Dynamic implementation of virtual machine in cloud

[1]Janarthanan R
hodcse@tjsenggcollege.com
Head Of The Department

[2]Mohith joshi A
mohithmj95@gmail.com

[3]Karthick M
mhm.karthick@gmail.com

[4]Prasanth K
prasanthsilambarasan@gmail.com

[2][3][4]UG students
Department of Computer Science and Engineering
T.J.S. Engineering College

***Abstract*-- Internet, it is a large collection of networks where resources are globally networked, In internet cloud computing plays a major role In order to share the data and one of the important technology in the cloud computing is virtualization. Mainly it is used to maintain the collection IT resources which are used by the cloud providers. The main aim of the virtualization is ability to run the multiple operat-ing systems on a single machine buy sharing all the resources that belong to the hard ware. In this paper our main goal is to provide the basic knowledge about the virtualization technol-ogy in cloud computing and how it acts in the cloud compu-ting environment. And we also discuss about, how to maintain the virtualized environment with the optimized resources.**

***Keyword*-- Virtualization, Traditional servers, virtual servers, effects of virtualization, cloud computing architec-ture.**

I. INTRODUCTION

Now a days in our global software markets, our business need plays a major role, and these business needs has to respond faster or they should upgrade to the changes that happening in the software market, and on the basis of the customer demands and the growth opportunities In order to happen this we need have an infrastructure that should be upgraded to the current changes in the market means it is nothing but the agile infrastructure.

Virtualization plays a major role in the cloud computing technology, normally in the cloud computing, users share the data present in the clouds like application etc, but with virtualization users shares the Infrastructure. the main us-age Virtualization Technology is ,Normally cloud providers provide the applications with the standard versions to their cloud users, for suppose if the next version of that applica-tion is released, then cloud provider has to provide the lat-est version to their cloud users and practically it is possible but it is more cost expensive. To overcome this problem we virtualization technology, Buy using virtualization, all sev-ers and the software application which are required by oth-er cloud providers are maintained by the third party people, and the cloud providers has to pay the money on monthly or annual basis[1].

Mainly Virtualization means, running multiple operating systems on a single machine but sharing all the hard ware resources. And it helps us to provide the pool of IT re-sources so, that we share these IT resources in order get benefits in the business.

II. BASIC VIRTUALIZED TECHNOLOGY ARCHITECTURE:

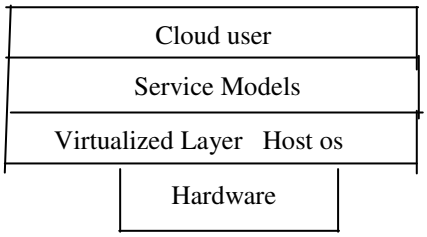


Figure 1.Virtualized model

The basic virtualized model consists of cloud users, ser-vice models, virtualized model and its host os and their hardware[5].the service models consists of software as a service(SaaS) which is used for providing the applications that related to the cloud users, then the following service model is platform as a service(PaaS) It is one of the most important service model in cloud for providing effective services to the cloud users, In this clo

III. TRADITIONAL SERVER VS VIRTUAL SERVER

Server it is one of the important infrastructure in the cloud computing technology, and it one of the important resource in the internet. The main purpose of the server is to formulate the responses which are sending by the clients, not only formulating the responses it also performs the several load balancing activities.

There are many differences between the normal and the virtual server belonged to the cloud computing technology, now we discuss about the information related to the both the servers and how they act in the cloud computing technology.

A. Concept of the traditional server

Traditional servers these are normally maintained by the system administrator, they normally describe these servers these servers as a combined unit that consists the operating system, the hardware, the storage and the application. And we name these traditional servers based upon their usage, if the server is providing any database operation, then it is called database server, if the server is providing any file operations, then it is called the file server etc.In traditional servers, if a particular server reached to the maximum storage capacity then the administrator has to replace the particular server with the new server [2].

Advantages

a. In traditional servers we easily the deploy the things

b. It is easy to maintain the backup in traditional servers

c. Traditional servers are easy to develop

b. By the traditional server equipment we can run the applications virtually [2].

Disadvantages

a. Maintaining hardware is very cost effective in traditional servers

b. Duplication is very difficult in traditional servers

c. No chance of upgrading the physical infra structure

d. Implementing the redundancy is very difficult

B. Concept of the Virtual servers

Normally virtual servers play a major role in the cloud computing environment. Virtual server seeks to encapsulate the server software away from the server hard ware.

The virtual server consists of the operating system, the storage and the application. If we are maintaining the virtual servers, these servers are serviced by one or more hosts and on host can maintain more than one virtual server. Same as traditional servers these also named according to their usage. By maintaining the Virtual servers we can also reduced their services providing by them .if the administrator feels that services providing by them crosses its limit then he will reduce it to certain level. And they will adjust them. In order to develop virtual servers, there are several templates so, that we can built multiple and identical virtual servers. The main advantage virtual servers they can be transitioned from one host to another host [6].

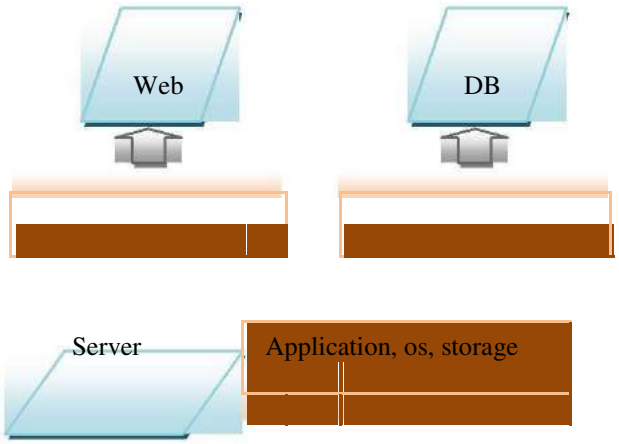
Advantages:

a. We can maintain the pool of IT resources

b. Availability of hardware in virtual servers is at high rate

c. We can change the server configuration while services are running

d. Frequently we can deploy the new servers in virtual environment [2].

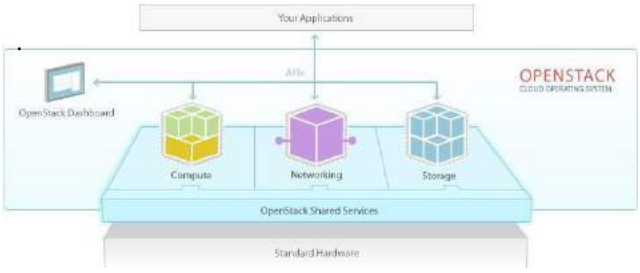


Figure\Traditionalservers

Openstack architecture

Openstack-Openstack is organized around three main modules i.e. compute, storage and networking. Along with these three, dashboard become an important component in providing interface to administrators and users for provisioning and release of resources. These components and their interaction with user's application and underlying hardware over which other openstack services do run can be represented as sown in **figure 1**. Openstack compute is designed for provisioning of virtual machines providing scalable cloud computing platform. Openstack storage provides objects storage to be used for storing necessary images to run virtual machines or virtual instances. Openstack network provides necessary services which are used for communication with in virtual machine i.e. inter-VM and external to virtual machines. All these modules along with other services running underneath works in a close interaction with each other which may or may not be running on single server (test environment) or on a multiple servers (production environment) jointly fulfilling the common purpose of openstack for providing a feature rich, scalable platform for infrastructure as a service cloud platform.

Rackspace as a new open source cloud initiative freely available under Apache License. Openstack controls large pools of compute and storage all managed either through APIs or dashboard. Dashboard provided by openstack is a web interface for provisioning to and releasing of resources from end users.



Openstack mission according to **[3]** 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". Since its very first introduction in June 2010 openstack is accelerating and gaining popularity every day. And now openstack is joined by scores of developers and support team backend by some large houses like Canonical, Rackspace, etc. Currently openstack is joined by more than 180 business houses providing to support for openstack, more than 15996 people working over it and active involvement of people from more than 137 nations **[4]**. Although openstack is portable software but many Linux distributions provide it as an operating system also like Ubuntu Canonical

Openstack currently consist of seven different service code projects to make it modular, each having its different code name for project. This code name describes

Sr. No.	Openstack Project Name	Codename
1	Compute	Nova
2	Object Storage	Swift
3	Identity	Keystone
4	Dashboard	Horizon
5	Block Storage	Cinder
6	Network	Quantum
7	Image Service	Glance

the different modules of the openstack and their configuration files respectively. The seven openstack's projects along with their respective code name are listed in **table 1**.

Compute (codenamed Nova): Openstack compute originated from NASA's Nebula platform. Compute provides the service for provisioning and un-provisioning of virtual machines on demand basis. Many companies provide compute services commercially bases on Openstack's compute moreover, compute is used internally by many organizations including where it originated i.e. NASA. Nova is main core part of openstack essential for IaaS. It is responsible for running virtual servers. It is used to host and manage cloud computing systems. Nova originated at NASA Ames Research Laboratory. Its design is built keeping in mind the ease of adding new features, scaling with workload, fault tolerance and compatibility of its APIs with other systems like Amazon EC2.

hypervisor-Virtualization Hypervisors Virtualization enables or allows multiple applications or operations to gain access to the hardware resources/ software resources of the host machine.

The hypervisors also known as the Virtual Machine Monitor (VMM), manages the applications and the operating system in general. There's a path created by the VMM which allows multiple of the same operating system to run on the host machine as well with the hypervisor managing the resources among the various operating system hardware requirement. In [16], Virtual Machine originated from the PR/SM hypervisor built for IBM 370 mainframes systems in 1970. In memory virtualization, an application or software in the computer gains access to more memory than what is originally installed physically, this way other IT infrastructures can also have memory virtualization to increase productivity, efficiency, and effectiveness of the corresponding application, such infrastructure includes: networks, storage, memory, server hardware, laptop hardware, operating system and applications alike. Figure 2 shows a host machine before virtualization; it runs a single Operating system image per machine, software and hardware resources per machine, resource are not used fully, it is not flexible and costly infrastructures, and running of more than one instance of an application on the same machine often causes conflicts of applications. Figure 3 depicts a computer that is virtualized, that can host more than one operating system in its virtualized environment, running at the same time, and virtual machines can be deployed on any system, and it doesn't rely on the operating system nor hardware of the host.

a) Server Consolidation: This combines or centralizes the workloads of various physical machines that are not fully used to lesser machines that can run safely and transparently over shared hardware infrastructure and also increase the overall utilization of the server from 5% - 15% to 60% - 80% [17]. **Figure 4**, illustrate the server consolidation virtualization, where different physical servers are virtualized into one physical server and then virtualized as different servers, increasing its efficiency, workability, speed etc.

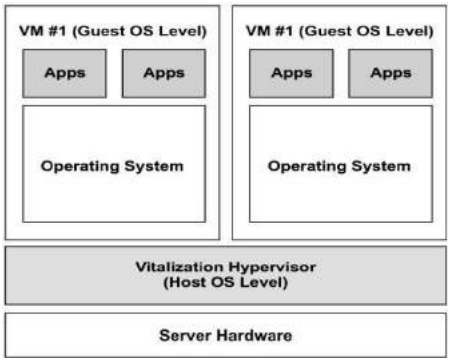
JJ. Application Consolidation: This is giving legacy or outdated applications the environment to utilize new hardware and operating system by virtualizing the new hardware and providing access to other guest machines to utilize the application.

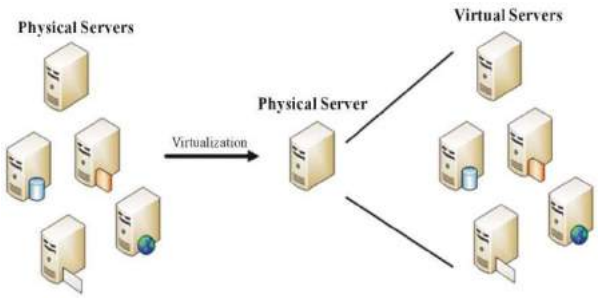
KK. Multiple Execution: Virtualization can help create more than one environment for program or application execution ad also the quality of service can be increased by ensuring that specific amount of resources is allo-cated appropriately.

d. Virtual Hardware: The virtualization of hardware that is unavailable to users is achieved in virtualizing hardware. Examples of such hardware are: SCSI drivers, Virtual Ethernet Adapters, Virtual Ethernet Switches, and Hubs etc. as shown in **Figure 5**.

e. Debugging: The virtual environment can help in debugging of applications or software that are compli-cated such as an operating system or a device driver. This is achieved by allowing the user to execute the soft-ware in a virtualized environment with all the full control of the software available in the environment, giving the programmer or developer the perfect environment for debugging.

f) Multiple Simultaneous Operating System: Virtualization enables the facility of having and running more than one operating system simultaneously, and also having different applications according to the users demands as shown in **Figure 6**. The guest machine runs on the virtualized application or software that in turn runs above





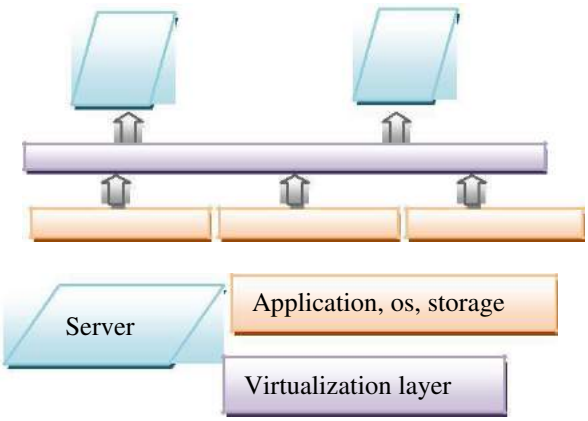


Figure 3 .Virtual server

IV. THE EFFECTS OF THE VIRTUALIZATION TECHNOLOGY

A. Increase in temperature

As virtual technology is based on the collection of hardware machines, heats released by these machines are very high. So, necessary cooling mechanisms are must employ, In order rise the performance.

B. Increases power usage effectiveness

By introducing this Virtualization technology, there will be high usage of the hardware and there will be increase in the power usage, as there is increase in the power usage finally it leads to the physical infrastructure efficiency.

C. Lesser redundancy

As virtualization technology consists of high level datacenters, so, normally it have high level fault tolerance, so, there will be the lesser scope of redundancy[3].

And then we came to know how virtual servers are worked when compared to the traditional servers, and we also came to the pros and cons of both traditional and virtual servers. And we also came to know the effects which are arise when

V. A SAMPLE VIRTUAL UPGRADABLE MODEL

The above figure represents the future upgradable model for virtualized technology, this technology is maintained by the third party providers, in the developing the initial virtualized model, we start with the initial or versions present at that time. So, after changes in the market we upgrade our applications [7].

VI. CONCLUSION

In the above sections we initially describe the basic virtual technology architecture that consists of cloud users and the service models, operating system and the hardware.
we are implementing the virtualization technology in cloud computing environment. So, by using the virtual Mechanism it takes the cloud computing technology to another step forward in all aspects. So, by using the virtualization technology it leads to efficient usage of cloud computing environment

REFERENCES

[1] http://www.customis.com/resources/library/VirtualizationWhitePaper.pdf

[2] http://uwf.edu/computerscience/seminar/documents/20090911_virtu alizationandcloud.ppt

[3] http://www.computerworld.com.au/whitepaper/370761/virtualisation -and-cloud-computing-optimised-power-cooling-and-management-maximises-benefits/download/

[4] http://en.wikipedia.org/wiki/Cloud_computing

[5] http://www.csc.villanova.edu/~nadi/csc8580/S11/AnushaUppalapati. pdf

[6] http://en.wikipedia.org/wiki/Cloud_computing

[7] http://www.customis.com/resources/library/VirtualizationWhitePaper.pdf