

OST-104 Openstack Admin. and COA exam.prep.

Course Description: This course covers the fundamentals of the Openstack open source IAAS (Infrastructure As A Service) cloud solution, used for creating private 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 Nova compute service, the Neutron network service and software defined networking, the Glance image service, the Cinder block storage service, the Ceilometer metering solution, the Heat orchestration services and the Swift object store. Besides in-depth theoretical coverage students also do hands-on exercises with all studied Openstack components in their own Openstack lab system.

The OST-104 Openstack private cloud administration training also prepares participants to the online vendor neutral [Certified OpenStack Administrator \(COA\)](#) exam of the [Openstack Foundation](#).

Structure: 50% theory 50% hands on lab exercises.

Target audience: Developers, Sys.Admins and Dev.Ops wanting to obtain an initial knowledge about the Openstack open source cloud system.

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

Duration: 4 days

Detailed Course Outline

1. Introduction

- **Overview**
- **Core Projects**
 - Nova
 - Neutron
 - Glance, Cinder
 - Ceilometer
 - Heat
 - Swift
- **OpenStack Architecture**
- **Virtual Machine Provisioning Walk-Through**

Lab1

- Understanding the classroom environment
- Perform initial health check
- Test instance creation

2. Controller node

- **Overview Horizon and OpenStack**
- **Keystone architecture**
 - Keystone workflow (simplified)
 - Keystone Services
 - Keystone backends
 - Keystone v3 – domains/groups
 - Keystone - User/tenant maintenance
 - Keystone – service catalog
 - Service APIs + keystone
 - Troubleshooting Keystone - Cases
- **Openstack messaging - AMQP**
 - OpenStack Messaging and Queues

- Messaging example with Oslo-RPC
- Message Queue Configuration
- Troubleshooting RabbitMQ - Service
- **Image Management**
 - Glance overview
 - Glance CLI overview
 - Glance CLI overview
 - Troubleshooting Glance - Cases

Lab2

- Keystone
- Glance

3. Cinder - block storage

- **Volume creation flow**
- **Volume operations**
- **Cinder CLI - create**
- **Cinder CLI – extend**
- **Cinder CLI - snapshot**
- **Cinder CLI – backup/restore**
- **Cinder – encrypted volumes**
- **Encrypted volumes - CLI**
- **Cinder quotas**
- **Troubleshooting Cinder - Cases**
- **Considerations for block storage**

Lab3

- Create volume
- Attach volume to an instance
- Extend a volume
- Using snapshot
- GlusterFS as backend for Cinder (optional)

4. Compute Node

- **Linux virtualization basics**
 - Hypervisors, KVM, Linux bridges
- **VM Placement**
- **VM provisioning in-depth**
- **Instance management**
 - Nova CLI overview
 - Boot/Terminate instance
 - Attach volume to instance

Lab4

- Setup
- VM placement
- Instance post configuration
- Image customization
- Migration (optional)

5. Network node

- **Networking in OpenStack**
- **OpenStack Networking Concepts**
 - Nova-network vs. Neutron
 - Neutron architecture and plugins
 - OpenVSwitch concepts
 - Neutron agents
- **Network management**
 - Neutron CLI overview
 - Manage networks

- Manage subnets
- Manage routers
- Manage ports
- Manage floating IPs

Lab5

- Neutron CLI
- Working with security groups
- Debugging data flows
- Manage network as a tenant
- Create Neutron load-balancer (optional)

6. Ceilometer

- **Ceilometer background and usecases**
- **Ceilometer architecture**
- **Ceilometer meters and pipelines**
- **Ceilometer deployment**

Lab6

- Ceilometer healthcheck
- Start instance
- Check VM with ceilometer
- Alarm setup

7. Heat

- **Heat Overview**
- **Architecture**
 - AWS CloudFormation template format
 - Heat services
 - heat-api
 - heat-cfn-api
 - heat-engine
- **Configuring Heat**
 - Configuring images for use with Heat
 - Creating a stack

Lab7

- Basic static template
- Template using input parameters and environment
- Nested templates
- Template with auto-scaling

8. Openstack Object Store (Swift)

- **Swift Overview**
- **Swift Architecture**
 - Accounts, containers, objects, rings
 - Nodes types : auth, proxy, storage
 - Partitions, zones, replication
- **Using Swift**
 - Accounts
 - Creating and managing objects
 - Object server management
 - Container server management
 - Account server management
 - Proxy server management
 - Ring management
 - Large objects

Lab8

- Start storage nodes and configure swift
- Upload files
- Practice ACL and Expiration usage
- Swift backend for glance