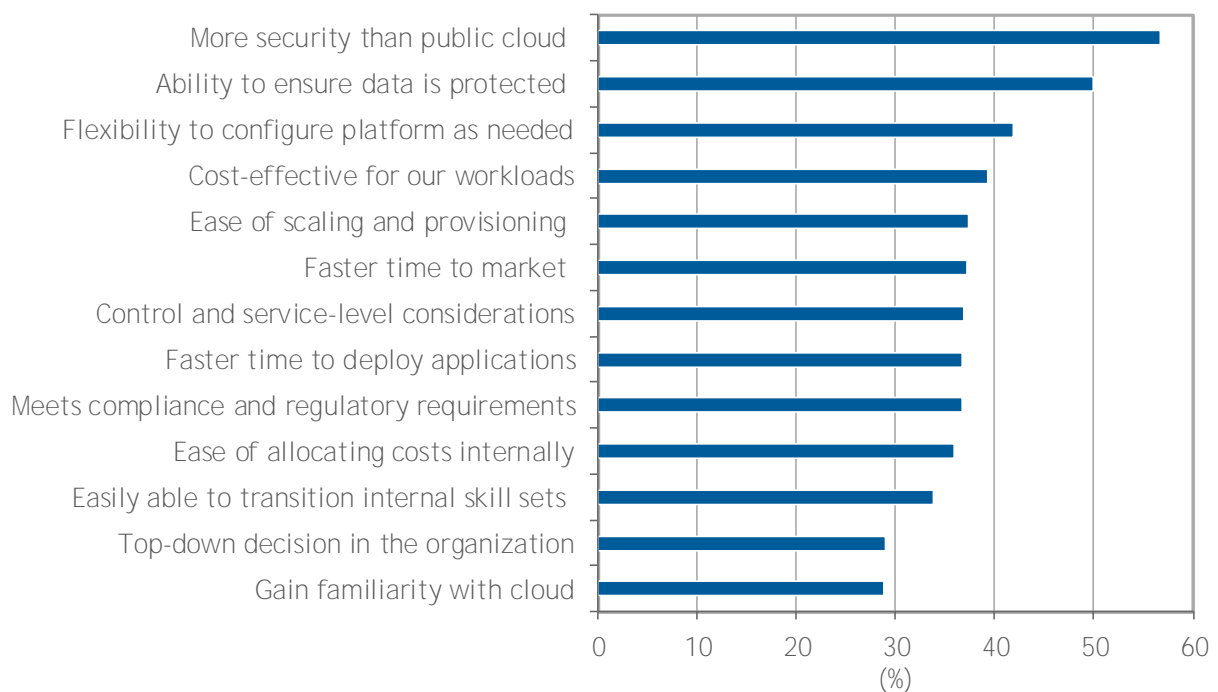
### Top Drivers of Public Cloud Use



Source: IDC's *Hybrid Cloud Survey*, sponsored by Dell EMC and Intel, March 2019

FIGURE 2

### Top Drivers of Private Cloud Use



Source: IDC's *Hybrid Cloud Survey*, sponsored by Dell EMC and Intel, March 2019

These requirements reflect typical priorities of business-critical workloads at large enterprises, including workloads used to host data such as protected health information (PHI) in healthcare, financial data, or other types of critical end-user information.

## Challenges Enterprises Face with Public and Private Clouds

While public and private cloud offer specific benefits, organizations that are exclusively using public or private cloud for their needs report several challenges with this model. (The organization may not be an entire corporation but is often a business unit or division with its own IT boundary.)

### *Public Cloud – Security, Performance, and Cost Challenges*

While public cloud offers many advantages, there are some inherent shortcomings and concerns. The top 3 concerns are security, performance, and cost:

- **Security:** Even though public clouds are arguably as secure as any datacenter, concerns about security are persistent nonetheless. In the IDC survey, 67% of respondents said that they were worried about the security of their data and applications in the public cloud. Why? When enterprises use public cloud, there may be justifiable concerns about privacy and security because sensitive data and applications are hosted outside the datacenter in third-party, shared infrastructure. While customers are always concerned about data breaches, distributed denial-of-service (DDoS) attacks, hackers, ransomware, and so forth, their concerns are elevated when moving to a public cloud where they don't have complete control of the environment. Specific concerns about public cloud's security include identity/access/credential management, insecure APIs, and vulnerability of hypervisors and other shared resources. At the same time, some of the biggest data breaches have occurred simply because an enterprise administrator misconfigured a cloud resource such as an S3 bucket or didn't change the default passwords.

Closely related to security is the issue of governance – corporate and legal. Some of the rules may simply prohibit the use of public cloud; other times, there are strict governances about the physical location of data. This requirement can be very restrictive because the data and its replicas in the public cloud are likely to be geographically dispersed and thus subjected to different laws. For example, Europe's GDPR has many stringent laws about the location of data, retention policies, and privacy, which make it challenging to use public cloud for certain applications.

Thus, enterprises often find themselves with two choices regarding mission-critical applications: Either don't host them on public cloud or spend considerable money on cloud security experts and niche software tools.

- **Application performance:** 61% of the respondents said that the application performance in public cloud did not meet their expectations. This shouldn't be surprising because it's a well-known fact that performance varies among public cloud providers, and network latency can become a serious issue in some scenarios. Not all public cloud providers have their own private, high-bandwidth, and low-latency WAN. Also, while cloud service providers (SPs) can guarantee some performance SLAs, it would cost more. For example, customers can get dedicated servers, SSD drives, and so forth, but they would incur extra charges. Thus, when customers express dissatisfaction about performance, they are sometimes referring to the cost-performance metric. Customers may also experience unexpected downtimes and outages, which could be due to the cloud SP or a customer's lack of specific expertise regarding the cloud SP's environment.
- **Cost and billing:** Just over half of all enterprise public cloud customers surveyed encountered higher costs than what they had anticipated. The specific areas where the expenses exceeded the budget are training, migration, and management. This also highlights the difference

between expectation and reality as well as the relative challenges in accurately calculating the cost of operations on public cloud. While public cloud services save on up-front capital expenses, there are many cloud-related tools and policies that IT staff must master to manage the cloud efficiently. While spinning up resources (e.g., virtual machines [VMs] and storage) in a cloud is very easy, it can also lead to VM sprawl and numerous unused VMs or zombie VM-related files. Customers must carefully plan storage tiering, which is essential at a time when the amount of data is exploding. All of these factors can easily result in public cloud usage costs exceeding the initially planned costs. Another cost that IT may not clearly plan for is the bandwidth cost incurred for transferring data in and out of cloud. Further, costs related to cloud security, refactoring applications, and cloud management may all turn out to be more than what was planned for in the beginning.

### *Private Cloud — Operational Costs, Limited Expertise, and Limited Flexibility*

The top challenges reported by private cloud customers today are operational costs, limited tooling and skill sets, lack of access to new technologies, data protection challenges, and scalability limitations. Private cloud can involve substantial up-front costs in the acquisition of hardware and software (especially for offerings with limited flexibility in financing), which is typically followed by operational costs related to maintenance, upgrades, management, and licensing fees as well as other costs related to running the datacenter. Also, when enterprises implement a private cloud, they must hire highly qualified IT staff, which will be expensive and may be hard to accomplish. For many leading-edge technologies such as artificial intelligence/machine learning (AI/ML) and Internet of Things (IoT), there's a shortage of skilled labor. In terms of scalability, most private clouds won't be able to match the major public cloud providers such as Amazon, Microsoft, or Google.

- **High ongoing costs:** 46% of private cloud users claim that operational costs are too high. This is understandable because customers need expensive hardware, software, and IT staff to monitor, manage, fix, and upgrade the private cloud. Enterprises with private cloud also incur substantial datacenter-related expenses such as rent, power, and cooling. Over the life span of IT resources, enterprises usually spend \$5 on management for every \$1 of acquisition.
- **Limited expertise with private cloud stack:** 37% of enterprise customers faced challenges because of limited availability of skill sets and lack of consistency across heterogeneous environments. Building a private cloud and the operational tooling around it can be enormously challenging because the IT staff must integrate the entire stack that involves numerous hardware, software, protocols, and APIs, often from a multitude of vendors. Furthermore, the IT administrators must constantly upgrade these resources while trying to maintain interoperability, availability, performance SLAs, and security. This specific challenge has been somewhat mitigated in recent years with the advent of modern and ready-to-use private cloud platforms such as the Dell EMC VxRail hyperconverged platform (powered by Intel). These newer offerings come pre-installed with the cloud operating stack and tooling support for management and operations. But capacity planning, orchestration, and scaling of IT resources (servers, VMs, containers, networking, and storage) are still formidable tasks for which enterprise customers need a lot of time, money, and expertise.
- **Ability to protect data:** 36% of customers said that data protection was difficult in a private cloud. This refers to scheduling and maintenance of snapshots, clones, backups, archives, and disaster recovery-related replications. Some examples of what IT administrators have to ponder while managing data protection of private clouds are as follows: *What should be backed up/archived/replicated and how often; what are the retention policies; how should the data be tiered; where should the replicas be located; how could deduplication, compression, and encryption be used?* The tools and skill sets required for these vital operations are

expensive and complex. Purchasing all the hardware and software for data protection, integrating that hardware and software with the enterprise applications, instituting appropriate policies and automation, and managing the entire environment can be cumbersome, time consuming, and expensive.

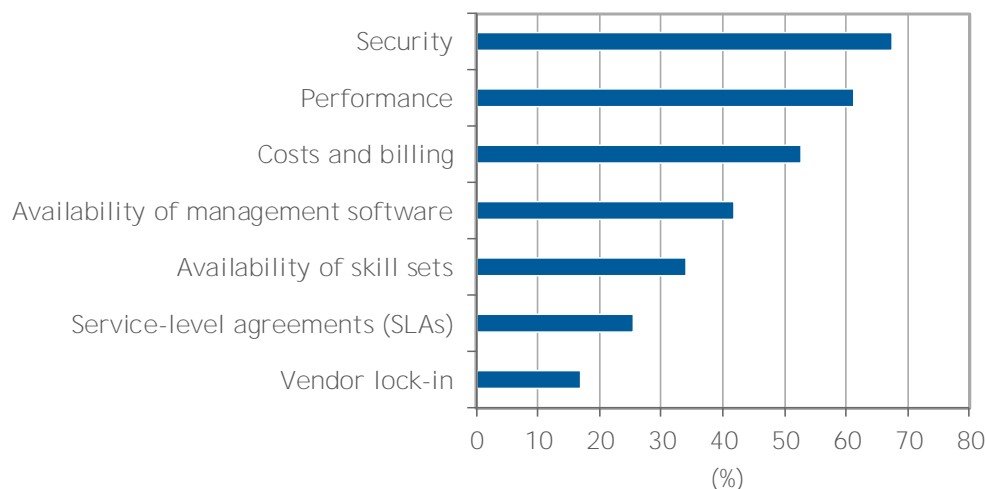
- **Limited flexibility to select resources and lack of access to value-added services:** A public cloud provider such as Amazon might have hundreds of programmers, developers, and system administrators to work on a complex technical issue. Public cloud providers can also leverage their economies of scale to create products to solve a specific problem and then commercialize those products. However, a typical datacenter in a large enterprise won't have such depth and breadth of expertise. Not surprisingly, one-third of the private cloud users in the survey say that they are limited in resources, expertise, and value-added services.
- **Lack of ability to scale rapidly:** Private clouds are obviously less scalable than public clouds. First, enterprise customers don't have the luxury of buying vast amounts of servers, storage, and other hardware just to be prepared for an unexpected demand in the future; it must be noted that there are newer, consumption-based private cloud models that address some of these limitations. But the IT team's acquisitions will be constrained by capacity planning as well as corporate budget.

Second, there might also be inherent system limitations on scalability – whether the number of VMs and containers in a physical server, capacity and performance of a storage array, network bandwidth, or limitations of software. These are some of the reasons why 30% of the customers in the survey said that private clouds are unable to scale rapidly to meet workload requirements. As mentioned previously, the advances in private cloud offerings in recent years – particularly with flexible financing options – go a long way in addressing this challenge.

See Figures 3 and 4 for survey data around these challenges.

FIGURE 3

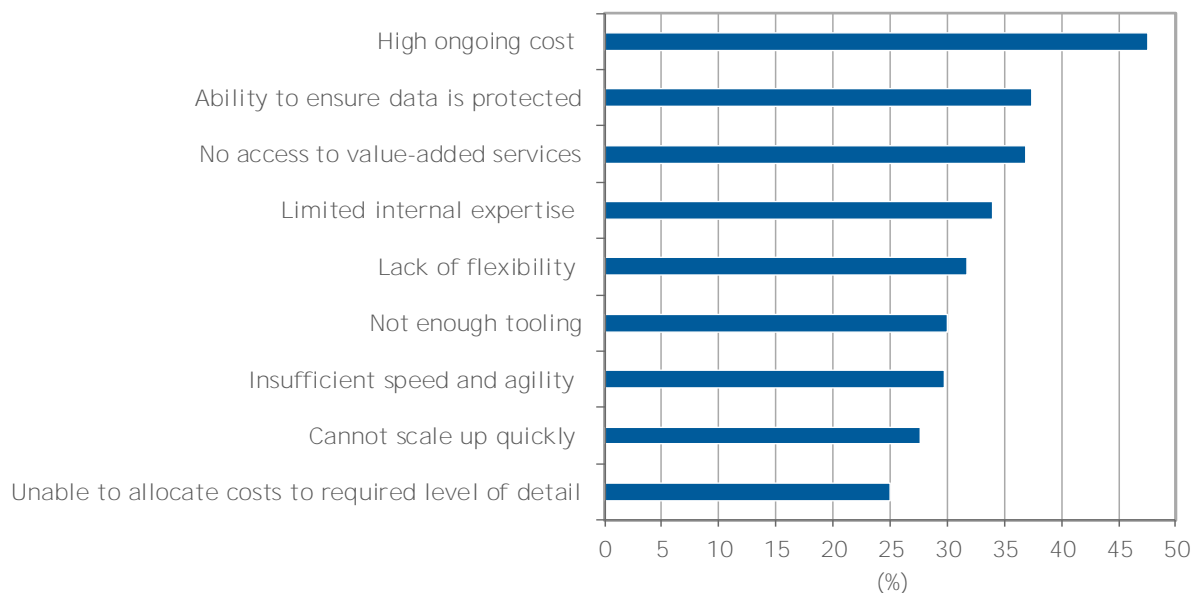
#### Top Challenges with Public Cloud



Source: IDC's *Hybrid Cloud Survey*, sponsored by Dell EMC and Intel, March 2019

FIGURE 4

## Top Challenges with Private Cloud



Source: IDC's *Hybrid Cloud Survey*, sponsored by Dell EMC and Intel, March 2019

## Analysis of Drivers and Challenges — Requirements Change as Usage Grows

An analysis of the drivers and challenges for each platform reveals an interesting pattern. In both cases, the initial drivers are well-suited for a certain category of workloads. These are often determined by the lead workloads driving the initial adoption of public or private cloud. But the challenges reflect the new requirements that are introduced when expanding the platform to a broader set of applications. This divergence of enterprise workload requirements is behind the growing adoption of hybrid cloud approaches.

Certain workloads in the enterprise portfolio must prioritize compliance, security, and predictability. These may consist of existing customer operations applications, financial information systems, or applications that need to be co-located with physical enterprise assets. Other workloads in the portfolio need to have more flexibility in taking advantage of emerging technologies and solutions quickly and at a lower cost – for example, analytics and AI/ML platforms, blockchain, and IoT solutions. The optimal solution for enterprises would include a coordinated approach that would use both public and private cloud resources, offering the best of both worlds. Hybrid cloud brings together these complementary capabilities, allowing organizations to run each workload in its optimal environment.

## HYBRID CLOUD BENEFITS — ADDRESSING ALL-IN CHALLENGES AND PRODUCTIVITY

Both public and private cloud platforms provide enterprises with the core attributes of cloud, which are efficiency and agility in the consumption of resources for workloads. At the same time, the unique benefits of public and private cloud platforms complement each other – especially in the top areas of concern reported by customers. Specific areas where this complementary nature can be seen are in meeting security needs and providing access to a broad ecosystem, where a mix of public and private



cloud platforms allows organizations to use the appropriate platform to meet compliance and security needs without compromising agility for other workloads or limiting access to emerging services for new initiatives or pilot projects. Another area is in balancing scalability needs and budgets by allowing a baseline of predictable and high data transfer operations to be executed on-premises while using public cloud for rapid scaling and application expansion needs.

Included also in this study of public, private, and hybrid cloud customers is a comparison of business and operational metric improvements between hybrid cloud customers and all-in public and private cloud customers. Analysis of the results reveals that hybrid cloud customers:

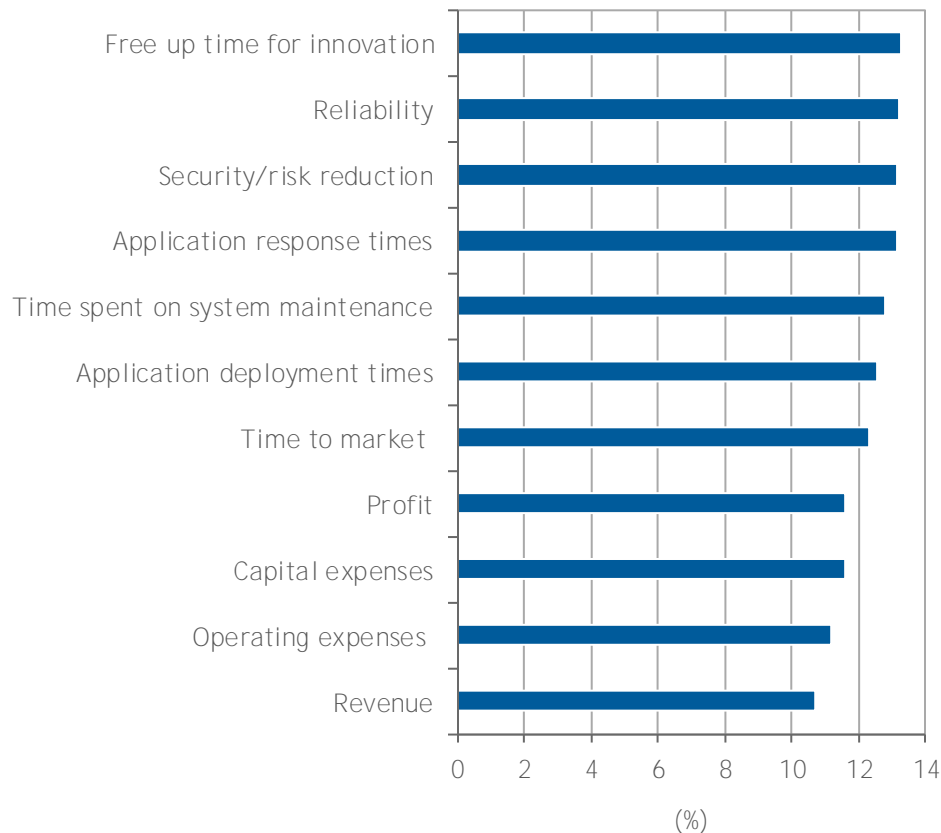
- Are able to **address a majority of top cloud challenges** reported with all-in approaches, and customers observe an increase in performance along each of these factors
- Report similar or better improvements along **business and operational metrics**, compared with all-in customers
- Observe **benefits along more factors (cost, speed, revenue, risk, etc.) as a result of hybrid cloud investments**, compared with all-in customers

### Complementary Strengths of Hybrid Cloud Address Top All-In Challenges

Figure 5 illustrates the improvements in key operational and business metrics – including operational efficiency, security, and cost – reported by hybrid cloud customers. The sections that follow highlight how hybrid cloud customers observe improvements along the specific challenges reported by exclusive public cloud and private cloud customers.

FIGURE 5

## Operational and Business Metric Improvements of Hybrid Cloud



Source: IDC's *Hybrid Cloud Survey*, sponsored by Dell EMC and Intel, March 2019

### *Better Security, Risk Reduction, and Confidence*

Security continues to be the top concern among organizations using public cloud, reported by over two-thirds (67%) of enterprises surveyed in this study. Hybrid cloud platforms successfully address these concerns by giving organizations the flexibility to deploy workloads in the appropriate platform based on compliance requirements. Security and compliance concerns are further complicated in today's IT environment, with rapid changes in factors such as end-user trust and regulatory requirements. One of the hybrid cloud customers interviewed as part of this study, a large SaaS provider that has been gradually increasing its use of public cloud, stated that the ability to move workloads and data to the right premises – to meet evolving governance requirements and client confidence needs – was a top reason to maintain an active hybrid cloud configuration.

These anecdotal data points are also supported by survey results, where the majority of respondents reported an increase in security and reliability metrics as a result of hybrid cloud investments. The average enterprise reported a 13% reduction in risk. Of the enterprises that were running security-sensitive workloads, hybrid cloud customers saw an incremental improvement of approximately 5% compared with all-in public cloud customers. Similar results were also observed with regard to the confidence level in meeting security needs, where over 95% of the respondents said that

they were either "very confident" or "somewhat confident" in their ability to protect enterprise information assets.

### *Operational Cost Improvements*

High cost of operations was reported as a challenge among both public cloud (54%) and private cloud (46%) customers. This was, in fact, the top concern reported by all-in private cloud customers. A leading educational institution that IDC interviewed highlighted that its top driver to move to a hybrid cloud approach was to reduce its ongoing cost of operations. Their research labs required large compute resources on a periodic basis, and it was not cost effective to continuously host this buffer fleet in the leased datacenter space. Since moving to a hybrid cloud architecture, the institution has observed more than a 12% drop in annual IT infrastructure expenditures, amounting to approximately \$2.5 million in annual savings. The empirical survey results show that these savings are consistent with those of the broader hybrid cloud customer base, which reported an average 5% drop in annual infrastructure operating expenses.

Another company that IDC interviewed as part of this study is a major North American-based financial services company, which invested in a hybrid cloud platform to address its periodic increases in infrastructure requirements for computation-intensive simulations and test case executions. This resulted in a cumulative annualized savings of 20% in infrastructure costs and scaling duration reductions on average of 40% – which reduced the effort, time, and cost of running these simulations.

Hybrid cloud investments also resulted in better asset utilization and optimization for customers, as demonstrated by the example of a healthcare SP interviewed in this study. The hybrid cloud investments enabled the company to shut down two of its datacenters, resulting in substantial operational cost and asset reductions. The hybrid cloud also provides the company flexibility to move workloads and data between public and private cloud locations as needed to address potential changes in regulation and policies.

On the cost of operations side, common challenges still remain on both public and private cloud such as the high cost of skilled staff and training. These challenges are discussed in detail in the document, as we introduce the *consistent hybrid cloud solution*.

### *Increased Agility and Speed*

Among all-in private cloud customers, other top challenges are the limited flexibility and access to a broad range of services as well as limitations in speed and magnitude of scaling. In the context of the challenges and the changing requirements, this is often the case when the initial adoption is driven by predictable and stable workloads, and the usage expands to include more exploratory pilots and digital business initiatives. Services that would accelerate such projects, such as ready-to-use data analytics services, serverless compute, or AI/ML, are not as easily available in private cloud. In addition, private cloud scaling limitations also restrict the extent to which resources can be rapidly provisioned for tests and iterations. On the other hand, release of security-sensitive services may be slowed down when using a new deployment model. Dedicated infrastructure may offer faster testing and qualification time for such applications, relying on existing familiarity with the platform and its security boundaries. Hybrid cloud platforms offer a way for enterprises to enable this type of rapid scaling as needed without a significant impact on infrastructure budgets and utilization ratios.

The survey results in this study show that respondents observed an average application deployment time reduction of 12.5% as a result of their hybrid cloud investments. Similar improvements were also

seen in time to market, with enterprises realizing an average reduction of 12.3% in time to market for new applications as a result of their hybrid cloud investments.

An example that illustrates this benefit of rapid scalability is a major healthcare services company in the United States, which uses "bursting to public cloud" for rapid provisioning of a customer environment when needed (in scenarios where public cloud is acceptable to the customer) and uses the more gradual expansion of its private cloud fleet to address long-term trending growth needs. After the initial deployment and scaling, the customer environment is transitioned to the company's private cloud fleet to take advantage of the lower cost of infrastructure on the company's self-operated fleet. This enables the enterprise to maximize client business capture without overinvesting in unmonetized infrastructure assets.

This theme of operational cost savings was also reported by a SaaS provider interviewed by IDC as part of this study. The SaaS provider's move to hybrid cloud was initially triggered by the ability to better meet regulatory and compliance requirements based on local regulations while allowing a mechanism for rapid global scaling as needed. The investment in hybrid cloud resulted in an average improvement of 15% in operational speed and time to market. Similar results were reported by a healthcare platform provider that observed a 20% reduction in new customer environment deployment time and readiness for business, as a result of its hybrid cloud investment.

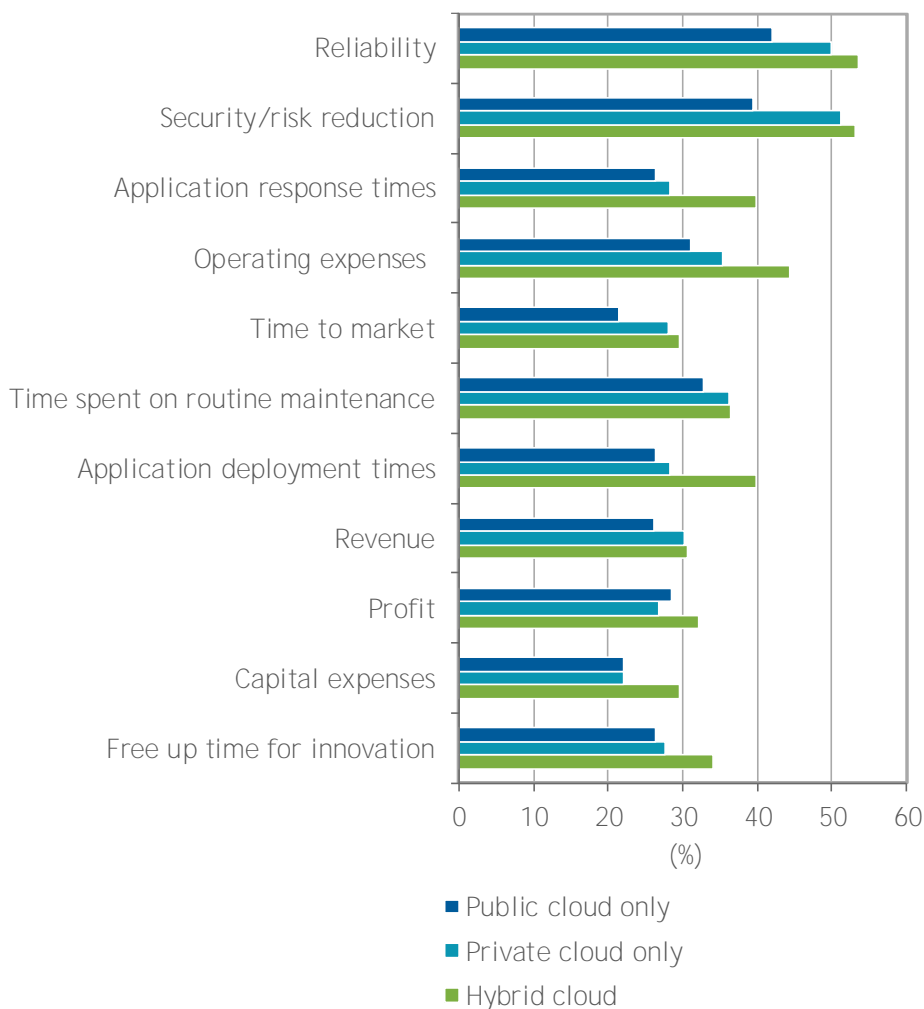
## Hybrid Cloud Facilitates Broader Cloud Benefits Among Enterprises

In addition to addressing top challenges associated with all-in public or private cloud, hybrid cloud approaches also enable access to broader benefits from cloud adoption and productivity.

One of the survey questions asked about the ways in which enterprises' cloud strategies – public, private, or hybrid – helped along various performance metrics, including business metrics such as revenue and profit as well as internal operational metrics such as productivity and operational costs. As Figure 6 shows, a larger percentage of hybrid cloud customers reported benefits along every single factor compared with all-in public and private cloud customers.

FIGURE 6

### Percentage of Customers Benefiting from Each Factor



Source: IDC's *Hybrid Cloud Survey*, sponsored by Dell EMC and Intel, March 2019

## Hybrid Cloud — Today

Every enterprise is at a different point in its cloud journey and thus faces different challenges. Customers on the more mature end of the landscape have sophisticated tools and the right staff to implement a hybrid cloud. Some are still in the planning stage, and others are trying to scale back some of their projects in order to get a better handle on the environment.

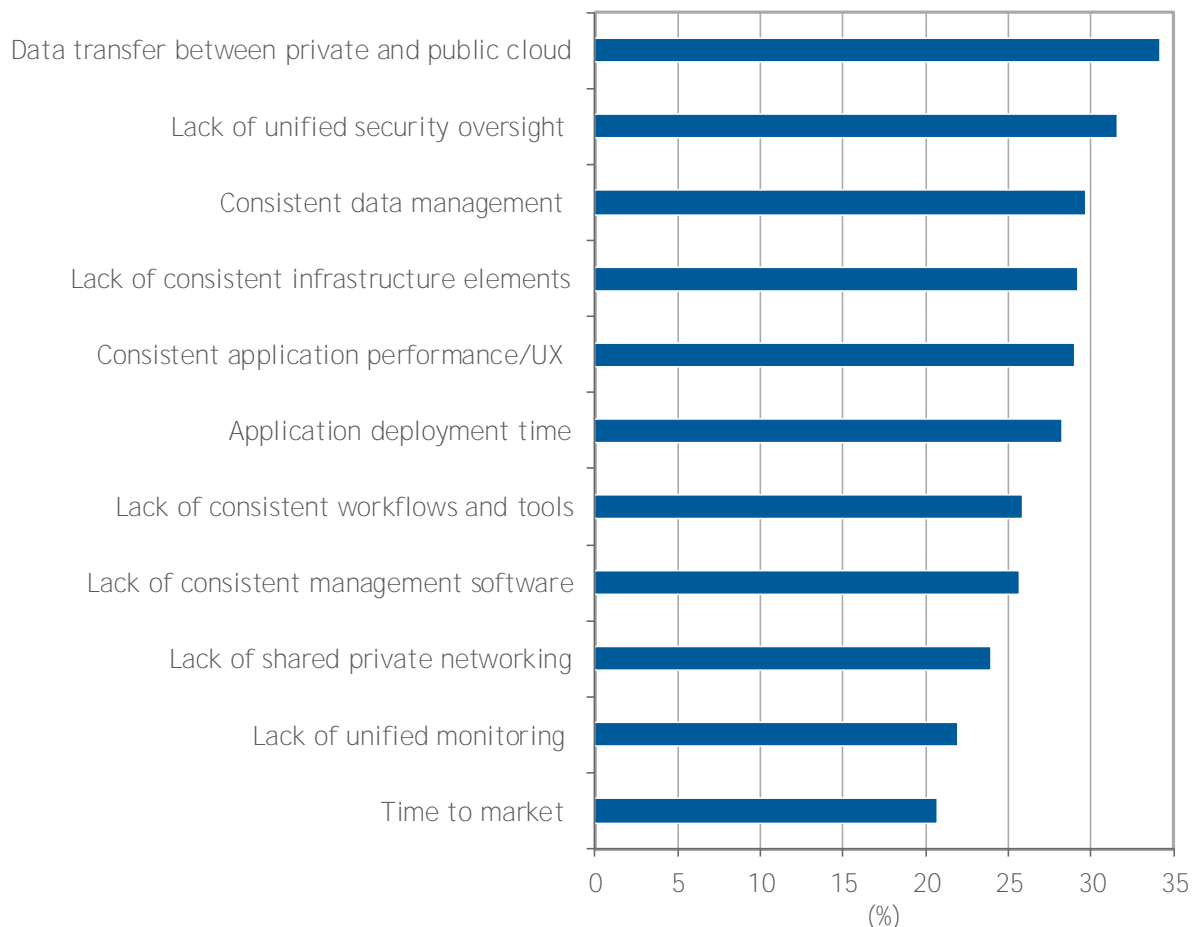
A majority of the customers surveyed by IDC are already using hybrid cloud through either off-the-shelf or customer-built integration solutions to unify the management and workflows across platforms. The prevalence of customer-built solutions highlights the limited availability of vendors that can provide the right strategy and solutions for hybrid cloud. This limitation in commercially available solutions for private cloud is also an underlying causal factor for other top challenges reported with private cloud operations, such as high ongoing costs, limited tooling, and limited skill sets for operations.

## Hybrid Cloud Improvement Opportunity – Consistency, Tools, and Integration

As Figure 7 shows, the top challenges that customers face with hybrid cloud are data migration between clouds, lack of unified security oversight across all platforms, absence of a consistent management fabric across all platforms, and the inability to quickly deploy applications. Lack of consistent infrastructure, lack of unified monitoring tools, and lack of shared private networking across various clouds were also pointed out as problems that enterprises are struggling with.

FIGURE 7

### Challenges with Hybrid Cloud Today



Source: IDC's *Hybrid Cloud Survey*, sponsored by Dell EMC and Intel, March 2019

In addition, there continues to be blocked demand for hybrid cloud adoption. When enterprise customers were asked why they haven't adopted hybrid cloud, they cited lack of necessary skills and solutions or the cost-benefit analysis that didn't justify the implementation. To put it another way, the reasons for not adopting hybrid cloud boiled down to "it's too costly" or "it's too difficult" to put this together in-house. This is also consistent with the nature of integration seen among the respondents,

where a majority of the hybrid cloud customers indicated having some level of integration across control and management, but over half reported building this integration in-house or through a professional services partner.

## The Consistent Hybrid Cloud Solution

Having discussed in detail the benefits and challenges of private, public, and hybrid clouds, we determined that the ideal IT architecture would be centered around a "consistent" hybrid cloud that enables seamless monitoring, management, orchestration, and policy-based automation through a unified software. In such a consistent hybrid cloud, customers would enjoy total visibility of their entire infrastructure with the flexibility to deploy workloads in an optimal manner. Such consistency helps integrate the public and private cloud environments, enabling a single application deployment pipeline and unified life-cycle management. Cumulatively, these features of a consistent hybrid cloud deliver to customers lower total cost of ownership (TCO), higher operational efficiency, and faster application deployment cycles without incremental training or fragmentation of the IT infrastructure assets and operations.

## Dell Technologies Cloud — A Consistent Hybrid Cloud Solution

Dell Technologies Cloud combines the power of VMware software and Dell EMC infrastructure, designed to make hybrid cloud environments easier to operate. The Dell Technologies Cloud portfolio consists of the new Dell Technologies Cloud Platforms and a new Data Center-as-a-Service offering, VMware Cloud on Dell EMC. These enable a flexible range of IT and management options with tight integration and a single-vendor experience for purchasing, deployment, services, and financing. Dell Technologies Cloud gives customers more control with the operational hub of their hybrid clouds on-premises and a consistent cloud infrastructure across all cloud types, both on- and off-premises, with a broad set of 4,200+ cloud providers and hyperscalers.

This consistent hybrid cloud approach is delivered through a unique integration of hardware, software, services, and flexible consumption options from Dell EMC and VMware. Dell Technologies Cloud employs familiar VMware tools to provision, govern, automate, and orchestrate applications across multiple cloud deployment options. This gives organizations workload placement flexibility through a single operational hub across public, private, and edge clouds, backed by a broad global network of cloud SPs. It is consumable in two ways: Dell Technologies Cloud Platform and as a fully managed Data Center-as-a-Service.

Dell Technologies Cloud Platform with VMware Cloud Foundation is now available shipping natively on Dell EMC VxRail hyperconverged infrastructure (HCI). This is the industry's first jointly engineered, hybrid cloud infrastructure solution tightly integrated with VMware's flexible, full-stack HCI architecture for the simplest and quickest path to deploy hybrid cloud. Ongoing operations are simplified, and operational agility is provided with automated life-cycle management across the stack of hardware and software.

Data Center as-a-Service with VMware Cloud on Dell EMC combines core technology from both vendors and was previewed as Project Dimension at VMworld 2018 US. This Dell Technologies Cloud offering enables organizations to consume infrastructure in datacenter and edge environments on demand, like a public cloud service. VMware Cloud on Dell EMC also enables a bidirectional connection to public clouds for application and data portability via a hybrid cloud control plane. This allows IT organizations to eliminate the need for basic tasks, such as infrastructure management and maintenance, while lowering up-front costs with subscription-based pricing.

Both of these solutions offer flexible cloud consumption. Organizations can align how they pay for IT with how they do business through a range of options to buy, rent, or consume IT as a service and elastic capacity with metered use. With Dell Technologies Cloud Platforms, customers benefit from consistent infrastructure and operations. Consistent operations are provided across private and public cloud locations through a common management and orchestration software layer, powered by VMware Cloud Foundation. Consistent infrastructure means the same VM or container is compatible across various clouds, saving time and cost by eliminating unnecessary application replatforming.

## IDC GUIDANCE

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Enterprises are increasingly facing a do-or-die landscape where new business models are rapidly replacing existing business models. To thrive in this climate, executives must wholeheartedly embrace digital business initiatives and next-generation technologies to maintain a competitive edge and rapidly deliver innovative products at scale. Cutting-edge technologies such as artificial intelligence/machine learning/deep learning, augmented reality/virtual reality, blockchain, Internet of Things, microservices, and containers are not optional anymore. To employ these indispensable tools, enterprises must adopt and invest in a cloud-first and cloud-native architecture – specifically, a consistent hybrid cloud. IDC recommends that executives seek trusted partners and vendors with a proven track record in implementing hybrid clouds.



## About IDC

International Data Corporation (IDC) is the premier global provider of market intelligence, advisory services, and events for the information technology, telecommunications and consumer technology markets. IDC helps IT professionals, business executives, and the investment community make fact-based decisions on technology purchases and business strategy. More than 1,100 IDC analysts provide global, regional, and local expertise on technology and industry opportunities and trends in over 110 countries worldwide. For 50 years, IDC has provided strategic insights to help our clients achieve their key business objectives. IDC is a subsidiary of IDG, the world's leading technology media, research, and events company.

## Global Headquarters

5 Speen Street  
Framingham, MA 01701  
USA  
508.872.8200  
Twitter: @IDC  
idc-community.com  
www.idc.com

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