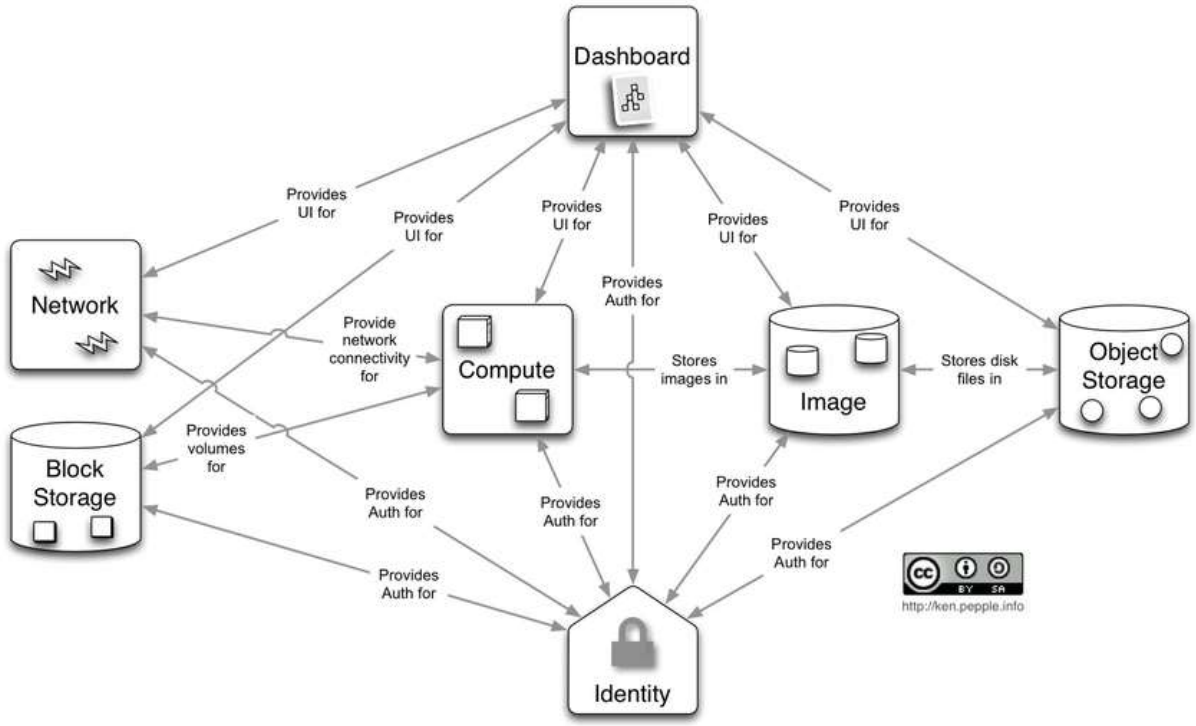
Cloud Security & Management

Lab 1

Name: - Nilesh Verma
SAP Id.: - 500087239
Batch: - B4 Non-Hons CC&VT
Roll No.: - R2142201812



Cinder (Block Storage)

Cinder, also known as OpenStack Block Storage, is a service that provides block-level storage to virtual machines (VMs) in an OpenStack cloud. It allows users to create, attach, and manage block storage devices, similar to Amazon Elastic Block Store (EBS) in AWS.

Block storage is a type of storage that is organized into fixed-size blocks. This type of storage is commonly used for applications that require high-performance, low-latency storage, such as databases or virtual machines.

Cinder provides a uniform API for managing storage across multiple backends, including local storage. This allows administrators to easily add and remove storage capacity as needed, and

to create and manage storage volumes for use by other OpenStack services like Nova (compute) and Glance (image management).

Cinder also provides features such as volume snapshots, which allow users to create point-in-time copies of a volume, and volume backups, which allow users to create a full copy of a volume. Additionally, Cinder supports the ability to create and manage volume types, which allow administrators to create different storage tiers with varying performance characteristics.

Swift (Object Storage)

OpenStack Swift is a distributed object storage service for OpenStack clouds. It allows users to store, retrieve, and manage large amounts of unstructured data, similar to Amazon Simple Storage Service (S3) in AWS.

Swift stores data as objects, which are organized into containers. Each object is identified by a unique identifier and can be accessed via a RESTful API.

Swift provides a number of features to ensure data durability and availability, such as data replication across multiple storage nodes and the ability to create and manage object versions. Additionally, Swift supports the ability to create and manage policies for data retention and archiving.

Swift is often used for storing and archiving large amounts of unstructured data such as images, videos, backups, and log files.

Glance (Image Service)

OpenStack Glance is an image management service for OpenStack clouds. It allows users to create, store, and manage virtual machine images, similar to Amazon Machine Images (AMIs) in AWS. Glance provides a uniform API for managing images across multiple backends, including local file systems, object storage systems like OpenStack Swift and external image services like Amazon S3.

Glance allows users to create and manage images, which are essentially snapshots of a virtual machine's disk. These images can be used to launch new virtual machines and can be used as a template for creating new images. Glance also provides features such as image metadata and image tagging, which allow users to organize and describe images.

Glance also provides the ability to create image stores which are a way of organizing and managing images. This allows users to create different stores for different types of images (e.g. production images, test images, etc.).

Glance is an essential component for managing virtual machine images in OpenStack clouds. It allows users to create, store, and manage images in a central location, making it easy for users to launch new virtual machines or create new images.

Neutron (Networking)

The Neutron service in OpenStack is a powerful tool for managing virtual networks. It provides a wide range of functionality to users, including the ability to create and manage networks, subnets, and ports, as well as implementing various networking technologies such as virtual LANs (VLANs), virtual private networks (VPNs), and security groups.

One of the key features of Neutron is its ability to support different types of network connectivity, such as layer 2 (L2) and layer 3 (L3) connectivity. This allows users to create virtual networks that are isolated from each other, while still being able to connect them to external networks as needed. Additionally, Neutron supports a variety of plugins and drivers that allow it to integrate with different networking technologies and vendors, such as Cisco, Juniper, and Nuage Networks.

Another important feature of Neutron is its support for security groups. Security groups allow users to specify which traffic is allowed to enter and exit a specific network or subnet, providing a layer of security for virtual networks. This allows users to control access to their virtual networks and restrict access to only the necessary traffic.

In addition, Neutron also provides an API for creating and managing networks, subnets, and ports. This allows users to automate the creation and management of virtual networks, making it easier to scale and manage large deployments. With the Neutron service, OpenStack users can create and manage virtual networks that are tailored to their specific needs, providing flexibility and control over their virtual infrastructure.

Horizon (Dashboard)

OpenStack Horizon is the web-based user interface for OpenStack. It provides a graphical user interface for users to interact with the OpenStack cloud, allowing them to launch instances, create and manage networks, and manage storage, among other tasks. Horizon also includes a dashboard that provides an overview of the current state of the cloud, including the number of instances and their status, as well as usage statistics and alerts. Additionally, it supports role-based access control, allowing administrators to control which users have access to which features and resources. Overall, Horizon is a powerful tool that makes it easy for users to interact with and manage OpenStack clouds.

Nova (Compute)

OpenStack Nova is a cloud computing fabric controller, which is the main part of OpenStack Compute service. It is responsible for managing the lifecycle of virtual machines (VMs) and other compute resources, such as creating, starting, stopping, and deleting VMs, as well as managing and allocating resources like CPU, memory, and storage.

Nova also provides a web-based API that can be used to interact with the compute resources, allowing users to create and manage VMs through a variety of programming languages and frameworks. It also supports several hypervisors like KVM, Xen, VMware, and Hyper-V, making it possible to run instances on different type of Hardware.

Nova uses a message queue to handle communication between its different components, and it also can be integrated with other OpenStack services such as Neutron for networking, Cinder for block storage, and Glance for image management.