Hybrid Cloud and Beyond
The Opportunity for Providers to Serve Next-Generation Enterprise IT
MARCH 2018
About this paper
A Pathfinder paper navigates decision-makers through the issues surrounding a specific technology or business case, explores the business value of adoption, and recommends the range of considerations and concrete next steps in the decision-making process.

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INTRODUCTION

For IT services and infrastructure providers, increasingly stark lines have been drawn through the industry in the last several years. Cloud computing – IT infrastructure that is fungible and commodified, elastic, scalable, programmatically accessible over the network and fully automated in software – has become entrenched and accepted by mainstream enterprises as the way to consume IT infrastructure. Enterprises of all sizes now actively seek out the best execution venue for each workload they operate – the right cloud for the right job. Stratification has occurred, separating the hyperscale cloud infrastructure providers such as AWS, Microsoft, Google and IBM from smaller, regional IT infrastructure operators that do not buy computers by the truckload. Likewise, software has become a bright line between infrastructure and cloud, with new services such as VMware Cloud on AWS seeing viability in the market. An enterprise can and will consume IT services, software licenses and external infrastructure (IaaS) on demand.

Managed services providers and managed infrastructure providers outside the hyperscalers represent the long tail of the managed infrastructure and cloud market, and combined, they bring in more than 70% of the total revenue in these areas. They are increasingly asked to provide more sophisticated IT service offerings and, critically, to help enterprises effectively interoperate between existing IT assets and datacenters and the wide range of public cloud infrastructure services and on-demand software services. Today, most enterprises operate in a variety of cloud computing environments, including private cloud, hosted private cloud and public cloud, and most of them expect to eventually embrace hybrid cloud as the most appropriate and efficient operating model.

Service providers that can effectively support hybrid IT operations using the enterprise-class software tools already present in enterprise IT organizations will be the best positioned to grow and gain new customers that need a blend of hands-on expert support, advanced, stable software interfaces, and a mix of application venues all delivered in the fully automated manner they’ve become accustomed to.
Hybrid cloud definition

Hybrid cloud is best defined as a delivery model. It consists of two or more distinct cloud infrastructures that remain unique entities, all coordinated by standardized or proprietary technology, and interoperate to deliver seamless business functions. Hybrid cloud has specific architectural requirements including, but not limited to, a control plane that overlays these distinct infrastructure environments, and an application-centric design with an emphasis on interoperability and portability, requiring APIs and automation. Figure 1 is an example of a hybrid cloud architecture that demonstrates the reach and scope of hybrid IT, and how it can touch every aspect of an IT organization.

Figure 1: Sample hybrid cloud infrastructure architecture
Multi-cloud vs. hybrid cloud

Most enterprises maintain relationships with multiple cloud providers (See Figure 3), but this is not the same as hybrid cloud. It is important to make the distinction because multi-cloud is a transitional step to full hybrid environments. However, this distinction will be short-lived; it is clear that most enterprises are headed toward this hybrid model, and the terms will become interchangeable at some point. Service providers need to be able to competently and efficiently maintain support for third-party cloud environments such as AWS (where VMware-enabled hardware can now be operated) separately from other cloud services, and then be ready to help customers move into hybrid models to realize continual gains in efficiency. For their part, many service providers have created siloed, separate multi-cloud practices and services in response to this demand. There is often work that needs to be done to achieve the flexibility and efficiency promised by the true hybrid model.

Figure 2: On-premises and off-premises cloud usage over the next two years

Q. Which of the following best describes how your organization will use different on-premises and off-premises cloud environments over the next two years? (n=649)

Q. Has your organization configured any of the following cloud deployments for interoperability for the seamless delivery of a business function? Please select all that apply.

Which Flavor of Multi-cloud?

- **34% Single Cloud**
  - We will focus primarily on a single cloud environment, not multiple clouds

- **29% Multi-Cloud**
  - We will have multiple cloud environments, but there will be little to no interoperability between the cloud environments

- **25% Multi-Cloud+**
  - We will have multiple cloud environments to migrate workloads or data between different cloud environments

- **13% Hybrid**
  - We will have multiple cloud environments where the delivery of a single business function across the different cloud environments is seamless

Environments Configured for Cloud Interoperability

- **40.8% Q3 2016**
  - On-premises private cloud with a hosted private cloud

- **42.4% Q2 2015**
  - On-premises private cloud with a public cloud

- **36.6% Q3 2016**
  - Hosted private cloud with a public private cloud

- **35.4% Q2 2015**
  - Hosted private cloud with a public private cloud

Providers should be aware of how customers want to use their external services – either separately or in a true hybrid capacity – and be prepared to support those efforts. Historical trends show steady movement toward this vision of IT as a true hybrid management model. More than half of the respondents to this research said they have already established some level of interoperability between their own assets and an external cloud environment. Nearly all of them want to do more; however, they may not be able to or know how, which is where savvy providers can step in.

Even those enterprises with only one provider of record want help. Cloud computing services have now been universally adopted – they have spread through every industry vertical – but many enterprises still rely on a trusted partner to be their broker and IT department, especially when it comes to using third-party services.

The opportunity

In the early days of cloud computing, many industry observers thought the advent of giant operators such as AWS would completely push hosted infrastructure and smaller datacenter operators out of business, but in fact, the opposite has happened: the managed infrastructure and cloud markets have continued to grow and show no signs of slowing down. In fact, after years of explosive growth in IaaS revenue, public cloud growth and managed infrastructure growth are about equal, with the overwhelming bulk of the revenue headed to service providers and partners that aren’t the household names. Figure 4 tells the tale: traditional kinds of hosting services, such as dedicated server leasing and website hosting, lag well behind managed and cloud in growth, because at this point, most providers and partners can provide equivalent IaaS services to public clouds, but with strong added value in terms of support, security and tailored services.

Figure 3: Worldwide hosting and cloud market size, 2016-2021

<table>
<thead>
<tr>
<th>Service Type</th>
<th>2016</th>
<th>2021</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dedicated Hosting</td>
<td>$4,742</td>
<td>$5,997</td>
</tr>
<tr>
<td>Managed Infrastructure</td>
<td>$11,067</td>
<td>$19,102</td>
</tr>
<tr>
<td>Platform as a Service</td>
<td>$3,959</td>
<td>$9,464</td>
</tr>
<tr>
<td>Infrastructure as a Service</td>
<td>$12,879</td>
<td>$30,225</td>
</tr>
</tbody>
</table>

Source: 451 Research Market Monitor, Hosting, Cloud & Managed Services

The opportunity for service providers is large and increasing all the time. As computing has gotten cheaper and easier because of cloud, the ability for providers to offer tailored, more accessible and more attentive service has also gotten easier, and now most providers say that the majority of new revenue is in hosted private clouds and in supporting third-party infrastructure, and for the sharpest operators, all of the above. It is not uncommon for managed services providers to support
multiple cloud technologies and environments, and there is no sign this trend will end. Instead, providers and partners will be tasked with using and delivering more automated services for enterprises. Taken together, this is a $160bn market by 2021 that all service providers should be doing their best to capitalize on.

Figure 4: EMEA hosting and cloud market size, 2016-2021

<table>
<thead>
<tr>
<th>Service</th>
<th>2016 (US$ Millions)</th>
<th>2021 (US$ Millions)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dedicated Hosting</td>
<td>$1,479</td>
<td>$1,792</td>
</tr>
<tr>
<td>Managed Infrastructure</td>
<td>$3,410</td>
<td>$5,518</td>
</tr>
<tr>
<td>Platform as a Service</td>
<td>$905</td>
<td>$2,195</td>
</tr>
<tr>
<td>Infrastructure as a Service</td>
<td>$3,160</td>
<td>$7,778</td>
</tr>
</tbody>
</table>

Source: 451 Research Market Monitor, Hosting, Cloud & Managed Services

Major drivers and inhibitors for enterprise customers

The IT infrastructure that enterprises have trusted for years is continuing its metamorphosis. IT organizations are no longer limited to managing datacenters and a few hosted and managed services providers. Needy line-of-business teams and impatient IT developers have procured SaaS, IaaS and PaaS cloud services to overcome resource constraints. Now, all enterprise IT structure is composed of multi-clouds. Early enterprise adoption of cloud was often driven by slush-fund spending and other ways to sneak around the formal IT operations budget and obtain resources.

When multi-clouds enable the execution of distributed business processes, they become hybrid clouds. To be precise, hybrid cloud architecture consists of two or more distinct cloud and on-premises infrastructures that exchange and synchronize data flows and execute business processes to deliver seamless business functions.

Within the past two years, CSPs and IT technology vendors have introduced various means for hybrid and multi-cloud support. These include the creation of partnerships with key hyperscale IaaS/public cloud platform providers; the ability to manage customer deployments on third-party cloud platforms; pre-production design assistance and ongoing workload placement optimization; and interoperability and unified provisioning and management across their own cloud platforms. Some examples of hybrid cloud usage are e-commerce and mobile device/mobile application services where access to customers and endpoints is better facilitated in the public cloud, and sensitive information such as payment data and tasks such as data capture and analysis are better suited for a hosted environment.

For various reasons based on their needs, organizations will continue to operate both on-premises and off-premises cloud environments in the coming years. Providers’ intention is to consolidate and reduce engineering efforts while eliminating the need for their enterprise customers to refactor workloads – essentially making the workloads more portable across private and public cloud deployments.
Containers and serverless: from hybrid to invisible infrastructure

The current opportunity for providers is in supporting and enabling hybrid cloud and IT transformation for enterprises. However, the next wave of innovation will spring from that enablement. New ways to manage and consume this infrastructure are developing, and service providers and partners should be paying close attention to them. ‘Serverless’ computing and containers are related, but they address the challenge of maintaining workloads across disparate infrastructures in two different ways. IT transformation is calling for greater hybrid interoperability across clouds and on-premises infrastructures. Enterprises will be challenged to redistribute workloads to the best execution venues. As workloads shift across distributed disparate multi-cloud and hybrid cloud execution venues, container technology and serverless computing will begin to rise in importance.

AWS, Azure, IBM and Google all have so-called serverless environments that execute simple workloads as functions without consideration of the underlying architecture. This can alleviate concern over platform performance disparity for service providers, which can find ways to integrate enterprise infrastructure management with serverless commands and create a consistent experience. Containers remove everything from an operating system but the exact functionality needed to run an application or component of an application, so they can remove variables in performance and reliance on the underlying infrastructure. When critical performance and execution metrics vary or when anomalies occur, organizations can easily shift workloads to another execution venue in another cloud region, an on-premises private cloud or a third-party IaaS environment. In these cases, the more portable the workload the better, and containers are the current frontier of application portability.

Hybrid cloud enables things such as radical improvement to e-commerce; distributed workloads such as fleet monitoring and social interaction; and concepts such as disaster recovery, a market thoroughly disrupted by cloud and hybrid strategies, but as infrastructure becomes more seamless, concepts such as serverless computing and containers are providing important new ways to go beyond hybrid cloud and into new horizons of application efficiency and density. We know the demand will be there, and enterprises will need the aid of service providers and partners to fulfill that demand.

Recommendations for Service Providers

With multi-cloud increasingly the norm for enterprise firms and hybrid cloud skills in short supply, cloud service providers form a critical part of the outsourcing of cloud infrastructure and workload management requirements for both on-premises and off-premises operational aspects.

The opportunity for cloud service providers is growing in several areas as a result, and we have a number of recommendations for those looking to make a potential move. These suggestions are not exclusive of other service types, and should be considered complementary to existing offerings:

- Aside from startups, the vast majority of businesses have some kind of existing IT infrastructure and are unlikely to ditch it on a wholesale basis. Compatibility is a key requirement when introducing new cloud applications, and requires knowledge of service integration combined with traditional IT skill sets.
- Migration services are top of the list when it comes to any ‘lift and shift’ requirements for most workload types. Technology vendors are not the best placed to facilitate this aspect of hybrid cloud, while service providers with experience in refactoring/repurposing, off-premises testing and hosting can offer assessment and other professional services to reduce risk and avoid potential project delays.
- Aside from the larger enterprises that have already undergone some kind of digital transformation, multi-cloud and/or hybrid cloud management is generally beyond the capability of most firms – unless additional investments are made. Service providers that offer hosted cloud service management can help clients reduce operational complexity while increasing visibility of service usage.
- Taken further, cloud service optimization, price/performance management and monitoring can help companies of all sizes with TCO measurement – potentially including the development of chargeback and payback models for internal budgeting. While these are niche requirements at the moment, their importance is growing as the economics of cloud becomes integral to clients’ overall IT strategies.
Call to Action for VMware Cloud Service Providers

VMware Cloud Providers have a great opportunity to capitalize on a true hybrid cloud capability, from managing on-premises customer datacenters to managing multiple clouds within their datacenters or now in VMware Cloud (VMC) on AWS – true hybrid cloud is a very real and very logical solution. With the VMware Cloud Provider Program portfolio of solutions, VMware Cloud Service Providers can help customers achieve cloud economics quicker and with less impact or risk than some hyperscale migrations, using a consumption-based billing model across all platforms.

VMware's strategy for Cloud Provider Partners is centered on the VMware Cloud Provider Platform, which delivers all of the tools necessary for the integration and management of hybrid cloud environments across private and public clouds.

Figure 5: VMware Partner MSP service overview (conceptual)

Source: VMware, March 2018

By utilizing a VMware Certified Reference Design (CRD), VMware Cloud Providers can rapidly implement the Cloud Provider Platform and realize many cloud benefits, including:

- Reduced complexity
- Scale and performance
- Ability to deliver secure multi-tenant solutions
- Manage on- and off-premises workloads
- Hybrid cloud integration
- End-to-end security

While many customers demand a fully managed service, the reality of relinquishing control, and especially security, to a 3rd party can be difficult. Using a VMware Cloud Provider Platform-based cloud service, customers can have access to a self-service portal for compute storage and network functions and also to usage and performance reporting and, critically, security capabilities – making the transition to multi- and hybrid cloud easier.

With the launch of VMware Cloud on AWS (VMC), VMware now is able to offer Cloud Providers and their customers even more choice. VMware Cloud on AWS is the implementation of a VMware CRD on top of the highly scalable AWS infrastructure platform. As well as providing access to some key VMware Cloud Provider Platform technologies (e.g., vSphere Hypervisor (ESXi), Virtual SAN (vSAN) and the NSX network virtualization platform), it also has access to the many advanced services offered by AWS, thereby combining the best of both platforms.

With VMware, Cloud Providers can integrate managed VMware Cloud deployments with customers’ on-premises VMware deployments, with VMware on AWS, and enable a true hybrid cloud architecture. NSX allows for an effective Layer 2 connection to be run from the customer’s datacenter to their cloud in VMware Cloud on AWS or their hosted VMware cloud at a Cloud Service Provider, or both, simplifying network design and providing end-to-end security.
The VMware approach also helps VMware Cloud Providers overcome several other key obstacles in transforming customers to the cloud.

**Critical Application Support** – VMware is recognized as the industry leader in providing enterprise-grade platforms that are secure, reliable and, most importantly, robust. By offering this platform solution set across private, public and managed clouds, customers are ensured of high SLAs and availability on a common hypervisor across all cloud platforms, now including hyperscale offerings.

**Migrations** – Migration to cloud is key for customers and hence a great revenue opportunity for Cloud Service Providers. Most customers desire to get to a cloud economic model as quickly as possible. This can be translated into providers offering managed hosted cloud on-premises followed by a staged migration to whichever is the most relevant cloud. Being able to offer an end-to-end solution based on proven and trusted VMware technology (even on AWS), VMware partners can reduce risk throughout the whole process for the customer, as well as ease the migration process over Layer 2 connections with no application reconfiguration, thereby reducing the business impact.

VMware Cloud Providers can capitalize on a great opportunity to provide their customers with a path to a true hybrid solution relevant to their needs, utilizing verified designs to achieve an optimum capability. By leveraging the VMware Cloud Provider Platform, VMware Cloud Providers are also eligible to earn the 'Cloud Verified' badge to further promote their brand and gain additional visibility for their service offerings from VMware. But the journey is just starting, as more and more businesses move to a cloud model, multi-cloud and eventually a true hybrid cloud, their transition is creating immense opportunities for the Cloud Service Providers.

VMware Cloud Service Providers implementing the Cloud Provider Platform will be well placed to deliver services enabling a hybrid cloud for their customers. VMware also provides a range of pre-packaged solutions to enable the Cloud Service Providers to expand their portfolio of services and differentiate themselves competitively. All these solutions are delivered using the same underlying VMware technologies and provide the most secure and manageable solution across the many clouds. As the VMware Cloud Services portfolio becomes available within the Cloud Provider Program and delivered by an integrated platform, Cloud Service Providers will have more services to differentiate their services offerings, and simplify their operating models with significant cost benefits.