H6C68S: Fundamentals of OpenStack® Technology

Course Summary

Description

This 3-day course assists administrators and users to configure, manage, and use the OpenStack® cloud services platform. An architectural overview ensures understanding of various OpenStack® projects and their functions. Hands-on labs provide configuration and operation experience with major aspects of the OpenStack® environment.

Objectives

By the end of this course, students will be able to:

- Describe the major features of OpenStack®
- Describe the architecture of OpenStack®
- Configure and use OpenStack®

Topics

- Course Overview
- Introduction to OpenStack®
- Keystone – OpenStack® Identity Service
- Nova – OpenStack® Compute Service
- Glance – OpenStack® Image Service
- Horizon – OpenStack® Dashboard
- Neutron – OpenStack® Networking Service
- Cinder – OpenStack® Block Storage
- Swift – OpenStack® Object Storage
- Ceilometer – OpenStack® Telemetry Service
- Heat – OpenStack® Orchestration Service
- Trove – OpenStack® Database Service
- Deployment Planning
- New Capabilities

Audience

System Administrators, engineers and consultants who will plan and manage OpenStack-based environments

Prerequisites

- Completion of Linux Fundamentals (U8583S)
- Completion of Linux for Unix Administrators (U2794S)
- HP Cloud Overview Seminar (HK917AAE)

Duration

Three days

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Course Outline

I. Module 1: Course Overview
- A. Set out the course objectives

II. Module 2: Introduction to OpenStack®
- A. OpenStack Overview
  1. OpenStack high level architecture
  2. OpenStack architecture overview
  3. OpenStack component interactions
  4. OpenStack API Interfaces
- B. HP and the Cloud
  1. HP's Contributions to OpenStack
  2. HP's OpenStack and Cloud Leadership
  3. HP's OpenStack Based Offerings
- C. Accessing OpenStack Services
  1. Dashboard
  2. CLI
  3. API
- D. Lab Exercises:
  1. Accessing the Lab VM and starting the OpenStack® environment
  2. Exploring the OpenStack® command line
  3. Accessing OpenStack® using Horizon GUI

III. Module 3: Keystone – OpenStack® Identity Service
- A. Keystone overview
- B. Keystone architecture
  1. User management
  2. Service management
- C. Using Keystone
  1. Using the python-keystone client
  2. Adding Users, Tenants, and Roles
  3. Token Auth vs Password Auth methods
  4. Configuring service credentials
  5. Configuring SSL support
- D. Configuring Keystone
- E. Troubleshooting Keystone
- F. Lab Exercises
  1. Keystone Identity Functionality
  2. Horizon Identity Functionality
  3. OpenStack® Service Catalog and API access

IV. Module 4: Nova – OpenStack® Compute Service
- A. Nova Overview
- B. Nova architecture
  1. OpenStack Compute component interactions
  2. A look the Nova API
  3. Nova-network
  4. Nova volume management
- C. Configuring Nova
- D. Operating Nova
  1. Creating and managing a compute node
  2. Image and instance management using Nova
- E. Scheduler
  1. Scheduling overview
  2. Nova Schedulers
- F. Troubleshooting
- G. Lab exercises
  1. Creating an Instance from the CLI
  2. Verify the required nova services are enabled and happy
  3. Run (boot) an Image
  4. Manage Instances from the Horizon GUI
  5. Pausing and Suspending the VM
  6. Creating a Snapshot
  7. Terminating Instance

V. Module 5: Glance – OpenStack® Image Service
- A. Glance Overview
- B. Glance architecture
  1. Glance API
  2. Glance Registry
  3. Glance storage adapters
- C. Image management using Glance
  1. Overview of image management
  2. Supported image types
  3. Creating and configuring images in Glance
  4. Booting an image
  5. Deleting an instance
  6. Replicating images
- D. Troubleshooting Glance
- E. Lab Exercises
  1. Creating a Glance Image
  2. Creating an Instance

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Course Outline (con't)

VI. Module 6: Horizon – OpenStack® Dashboard
- A. Horizon overview
- B. Horizon Architecture
- C. Installing and configuring Horizon
- D. Common management tasks
- E. Troubleshooting
- F. Lab Exercises
  1. Exploring the OpenStack® Dashboard
  2. Exploring the Horizon Configuration Settings

VII. Module 7: Neutron – OpenStack® Networking Service
- A. Overview of OpenStack Neutron
- B. Neutron Architecture and use cases
  1. Single flat network
  2. Multiple flat network
  3. Mixed flat and private network
  4. Provider router with private networks
  5. Per-tenant routers with private networks
  6. Open vSwitch and Linux Bridge
  7. Linux network namespaces
- C. Configuring Neutron
- D. Using Neutron Services
- E. Troubleshooting Neutron
- F. Lab Exercises
  1. Verifying Neutron configuration
  2. Assembling the network map
  3. Creating a VM
  4. Modifying Access & Security settings
  5. Connecting to the Instance
  6. Associating Floating IP to the Instance
  7. Examining the Network Topology

VIII. Module 8: Cinder – OpenStack® Block Storage
- A. Cinder Overview
- B. Cinder Architecture
  1. OpenStack storage concepts
  2. Cinder API
  3. Cinder scheduler
- C. Cinder Configuration
- D. Using Cinder
  1. Creating volumes
  2. Configuring boot from volume
- E. Troubleshooting
- F. Lab Exercises
  1. Creating a Stack Volume from the CLI
  2. Creating an instance that boots from a Cinder volume
  3. Using Horizon to manage Cinder Volumes

IX. Module 9: Swift – OpenStack® Object Storage
- A. Swift Overview
- B. Swift Architecture
  1. Accounts and credentials
  2. Containers, objects, rings
  3. Nodes: auth, proxy, storage
  4. Replication
  5. Updaters and auditors
  6. Language Bindings
- C. Configuring Swift
- D. Using Swift
  1. Accounts
  2. Creating and managing objects
  3. Object server management
  4. Container server management
  5. Account server management
  6. Proxy server management
  7. Ring management
  8. Large objects
  9. Monitoring
- E. Troubleshooting
- F. Lab exercises
  1. Using the OpenStack® Object Storage Service
  2. Exploring the Swift Configuration

X. Module 10: Ceilometer – OpenStack® Telemetry Service
- A. Ceilometer overview
- B. Architecture ◦Central agent
  1. Compute agent
  2. Collector
  3. Data store
  4. API server
  5. Meter types and units
- C. Configuring Ceilometer
- D. Using Ceilometer
  1. Using component meters
  2. API and CLI queries
- E. Troubleshooting Ceilometer
- F. Lab Exercises
  1. Ceilometer overview

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Course Outline (con't)

XI. Module 11: Heat – OpenStack® Orchestration Service

A. Heat Overview
B. Architecture
   1. Heat Orchestration Template (HOT) format
   2. Heat CFN API service
   3. Heat CFN tools
   4. Heat enabled images
   5. User data input formats
   6. Cloud-init and user-data scripts
   7. Resource plugins
C. Configuring Heat
D. Using Heat
   1. Configuring images for use with Heat
   2. Creating a stack
E. Troubleshooting
F. Lab exercises
   1. Configuring OpenStack® for Heat
   2. Heat basic template example
   3. Viewing the status of Stack from Horizon
   4. Template Input Parameters
   5. Improving Templates
   6. Providing parameters to heat command line
   7. Providing template outputs
   8. Complex Template Deployment
   9. Cleanup

XII. Module 12: Trove – OpenStack® Database Service

A. Trove Overview
   1. Terminology
   2. Use Cases
B. Architecture
C. Trove Installation
D. Configuring Trove
E. Using Trove
   1. Working with Datastores
   2. Working with Instances
   3. Working with Databases
F. Managing Trove using Horizon
G. Troubleshooting Trove
   1. Using Trove with DevStack Environment
H. Lab Exercises:
   1. Preparing the environment for Trove
   2. Creating new Datastore
   3. Create trove Instance and Database
   4. Managing Trove using Horizon

XIII. Module 13: Deployment Planning

A. Planning an OpenStack deployment
B. Regions, AZs, Cells, etc.
C. HA considerations
D. HP Services for OpenStack deployment planning

XIV. Module 14: New Capabilities

A. Introducing capabilities under development for Juno release
B. Introducing Ironic – OpenStack® Bare Metal Provisioning Service
C. Use Cases
   1. Logical Architecture
   2. Key Technologies
   3. Deployment Architecture
   4. Prerequisites for Bare Metal Deployment
   5. Bare Metal Deployment Steps
D. Introducing Zaqar – Multi-tenant Cloud Messaging Service
E. Introducing Manilla – Shard File System Service
F. Introducing Designate – DNS as a Service component
G. Introducing Barbican – Key Management Service