OpenStack as Open-Source Cloud operating system

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Abstract — Launching a new service by enterprise often was requiring a new hardware, which is need time and extra cost, in addition to the complexity of preparing it. The virtualization technologies provide a solution for this problem to make a virtual machine instead of a physical machine every time. By increasing the workloads, the difficulties of managing the virtual system will be increased. That includes the different hypervisors and services with different brands. The OpenStack is a cloud operating system that turns all the sets of virtualization technologies within a data center into pools of resources. These pools of resources can be consumed and managed from a single place named as, OpenStack dashboard. It can create virtual machines, configure networks and manage the volumes of their storage capacity.
The purpose behind the OpenStack was to provide open source software that enables any organization to create and offer cloud-computing services running on any standard hardware.
This paper analyses architecture and characteristics of an OpenStack and the integration with other network technologies.

I. INTRODUCTION

Virtualized data centers came about as the virtual technology revolution made it possible to creating a software-based (or virtual) representation rather than a physical. Virtualization can apply to applications, servers, storage, and networks and is the single most effective way to reduce IT expenses while boosting efficiency and agility. Virtualization uses software called Hypervisor to simulate the existence of hardware and create a virtual computer system. It allows run more than one virtual system and multiple operating systems and applications on a single server. OpenStack is a control layer that sits above all the virtualized layers and provides a consistent way to access everything regardless of the hypervisor technology, it is an open source cloud operating system for creating and managing large groups of virtual private servers inside a data center, including computing, networking, and storage.
It enables any organization to create and offer cloud-computing services running on standardized hardware and provide an infrastructure as a service. OpenStack was a pilot project launched by Rackspace and NASA, which was founded in July 2010.instead of just dropping some packet or slowing down the sources as in the traditional congestion avoidance tools.

II. OPENSTACK

OpenStack is a cloud operating system that controls large pools of compute, storage, and networking resources regardless to any type of virtualization technology such as KVM, Xen, and VMware etc. All managed through a dashboard that gives administrators control while allowing their users to provision resources through a web interface in a secure way. OpenStack is a free and open-source software platform for cloud computing, mostly deployed as an infrastructure as a service (IaaS). It has a modular architecture, which provides to users the flexibility to design the cloud as required, without any proprietary issues related to hardware or software requirements. It uses various components to work together as a service.
OpenStack is an open source which means that anyone can access the source code, make any changes or modifications required to solve a specific problem, or provide a new feature, and freely share these changes back out to the community at large. It also means that OpenStack has the benefit of thousands of developers all over the world working in tandem to develop the strongest, most robust, and most secure product that they can.

III. OPENSTACK COMPONENTS

OpenStack is built as a set of distributed component that can communicate with each other, and which are responsible for the different functions required from a virtualization/cloud management system. Some of the key services of OpenStack are:
OpenStack Compute (Nova): a compute service, responsible for creating instances (virtual machine) and managing the hypervisor of choice. The hypervisors are pluggable to Nova, while the Nova API remains the same, regardless of the underlying hypervisor.
OpenStack Networking (Neutron): a network service, responsible for creating network connectivity and network services. Capable of connecting with vendor network gear through plug-ins.
Block Storage (Cinder): a storage service, responsible for creating and managing external storage including block devices and NFS.
OpenStack Image Service (Glance): an image service, responsible for managing the images uploaded by the users. Glance is not a storage service but is responsible for saving image attributes.
Dashboard (Horizon): a Dashboard, creates a GUI for users to be able to control the OpenStack deployment. This is an extensible framework that allows vendors to add features to it. Horizon uses the same APIs exposed to users.
Object Storage (Swift) Provides redundant storage for static objects. This service is scalable to massive data sizes [3].

IV. OpenStack components Communication

OpenStack has a modular architecture where all of the different components are separate services that communicate together using standardized APIs.

The service relationship shows that the services are dependent on each other. It to be noted that all the services work together in harmony to produce the end product as a Virtual Machine (VM).

All of the OpenStack components' features and updates start by an API design discussion. All of these APIs should be simple, standard, re-usable and re-implementable by any developer who would want to use them and have custom services that would implement the API open-specifications. Moreover, these standard APIs have features that use a messaging queue to internally process the different actions and events [4].

V. Integrate other technology with OpenStack

Cloud computing is proven service delivery model over the internet. Network play's an important role during this service provisioning but Cloud network have major security issue during service delivery. Network security and reliability achieve together is much more difficult task. Now a day cloud traditional network is replaced by the programmable and unified software defined network which have separate

Control plane and data plane for managing network traffic. SDN have capability to reduce cost of networking device using network virtualization which have facilitate to hardware and software virtualization using NFV(Network Function Virtualization). SDN and NFV integration in cloud computing give power of virtualization and improve network security and service. So SDN and NFV both are integrate in Open stack cloud to minimize network attack surface, improve network service and provide some salient advantage of SDN. [5]

VI. CONCLUSION

OpenStack designed to allow administrators and researchers to deploy IaaS infrastructure and provide tools for creating and managing virtual machines on top of existing resources. This work aims to illustrate that the system OpenStack has filled an important niche in the design space of cloud computing by providing an easy to deploy over the existing resources, easy to use in experimentation by being modular, and most importantly forms open source and provides powerful features while following emerging open standards.

VII. References

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