Efficiently Automate and Orchestrate Your Hybrid/Multicloud Deployments with Next-Generation Infrastructure

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Enterprises worldwide are contending with an accelerated pace of digitization where reliable and flexible information technology infrastructure means the difference between winning and losing customers. The groundbreaking agility, flexibility, and power of cloud computing have businesses exploring ways to adopt cloud functionality and economics. Security, compliance, and performance/latency requirements limit the breadth of workload deployment on public clouds. Hybrid and multicloud deployments are the new norm. This paper examines the current state of infrastructure needs/challenges and looks at how IBM Spectrum Access for IBM Cloud Private enables application and operational transformation and cloud agility, accelerating customers' digital transformation (DX).

Introduction

Digital disruption is real. What IDC calls 3rd Platform computing is the underpinning of DX worldwide. The average life span of a company on the S&P 500 index is 18 years in the 3rd Platform era versus 25 years during the 2nd Platform era. To survive, companies need to embrace and accelerate DX.

In the DX era, the world of IT and the datacenter remains in the midst of a massive structural shift built on a foundation of mobile, social, big data, and cloud services. IDC's 2016 *CloudView Survey,* covering over 6,000 IT organizations around the world, revealed that 62.7% of the respondents are either already using or planning to use public cloud infrastructure as a service (IaaS) for their infrastructure needs. For organizations undertaking DX at the business level, cloud isn't just about picking a service delivery model such as public or private cloud. Organizations must complete the shift to a predominantly cloud-based IT environment in the next few years. One of the most important elements in this shift will be to extend the value of mission-critical applications through cloud enablement products and services. Businesses are looking to transform their IT services to a cloud services model to enable rapid time to market for their applications, support continuous product innovation, have simple infrastructure management, and pay for only what they use — all without losing control of their data.

One of the biggest challenges facing organizations is deciding where to deploy their applications/workloads while balancing cost, compliance, agility, flexibility, and simplicity. Most of the workloads in enterprise datacenters (e.g., Microsoft Exchange, VDI, databases, and Active Directory) are predictable, run frequently, and have resource needs that are well understood and can be planned for. A majority of businesses are exploring or using hybrid/multicloud approaches that use a combination of on-premises (traditional IT/private cloud) and public clouds to store their data and run their services.

IDC believes that the future of IT is hybrid/multicloud. Traditional storage and data management approaches are challenged to meet the agility and efficiency needs of workload deployments in a hybrid/multicloud setup. Software-defined storage (SDS) and modern data management offerings bridge the current and future business objectives in virtual, containerized hybrid/multicloud deployments.

Benefits

In a cloud compute environment, there is often increased complexity due to the volume of objects and components that make up the solution. Managing thousands of individual servers, devices, microservices, and containers can be challenging. Inefficient storage allocation along with a lack of overall performance poses a real threat to the scalability of the cloud environment.

Modern data management infrastructure for hybrid cloud that leverages enterprise-grade storage functionality and incorporates data life-cycle management can help organizations streamline operations and achieve superior cost savings.

As enterprise apps shift toward hyperagile architectures, with applications using microservices and cloud functions, a hybrid cloud solution that enables usage of data throughout the value chain while maintaining internal data privacy policies can help businesses achieve superior business outcomes.

Trends

IT organizations find that their line-of-business clients are increasingly impatient and dissatisfied with the services they deliver and frequently bypass IT to directly consume services from cloud providers to meet objectives. Leading IT executives are realizing that they need to fundamentally redesign their application, infrastructure, and operating models to remain secure and competitive in the marketplace of IT services.

According to IDC's Worldwide Quarterly Cloud Infrastructure Tracker, April 2017, the portion of total spending on IT infrastructure hardware used to support private and public cloud deployments will increase from 37% in 2016 to 54% in 2021 and will account for all the overall growth in IT infrastructure spend during that period (see Figure 1).

FIGURE 1

IT Infrastructure Redistribution: Public and Private Cloud
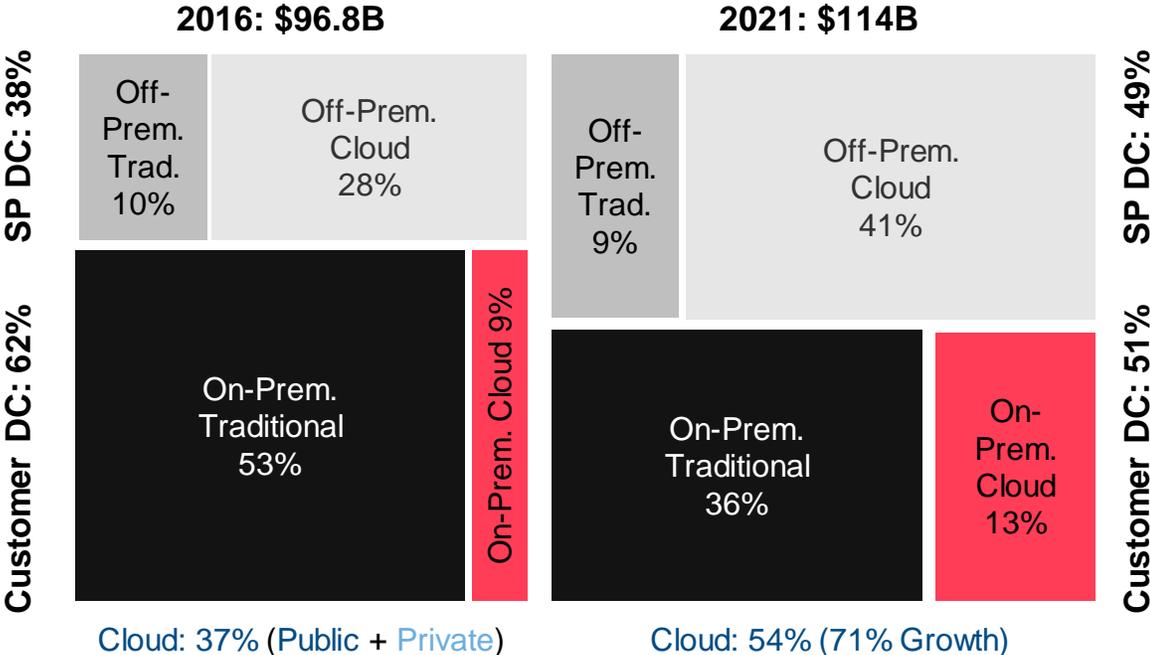
Source: IDC's Worldwide Quarterly Cloud Infrastructure Tracker, April 2017

Public clouds are shared among unrelated enterprises and/or consumers and are designed for a market, not a single enterprise. They enable enterprises to get new value from third-party apps/data (e.g., weather insights, social media sentiment, machine learning algorithms, or blockchain apps).

Private cloud leverages existing investments by extending the scale, performance, and security of internal data and systems to provide IT as a service (ITaaS) to stakeholders.

Optimizing the benefits of all these cloud environments requires a hybrid cloud strategy.

Legacy applications are expensive to maintain and are not flexible enough to adapt to new development techniques. Cloud-native development and applications are part of the new development framework. However, some industries cannot move their data to a public cloud, so the ability to develop cloud apps on-premises drives clients to look for private cloud options.

Containers are being used to support both cloud-native, microservices-based applications and traditional applications (i.e., so-called "lift and shift" applications such as classic three-tier web applications and Java applications).

Most deployments include traditional applications that are often simply dropped "as is" into containers and not refactored into smaller services. This occurs because it often takes customers a long time to refactor applications or change development methodologies, with certain parts of the enterprise portfolio remaining static for decades. For the most part, IT decision makers see the benefit of using containers for traditional workloads as coming from the improved use of infrastructure and more scalable and resilient operations.

The combination of containers and microservices yields the biggest benefits. Many organizations run the development/testing of their microservices in the public cloud and then deploy it to the private cloud. Container-based microservices are faster to build, test, and deploy, with improved agility and application resilience being the main business benefits. Today, organizations using containers to support microservices-based DevOps use them to help speed up the frequency of software releases. Most DevOps teams are using containers with a continuous integration/continuous development (CI/CD) system, but even DevOps teams that don't have automated testing see significant gains. Some organizations feel that containers make it much easier to collaborate on development across different geographies and public clouds.

IDC predicts that by 2021, enterprise apps will shift toward hyperagile architectures, with 90% of applications on cloud platforms (PaaS) using microservices and cloud functions and over 95% of new microservices deployed in containers.

Data — whether structured or unstructured, generated by humans or by machines, or stored in the datacenter or the cloud — is the new basis of competitive advantage. Leveraging the vast quantities and diversity of data to uncover patterns and pursue breakthrough ideas, an enterprise can win in the increasingly competitive business landscape. The proliferation of application deployment models, including newer, cloud-native software as a service (SaaS), Internet of Things (IoT), mobile, and hybrid/multicloud, plus traditional on-premises applications, has resulted in organizational data being widely and unpredictably spread across multiple repositories. End-user organizations need to develop a coherent hybrid/multicloud data strategy of complementary, integrated, and cloud-enabled products/solutions that optimizes the value of organizational data.

IDC believes that to support business agility needs as well as to manage the skills gap, more and more enterprise infrastructure will employ artificial intelligence/machine learning–based algorithms.

The worldwide data services for hybrid cloud market is expected to grow at a CAGR of 20.53% from 2016 to 2021. Three significant shifts happening in the data services for hybrid cloud market are reflected in this forecast: first, rapid growth of data location optimization services that employ

cognitive/machine learning; second, growth of integration and orchestration software with the ongoing shift to hybrid/multicloud; and third, growth in security and compliance data services with a heightened emphasis on regulatory compliance.

Considering IBM

IBM's strategy is to provide a seamless experience across all three cloud environments — private, public, and dedicated — regardless of which combination of cloud adoption an organization chooses. IBM Cloud Private is a software platform for enterprises to create, run, manage, and transform applications on-premises while getting the agility, flexibility, and pay-as-you-go benefits of public cloud along with the additional security and compliance that enterprises need. IBM Spectrum Access is a converged infrastructure blueprint for IBM Cloud Private (see Figure 2). Together, these offerings enable application and operational transformation and cloud agility.

IBM Spectrum Access consists of:

- **IBM Spectrum Connect.** This centralized cloud integration software consolidates storage provisioning and abstracts the storage configuration process from applications. Users can provision storage based on classes of storage, predefined to comply with business service-level agreements (SLAs). IBM Spectrum Connect also includes a universal plug-in to all IBM Spectrum Accelerate– and IBM Spectrum Virtualize–based storage systems enabling capacities to be provisioned and used directly by containerized applications without manual intervention, providing dynamic persistent volumes and dynamic persistent volume claims.

- **VersaStack.** Recommended for compute, network, and storage infrastructure, this offering leverages the IBM Storwize family and IBM Spectrum Virtualize as the storage back end for stateful containers.

FIGURE 2

IBM Spectrum Access for IBM Cloud Private Architecture Overview
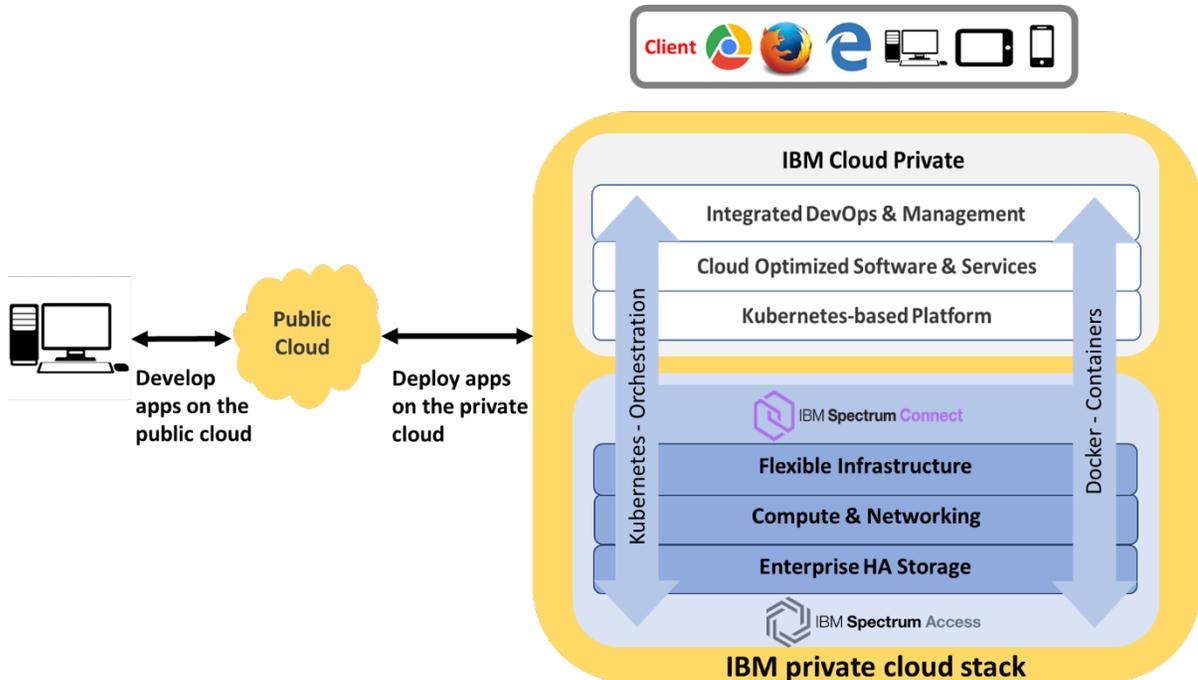
Source: IBM, 2018

IBM Spectrum Access delivers a pretested, validated, and easy-to-use converged solution that pools compute, network, and storage resources to more easily and quickly deploy IBM Cloud Private. The solution can be deployed in hours rather than days or weeks and helps reduce risk and guesswork by providing architect and administrator implementation guidebooks, enabling IT staff to more easily deliver the economics of cloud in an on-premises environment.

The solution utilizes the IBM Storwize family, a virtualized, flash memory–optimized, enterprise-class storage system that provides efficient storage infrastructure. The system includes technologies that enhance virtual and cloud environments, with built-in functions such as data virtualization and real-time compression. IBM Spectrum Virtualize is embedded within the Storwize family and extends data services to heterogeneous storage systems including data copy services, as well as virtual machine (VM) granularity data protection for dev/test use, security, and high availability. These features can help IT staff improve efficiency and capacity utilization while reducing complexity and costs. IBM and external third-party storage can also be virtualized into pools of capacity, further improving overall efficiencies and capacity utilization. As a result, the IT organization can tap into new and previously unused disk storage capacity to drive even better cost efficiencies.

IBM Spectrum Access incorporates container integration and provides highly available persistent block storage for stateful applications. It can scale and simplify the containerized environment, with the ability to scale to more containers faster, with automated provisioning of supporting volumes, than native container scripting. The solution can also enable an IBM Cloud Private administrator to self-provision external storage without being a storage expert. This feature allows storage administrators and architects to delegate storage provisioning safely via predefined storage classes. It also enables storage container operations consistency within the IBM Storage family as well as multivendor storage when virtualized. IBM Cloud Private integrates a variety of microservices and middleware capabilities that combine with IBM Spectrum Access to form a robust and responsive infrastructure. These capabilities can help improve the overall integration and continued deployment of applications while minimizing risks associated with performance bottlenecks and unpredictable scalability. Developers and end users expect continuous operation and easy access to resources, so IT can't take a long time to add new servers and capacities or repurpose idle ones.

IBM Spectrum Access abstracts the complexity of individual devices, hypervisors, and virtual machines into a simplified model that can be easier to manipulate and incorporate into automated processes. IT staff can centrally manage storage volumes from a single point, dynamically provision volume with service levels aligned with the IBM Cloud Private catalog, migrate data from existing arrays with virtually no disruption to applications, and avoid downtime for backup, maintenance, and upgrade operations. Users simply request the resources they need through an easy-to-use, security-rich self-service portal, and the system provisions the underlying infrastructure resources.

Additionally, IBM Spectrum Access helps monitor and manage applications and provide resource consumption reports. With at-a-glance status panels, resource utilization tracking, and predefined reports, IT departments can monitor cloud infrastructure status. The ability to replace time-consuming, manual provisioning and deprovisioning of datacenter resources with automated workflows can also help IT staff reduce delivery time to improve consistency, efficiency, and speed within the organization.

IBM Cloud Private along with IBM Spectrum Access supports seamless integration with IBM Public Cloud to offer secure access and integration to innovative technologies, including cognitive/artificial intelligence, blockchain, and IoT.

Challenges

While IBM Spectrum Access helps enterprises transform their applications and operationalize the cloud environment based on IBM Cloud Private, currently it could face challenges around:

■ The openness of the offering and the ability of IBM Spectrum Access for IBM Cloud Private to seamlessly integrate with other public cloud services such as Amazon Web Services, Google Cloud Platform, and Microsoft Azure

■ The solution's lack of support of different container orchestrators to give customers the freedom of choice

Conclusion

IDC forecasts over the next five years in enterprise infrastructure show a marked migration of market revenue toward flash storage, virtualization, hyperconverged infrastructure, and other cloud-related technologies that will be required to enable hybrid/multicloud deployments.

In IDC's opinion, IBM Spectrum Access for IBM Cloud Private is a cost-effective and intelligent solution, which makes it a compelling infrastructure offering for hybrid cloud and one that can help organizations modernize existing heritage applications while integrating with new applications. Overall, it meets customer requirements of agility, simplicity, flexibility, scale without compromise in performance, and cost efficiency. It also possesses a rich set of storage services, and it is DevOps and cloud ready.

IDC believes IBM Spectrum Access can help customers move from technology silos to a cloud model that transforms the datacenter infrastructure into pools of resources that can be more easily allocated and repurposed. This change helps applications run more efficiently within, between, and beyond datacenter boundaries. If IBM can address the potential challenges noted previously, it will be poised for significant success in helping IT departments worldwide evolve into ITaaS to accelerate service delivery and increase revenue.

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