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Cloud Management For Dummies®, VMware Special Edition

Published by
John Wiley & Sons, Inc.
111 River St.
Hoboken, NJ 07030-5774
www.wiley.com

ISBN 978-1-119-27926-6 (pbk); ISBN 978-1-119-27927-3 (ebk)

Manufactured in the United States of America

10 9 8 7 6 5 4 3 2 1

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Publisher's Acknowledgments

Some of the people who helped bring this book to market include the following:

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Business Development Representative: Karen Hattan
Production Editor: Antony Sami
Special Help: Shobhana Viswanathan

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Introduction

You've got to love that famous quote from *The Wizard of Oz*:

Toto, I have a feeling we're not in Kansas anymore.

That's how it is in the world of IT. Suddenly, the comfortable, slow-to-change farm of Auntie Em and Uncle Henry is gone. Now we're on a crazy journey to Emerald City, with a cast of characters that includes a Scarecrow, a Tin Woodman, and a Cowardly Lion.

In the case of IT, the familiar farm is the self-contained data center. The Emerald City destination is this nebulous thing called "the cloud." And the cast of characters for the journey includes private clouds, public clouds, and conventional and modern application architectures.

The world of enterprise IT is changing at speeds never seen before. It's like a tornado has swept across the IT organization. The walls of the data center are blurring as enterprises embrace the cloud in its many forms. Now, enterprise IT can include private on-premises clouds, hosted private clouds, and a mix of public cloud services.

For business units and end users, this shift to the hybrid cloud era is good news. Everything can now happen a lot faster, which helps the enterprise maintain its competitive edge.

For the IT pros on the back end, things get trickier.

- Your IT team now needs the ability to quickly provision a soup-to-nuts services stack, including application components, servers, storage devices, and networking gear.
- After that, you need tools that allow you to manage changes to the service stack and optimize systems to deliver top-quality service.

- Of course, all the while you need to meet today's expectations for such capabilities as self-service provisioning, simplified security, and a consumer-style experience with corporate IT services. These aren't really *nice-to-have* capabilities. Today, these are *must-have* capabilities.

This is where the *cloud management platform* (CMP) enters the picture. The CMP provides a unified platform for managing private, public, and hybrid cloud environments together with conventional and modern application architectures.

We're not in Kansas anymore. We're in the hybrid cloud era. And you don't want to leave this to anyone behind a curtain. It's a task best handled by a modern set of management tools.

About This Book

Don't be fooled by the small size. *Cloud Management For Dummies* is loaded with information that can help you understand and capitalize on cloud management. In plain and simple language, we explain what a cloud management platform is, why you need it, and which capabilities to demand in an enterprise solution. We also illustrate common use cases for CMP and guide you to the path to management in the hybrid cloud era.

Foolish Assumptions

In writing *Cloud Management For Dummies*, we've made some assumptions about you:

- You're an IT practitioner in an enterprise environment.
- You aren't content with the status quo. You want to use IT to empower the business.
- You're interested in managing hybrid cloud services in conjunction with traditional IT infrastructure.
- You'll love the capabilities of a fully featured enterprise cloud management platform.

Icons Used in This Book

To make it even easier to navigate to the most useful information, the following icons highlight key text.

Take careful note of these key takeaway points.

Read these optional passages if you crave a more technical explanation.

Follow the target for tips that can save you time and effort.

Watch out for these potential pitfalls on the road ahead.

Where to Go from Here

The book is written as a reference guide, so you can either read it from cover to cover or jump straight to the topics you're most interested in.

Whichever direction you choose, you can't go wrong. Both paths lead to the same outcome: a better understanding of cloud management platforms and how they can help you lead your organization through the challenges of the hybrid cloud era.

Chapter 1

Getting Acquainted with the Cloud Management Platform

In This Chapter

- Introducing the market context for cloud management
- Exploring the challenges that drive the need for the cloud management platform
- Defining the cloud management platform at a high level
- Meeting today's IT requirements
- Getting ready for what lies ahead
- Exploring the business and IT benefits of the cloud management platform

Every industry is experiencing massive changes in both business and operating models as a result of digitization. Everywhere you look — from your smartphone apps to your Google searches — you see examples of the shift to digitally driven business models.

In this chapter, we introduce the concept of the cloud management platform (CMP) at a high level and explore the trends driving the need for this new realm of IT management, starting with the market context and the associated IT challenges.

Identifying the Market Context

Companies in all industries are responding to new opportunities to leverage big data and mobility to drive a better customer experience and a more productive work environment. Many companies are actively pursuing new business models and revenue streams that rely on digitizing and modernizing business processes.

The phenomenon of digitization, along with other structural changes in the business world, is driving the need to dramatically speed up application delivery. As any C-level executive knows, being first to market can mean significant competitive advantage. But the flip side is also true: Being late to market can mean missed opportunities and lost revenue — or worse. Just think of the many companies that have faded into obscurity as they were overtaken by more agile and fast-moving competitors. In many cases, those competitors are essentially masters of the digital universe.

For IT teams, the switch to digitally driven business has big implications. The need to get applications to market quickly is generating increased expectations on IT to provide resources on demand to development, quality assurance, and production teams. This is one of the keys to enabling the rapid rollout to production of new and updated applications: the apps that keep the enterprise competitive.

Resource provisioning in many organizations can best be characterized as a combination of automated and manual steps, performed by multiple individuals, across multiple silos, and strung together by a series of help desk tickets that move the provisioning process from one small task to the next. Sound familiar? Figure 1-1 shows the broad range of these stakeholders. These are unwelcomed legacy processes that must be addressed.

To pull more on that thread, consider this: Over the last decade or so, virtualization has helped IT transform data centers by abstracting and consolidating legacy infrastructure while drastically reducing a critical metric used by the business to justify the investment: cost per application. What used to take weeks or months to rack, stack, install, and configure a new machine is now accomplished within a few minutes — right-click, deploy from template. And just like that, you've provisioned a new replica of your organization's "gold master." All good, right?

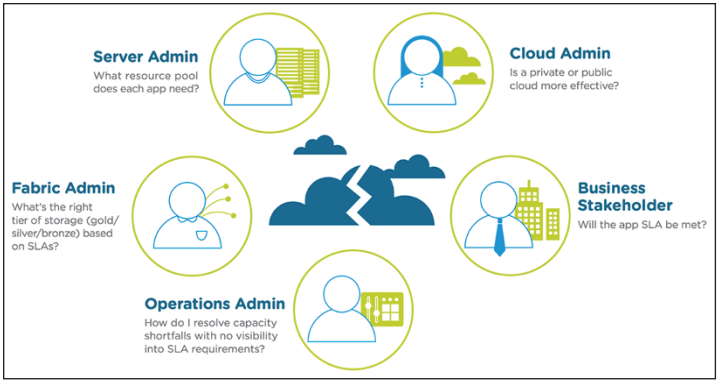

Figure 1-1: The stakeholders in hybrid cloud environments have very different concerns.

So, why does it *still* take weeks — or even months — to fulfill a request for resources and applications?

Although virtualization — and associated management tools — changed the data center landscape, the many inefficiencies still embedded in legacy processes continue to be inhibitors, leading to a timeline that is increasingly unacceptable to IT customers. The inability of IT teams to keep up with these expectations is a big reason why the public cloud market has exploded. You can turn on cloud-based infrastructure and services and immediately begin provisioning applications, a process that can be completed in a matter of minutes. Try to do that in the typical enterprise IT environment.

In these infrastructures, all aspects of an application's life cycle are automated — all pre- and in-flight, and post-provisioning tasks and associated processes. Automation reaches beyond the application itself with hooks into the broader ecosystem of tools and services. It's a world where infrastructure just happens.

Fortunately, these capabilities aren't limited to your big-box cloud providers. It's time to step up the pace and meet the evolving expectations of the lines of business and consumers. IT organizations have little choice but to embrace cloud delivery models.

And at this point, things get even trickier. It's important to deliver resources quickly, but speed alone isn't the primary goal. There are other pressing challenges that must be addressed to enable an enterprise to move into a hybrid cloud world in a controlled and secure manner. For example:

- Policy-driven governance must be in place to ensure that resources are properly allocated and efficiently utilized while also giving your IT team unprecedented visibility and control.
- Granular application-level security must be in place to meet compliance requirements and mitigate the risk of data breaches.
- Resources must be reliable and ready to perform in a manner that meets all quality of service expectations.
- All the while, budgets have to be respected. The business wants IT to be more responsive, but speed at any cost isn't an option. In most cases, IT teams must address the need for speed within existing budgets and current staffing levels.

Organizations can't meet these modern, cloud-driven challenges with management tools designed with legacy IT in mind. You need a new, more agile management suite that allows you to provision resources quickly and efficiently, a management suite that automates all aspects of an application's ecosystem throughout its entire life cycle. This brings us to the concept of the CMP.

Structuring a Cloud Management Platform

The CMP concept means different things to different people. That point becomes apparent when you start comparing the CMP offerings from different technology vendors. You can quickly decipher the key concepts — cloud, management, and platform — but each one of those terms come with its own definition. So, let's take a step back and consider some basic characteristics of CMPs.

Management for a mix of cloud services

For starters, a CMP isn't just about managing your in-house private clouds and the associated infrastructure. It's about managing the mix of private and public cloud services in an increasingly hybrid world.

Industry analyst Forrester, in "Vendor Landscape: Hybrid Cloud Management Solutions," defines a hybrid cloud management solution as:

> [A] cloud-agnostic standalone software solution that automates cloud application and infrastructure service delivery, operations, and governance across multiple cloud platforms.

Both of these basic descriptions of a CMP incorporate the notion of managing a mix of private and public cloud services, which is how it will be for enterprise IT in a hybrid cloud world. And then consider this: Although many organizations have already adopted cloud management solutions, relatively few are managing their public, private, and hybrid cloud environments as a single entity. True hybrid cloud management is still emerging — but it's undoubtedly the future of cloud management.

Essential capabilities

At a broader and more business-oriented level, a CMP is about much more than enabling the automated provisioning of IT resources. Yes, that's a critical CMP capability, but it isn't the full story. An effective enterprise CMP includes both the following:

- **Day 1 capabilities:** Day 1 capabilities enable cloud providers and consumers the ability to rapidly provision a complete services stack — one or more applications, infrastructure, plus all their dependencies — across private and public clouds. And your users have easy access to cloud-based IT services. These are among the minimum capabilities for a CMP — but an enterprise CMP doesn't stop there.

- **Day 2 capabilities:** A CMP that's ready for the challenges of a large enterprise also addresses the Day 2 activities involved in managing and optimizing a hybrid cloud environment. These include both *automation-centric activities* and *operations management-centric activities* that allow you to keep a hybrid cloud environment and associated applications up and running — with peak efficiency and optimal performance — and to operate it like a business.

We explore both of these fundamental capabilities in detail in Chapter 3 and Chapter 4.

An enterprise CMP does all the following:

- Provides unified management of public, private, and hybrid cloud resources
- Enables Day 1 automated provisioning of application-centric infrastructure and streamlined access to cloud services
- Enables Day 2 capabilities needed to keep a hybrid cloud environment operating at peak efficiency and maintain optimal performance throughout an application's life cycle

Getting to the Good Stuff: Cloud Management Platform Benefits

A full look at the benefits of a CMP gets to the heart of a common question among IT practitioners: What can a CMP do for me?

There are three key reasons that you need a CMP:

- To meet today's conflicting IT priorities
- To get ready for what lies ahead: a software-defined world
- To gain compelling business and IT benefits

Meeting today's conflicting IT priorities

In the cloud era, IT faces ever-changing and often-conflicting priorities. IT teams now need to be poised to

- Quickly adopt new technology, while minimizing technical debt.
- Be strategic and focus on business objectives, while maintaining operational excellence.
- Encourage innovation, while staying secure and maintaining compliance.

These priorities all play into an overarching challenge in the cloud era:

- Support the business with speed and agility.
- Maintain control.
- Reduce costs.

A CMP helps IT juggle these dynamic and conflicting priorities and gain the ability to

- Respond nimbly to the demands of a fast-moving business and accelerate provisioning.
- Enable automation-centric activities, such as resizing, reclamation, and retirement.
- Enable operations-centric activities, such as managing health, performance, and capacity.
- Run your hybrid cloud like a business, with such capabilities as continuous infrastructure costing and consumption metering.

Getting ready for what lies ahead

We're rapidly approaching the world of software-defined data centers (SDDCs) with hybrid approaches. Workloads increasingly will be a mix of traditional and modern application architectures. They'll be provisioned in an increasingly virtualized mix of physical and virtual environments that are managed both on-premises and in public clouds.

The concept of a CMP has evolved as a response to this complex set of management requirements. A robust CMP delivers the management capabilities you need to effectively manage the complete life cycle of services delivered in an SDDC or hybrid cloud environment and encompasses the traditional enterprise data center, private clouds, hosted clouds, and public clouds.

Gaining compelling business and IT benefits

A CMP is as much about business benefits as it is about IT benefits. A well-architected, enterprise CMP delivers many important benefits:

- **Agility:** Every business needs agility in today's fast-moving digital business climate. A robust CMP speeds up the delivery of IT services, so your IT pros can fully meet the ever-rising expectations of your line-of-business partners.

  

  Industry analysts emphasize that the automated provisioning capabilities in CMPs are particularly important to software development teams, which are under constant pressure to accelerate time-to-market for new applications and software updates.

- **Efficiency:** Many new demands are being placed on IT organizations, but there typically isn't a lot of funding to meet those demands. That means you need to do more with what you've got — and a CMP helps you do that. A CMP can help your organization increase the efficiency of your IT staff by automating repetitive tasks — both modern and legacy — as well as improve the utilization of in-house and cloud-based data center resources. These are fundamental aspects of reducing operational and capital expenditures.

- **Control:** One of the greatest concerns for IT with the move to cloud-based services is the risk of losing control of business applications and their associated data. An enterprise CMP helps maintain — or increase — visibility and control of your company's assets, regardless of where they reside. The platform gives you the right level of control to support the needs of your IT team in your quest to balance the dynamics of agility, risk, and cost.

- **Choice:** A hybrid cloud environment, managed by a CMP, is all about choice. The CMP allows your IT team to leverage heterogeneous on-premises resources, including hypervisors from multiple vendors, along with any number of public clouds. This flexibility makes it possible to match the right hybrid cloud services with the particular requirements of individual business units, application owners, and development teams for an optimal service delivery strategy.
- **Business and IT alignment:** An enterprise CMP provides transparency into the operations and the cost characteristics of your IT services:
  - People on the business side can see exactly what they're paying for.
  - People on the IT side can prove exactly what they're delivering.

  This transparency helps you drive better business and IT alignment and build a stronger partnership between the lines of business and your IT organization.

Chapter 2

Just the Basics: Minimum Cloud Management Platform Capabilities

In This Chapter

- Outlining minimum cloud management platform capabilities
- Highlighting features for provisioning, metering, optimization, and more
- Summarizing differences between cloud management platform and native OpenStack management

Every cloud management platform (CMP) requires a minimum range of capabilities. Without these capabilities, it's difficult to manage hybrid cloud resources in an efficient and cost-effective manner, as outlined in Chapter 1.

Must-Have Capabilities for a Cloud Management Platform

According to industry analysts (`www.gartner.com/it-glossary/cloud-management-platforms`), the base-level capabilities for a CMP include the following:

- **Self-service interfaces:** Self-service interfaces allow authorized users to get the resources they need, when they need them. This on-demand approach to provisioning helps users stay productive while easing the burden on IT staff to respond to routine requests for resources.

- **System image provisioning:** Your cloud management platform should include capabilities that automate the provisioning of system images. The goal is to rapidly provision consistent environments across hybrid clouds for development, test, and production uses with minimal manual intervention.
- **Metering and billing:** Your CMP should give you capabilities for usage metering, costing, pricing, showback, and reporting. These capabilities enable your IT organization to
  - Allocate the costs of services to the business units using those services.
  - Provide the lines of business with reports that document the services they received and their usage levels.
- **Workload optimization:** A CMP should offer tools for intelligent workload management. The goal is to dynamically orchestrate and balance workloads to meet changing demands and keep services running at an optimal level of performance without a lot of intervention by your IT operators.

Are the Basics Enough?

For many organizations, the minimum CMP capabilities don't go far enough. Most software-defined data centers are a hybrid mix of public and local resources (Chapter 1 covers the details). Workloads will be a mix of traditional and modern application architectures. They'll be provisioned in an increasingly virtualized mix of physical and virtual environments that will be managed both on-premises and in public clouds.

Self-service isn't enough; organizations need catalog-based self-service with policies that define precisely who can access which service(s) and under which circumstances. Likewise, basic system image provisioning won't cut it — provisioning should include the integrating, orchestrating, and automating of all the infrastructure necessary to support the broader ecosystem for an app-centric result.

To meet this complex set of management requirements, a more advanced CMP has evolved to deliver management capabilities that go well beyond those of a basic CMP. We discuss the capabilities of this enterprise CMP in Chapter 4.

Is OpenStack a CMP?

In recent years, the developer community has added new management capabilities with each new release of the OpenStack open-source cloud platform. That's good news, but that doesn't mean that OpenStack now is a CMP. The capabilities of a true CMP go far beyond the management capabilities available in the OpenStack platform.

"Do not equate OpenStack to a CMP," Gartner stated in a December 2015 research note (www.gartner.com/doc/3173523/openstack-cloud-management-platform). "Even though OpenStack offers some cloud management capabilities, it is not a CMP. CMPs offer a suite of management functionality that cuts across a wide variety of public and private cloud services. OpenStack management only manages OpenStack-provisioned workloads. CMPs manage OpenStack workloads along with those provisioned into VMware, Amazon Web Services (AWS), Azure, etc., in the same manner."

In many ways, CMPs and OpenStack are complementary technologies that can work well together. Here's a great example:

- OpenStack can handle infrastructure provisioning tasks.
- CMP can manage the higher-level work, such as policy-based governance and coordination with external cloud services.

Chapter 3

Revving Things Up: Operationalizing Cloud Management Platform Capabilities

In This Chapter

- Managing the lifecycle of resources via a cloud management platform
- Provisioning a complete services stack
- Managing ongoing changes to the service stack

The capabilities of a more advanced cloud management platform (CMP) that is built for the challenges of today's enterprises go far beyond the minimum CMP capabilities that we identify in Chapter 2.

This chapter presents the advanced capabilities that industry analysts point to when they talk about CMPs that are designed for the challenges of enterprise environments. For more information, see the Gartner IT Glossary: Cloud Management Platforms, at `www.gartner.com/it-glossary/cloud-management-platforms`.

Essential Features of an Enterprise Cloud Management Platform

When you evaluate an enterprise CMP, check for these performance-enhancing capabilities:

- **Integration with external systems:** CMPs don't exist in isolation. That's why they should be designed to integrate with both external enterprise systems and third-party systems. Integration into the broader ecosystem is a required first step for end-to-end, app-centric automation throughout an application's life cycle. Omitting this key capability dilutes many of a CMP's proposed benefits.
- **Service catalogs:** Moving beyond a basic catalog of services, an enterprise CMP provides self-service infrastructure, applications, and other, more complex, services through a unified IT service catalog accessible via a web-based portal. The catalog enables a personalized self-service framework for business consumers and provides a consistent user experience regardless of destination platform.
- **Configuration of storage and network resources:** Management of a hybrid cloud environment doesn't stop at simply managing or automating the underlying compute resources. You also need the ability to configure and manage storage and network resources via the CMP. A CMP should enable the provisioning and management of unified fabrics consisting of compute, storage, network, and application services across private and public cloud environments automatically.
- **Service governors:** An enterprise CMP should include service governors that help you enhance resource management and service delivery.

A key goal here is to maintain the policy and process control required to ensure that services are reliable, highly available, efficiently used, and compliant with your operational and security requirements. Policy-based governance also helps you ensure that multivendor, multicloud services are delivered at the right size and service level for the task at hand.

- **Advanced monitoring:** An enterprise CMP may provide monitoring for improved guest performance and availability. In our experience, a CMP should give you the ability to continuously monitor the utilization, health, and performance of all underlying resources.

Addressing Day 1 and Day 2 Operations

To meet the challenges of an enterprise environment, a CMP must comprehensively address both Day 1 and Day 2 operations — because both Day 1 and Day 2 capabilities are needed to manage services across a hybrid IT landscape. Figure 3-1 compares the Day 1 and Day 2 capabilities.

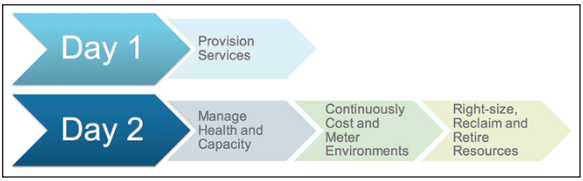

Figure 3-1: Day 2 capabilities go beyond provisioning to enable management across a hybrid IT landscape.

Day 1: Initial provisioning

Day 1 refers to the initial provisioning stage of applications and services. These capabilities allow IT to rapidly provision a complete services stack — application components along with compute, storage, and network infrastructure — across both private and public clouds.

Embedded policy management gives IT control over such decisions as

- The applications and services available to a specific user or group
- The available configuration parameters
- Where applications and services are provisioned
- How resources are consumed

Day 2: Life-cycle management

Day 2 refers to the post-provisioning capabilities available for managing applications and services throughout their life-cycle stages. These include

- Basic operations, such as power on/off, shutdown, restart, destroy, and console connections
- Advanced operations, such as executing in-guest scripts, installing applications, running backups, and migration

Most important, availability of these Day 2 operations should be based on a set of policies. For example, although all users are allowed to provision the latest version of an application, only a subset of users can destroy it after it's been provisioned. In this case the destroy operation is available based on a business policy. Better yet, the operation can be available but require governance for a subset of users.

Day 2 capabilities also extend into the operational stages of provisioned resources, including the ability to intelligently monitor and manage the health and performance of infrastructure and applications across physical, virtual, and cloud environments — with an eye toward meeting your service level agreements (SLAs) with different business units.

To take things a step further, Day 2 capabilities give your operations team the ability to fully manage changes to the service stack, including everything from right sizing to retirement, along with the ability to fully address quality of service requirements associated with the running service.

For example, the CMP provides the ability to continuously monitor resource utilization along with the ability to scale resources up or down as necessary to meet changing business demands. After a service is no longer needed, the CMP should give you the ability to reclaim capacity and to make that capacity available for new requests.

These capacity management capabilities, combined with companion automation capabilities that allow IT to right-size, reclaim, and retire already-provisioned resources, help you make the best use of your data center resources — and your capital and operational budgets.

An enterprise CMP should offer

- Integration with external enterprise systems
- The ability to configure storage and networking
- Service catalogs and service governors
- Day 1 and Day 2 management capabilities

An enterprise use case

To illustrate the capabilities of a full-bodied CMP, here's an example of a typical enterprise, Rainpole, Inc.

The IT department at Rainpole has deployed an enterprise CMP to solve several pressing business needs. The organization also employs traditional tools and services in its data center; several of these tools and services need to be leveraged by all new applications. Rainpole has data centers distributed across the Midwest and recently began to pilot public cloud services.

Here's a step-by-step look at how Rainpole's IT team has leveraged its CMP:

1. Thanks to the hard work by Rainpole IT, Scott (a developer) can log into a common portal by using enterprise Active Directory credentials, browse a catalog of services available specifically for his use, and request the needed platform, application, or service.
2. Depending on the item requested, a governance policy may be automatically initiated to ensure all the proper checks and balances are in place.

   In this case, Scott's manager and the operations team are notified because of a large amount of CPU and memory resources being requested for the application. It's supported — IT just needs to check for accuracy.
3. When approved, this multitiered application is provisioned to a remote data center normally used for disaster recovery due to some unique services and resources available. That decision factor is based on a business policy designed to optimize efficiency while reducing cost for various applications and development cycles.
4. During provisioning, the CMP provides hooks into various external systems to incorporate IP address management, load balancing, backup tools, configuration agents, configuration management databases (CMDBs), software repositories,

(continued)

(continued)

and a help desk ticketing system into the request.

Each of these integrations is automated according to the application's requirements, freeing IT to focus on more strategic efforts.

5. One hour after the request was initiated, Scott receives an email with the application and access details, while the operations team gains an additional application to monitor for SLAs.

   Now, Scott can modify the application and perform various Day 2 operations using the same unified portal.

   What Scott can do with his shiny new application depends on a broad or finite set of Day 2 tasks explicitly allowed by the governing policy, which may include their own governance policies.

6. Scott strikes gold with his new app and returns the favor to Rainpole's IT department by taking them to lunch (a cheap lunch).

Chapter 4

Roaring Ahead: An Enterprise Cloud Management Platform

In This Chapter

- Exploring the attributes of an enterprise cloud management platform
- Showcasing an example platform
- Highlighting key platform capabilities

In this chapter, we dig more deeply into the attributes of a complete enterprise cloud management platform (CMP) and then explore the specific features and capabilities of an actual platform. For this discussion, we use the characteristics of VMware's CMP as an example, which we explore in more detail in Chapter 5.

Many organizations assume that the only cloud management functionality needed to deploy private or public cloud services for their users is a portal for users to request services combined with the ability to automate the provisioning of those services. Similarly, many cloud management solutions focus almost exclusively on the initial provisioning (Day 1). They may include a few life-cycle functions (Day 2), including decommissioning and some operations visibility, but are they really providing the tools you need to effectively manage a multivendor hybrid cloud deployment? We think not.

Let's separate the wheat from the chaff. Here are some essential hybrid cloud management capabilities designed to enable IT to deliver modern services and manage a hybrid cloud in an enterprise environment.

Not all platforms are the same. The features called out here are essential characteristics of an enterprise CMP, but several of these features aren't found in other platforms. Consider this chapter *setting the bar.*

Multivendor Hybrid Cloud Infrastructure

Cloud resources aren't bound to any one virtualization platform, location, or provider. An enterprise CMP needs to enable IT to build heterogeneous resource fabrics across any number of platforms and give consumers the ability to request, deploy, and manage the life cycle of their applications and services in a consistent way. A true enterprise cloud management solution gives IT the ability to take advantage of the unique capabilities of different platforms based on business needs.

Service Delivery

Enterprise service delivery isn't just about providing a basic catalog of services — it's about delivering *any* service to *any* user across a hybrid set of resources with policy-based governance to identify precisely which services are available to any given consumer. While providing a service catalog inclusive of a dozen different flavors of Linux or Windows-based services is neat, providing just about anything as an entitled, governed, and life-cycle managed service (also known as Everything-as-a-Service, or XaaS) is needed to truly modernize IT.

It's time to look beyond basic Infrastructure-as-a-Service (IaaS) and incorporate a broader set of IT services. Need the latest Windows 2012 corporate image? No problem. One of 30 Linux offerings? Still no problem. An F5 load balancer? Easy. Active Directory as a service? Easier. Disparate storage, compute, or networking services? Done, done, and done.

Service delivery and *IaaS* used to be somewhat synonymous. But in a world of software-defined everything, service delivery must extend beyond IaaS and into the broader ecosystem of technologies and services.

Service Authoring

For the service architect, a flexible service authoring platform is a critical piece of rolling cloud services into production. The majority of CMPs employ the blueprint concept (or something similar) to provide administrators with a wide array of authoring options, leveraging any number of user interfaces, for creating and publishing services of varying complexities. Niche solutions can provide simplified authoring tools, but they often lack much-needed enterprise capabilities or extensibility options.

On the other end of the spectrum are the massively complex solutions that claim anything is possible . . . provided that a year-long paid services engagement — and associated timeline, costs, and eventual learning curve — jibes with the business. Although the needs of the enterprise often require complex solutions, service authoring doesn't have to be one of them. An enterprise CMP aligns with the IT needs in this area — noncomplex, quickly adoptable, collaborative, and used for all service design, regardless of the service (see the preceding section).

Federated Identity

Authentication providers (for example, Active Directory) play a critical role in controlling access to enterprise tools and services across an organization. Accessing cloud management tools — regardless of a user's role — is no exception.

Just about all CMPs provide some level of role-based access controls by integrating into Active Directory and/or other providers. Let's call this a fundamental requirement. However, in a world of increased security and access scrutiny, many enterprises are opting for additional layers of authentication, often called *two-factor authentication* (2FA) or *multifactor authentication* (MFA).

In the context of enterprise CMPs, 2FA and MFA options provide enhanced security and access controls by enabling integration into third-party solutions (for example, SAML 2.0 providers). To complicate things a little more, an enterprise CMP should support multiple cloud platforms — private and

public — and must enable access to any number of hybrid resources using common access criteria.

Whether a consumer requests a catalog service that's provisioned to a local private cloud (for example, vSphere or OpenStack-based) or public (such as Amazon Web Services or VMware vCloud Air), access and entitlements should

- Leverage enterprise authentication providers.
- Provide a deep level of policy-based access controls.
- Operate independently from a specific platform.

Comprehensive Life-Cycle Management

As highlighted in Chapter 3, service delivery encompasses much more than initial provisioning. It must include the ability to automate the delivery of Day 2 actions, such as power on/off, remote console access, reconfiguration, snapshot, backup, and archival tasks. An enterprise CMP takes it a step further and allows IT to incorporate external systems and services as a key self-service enabler.

What will it take to gain these capabilities in terms of resources and level of effort? Are they native (built in) or the result of a custom integration effort? Enhanced lifecycle management shouldn't be a complex undertaking, or you risk distracting from the real business value.

Extensibility to Integrate Third-Party Components

In a hybrid cloud environment, the provisioning and ongoing management of almost every IT service requires integration with existing infrastructure tools and processes. This includes multivendor software tools like IP address management (IPAM), configuration management databases (CMDBs), software configuration management, and work-order ticketing systems.

Extensibility also plays a critical role in allowing IT managers to leverage existing investments and potentially increase their overall value to the business. For example, auditing, backup, and patching tools provide critical services to the business but can be challenging to incorporate into a self-service world. The process of incorporating external services will vary based on interface types, but the platform to build those integrations should be readily available.

Given this requirement for extensibility, time to value of a customized solution will be determined by how many of these integrations are available out of the box, as partner-provided plug-ins, or as a completely custom job. An enterprise CMP gives you access to both out-of-the-box and partner-provided integration tools.

Regardless of how the integration is accomplished, a robust partner ecosystem and readily available plug-ins will greatly reduce the complexities and provide increased time to value.

Operational Health and Performance

Does your CMP monitor the health and performance of the services it delivers? If not, how can your administrators or resource consumers take appropriate corrective actions? Or how can you establish policies that will automate both intelligent placement of where resources will be provisioned, as well as corrective actions?

An enterprise CMP should be armed with the tools you need to monitor operational health and performance across your hybrid cloud, performing real-time analytics to pinpoint precisely what's happening holistically (for example, across the entire cloud fabric), at the granularity of a single contributing entity (for example, failing CPU or memory module in a single compute node), or at the application layer.

Besides pointing out what's wrong, the enterprise CMP should recommend — or automatically initiate — one or more actions to remediate the issue.

Capacity Utilization and Planning

One of the guiding principles of a cloud implementation is that it must be perceived to have unlimited capacity. But let's face it: Not even the largest cloud service providers can make that claim. The secret here is to understand capacity utilization and historical growth rate so your available infrastructure can stay ahead of the demand without forcing you to break the bank with unnecessary infrastructure purchases.

To overcome this *cloudy* perception, your cloud management solution needs to operate broadly and provide

- Visibility into your overall capacity, utilization, trends, and potential shortfalls at varying levels of granularity (for example, tenant, business group, or individual user)
- Detailed visibility into overall health and associated risk
- Usage analysis and opportunities to drive efficiency

Cost Transparency

Chargeback or showback often aren't often the top priority for organizations when they deploy cloud services. However, pay for usage is a key function that helps self-regulate cloud usage. Even if there is no immediate plan to communicate the costs to your cloud consumers, understanding the cost impact (and benefits) of deploying a CMP provides needed cost transparency for IT stakeholders.

Cost transparency helps IT understand the total cost for providing any and all services and even provides cost comparisons for the various providers, allowing IT or the consumer to make cost-conscious placement decisions. And later, when the organization is ready to begin charging for these services, you'll need a CMP that can readily provide that capability.

Multiple Interfaces

When evaluating CMPs, most people think of a graphical user interface (GUI) that lets users define their IT services and governance policies and request and manage their resources. The simplicity and usability of a GUI is an important part of any CMP, but command line interfaces (CLIs), workflow engines, and application programming interfaces (APIs) have become just as important for "headless" management of infrastructure.

Although the primary interaction for the administrators and users may be through the GUI, increasingly, CLIs are needed to script bulk operations while APIs provide additional integration opportunities and help development and test teams link provisioning tasks into their continuous delivery release automation processes. An enterprise CMP gives you all these capabilities — a user-focused GUI, CLIs, and APIs — based on business needs.

Partner and Community Ecosystem

A primary objective of deploying automated cloud services is to increase the speed of IT while improving the stability and compliance of the services delivered. To do this in a repeatable fashion, your organization needs to standardize its processes. However, these processes must be standardized on the organization's environment of infrastructure, tools, and best practices, and not on some vendor's or other company's practices.

For this reason, no single commercially available CMP can meet the needs of every company on its own, no matter how broad the interoperability or extensibility options. This is why the CMP shouldn't be only extensible in its design but should have a partner and community ecosystem of plug-ins that work with the existing and future environment. This solution ecosystem will allow IT to deliver a business-relevant cloud that meets the organization's unique needs in the shortest amount of time and with the least possible risk.

Skills Availability

The quickest way to deploy an IT solution is to leverage the experiences of someone who has already deployed the same solution. A knowledgeable professional services engineer can significantly reduce the time, cost, and risk associated with deploying your CMP. That's why an enterprise CMP is backed by skilled engineers.

This leads to some important questions to keep in mind when shopping for a CMP:

- Does the vendor have sufficient critical mass of service-delivery people, and are those people available where you need them? If not, are there partners with the appropriate skills and experience to augment the vendor's resources?
- Does the vendor provide adequate support resources to respond to your requests in a timely fashion?

Enterprise Proven

One proven and effective method of reducing risk is to leverage the learnings and experience of others. The good news is that CMPs are no longer bleeding-edge technologies. Many of the leading commercial providers have been deploying solutions for ten years or more, providing hundreds or thousands of deployments.

The best way to reduce risk with your CMP project is to deploy a cloud management solution that has a number of successful deployments at a wide variety of businesses. This gives you the confidence that the product is robust and flexible enough to meet the specific needs of your business.

As you search for the right CMP for your organization, be well aware of the features, capabilities, and other CMP characteristics that will provide your business increased value, enhanced capability, and reduced risk. Focus on time to value by seeking out streamlined solutions, integration, and automation of the tools you've already invested in, and a platform that *delivers* — not just sells — what's most important to your organization.

Chapter 5

Introducing the VMware Cloud Management Platform

In This Chapter

- Exploring the VMware cloud management solution
- Highlighting the value of proven technologies from a trusted market leader
- Introducing VMware vRealize Suite

In this chapter, we introduce VMware's industry-leading cloud management solution — delivered with VMware vRealize Suite — and explore its tight alignment with the principles of what an enterprise cloud management platform (CMP) *should* be.

Right out of the gate, the VMware CMP is designed to speed up IT service delivery, improve IT efficiency, and optimize IT operations and capital spending in enterprise environments. These are all must-haves for an enterprise platform.

At a functional level, the VMware CMP, which is based on the components of the VMware vRealize suite, provides the management capabilities to address two key IT initiatives:

- Streamlined and automated data center operations
- Application and infrastructure delivery automation

These capabilities are essential for managing an enterprise-scale hybrid cloud environment throughout all life-cycle stages.

What the VMware Platform Offers

The VMware platform delivers on three top-level requirements for an enterprise CMP:

- A comprehensive enterprise cloud management solution
- A platform for managing the software-defined data center (SDDC)
- Proven technologies from a trusted market leader

A comprehensive enterprise cloud management solution

Unlike the many niche products or point solutions available for managing targeted cloud resources, the VMware CMP is designed to serve as a complete CMP. The VMware CMP offers all the features of an enterprise CMP, plus many innovations unique to VMware:

- Life-cycle management across Day 1 service provisioning and Day 2 ongoing operations (see Chapter 3)
- Management across compute, network, storage, and application services
- Management across *any* hypervisor (VMware vSphere and non-vSphere, or heterogeneous, hypervisors)
- Management across private, public, and hybrid clouds
- Integration with third-party independent software vendor solutions and other extensibility mechanisms to support interoperability across the IT ecosystem

Taking a holistic approach also means recognizing that enterprises often have third-party and custom-built solutions. To meet the needs of the most diverse IT environments, VMware delivers a CMP that is highly extensible to facilitate integration with a vast ecosystem of software, hardware, and services partners.

Gartner may have said it best in its "Market Guide for Cloud Management Platforms: Large, Emerging and Open-Source Software Vendors" report, which noted

> VMware, unlike most CMP vendors, is starting to pull the pieces together into a CMP that offers the automation, operational, and business management aspects needed in enterprise deployments.

A platform for managing the software-defined data center

The VMware CMP is designed to serve as the management control plane for the SDDC. Through the SDDC, VMware is reimagining the data center by extending the paradigm of resource abstraction to all infrastructure domains, across both on-premises private clouds and public clouds.

To enable this expanded role, native integrations across VMware SDDC technologies support a rich set of out-of-the-box functionality for operations, automation, and business-oriented functions. For example, VMware CMP provides native integration of VMware NSX, a leading network virtualization technology, and enables drag-and-drop capabilities for incorporating application-centric, on-demand networking. This can translate to faster time to value at a lower cost than might otherwise be possible.

Many enterprises are still in the early phases of rolling out a software-defined strategy. For that reason, VMware's CMP can provide immediate benefits to data centers at any stage, regardless of whether they're just beginning to move beyond basic virtualization or they've gone all-in with SDDC.

Proven technologies from a trusted market leader

As the company that pioneered the use of virtualization in data centers, VMware is both a trusted vendor and a market leader. VMware's flagship virtualization technology, vSphere, has saved IT organizations, both large and small, billions of dollars in capital expenses. Hundreds of industry partners

and service providers have also depended on VMware as the foundation of their services for many years.

VMware's CMP is a critical capability within the SDDC architecture, and the cloud management capabilities that comprise the VMware platform have been proven through thousands of deployments across both mission-critical and large-scale environments.

Customers' trust in VMware and the technical strength of VMware cloud management offerings have helped make VMware the leading vendor in both cloud systems management and cloud automation.

VMware vRealize Suite

The VMware CMP (the *what*) is built with the components of VMware vRealize Suite (the *how*). VMware vRealize Suite is an enterprise cloud management platform that delivers a complete solution for managing a heterogeneous, hybrid cloud.

vRealize Suite supports cloud management requirements across Day 1 and Day 2 operations for compute, storage, network, and application-level resources. Native integrations across VMware technologies make vRealize Suite the natural choice for organizations building a VMware-based SDDC.

Unlike traditional management solutions, VMware vRealize Suite is purpose-built for managing the vast diversity and many complexities of the heterogeneous data center and the hybrid cloud:

- Although it's optimized for vSphere environments, it can provision and manage applications across other hypervisor platforms, such as Microsoft Hyper-V and Red Hat KVM.
- VMware vRealize Suite also extends the unified management experience to
    - External cloud service providers, such as VMware vCloud Air and Amazon Web Services
    - OpenStack-based private and public clouds
    - VMware SDDC-as-a-Service providers, such as IBM Cloud

Table 5-1 outlines the various vRealize Suite products and their functions and benefits.

Table 5-1 vRealize Suite: Functions and Benefits

Product	*Function*	*Benefit*
vRealize Automation	Automate the delivery of infrastructure and application services	Business agility; right-size app/resources; reclaim inactive resources
vRealize Operations	Automate operations management, including performance, capacity, and configuration management	Holistic view of infrastructure and applications; proactively avoid performance issues; enable optimal resource usage
vRealize Log Insight	Real-time log management across physical, virtual, and cloud environments	Proactively identify and resolve problems faster with intelligent operations across all machine-generated data
vRealize Business	Get transparency and control over the costs/quality of IT services	Control/optimize IT budget; align IT with business priorities

With VMware vRealize Suite, the VMware CMP is designed to help your organization gain the agility and speed that are essential to claiming and maintaining a competitive advantage. At the same time, your IT team gets the tools you need to manage uptime, performance, compliance, and cost of infrastructure and applications.

The VMware CMP is an example of

- A complete cloud management solution
- A platform for managing the SDDC
- Proven technologies from a trusted market leader

Chapter 6

Top Use Cases for Cloud Management Platforms

In This Chapter

- Powering intelligent operations management
- Unleashing the ability for IT to automate its services
- Enabling DevOps-ready IT

In this chapter, we explore top use cases for cloud management platforms (CMPs). In our experience, the most common and valuable use cases for CMP solutions fall into three categories (as shown in Figure 6-1):

- **Intelligent operations management** to proactively address health, performance, and capacity management of IT services across heterogeneous and hybrid cloud environments to improve IT service performance and availability.
- **IT Automating IT** to automate the delivery and ongoing management of IT infrastructure to reduce the time it takes to respond to requests for IT resources and to improve the ongoing management of provisioned resources
- **DevOps-ready IT** to build a cloud solution for development teams that can
  - Deliver a complete application stack
  - Support developer choice in the form of both application programming interface (API) and graphical user interface (GUI) access to resources
  - Provision resources across a hybrid cloud

  To further speed up application delivery, you can extend the solution scope by addressing continuous delivery.

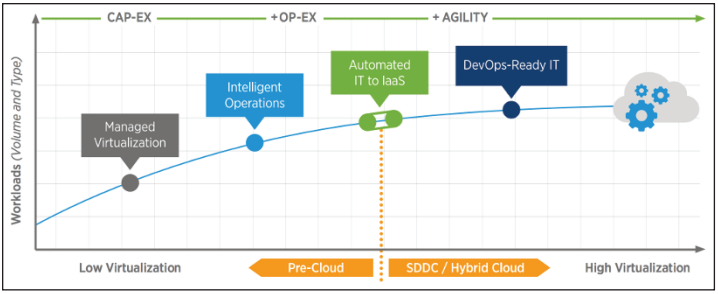

Figure 6-1: The top use cases for an enterprise CMP build on each other to deliver business value.

In many ways, these use cases build on each other. Let's take a closer look at each of them.

Intelligent Operations Management

The complexity associated with increased scale, more dynamic workloads, and the adoption of hybrid cloud services has made managing today's application environments extremely challenging. An enterprise CMP responds to these management challenges by providing unified management of compute, storage, networks, and applications with a single view of environmental health.

The VMware CMP provides IT with all the tools and visibility to effectively manage the performance, availability, capacity, and cost of IT services across a heterogeneous and hybrid cloud with potentially tens of thousands of physical and virtual servers, networks, and storage devices. It also delivers the benefits of advanced analytics that help IT respond proactively to avoid issues that are developing while providing the visibility needed to quickly resolve issues that do occur, as shown in Figure 6-2.

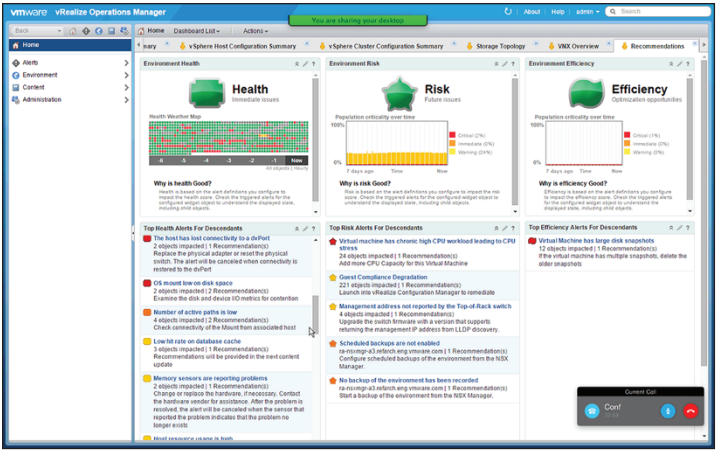

Figure 6-2: Intelligent operations capability enables proactive management of the hybrid cloud environment.

Intelligent operations management delivers benefits beyond simply ensuring that applications meet performance and availability expectations. Proactively managing performance and availability with the CMP can allow operations and support staff to spend significantly less time troubleshooting incidents, reducing the operating expense associated with these tasks. A strong discipline in capacity management also helps you fully maximize data center resources, saving capital expense.

An enterprise CMP helps you

- Proactively solve performance issues.
- Continuously monitor and manage capacity.
- Streamline processes with customizable policies, guided remediation, and automated enforcement of standards.
- Understand the cost and consumption of private and public cloud services.

Case study: AutoTrader.com

AutoTrader.com is an online automotive marketplace with nearly 4 million vehicle listings from 40,000 dealers and 250,000 private owners in the United States. The company's web and mobile properties attract more than 16 million qualified buyers every month.

AutoTrader uses VMware vRealize Suite to provide comprehensive visibility into real-time performance across a complex environment. The solution helps keep system downtime to a minimum, while significantly reducing operating costs. For AutoTrader, one huge benefit of using vRealize Suite has been the ability to dramatically improve consolidation ratios (ratio of VMs to CPUs).

"Before vRealize, we tended to hover around 8:1, but now it's fairly normal for one of our development clusters to be at 60:1, and sometimes even higher than that," said Chris Nakagaki, Virtualization Architect, AutoTrader.com.

IT Automating IT

Many enterprises have "semi-automated" the delivery of infrastructure to development and production groups using a series of scripts, workflows, and configuration management tools, but most are unable to meet the needed agility, speed of delivery, or high levels of operating efficiency.

Service authoring and delivery

An enterprise CMP helps IT overcome this challenge by delivering the capabilities IT needs to fully automate service delivery and ongoing management of shared service infrastructure. IaaS, in turn, takes these efforts one step further by exposing the CMP's automation capabilities directly to consumers through a self-service portal, as illustrated in Figure 6-3.

With the VMware CMP, IT gains the ability to model all services — no matter what that service is — as *blueprints*. This is accomplished by leveraging the unified service designer — a single, converged designer for all blueprint

authoring. Blueprints are built on a dynamic drag-and-drop design canvas. Admins can choose any of the available components, drag them onto the canvas, bind dependencies, and publish the finished product to the service catalog of choice (see Figure 6-4). The supported components include the operating systems, software, networks, VMware NSX-provided dynamic networking and security services, external services, and even other blueprints.

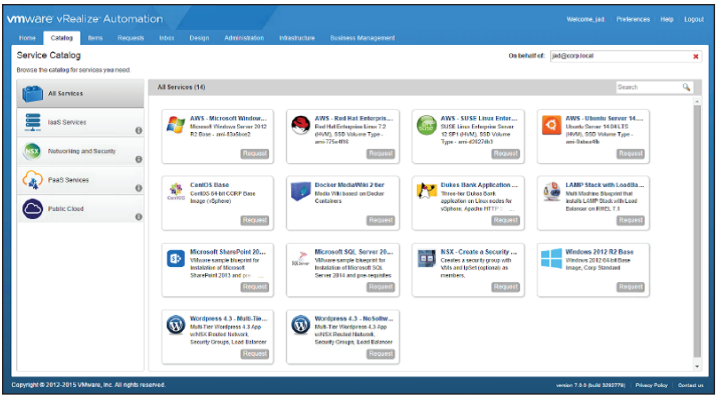

Figure 6-3: In an enterprise CMP, automation capabilities are exposed directly to IT customers through a self-service portal.

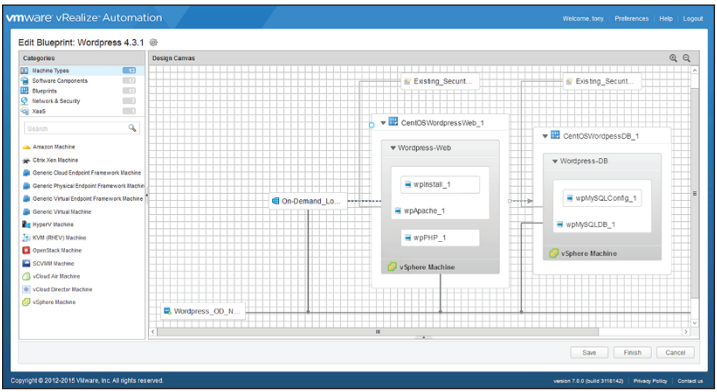

Figure 6-4: In the VMware CMP, IT gains the ability to model all services as blueprints built on a dynamic drag-and-drop design canvas.

This capability allows an infrastructure or application architect to quickly design complex services in an intuitive user interface, collaborate with other architects, and publish the blueprint when complete.

Get a close-up look at building a multitier application in vRealize Automation 7.0 on the VMware Cloud Management YouTube channel: `https://youtu.be/B7CEp8RnJwo`.

Building an application or service in the unified designer can be a ton of fun, but we're always looking for ways to drive efficiency. To facilitate exporting blueprints for versioning or use across other tenants or environments, entire blueprints can be exported as a human-readable file, known as *infrastructure as code*. When exported, admins can edit, change, and manipulate the content however they see fit, and then import it back into any available environment as a new blueprint.

The VMware CMP provides a rich set of governance policies that are configured to determine specifically

- Which users or groups can access any specific published service or Day 2 action
- Whether approvals are required when a user requests the service or action

Life-cycle extensibility

As we've already concluded, there is no single-vendor solution for building and managing a modern hybrid cloud. Cloud management requires IT to plug into several disparate components. A typical private cloud alone can include dozens of unique vendors, platforms, and services that may need to be incorporated into the provisioning workflow of an application. This means integrating, automating, and orchestrating any number of external systems during application provisioning.

The VMware CMP delivers an extensibility engine to do just that: the Event Broker. The Event Broker is a centralized, UI-driven extensibility platform to enable serious life-cycle state automation without all the complexities of traditional tools.

Organizations that leverage the VMware CMP to address infrastructure provisioning routinely report reductions in the

time it takes to provision resources, dropping from three to four weeks to less than an hour. And in addition to accelerating the initial provisioning process, or Day 1 operations, the VMware CMP delivers the essential Day 2 capabilities that support advanced life-cycle functions, continuous monitoring of resource utilization, and the ability to right-size (up or down) and reclaim capacity as needed. These capabilities help IT make sure applications have the resources they need to meet performance and availability requirements and that those resources are used as efficiently as possible, reducing the need for new capital expenditures.

Cost transparency

The VMware CMP also provides differentiated Day 2 capabilities in the area of cloud business management and cost transparency. The VMware CMP automates infrastructure costing and usage metering and supports financial processes, such as service pricing, investment planning, and consumption reporting. Business management capabilities give IT the ability to compare the cost of running workloads in either a private or public cloud environment to facilitate workload placement decisions.

Federated identity

Providing basic authentication and access controls to the hybrid cloud can present a significant challenge. All cloud services must be delivered securely regardless of where they'll ultimately be provisioned, while also meeting the enhanced access security measures in place at many enterprises. To meet this need, the VMware CMP federated identity brokering provides native support for third-party SAML 2.0 authentication providers, the ability to incorporate two-factor and multifactor authentication mechanisms, OAuth2 token support, policy-based access controls, and several additional capabilities worthy of the most secure enterprise.

Best of all, these capabilities extend to any cloud platform management via the CMP, instantly providing a means for delivering public cloud resources (for example, Amazon Web Services) to the entire enterprise using local, federated identity sources.

Case study: Tribune Media

With a diverse portfolio of television and digital properties, Tribune Media is the largest independent broadcaster in the United States.

Tribune Media uses VMware vRealize Suite along with other VMware software-defined data center solutions to speed up IT service delivery while dramatically improving IT efficiency. Using VMware solutions, Tribune Media has *more than tripled* the number of IT projects delivered to the business. The team also reduced the cost of IT by 80 percent while achieving "five nines" of uptime.

David Giambruno, Senior VP and CIO of Tribune Media sums it up: "(Today) we operate literally in minutes and seconds, not days and weeks."

Get a close-up look at VMware Identity Management in vRealize Automation 7.0 on the VMware Cloud Management YouTube channel: `https://youtu.be/X1ed5wIzFAA`.

An enterprise CMP enables your team to

- Embed automation and policy within blueprints to help you stand up production-ready infrastructure in minutes rather than weeks.
- Right-size, reclaim, or retire already provisioned resources to maximize capital investments.
- Continuously monitor the health, performance, capacity, and costs of already-provisioned resources.

DevOps-Ready IT

To accelerate time-to-market for tested software applications and updates, many enterprises are adopting the DevOps process. Organizations that have made DevOps a business-critical priority are transforming both the process of developing software and the way that IT operations and application development teams work together.

The VMware CMP supports the needs of teams embracing DevOps in several ways. Right out of the gate, the VMware CMP enables IT organizations to provision infrastructure and applications to developers in minutes.

Because many companies have a mix of developer types with different requirements for how they interact with infrastructure, the VMware CMP provides developers access to infrastructure resources through both an API and a self-service portal. Policies that control the *who, what,* and *where* of resource provisioning are enforced regardless of the method used by developers to access resources.

With a unified approach to modeling a complex, multitier application, the VMware CMP dramatically speeds up the delivery of complete application stacks to developers. But its capabilities don't stop there. As shown in Figure 6-5, the VMware CMP is designed to work in tandem with the additional capabilities of VMware vRealize Code Stream to provide a continuous delivery solution that supports the automation of the deployment pipeline.

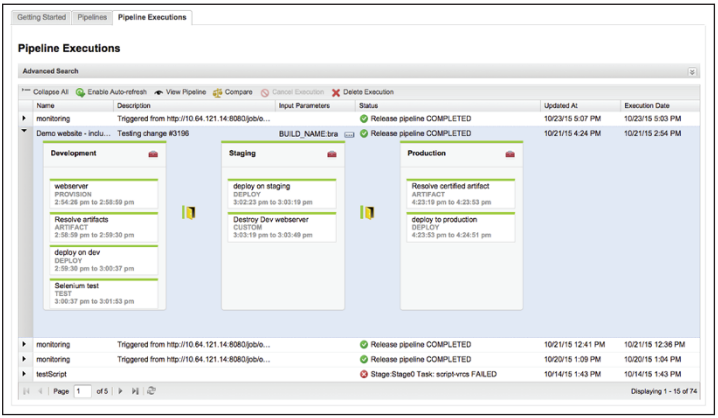

Figure 6-5: The VMware CMP is designed to work in tandem with VMware vRealize Code Stream to provide a continuous delivery solution that supports the automation of the deployment pipeline.

Code Stream enables continuous delivery by automating the tasks required to build, deploy, and test at each stage in the release delivery pipeline, including gating rules between stages. To automate the delivery, Code Stream integrates with and orchestrates the release process by leveraging existing software development life-cycle tools. The end result: Your enterprise can release higher-quality applications faster while reducing operational risk.

An enterprise CMP helps you

- Rapidly provision a complete application stack within a private or hybrid cloud.
- Provide both self-service and an API approach to support developer choice in how resources are accessed.
- Deliver a solution for continuous delivery that seamlessly integrates with the VMware CMP for resource provisioning.

Case study: Choice Hotels

Choice Hotels International is one of the world's largest and most successful lodging companies. The company currently franchises more than 6,300 hotels in more than 35 countries and territories, representing more than 500,000 rooms.

Choice Hotels was looking for a solution that would help it speed up the delivery of infrastructure and application resources to its development teams. It was also looking for a solution to help it more easily troubleshoot performance issues in its environments. It found both while working with VMware.

Using vRealize Suite, the team reduced the time to provision an application from six weeks to less than 30 minutes while also reducing IT operating costs by resolving more performance issues before they cause downtime.

Chapter 7

Getting Started with the VMware Cloud Management Platform

In This Chapter

- Outlining a path forward
- Preparing for what lies ahead
- Highlighting potential pitfalls and tips to overcome them
- Setting a winning strategy

In this chapter, we show you how your organization can get started with planning a cloud management platform (CMP) implementation, navigating the potential roadblocks, and empowering your team to deliver real results.

In an ideal world, a well-defined strategy is executed with perfection. But that isn't the world you live in. You can't ignore the past decisions that have impacted business direction, the substantial investments made in legacy platforms, or even the strategic vendor relationships built over the years. And although the need for and associated benefits of a CMP may be obvious to some, there are still several important factors to consider before jumping all in.

Implementing a CMP can revolutionize how IT operates and responds to emerging business needs, providing new opportunities to drive innovation. Measuring success can also be tricky. The ability to deliver clear, tangible results means understanding the key objectives of the business and focusing on those goals.

As we note throughout this guide, one of the benefits of a CMP is to help eliminate excess work and refine legacy IT processes, while also maximizing IT and business agility. Imagine the transition from simply responding to a never-ending list of demands to proactively partnering with the line of business to drive stronger results.

Like past evolutions, the CMP journey isn't about buying a product and rolling it out. It's about delivering real value, real benefits, and trusted technologies. Focus on the primary use cases — intelligent operations, IT automation, Infrastructure-as-a-Service, and DevOps-ready IT — and set your goals accordingly.

Getting Business Buy-in

Are you comfortable articulating the benefits of rolling out an enterprise CMP across your organization to your stakeholders? Do you have a clear understanding of what it takes? An IT transformation requires a new strategy to address both the technology decisions and the accompanying cultural, financial, political, and process considerations. You will get push-back.

That's worth repeating: *You will get push-back.*

Where that push-back comes from, and how it impacts your efforts, will depend on a multitude of factors. Watch out for some of the regular arguments:

- Automation is for wimps. My 850-line script does the job just fine!
- Besides, what will I do with all that free time?
- Why do we need a CMP strategy? We're already heavily virtualized!
- I'm okay waiting six weeks for a basic Windows machine.
- Don't waste your time. This organization will never change its legacy processes!
- Inefficiency equals job security. Not interested!

If you haven't heard (or don't expect to hear) any one of those arguments, congratulations! You've found the perfect job! But when you do get push-back, be prepared with real data, a clear strategy, and outcomes that align with real business needs.

Don't oversell. Use what you've learned in this guide to paint a realistic — and achievable — picture. Discuss the winning strategy with each of your stakeholders, the many IT silos, your chief information security officers (CISOs) and information security (InfoSec) leads, and anyone else who needs to be in the know.

Professional services can alleviate much of the pain, lack of in-house skill sets, and required planning. Leverage your partners to gain expertise and best practices and help you develop and execute your strategic plan for the CMP roll out.

Delivering Immediate, Tangible Results

What does it take to be an IT leader? Boasting a wall covered with industry certifications is respectable, but leadership is more about results. You have to understand the importance of setting a foundation, building a feasible strategy, executing to plan, and showing results.

Quick wins are a great way to demonstrate immediate results and have something interesting to share in your weekly stakeholder meetings. A win doesn't necessarily mean you moved mountains overnight or completely revamped your organization's legacy processes in a day. Set your success criteria in achievable chunks, and then demonstrate your team's ability to deliver. Finally, stay laser-focused and provide regular status reports to your line-of-business stakeholders; they're looking at you to ensure their investments are providing a valuable return.

Empowering Your Team

Understanding the required skillsets, bandwidth, and overall level of effort for designing, implementing, and operating a hybrid cloud will help you determine how to best train your teams and how to incorporate external resources (for example, hired professional services) to keep the project on track:

- Break down the silos and create a team of CMP ninjas, incorporating all the folks who have a vested interest in the success of the project.
- Enable collaboration throughout each phase of the project and be sure to celebrate each and every win.
- Take the time to call out the IT champions with each phase of the project.
- Provide the training, tools, and resources your team needs to be successful.

You are not alone

Are you ready? It's okay if you aren't — in fact, most organizations struggle to respond to this seemingly simple question. But don't worry, that isn't necessarily a bad thing. Learn to better leverage professional service partners, trusted advisors, and the available expertise. A reputable professional services offering can alleviate much of the learning curves skillset gaps, but how you leverage them is up to you.

Chapter 8

Ten Cloud Management Platform Resources

In This Chapter

- Highlighting resources packed with cloud management platform insights
- Linking to research reports, blogs, and product information

Ready for a deeper dive into the concepts and technologies embodied in a cloud management platform? Immerse yourself in our recommendations for resources that will enrich your understanding of cloud management platform (CMP) and the tools that can help you get started.

If you count carefully, you may decide we've put more than ten resources in this chapter. But they're all great!

- **"Multi-Cloud Environments Are Becoming the New Normal for IT":** You can see how enterprises are leveraging hybrid and multi-cloud strategies in this VMware-commissioned report from Dimensional Research. The research, published in February 2016, investigates cloud adoption patterns and examines the benefits customers expected to receive from their cloud implementations, along with the current levels of automation being used to operate these clouds. Go to `www.vmware.com/files/pdf/products/vrealize-suite/vmware-managing-the-multi-cloud-environment.pdf` for more.
- **"Cloud Management and Automation":** According to this report from 451 Research, a leading global analyst and data company focused on the business of enterprise

IT innovation, "tools for cloud management and automation are poised to become the 'assembly line' for integrated cloud services": www.vmware.com/files/pdf/management/451-cs-cloudmmtautomation-final.pdf.

- **"Competitive Analysis of the VMware vRealize Cloud Management Platform":** In this white paper from the Virtualization Practice, gain a third-party view of the criteria for a new management stack for the hybrid cloud era. See how the VMware vRealize Suite and several leading alternatives stack up against those criteria. Go to www.vmware.com/files/pdf/vrealize/VMware-vRealize-Cloud-Management-Platform-Competitive-Analysis-2014.pdf.
- **"Get the Cloud Working for You: Cloud Management by VMware":** Explore a brave new model for IT, based on one cloud, any application, and any device — enabled by an integrated cloud management platform that simplifies key IT management tasks. You can find this video here: https://youtu.be/wN_33PggXMs.
- **"Simplify and Automate IT Management":** Learn how a unified cloud management platform can help you simplify and automate the way you mange IT—and enable the ultimate goal of delivering IT as a service. You can find this video here: www.vmware.com/virtualization/cloud-management#4518772162001.
- **"Streamlined and Automated Data Center Operations":** See how VMware's software-defined data center enables streamlined and automated IT operations in the era of hybrid cloud environments. You can find this video here: https://youtu.be/0797nw6OuQE.
- **"Application Infrastructure and Delivery Automation with VMware":** See how the VMware software-defined data center enables application and infrastructure delivery automation to accelerate time to market for IT services. You can find this video here: https://youtu.be/SE3yJy25gY8.
- **VMware Cloud Management blog:** Get the inside view of cloud management from people who live and breathe CMP. Gain insights into better management of hybrid data centers with CMP. Check out this blog at http://blogs.vmware.com/management.

- **VMware Cloud Management Platform site:** Take a closer look at the VMware CMP and its key product components. Find links to customer case studies, social communities, and more. Go to `www.vmware.com/virtualization/cloud-management`.
- **VMware vRealize Suite:** Learn how VMware vRealize Suite extends cloud management platform capabilities beyond VMware vSphere to address the management of non-vSphere hypervisors, physical infrastructure, and hybrid cloud environments. Go to `www.vmware.com/products/vrealize-suite`.
- **VMware vRealize Product Walkthrough:** Explore how VMware vRealize Suite — an enterprise-ready cloud management platform — can help you accelerate cloud service delivery, improve cloud operations and optimize cloud costs. Go to `https://featurewalkthrough.vmware.com/#!/vrealize-suite`.

Glossary

2FA: *See* two-factor authentication (2FA).

actions: Operations that can be performed on provisioned items. *See* Day 2.

analytics: The discovery, interpretation, and communication of meaningful patterns in data.

Anything-as-a-Service (XaaS): A framework or ability to publish any custom service in a manner similar to Infrastructure-as-a-Service.

API: *See* application programming interface (API).

application: A program designed to perform a group of functions, tasks, or activities, primarily for the benefit of the business, users, or other applications.

application architect: A role or persona that designs or creates an application based on a defined user or business criteria.

application lifecycle: The phases in which an application enters from time of provisioning to decommissioning.

application programming interface (API): A set of routines, protocols, and tools for building software applications. The API specifies how software components should interact. APIs are used when programming graphical user interface (GUI) components.

automation: The ability to integrate and automate infrastructure, applications, or services using various software tools for the purpose of reducing complexity of repetitive tasks.

blueprint: The complete specification for a virtual or cloud machine, used to determine a machine's attributes and how it is provisioned.

cloud: A general term used to represent the delivery of infrastructure, applications, and services over the Internet using a utility model of consumption.

As defined by the National Institute of Standards and Technology (NIST), the cloud is a model for enabling ubiquitous, convenient, on-demand network access to a shared pool of configurable computing resources (for example, networks, servers, storage, applications, and services) that are rapidly provisioned and released with minimal management effort or service provider interaction. This cloud model has five essential characteristics, three service models, and four deployment models.

catalog: A collection of one or more IT services typically organized in similar groups and accessed from a graphical user interface (GUI). Also referred to as cloud catalog, portal, or service catalog.

CLI: *See* command line interface (CLI).

cloud broker: A service provider that acts as an intermediary between the consumer (user, group, or organization) of cloud computing services and the cloud providers, typically intended to deliver additional value to the consumer.

cloud catalog: *See* catalog.

cloud management platform (CMP): Integrated products that provide for the management of public, private, and hybrid cloud environments.

cloud provider: A provider of public, private (on-premises), or hybrid cloud resources and services.

CMDB: See configuration management database (CMDB).

CMP: *See* cloud management platform (CMP).

command line interface (CLI): A means of interacting with a computer program where the user (or client) issues commands to the program in the form of successive lines of text (command lines).

compute resource: An object that represents a host, host cluster, or pool in a virtualization platform, a virtual data

center, or an Amazon region on which machines can be provisioned.

configuration management database (CMDB): A repository that acts as a data warehouse for IT installations.

consumer: One or more users, groups, or organizations requesting cloud services.

continuous delivery: A software development approach in which development teams produce software in short cycles, ensuring that the software can be reliably released at any time.

cost metering: Tools and services designed to help cloud providers or consumers understand the cost of infrastructure and the consumption of resources.

Day 1: The initial provisioning stage of applications and services into both private and public (that is, hybrid) clouds.

Day 2: The post-provisioning capabilities available for managing applications and services throughout their life-cycle stages.

decommissioning: Removing an application, system, or service from its active state, usually done as a post-provisioning (Day 2) operation.

DevOps: A term used to represent the relationship between development and IT operations teams in association with agile software development.

DevOps-ready IT: To build a cloud solution for development teams that can deliver a complete application stack, support developer choice in the form of both application programming interface (API) and graphical user interface (GUI) access to resources, and to provision resources across a hybrid cloud.

ecosystem automation: The process or ability to integrate with and automate a broad set of IT infrastructure tools and services — both modern and traditional — by leveraging available protocols, plugins, or workflows.

ecosystem integration: The ability to leverage available protocols, plugins, workflows, or other native controls to incorporate a broad set of IT infrastructure tools and services.

elasticity: The ability to expand and contract (scale out/scale down) logical infrastructure or applications as needed throughout a system's life cycle.

entitlement: A policy that determines which users and groups can request specific catalog items or perform specific actions.

federated identity: The process logically linking two or more identity sources.

governance: The use of specific policies or processes to control the use and consumption of infrastructure, applications, or services.

graphical user interface (GUI): A type of interface that allows users to interact with electronic devices through graphical icons and visual indicators.

GUI: *See* graphical user interface (GUI).

heterogeneous: In the context of cloud infrastructure, a system or infrastructure made up of one or more different types of compute platforms (for example, vSphere, Hyper-V, or OpenStack).

hybrid cloud: A combination of public (hosted) and private (on-premises) cloud services, generally made to appear seamless for the end user.

hybridity: The ability to facilitate movement of applications, or application components across hybrid cloud infrastructures using flexible application configuration and security policies.

hypervisor: A program or platform that abstracts a host's underlying physical hardware and enables multiple operating systems to share the hosts compute, network, and storage resources.

IaaS: *See* Infrastructure-as-a-Service (IaaS).

information technology (IT): The application of computers to store, retrieve, transmit, and manipulate data, often in the context of a business or other enterprise.

infrastructure: The hardware and software components, such as compute, storage, network, and virtualization software, that together deliver resources to applications and services.

Infrastructure-as-a-Service (IaaS): A cloud services model that provides virtualized and/or abstracted computing resources, usually on demand.

infrastructure as code: A type of IT infrastructure definition that enables application architects or operations teams to manage and provision services using human-readable code, instead of using a manual process or UI-based interfaces.

intelligent operations: Management tools that supply predictive analytics and alerting on application and infrastructure health, enabling proactive identification and remediation of emerging performance, capacity, and configuration issues.

Intelligent Operations Management: Proactively address health, performance, and capacity management of IT services across heterogeneous and hybrid cloud environments to improve IT service performance and availability.

Internet Protocol Address Management (IPAM): A means of planning, tracking, and managing the IP address space used in a network.

interoperability: The capability of different programs or systems to exchange data using a common set of exchange formats and to use common protocols.

IPAM: *See* Internet Protocol Address Management (IPAM).

IT: See information technology (IT).

ITaaS: *See* IT-as-a-Service (ITaaS).

IT-as-a-Service (ITaaS): An operational model where the IT organization of an enterprise is run much like business, acting and operating as a distinct business entity delivering services for the other line of business (LOB) organizations within the enterprise.

IT Automation and Infrastructure-as-a-Service: Automate the delivery and ongoing management of IT infrastructure

to reduce the time it takes to respond to requests for IT resources and to improve the ongoing management of provisioned resources.

just-in-time provisioning: *See* on demand.

life-cycle extensibility: A platform-level capability enabling the injection of custom logic (for example, scripts, workflows, API calls, and so on) at various predetermined IaaS life-cycle stages.

life-cycle management: The ability to manage a machine, application, or service throughout its various life-cycle stages (for example, provisioning or decommissioning).

line of business (LOB): A general term that describes the products or services offered by a business or manufacturer.

LOB: *See* line of business (LOB).

MFA: *See* multifactor authentication (MFA).

multifactor authentication (MFA): A security system that requires more than one method of authentication from independent categories of credentials to verify the user's identity for a login or other transaction.

multitenancy: The sharing of resources and services across large pools of logically segregated consumers for the sake of providing centralized management and high efficiencies.

NSX: The VMware network virtualization platform for the software-defined data center (SDDC), bringing the operations model of a virtual machine to the data center network.

on demand: A means of delivering any service or application only as it is specifically requested. Also known as *just-in-time provisioning*.

open source: Software for which the original source code is made freely available and may be redistributed and modified.

OpenStack: An open-source software platform for cloud computing, mostly deployed as an Infrastructure-as-a-Service (IaaS).

PaaS: *See* Platform-as-a-Service (PaaS).

Platform-as-a-Service (PaaS): Cloud services designed primarily to host development tools and general software development.

policy-based access: One or more policies designed to control access to cloud infrastructure, applications, or services, based on security requirements.

pooling: The ability to abstract and seamlessly aggregate compute, storage, and network resources to be consumed by applications and services. Pooling is primarily delivered using a hypervisor.

portal: *See* catalog.

private cloud: Cloud services typically delivered from an organization's own data centers.

provisioning: The initial deployment, installation, or activation of infrastructure, applications, and services.

public cloud: Cloud services delivered by an external/third-party service provider as a utility model and based on the specific needs of a business.

release automation: The automated process of packaging and deploying applications from the initial development stage, across various stages, and eventually into production.

remediation: The ability to correct, patch, or fix a system, application, or service based on a defined set of criteria.

SAML: *See* Security Assertion Markup Language (SAML).

Security Assertion Markup Language (SAML): An XML-based, open-standard data format for exchanging authentication and authorization data between parties — in particular, between an identity provider and a service provider. SAML is a product of the OASIS Security Services Technical Committee.

self-service portal: A UI-based collection of one or more IT services (also known as a catalog), intentionally exposed to the end user for requesting services.

semiautomation: A hybrid of manual process and automation.

service catalog: A unified self-service portal for consuming IT services, enabling users to browse, request, and track services. *See also* catalog.

service category: Catalog items organized into related offerings to make it easier for users to browse for the catalog items they need.

service design: A set of tools or capabilities that enable the creation of applications and services using noncomplex processes. *See also* blueprints.

single sign-on (SSO): An access control mechanism in which a session or user authentication process permits a user to enter one name and password in order to access multiple applications.

Software-as-a-Service (SaaS): A cloud services distribution model that delivers hosted software or applications from a cloud provider.

software-defined data center (SDDC): The concept in which organizations virtualize most or all of the data center so all infrastructure services become as inexpensive and easy to provision and manage as virtual machines, based on the benefits of compute virtualization.

tenant: A unique organizational unit that represents a set of cloud service consumers (for example, a business unit in an enterprise or a company that subscribes to cloud services from a service provider).

time-to-market (TTM): The length of time it takes from the conception of an application or service until it is available for use or sale.

time-to-value (TTV): The period of time between a request for a specific value and the initial delivery of the value requested. An increased TTV results in increased benefits for an organization.

TTM: *See* time-to-market (TTM).

TTV: *See* time-to-value (TTV).

two-factor authentication (2FA): A security process in which the user provides two means of identification from separate categories of credentials. One is typically a physical token, such as a card, and the other is typically something memorized, such as a security code.

user experience (UX): All aspects of the end user's interaction with the company, its services, and its products.

UX: *See* user experience (UX).

vCloud Air: A secure, dedicated hybrid cloud platform built on VMware vSphere. An agile IaaS platform, it supports existing workloads and third-party applications, as well as new application development.

VDC: *See* virtual data center (VDC).

virtual: The nonphysical version of a system or application, including operating systems, compute, storage, and network resources, often enabled by the use of a hypervisor.

virtual data center (VDC): An abstracted pool of cloud infrastructure resources, including any combination of compute, memory, storage, and networking capacity, which are allocated specifically for an enterprise IT need.

virtual machine (VM): An emulation of a particular computer system that operates based on the computer architecture and functions of a real or hypothetical computer, but is abstracted from the underlying physical server hardware.

VMware vCenter Server: Provides centralized management for the vSphere platform.

vRealize Automation: Automates the delivery of personalized infrastructure, applications, and custom IT services across a multivendor hybrid cloud infrastructure, giving you both flexibility and investment protection for current and future technology choices.

vRealize Business: Automates cloud costing, consumption analysis, and comparison, delivering the insight needed to efficiently deploy and manage cloud environments.

vRealize Code Stream: Provides release automation and continuous delivery to enable frequent, reliable software releases while reducing operational risks.

vRealize Log Insight: Delivers heterogeneous and highly scalable log management with intuitive, actionable dashboards, sophisticated analytics, and broad third-party extensibility, providing deep operational visibility and faster troubleshooting.

vRealize Operations: Delivers performance, capacity, and configuration management for applications and infrastructure across physical, virtual, and cloud environments.

vRealize Orchestrator: Simplifies the automation of complex IT tasks to adapt and extend service delivery and operational management, effectively working with existing infrastructure, tools, and processes.

vRealize Suite: An enterprise-ready, cloud management platform that delivers the industry's most complete solution for managing a heterogeneous, hybrid cloud.

vSphere: A platform providing compute, availability, management, and operations capabilities on a high-performance virtualization layer that abstracts and pools server hardware resources and makes them available by multiple virtual machines.

workflow: A description of the tasks (logical units of work) that comprise a complex activity, including their order of execution and the dependent relationships between them and the people or systems that perform the tasks.

XaaS: *See* Anything-as-a-Service (XaaS).

YAML: *See* YAML Ain't Markup Language (YAML).

YAML Ain't Markup Language (YAML): A human-readable data serialization language that takes concepts from programming languages such as C, Perl, and Python, and ideas from XML and the data format of electronic mail.

Get your head into the cloud!

Companies in all industries are responding to new opportunities to leverage big data and mobility to improve service and increase productivity. For IT teams, the switch to digitally driven business has big implications. This book shows you how to meet these cloud-driven challenges.

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