INFO 3606

OpenStack Lab 1: Navigating the Cloud Landscape

Use Case Scenario:

Welcome to the OpenStack Lab 1 – a comprehensive journey through the OpenStack cloud operating system. As a student, envision yourself as a cloud architect in a rapidly evolving technology landscape. In this lab, you will explore the fundamentals of OpenStack, understand its services, and visualize how they align with real-world scenarios.

Part 1: Introduction to OpenStack

Scenario: Building the Cloud Foundation

Imagine you are tasked with building a robust cloud infrastructure for a growing tech company. OpenStack is your go-to solution. As you embark on this journey, the lab introduces you to the core concepts of OpenStack – a cloud operating system controlling compute, storage, and networking resources. The dashboard becomes your command center, offering control to both administrators and end-users.

Part 2: OpenStack Services Overview

Activity 1: Deciphering the OpenStack Landscape

In the fast-paced world of cloud architecture, flexibility is key. OpenStack's modular design allows you to plug and play components based on your project needs. Dive into the openstack map, gaining an "at a glance" view of the services available. Understand how these components can be orchestrated to meet specific project requirements.

Part 3: Service Exploration

Activity 1: Compute Services (NOVA, ZUN, IRONIC, CYBORG)

Scenario: Tailoring Compute Resources

As your tech company expands, diverse workloads emerge. Learn to provision massively scalable, on-demand compute resources. NOVA provides virtual machines, ZUN manages containers, IRONIC handles bare-metal provisioning, and CYBORG manages accelerators. Each service plays a role in creating a flexible compute environment, catering to the varying needs of your applications.

Activity 2: Storage Services (SWIFT, CINDER, MANILA)

Scenario: Efficient Data Management

Imagine managing vast amounts of data for different projects. SWIFT offers a highly available, distributed object store, CINDER handles block storage, and MANILA coordinates access to shared file systems. Explore how these storage services seamlessly integrate into your cloud environment, ensuring data availability and accessibility.

Activity 3: Networking Services (NEUTRON, OCTAVIA, DESIGNATE)

Scenario: Connecting Your Cloud

In a cloud-centric world, networking is the backbone. NEUTRON delivers networking-as-a-service, OCTAVIA manages load balancing, and DESIGNATE provides DNS services. Visualize the importance of a robust network infrastructure, ensuring seamless communication between your applications.

Part 4: Shared Services and More

Activity 1: Identity, Image, and Key Management (KEYSTONE, PLACEMENT, GLANCE, BARBICAN)

Scenario: Securing and Managing Resources

In a secure cloud environment, identity, image, and key management are crucial. KEYSTONE handles identity, PLACEMENT tracks resource inventories, GLANCE manages images, and BARBICAN secures keys. Experience how these shared services contribute to a secure and well-managed cloud ecosystem.

Activity 2: Orchestration, Monitoring, and Billing (HEAT, MONASCA, CLOUDKITTY)

Scenario: Orchestrating, Monitoring, and Billing

As your cloud infrastructure evolves, orchestration, monitoring, and billing become paramount. HEAT orchestrates infrastructure, MONASCA provides monitoring-as-a-service, and CLOUDKITTY handles billing. Witness how these services streamline your cloud operations, ensuring scalability, performance, and cost-effectiveness.

Part 5: Frontend and Tools

Activity 1: Dashboard, Monitoring, and SDKs (HORIZON, CEILOMETER, OPENSTACKSDK)

Scenario: User-Friendly Interfaces and Development Tools

In the era of user-friendly interfaces, HORIZON serves as your dashboard, CEILOMETER provides metering, and OPENSTACKSDK offers development tools. Explore how these interfaces and tools enhance user experience and simplify application development in the OpenStack environment.

Conclusion:

In this lab, you, as a student, play the role of a visionary cloud architect, tasked with creating a dynamic and scalable cloud infrastructure. The use case scenarios and activities are designed to provide a hands-on experience, linking theory to practical application. As you navigate through OpenStack's landscape, envision how each service aligns with the needs of your projects, making your cloud architecture resilient, flexible, and ready for the challenges of the digital age.