White Paper
October 2016

‹›‹›‹›
CISCO™

Deploy Applications with Speed and Consistency Anywhere

Cisco CloudCenter Platform and Cisco ONE Enterprise Cloud Suite

Contents

Deploy Applications with Speed and Consistency Anywhere

With Cisco CloudCenter Platform and Cisco Enterprise ONE Cloud Suite

Keep Pace with Your Changing Business Needs

Digital transformation is occurring everywhere. Read any technical website, blog, or conference agenda and you will see that the industry is focused on the topic. And transformation can't happen fast enough.

To respond to all the changes in technology, many organizations are seeking to transform processes across three areas: users, applications, and workload placement. The modern enterprise has become user-centric, instead of IT-centric, and a more diverse set of users now have significant influence and control over technology decisions.

Modern applications and application development have become less dependent on the data center and more focused on mobile environments, resulting in changes in the way that applications are created. Workloads are no longer housed safely within the confines of the on-premises data center. Users, applications, and workloads now operate in public and hybrid cloud environments. All these changes are happening concurrently, placing a greater burden on IT organizations.

The cloud has become the practical option for an increasing set of enterprise workloads and the platform of choice for application development teams. However, it becomes a costly and highly complex alternative when you need to manage applications across different environments. And because every cloud's management stack is different, your business expends time and staff resources to learn how to manage each one. Complicating matters further, some applications and their data must reside in specific execution environments due to regulatory requirements.

As a result, if you need to access a wide range of environments, you have to resort to writing and maintaining scripts to implement repeatable operations in each cloud. But scripts are fragile. Writing, using, and maintaining them can be time consuming and inefficient. Often 50 percent of a script has to be changed whenever an application, infrastructure, or cloud environment is modified. Automation is the answer. It is the foundation for managing the digital transformation. Cisco ONE™ Enterprise Cloud Suite provides the automation you need across data center and

hybrid cloud environments to give you unified management for your organization's transformation.

Cisco ONE Enterprise Cloud Suite delivers a hybrid cloud–ready platform that makes deploying applications fast and easy through role- and policy-based automation. This solution is a part of the Cisco ONE Software family, which delivers purchasing flexibility for data center, WAN, and access software solutions. Cisco ONE Enterprise Cloud Suite is a part of the Cisco ONE for Data Center solution and consists of four offers. Each one can be used individually, or all offers can be used together to create an integrated hybrid cloud solution. All were designed to work together, providing you with an incremental approach to hybrid cloud automation.

Cisco ONE Enterprise Cloud Suite, which now includes the Cisco CloudCenter™ (formerly CliQr®) platform, makes application deployment fast and easy through role- and policy-based automation—without scripts. Rather than managing each of your environments differently, you create a single profile that describes how an application is to be deployed. The Cisco CloudCenter platform deploys the application efficiently and consistently, independent of the environment. The Cisco CloudCenter platform is the only cloud–independent automation and management solution available on the market today. In fact, it is the only cloud management solution that can actually help you decide which cloud is the best one to run your application. This document describes the Cisco CloudCenter platform and how it fits into the Cisco ONE Enterprise Cloud Suite.

Cisco One Enterprise Cloud Suite

Cisco ONE Enterprise Cloud Suite provides a modular, model-based approach to cloud deployment, helping you automate processes across the data center, private clouds, hybrid clouds, and public clouds. It is an integrated stack of management offers that lets you create and deploy services quickly and easily. It lets you order data center applications or business services on demand from an intuitive self-service portal and deploy them in private, hybrid, and public environments. For your private and hybrid cloud services, it provides infrastructure automation that delivers consistent and secure infrastructure instances across computing, network, and storage resources.

The four solution offers are as follows:
- **Infrastructure Automation and Infrastructure as a Service (IaaS)** delivers all-inclusive provisioning and management of physical and virtual resources across computing, network, and storage layers. The Infrastructure Automation and IaaS offer replaces manual, trouble-ticket-based processes with automated workflows that deliver consistent and secure infrastructure instances within minutes. This software simplifies and automates the delivery of complex processes such as:
  - Setup and resource assignment for bare-metal environments
  - Configuration and deployment of diverse security and isolation models designed for specific applications
  - Day-0 setup and day-1 definition and deployment of resources across converged and hyperconverged infrastructure
- **Cloud Management** provides modeling, provisioning, and deployment of application and supporting infrastructure into approximately 20 data center

and private and public cloud environments. By abstracting the application from the underlying cloud environment, this patented approach helps ensure that infrastructure is set up and deployed to meet the specific needs of the application. The cloud management offer comes from one of the latest acquisitions: the Cisco CloudCenter platform. The rest of this document describes the Cisco CloudCenter platform.

· **IT Service Management (ITSM)** delivers an ultimate self-service user experience that replaces multiple portals with a single, unified portal that simplifies consumption and lifecycle management. Role-based access empowers users to monitor and manage their applications and business services as well as infrastructure instances under their control. From the single user dashboard, customers can perform lifecycle actions such as take a snapshot, clone a virtual machine, or start or stop a service, eliminating the need to issue a trouble ticket to IT.

· **Big Data Automation** assists in the deployment, modification, and scaling of Hadoop big data infrastructure from a single user interface. This offer provides a single-touch solution that automatically deploys Hadoop clusters residing on the Cisco Unified Computing System™ (Cisco UCS) architecture as well as consolidated views of Hadoop activity with networking and computing on individual nodes.

When all four offers are installed, your business will experience the speed, flexibility, and agility of management across all environments (Figure 1). The Cisco ONE suite provides speed and agility to your data center by replacing manual trouble-ticket-based processes with automated workflows. Application teams gain the flexibility to place their workloads in approximately 20 data center and private and public cloud environments. Additionally, IT professionals and line-of-business and application teams can consume services in a way that meets their expectations.

Cisco CloudCenter Overview

The Cisco CloudCenter platform translates infrastructure templates and application profiles into automated application deployments, thus automating application provisioning across your environments. The platform tailors its requests and workflows to match what the deployment layer can accommodate. It abstracts and normalizes environments so that they are cloud and infrastructure independent. After the infrastructure has been provisioned, the Cisco CloudCenter platform deploys the application into the environment and makes it available to the user who made the original request.

For development operations (DevOps), developers and testers can access infrastructure either through the ITSM layer or through the Cisco CloudCenter interface directly to quickly provision and promote applications through the software development lifecycle, either locally or in the public cloud, quickly and consistently.

Cisco CloudCenter Offers

With the Cisco CloudCenter platform, your staff can interact with a single interface across all your cloud environments. The platform takes what could easily be a 75-step manual application deployment process, and turns it into a repeatable three-
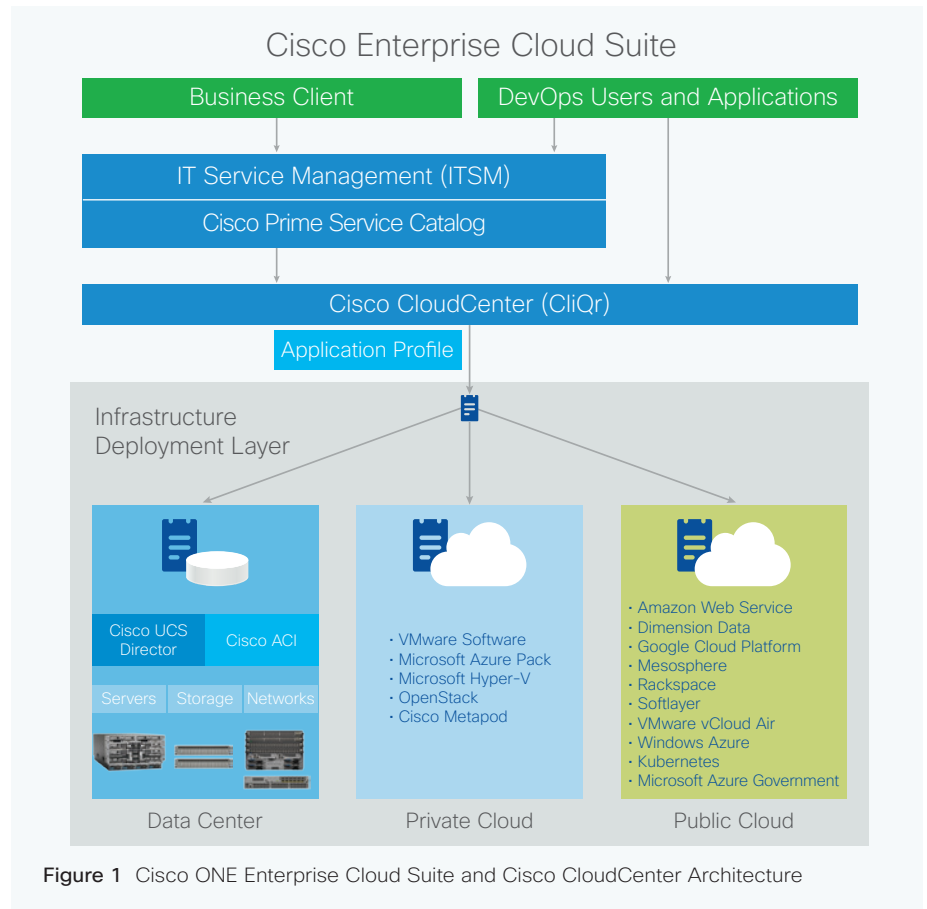
Cisco Enterprise Cloud Suite

Business Client | DevOps Users and Applications

IT Service Management (ITSM)

Cisco Prime Service Catalog

Cisco CloudCenter (CliQr)

Application Profile

Infrastructure
Deployment Layer

Cisco UCS Director | Cisco ACI

Servers | Storage | Networks

Data Center

- VMware Software
- Microsoft Azure Pack
- Microsoft Hyper-V
- OpenStack
- Cisco Metapod

Private Cloud

- Amazon Web Service
- Dimension Data
- Google Cloud Platform
- Mesosphere
- Rackspace
- Softlayer
- VMware vCloud Air
- Windows Azure
- Kubernetes
- Microsoft Azure Government

Public Cloud

Figure 1 Cisco ONE Enterprise Cloud Suite and Cisco CloudCenter Architecture

step process. These cloud-agnostic application profiles are portable and easily manageable to deliver flexibility. The Cisco CloudCenter platform grows with your organization, letting you start with one cloud environment and expand to as many environments as your business needs, with full application lifecycle management and full infrastructure lifecycle management.

The Cisco CloudCenter platform combines a cloud-independent application profile with a cloud-specific orchestrator (Figure 2). The application profile is a description of the application stack's deployment and management requirements, which you create with Cisco CloudCenter Manager.

- **Cisco CloudCenter Manager** creates a description of the entire application environment to create a model. You define the model one time and then deploy the same model many times without needing to re-create the definition. The application profile contains all the information that is needed to deploy the application, such as the application topology, required services, code location, firewall rules, installation processes, migration information, application upgrade information, required and preset tags, and customer input fields, and more.

- **Cisco CloudCenter Orchestrator** deploys both the infrastructure and the application using best practices for the target environment that you choose. It knows how to interpret application profiles and implement them faithfully in all the cloud environments shown in Figure 2.

Figure 2 With Cisco CloudCenter Manager, You Create an Application Profile with Cisco CloudCenter Orchestrator and Then Let Cisco CloudCenter Orchestrator Deploy the Application as Defined by the Application Profile
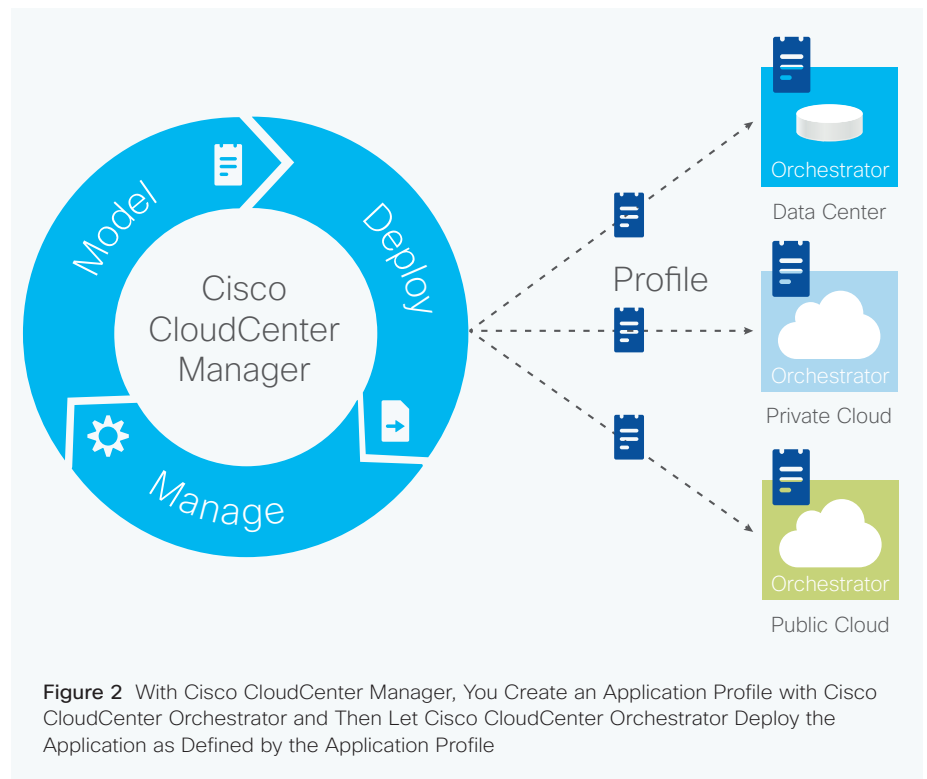
Cisco CloudCenter Manager

Cisco CloudCenter Manager provides a single intuitive management portal that allows you to easily model, deploy, and manage the lifecycle of your applications. It has a highly scalable, distributed architecture that can easily grow with your business needs. It supports n-tier applications and includes integrated security with full multitenancy. Because it is cloud independent, you can define the environment one time, in an application profile, and run your application anywhere.

- First, you develop an application profile using Cisco CloudCenter Manager. This profile is a model of your application's deployment, run-time, and management requirements that Cisco CloudCenter Manager creates in a portable format.

- Next, you set requirements for your application using the simple and visual drag-and-drop topology modeler using a library of out-of-the-box services that comes with the Cisco CloudCenter platform or customized services, images, or containers (Figure 3). For example, you may have a three-tier application: a web front-end takes orders from customers, and then communicates with a database that has the customer contact information, and then interacts with an ordering system that launches the order for the customer.

- The infrastructure requirements are then abstracted in Cisco CloudCenter Manager to make the profile cloud independent.

- Then the application profile is sent to the appropriate place (data center or cloud) and given the resources you've requested. It already knows how to build the infrastructure you need either locally or in the public cloud.
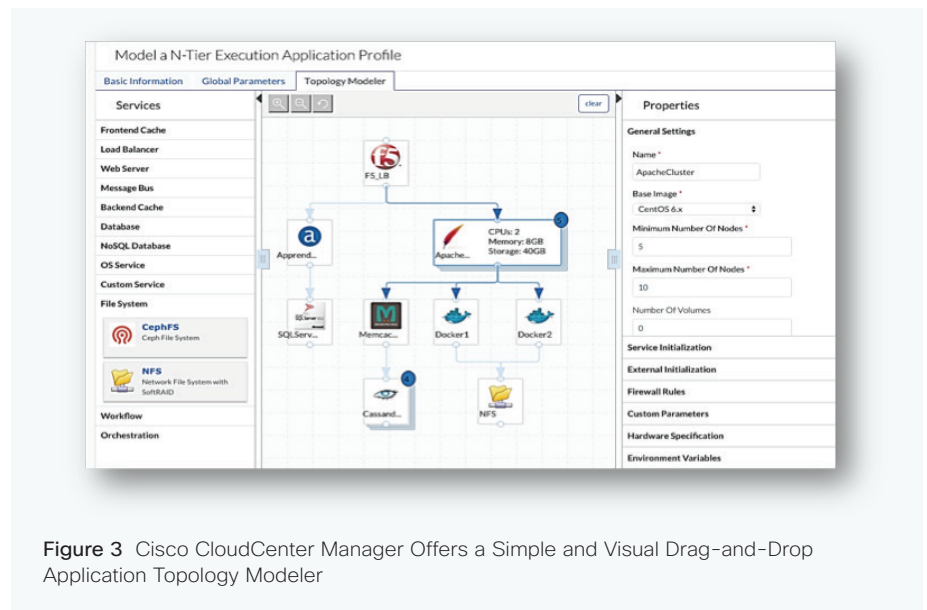
Figure 3 Cisco CloudCenter Manager Offers a Simple and Visual Drag-and-Drop Application Topology Modeler

Cisco CloudCenter Orchestrator

Cisco CloudCenter Orchestrator interprets application profiles and takes the actions that are needed to deploy your application in any target environment by connecting directly to the target cloud or data center API. It is a cloud-specific, multitenant tier that provides end-to-end orchestration in a transparent way. It is installed in each environment (data center, private cloud, or public cloud). It interprets the application profile created in Cisco CloudCenter Manager and deploys the infrastructure and the application. It sets up run-time policies and aggregates the application use and cost information for show-back purposes

Data Center and Private Cloud Installation

Cisco CloudCenter Orchestrator interacts with Cisco UCS Director to provision both bare-metal servers and cloud underlay infrastructure such as storage and networking resources.

Infrastructure can be deployed in conjunction with the Cisco® Application Centric Infrastructure (Cisco ACI™) platform. In this case, Cisco CloudCenter Orchestrator interfaces with the Cisco Application Policy Infrastructure Controller (APIC) to create a network container for the entire application environment.

- With the Cisco ACI platform, the Cisco CloudCenter platform creates all endpoint groups and contracts between the layers. This behavior creates microsegmentation so that communication flows only between whitelisted machines, improving security and reducing the data center attack surface. Figure 4 shows how the Cisco CloudCenter platform would orchestrate the network and server configuration for a three-tier web application consisting of web, application server, and database tiers.

- If you need to scale your application, for example, by adding more front-end web servers, you don't need to update the contracts between the layers. The Cisco CloudCenter platform puts the new servers in the right endpoint groups, and the Cisco ACI platform enforces contracts for communication between tiers.
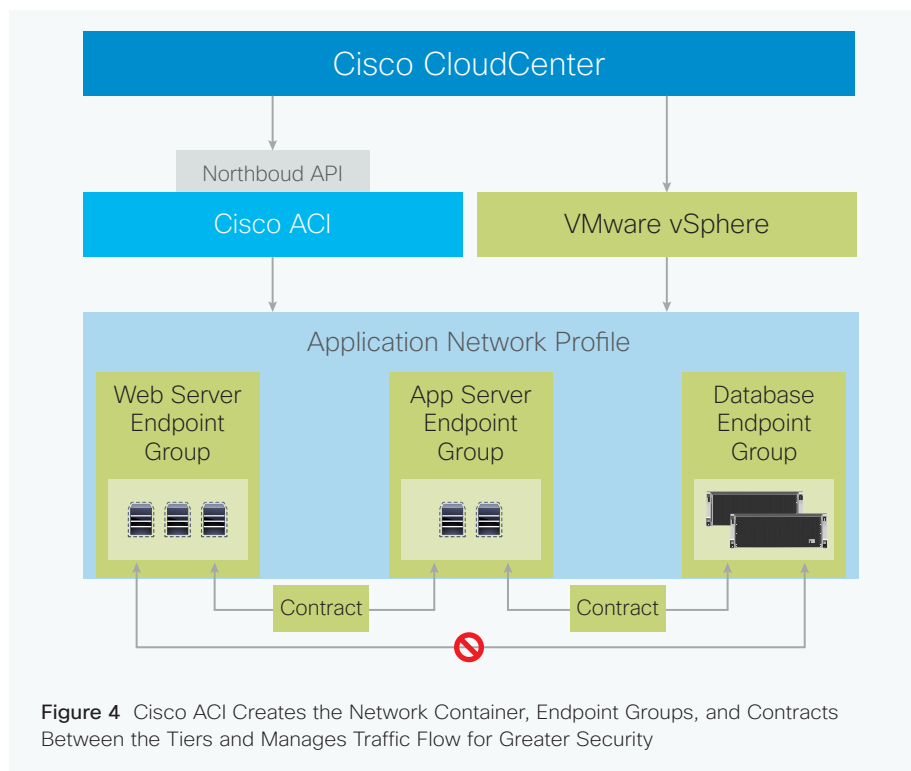
Figure 4 Cisco ACI Creates the Network Container, Endpoint Groups, and Contracts Between the Tiers and Manages Traffic Flow for Greater Security

For servers deployed as virtual machines, the Cisco CloudCenter platform interacts with the virtualization layer to configure them. Cisco CloudCenter Orchestrator understands how to manage VMware vCenter, the Microsoft Azure stack for Hyper-V, OpenStack, the Cisco Metapod™ solution, and many other platforms.

After the bare-metal or virtual machine environments are created, Cisco CloudCenter Orchestrator installs and configures the application components and even starts the application as the deployment policies dictate.

Deploying to Public Clouds
The same profiles that dictate the application infrastructure for data center and private cloud deployments can be used in public clouds. Cisco CloudCenter Orchestrator interacts with the public cloud infrastructure you choose for deployment, and it deploys the application in the cloud.

After your application is up and running, the Cisco CloudCenter platform collects data about the run-time environment, including application performance and costs, and creates intuitive reports.

With the Cisco CloudCenter platform, you don't have to create any cloud-specific scripts, orchestrate flows, or modify application code, unlike with cloud-management solutions that are not model based. You no longer have to be locked in to a specific cloud vendor, nor do you have to invest in multiple cloud-specific teams to manage your applications in the cloud (Figure 5).
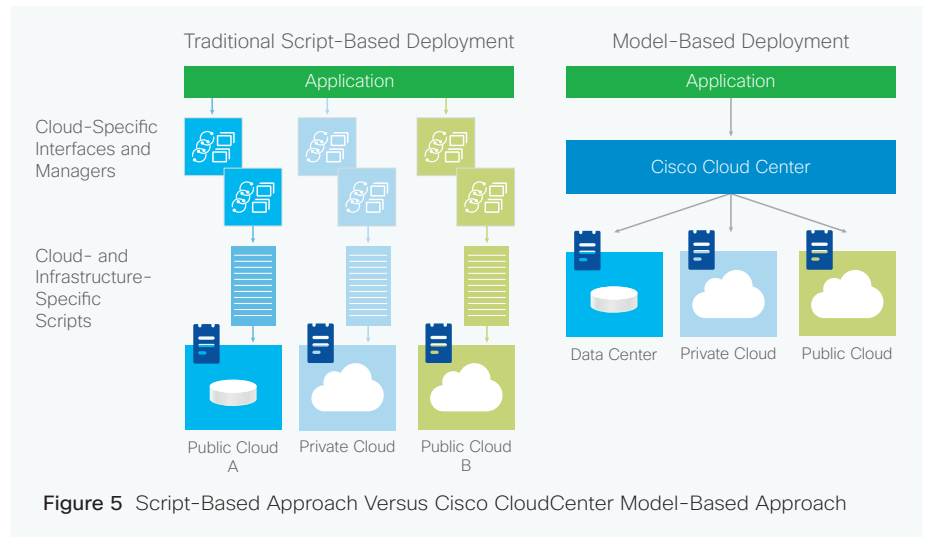
Figure 5 Script-Based Approach Versus Cisco CloudCenter Model-Based Approach

Service Management Integration

The Cisco CloudCenter platform integrates with ServiceNow Express ITSM to provide a catalog of on-demand services that are easily consumed by users. The platform also can integrate with other leading ITSM tools through its northbound API. For example, integration with Cisco Prime™ Service Catalog is planned for the future.

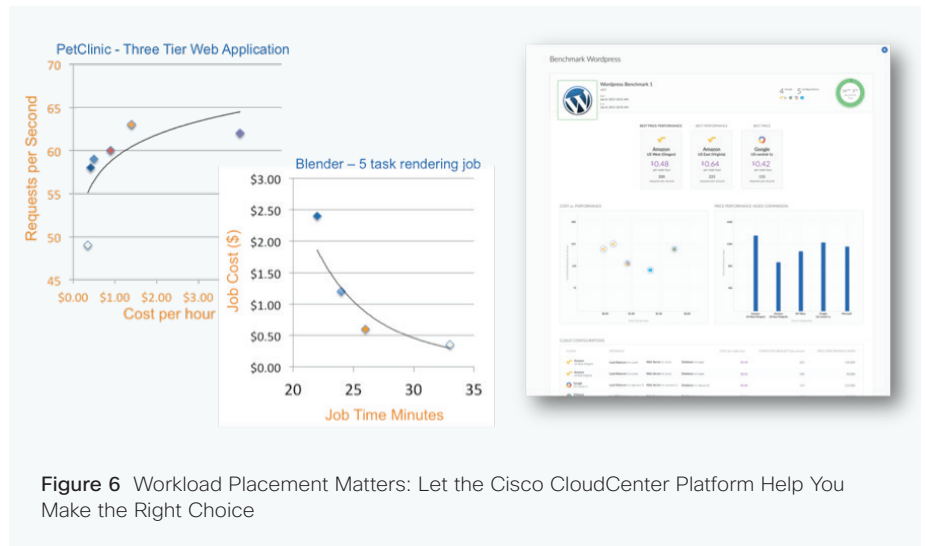## The Cisco CloudCenter Platform Makes Cloud Deployment Easy

The Cisco CloudCenter platform can accomplish tasks with ease that other cloud-management solutions cannot do at all. For example:

- The Cisco CloudCenter platform can benchmark your application in each cloud to estimate the price and performance trade-offs for each environment. Now you can decide where to run your applications based on real data.

- If you choose to move your applications and data from one cloud to another, the Cisco CloudCenter platform can automate their movement.

Make the Right Decision: Benchmark Your Cloud Choices Before Deployment

Because the Cisco CloudCenter platform is cloud independent, it enables you to deploy the same application in many clouds and benchmark the price and performance of that deployment before you invest heavily in one environment. Only the Cisco CloudCenter platform can do this. You can deploy your applications to all the clouds you want to obtain the costs and real cost-to-performance ratio. Then you can make a more informed decision about sizing, performance, and costs.

When your application is deployed, a testing tool is deployed that provides statistics based on current real-time observations rather than historical data (Figure 6). There are other tools on the market that claim similar capabilities, but they use hypothetical data rather than real performance measurements to determine whether the proposed configuration would allow the application to perform well.

Figure 6 Workload Placement Matters: Let the Cisco CloudCenter Platform Help You Make the Right Choice

Moving Applications and Data from One Cloud to Another

What if your public cloud provider goes out of business or becomes too costly? Automate the movement of your application back to your private cloud or to another cloud provider with the Cisco CloudCenter platform. Because the platform itself doesn't build the cloud but simply deploys the application stack to the cloud, to move the application to a new cloud you perform these tasks:

· Deploy Cisco CloudCenter Orchestrator in the new cloud.

· Update the application profile in Cisco CloudCenter Manager to indicate where the current data lives.

· Save the update. Cisco CloudCenter Orchestrator then puts all the information in a centralized repository and deploys resources in the new cloud. Then it pulls data from the centralized location. When the data is transferred and the application is up in the new cloud, it destroys the old site.

Virtual and Physical Deployments

The Cisco CloudCenter platform can deploy applications that require both virtual machines and bare-metal servers and appliances such as load balancers and security devices. Other cloud-management tools assume a virtual-only cloud. The Cisco CloudCenter platform can interface with both Cisco UCS Director and the Cisco ACI platform using public APIs, which you can use to build the physical infrastructure when you deploy applications to your data center or to your private cloud. After the physical infrastructure is in place, the virtual environment is layered on top. Then, on either the bare-metal or virtual infrastructure, the Cisco CloudCenter platform deploys the application stack. This approach enables you to test and choose the right environment to make the best use of your application and resources.

Accelerate Your Transformation

Now you can respond to all the changes in technology and to your users, applications, and workload placement needs. Help enable your business to take advantage of public and hybrid cloud environments while more efficiently managing and securing business assets across all your environments with automation.

Cisco One Enterprise Cloud Suite with the Cisco CloudCenter platform provides automation across your data center and hybrid cloud environments, giving you the unified management you need for your organization's digital transformation.

For More Information

- For more information about the Cisco CloudCenter platform, visit http://www.cisco.com/go/cloudcenter.

- For more information about Cisco ONE Enterprise Cloud Suite, visit http://www.cisco.com/go/cloudsuite.