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Profound survey on virtualization in cloud

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ABSTRACT

Cloud Computing is the fundamental change happening in the field of Computer Science and Information Technology. It helps to overcome the problems of data loss, accessing data whenever needed and data security. This technology is mainly service oriented and focuses on cost reduction, hardware reduction and pay just for service concept. Virtualization is one of the key components of cloud computing. With the help of virtualization, cloud computing brings efficiency benefits, security, availability and privacy protection. Virtualization is expensive mainframes to be easily shared among different application within the environments. The concept of virtualization needs to understand and implement in the cloud computing systems and enables the users how to better use it and make it better management of cloud. In this paper, the virtualization in the cloud is explained with the concept of service models. In this internet world, cloud computing is raising high by providing everything incense the required resources, applications, software, hardware, computing power to computing infrastructure, business process to control collaboration.

Keywords: *Virtualization, Cloud Computing, Cloud Security.*

1. INTRODUCTION

Cloud Computing:

Cloud computing is defined by the concept of web centered computers, services and resources that system developers use to implement compound web-based systems. Cloud computing has improved computation's efficiency while reducing its cost for users [1].

Virtualization:

Virtualization is the key component of cloud computing for providing computing and storage services. In computing, a process of creating an illusion of something like computer hardware, operating system (OS), storage device, or computer network resources is Virtualization. The main aim of virtualization is to manage the workload by transforming traditional computing to make it more scalable, efficient and economical. Virtualization can be applied to a wide range such as operating system virtualization, hardware-level virtualization, and server virtualization. Virtualization is the creation of a virtual (rather than actual) version of something, such as a hardware platform, operating system, a storage device or network resources" Virtualization abstracts the physical computing resources from their users, applications, or end users This includes, single physical resource (such as a server, an operating system, an application, or storage device) virtualized into multiple virtual resources; it can also include multiple physical resources (such as storage devices or servers) virtualized into single virtual resource.

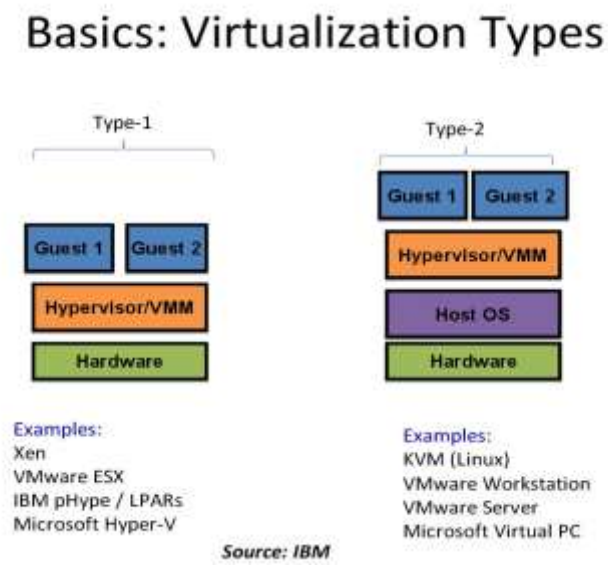
Virtualization software makes it possible to run multiple operating systems and multiple applications on the same server at the same time, it is based on three service models that are SAAS (software as a service), PAAS (platform as a service) and IAAS (infrastructure as a service). SAAS provides applications to the cloud users to full fill their needs and demands. PAAS provides the cloud users a common platform on which they can execute their applications and IAAS provides the security and hardware to maintain the cloud resources [5] The basic idea is to share large pools of resources like compute cycles or virtual CPUs (VCPUs), storage, software services etc. [6].

Hypervisor:

This is the software program which handles the virtual machine to work under the virtually simulated environment. This also allows multiple operating systems to run on a physical server at the same time.

This also provides the hardware abstraction to the running guest OSs and efficiently multiplexes underlying hardware resources.

Types of Hypervisors:



Features of Virtualization

1. **Flexible.** Your virtual servers must be flexible. You should be able to configure and reconfigure to meet your growing and changing needs.
2. **Scalable.** Scalability is an important characteristic of virtualization. You should be able to scale up or down as necessary to facilitate your company's growth and expansion.
3. **Efficient.** If virtualization isn't saving your company money then it isn't succeeding for you.
4. **Secure.** Your virtual servers should be as secure as the physical servers they replaced.
5. **Accessible.** Finally, your virtual servers should be accessible to everyone who has a need to use them.

Types of Virtualization

Server Virtualization:
Server virtualization is the partitioning of a physical server into smaller virtual servers to help maximize your server resources.

Vendors for server virtualization	VMware sphere Citrix Xen server Microsoft Hyper-V RedHat KVM

Storage Virtualization:
Storage virtualization is the pooling of physical storage from multiple network storage devices into what appears to be a single storage device that is managed from a central console

Vendors for storage virtualization	IBM SAN Volume Controller EMC Invista Data core SANsymphony-V

Network Virtualization:
In computing, network virtualization is the process of combining hardware and software network resources and network functionality into a single virtual network.

Vendors for storage virtualization	VMWare NSXi

Desktop Virtualization:
Desktop virtualization "virtualizes desktop computers" in the data center and these virtual desktop environments are "served" to users on the network. Users interact with a virtual desktop in the same way that a physical desktop is accessed and used. Another benefit of desktop virtualization is that lets you remotely log in to access your desktop from any location.

Vendors for desktop virtualization	Citrix XenDesktop Citrix VDI-in-a-box VMWare View Microsoft VDI Redhat RHEV for Desktops

Application Virtualization:
Application virtualization is software technology that encapsulates application software from the underlying operating system on which it is executed.

Vendors for desktop virtualization	Citrix XenApp VMWare ThinApp Microsoft App-V

Approaches to Virtualization

Full Virtualization:

The guest operating system is unaware that it is in a virtualized environment and thinks it is running on the real hardware. Therefore hardware is virtualized by the host operating system so that the guest can issue commands to what it thinks is actual hardware.

Para Virtualization:

This is also known as OS- assisted virtualization. Hyper calls to virtualization layer replace non virtualized OS requests. The main difference between full virtualization and para virtualization is the quest OS knows that it is running in the virtualized environment. In full virtualization, guest OS does not know that it is in a virtual environment.

Hardware Assisted Virtualization:

In the above two approaches, there is an additional overhead of binary translation or modification of guest OS to achieve virtualization. In this approach, hardware vendors itself offer support for virtualization which eliminates much overhead involved in the binary translation and guest OS modification.

Benefits of Virtualization:

Reduce Overall Costs

Increased resource utilization

Zero downtime maintenance

High Availability

Scalability

Green IT

Issues in Virtualization:

Security

Low Performance

2. CONCLUSION

The need for virtualization and the process involved in it is depicted. The advantages of virtualization are given with brief explanation. The requirement and importance of virtualization in data centers have also illustrated. How virtualization reduced the problems of machines Virtualization may bring several advantages to the design of modern computer systems including better security higher reliability and availability, reduced costs, better adaptability to workload variations, easier migration of virtual machines among physical machines, and easy coexistence of legacy applications. Many vendors including Sun, IBM, and Intel have already announced or already have virtualization solutions. It is important to briefly discuss two major directions for virtualization that can be encountered on the market. One is called full virtualization and the other para virtualization. In the former case, the Virtual Machine Monitor provides an identical abstraction of the underlying hardware to the virtual machines. However, not all architectures are virtualizable. This abstraction implements some new virtual instruction so as to make the machine virtualizable. The drawback is that the guest operating system has to be modified to use these instructions while in the full virtualization case this is not required. Para virtualization provides better performance than full virtualization since the guest operating systems are aware that they running on a VM and therefore can be optimized for that type of environment. Examples of virtual machine monitors that use para virtualization include the open source Xen and Denali

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