

H8Q14S HPE Helion OpenStack

Course Summary

Description

This course will take students through an in-depth look at HPE Helion OpenStack V5.0. The course flow is optimized to address the high-level architecture and HPE Helion OpenStack specific features through lectures. The lab guide starts with the pre-deployed environment, and focuses on verification, configuration, and maintenance procedures. Each student will receive access to the dedicated HPE hardware-based environment. Students will get a hands-on lab experience for many of the course topics, in order to gain experience in the management procedures and operation of HPE Helion.

Objectives

After taking this course, students will be able to:

- Understand Linux containers
- Understand using SLES KVM Compute nodes
- Understand Git-based repository to keep the track of configuration changes
- Understand updates to the HPE Helion OpenStack services based on the new Vanilla OpenStack Mitaka release
- Understand Neutron Load Balancing as a Service (LBaaS)
- Understand VPN as a Service (VPNaaS)
- Understand DNS as a Service (DNSaaS)
- Understand Network configuration options, such as Neutron role-based access control (RBAC) and LBaaS
- Understand VLAN aware project server instances
- Understand Monasca-based monitoring
- Understand Centralized logging
- Introduce the concept of virtualization as applied to network functions
- Be familiar with the ESTI Framework for NFV
- Examine the hardware components of HPE NFV System
- Understand control components
- Understand compute components
- Look in detail at the network and storage configuration of the various components
- Be familiar with the solution architecture and deployment models
- Examine each of the HPE NFV System kits and the hardware that each is composed of
- Examine the factors that affect hardware performance
- Understand the software used in HPE NFV System and the part that each plays: Control Plane, Hardware Management components, Compute Plane, and Helion Carrier Grade
- Look at the Value Add components available
- Understand the lifecycle management of the various components
- Look at where SDN, HPE ConteXtream and HPE NFV Director can fit with the HPE NFV System
- Be aware of some troubleshooting recommendations

H8Q14S HPE Helion OpenStack

Course Summary (cont'd)

Topics

- Course Overview
- HPE Helion OpenStack Introduction
- Managing Identity Service
- Managing Compute
- Managing Storage Services
- HPE Helion OpenStack Networking and network services
- HPE Helion OpenStack Ironic Services
- HPE Helion OpenStack —Security and High Availability
- HPE Helion OpenStack —Magnum (Container) Service

Audience

This course is created for system administrators, technical consultants, and cloud architects responsible for designing and supporting OpenStack solutions based on HPE Helion OpenStack.

Prerequisites

Before taking this course, students should have experience in Linux system administration and experience with OpenStack installation and configuration. Students should also have an understanding of: virtualization concepts, networking concepts, high-level HPE StoreServ concepts, and high-level StoreVirtual VSA concepts.

Duration

Three days

H8Q14S HPE Helion OpenStack

Course Outline

- I. Course Overview**
 - A. Course objectives
 - B. Course audience
 - C. Introductions
 - D. Course agenda
- II. HPE Helion OpenStack Introduction**
 - A. Objectives
 - B. What is HPE Helion OpenStack
 - C. Enterprise-grade private cloud based on OpenStack
 - D. The open-source foundation
 - E. Key value add in HPE Helion OpenStack
 - F. HPE Helion OpenStack — improvements
 - G. HPE Helion OpenStack — What's new
 - H. HPE Helion OpenStack — Architecture block diagram
 - 1. Operations environment
 - 2. Running environment
 - I. The OpenStack services overview
 - 1. Compute services overview (Nova)
 - 2. Identity service overview (Keystone)
 - 3. Key management service (Barbican)
 - 4. Image operations service overview (Glance)
 - 5. Network service overview (Neutron)
 - 6. Object storage service (Swift)
 - 7. Bare-metal service (Ironic)
 - 8. Orchestration service (Heat)
 - 9. Block storage service (Cinder)
 - 10. Metering service (Ceilometer)
 - 11. Dashboard (Horizon)
 - 12. Monitoring service (Monasca)
- III. Managing Identity Service**
 - A. Objectives
 - B. What is the Identity service?
 - C. Keystone authentication and authorization
 - 1. Domains
 - 2. Domain administrators
 - 3. Projects
 - 4. Users and groups
 - 5. Roles
 - 6. Preinstalled roles
 - D. Managing passwords
 - 1. Retrieving the admin password
 - 2. Changing the password
 - 3. Password rules
 - 4. Password metadata
 - 5. Password change playbooks and tables
 - E. Reconfiguring Identity service
 - 1. Examine the existing configuration
 - 2. Create users and assign roles
- IV. Lab Exercises**
 - A. Accessing and verifying the vLabs environment
 - B. In this lab, students will connect to pre-installed HOS5 environment using the Horizon user interface and CLI.
 - C. Post Installation Configuration
 - D. In this lab, students will proceed with environment configuration, performing the following steps:
 - 1. Changing the admin password for the cloud
 - 2. Creating an external network using the Ansible playbook
 - 3. Creating users and projects
 - 4. Preparing the CLI resource configuration files
 - 5. Creating private networks
 - 6. Creating the security group and access key
 - 7. Uploading the Glance images and modifying metadata
 - E. Working with a SLES compute In this lab, students will perform the steps required to deploy and activate an SLES KVM compute with HPE Helion OpenStack.
 - F. ESXi compute integration In this lab, students will perform the steps required to deploy and activate an ESXi compute with HPE Helion OpenStack.
- V. Managing Compute**
 - A. Objectives
 - B. OpenStack Compute Overview
 - C. Nova scheduling
 - D. Nova scheduler filters
 - E. Host aggregates and availability zones
 - F. Adding metadata to host aggregate
 - G. Using flavor metadata to specify a CPU model
 - H. Enabling Nova resize and migrate features
 - I. Glance image caching
 - J. CPU and ram overcommit

H8Q14S HPE Helion OpenStack

Course Outline (cont'd)

VI. Managing Storage Services

- A. Objectives
- B. Types of OpenStack storage
- C. Block storage with HPE StoreVirtual VSA
 - 1. StoreVirtual VSA overview
 - 2. StoreVirtual VSA Installation
 - 3. Automated VSA cluster creation
 - 4. Configuring StoreVirtual VSA as the backend
- D. Block storage with HPE StoreServ
 - 1. HPE 3PAR StoreServ overview
 - 2. 3PAR backend configuration
- E. Configuring the Cinder volume types
 - 1. Storage architecture
 - 2. Cinder volume types
 - 3. Volume type creation example
 - 4. Extra specification options for VSA
 - 5. Extra specification options for 3PAR
 - 6. Creating the Cinder volume
 - 7. Third-party Cinder driver support
- F. OpenStack object storage
 - 1. Types of storage
 - 2. Object storage
- G. HPE Helion OpenStack Swift support
 - 1. Container synchronization
 - 2. Container synchronization limitations
 - 3. Availability zones
 - 4. Erasure coding
 - 5. Using the erasure coding to optimize the number of replicas
- H. Swift Operations Console
 - 1. Operations Console enhancements overview
 - 2. Performance summary screen
 - 3. Inventory summary screen
 - 4. Capacity summary screen
 - 5. Alarm summary screen

VII. HPE Helion OpenStack Networking and network services

- A. Learning check
- B. OpenStack networking overview
 - 1. Virtual machine networking
 - 2. Neutron architecture
- C. Physical networking and HOS
 - 1. Modeling the cloud network infrastructure
 - 2. Server network configuration
 - 3. Server network device naming
 - 4. Network configuration examples

D. Neutron physical networking

- 1. Neutron touchpoints with physical networking
 - 2. VxLAN touchpoints with physical networking
 - 3. VxLAN tunnel endpoint example
 - 4. Neutron provider VLAN touchpoints with physical networking
 - 5. Provider VLAN routing
 - 6. Neutron tenant VLAN touchpoints with physical networking
 - 7. Neutron provider FLAT network touchpoints with physical networking
 - 8. Neutron router external touchpoints with physical networking
- #### E. Neutron DVR and CVR
- 1. Centralized vs distributed routing features
 - 2. HA routing using VRRP
 - 3. L3 HA configuration
- #### F. Load Balancing as a Service (LBaaS)
- #### G. Firewall as a Service
- #### H. VPN as a Service
- #### I. DNS as a Service

VIII. Lab Exercises

- A. VSA block storage integration StoreVirtual VSA, deployed as part of the cloud installation, will be configured and connected to the cloud. Basic Volume creation will be tested after creating the new volume type.
- B. HPE 3PAR block storage integration HPE 3PAR StoreServ will be configured to be used by Cinder. Basic volume creation will be tested after creating the new volume type.
- C. Working with Orchestration and LBaaS In this exercise, students are going to use the HPE Helion OpenStack orchestration service to start three server VMs. Heat orchestration template used in the lab will create the web service on the CirrOS instances, but service has to be started manually.
- D. Once the servers are up and running, students will configure the LBaaS service using the Horizon UI, and test the load balancer functionality.

H8Q14S HPE Helion OpenStack

Course Outline (cont'd)

- IX. HPE Helion OpenStack Ironic Services**
 - A. Objectives
 - B. The function of the bare-metal provisioning
 - C. Brief introduction to Ironic
 - D. Key technologies and protocols
 - E. Ironic architecture and deployment flow
 - 1. Architecture components
 - 2. High-level overview of the Ironic deployment flow
 - F. User Interface Support
 - G. Horizon
 - H. Ops Console
 - 1. Ironman and iLO drivers
 - 2. iLO driver feature summary
- X. HPE Helion OpenStack —Security and High Availability**
 - A. Objectives
 - B. HPE Helion OpenStack security
 - 1. Security domains
 - 2. Tenant VM security
 - 3. Tenant VM protection methods
 - 4. Security focus
 - 5. Barbican service
 - 6. Security enhancements
 - 7. Encrypting data in transit
 - 8. Neutron RBAC
 - 9. Secure mode HPE Linux install/boot for UEFI Secure Boot
 - C. HPE Helion OpenStack high availability
 - 1. Highly available, cloud-aware tenant workloads
 - 2. Cloud application and workloads availability
 - 3. Application redundancy
 - 4. Availability zones
 - 5. Cinder and Swift HA
 - 6. Controller HA example
- XI. HPE Helion OpenStack —Magnum (Container) Service**
 - A. Objectives
 - B. What are virtual containers?
 - C. Container as a Service on OpenStack® platform
 - D. Magnum architecture overview
 - E. Magnum installation
 - 1. HOS5 Magnum dependencies
 - 2. Installation as part of new OpenStack environment
 - 3. Adding Magnum to existing HPE Helion OpenStack
 - F. Deploying a Kubernetes cluster on Fedora Atomic
 - 1. Prerequisites
 - 2. Creating the cluster
 - 3. Deploying a Docker Swarm cluster on Fedora Atomic
 - 4. Creating magnum Cluster with Dashboard
- XII. Lab Exercises**
 - A. Creating Encrypted Volumes In this exercise, students will create the encrypted Cinder volume using the VSA iSCSI backend. Students will then verify the encrypted volume functionality, which should be identical to the standard Cinder volumes.
 - B. Using the VPN as a Service HPE Helion OpenStack comes with pre-configured VPNaaS functionality. In this exercise, students will test the VPN functionality by connecting two private networks using the IPSec tunnel.
 - C. Cloud Infrastructure Maintenance In this lab, students will walk through the Operations Console user interfaces, and then follow the steps to reboot the HPE Helion OpenStack cloud.