Citrix Cloud Works... with a Single Management Plane

Simple private cloud deployment and management

CITRIX®

With businesses today trying to streamline operations and reduce infrastructure costs, IT is looking at private Infrastructure-as-a-Service (IaaS) clouds to help them become more agile and efficient, while gaining better visibility into how infrastructure such as compute, network and storage is being used in their organizations. In a traditional enterprise datacenter environment, IT has to manage complex operational processes and manually provision resources, which can impede business innovation and agility.

As a result of this complexity, IT is spending excessive time, staff and money manually onboarding, supporting and maintaining applications and IT services. With all the different technologies from a variety of vendors in the datacenter, many of them with their own management consoles, it becomes difficult and time-consuming for IT staff to manage them as the environment grows.

To reduce complexity and increase efficiency in today's hypercompetitive environment, IT needs to move beyond virtualization. What's needed is a new dynamic IT based on a complete cloud solution that can give IT admins the visibility, manageability and control they require.

Citrix® has a proven track record for helping enterprise organizations build private cloud deployments that drive real-world business. In order for private cloud deployments to be successful, the software used to build and manage them must be easy to use, reliable and robust.

Citrix CloudPlatform™, powered by Apache™ CloudStack,® delivers a simple, turnkey cloud orchestration platform with a single management console for your entire system to enable you to quickly and efficiently build a future-proofed cloud. With enterprise-grade upgrades and minimal IT training required, it allows you to get your implementation up and running quickly.

In this paper, we will explore how building a private IaaS cloud with Citrix CloudPlatform can give you better visibility into your organization's infrastructure utilization so you can deliver the operational benefits and the cost savings needed to transform your IT organization.

Citrix CloudPlatform is designed to work within your environment, leveraging your existing infrastructure and allowing you to choose best of breed servers, storage and networking components. As shown in figure 1, it supports all major hypervisors, a large number of storage options and comprehensive networking, including the ability to directly interact with a number of virtual and physical networking components.

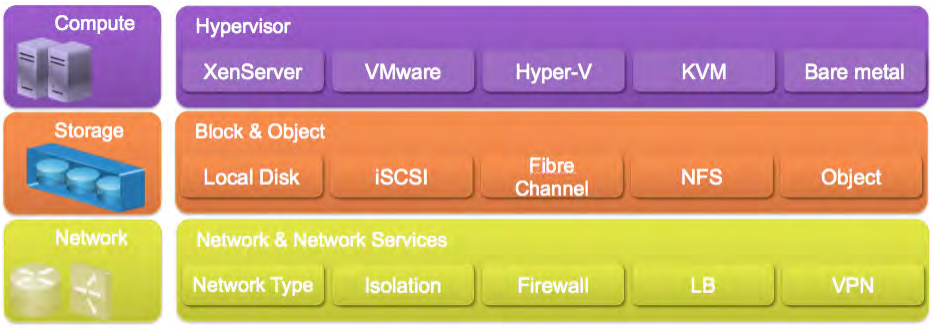

Figure 1. Citrix CloudPlatform supported compute, network and storage options.

This flexibility allows you to quickly customize your infrastructure to the needs of your business without having to make costly investments or being locked into a particular vendor's infrastructure requirements.

Let's take a look at the architecture for Citrix CloudPlatform, to gain some valuable insight into the steps of managing and deploying your cloud infrastructure.

Deployment Architecture Overview

When setting up Citrix CloudPlatform, it is important to understand the cloud infrastructure organization. The cloud infrastructure is organized as follows:

- **Host:** A single compute node within a cluster. The hosts are where the actual cloud services run in the form of guest virtual machines.
- **Cluster:** A cluster consists of one or more hosts and primary storage.
- **Pod:** A pod is usually one rack of hardware that includes a layer-2 switch and one or more clusters.
- **Zone:** Typically, a zone is equivalent to a single datacenter. A zone consists of one or more pods and secondary storage.
- **Region:** To increase reliability of the cloud, you can optionally group resources into multiple geographic regions. A region consists of one or more zones.
- **Primary storage** is associated with a cluster, and it can also be provisioned on a zone-wide basis. It stores the disk volumes for all the VMs running on hosts in that cluster.
- **Secondary storage** is associated with a zone, and it can also be provisioned as object storage that is available throughout the cloud. It stores templates, ISO images, and disk volume snapshots.

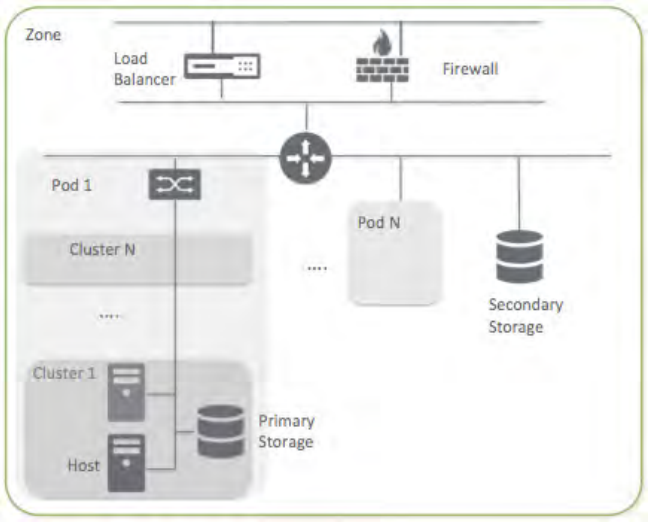

Figure 2. Citrix CloudPlatform architecture example.

CloudPlatform Networking

CloudPlatform offers two types of networking scenarios:

1. BASIC provides a single network where guest isolation can be provided through layer-3 means such as security groups (IP address source filtering).
2. ADVANCED is for more sophisticated network topologies. This network model provides the most flexibility in defining guest networks and providing guest isolation.

CloudPlatform Storage

Primary storage is used for all active VM storage of both root and data disks. This storage is local to the CloudPlatform pod and is directly available to the hypervisors hosts in the pod. The two universally supported connection methods are NFS and iSCSI, and CloudPlatform manages these connections. Additionally, options exist for Fibre Channel (FC) and local storage, but these options do vary by hypervisor type.

Primary storage is associated with a cluster, or a zone (in KVM and VMware), and it stores the disk volumes for all the VMs running on hosts.

Secondary storage is used for all template, ISO and volume snapshot activities. This storage is local to each CloudPlatform availability zone and is accessed through the CloudPlatform secondary storage server. This system VM connects to the underlying secondary storage device using NFS.

Secondary storage stores the following:

- Templates — OS images that can be used to boot VMs and can include additional configuration information, such as installed applications
- ISO images — disc images containing data or bootable media for operating systems
- Disk volume snapshots — saved copies of VM data which can be used for data recovery or to create new templates

A Common Management Plane

Citrix CloudPlatform enables the consolidation of disparate infrastructures into one common management plane. A common management plane offers many benefits for the automation and provisioning of your resources, which in turn, enables your business to be more agile and to reduce costs.

IT Administrators gain a holistic view of resources using either the Citrix CloudPlatform web interface or working directly with its APIs. Administrators can provision, view, and manage the cloud infrastructure inclusive of domains, user accounts, projects and configuration settings. The Citrix CloudPlatform Management Server is built to scale out along with the underlying resources, and can manage tens of thousands of servers within a single region across geographically distributed datacenters and from a single pane of glass.

When you set up and manage a CloudPlatform cloud, you provision resources such as hosts, storage devices and IP addresses into the Management Server, and the Management Server manages those resources.

The Management Server is the CloudPlatform software that manages cloud resources. By interacting with the Management Server through its UI (the console) or API, you can configure and manage your cloud infrastructure. The centralized management server scales linearly, eliminating the need for intermediate cluster-level management servers.

The Management Server runs on a dedicated server or VM. It controls allocation of virtual machines to hosts and assigns storage and IP addresses to the virtual machine instances. The Management Server:

- Provides the web user interface for the administrator and a user interface for end users.
- Provides the APIs for CloudPlatform. For a list of APIs, refer to the API reference: http://support.citrix.com/article/CTX140466.
- Manages the assignment of guest VMs to particular hosts.
- Manages the assignment of public and private IP addresses to particular accounts.
- Manages the allocation of storage to guests as virtual disks.
- Manages snapshots, templates, and ISO images, possibly replicating them across data centers.
- Provides a single point of configuration for the cloud.
- Manages one or more zones (typically, datacenters) containing host computers where guest virtual machines will run.

Citrix CloudPlatform provides a single management console for IT admins as well as dev/test end users. The console for admins allows them to see the system and all of the components needed including storage and memory requirements from a single platform/console.

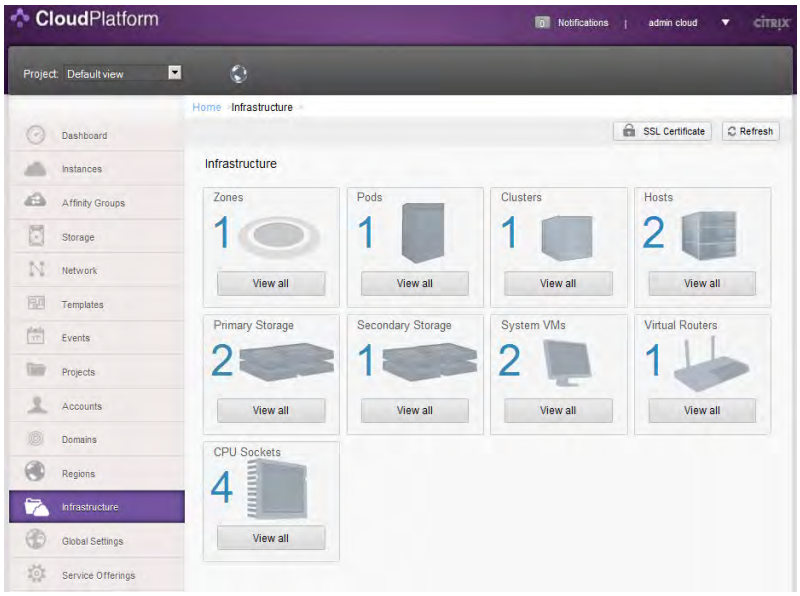

Figure 3. The Administrator view of the console

While Citrix CloudPlatform automates the orchestration and provisioning of compute, network and storage resources, both datacenter administrators and end-users need to interact with the system to benefit from it. An intuitive web-based user experience is provided so that administrators can quickly and easily define service offerings and operating system templates that end-users can select from. Administrators are also able to manage and monitor resources that are in use from the same unified experience. Metered usage can be provided to billing systems for chargeable services or used internally by organizations for showback/chargeback. For end-users, the same web interface is tailored to their role and provides self-service options including wizards to enable easy selection of desired infrastructure resources.

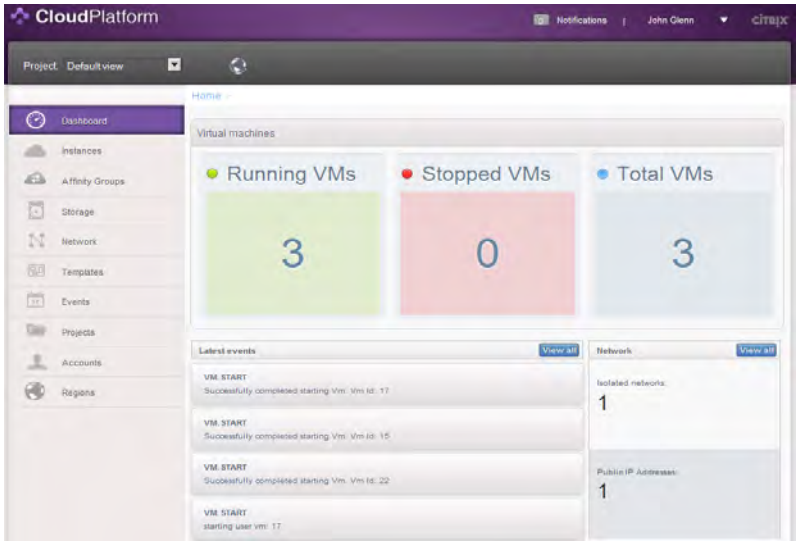

Figure 4. The end-user view of the console

The console also allows admins to create instances for different types of service offerings via a wizard-driven interface. A user creating a new instance can make a variety of choices about its characteristics and capabilities. Citrix CloudPlatform provides several ways to present users with choices when creating a new instance:

- Service Offerings, defined by the Citrix CloudPlatform administrator, provide a choice of CPU speed, number of CPUs, RAM size, tags on the root disk, and other choices.
- Disk Offerings, defined by the CloudPlatform administrator, provide a choice of disk size for primary data storage.
- Network Offerings, defined by the Citrix CloudPlatform administrator, describe the feature set that is available to end users from the virtual router or external networking devices on a given guest network.
- Templates, defined by the Citrix CloudPlatform administrator or by any user, are the base OS images that the user can choose from when creating a new instance. For example, Citrix CloudPlatform includes CentOS as a template.

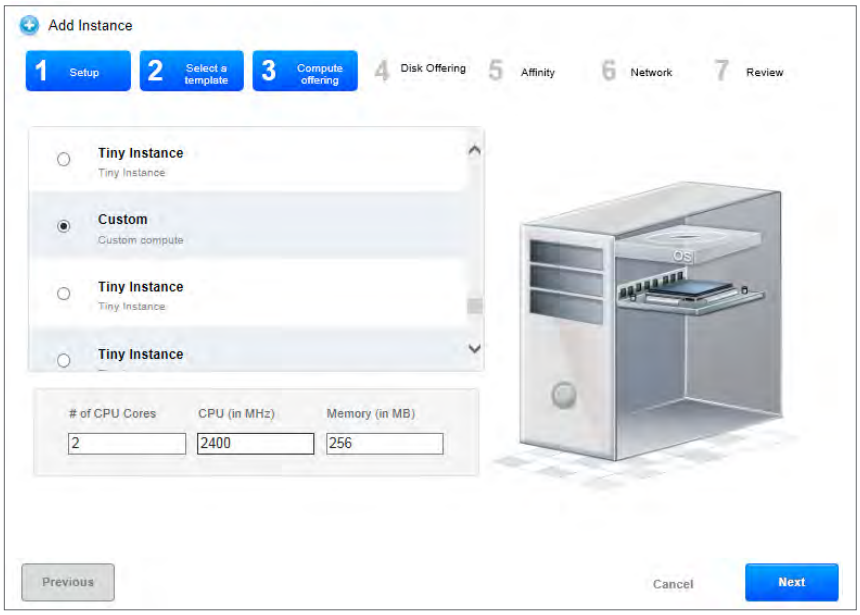

Figure 5. Citrix CloudPlatform wizard-driven interface.

In summary, the Citrix CloudPlatform single management console gives you complete visibility into the resource utilization of your entire cloud deployment for informed scaling and operations. Key advantages of Citrix CloudPlatform include:

- Turnkey cloud orchestration solution, not a set of projects (or not a science project)
- Easy to get up and running in hours/days, not weeks or months
- Minimal IT training required, reduced IT workload
- Open, flexible architecture, no vendor lock-in
- Simple deployment architecture, robust, but not complex to manage

Citrix Cloud Platform Product Portfolio

Citrix CloudPlatform provides our 250+ large-scale production cloud customers with the industry's only cloud orchestration and provisioning platform capable of managing cloud-native, desktop and traditional enterprise application workloads with a single cloud infrastructure platform.

Citrix CloudPortal™ Business Manager is a unified cloud services delivery and business management platform that unifies and simplifies the delivery, operational, commerce and user management aspects of a cloud.

Citrix XenServer is an industry and value leading open-source virtualization platform for managing cloud, server and desktop virtual infrastructures. Organizations of any size can download XenServer® for free to virtualize demanding workloads and automate management processes – increasing IT flexibility and agility and lowering costs.

Citrix CloudPlatform

Citrix CloudPlatform, powered by Apache CloudStack, is an open and flexible cloud orchestration and provisioning platform for building, managing and delivering highly scalable and efficient private, public and hybrid Infrastructure-as-a-Service (IaaS) clouds. Already proven in hundreds of successful production clouds, Citrix CloudPlatform is the only solution to help public and private sector organizations build powerful cloud services designed for agility, scale, elasticity and best-in-class economics.

- Proven product: 250+ large-scale production deployments
- Flexible: Application-centric cloud uniquely delivers every workload
- Scalable: Amazon style operations and scale – over 40,000 servers per region
- Open: Built on Apache CloudStack, AWS-like APIs, hypervisor agnostic

Here's what a few of our customers are saying about Citrix CloudPlatform.

Because of the demand for more choice, flexibility and improved cloud management, SoftLayer set out to build a flexible private cloud solution.

"We have customers with fairly large server deployments, hundreds or even thousands of physical servers or virtual machines and they were creating their own management tools, because they lacked an efficient method for managing their cloud."- Nathan Day, Chief Scientist at SoftLayer

BT can manage infrastructure/datacenters across 4 continents with one interface.

"Citrix CloudPlatform gives us enormous agility to support multiple datacenters around the world through a single pane of glass."- John Gillam, CTO BT Compute Global Portfolio

Download the free Citrix CloudPlatform 90-day trial software (www.citrix.com/products/cloudplatform and click "Try it"), or contact your local Citrix representative to start your move to the Cloud.

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About Citrix
Citrix (NASDAQ:CTXS) is a leader in mobile workspaces, providing virtualization, mobility management, networking and cloud services to enable new ways to work better. Citrix solutions power business mobility through secure, personal workspaces that provide people with instant access to apps, desktops, data and communications on any device, over any network and cloud. This year Citrix is celebrating 25 years of innovation, making IT simpler and people more productive. With annual revenue in 2013 of $2.9 billion, Citrix solutions are in use at more than 330,000 organizations and by over 100 million users globally. Learn more at www.citrix.com.