# A Private Cloud On Open Source Paradigm

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**Abstract** —*Cloud is a network of remote servers hosted on the internet and is used to manage and process data in place of local servers or personal computer. "ENTREPOT CLOUD" will provide the basic level of computing services. Hence, ENTREPOT CLOUD provides the architecture of Cloud with market-oriented resource allocation by leveraging technologies such as Virtual Machines (VMs). Initially we start by defining Cloud Computing and its services. Furthermore, we have elaborated about Virtualization and Hypervisors. Entrepot Cloud aims at providing on-demand services with greater flexibility, availability, reliability, elasticity and scalability to the cloud users. It is also eco-friendly. The main scope of this project is to understand how to best utilize different cloud computing services to get good performance with less expenditure. Authentication Server is the main concern of the cloud based computing. Load Balancing and Live Migration can be the future work of this project.*

**Keywords**-ENTREPOT, Cloud Computing, Hypervisor, Virtualization, Server, Virtual Box, Load Balancing

## I.  INTRODUCTION

The Cloud Computing paradigm holds good promise for the performance hungry scientific community. Cloud Computing is defined as the delivery of computing services over the Internet Connection. Example of Cloud Computing is Gmail, Salesforce.com, Amazon etc. All one needs is a good Internet connection for public cloud and a high speed LAN is sufficient for private cloud. In Cloud Computing there is a virtualised third party hosting performed [1]. Cloud Computing offers endless resources. Cloud Computing is divided into three segments: Application, Storage and Connectivity. Clouds use virtualization to abstract away from the actual hardware thus increasing the user base.

## II.  INTRODUCTION TO CLOUD SERVICES

Cloud services are the same as Web services. Henceforth, the term cloud services have been very commonly termed as Service Models. Cloud vendors greatly provide the cloud services to the users who have lesser resources [2]. Cloud computing has been mainly divided into three services:

### a.  Infrastructure as a Service (IaaS)
Infrastructure as a Service is a provisional model in which an organization outsources the equipment used in operations like storage, hardware, servers and networking components. Example: HP Cloud, Microsoft Azure Services Platform.

### b.  Platform as a service (PaaS)
Platform as a Service provides a platform to the customers to develop, run and manage the applications without the burden of building and maintaining the infrastructure. It is a way to rent the Hardware, OS, Storage and Network capability over the Internet. Example: Google App Engine, Windows Azure Cloud Services.

### c.  Software as service (SaaS)
Software as a Service offers licensing and builds a delivery model in which the software is licensed on a fixed subscription basis which is centrally hosted by the server. Example: Google Apps

## III.  ARCHITECTURE OF ENTREPOT CLOUD

Entrepot Cloud aims at providing a Service Model to the users. The elements to be used are: C#.Net, Visual Studio and Virtual Box. The interaction will be between Client-Server, Server-Client, Machine-Machine, Server-Server and VM-VM.
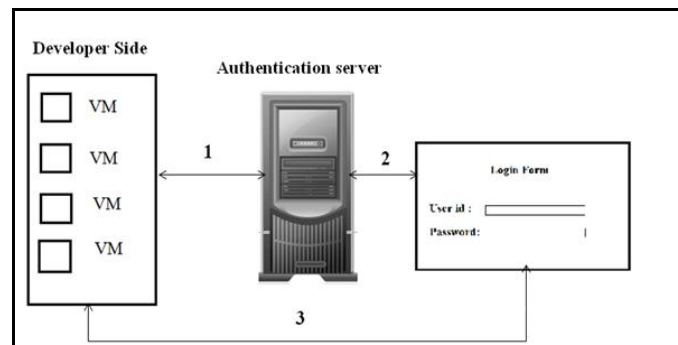
**Figure 1: Architecture of Entrepot Cloud**

Fig 1 shows the developer and client side. The developer side consists of the Virtual machines that can be remotely accessed by the client with the help of Entrepot Cloud Services. The client can freely register for the services. Authentication server is a network service which applications use to verify the credentials of the users. It is primarily used for the security purpose of the users. Hence, the cloud services to be used are secure. The credentials entered in Log-In will be authenticated by the Authentication Server and thereby the user will have access to the Cloud Services.

## IV. VIRTUALIZATION AND HYPERVISORS

### a. Virtualization

Virtualization makes it possible for the software to run multiple operating systems and multiple applications on the same server at the same time. Virtualization enables servers, workstations, storage and other systems independent of the physical hardware layer [3]. Moreover, virtualization avails to create a virtual version of the resource such as a server, a storage device, a network or even an operating system where the framework resources gets divided into one or more execution environments.
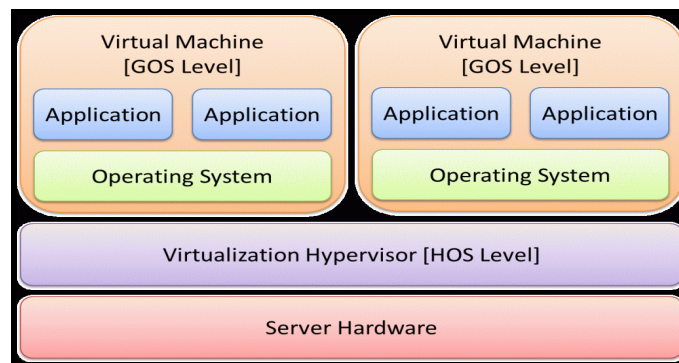


**Figure 2: Virtualization**

Virtualization is associated with a number of computing technologies such as Storage Virtualization, Server Virtualization, Operating System-Level Virtualization and Network Virtualization [5].

### b. Hypervisors

A Hypervisor enables multiple operating systems to share single hardware. Hypervisor is a piece that creates and runs virtual machines for software, hardware or a firmware. Hypervisor acts as an interface between the Guest OS and the Host OS. Oracle Virtual Box is a hypervisor for computers from Oracle Corporation which has been used for the Entrepot Cloud [4]. Upon which other Virtual Machines have been levied for users. Hypervisor are of two types:

Type I Hypervisor: Type I hypervisor is a bare-metal installation hypervisor. The benefit that this hypervisor provides is that it will interact directly with the hardware. The resources are then para-virtualized and delivered to the running VMs.
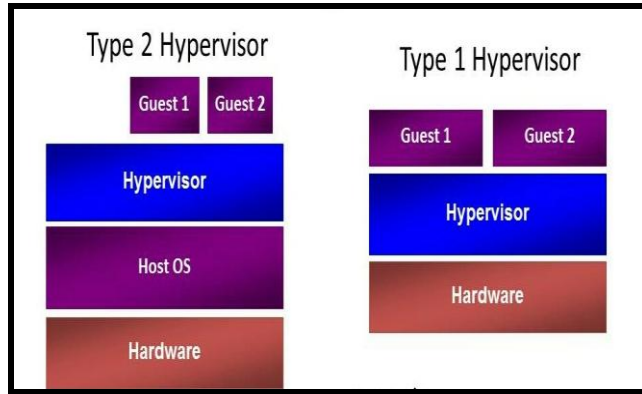
**Fig 3: Type of Hypervisors**

Type II Hypervisor: Type 2 Hypervisor is known as a hosted hypervisor. The software is not configured on the bare-metal, but it is loaded on top of a live operating system. For example, a server which runs Windows Server 2008 could be having VMware Workstation configured on top of that Operating System. Fig 3 shows the place of Type I and Type II hypervisors [6].

## V.    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.    5.1 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.  Registration

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.
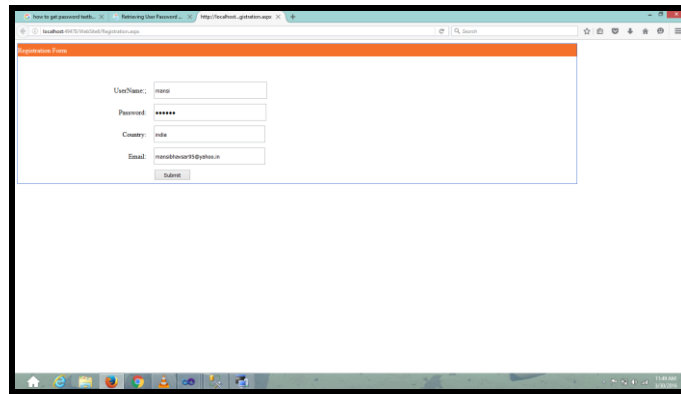


**Figure 5: Registration form**

### c.  Log-In

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.
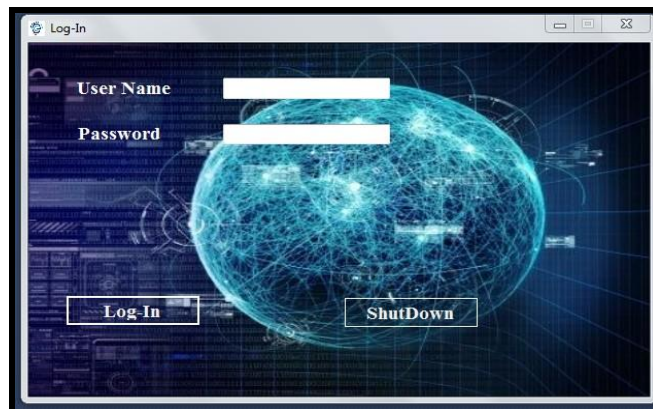


**Figure 6: User Log-In**

### d.  Authentication Server

Authentication server is a network service which applications use to verify the credentials of the users. It is primarily used for the security purpose of the users.  Hence, the cloud services to be used are secure [7].
Figure shows the screenshot of when the server is started or stopped. It also displays the Server status.

**Figure 7: Authentication Server**

### e. Remote Desktop Connection

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



**Figure 8: Client view of user services**

## VI.     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.

## VII. 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.

## VIII. 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 help us to survive on this planet by diminishing resource usage in every possible way.

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