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Automation in a Multi-Cloud World: The Key to Agility

Introduction

We live in a world in which the fastest-growing transportation company (Uber) owns no cars and the hottest accommodation provider (AirBnB) owns no accommodation. What unites these companies is the lack of traditional assets, and the presence of something else: applications that can be rapidly deployed and flexibly orchestrated to facilitate commerce on a global scale.

Today, the way you deliver a service to customers—via applications—has become as important as, if not more important than, the service itself. Indeed, in many cases, applications have become inseparable from the products and services sold by enterprises. That's certainly true of many start-ups. Increasingly, it's also true of the long-established incumbent organizations that aim to compete with them.

Whether it's an update to a customer's mobile app, or a new version of CRM for employees, companies need to be able to deploy applications at the same speed as the competition. Agility has become a necessity.

The Rise of Hybrid Cloud: More Agility, More Complexity

Most established organizations are choosing to compete by deploying a hybrid cloud approach. At its most basic, this involves defining the needs of specific applications and running them on the infrastructure that's appropriate. The hybrid approach is here to stay. In Europe, four out of every 10 enterprises (37%) have deployed a public cloud in conjunction with a private cloud of some kind.[1]

But the increasing scale and dynamism of the workloads involved is adding a tremendous amount of complexity to today's application environments. In many organizations, it has become necessary to manage traditional virtualized data centers, private clouds, and public clouds alongside one another. Complexity is the result of building flexibility into IT: It enables faster response times but also increases the risk of error and failure. For IT organizations, the ability to manage complexity has become one of the key challenges of the digital era.

[1] Forrester Research, Adoption Profile: Private Cloud In Europe, Q1 2016 (February 2016).

The State of IT Operations: Too Slow, Too Manual

In hybrid and heterogeneous environments, one requirement is obvious: the need for a unified and consistent way to configure, provision, orchestrate, and analyze the performance of computing resources.

Inevitably, this is encouraging many organizations to assess the potential of the Software-Defined Data Center (a term often used by VMware that has since become common currency.). Abstracting control out of hardware and into unified software makes sense in the context of hybrid cloud complexity. With compute, storage, network, and security all virtualized, the software-defined approach allows IT to manage workloads where they need to be managed, on-premises or in the cloud.

Broadly speaking, there are two prerequisites for the software-defined approach. First, you need a high level of virtualization across compute, network, and storage, which makes data center services easy and inexpensive to manage. The second requirement is software to manage (or "define") your hardware. In recent years, Cloud Management Platforms (CMPs) have emerged to do this job, acting as the control plane for the software-defined data center.

The Role of Cloud Management Platforms

In the software-defined data center, CMPs address two challenges. They enable speedy and secure provisioning and configuration. In addition, they carry out monitoring and impose policy-driven controls as required.

Rapid provisioning is a key issue. Resource provisioning in many organizations can best be characterized as a combination of automated and manual steps; performed by multiple individuals; and strung together by a series of help desk tickets that move the provisioning process from one small task to the next. The inefficiency embedded in this approach means that for many organizations, fulfilling a request for resources can take multiple weeks and sometimes even months. Confronted with delays, the risk is that business managers will seek public cloud-based solutions. To compete successfully as a supplier of IT services, IT organizations increasingly need to match the speed of deployment in the public cloud.

Moreover, manual tasks lead to inconsistencies and errors in configurations. Reworking to ensure that systems behave consistently simply adds to overhead. In addition, slow provisioning incentivizes over-provisioning, because developers request both the resources they need now and the resources they might need in the future. The result? More unnecessary cost.

Monitoring is equally important. In a heterogeneous environment, IT Operations staff are likely to use multiple tools, each tied to specific pieces of infrastructure. Bringing together the data from these disparate sources of information, from different teams in Operations, to arrive at coherent view of what's happening (or what has gone wrong) is typically challenging. As a result, it can take longer than necessary to fix problems.

In poorly managed virtualized and hybrid cloud environments, slow and costly incident management encourages over-provisioning. Why? Because the easiest way to fix performance issues typically involves spinning up more over-resourced VMs and adding additional network and storage capacity. Not only does this create additional cost. It also creates further complexity. This, in turn, makes it even harder to monitor and control the IT estate. For many IT organizations, the result is a circle that can turn vicious.

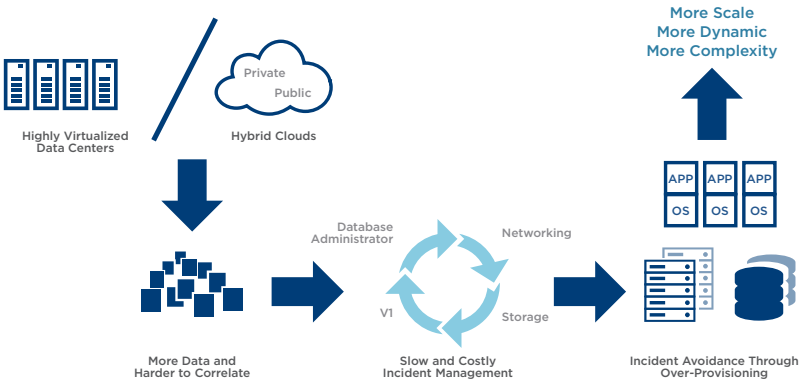

Figure 1. The vicious circle of operations management in the hybrid cloud

Hybrid Complexity: The Case for Automation

Speed at any cost isn't an option. Control matters, too. Policy-driven governance must be in place to ensure efficient resource utilization. Fine-grained application-level security is also critical to meet compliance requirements and to mitigate the risk of data breaches. Resources delivered must be reliable and perform in a manner that meets the quality of service (QoS) expectations.

Clearly, not all organizations working with hybrid cloud have the necessary management tools. According to research undertaken by Taneja Group, 65% of VMware customers that rely primarily on manual, hardware-dependent infrastructure and application delivery find that manual processes slow down their ability to respond to new business opportunities.[2]

Two of the key characteristics of any cloud environment are end-user self-service and consumption-based metering. But even among North American enterprises operating private clouds, only 61% have implemented self-service access for business units, or test and development teams. Even fewer—52%—are able to chargeback internal customers for their consumption of cloud-based resources.[3]

Broadly speaking, there are two ways to confront the challenge facing IT Operations. The first relies on a shaky mixture of optimism and denial: This is the notion that if only IT Operations can reorganize and become more efficient, it should be able to rise to the challenge of managing hybrid clouds. The stress on efficiency and reorganization is sensible, and necessary. But on its own, it's insufficient. To cope with hybrid complexity, IT organizations need to chart an alternative course on what we might call the journey to agility. Specifically, they need to adopt both the right tools and the right kind of organization.

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[2] **Taneja Group**, Automating Application and Infrastructure Delivery In A Growing Enterprise (January 2015)

[3] **Forrester Research**, Adoption Profile: Private Cloud In North America, Q1 2016 (February 2016)

The Journey to Agility: Intelligence, Automation, and the Full Stack

VMware has worked with thousands of customers to build private and hybrid clouds. We have also undertaken significant amounts of research into the kind of challenges customers encounter. The following graphic condenses our cumulative understanding of what we call the journey to agility:

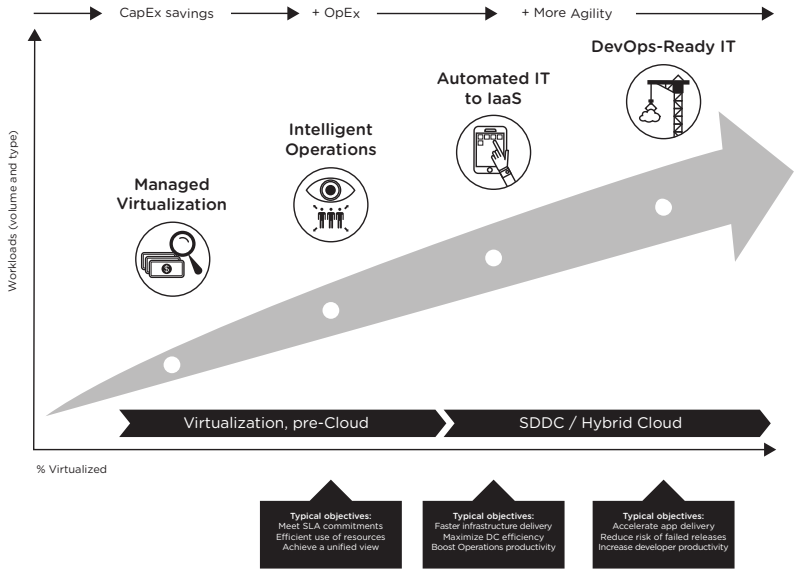

Figure 2. Complexity and management: the journey to agility

Often, customers move from left to right in their cloud journey as they increase the degree of virtualization in their environments (the x axis) and see an increase in the volume and type of workloads they support (the y axis). As your organization grows and you scale your IT services, the focus often shifts, from virtualizing to reduce CapEx, toward an emphasis on using automation to reduce OpEx. Typically, the third—and final—set of challenges involve accelerating application development and deployment so that it becomes possible to satisfy the demands of digital business.

In this document, we will mostly focus on one of these challenges (automation). But before exploring this theme in more depth, it makes sense to discuss the full spectrum of challenges experienced by enterprises as they move toward a future that's both software-defined and increasingly hybrid.

Use Case 1: The Need for Intelligent Operations

Two factors are forcing most organizations to get smarter about IT Operations: budgetary constraints and the increasing complexity of data centers. To meet SLAs, you need to continuously monitor the performance, quality, security, and the cost of infrastructure. But it's often challenging to tie together the verdicts of multiple point solutions for monitoring the data center. What's required is a unified view across compute, network, and storage—regardless of the mix of private/hybrid/public resources your organization is consuming. On this stage of the journey to agility, organizations that have already virtualized a large part of their server estate typically look for additional tools to monitor capacity, proactively solve performance issues, streamline processes, and monitor costs.

Use Case 2: The Need for Automation

Finding more intelligent ways to monitor compute, network, and storage typically provides a basis for the next step: doing more with less resourcing, and doing it faster. Typically, this becomes necessary when organizations embark on a hybrid cloud strategy, which brings with it additional levels of management complexity. Depending on your organization, there are different ways of achieving the appropriate level of automation, all of which can be implemented with the right technology and the right organizational changes. But in every case, the underlying challenges remain the same: how to reduce the time it takes to respond to requests for IT resources and improve the management of provisioned resources.

Use Case 3: The Need for True DevOps Partnership

In the final analysis, Intelligent Operations and Automated IT are all about efficiency. By contrast, the drive toward DevOps-Ready IT focuses on the need for innovation. Building an environment in which developers can maximize their productivity requires automation (and collaboration) that extends up the stack, from infrastructure to applications. At the same time, collaboration needs to extend outward in organizational terms, from the Operations team to the Test and Development teams. Whether the requirement is to update a mobile app for consumers or an internal application for employees, the emphasis on speed of deployment needs to be balanced with the need to prevent failed releases with a high-quality testing regime. What's required are the tools and processes to manage the "Ops" in DevOps—in a way that takes account of the tools and processes used by Test and Dev.

The Role of vRealize: Enterprise-Ready CMP

At VMware, we've spent nearly 20 years helping IT organizations to fulfill the promise of virtualization. Our consistent aim has been to help IT to streamline processes and apply the kind of intelligence and automation required to deliver IT as a service. Today, hundreds of thousands of organizations around the world use VMware vSphere® in virtualized and cloud computing environments. An increasing number of these customers use VMware vRealize® Suite, our market-leading Cloud Management Platform (CMP), to manage the increasing complexity of hybrid and heterogeneous environments.

Initially, CMPs emerged as a response to the need for IT to provision resources more quickly and efficiently. Today, an enterprise-ready CMP needs to provide a lot more. It should allow you to adopt a unified approach to managing infrastructure and applications wherever they're located—in on-premises data centers, private clouds, and/or public clouds, in vSphere or non-vSphere environments. An enterprise-ready CMP also needs to be flexible and complete: Depending on your needs at any one moment in time, it should allow you to achieve different levels of automation and efficiency.

The Need for Management on Day 1 and Day 2

CMPs should also allow you to manage resources through their entire lifecycle: on Day 1 (configuration and provisioning) and from Day 2 (for continuous rebalancing and reclamation of resources). In particular, too many CMPs fall short when it comes to Day 2 tasks, including management of health and capacity; the rightsizing, reclamation, and retiring of resources; and the ability to continually cost and meter the environment.

vRealize Suite is the most complete cloud management solution available. We offer it in a variety of editions and standalone products to suit the differing needs of organizations as they progress from managing virtualization to implementing hybrid cloud. VMware vRealize Suite is available in three editions: Standard, Advanced, and Enterprise. Each edition has been designed to address challenges at one of the three stages on the journey to agility: Intelligent Operations, Automated IT to IaaS, or DevOps-Ready IT. (Automation-specific features of vRealize are available in Advanced and Enterprise editions.)

Native integrations across VMware technologies such as VMware NSX® also make VMware's CMP the best choice for organizations building a VMware-based Software-Defined Data Center (SDDC). Recognizing that an enterprise-ready CMP must function as part of a larger IT ecosystem, vRealize Suite supports integration with a wide range of third-party solutions, either out-of-the-box or via a well-architected extensibility framework.

	vRealize Suite STANDARD	vRealize Suite ADVANCED	vRealize Suite ENTERPRISE
Application monitoring For applications, middleware and databases			✓
Application automation App stack provisioning, dynamic scripting, app-centric network and security configuration			✓
Infrastructure automation API-based service catalogue: IaaS & XaaS provisioning, lifecycle management		✓	✓
Cloud planning Forecast the costs of adding capacity & savings from reclamation		✓	✓
Cloud costing & comparison Analyze and optimize cost and usage: virtual, private and public cloud	✓	✓	✓
Log analytics for SDDC Deep visibility: extensible, intuitive, scalable	✓	✓	✓
SDDC monitoring for hybrid cloud Predictive analytics, smart alerts, intelligent workload placement	✓	✓	✓

***Application Monitoring is one of the features in vRealize Operations Enterprise. It is included in vRealize Suite Enterprise edition and available as an add-on capability for vRealize Suite Standard and Advanced.**

Figure 3. vRealize Suite: the right functionality for your organization

How vRealize Helps You to Automate IT

Accelerated Service Delivery

Creating infrastructure services is typically a time-consuming manual task. Based on surveys we have conducted with customers, we know that the actual work effort is typically around 4–6 hours. But these hours are frequently spread over days or weeks because the work involved is spread among multiple teams, which often operate in silos. The inevitable result is wait time. vRealize Suite allows admins to embed automation and policy within blueprints, allowing production-ready infrastructure to be stood up in minutes rather than weeks.

Automation: As Much or As Little As you Need

IaaS and self-service provisioning is a great idea, but it's not yet the right option for everyone. Some organizations, for example, shy away from it because of the added work involved in tying individual customers to entitlements via LDAP and Active Directory. What many organizations need is a solution that will allow them to adopt just as much automation as they need—and no more.

vRealize Suite allows you to automate the provisioning process in the context of a traditional helpdesk, simply by accelerating the processes involved (e.g, with standardized templates for provisioning, known as blueprints). But it also offers a fully automated option, including a Unified Service Catalog that gives internal consumers (e.g, developers or line of business managers) the ability to make requests from a personalized collection of application and infrastructure services. In addition, administrators can use the XaaS Designer to automate, and make available, custom IT services. Once a consumer requests a service, a showback of the service cost is displayed.

Controlling Service Delivery

Faster provisioning is all well and good. But it isn't an attractive option if it involves a loss of control. IT Operations requires a balance between speed, flexibility, and standardization.

vRealize Suite offers faster provisioning and self-service provisioning if required. But it also allows you to add appropriate operational controls behind the scenes. Customizable blueprints for delivering different kinds of application environment result in a reduction in errors and consequent reworking. Policy-based provisioning and governance allow role-based allocation of IT resources governed by costs, capacity, and business rules. In addition, granular configuration and monitoring of compliance allow you to protect every virtualized workload with the required security and compliance policies.

Performance Monitoring Made Easy

After infrastructure has been provisioned, Operations needs to monitor the configuration, health, performance, capacity, and cost of resources. But all too often, Operations can't adequately track and manage the resources that have been deployed.

vRealize Suite allows you to continuously monitor the health, performance, capacity, and costs of already provisioned resources and to preprogram appropriate responses to specific situations (e.g, capacity monitoring alerts). Proactive analysis and smart alerts enable rapid discovery and root-cause analysis of IT issues. vRealize Suite also allows you to systematically reclaim unused capacity and deliver that capacity where it's needed today, not leave it where it was needed yesterday.

Enterprise-Ready Extensibility

Enterprises have a variety of third-party and custom-built solutions for monitoring and management. How can you be sure that VMware vRealize Suite will work with these solutions if you choose to retain them?

VMware delivers a CMP that is highly extensible. Well-documented APIs; SDKs; prebuilt management packs and plug-ins that provide integration with third-party ISV solutions; and other extensibility mechanisms support interoperability across the IT ecosystem.

Future-Proofed and Software-Defined

Many organizations are planning a staged approach to creating Software-Defined Data Center (SDDC). For these organizations, it's critical that their CMP should integrate with this strategy.

Native integrations across VMware technologies make VMware's CMP the best choice for organizations building out a Software-Defined Data Center based on VMware. Integration within vRealize Suite means that VMware can provide a holistic and integrated approach to the management of an SDDC. For example, within vRealize, operational capabilities that highlight resource inefficiencies within the infrastructure are connected with automation capabilities that can manage the reclamation of unused resources.

VMware's CMP technologies are also natively integrated with other VMware SDDC solutions. For instance, VMware NSX constructs such as networking and firewalling are natively available for inclusion in service templates created using VMware's CMP. This means that virtual networks, load balancers, and firewalls can be instantiated on demand when provisioning resources.

Transparent Comparisons: Private vs. Public Cloud

Organizations working with hybrid cloud need to be able to rightsize resources for specific workloads. In the public cloud, it pays to ensure that the resources you buy are a reasonably tight fit with your requirements. Beyond that, you can rely on additional capacity as required. There's also a need to "right-locate" their workloads, and to continually monitor that the right workloads are in the right place.

vRealize Suite supports the concept of brokering, providing support for sourcing and provisioning resources across both private and public clouds. We give you the ability to understand how your costs compare to those of public cloud providers. VMware provides you with the ability to configure a single VM or a group of VMs to a specific standard—say a specific amount of memory, CPU, etc. Then you can compare that specification to that same configuration available through a public cloud provider such as Amazon, Azure, or VMware vCloud® Air.™ This gives you the ability to understand whether your costs are competitive with public cloud alternatives.

Conclusion

Every industry is experiencing massive changes in both business and operating models as a result of digitization. Companies are responding to new opportunities by leveraging big data and mobility. Many more are pursuing new business models and new revenue streams that rely on digitizing and modernizing business processes.

These shifts are driving the need to dramatically speed up application delivery. Being first to market can mean significant competitive advantage. Being late to market can mean missed opportunities—or worse.

A Comprehensive Cloud Management Solution

Manage and automate a heterogeneous, multi-cloud environment with an enterprise-ready cloud management platform based on VMware vRealize® Suite and optimized to run on Intel®-based server platforms. vRealize Suite powered by Intel® Xeon® processors provides a robust solution for effectively managing enterprise workloads.

Choose the Right Level of Automation for Your Organization

With the right tools for managing your resources, you can accelerate infrastructure delivery with policy-driven blueprints and reclaim/rightsize existing unused capacity. vRealize Suite also allows you to squeeze further efficiency gains out of hardware and develop much deeper analysis of resource costs. It also allows you to press further forward with automation, offering IaaS and self-service provisioning.

Organizations that automate their highly virtualized infrastructure environments discover that they are able to introduce new forms of self-service and on-demand IT delivery models. As a result, they're far better positioned to compete in a world where the quality and performance of applications increasingly dictate success and failure.

On the journey to agility, the ultimate destination remains infrastructure defined by software and operating in a way that's both application-aware and self-healing. For enterprises competing in the digital economy, deploying a CMP to manage increasingly complex infrastructure has become an indispensable part of that journey.

Learn more about vRealize Suite and our strategy for the Software-Defined Data Center here.

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