# Lab 06: OpenStack Deployment & Experiments

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# Previous Lab 01: VirtualBox or VMware Workstation

**Objectives:**

1.1 Install VirtualBox or VMware Workstation on Windows 10/11.

1.2 Install Ubuntu 24.04.1 LTS on VirtualBox in Windows 10/11

1.3 Install Ubuntu 24.04.1 LTS on VirtualBox in Windows 10/11

# Previous Lab 02: Google Cloud Platform (GCP)

**Objectives:**

2.1 Familiarize students with the core services provided by Google Cloud Platform (GCP).

2.2 Provide hands-on experience in deploying and managing cloud resources.

**Lab Tasks:**

- Create a Google Cloud account and set up a project.
- Deploy a VM using Google Compute Engine (GCE).
- Store data using Google Cloud Storage.

# Previous Lab 03: Google Cloud Platform (GCP)

**Objectives:**

2.1 Familiarize students with the core services provided by Google Cloud Platform (GCP).

2.2 Provide hands-on experience in deploying and managing cloud resources.

**Lab Tasks:**

- Deploy a serverless application using Google Cloud Functions.
- Explore Big Data services using BigQuery.
- Monitor resources using Google Cloud Operations Suite.

# Previous Lab 04: Amazon Elastic Cloud Compute (EC2)

**Objectives:** After this lab, you will be able to:

- Launch an EC2 instance with **termination protection**
- Monitor instance health and metrics
- Manage instance states (stop/start/terminate)
- Resize an instance by changing its type

**Tools:** AWS Educate Simulation (60 mins)

# Previous Lab 05: IAM Identity Center in AWS

**Objective:** Learn basic IAM Identity Center operations:

- Create an IAM Identity Center group
- Create an IAM Identity Center user
- Assign a permission set

**Refer to:**

- AWS account with IAM Identity Center access (If possible), or
- AWS Identity and Access Management - Identity Center Getting Started (Digital Course)
- AWS educate `https://aws.amazon.com/education/awseducate/`

# Lab 6: OpenStack Deployment & Experiments

- **Prerequisite**: Ubuntu 24.04 LTS on VirtualBox (Lab 01)
- **Tools**: VirtualBox, DevStack (OpenStack)
- **Duration**: 2–3 hours
- **Objectives**:
  1. Install OpenStack (DevStack)
  2. Explore OpenStack Dashboard
  3. Launch a VM instance

# What is OpenStack?

- Open-source **cloud operating system** (IaaS)
- Core components:
  - **Nova**: Compute service
  - **Neutron**: Networking
  - **Horizon**: Web UI
- **DevStack**: All-in-one installer for testing

# Pre-Installation Setup

- **Update Ubuntu:**
  - `sudo apt update && sudo apt upgrade -y`
  - `sudo apt install git -y`
- **Clone DevStack:**
  - `git clone https://opendev.org/openstack/devstack`
  - `cd devstack`

# Configure DevStack

Create `local.conf` with minimal setup:

- `[[local|localrc]]`
- `ADMIN_PASSWORD=secret`
- `DATABASE_PASSWORD=secret`
- `RABBIT_PASSWORD=secret`
- `SERVICE_PASSWORD=secret`

# Run DevStack Installation

- **Execute the installer:**
  - `./stack.sh`
- **Expected Output:**
  - Horizon URL: `http://<VM_IP>/dashboard`
  - Credentials: `admin / secret`
- **Note:** Installation takes 15–30 mins.

# Access OpenStack Dashboard

- Open Horizon UI in browser
- **Key Tabs**:
  - **Project**: Instances, Networks
  - **Admin**: Resource usage
- Verify services:
  - Nova (Compute) $\rightarrow$ Running
  - Neutron (Networking) $\rightarrow$ Active

# Create a Virtual Network

1. Navigate to **Network** to **Networks**
2. Click **Create Network**
3. Assign subnet (e.g., 192.168.1.0/24)
4. Attach router to external network

# Launch a VM Instance

- **Image**: Upload CirrOS (test OS)
- **Flavor**: Select `m1.tiny`
- **Key Pair**: Generate SSH key
- **Launch**: Monitor status

# Test Connectivity

1. Assign **Floating IP** to instance
2. SSH into VM:
   - `ssh -i key.pem cirros@<Floating_IP>`
3. Validate internet:
   - `ping google.com`

# Troubleshooting & Submission

## Common Issues

- **DevStack fails**: Check `/opt/stack/logs`
- **No internet**: Verify router/NAT settings

## Lab Submission

Submit screenshots of:

- Horizon dashboard
- Running instance
- Successful SSH test