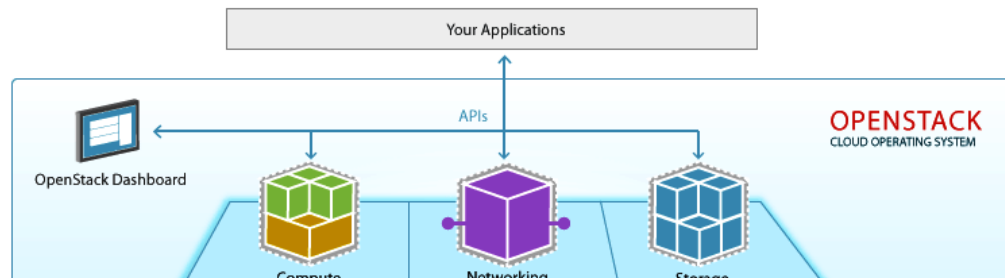# Openstack Components

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## Openstack component overview



Information Technology / OpenStack / Openstack Components

Openstack is a deployment of multiple applications that work together to become a cloud-based virtualization system.

## Rabbitmq

The main messaging system that handles requests between the different portions of OpenStack is Rabbitmq. this carries all queued requests to the different API endpoints of the OpenStack system.

## Ceilometer

Ceilometer delivers a single point of contact for metrics systems obtaining all of the measurements to authorize customer utilization across all OpenStack core components. By monitoring notifications from existing services, developers can collect the data and may configure the type of data to meet their operating requirements.

## keystone

Keystone provides a central list of users, mapped against all the OpenStack services, which they can access. It integrates with existing backend services such as LDAP while acting as a common authentication system across the cloud computing system.

Keystone supports various forms of authentication like standard username & password credentials, AWS-style (Amazon Web Services) logins, and token-based systems. Additionally, the catalog provides an endpoint registry with a queryable list of the services deployed in an OpenStack cloud.

## Neutron

Neutron is the networking portion of OpenStack. it is responsible for all of the software-defined network communication. Neutron provides networking capabilities like managing networks and IP addresses for

OpenStack. It ensures that the network is not a limiting factor in a cloud deployment and offers users self-service ability over network configurations. OpenStack networking allows users to create their own networks and connect devices and servers to one or more networks. Developers can use SDN technology to support great levels of multi-tenancy and massive scale.

Neutron also offers an extension framework, which supports deploying and managing other network services such as virtual private networks (VPN), firewalls, load balancing, and intrusion detection system (IDS)

## Placement

This is a REST API stack and data model used to track resource provider inventories and usages, along with different classes of resources. For example, a resource provider can be a compute node, a shared storage pool, or an IP allocation pool. The placement service tracks the inventory and usage of each provider. For example, an instance created on a compute node may be a consumer of resources such as RAM and CPU from a compute node resource provider, disk from an external shared storage pool resource provider, and IP addresses from an external IP pool resource provider.

## Horizon

Horizon is the authorized implementation of OpenStack's Dashboard, which is the only graphical interface to automate cloud-based resources. To service providers and other commercial vendors, it supports third-party services such as monitoring, billing, and other management tools.

## NTP

Network time protocol makes sure all of the systems in the OpenStack stay on a consistent time schedule to prevent issues with messaging or api calls.

## Nova

Nova is OpenStack's cloud compute virtualization system. This manages resources across available compute hosts running nova to use as backing for virtual instances. This can be deployed using multiple different hypervisor technologies. EX: KVM, VMware, LXC, Xenserver, Etc.

### Nova-compute

Nova compute is the actual compute system service that virtualizes the ram and CPU of a host. this is the program (juju charm) that needs to be installed on bare-metal nodes used as "compute" nodes.

### Nova-cloud-controller

Nova-Cloud-Controller is the Nova host control, this sits on the "controller" system and orchestrates compute actions across the various compute nodes in the stack.

## Vault

Vault provides a secure storage and certificate management service. Integrating vault into an OpenStack deployment involves a few post-deployment steps which have been encapsulated in charm actions. Vault instructions can be found at /Dev_Ops/OpenStack/Smokey/Vault-init

## Glance

Glance is the Image service for nova-compute and allows OpenStack to find images available to use to deploy VM instances. Glance has a client-server architecture and delivers a user REST API, which allows

querying of virtual machine image metadata and also retrieval of the actual image. While deploying new virtual machine instances, Glance uses the stored images as templates.

OpenStack Glance supports Raw, VirtualBox (VDI), VMWare (VMDK, OVF), Hyper-V (VHD), and Qemu/KVM (qcow2) virtual machine images.cinder

## ceph

Ceph creates redundant, scalable data storage to store petabytes of accessible data. The stored data can be leveraged, retrieved, and updated. It has a distributed architecture, providing greater redundancy, scalability, and performance. Ceph must be deployed in 3 instances per location to allow for internal redundancy and optimum data transport. Ceph also requires a higher speed back end to allow for proper replication of data. Ceph in our organization needs to be configured for 3X data redundancy.

### Ceph-mon

Ceph-mon is the monitor service for Ceph. this will monitor all of the Ceph-OSD hosts to ensure a quorum is reached in data service and redundancy. 3 Ceph-mon systems are required for a HA Ceph system, depending on the scale of Ceph you can add monitors in odd numbers however it is recommended not to go above 5 total monitors.

### Ceph-OSD

Ceph-OSD is listed as the application in JUJU This is also known as OSD-Host. OSD's are the individual drives in Ceph. The Ceph-OSD stores the physical disks in the system.

### OSD

This is the physical disk in a Ceph system. Each one is addressed and handled internally to Ceph as a type of storage host. Each one is then contacted and data is distributed among the different OSD's to ensure the best IOPS as well as data redundancy.

## Cinder

OpenStack Cinder delivers determined block-level storage devices for applications with OpenStack compute instances. Cloud users can manage their storage needs by integrating block storage volumes with Dashboard and Nova.

Cinder can use storage platforms such as Linux server, EMC (ScaleIO, VMAX, and VNX), Ceph, Coraid, CloudByte, IBM, Hitachi data systems, SAN volume controller, etc. It is appropriate for expandable file systems and database storage.

Maplewood utilizes Ceph for Cinder in our OpenStack configuration.

## MySQL

Mysql is the back end for all of the OpenStack systems to manage data, SDN, Placement, etc. Mysql is converted to HA for the HA stack with mysql-innodb-cluster

## HA additions

## Pacemaker

Pacemaker cluster stack is a state-of-the-art high availability and load balancing stack for the Linux platform. Pacemaker is used to make OpenStack infrastructure highly available.

Pacemaker relies on the Corosync messaging layer for reliable cluster communications. Corosync implements the Totem single-ring ordering and membership protocol. It also provides UDP and InfiniBand-based messaging, quorum, and cluster membership to Pacemaker.

Pacemaker does not inherently understand the applications it manages. Instead, it relies on resource agents (RAs) that are scripts that encapsulate the knowledge of how to start, stop, and check the health of each application managed by the cluster.

These agents must conform to one of the OCF, SysV Init, Upstart, or Systemd standards.

Pacemaker ships with a large set of OCF agents (such as those managing MySQL databases, virtual IP addresses, and RabbitMQ), but can also use any agents already installed on your system and can be extended with your own.

## Corosync

The Corosync Cluster Engine is a Group Communication System with additional features for implementing high availability within applications.

## Memcached

Memcached is an in-memory key-value store for small chunks of arbitrary data (strings, objects) from results of database calls, API calls, or page rendering.

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