

Openstack Administration

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 at private and public clouds. After a short cloud and OpenStack primer, it presents the architecture of OpenStack and introduces its base components in detail 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 OpenAttack lab system.

Certification: This course prepares participants for certification. The Certified OpenStack Administrator (COA) certification is the only sponsored certification by 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

Developers, SysAdmins, and DevOps wanting to obtain working knowledge about the OpenStack open source cloud system.

Prerequisites

Basic Linux systems administration (GL250), networking, as well as virtualization knowledge.

Duration

Four days

Openstack Administration

Course Outline

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. OpenStack Releases
- M. Further projects
- N. Distribution of Services
- O. LAB 1

II. CONTROLLER NODE BASIC SERVICES

- A. Overview Horizon and OpenStack
- B. Keystone Architecture
- C. Keystone Workflow
- 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. Troubleshooting Glance - Cases
- E. Volume Service (Cinder)
- F. Volume Creation Flow
- G. Volume Operations
- H. Cinder CLI - Create
- I. Cinder CLI – Extend
- J. Cinder CLI - Snapshot
- K. Cinder CLI – Backup/Restore
- L. Cinder – Encrypted Volumes

- M. Encrypted Volumes - CLI
- N. Cinder Quotas
- O. Troubleshooting Cinder - Cases
- P. Considerations for Block Storage
- Q. LAB 3

IV. COMPUTE NODE

- A. Compute Terms
- B. Nova - Flavors
- C. Nova Services
- D. VM Provisioning
- 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. Terminate Instance
- L. Working with host-aggregates
- M. Working with Availability Zone
- N. Post Configuration
- O. Post Config - config-drive
- P. Post Config - cloud-init + Metadata
- Q. Create/Customize an Image
- R. Troubleshooting Nova - Cases
- S. 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. Why Neutron? (quantum)
- J. Networking with Neutron
- K. The ML2plugin
- L. Neutron CLI Overview
- M. OVSNeutronPlugin – Example Topology
- N. OVSNeutronPlugin – Physical Layout
- O. EvoOVS layout - Compute Node
- P. OVS layout - Network Node
- Q. Floating IPs with OVSNeutron
- R. Security Groups with Neutron
- S. Troubleshooting Neutron - Cases
- T. LAB 5

Openstack Administration

Course Outline (cont'd)

VI. *TELEMETRY SERVICE*

- A. Telemetry Service
- B. Telemetry Service Data Flow
- C. Telemetry Service Data Gathering Agents
- D. Telemetry Meters and Archive Policies
- E. Telemetry Pollings and Pipelines
- F. Telemetry Service CLI – Samples, Meters
- G. Telemetry Service CLI - Alarms
- H. Troubleshooting Telemetry Service - Cases
- I. Telemetry Service - Deployment Considerations
- J. LAB 6

VII. *ORCHESTRATION SERVICE - HEAT*

- A. Openstack Heat
- B. Heat Overview
- C. Heat Orchestration Template (HOT) Format
- D. HOT - Examples
- E. HOT – Parameters - Constraints
- F. HOT - Parameters - Environment
- G. Examples – Resource References
- H. Examples – Multiple File Templates
- I. Auto Scaling - Overview
- J. Auto Scaling – 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