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Investigation on Open stack Nova's Scheduler and File Structure for Customizing Enterprise Private Cloud

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Abstract- Cloud computing is a quite concept for which the resources are virtualized, dynamically extended and provided services through the Internet. In this paper, we discusses about deploying private cloud using open source software's and also customizing the Openstack nova by reducing it size. Normally there are two types of cloud, public cloud and private cloud. This project goal is to develop a customized Openstack nova in the private cloud. The implementation of the private cloud using Openstack reduces the cost for the small and mid-sized organizations. It reduces money spending to third party cloud service providers. In this paper the private cloud deployed using Openstack in Ubuntu operating system. The implemented cloud has the capable of providing the infrastructure as a service like middleware environment and operating systems. The Openstack Nova is customized by reducing its size and to launch the VM instance efficiently.

Keywords—cloud computing, Nova,Openstack

I. INTRODUCTION

Cloud Computing is depend on the collection of various concepts and several research fields like infrastructure as a service (IaaS), distributed and grid computing as well as virtualization. Openstack is one of the important cloud computing platform that provides IaaS (Infrastructure as a Service) and provides resources like compute, storage and network resources. Openstack use nova to deliver compute instances and it has responsibilities that include spawning, scheduling and decommissioning of virtual machines on demand.

II. ARCHITECTURE OF OPENSTACK

Openstack consists of four main components as illustrated in the fig 2.1. These components are developed to perform various operations. The communication between these components is performed through the horizon through an asynchronous mode.

A. Horizon: It provides a web-based self-service portal to the user to interact with Openstack services, like as launching an instance, assigning IP addresses and configuring access controls to the various users.

B. Nova: Nova helps to manage the compute instances in an Openstack environment like spawning, scheduling and decommissioning.

C. Neutron: Neutron provides Networking services for all the Openstack services. It also provides an API for users to define networks and the attachments.

D. Keystone: Keystone provides a authentication services for all the users to perform the Openstack services.

E. Glance: Glance provides image services it stores and retrieves virtual machine disk images during instance provisioning.

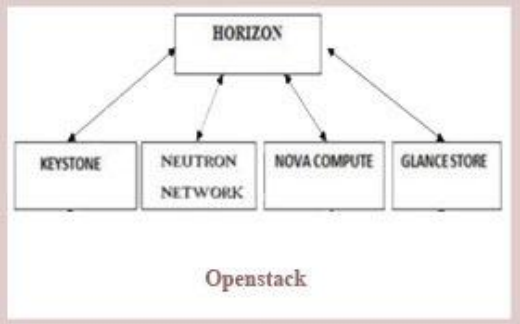

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Fig 2.1 Architecture of Openstack

III. OPENSTACK NOVA

Nova is the Computing controller for the Openstack Cloud. It has the responsible for the life cycle of VM instances. This characteristic makes Nova a Management Platform to manage various compute resources, networking, authorization, and scalability needs of the Openstack cloud. Nova helps to manage the compute instances in an Openstack environment like spawning and scheduling.

IV. OPENSTACK NOVA SCHEDULER OVERVIEW

Openstack Nova uses the nova-scheduler service which selects the compute node to launch the Virtual Machines. The nova-scheduler automatically initializes the placement decision using metrics, such as available compute resources. Nova-scheduler cannot do load-balancing tasks the static information about compute resources it does not consider current utilizations of compute and network resources. The scheduler has a number of configurable options and can be modified in the nova.conf file. Christo Ananth et al. [4] discussed about a system, In this proposal, a neural network approach is proposed for energy conservation routing in a wireless sensor network. Our designed neural network system has been successfully applied to our scheme of energy conservation. Neural network is applied to predict Most Significant Node and selecting the Group Head amongst the association of sensor nodes in the network. After having a precise prediction about Most Significant Node, we would like to expand our approach in future to different WSN power management techniques and observe the results.

V. OPENSTACK NOVA FILE STRUCTURE

The Openstack nova file structure has the various components like nova, plugins and tools etc. Nova mainly focuses on scheduling the VMs. The fig 5.1 illustrates the file structure before customizing the Openstack nova.

Fig 5.1 Nova file structure

VI. CUSTOMIZED SCHEDULER OPTIONS.

The Openstack nova is customized by reducing the additional nova features which is not required to launch the VM. The log data that need for scheduling_option are imported from the oslo_log files from Openstack library instead of nova files. The flag files are replaced by the oslo_log configuration files which helps to reduce the execution time of the scheduler option by importing the data from the oslo_configuration files. The fig 6.1 illustrate customized file structure of Openstack nova and fig 6.2 illustrate scheduling_option code is represented bellow.

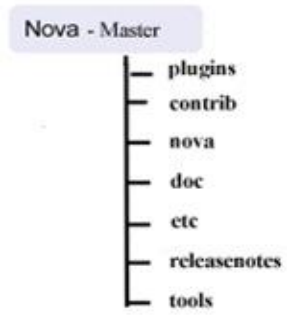

Fig 6.1 Nova customized file structure

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```
from oslo_config import cfg
from oslo_log import log as logging
from oslo_serialization import jsonutils
from oslo_utils import excutils
from oslo_utils import timeutils

    def auto_schedule_networks(self, plugin, context, host):
        agents_per_network = cfg.CONF.dhcp_agents_per_network
        bindings_to_add = []
        with context.session.begin(subtransactions=True):
```

Fig 6.2 Customized scheduler_option.py

VIII. CONCLUSION AND FUTURE WORK

Cloud Computing is a powerful and flexible environment. Openstack helps to deploy the private cloud with cost efficiency. The Openstack can be customized according to the need of deployed private cloud. In this paper, we have customized the Nova and It's Scheduler_option. In future work the performance and throughput of the Openstack nova scheduler's scheduling time for the VMs will be analyzed and evaluated.

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