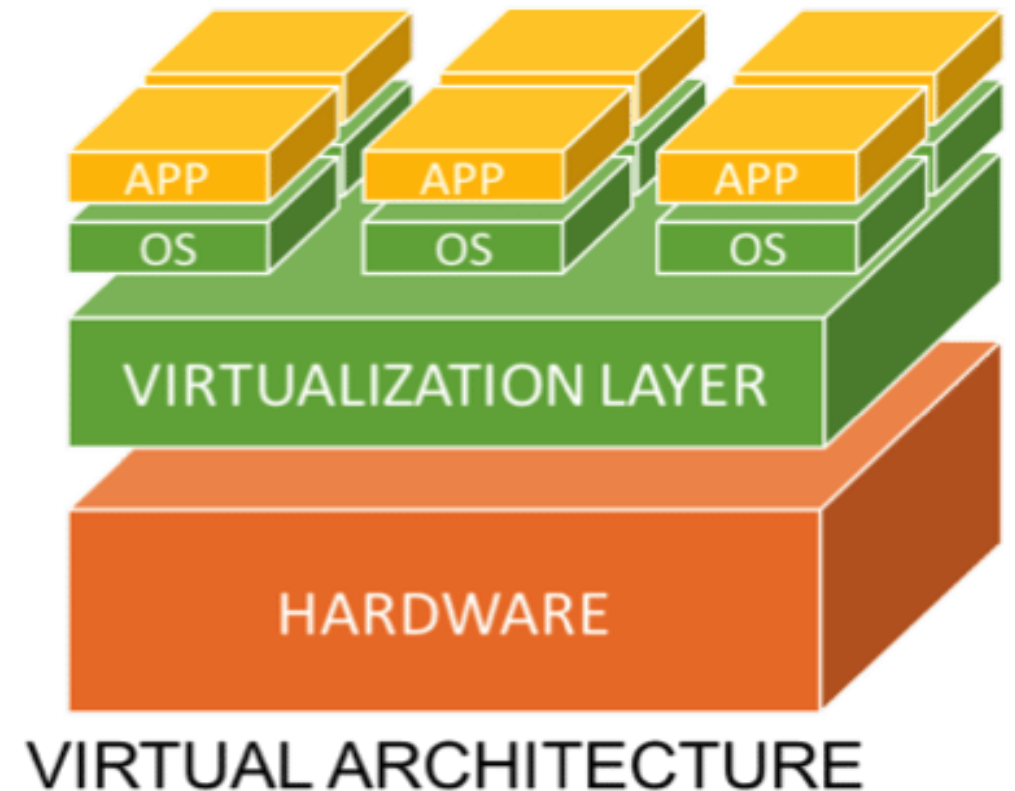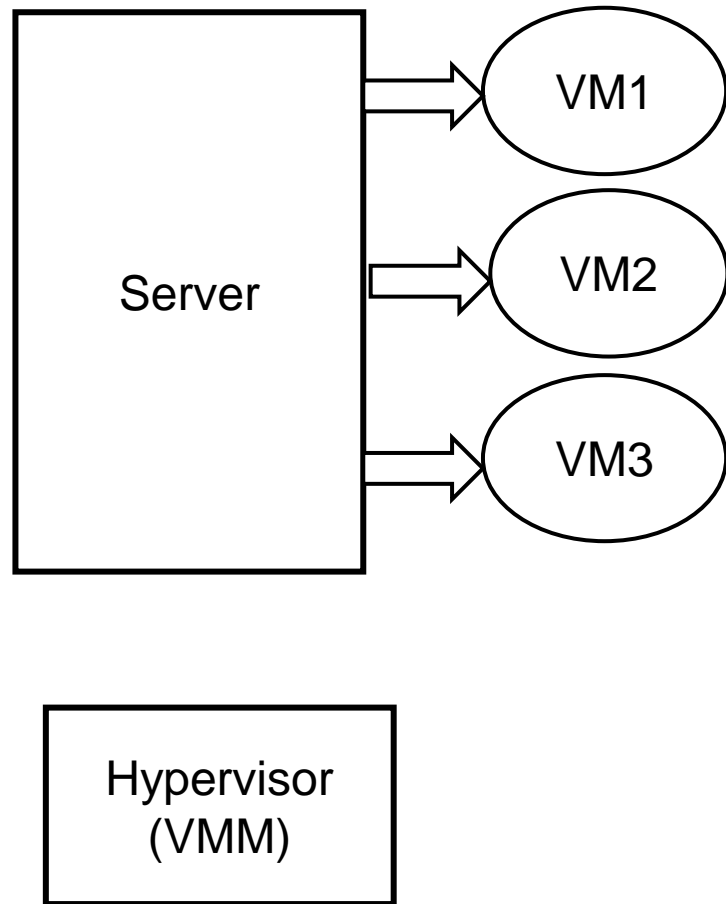# Virtualization

Virtualization

- Virtualization technology is one of the fundamental components of cloud computing.

- It uses a software to create an abstraction layer over computer hardware elements of a single computer to be divided into multiple virtual machine.

- Each virtual machine acts as an independent computer.

VIRTUAL ARCHITECTURE

Virtualization

Server

VM1

VM2

VM3

Hypervisor
(VMM)

Processor
Storage
Network

Virtualization

- The basis of this technology is the ability of a computer program or a combination of software and hardware to emulate an executing environment separate from the one that hosts such programs.

- For example, we can run Windows OS on top of a virtual machine, which itself is running on Linux OS.

- Virtualization provides a great opportunity to build elastically scalable systems that can provision additional capability with minimum costs.

Virtualization

- Virtualization is the technology to generate virtual instances of computer resources for multiple uses of the same physical resource.

- There are several virtualization technologies available that are capable of virtualizing the server, storage, networks, and operating systems.

- The virtualization environment shared the actual resources component such as Memory(RAM), disk space and network as a separate resource group.

- Virtualization helps the organizations to scale the computation resources.

- Virtual machines (VM) are the popular uses of hardware virtualization that are managed through the hypervisor.

How does it work?

- A software (Hypervisor) runs over physical server.

- Hypervisor takes physical resources and allocates them to virtual machines.

- A virtual machine cannot directly communicate with physical memory. It needs a lightweight software layer

- It can help business by making it possible to maintain fewer devices, use these devices in a better way and ensure more reliable backup and recovery.

- Once a virtual server is configured, you can configure the new virtual servers using the same configuration which only takes several minutes.

Benefits

- Resource efficiency
- Easier management
- Minimal downtime
- Faster Provisioning

Types of Virtualization

- Hardware Virtualization.

- Application Virtualization.

- Server Virtualization.

- Network Virtualization.

- Desktop Virtualization.

- Storage Virtualization.

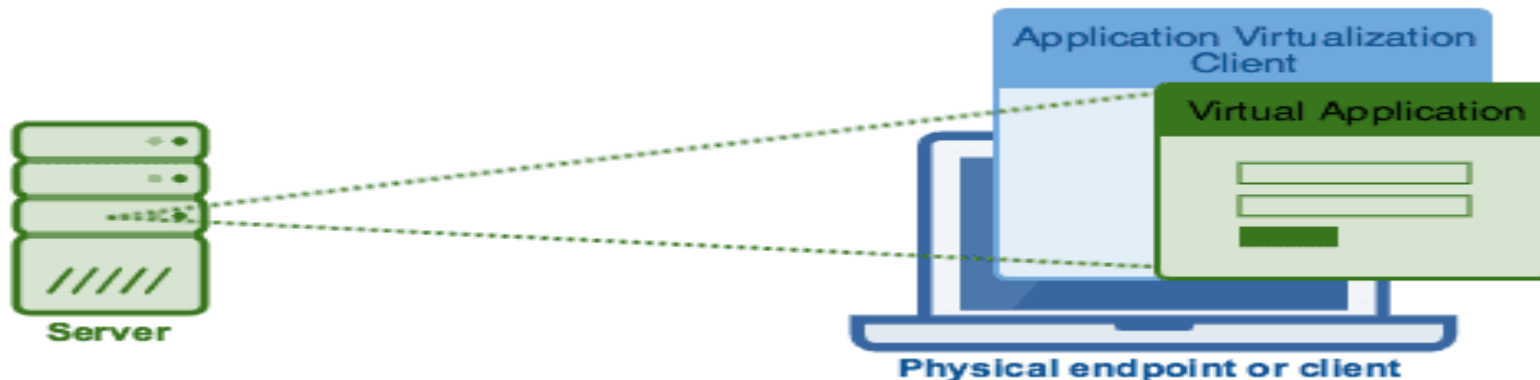# Types of Virtualization

1. Hardware Virtualization:

- This is the most common type of virtualization.

- A virtual machine manager (VM) which called as hypervisor makes hardware virtualization possible.

- The hypervisor creates and consolidates virtual versions of computers and operating systems into one large physical server, making it possible to use all hardware resources more efficiently.

- Users can use multiple operating systems on the same machine simultaneously.

Types of Virtualization

2. Application Virtualization

- In Application virtual, applications are virtualized on the server.

- After that, the application is sent from the server to the devices of the end users.

- Instead of logging into their work computers, users will be able to access the application directly from their device with a proper internet connection.

Types of Virtualization
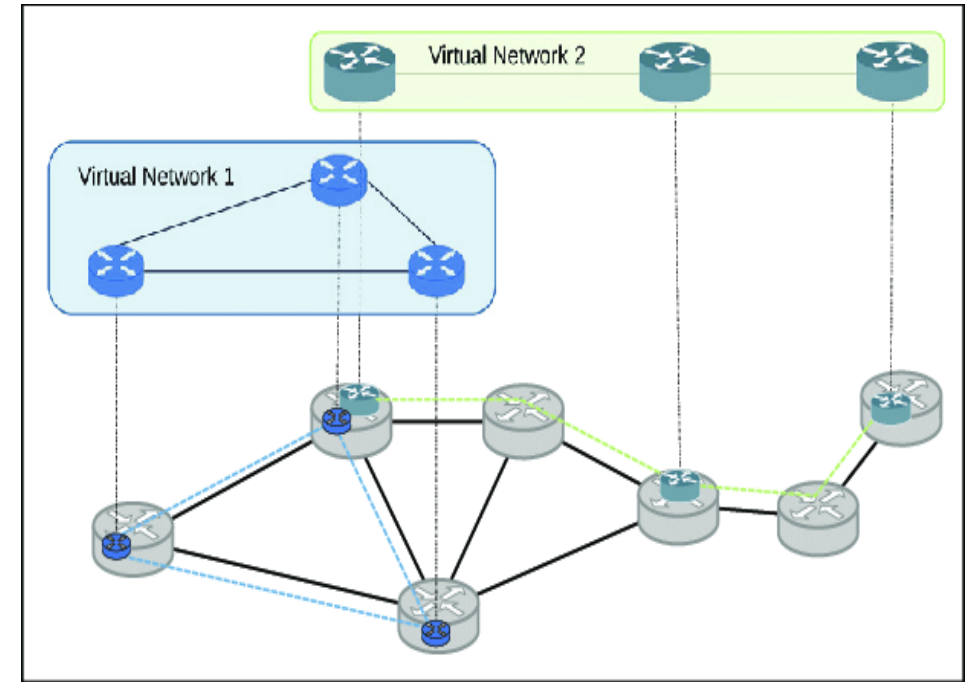
3. Server Virtualization

- It is the masking of server resources from server users, including the number and identity of physical servers, processors, and operating systems.

Traditional server architecture

Application → Operating System

Virtualized server architecture

Application → Virtualization → Operating System
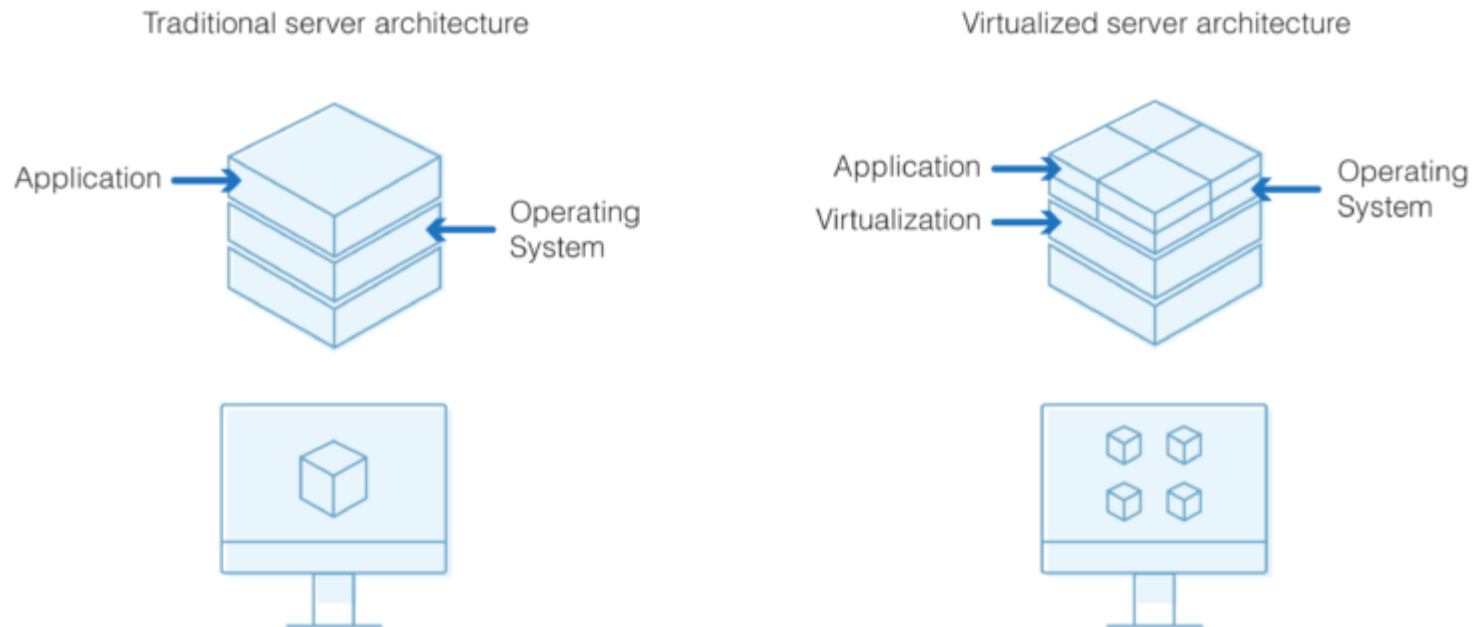
Types of Virtualization

4. Network Virtualization

- This (NV) means a hardware platform is simulated.

- e.g. a software server, storage device or network resource.

- It provides a summary for networking and services through hardware into a logical, virtual network which is connected to a physical network on a hypervisor and operates independently from the network.

- It can provide a virtual network that is truly independent of other network resources in a virtual environment.

Types of Virtualization

5. Desktop Virtualization

- We often call Desktop as client virtualization.

- This desktop technique is used to separate the physical computer from the computer desktop environment.

- You can interact in the same way that you use a physical desktop on a virtual desktop.

- It reduces the cost of software licenses and updates.

- Maintenance on the systems is easy because all the virtual desktops are hosted at the same place.

- Another advantage of desktop virtualization is to remotely log in from any location to access your desktop.

- This desktop virtualization is been used in server computing models.

Types of Virtualization

6. Storage Virtualization

- Storage is very important and useful when sudden system breakdowns.

- It is done by assembling all of the physical hard drives into one cluster.

- In the time of crashing or unavailability of the hardware or software, the user can recover data from this.

- Copies of data can be stored and moved to another location.

- It can be implemented by software applications or by using software and hardware devices simultaneously.
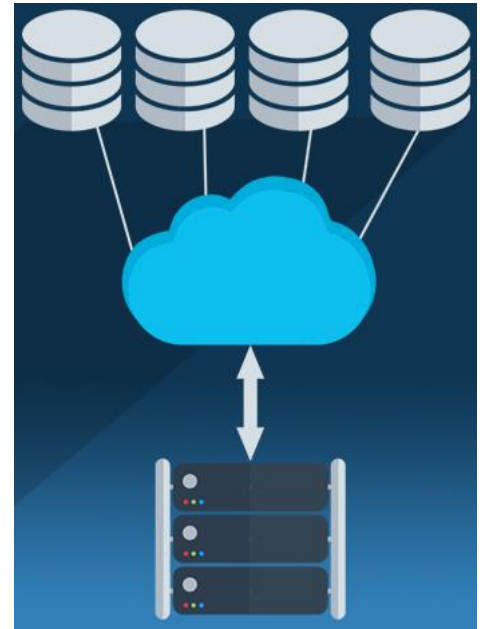
Advantages

- It saves space as well as operating cost.

- Easy management of the data centers.

- It can increase the Productivity of IT.

- It helps to continue working if the system crashes or any sudden failures.

- Applications and resources are provided more quickly while using virtualization.

- No actual hardware components for installation are required.

Disadvantages

- Not every application or server will work in a virtualization environment.

- You will need to invest in training existing network administrators who do not have the capabilities to manage a virtual network.

- In a virtualized system, when something is wrong, complex troubleshooting is needed.

- The difficulty is that the extra resources needed are almost impossible to estimate in advance.

Thank You