PLATFORM9

Self-service & Automation Using OpenStack for VMware vSphere

This white paper details how OpenStack can be used as a cloud management platform that seamlessly integrates with VMware vSphere, including use cases, interoperability, design considerations, storage and network requirements, and cloud-native application templates for dynamic scaling.

AUTHORED BY ANTHONY HERNANDEZ (415)786-2081 - anthony94122@outlook.com

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Executive Summary

Developers are increasingly familiar with cloud-based coding practices that include automation and self-service. They need access to private cloud infrastructures that mirror public clouds as closely as possible in order to quickly and efficiently write and deploy code. Platform9 Managed OpenStack helps leverage your private cloud infrastructure. This disruptive solution adds a thin, unobtrusive OpenStack layer above your existing virtualized infrastructure that provides all of the features of a private cloud while retaining 100% compatibility with that infrastructure to deliver the following key benefits:

- Rapid setup that gets you up and running within minutes.

- Continuous health monitoring.

- Immediate response to any issues that arise.

- Automatic updates with full backups.

- Robust, well-tested platform.

- Deploying cloud-native application templates. that dynamically scale with workload.

The Complexity Barrier to Effective Private Clouds

The last five to seven years have seen a growing number of software developers entering the workforce who are increasingly familiar with Amazon Web Services (AWS) and cloud infrastructure APIs. These developers are accustomed to provisioning software using automation and self-service and need access to a private cloud infrastructure wherever they work. This infrastructure must mirror a public cloud as closely as possible because that is the most productive way for them to quickly and efficiently write and deploy code.

Most enterprises rely on virtualized assets that tend to be firewalled from the development team—or at least that's how they perceive it. Meanwhile, almost 70% of the IT departments interviewed by Platform9 want to make self-service available to customers within their organizations—a complex undertaking that is very easy to get wrong.

vSphere is well known to IT departments because it has a solid track record, but this is not the case with current private cloud solutions. The difficulty of installing and tuning these solutions exacerbates the complexity barrier and can result in projects getting stuck in the proof-of-concept stage and/or abandoned altogether. Other solutions, including OpenStack, lack seamless integration with existing environments. This is a key drawback for VMware users, many of whom have been using vSphere for years. Emerging technologies add yet another layer of complexity. For example, developers are getting used to provisioning their applications in containers and having a container-centric infrastructure provisioning workflow.

An effective private cloud solution must therefore offer:

- Automatic discovery of existing virtualized resources.

- Compatibility with the existing environment.

- Support for multiple virtualization solutions such as VMware, KVM, and Docker.

- Unified management platform for all of the above.

Platform9 Managed OpenStack makes private clouds easy for the enterprise by making all of these features, and more, available to both developers and IT departments.

Platform9 Managed OpenStack
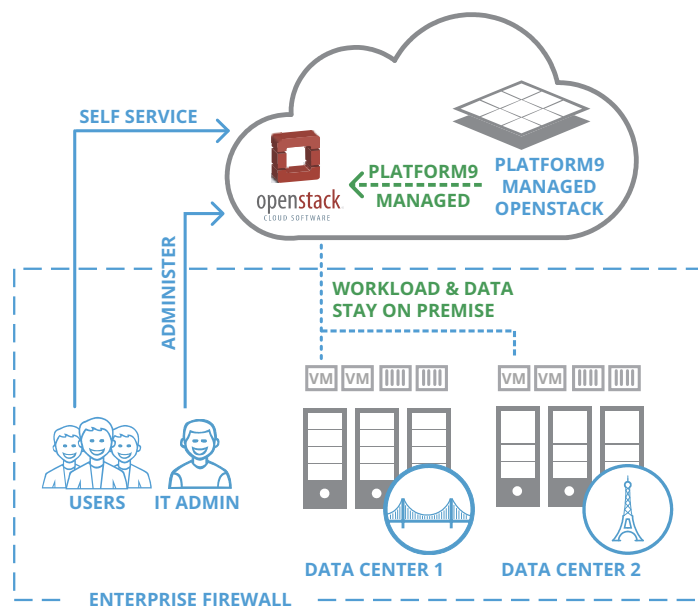
PLATFORM9 MANAGED OPENSTACK

Figure 1: SaaS-based Platform9 Managed OpenStack

Platform9 Managed OpenStack is a SaaS solution based on OpenStack. It is similar to AWS in that adoption is as easy as signing up and getting right to work. One of the biggest differences is that an AWS subscription relies on hardware and infrastructure that is wholly owned and controlled by Amazon. By contrast, Platform9 uses the servers, storage, and virtualization environments that you already own and control wherever they may happen to be. You provide the systems and Platform9 provides the OpenStack-based orchestration for your cloud as a service that delivers full private cloud automation and self-service within minutes at any scale.
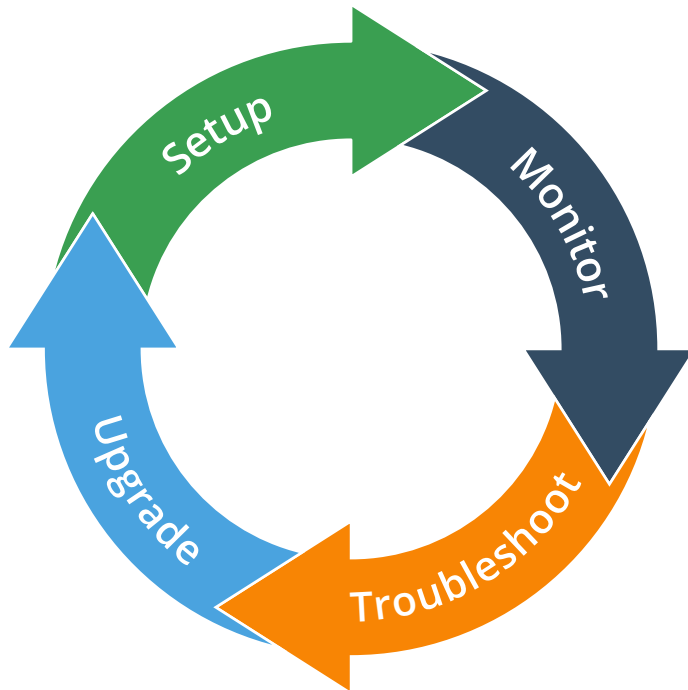
KEY BENEFITS

Figure 2: Benefits of Platform9 Managed OpenStack

Offering Platform9 Managed OpenStack as a completely managed solution allows us to go beyond the software itself by delivering complete lifecycle support that eliminates the challenges some organizations face when running OpenStack on their own. These services include:

- **Incredibly easy setup:** Sign up for Platform9 Managed OpenStack, install our lightweight gateway on your systems, and specify the internal resources you want us to manage. It's that easy.

- **Health Watch:** Our built-in monitoring tracks overall OpenStack health on both the control plane and data plane so you don't have to. We do this 24 hours a day, seven days a week.

- **Built-in Troubleshooting:** Platform9 troubleshoots issues for you when they arise with resolution SLAs that are unmatched for private clouds. Again, we do this at any time of day or night.

- **Zero Touch Upgrade:** We do the work of backing up your OpenStack controllers, rolling out and validating the upgrade, and then committing the transaction.

USE CASES

VMware vSphere is a fantastic platform for IT departments across the entire range of operations from maintenance to infrastructure management, storage and network management, and building virtualized environments; however, OpenStack supports several important use cases that go beyond vSphere's capabilities, including:

- **Streamlined Provisioning:** Simplified transformation from a virtualized environment to a central library of curated images with flavors that roughly correspond to vSphere profiles by specifying CPU, memory, disk, and other resource allocation policies. Flavors greatly speed up virtual machine (VM) provisioning.

- **Robust Policies and Rules:** The ability to create multiple tenants and users and to assign quotas. You can also define rules around available images, flavors, networks, and more to further streamline VM provisioning.

- **Use Existing Assets:** Adding OpenStack to your vSphere environment leverages your existing virtualized assets to bring full self-service to developers who need the ability to spin up and tear down infrastructure and push source code to production as fast as possible. This brings the same level of efficiency and productivity normally associated with the public cloud to your private cloud.

- **Automated Scalability:** A variety of infrastructure automation patterns can emerge in a cloud infrastructure. Scaling is one example. Modern cloud applications often run on multiple worker nodes and need the ability to automatically scale up or down across more or fewer nodes based on CPU utilization thresholds. You may want to integrate these

applications with a front-end load balancer and apply firewall rules to that load balancer and its associated traffic. Distribution for performance and availability is another example. You don't want a multi-node application running on a single ESX server because that creates a single point of failure and also limits performance. OpenStack can orchestrate these scenarios and more very well when running on top of vSphere.

- **Unified Management:** Newer platforms such as KVM and Docker are coming to market. A growing number of applications and projects are being packaged in containers that can be another form factor for running applications. OpenStack provides a single unified management platform for all of these environments.

Architecture

Platform9 Managed OpenStack is the first private cloud solution that is 100% interoperable with VMware vSphere. A typical vSphere environment uses vCenter to manage ESX clusters, datastores, networks, portgroups, vswitches, virtual machines, and templates—just what IT needs to keep things up and running. vSphere does not, however, provide the easy self-service and automation that developers need.
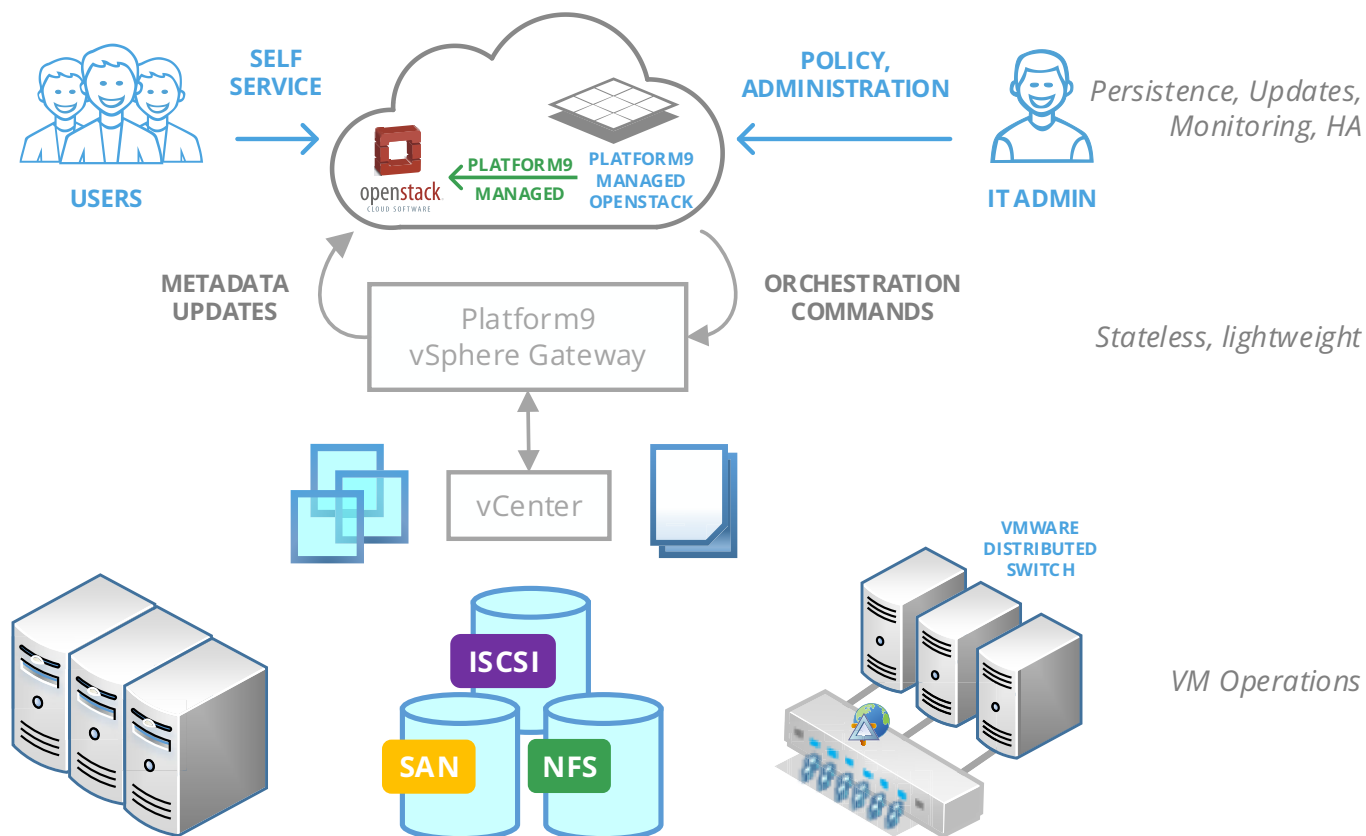

Figure 3: Platform9 and VMware Sphere Architecture

Platform9 installs OpenStack as a seamless layer on top of vSphere using one small, lightweight, and stateless appliance per vCenter server. Simply download this gateway from your Platform9 account and install it. Once installed, the appliance integrates with the vCenter public API, authenticates itself with vCenter, and runs queries to discover your current clusters, datastores, etc. The OpenStack controller receives this data and presents it in a unified interface that allows IT to manage aggregate compute resources, users, flavors, the centralized image repository, storage, tenants, quotas, and more— everything needed to manage and administer a private cloud using your existing virtualized environment.

End users can access provisioning via the Platform9 Managed OpenStack interface. They can also use any or all of the integrations that are accessible via the Command Line Interface (CLI) and/or the OpenStack RESTful API that is very similar to the AWS API. Any existing Developer Operations and integration tools such as Vagrant, Terraform, Java, Puppet, Chef, Ruby, and Ansible are also compatible with the OpenStack API right out of the box.

The OpenStack controller accepts user commands from any or all of these interfaces and orchestrates them onto the vSphere environment on behalf of those users. Platform9 Managed OpenStack handles the persistence, updates, monitoring, HA, and more, using only the API data provided by vSphere. All operations occur in the vSphere layer. This ensures that Platform9 Managed OpenStack remains lightweight, stateless, and fully compatible with your vSphere environment.

Installation

Installing Platform9 Managed OpenStack is as easy as downloading the gateway and installing it in your vSphere environment. During gateway deployment, it requests vCenter authorization credentials, and automatically accesses your Platform9 account upon powering on.

Authorization allows the gateway to obtain high-level cluster and utilization information. You select the cluster(s) and associated datastore(s) to integrate with Platform9 Managed OpenStack. Full discovery of the assigned resources takes just a few minutes, after which you can create entities such as tenants, users, rules, and quotas. You can also specify options, such as whether you use an external DHCP pool or whether OpenStack should inject IP addresses into VMs from a pool. Once this is done, your private cloud is now ready for use. You have full control to add and/or remove vSphere resources from your Platform9 Managed OpenStack account at any time.

Compatibility

Making life easy for your developers should not make life hard for your IT department. Platform9 Managed OpenStack is the first solution to offer 100% interoperability with vSphere because it relies solely on the metadata provided by vSphere to perform orchestration functions. If your hardware, software, and networking are compatible with VMware, then they are compatible with Platform9 Managed OpenStack. Further, any operation performed in vSphere—such as importing, removing, or moving a VM—appears in the OpenStack controller. Your vSphere operations are completely unrestricted.

Any port groups that are visible to vCenter are compatible and registered as OpenStack networks. Platform9 Managed OpenStack is compatible with VMware vDS, and Cisco APIC support is currently in development.

Scalability

Platform9 Managed OpenStack also makes scaling up and down fast and simple. You can add or remove one or more cluster(s) and/or vCenter server(s) at any time, and the OpenStack controller will automatically scale behind the scenes. Again, this is possible because the gateway is simply a metadata proxy between your vSphere environment(s) and the OpenStack control plane. All you need to do is install the gateway on each vSphere server that you want to manage using Platform9 Managed OpenStack.

As previously discussed, OpenStack supports scaling through placement rules and/or load balancers. Additional nodes spin up when needed based on predefined CPU utilization thresholds and spin down when no longer needed in the same manner previously pioneered for public clouds. This allows your developers to treat your infrastructure as code by supporting native cloud application design similar to that used for AWS CloudFormation.

Automation

Platform9 Managed OpenStack allows you to easily automate your Continuous Integration/Continuous Delivery (CI/CD) pipelines using OpenStack REST APIs, convenient CLIs, or the integrations that are available for various programming languages and configuration management frameworks. Scaling up and down occurs automatically behind the scenes based on workload, and VM placement takes workload tier and available capacity into account for maximum performance and availability.

OpenStack Heat is used to orchestrate provisioning of multi-VM application stacks, allowing easy implementation of DevOps patterns such as load-balancing, auto-scaling, and replication. Heat supports cloud-native application design in a manner similar to that of AWS CloudFormation. Auto-scale up occurs based on increased VM resource utilization and vice versa. Reusable Heat templates allow you to specify how this scaling should occur.

About Platform9

Summary

Platform9 Managed OpenStack is disrupting the private cloud solution space by delivering unmatched simplicity and 100% vSphere compatibility combined with expanding support for managing additional virtualization platforms within the same interface. It is built to leverage the stable vSphere API while remaining vendor neutral by being built on OpenStack. Simply Install and authenticate the Platform9 Managed OpenStack gateway on your existing vSphere server(s) and then configure your private cloud to suit your needs. The Platform9 Managed OpenStack controller works via the vSphere API, thereby ensuring 100% compatibility while making scalability faster and easier than ever before.

For Further Information

This white paper described how OpenStack can be used as a cloud management platform that seamlessly integrates with VMware vSphere. If you would like more information or to schedule a demonstration, please contact us at:

- Email: support@platform9.com

- Phone: +1-650-898-7369

To learn more about Platform9, visit **www.platform9.com**.

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