

PLATFORM 9

Five Reasons OpenStack Delivers a True Private Cloud for VMware

This white paper reviews the five key benefits that organizations using VMware vSphere can realize by deploying OpenStack as their management platform: Self-service automation, an AWS-like REST API, a single dashboard across platforms, reduced configuration sprawl, and the ability to leverage open, industry-standard APIs.

Table of Contents

Executive Summary	1
OpenStack Architecture Overview	2
The Five Reasons	2
One: Self-Service Automation	2
Two: AWS-Like REST API	3
Three: Single Dashboard Across Virtualization Technologies	3
Four: Reduced Configuration Sprawl	4
Five: Reliance on Open, Industry-Standard APIs	6

Figure 1: For Further Information7

Executive Summary

The phenomenal growth of OpenStack has made it both the industry leading private cloud management platform and the second largest open source project of all time. This is evident from search interest numbers* showing that interest in OpenStack has far exceeded interest in alternative private cloud management platforms, including the VMware vCloud/vRealize solution.

This white paper looks beyond the 'OpenStack vs VMware' hype to explain the five reasons why OpenStack is the ideal management platform for VMware users.

*Google Trends (click to open page)

OpenStack Architecture Overview

The OpenStack design is inspired by Amazon Web Services (AWS), and has well-documented REST APIs that enable a self-service, elastic Infrastructure-as-a Service (IaaS) cloud. In addition, OpenStack is fundamentally agnostic to the underlying infrastructure because it integrates with various compute, virtualization, network, and storage technologies.

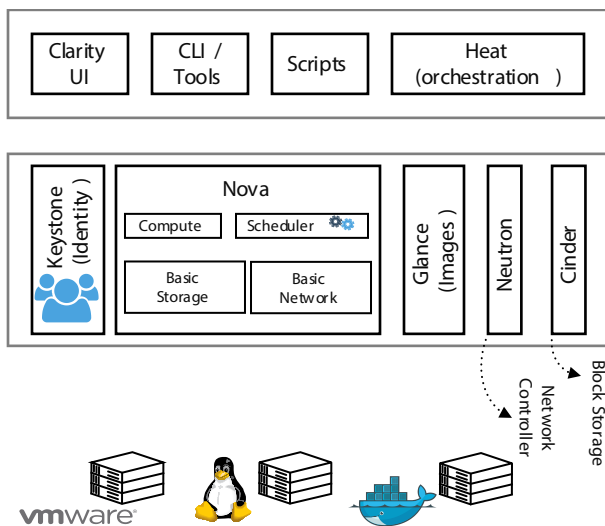


Figure 2: OpenStack architecture is both loosely coupled and extensible to support any hypervisor/container, storage, and network system.

The Five Reasons

The five reasons why OpenStack delivers a true private cloud for VMware are:

1. Self-service automation
2. AWS-Like REST API
3. Single dashboard across virtualization technologies
4. Reduced configuration sprawl
5. Leverage open, industry-standard APIs

Let's examine each of these reasons in more detail.

ONE: SELF-SERVICE AUTOMATION

OpenStack is the simplest way to enable self-service automation for your VMware vSphere infrastructure. OpenStack accelerates software provisioning by pooling underlying infrastructure resources and automating Virtual Machine (VM) placement across those pools. The OpenStack scheduler uses resource utilization statistics to place VMs and can automate IP address assignment to newly deployed VM instances, thus speeding up application deployment while requiring fewer manual steps. Administrators can also choose to enable self-service provisioning access. This is far simpler to do in OpenStack than in VMware vRealize Suite.

For example, consider an operations team with one rack of capacity in San Francisco, California and three racks in Austin, Texas. Before OpenStack, the team manually deployed each new VM instance on selected servers—a laborious, error prone task that consumed much of the team's bandwidth.

Implementing OpenStack allowed the team to manage their combined compute, memory, storage, and networking infrastructure as a single resource pool. The OpenStack scheduler reduced manual effort and human error by automatically determining the best resources to use when deploying each new VM instance.

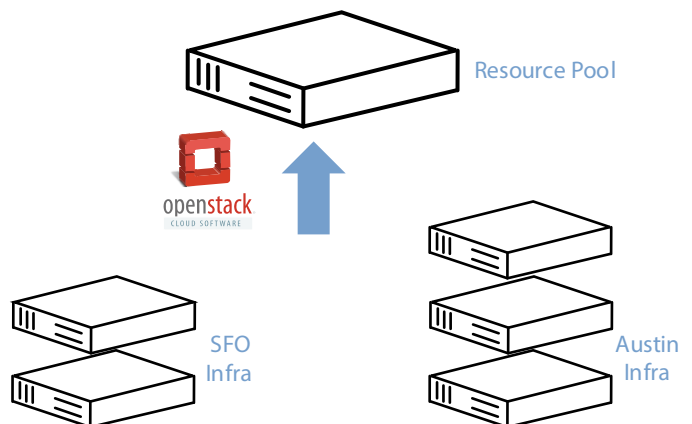


Figure 3: Automation by pooling resources.



TWO: AWS-LIKE REST API

OpenStack includes a simple, open, and versioned REST API that works with any language and gives users the freedom to choose from various technologies. This API is a key differentiator between OpenStack and the VMWare cloud management platform.

OpenStack APIs are easier to program against, more cloud centric, and thus more conducive to providing self-service capabilities to end users than VMware vSphere APIs (similar to AWS APIs). Operations such as creating a VM involve fewer and simpler steps with OpenStack APIs¹ compared to the complex steps involved while using the vSphere APIs².

THREE: SINGLE DASHBOARD ACROSS VIRTUALIZATION TECHNOLOGIES

The increasing cost of operating VMware vSphere and the rising interest in new technologies such as containers (Docker) are forcing organizations to look at alternatives such as KVM, Hyper-V, and Docker. The OpenStack cloud management platform gives organizations the freedom to use multiple virtualization platforms such as vSphere³, KVM⁴, or Docker⁵, thereby eliminating the need to “lock in” to a single hypervisor/virtualization technology. The following table provides more insight into the pros and cons of each options.

Platform	Type	Pros	Cons
VMware vSphere (ESXi)	Hypervisor	<ol style="list-style-type: none"> 1. Time tested and stable 2. Familiar technology 3. OS / HCL support 4. Non-disruptive operational workflows (vMotion) 	<ol style="list-style-type: none"> 1. vCloud licenses are expensive, and costs can add up, especially for a private cloud environment. 2. vSphere does not work on unsupported hardware that is not supported. (See the vSphere website for a comprehensive list of supported hardware.) 3. Vendors are “locked in.”

1. http://docs.platform9.com/#a-idcreate-instanceapost-v2tenant_idservers

2. https://pubs.vmware.com/vsphere-50/index.jsp?topic=%2Fcom.vmware.wssdk.apiref.doc_50%2Fvim.vm.ConfigSpec.html

3. Running OpenStack on vSphere Demo: <http://goo.gl/zH0Agv>

4. Running OpenStack on KVM Demo: <http://goo.gl/VnHQjp>

5. OpenStack works across Virtualization Technologies: http://platform9.com/solutions/across_silos.html

Platform	Type	Pros	Cons
Linux KVM	Hypervisor	<ol style="list-style-type: none"> 4. Much cheaper than vSphere (can be free if you are running Linux KVM with CentOS) 5. Increasing stability and performance 6. Supports a wide range of operating systems 7. Open source solution has strong value for developers and companies 	<ol style="list-style-type: none"> 1. Windows guest support is not as good as ESXi. 2. Operational workflows (vMotion) are still maturing. 3. Deploying and running OpenStack as a management platform can be complex and is not the best option for a resource-sensitive organization.
Docker/Containers	Container runtime	<ol style="list-style-type: none"> 1. Better performance density 2. No overhead from guest operating systems 3. Developer-centric workflow 	<ol style="list-style-type: none"> 1. The usage paradigm is still evolving. 2. Significant flux around recent developments in this space. 3. OS compatibility issues. 4. Security concerns. 5. Performance guarantees are not reliable or predictable.

FOUR: REDUCED CONFIGURATION SPRAWL

A virtualized environment makes it very easy to create new VM instances, and are often kept running for long periods of time. This can lead to organizations losing control over the set of curated operating systems, patches, and VM configurations being utilized by different users across departments and locations.

OpenStack reduces configuration sprawl by:

- Centralizing image management to control the curated set of VM templates from which users can create instances (see Figure 4).
- Reducing the number of unique VM templates while allowing customization when creating VM instances, thereby minimizing the number of unique configurations in the environment.

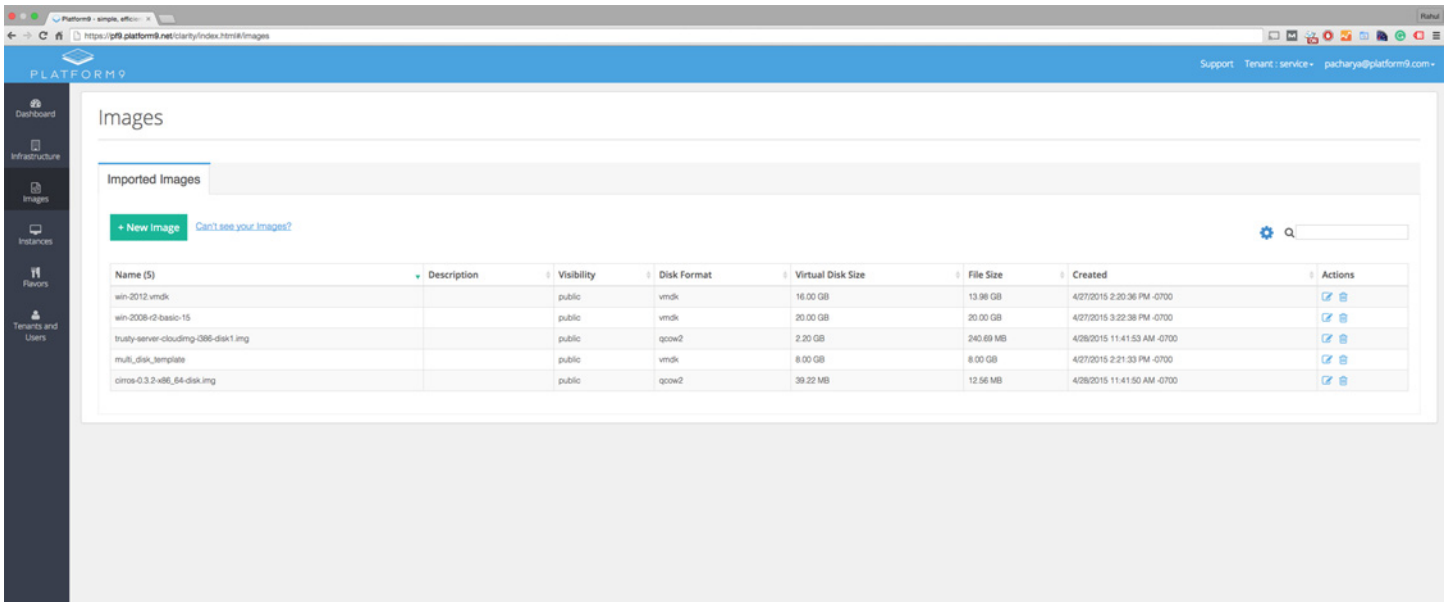


Figure 4: Centralized image management using OpenStack Glance

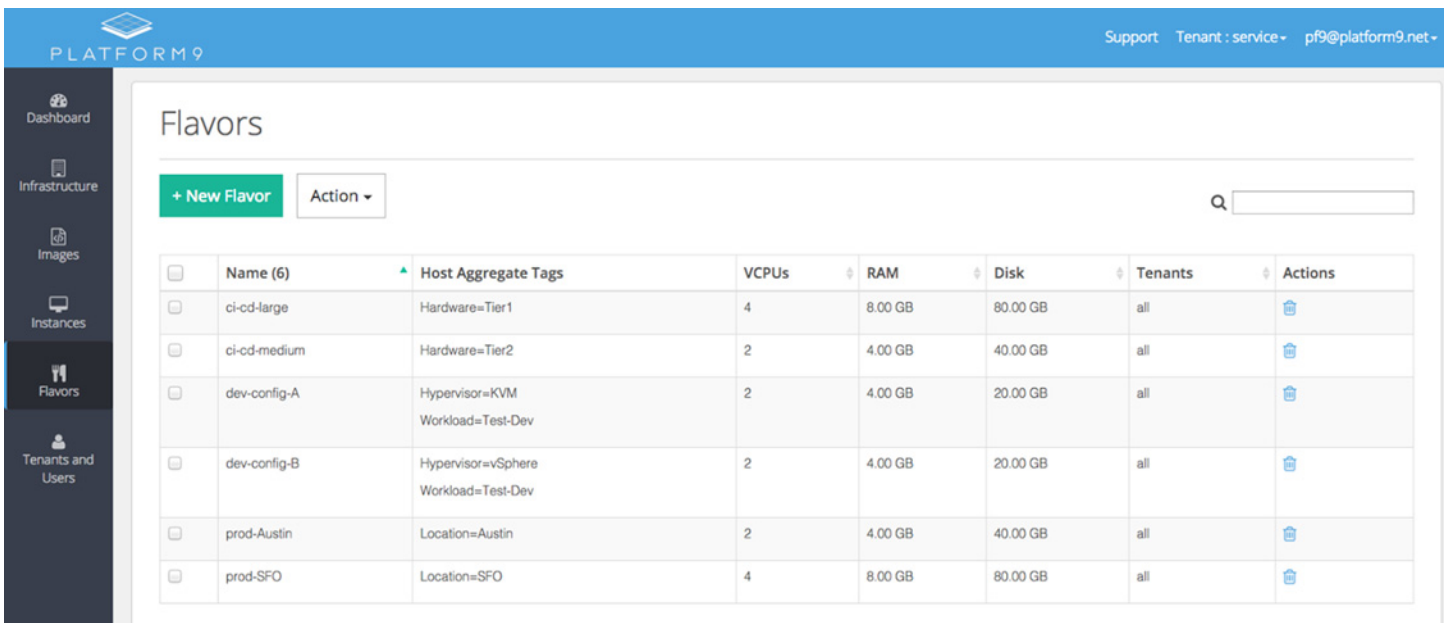


Figure 5: Flavors specify CPU, memory, disk and other resource allocation policies.

- Standardizing resource configurations into 'flavors' that capture CPU, memory, disk and other allocation policies for your environment. Flavors apply these predefined resource allocations during VM provisioning (see Figure 5).
- Application Blueprints in OpenStack allows users to compose applications across instances using YAML (similar to composing applications in AWS Cloud Formation) rather than using vApps created using the proprietary VMware vApp Director.

FIVE: RELIANCE ON OPEN, INDUSTRY-STANDARD APIS

Using an open source API such as the OpenStack API provides the following advantages:

- Better ecosystem support.
- Ability to leverage innovations in the data center management space.

- Consistency with AWS APIs.
- Freedom from vendor lock-in, a factor that can impact organizations if support for a product/technology is discontinued.

The following table highlights some OpenStack APIs:

	OpenStack API	VMware Proprietary API
Storage APIs	<p>Cinder (block storage)</p> <p>Swift (object storage)</p> <p>The Cinder API can be leveraged by multiple hypervisors and is compatible with a wide range of block storage technologies, including but not limited to LVM, Ceph, EMC arrays, Hitachi arrays, and IBM arrays.</p>	<p>VASA (block storage) is powerful but only compatible with VMware vSphere.</p>
Network Control Plane	<p>Neutron</p> <p>Multiple plug-ins are available for working with Open vSwitch, Cisco UCS/Nexus, PLUMgrid, Linux Bridge, and many others.</p>	<p>Proprietary integration with VMware NSX only.</p>
Application Blueprints	<p>Heat (based on Cloud Formations).</p> <p>See: https://github.com/openstack/heat-templates/tree/master/hot</p>	<p>vApp Director</p>

A recommended approach for organizations that use VMware vSphere is to continue using it as a hypervisor while adopting OpenStack as their management platform. This combination provides organizations with the advantage of using a known hypervisor while also helping them leverage OpenStack APIs. Platform9's cloud management-as-a-Service allows users to easily create an OpenStack-powered private cloud to manage their new and existing KVM and vSphere infrastructures.

About Platform9

Platform9's OpenStack-powered service transforms an organization's existing servers into an AWS-like agile and efficient self-service private cloud at any scale within minutes while leveraging the latest open source innovations. Platform9 Managed OpenStack is the first 100% cloud-managed platform for KVM, VMware vSphere, and Docker. Founded in 2013 by a team of early VMware engineers, Platform9 is backed by Redpoint Ventures and is headquartered in Sunnyvale, CA.

For Further Information

This white paper described how organizations using VMware vSphere can realize significant operational efficiencies by deploying OpenStack as their management platform to reap five key benefits:

- Self-service automation
- AWS-like REST API
- Single dashboard across platforms
- Reduced configuration sprawl
- Reliance on open, industry-standard APIs

If you would like more information or to schedule a demonstration, please contact us at:

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