

CANONICAL



OpenStack Deployment and Operations

Training Curriculum

Prepared For: Customers

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Introduction & Scope

The OpenStack Deployment and Operations Training is designed for administrators who already have a working knowledge of OpenStack and want to deepen their expertise in designing, deploying, and operating Canonical OpenStack in production environments.

This course focuses on the practical aspects of standing up a resilient, scalable, and fully automated cloud using Canonical's tools and best practices. Participants will learn how to navigate the challenges of OpenStack's complex architecture by leveraging Canonical's opinionated design and automation frameworks.

Key areas of the training include:

- **Deployment:** Guided multi-node installation, automation with MAAS and Juju, integration of optional features and third-party tools, and scaling strategies.
- **Operations:** Managing high availability, quotas, migrations, service restarts, backups, updates, and upgrades.
- **Deep dives:** Hands-on sessions covering the architecture, operations, and troubleshooting of core OpenStack services (Keystone, Glance, Neutron, Nova, Cinder, Octavia, and more) as well as supporting components such as MAAS, Juju, Ceph, OVN, Kubernetes, RabbitMQ, MySQL, and Vault.
- **Validation and observability:** Using Tempest and Canonical Observability Stack (COS) to validate, monitor, and troubleshoot the cloud.
- **Disaster recovery and resilience:** Planning for failure scenarios, recovering critical subsystems, and ensuring business continuity.

The course combines in-depth lectures with guided labs, ensuring participants develop not only theoretical knowledge but also real-world operational skills. By the end of the training, attendees will be able to confidently deploy, manage, scale, and troubleshoot Canonical OpenStack clouds, preparing them to operate production environments at enterprise scale.

Audience

- OpenStack administrators who already have generic knowledge of OpenStack

Prerequisites

- General knowledge of Linux system fundamentals
- Familiarity with the terminal and basic UNIX commands

Objectives

- Learn how to deploy Canonical OpenStack
- Learn how to operate Canonical OpenStack

Outline

- Challenges:
 - OpenStack's complex architecture
 - Taming the complexity:
 - Opinionated architecture
 - Right packaging mechanisms
 - Right automation framework
 - Stability with LTS releases
- Design considerations
 - Cloud architecture
 - Availability zones
 - Regions
 - Cells
 - Disaster recovery
 - Hardware requirements
 - Bare metal automation
 - Networking
 - Storage
 - Features
 - Third-party tools
 - Non-standard components
 - Commercial services
- Multi-node deployment
 - Guided installation
 - Scaling the cluster out
 - Keystone administration:
 - Domains
 - External backends
 - Validation:
 - Validation feature enablement

- Using Tempest to validate the deployment
 - Observability:
 - Observability feature enablement
 - Using COS to monitor the cloud
 - Towards the production:
 - Ubuntu Pro feature enablement
 - Product documentation:
 - OpenStack
 - Canonical OpenStack
 - Canonical knowledge base
 - Other knowledge sources
 - Creating SOSReports
 - How to create a bug on Launchpad
 - How to create a support case on Canonical Support Portal
- Multi-node deployment with bare metal automation
 - MAAS
 - Deployment manifest
- Canonical OpenStack deep dive:
 - MAAS:
 - Architecture
 - Resources
 - Operations
 - Node Rescue Mode
 - Troubleshooting
 - Juju:
 - Architecture
 - Operations
 - Charms and series
 - Charm operations
 - Troubleshooting
 - Kubernetes
 - Architecture
 - Troubleshooting
 - Snapd:
 - Troubleshooting
 - MySQL:
 - Architecture
 - Troubleshooting
 - RabbitMQ:
 - Troubleshooting
 - KVM:
 - Troubleshooting
 - OVN:

- Troubleshooting
- Ceph:
 - Architecture
 - Troubleshooting
- Vault
 - Troubleshooting
- OpenStack services:
 - Keystone:
 - Architecture
 - Resources
 - Operations
 - Troubleshooting
 - Glance:
 - Architecture
 - Resources
 - Operations
 - Troubleshooting
 - Neutron:
 - Architecture
 - Resources
 - Operations
 - Troubleshooting
 - Nova:
 - Architecture
 - Resources
 - Operations
 - Troubleshooting:
 - Placement:
 - Architecture
 - Resources
 - Operations
 - Troubleshooting
 - Cinder:
 - Architecture
 - Resources
 - Operations
 - Troubleshooting
 - Octavia:
 - Architecture
 - Resources
 - Operations
 - Troubleshooting
 - Designate:

- Architecture
 - Resources
 - Operations
 - Troubleshooting
 - Barbican:
 - Architecture
 - Resources
 - Operations
 - Troubleshooting
 - Heat:
 - Architecture
 - Resources
 - Operations
 - Troubleshooting:
 - Horizon:
 - Architecture
 - Operations
 - Troubleshooting
- Telemetry stack:
 - Architecture
 - Troubleshooting
- Observability stack:
 - Architecture
 - Usage
 - Troubleshooting
- Landscape:
 - Architecture
 - Usage
 - Troubleshooting
- Centralized management:
 - Centralized management through third-party tools
- Canonical OpenStack operations:
 - High Availability:
 - MAAS
 - Juju
 - Kubernetes
 - Ceph
 - OpenStack
 - Scaling:
 - MAAS
 - Juju
 - Kubernetes
 - Ceph:

- Add/Remove OSD devices
 - Add/Remove nodes
 - OpenStack:
 - Add/Remove nodes
- Cloud operations:
 - Managing quotas
 - Live migrations
 - Service restarts
 - Juju agents restarts
 - Safe node shutdown
 - Safe cloud shutdown
 - Ceph storage balancing - NearFull
 - Vault - certificate updates
 - Vault - unlocking
- Cloud recovery:
 - Recovery from power failures
 - Recovery of MAAS PostgreSQL
 - Recovery of Etcd
 - Recovery of MySQL
 - Recovery of RabbitMQ
 - Recovery from full Ceph storage
- Backups:
 - MAAS backups
 - Juju backups
 - Etcd backups
 - MySQL backups
 - Snapshotting volumes
 - VM backups through third-party tools
- Updates:
 - System updates through Landscape

Additional Topics

If there is any remaining time during the Training, the trainer will make efforts to cover additional topics or provide clarifications based on questions from the customer during the training session.