CLOUD COMPUTING VIRTUALIZATION

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.
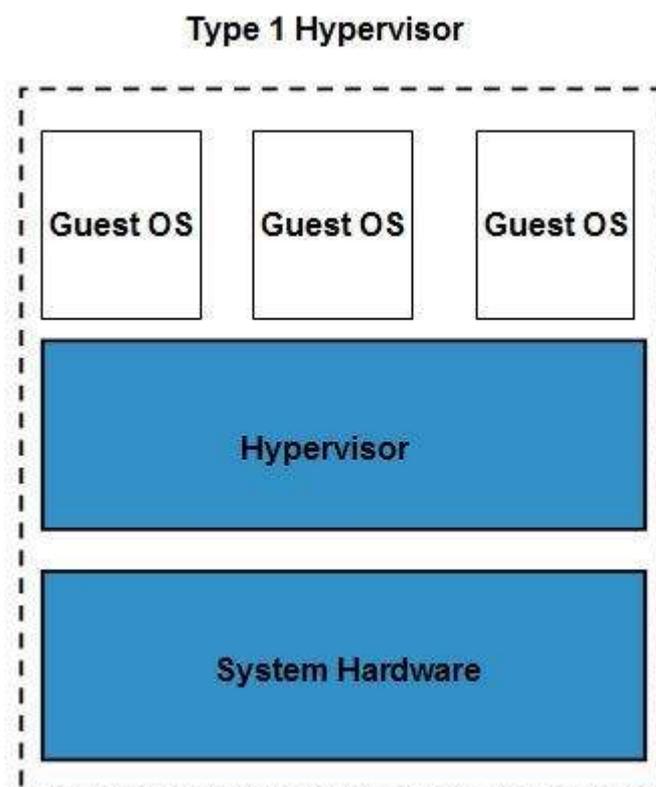
Type 1 Hypervisor

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.
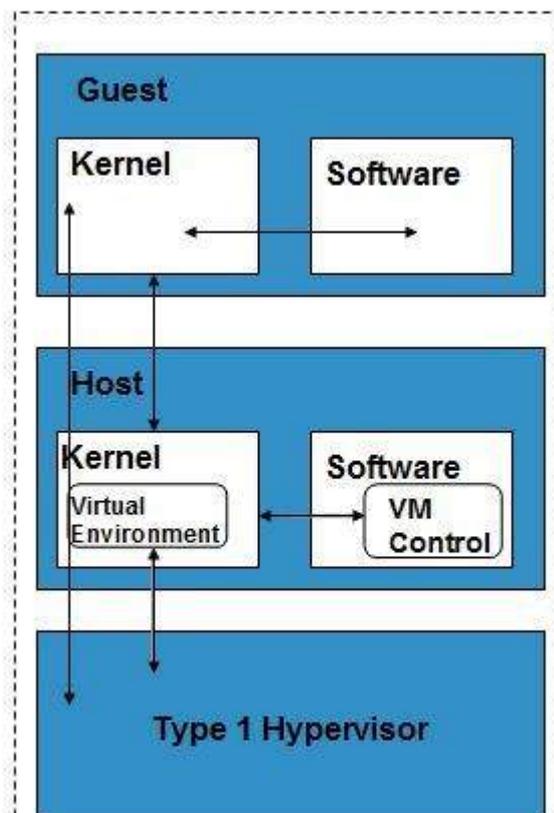
Type 2 Hypervisor
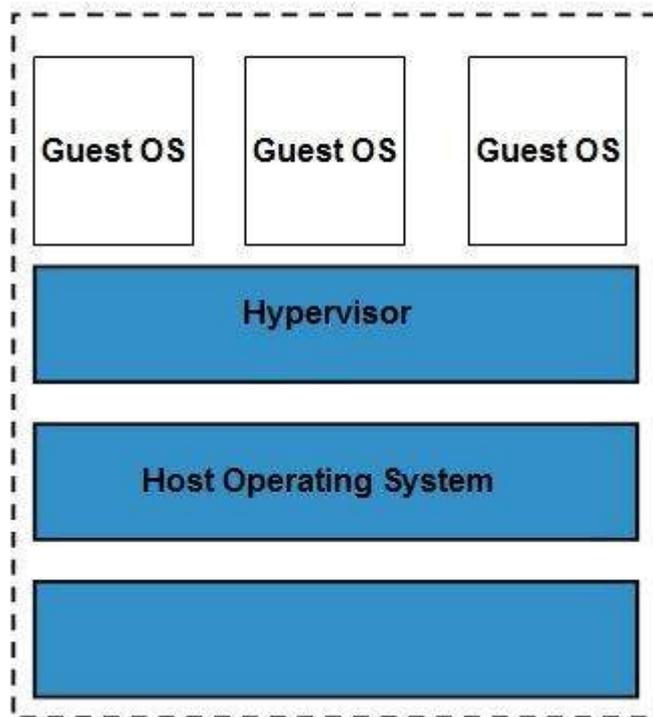
Types of Hardware Virtualization

Here are the three types of hardware virtualization:

- Full Virtualization
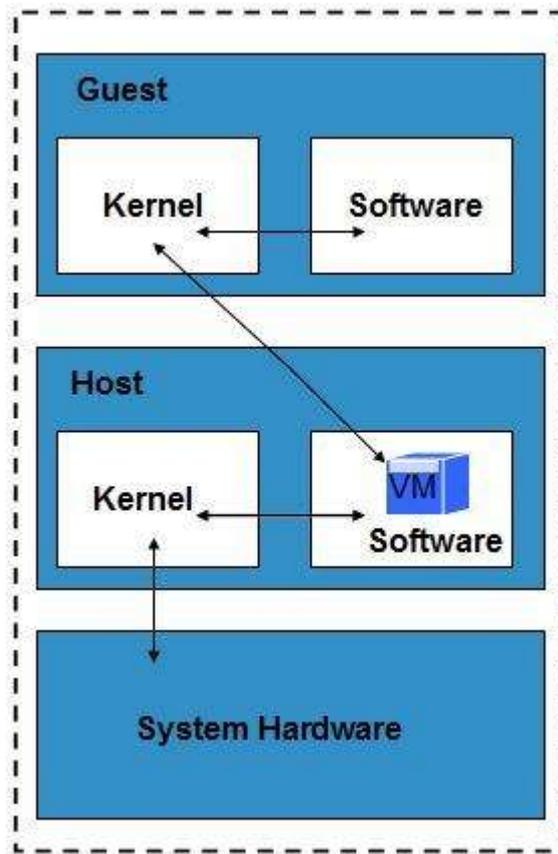- Emulation Virtualization
- Paravirtualization

Full Virtualization

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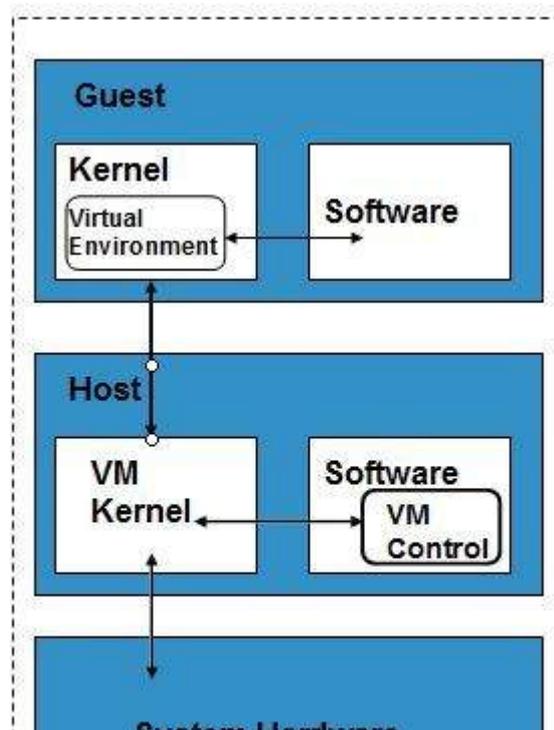
Emulation Virtualization

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.

System Hardware

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