

Multi-Tenant Cloud

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Abstract —Cloud computing is a term used for delivering hosted services over the internet to remotely store, process and share digital data."MULTI-TENANT CLOUD" is a means of providing cloud services through which multiple users can access server resources at the same time using virtualization. Hence, MULTI-TENANT CLOUD provides the development of virtual machine system. Initially we start by defining Cloud Computing and its services. Then, we have elaborated about Virtualization and Hypervisors. The main scope of this project is to provide the services to cloud users which lead to less storage consumption and more CPU utilization. Authentication Server plays an important role for providing security to cloud users from intruders. Load Balancing and Live Migration can be the future work of this project.

Keywords- MULTI-TENANT, Cloud Computing, Hypervisor, Virtualization, Server, Virtual Box, Load Balancing, Live Migration.

I. INTRODUCTION

Cloud Computing is a technology that uses the internet and central remote servers to maintain data and applications. It is also defined as delivery of computing services over the internet. Example of cloud computing are yahoo, Gmail etc. There are three types of services in cloud computing that are PAAS(Platform as a service), SAAS(Software as a service), IAAS(Infrastructure as a service). We are providing a cloud which is fully implemented on LAN. We have created the VMs on server. Each VM is assigned with unique IP address. User will be able to access the VM remotely using valid credential. Authentication server will verify the user's credential.

II. ARCHITECTURE OF MULTI-TENANT CLOUD

Multi-Tenant Cloud provides cloud services using virtualization technology. We have implemented it using C#.net. As shown in figure 1 the elements of MTC are server, Authentication server, Database and users. The virtual machines are installed on servers which are assigned with the unique IP address. Users login with their credential that will be verified by the Authentication server. After verification, Authentication server resolves the IP address of VM with their user name and then Remote Desktop Connection is established between user and the VM.

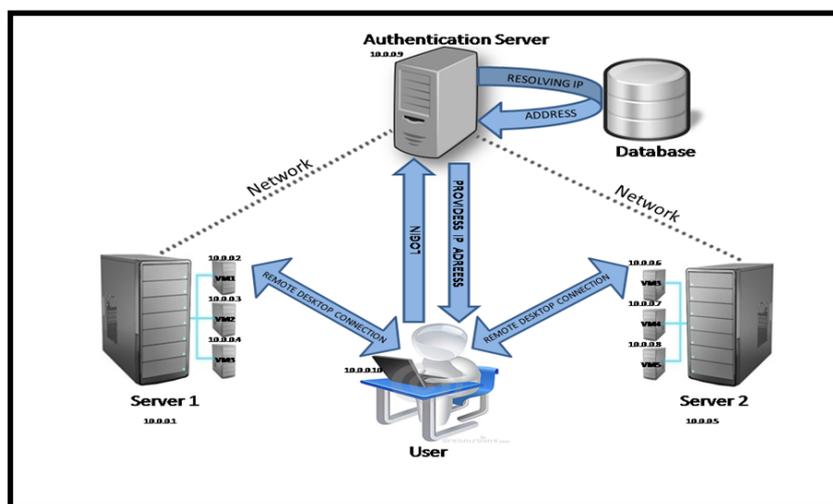


Figure 1: Architecture of Multi-Tenant Cloud

III. VIRTUALIZATION AND HYPERVISORS

a. Virtualization

Virtualization refers to the act of creating virtual machines which shares the computer hardware platforms, operating systems, storage devices and computer network resources. Virtualization technology involves separating the physical hardware and software by emulating hardware using software. When a different OS is operating on top of the primary OS by means of virtualization, it is referred to as a virtual machine. A virtual machine is nothing but a data file on a physical computer that can be moved and copied to another computer, just like a normal data file.

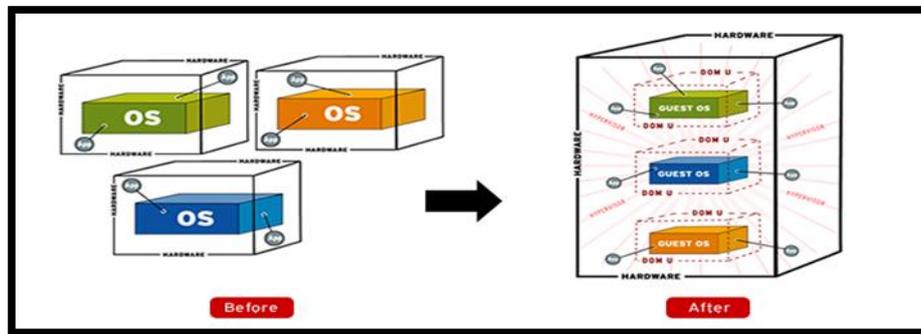


Figure 2: Virtualization

b. Hypervisors

If virtualization is defined as enabling multiple operating systems to run on a single host computer, then the essential component in the virtualization stack is the hypervisor. This hypervisor, also called Virtual Machine Monitor (VMM), creates a virtual platform on the host computer, on top of which multiple guest operating systems are executed and monitored. This way, multiple operating systems, which are either multiple instances of the same operating system, or different operating systems, can share the hardware resources offered by the host.

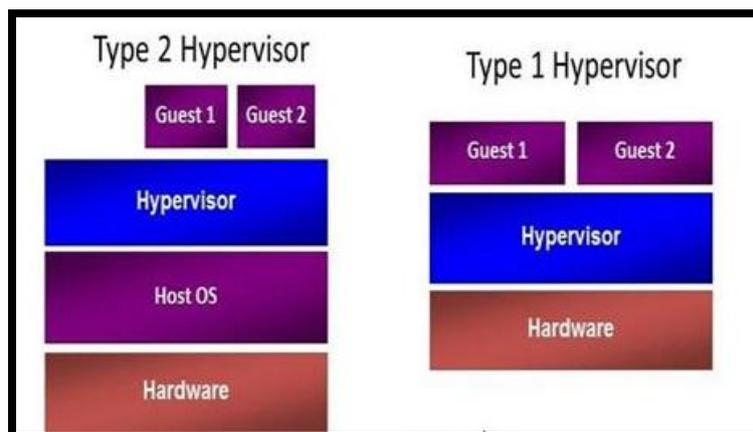


Figure 3: Types of Hypervisors

Type I: **Native or Bare metal** Native hypervisors are software systems that run directly on the host's hardware to control the hardware, and to monitor the guest operating systems. Type II: **Hosted** Hosted hypervisors are designed to run within a traditional operating system. In other words, a hosted hypervisor adds a distinct software layer on top of the host operating system, and the guest operating system becomes a third software level above the hardware.

IV. IMPLEMENTATION

Implementation phase includes server configuration with VT (Virtualization Technology) support test on the server hardware. Server establishment and other required steps are explained in further topics.

a. Server Establishment

Server established to provide the Cloud Services is of following configuration. Figure 4 shows the server configured by use for the proposed system.

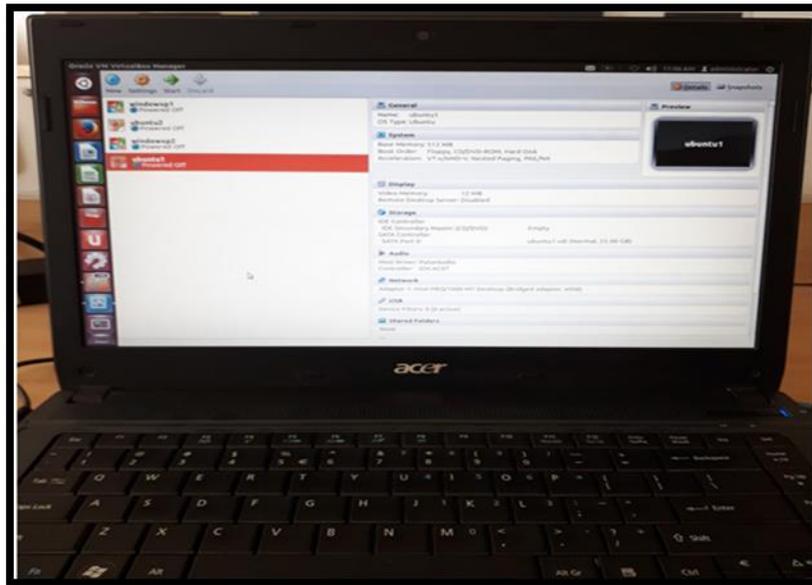


Figure 4: Server

Following table gives an overview of the server configuration, table shows the configuration available.

Table 1: Server Configuration

OS	UBUNTU 12.04 LTS
Processor	Intel Core TM i5-3220M
LCD	LED LCD Panel 35.56 cm Wide
Graphics	Intel HD Graphics 4000
Memory	4GB DDR3 Memory
Storage	500 GB HDD
WLAN/Bluetooth	Acer Nplify 802.11 a/g/nBT2.1
Battery	6-Cell-Li-ion battery

b. Client Cataloging

Registration form for the user to fill up the details is designed. The details will be stored in the database. Henceforth, Database Connectivity is achieved with MySQL for the user entries.

Figure 5: Registering Client

c. Client Interface

User Login will be provided after registering to the Cloud Services. Using it the client will have a Remote Connection and one can access the virtual machine required from the server.



Figure 6: Client Interface

d. Authentication Sever

Authentication server plays an important role for authenticating users and provides security to cloud users. Authentication server provides the registered IP address to valid user by which user can access the PAAS service.



Figure 7: Authentication Sever

a. Linking to Client

After running the application remote desktop connection is established for the user provides the user to use a Virtual Machine from the Server.

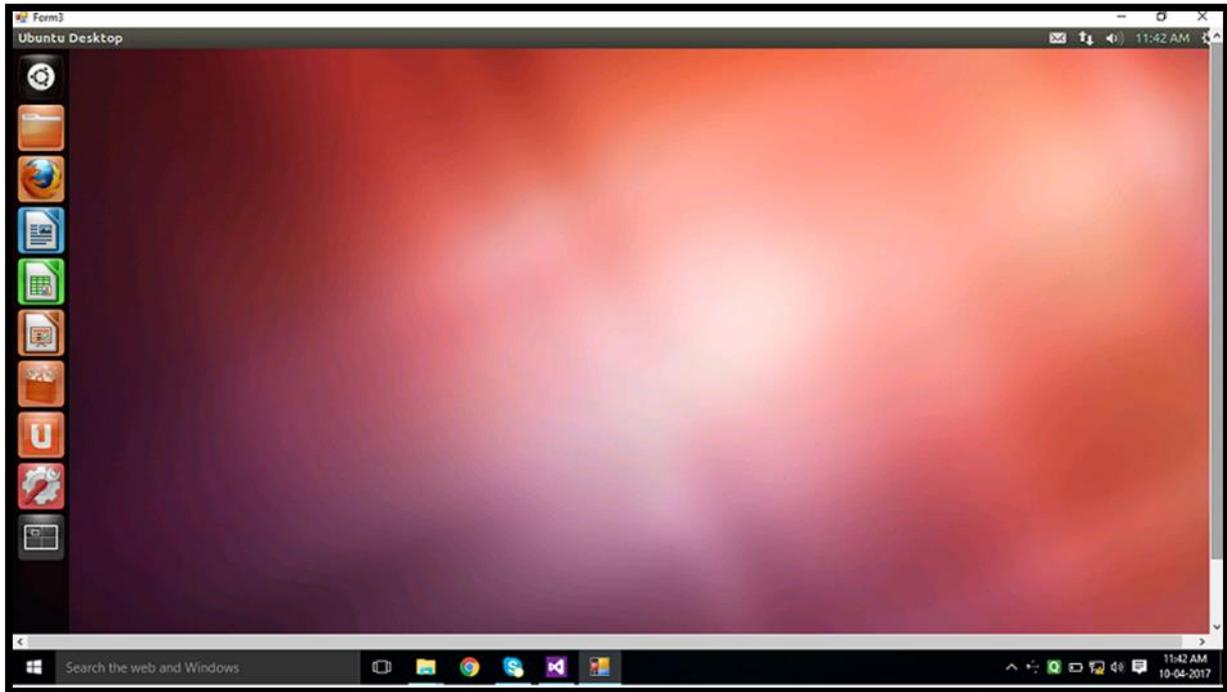


Figure 8: Connecting Client

V. BENEFITS

Cost Efficient

Cloud computing is a very cost efficient method for maintaining and upgrading in the present use. Licensing fees for multiple users is very costly for the establishment so, cloud makes it available at much lower rates which in turn reduces the overall expenditure of the user.

Almost Unlimited Storage

Storing information in the cloud gives you unlimited storage capacity. Hence, no need to care about things like storage space or for increasing the current storage space availability for further necessities.

Backup and Recovery

Backing up the current data and restoring the data is made much easier than storing it on a physical device.

Automatic Software Integration

Software integration is something that occurs automatically. Cloud computing enables us to customize all necessary options with great ease. Hence, choose only those services and software applications that will be best for your company.

Easy Access to Information

Once the registration is done in the cloud, information can be accessed from anywhere. The only requirement is an Internet Connection. This offers great flexibility and lets you move ahead the time zone and certain Geographical Issues. It provides great flexibility.

Quick Deployment

Full System can be made functional within a very less time. User can have elasticity of resources in terms of RAM, Hard disk or even platform.

VI. FUTURE ENHANCEMENTS

a. Load Balancing

As, Load Balancing would help in reducing costs and maximize the availability of the resources allocated. It will help in transferring loads to servers globally across the cloud servers. Load Balancing is done using a model in the Live Migration process wherein the load is balanced amongst the servers as per the usage and VM downtime. The load is equally partitioned in the system according to the system capacity to increase the throughput of the system. The software, network and file status is monitored and controlled by clusters which offer higher availability for the VM's to migrate.

Load Balancing for the whole cloud can be handled dynamically using the virtualization where remapping is done to the physical resources. Different algorithms are there through which Load Balancing is achieved.

b. Live Migration

Through Live Migration we wish to give our users the flexibility to move a VM from one host to another with ease. Live Migration is defined as a process by which the memory of a virtual machine is moved from source to destination with no impact on the machine availability for the users. Live Migration enables one to implement higher level of mobility, security and flexibility in the cloud. When the virtual machine is running on the source node and without distorting any network connections the virtual machine is moved to the destination. This procedure is termed as “live” because the original virtual machine is running simultaneously when the migration process takes place. Live Migration takes very less time.

We would be using Live Migration as it will ignore many difficulties by process level migrations. Live Migration helps in improving management, performance and fault tolerance in the systems.

VII. CONCLUSION

Cloud services allow users to access the Virtual Machines as per their usage thereby eliminating the need of downloading software. Rather a client having less RAM of his system through Virtualization can utilize the Cloud Services. This way cloud service can provide mankind an extra level of intelligence which ultimately helps us to survive on this planet by diminishing resource usage in every possible way.

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