



HPE Reference Configuration for SUSE OpenStack Cloud with HPE OneView

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Executive summary

With current trends towards a software-defined data center, there exists a very real need to consistently manage the underlying resources to a known state. Chief information officers (CIOs), chief technology officers (CTOs), data center managers and enterprise architects are acutely aware that such flexibility is accompanied by a myriad of decisions and options to accomplish their desired goals.

While abstracted usage of compute, network and storage resources is the expectation for the typical user of private cloud services, the administrator must still compose these infrastructure components in a way that provides a robust, reliable service. This complexity is often cited as one of the biggest barriers to private cloud adoption.

By integrating SUSE OpenStack Cloud, a private cloud distribution, with HPE OneView, a converged management platform, your Infrastructure-as-a-Service (IaaS) private cloud instance can be provisioned rapidly, repeatedly and reliably. This integration of HPE OneView and SUSE OpenStack Cloud uses known, working configurations captured by these products along with controlled, scalable, deployment processes to greatly reduce deployment time and costs while minimizing errors or inconsistencies.

Target audience: Data center managers, enterprise architects, CIOs, and CTOs interested in rapidly and consistently deploying private clouds will benefit from this reference configuration of HPE OneView and SUSE OpenStack Cloud.

Solution overview

SUSE OpenStack Cloud provides an enterprise-grade implementation of OpenStack components and related tools for a complete private cloud implementation. Augmenting the upstream OpenStack projects, SUSE OpenStack Cloud utilizes an Administration Server, which includes a complete deployment framework, along with implementations of core services such as the underlying database and message queue. SUSE OpenStack Cloud's multi-hypervisor support for compute nodes, affords choice around virtualization and allows organizations to leverage existing expertise.

To meet the needs of an inherently multi-user platform, like a private cloud, both the control plane and the compute plane are highly available (HA). To complement this HA approach, both block and object-based storage services are delivered via resilient technology options with the storage nodes. SUSE OpenStack Cloud facilitates all aspects of the software deployment, from bare-metal operating system installations, network configurations and the user interfaces needed for a private cloud instance. Consistently configured deployments of each of the physical resource nodes for: control, compute and storage roles, is greatly enhanced with the integration of HPE OneView, which handles the composable aspects of firmware, boot, network, storage and device settings into a known state before their inclusion into the private cloud.

HPE OneView is an integrated converged management platform that automates tasks and streamlines processes delivering the entire lifecycle management of your infrastructure across compute, storage and fabric. IT staff can control resources programmatically through a unified API, enabling easy integration with workflow and management tools you use today. With HPE OneView, infrastructure can be configured, monitored, updated and repurposed with a single line of code, allowing your IT team to more effectively meet changing application needs whether those applications are deployed as physical, virtual or container-based resources. HPE OneView provides the software-defined intelligence across the Hewlett Packard Enterprise entire family of infrastructure solutions, from providing embedded management in HPE Synergy, to delivering attributes of composability in HPE BladeSystems, HPE ProLiant server platforms, HPE Hyper Converged 380, HPE 3PAR storage and HPE Converged systems.

By creating a resource definition, or server profile template (for servers, storage, and networks), administrators can ensure these consistent, reliable configurations are used. Using the built-in REST API, HPE OneView is queried by the SUSE OpenStack Cloud administration web interface to allow the display of available systems, apply the template for the desired node's role in the private cloud and seamlessly integrate into the provisioning process.

In summary, the combination of SUSE OpenStack Cloud and HPE OneView addresses the needs to:

- Catalog and maintain a set of known working values of configuration options
- Consistently configure any number of physical infrastructure resource nodes into these desired, known states
- Incorporate these configured physical components into their respective private cloud service roles
- Reduce the administrator's workload of managing all the servers by simplifying the server lifecycle management

Key technologies

The key technologies that comprise this solution include:

- Partner application: SUSE OpenStack Cloud 6
- HPE OneView 2.0
- Hardware: HPE ConvergedSystem 700 with HPE ProLiant BL460 and/or HPE ProLiant DL360/DL380

Solution diagram

The following figure illustrates the integration of the key technologies and their core components. Please also refer to the design configuration and solutions components section for a step-wise description of the overall process.

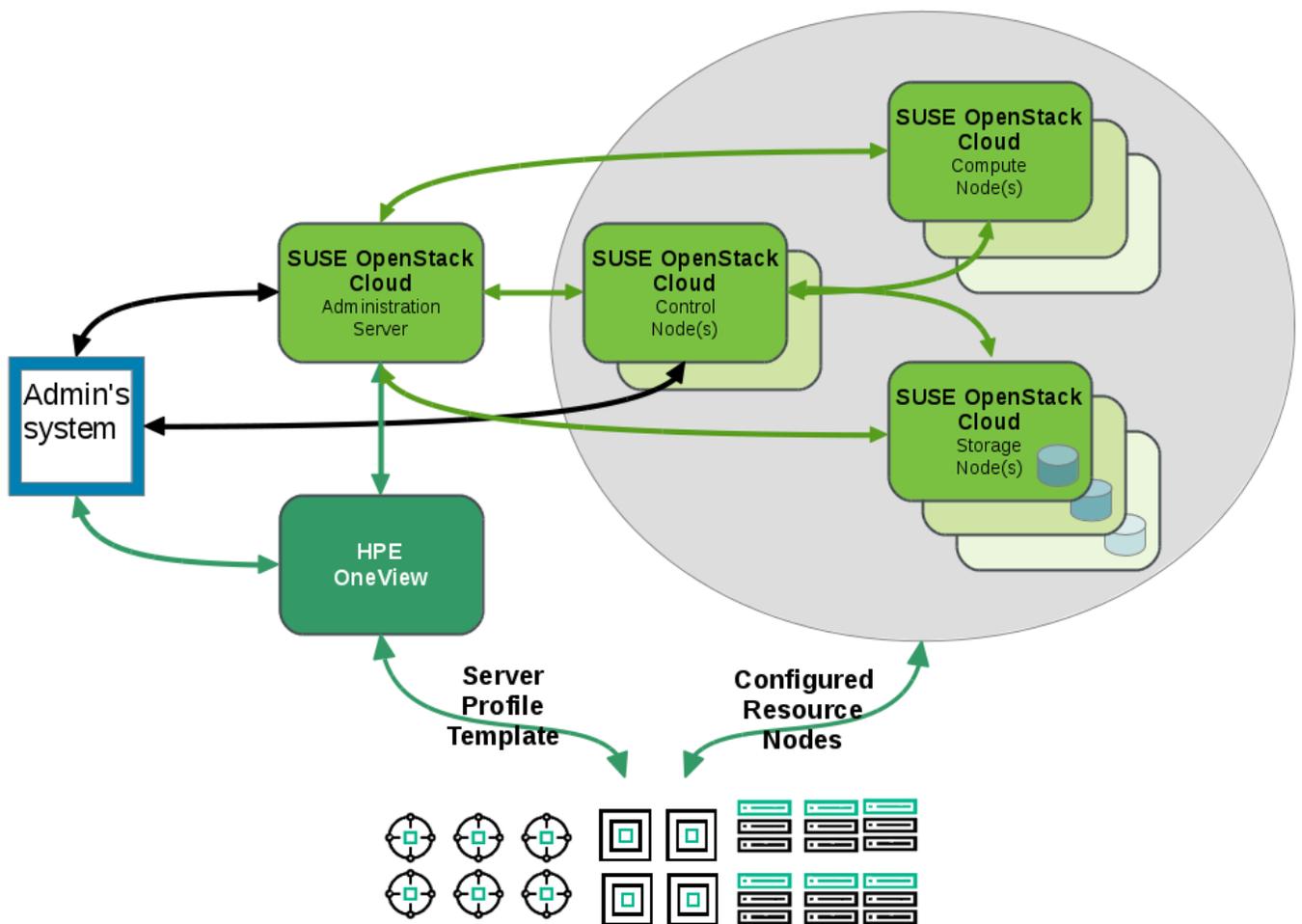


Figure 1. Integration diagram

Design considerations and solution components

An initial deployment of a private cloud can be accomplished with this integration of SUSE OpenStack Cloud, HPE OneView and the physical hardware as described in the steps below. Please refer to the solution diagram which illustrates these interactions:

Hardware

- Setup, rack, and cable each HPE system and its devices according to the product's documentation

HPE OneView

- Setup the product according to the documentation and ensure all of the desired system resource nodes are discovered and available for configuration.
- Setup System Profile templates to match each of the intended roles for the private cloud, including control, compute and storage. You can refer to the SUSE OpenStack Cloud Deployment Guide for minimum system requirements for each role. At a minimum, ensure that:
 - Firmware is up-to-date and set for known working versions for the respective platforms
 - Direct, local-attached storage devices are configured to be compatible with the roles being targeted and take into account any multiple device configurations needed for high availability or for resiliency perspectives. For instance, local disk volumes can be configured for the operating system installation across any nodes or as LUNs for the eventual location of distributed object, block or file on the storage nodes where Swift or Ceph are deployed
 - Network attached storage, like SAN or NAS LUNs can be setup and configured for access by those nodes where certain roles, like Cinder, may be later deployed
 - Both the expected number and type of network interfaces are enabled for each node role, with the boot priority set to PXE for the respective network card, to match the desired network topology of the overall cloud

Note: Any level of granularity for the system profile templates is possible. For example, a profile might exist for each type of compute node specific to the desired hypervisor and for each kind of local, shared or remote ephemeral storage. As such, take care in the naming of the profiles to be easily recognized later for their intended use.

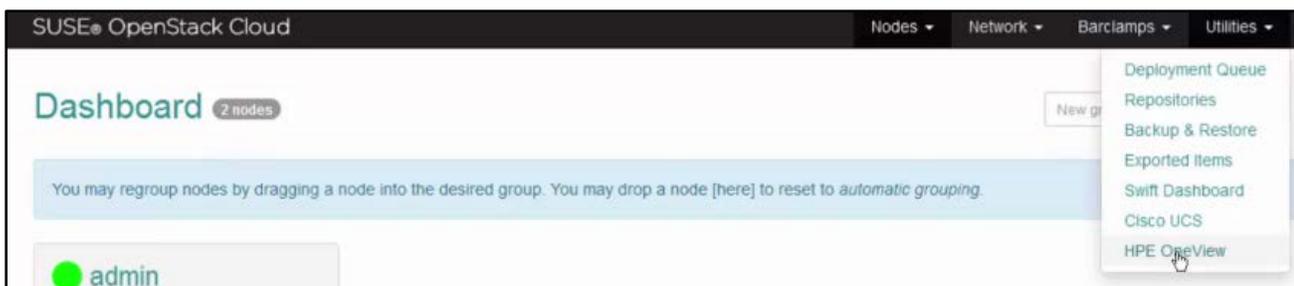
SUSE OpenStack Cloud

- Setup the product according to the documentation and ensure the Administration Server is ready to use with the desired network configuration and topology finalized.

Note

Since the integration with HPE OneView simplifies all system configuration tasks, this reference configuration paper serves as a complement to the reference architecture paper, ProLiant for Private Cloud: Optimized for SUSE OpenStack Cloud, located at <http://h20195.www2.hp.com/V2/GetDocument.aspx?docname=4AA6-1462ENW&cc=us&lc=en>.

1. From the administrative web interface, access the HPE OneView integration menu item



2. Configure the credentials necessary to access the API of your HPE OneView instance

SUSE OpenStack Cloud

Nodes Network Barclamps Utilities Help

Please provide OneView login credentials.

HPE OneView Login Settings

API URL

Username

Password

Login

3. Review the Server Hardware Inventory table for an overview of the environment and to be able to control power and server profile template states

SUSE OpenStack Cloud

Nodes Network Barclamps Utilities Help

HPE OneView

Server Hardware Inventory

Save

Server Name	Hardware	Specifications	Current Template	Apply Template/Action	Apply?
<input type="radio"/> SGH528Y5VD, bay 1	ProLiant BL460c Gen9	Intel(R) Xeon(R) CPU E5-2650 v3 @ 2.30GHz 64 GB Off ProfileApplied	SUSE_CLOUD_COMPUTE_Template	Remove Profile	<input type="checkbox"/>
<input type="radio"/> SGH528Y5VD, bay 2	ProLiant BL460c Gen9	Intel(R) Xeon(R) CPU E5-2640 v3 @ 2.60GHz 256 GB Off NoProfileApplied		SUSE_CLOUD_COMPUTE_Template	<input type="checkbox"/>
<input type="radio"/> SGH528Y5VD, bay 3	ProLiant BL460c Gen9	Intel(R) Xeon(R) CPU E5-2650 v3 @ 2.30GHz 64 GB Off NoProfileApplied		SUSE_CLOUD_COMPUTE_Template	<input type="checkbox"/>
<input type="radio"/> SGH528Y5VD, bay 4	ProLiant BL460c Gen9	Intel(R) Xeon(R) CPU E5-2650 v3 @ 2.30GHz 64 GB Off NoProfileApplied		SUSE_CLOUD_COMPUTE_Template	<input type="checkbox"/>
<input type="radio"/> SGH528Y5VD, bay 5	ProLiant BL460c Gen9	Intel(R) Xeon(R) CPU E5-2650 v3 @ 2.30GHz 64 GB Off NoProfileApplied		SUSE_CLOUD_COMPUTE_Template	<input type="checkbox"/>

4. The following steps are repeated for each of the required node types in your initial deployment
 - a. View the available system hardware specifications
 - b. Select the power state (up, down, reboot) of the system
 - c. View the current and available server profile templates

Note

If a desired template does not exist for a given role, go back to the HPE OneView administrative interface and create one.

- d. Associate the desired system profile template to a target system, starting with control nodes, then storage nodes and finally compute nodes

Note

The system will be rebooted to accomplish the configuration change, with progress noted on this table. Warnings will be provided to change an already established profile association.

- e. Ensure it shows as a discovered resource node on the administration node dashboard where it can be allocated with an operating system and assigned the desired roles in the private cloud
5. Once the initial cloud deployment has been accomplished, scaling or replacement of nodes can be accomplished by roughly the same steps as in the previous list. From the SUSE OpenStack Cloud administration web interface to HPE OneView, simply:
 - a. Select an available node
 - b. Apply the respective template, and for reference you can use the hardware inventory table to mimic what is currently deployed for a similar node and role combination
 - c. When the node shows a discovered state, proceed to associate an operating system and apply the desired cloud roles

Note: Substitution of nodes is similar, but the roles, services and any active workloads would need to be evacuated from the existing node before removing from the private cloud deployment.

Key points

The combination of SUSE OpenStack Cloud and HPE OneView, and its supported set of HPE hardware, addresses the need to minimize complexity while providing the corresponding value propositions:

- Catalog a set of known working values of configuration options, effectively codifying the collective experience of your IT infrastructure and cloud staff
 - Consistently configure the physical infrastructure components into these desired, known states, providing repeatable process control
 - Incorporate these configured physical components into their respective private cloud service roles, ensuring a reliable and robust Infrastructure-as-a-Service offering which can be correct-by-design and extended later to these same specifications
-

Summary

Key benefits from the integration of HPE OneView and SUSE OpenStack Cloud include:

- Abstraction of compute, storage and networking resources into reliable Infrastructure-as-a-Service private cloud offering
- Administrators of such services can rely on HPE OneView to compose the physical resources, including HPE system hardware and devices, into known states, thus reducing operational complexity and ensuring consistency
- Robust, rapid, reliable initial deployment to trusted, known states
- Rapid deployment of additional infrastructure resources into a robust, reliable private cloud instance
- Configures and deploys hardware and software from bare-metal up through the multiple software layers needed for the end users' desired interaction and abstraction
- Supports multiple hypervisor choices and highly available compute and control planes

In summary, HPE OneView with SUSE OpenStack Cloud deliver one of the fastest, most flexible, and easiest to deploy private cloud solutions.

Resources and additional links

HPE Solutions, hpe.com/solutions

HPE Converged Infrastructure Library, hpe.com/info/convergedinfrastructure

HPE Partner Page for SUSE, hpe.com/partners/suse

HPE ProLiant for Private Cloud, Optimized for SUSE OpenStack Cloud, <http://h20195.www2.hpe.com/V2/GetDocument.aspx?docname=4AA6-1462ENW&cc=us&lc=en>

SUSE Home Page, suse.com

SUSE Partner Page for HPE, <https://www.suse.com/partners/alliance/hpe/>

SUSE OpenStack Cloud software page, <https://www.suse.com/products/suse-openstack-cloud/>

SUSE ProLiant for Private Cloud, Optimized for SUSE OpenStack Cloud,
https://www.suse.com/docrep/documents/j2nd2zd2zq/HP_ProLiant_for_Private_Cloud.pdf

To help us improve our documents, please provide feedback at hpe.com/contact/feedback.



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