Course Outline

OpenStack Admin and COA exam prep OST-104

Course Summary

Description

This course covers the fundamentals and basic administration of the Openstack open source IAAS (Infrastructure As A Service) cloud solution, widely used in private and public clouds. After a short cloud and Openstack primer, it presents the architecture of Openstack and introduces its base components in details such as the Horizon GUI dashboard and the Openstack CLI, the Keystone identity system, the Glance image service, the Cinder block storage service, the Nova compute service, the Neutron network service and software defined networking (SDN), the Openstack Telemetry solution, the Heat orchestration services and the Swift object store. Besides in-depth theoretical coverage students also do hands-on exercises with all Openstack components studied in their own Openstack lab system.

This training doesn't only prepare participants for the daily administration of Openstack systems but for the official online vendor-neutral Certified OpenStack Administrator (COA) exam of the Openstack Foundation.

Topics

- Introduction
- Controller Node Basic Services
- Image and Volume Services
- Compute node
- Network node
- Telemetry Service
- Orchestration service - Heat
- Object Storage Service - Swift

Audience

System administrators, developers and devops with Kubernetes admin. skills who want to learn about the Openstack open source IAAS cloud system.

Prerequisites

Basic Linux sys.admin, networking as well as virtualization knowledge.

Duration

Four days

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I. Introduction
- A. Cloud computing
- B. Cloud types
- C. Clouds – the flip side
- D. Overview: Life Without OpenStack
- E. Overview: What OpenStack Does?
- F. OpenStack Features
- G. OpenStack Foundation
- H. Contributing to Openstack
- I. Certified Openstack Administrator (COA)
- J. OpenStack Architecture
- K. Core Projects
- L. Further projects
- M. Openstack releases
- N. Distribution of services
- O. Distribution of services
- P. Virtual Machine Provisioning Walk-Through
- Q. Lab 1

II. Controller Node Basic Services
- A. Overview Horizon and OpenStack (demo)
- B. Keystone architecture
- C. Keystone workflow (simplified)
- D. Keystone Services
- E. Keystone backends
- F. Keystone v3 – domains/groups
- G. Keystone - User/tenant maintenance
- H. Keystone – service catalog
- I. Service APIs + keystone
- J. Troubleshooting Keystone - Cases
- K. Openstack messaging - AMQP
- L. OpenStack Messaging and Queues
- M. Messaging example with Oslo-RPC
- N. Message Queue Configuration
- O. Troubleshooting RabbitMQ - Service
- P. Lab 2

III. Image and Volume Services
- A. Image Management (Glance)
- B. Glance overview
- C. Glance CLI overview
- D. Glance CLI overview
- E. Troubleshooting Glance - Cases
- F. Volume service (Cinder)
- G. Volume creation flow
- H. Volume operations
- I. Cinder CLI - create
- J. Cinder CLI – extend
- K. Cinder CLI - snapshot
- L. Cinder CLI – backup/restore
- M. Cinder – encrypted volumes
- N. Encrypted volumes - CLI
- O. Cinder quotas
- P. Troubleshooting Cinder - Cases
- Q. Considerations for block storage
- R. Lab 3

IV. Compute node
- A. Compute terms
- B. Nova - Flavors
- C. Nova services
- D. VM provisioning in-depth
- E. Hypervisors
- F. VM Placement
- G. VM Placement with nova-scheduler
- H. VM placement – nova.conf
- I. Filtering example – nova-scheduler.log
- J. Boot a VM instance
- K. Managing VM consoles
- L. Terminate instance
- M. Working with host-aggregates
- N. Working with availability zone
- O. Examples for scheduler hints
- P. Post configuration
- Q. Post config - config-drive
- R. Post-config - cloud-init + metadata
- S. Create/customize an image
- T. Troubleshooting Nova - Cases
- U. Lab 4

V. Network node
- A. Linux networking – Linux bridge
- B. Linux networking - OpenVSwitch
- C. OpenVSwitch architecture
- D. Linux networking - IP namespaces
- E. Linux networking - veth pairs
- F. Linux networking - Tunneling
- G. OpenStack Networking Terms
- H. Nova-network types (pre-grizzly)
- I. Nova-network types (pre-grizzly)
- J. Why neutron? (quantum)
- K. Networking with Neutron
- L. The ML2plugin
- M. Neutron CLI overview
- N. Neutron CLI overview
- O. OVSNeutronPlugin – Example topology

Course Outline (cont'd)

P. OVSNeutronPlugin – Physical layout
Q. OVS layout - Compute node
R. OVS layout - Compute node (2)
S. OVS layout - Network node
T. Floating IPs with OVSNeutron
U. Security groups with Neutron
V. Troubleshooting Neutron - Cases
W. Lab 5

VI. Telemetry Service

A. Telemetry Service
B. Telemetry Service (2)
C. Telemetry Service data flow
D. Telemetry Service data gathering agents
E. Telemetry meters and archive policies
F. Telemetry pollings and pipelines
G. Telemetry Service CLI – Samples,meters
H. Telemetry Service CLI - Alarms
I. Troubleshooting Telemetry Service - Cases
J. Telemetry Service - Deployment Considerations
K. Lab 6

VII. Orchestration service - Heat

A. Openstack Heat
B. Heat overview
C. Heat Orchestration Template (HOT) format
D. HOT - basic example
E. HOT – Parameters - Constraints
F. HOT - Parameters - Environment
G. Examples – resource references
H. Examples – multiple file templates
I. Auto scaling - Overview
J. Autoscaling – Keystone extension
K. CLI overview
L. Troubleshooting Heat - Cases
M. Lab 7

VIII. Object Storage Service - Swift

A. Swift – Object Storage Service
B. Swift terminology
C. Swift architecture
D. Swift background services
E. swift-ring-builder
F. Create/manage objects
G. Storage policies
H. Object ACLs
I. Object Expiration
J. Large objects
K. Use swift as backend
L. Troubleshooting Swift – Cases
M. Lab 8