

(OOCs) OpenStack Open-source Cloud Computing System

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Abstract- Cloud computing is a modern computing paradigm that delivers resources such as processing, storage, network and software are abstractions that are provided as services over the Internet in a remotely accessible fashion and many other benefit. Cloud Services are divided into three categories: Software as a Service, Infrastructure as a Service & Platform as a Service. Cloud computing comes in three forms: Private Cloud, Public Cloud & Hybrid Cloud. This paper analyses architecture and characteristics of an open source cloud computing platform for providing IaaS cloud deployment for public and private clouds. We summary the basic principles of the OpenStack is to produce the ubiquitous Open Source cloud computing platform that will meet the needs of public and private cloud providers regardless of size, by being simple to implement and massively scalable.

Keywords— Cloud Computing, OpenStack, Saas, Paas, Iaas, Open Source Cloud Computing

I. INTRODUCTION

Cloud computing provides computing services with the help of internet. Using Cloud computing users can use software and hardware services at remote locations based on pay per use. Cloud computing model provides shared pool of resources that include data storage space, network facilities, computing processing power of specialized and user applications.

Cloud Computing Models: Cloud computing has three service models:-

- ❖ **Software as a Service (SaaS):** This model describes any cloud service where consumers are able to access software applications over the internet. It provides the platform for the users to use their applications remotely like mail services, e-commerce applications etc.
- ❖ **Platform as a Service (PaaS):** This model, the cloud provider provides and manages the platform (hardware, server operating system, databases, storage, architecture, networks and Virtualization) but the client has to develop its application as per the need using these services provided by the cloud provider. The client has to manage the applications and the cloud service provider manages everything else. Like google app engine
- ❖ **Infrastructure as a Service (IaaS):** This model, the cloud service provider provides and manages the infrastructure (Virtualization, servers, networking and storage). This helps to avoid spending on hardware and human resources and which reduces the return of investment risk. The client can execute and manages virtual machines where it can use its applications, data, operating system, middleware and runtime like Amazon EC2, Rackspace, etc.

OpenStack is a global collaboration of developers & cloud computing technologists working to produce an Universal Infrastructure as a Service (IaaS) open source cloud computing platform for public & private clouds. OpenStack is the future of cloud computing, Assisted by Many of Biggest Organizations in software development and hosting, as well as many of individual community members. OpenStack is a non-profit Foundation; it manages both development and community-building around the project. OpenStack is open source software that means anyone can access source code, modify the source code and share changes back out to the community at large. And also OpenStack has Advantage of Many of the large number of Developers Who wants to develop strongest, robust and secure product.

II. HISTORY OF THE OPENSTACK

In July 2010, OpenStack was announced and the initial contributors of it are NASA and Rackspace, to help organizations offer cloud computing services on industry standard hardware. Rackspace contributed their "Cloud files" platform (code) to power the Object Storage part of the OpenStack, which NASA contributed their "Nebula" platform (code) to power the Computer part. The initial projects controlled pools of compute, storage and networking resources throughout a datacenter through a dashboard that gave administrators control and enabled users to instantly provision resources.

OpenStack Foundation was formed in 2012 as an independent not-for-profit organization to promote the development, distribution and adoption of the OpenStack cloud software. The Foundation allows for neutral third-party intellectual property management and shared resources to level the playing field for all participants.

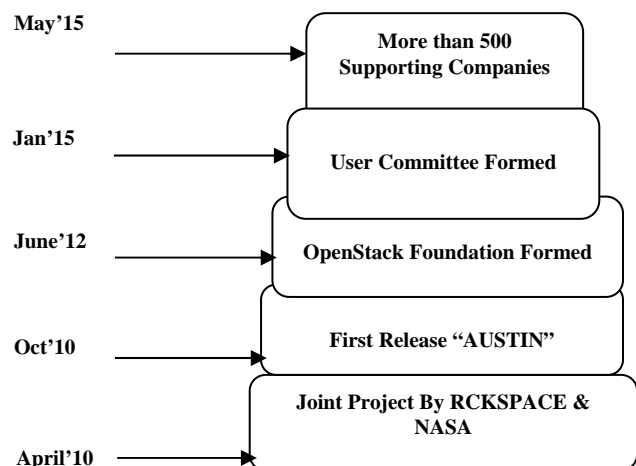


Fig1: History of the Openstack

III. COMPONENTS OF THE OPENSTACK

OpenStack has many components. Why because of it is open source, so any one can add new components to OpenStack to assist to their requirements. These components officially maintained by the OpenStack community.

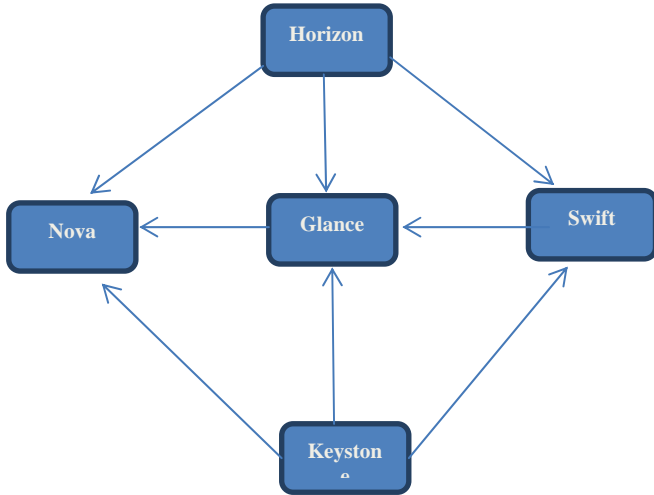


Fig 2:OpenStack Components/Services

TABLE 1

Service	Project name	Description
Dashboard	Horizon	Horizon is the canonical implementation of OpenStack's Dashboard, which provides a web based user interface to OpenStack services including Nova, Swift, Keystone, etc.
Compute	Nova	Designed to provide power massively scalable, on demand, self-service access to computer resources.
Object Storage	Swift	It Offers cloud storage software so that you can store and retrieve lots of data with a simple API. It's built for scale and optimized for durability, availability and concurrency across the entire data set. Swift is ideal for storing unstructured data that can grow without bound.
Identity Service	Keystone	It Provides Identity, Token, Catalog and Policy services for use specifically by projects in the OpenStack family. It Implements OpenStack's Identity API.
Image Service	Glance	It is used to upload and discover data assets that are meant to be used with other services. This Currently includes images and metadata definitions.

IV. OPENSTACK SYSTEM ARCHITECTURE

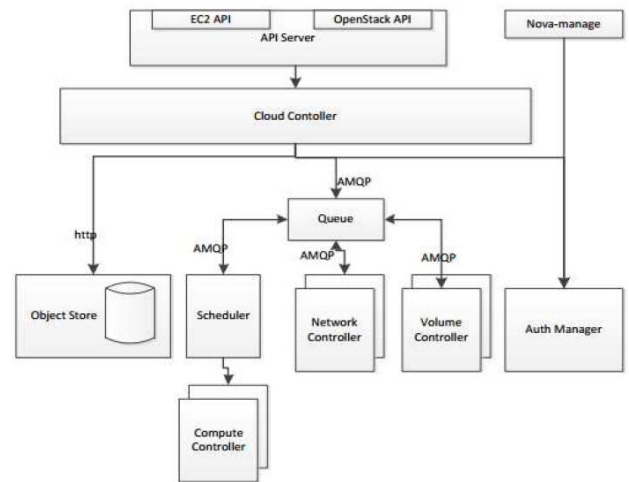


Fig 3: Open Stack System Architecture

- ❖ **API Server:** User's front end providing interaction with the cloud controller allowing users holding all kinds of roles to access and manage storage, network, images, projects, users and instances. Two interfaces are provided; one in EC2 compatible and another is OpenStack specific. Also, a nova-manage interface is provided for users holding admin roles for administration and maintenance of the cloud.
- ❖ **Cloud Controller:** maintains cloud state and handles interaction between services such as scheduler, volume and network controller through the use of a message queue called RabbitMQ.
- ❖ **Object Storage:** To implement services and libraries to provide on demand, self-service access to Block Storage resources. Provide Software Defined Block Storage via abstraction and automation on top of various traditional backend block storage devices.
- ❖ **Scheduler:** Selects the available computer controller to host an instance.
- ❖ **Network Controller:** manages networking resources on each node builds virtual networks to be used by computer controllers. It provides the commands such as Allocate Fixed IP Addresses, Configuring VLANs for Projects and Configuring Networks for Computer Nodes.
- ❖ **Volume Controller:** Provides permanent storage for the computer controllers. It provides commands such as Create Volume, Delete Volumes and Establish Compute Volumes.
- ❖ **Auth Manager:** Provides authorization and authentication services.
- ❖ **Compute Controller:** Manages hosted VM instances and provides commands such as Run instances, Terminate instances, Reboot instances, Attach Volumes, Detach volumes and Get console output through an API interface.
- ❖ **Storage service:** Cumulus is a web service providing users with storage capabilities to store images and works in conjunction with GridFTP.
- ❖ **Nova-manage:** nova-manage controls cloud computing instances by managing shell selection, vpn connections, and floating IP address configuration.

V. CONCLUSIONS

In the OpenStack various participants are contributing updating new features day by day. OpenStack is the useful for public, private and hybrid cloud for deploy large-scale cloud architecture analysis. Now a days OpenStack being used many Commercial, non-commercial organizations and also giving assistance from great community houses. OpenStack code is licensed by Apache 2.0 licensed software tool. It can run by anyone, anyone can build on it, or do changes back to project.

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