



# ***CLOUD COMPUTING***

## ***Unit-1***

### ***Cloud Computing Virtualization Concepts***



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# **Virtualization Concept**

**Virtualization is a technique, which allows to share single physical instance of an application or resource among multiple organizations or tenants (customers). It does so by assigning a logical name to a physical resource and providing a pointer to that physical resource on demand.**

## **Virtualization Concept**

**Creating a virtual machine over existing operating system and hardware is referred as Hardware Virtualization. Virtual Machines provide an environment that is logically separated from the underlying hardware.**

**The machine on which the virtual machine is created is known as host machine and virtual machine is referred as a guest machine. This virtual machine is managed by a software or firmware, which is known as hypervisor.**

## **Hypervisor**

**The hypervisor is a firmware or low-level program that acts as a Virtual Machine Manager. There are two types of hypervisor:**

**Type 1 hypervisor executes on bare system. LynxSecure, RTS Hypervisor, Oracle VM, Sun xVM Server, VirtualLogic VLX are examples of Type 1 hypervisor. The following diagram shows the Type 1 hypervisor.**



# **Virtualization Concept**

**The type1 hypervisor does not have any host operating system because they are installed on a bare system.**

**Type 2 hypervisor is a software interface that emulates the devices with which a system normally interacts. Containers, KVM, Microsoft Hyper V, VMWare Fusion, Virtual Server 2005 R2, Windows Virtual PC and VMWare workstation 6.0 are examples of Type 2 hypervisor. The following diagram shows the Type 2 hypervisor.**

## **Types of Hardware Virtualization**

**Here are the three types of hardware virtualization:**

- 1. Full Virtualization**
- 2. Emulation Virtualization**
- 3. Paravirtualization**

### **Full Virtualization**

**In full virtualization, the underlying hardware is completely simulated. Guest software does not require any modification to run.**



# **Virtualization Concept**

## **Emulation Virtualization**

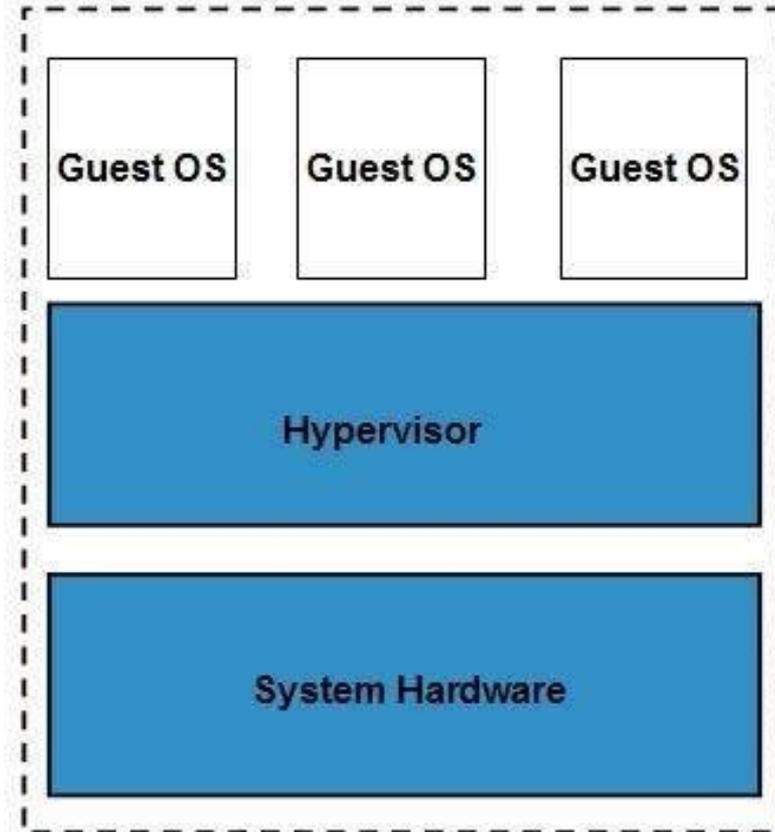
***In Emulation, the virtual machine simulates the hardware and hence becomes independent of it. In this, the guest operating system does not require modification.***

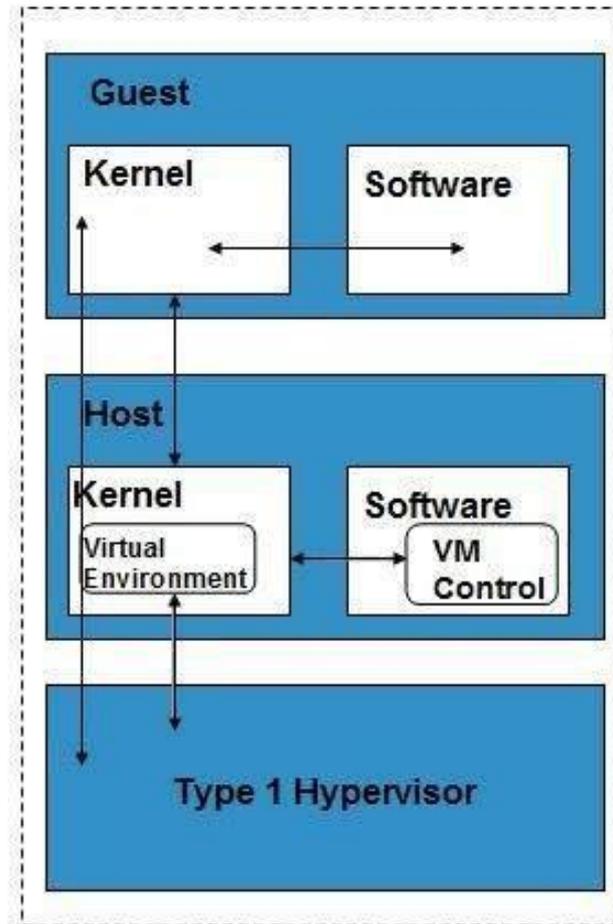
## **Paravirtualization**

***In Paravirtualization, the hardware is not simulated. The guest software run their own isolated domains.***

***VMware vSphere is highly developed infrastructure that offers a management infrastructure framework for virtualization. It virtualizes the system, storage and networking hardware.***

## Type 1 Hypervisor







# ***Cloud Computing Overview and Features***

# Introduction

**Cloud Computing provides us means of accessing the applications as utilities over the Internet. It allows us to create, configure, and customize the applications online.**

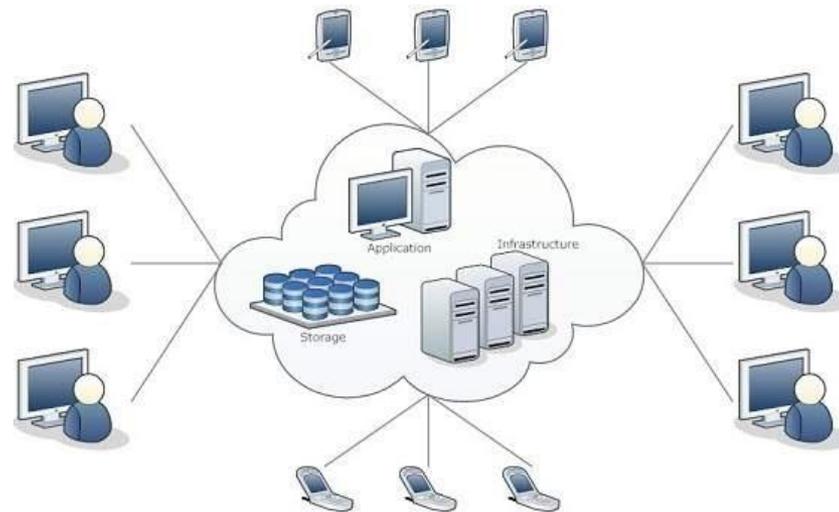
## **What is Cloud?**

**The term Cloud refers to a Network or Internet. In other words, we can say that Cloud is something, which is present at remote location. Cloud can provide services over public and private networks, i.e., WAN, LAN or VPN.**

**Applications such as e-mail, web conferencing, customer relationship management (CRM) execute on cloud.**

## **What is Cloud Computing?**

**Cloud Computing refers to manipulating, configuring, and accessing the hardware and software resources remotely. It offers online data storage, infrastructure, and application.**





# **Introduction**

**Cloud computing offers platform independency, as the software is not required to be installed locally on the PC. Hence, the Cloud Computing is making our business applications mobile and collaborative.**

## **Basic Concepts**

**There are certain services and models working behind the scene making the cloud computing feasible and accessible to end users. Following are the working models for cloud computing:**

### **Deployment Models**

#### **Service Models**

### **Deployment Models**

**Deployment models define the type of access to the cloud, i.e., how the cloud is located? Cloud can have any of the four types of access: Public, Private, Hybrid, and Community.**

#### **Public Cloud**

**The public cloud allows systems and services to be easily accessible to the general public. Public cloud may be less secure because of its openness.**

#### **Private Cloud**

**The private cloud allows systems and services to be accessible within an organization. It is more secured because of its private nature.**

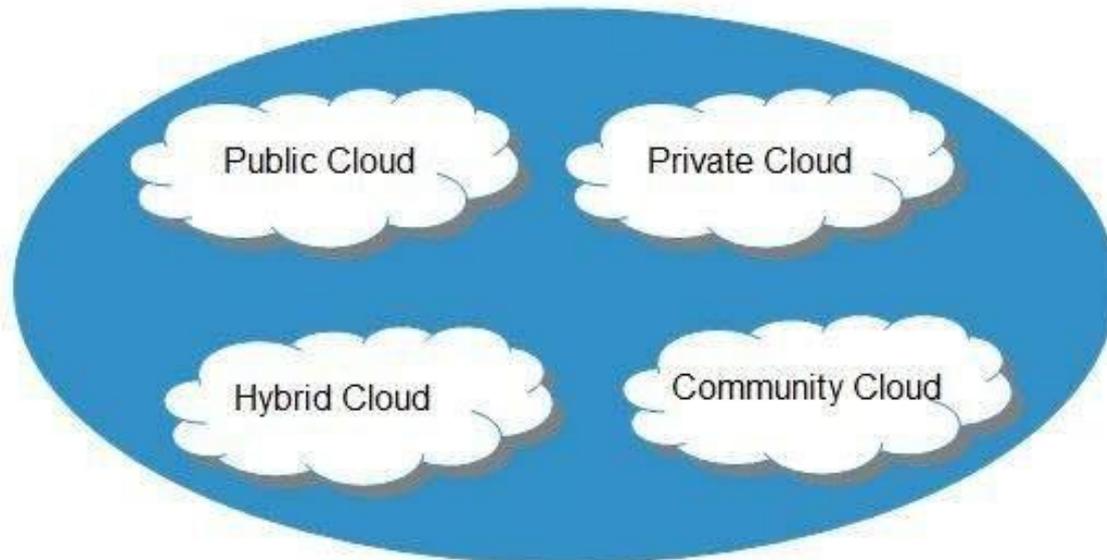
# ***Introduction***

## ***Community Cloud***

***The community cloud allows systems and services to be accessible by a group of organizations.***

## ***Hybrid Cloud***

***The hybrid cloud is a mixture of public and private cloud, in which the critical activities are performed using private cloud while the non-critical activities are performed using public cloud.***



# Introduction

## Service Models

**Cloud computing is based on service models. These are categorized into three basic service models which are -**

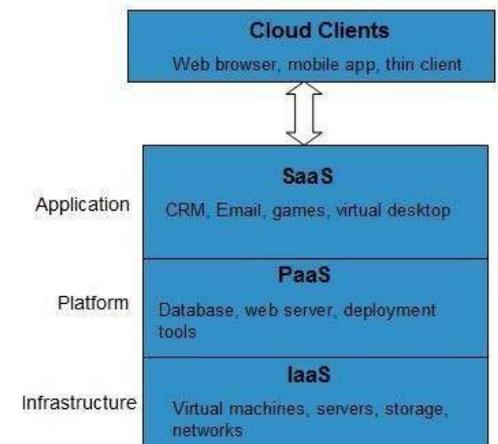
**Infrastructure-as-a-Service (IaaS)**

**Platform-as-a-Service (PaaS)**

**Software-as-a-Service (SaaS)**

**Anything-as-a-Service (XaaS) is yet another service model, which includes Network-as-a-Service, Business-as-a-Service, Identity-as-a-Service, Database-as-a-Service or Strategy-as-a-Service.**

**The Infrastructure-as-a-Service (IaaS) is the most basic level of service. Each of the service models inherit the security and management mechanism from the underlying model, as shown in the following diagram:**





# Overview

## **Infrastructure-as-a-Service (IaaS)**

**IaaS provides access to fundamental resources such as physical machines, virtual machines, virtual storage, etc.**

## **Platform-as-a-Service (PaaS)**

**PaaS provides the runtime environment for applications, development and deployment tools, etc.**

## **Software-as-a-Service (SaaS)**

**SaaS model allows to use software applications as a service to end-users.**

# **Characteristic Features of Cloud Computing**



**There are four key characteristics of cloud computing. They are shown in the following diagram:**

## **On Demand Self Service**

**Cloud Computing allows the users to use web services and resources on demand. One can logon to a website at any time and use them.**

## **Broad Network Access**

**Since cloud computing is completely web based, it can be accessed from anywhere and at any time.**

## **Resource Pooling**

**Cloud computing allows multiple tenants to share a pool of resources. One can share single physical instance of hardware, database and basic infrastructure.**

# **Characteristic Features of Cloud Computing**



## **Rapid Elasticity**

**It is very easy to scale the resources vertically or horizontally at any time. Scaling of resources means the ability of resources to deal with increasing or decreasing demand.**

**The resources being used by customers at any given point of time are automatically monitored.**

## **Measured Service**

**In this service cloud provider controls and monitors all the aspects of cloud service. Resource optimization, billing, and capacity planning etc. depend on it.**

# Characteristic Features of Cloud Computing

