Cloud Computing and Virtualization Technology

Priyanka Jadhav[1], Nidhi Palande[2], Rushikesh Gurav[3]

BCA [CT-IS (Cloud Technology & Information Security)],
SOIT, ADYPU, PUNE, INDIA[1]

Abstract: Virtualization and cloud computing are two popular research fields in recent times. Today, Virtualization is being used by a growing number of companies and organizations to reduce power consumption, Server Consolidation, Testing and Development, Dynamic Load Balancing and Disaster Recovery, Virtual Desktops. Cloud Computing is a style of computing in which dynamically scalable and virtualized resources are provided as a service over the Internet. It is integration of multiple technologies which includes distributed computing, utility computing, parallel computing, Virtualization, etc.

Keywords: **Cloud Computing, Virtualization, Server Consolidation, Hypervisor.**

Table of Contents

1. Introduction

2. Literature Review

    2.1. Types of Virtualization

    2.2. Types of clouds

    2.3. Cloud Deployment Models

    2.4. Benefits of Virtualization

2.5. Benefits of Cloud computing

3. Conclusion

4. References

INTRODUCTION

Cloud computing is one of the most useful technology that is been widely used all over the world. It generally provides on demand IT services and products. Virtualization plays a major role in cloud computing as it provides a virtual storage and computing services to the cloud clients which is only possible through virtualization.

Cloud Computing

" Cloud computing is a model for enabling ubiquitous, convenient, on-demand network access to a shared pool of configurable computing resources that can be rapidly provisioned and released with minimal management effort or service provider interaction. "

All the data is stored on the servers and can be accessed or managed simply by authenticating with the help of the internet anywhere in the world.

Virtualization

Virtualization is a technology that combines or divides the computing resources in order to run one or many operating systems.

It is basically making a virtual image of something such as server, operating system, storage devices so that they can be used on multiple machines at the same time.

CLOUD COMPUTING



VIRTUALIZATION



II. Literature Review

2.1 Types of virtualization

- **Storage Virtualization**

Storage virtualization is the collection of physical storage from multiple storage devices into what appears to be a single storage device. The process involves abstracting and covering the internal functions of storage device from the host application, host servers or a general network in order to facilitate the application and network independent management of storage.

- **Server Virtualization**

It is a process that includes partitioning a physical server into a number of small virtual servers using the hypervisor. Masking of server resources including the number and identity of individual physical servers, processors, and operating systems, from server users. It also conserver space through consolidation as several machines can be consolidated into one server running multiple environments.

- **Network Virtualization**

Network virtualization is a process of combining hardware and software network resources and network functionality into a single software based administrative entity, a virtual network.

It is a method of merging the available resources in a network by splitting up the available bandwidth into different channels. Each channel are independently secured and allocated to a specific server/device in real time.

- **Application Virtualization**

Application virtualization is a software technology that encapsulates computer programs underlying operating system on which it is executed. A fully virtualized application is not installed in the traditional sense, although it is still executed as if it were. The application behaves at runtime like it is directly interfacing with the original operating system and all the resources managed by it, but can be isolated or sandboxed to varying degrees.

2.2 Types of Cloud

- **Private Cloud**

Private cloud refers to a model of cloud computing where IT services are provisioned over Private IT infrastructure for dedicated use of a single organization. It is usually managed by internal resources.

The main Benefits of using a private cloud service are:

1. High security and privacy
2. Cost and energy efficiency
3. Improved reliability
4. Cloud bursting

- **Public Cloud**

A Public cloud is one based on the standard cloud computing model in which a service provider makes resources, such as virtual machines, application or storage, network resources, available to the general public over the internet.
Public cloud storage is typically redundant, using multiple data centres and careful prototype of file versions.

The main Benefits of using a public cloud service are:

1. It reduces the need for organizations or consumers to invest and maintain their own IT resources.
2. It enables scalability to meet workload and user demands.
3. There are few wasted resources because consumers only pay for the resources they use in Pay as you go model.

- **Hybrid Cloud**

Hybrid Cloud is a cloud computing environment that uses a mix of on-premises, private cloud and third-party, public cloud services with orchestration between the two platforms.

The main Benefits of using a hybrid cloud service are:

1. Hybrid cloud enables an enterprise to deploy a private cloud to host sensitive or critical workloads, and use a third-party public cloud provider to host less-critical resources, such as test and developments workloads.
2. It also enables an enterprise to use broader combination of IT services. For example, a business might run a mission-critical workload within a private cloud, but use the database or archival services of a public cloud provider.

- **Community Cloud**

A community cloud is a cloud service model that provides a cloud computing solution to a limited number of individuals or organizations that is governed, managed and secured commonly by all the participating organizations or a third party managed service provider.

2.3 Cloud Deployment Models

- **Infrastructure As A Service(IAAS)**

The capability provided to the consumer is to provision processing, storage, networks, and other fundamental computing resources on a pay-per-use basis where he or she is able to deploy and run arbitrary software, which can include operating systems and applications. The consumer does not manage or control the underlying cloud infrastructure but has control over the operating systems, storage, and deployed applications and possibly limited control of select networking components (e.g., host firewalls). The service provider owns the equipment and is responsible for housing, cooling operation, and maintenance.

- **Platform As A Service(PAAS)**

The capability provided to the customer is to deploy onto the cloud infrastructure acquired applications created using programming languages, libraries, services, and tools supported by the provider. The consumer does not manage or control the underlying cloud infrastructure, but has control over the deployed applications and possible configuration settings for the application-hosting environment. In other words, it is a packaged and ready-to-run development or operating framework. The PAAS vendor provides the networks, servers, storage and manages the levels of scalability and maintenance.

- **Software As A Service(SAAS)**

The capability provided to the customers is to use the provider's applications running on a cloud, including networking facilities, servers, operating systems, storage, and even application capabilities, with the possible exception of limited user-specific application configuration settings. The applications are accessible from various client devices, either through a thin client interface, such as a web browser (e.g., web-based e-mail), or a program interface. The customer does not manage or control the cloud infrastructure.

2.4. Benefits of Virtualization

- One of the Cost saving, Hardware reducing and Energy saving technique.
- Isolation
- Resource Sharing
- Dynamical Resource

2.5. Benefits of Cloud computing

- Pay just for service
- On demand self service
- Resource Sharing
- Accessible througout the world
- Data is secured.

Conclusion: This Paper throws light on both Cloud computing and Virtualization. Virtualization improves the efficiency of cloud computing. Virtualization improves scalability besides making the cloud solution cost effective. The two technologies go hand in hand to provide the services to the end user.

References:

1. https://www.researchgate.net/publication/297603485_Research_on_the_Virtualization_Technology_in_Cloud_Computing_Environment
2. Https://www.ijcsmc.com/docs/papers/May2014/V3I5201499a.pdf
3. https://www.omicsonline.org/open-access/virtualization-in-cloud-computing-2165-7866-1000136.php?aid=44684
4. http://www.ijstr.org/final-print/nov2014/A-Study-On-Virtualization-Techniques-And-Challenges-In-Cloud-Computing.pdf
5. https://ijarcce.com/wp-content/uploads/2012/03/IJARCCE3A-a-sunil-Review-on-Virtualization-for-Cloud-Computing.pdf