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Benefits of Virtualization

- ⇒ Reduced upfront hardware and continuing operating costs.
- ⇒ Minimized or eliminated downtime.
- ⇒ Increased IT productivity and responsiveness.
- ⇒ Greater business continuity and disaster recovery response.
- ⇒ Simplified data center management.
- ⇒ Faster provisioning of applications and resources.



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Application virtualization

Virtualizing applications allows them to be delivered from a server straight to an end user's device, such as a laptop smartphone or tablet. Instead of having to log into computers at work on a network server your employee can instead gain access to the application right from their electronic device as long as there is an internet connection.

Network virtualization

Completely reproducing a physical network network virtualization combines all physical networking equipment into a single software-based resource. This allows application to run a virtual network just like they would on a physical independent network. However a virtual network provides benefits from hardware and greater operational

Desktop virtualization

Desktop virtualization is a technology that allows a desktop operating system to run on a central server or cloud, instead of running directly on a user's local computer. User's access their desktop remotely through a network using any device.

Storage virtualization

Storage virtualization is a technology that combines multiple physical storage devices into a single logical storage pool that appears as one unified storage system to users and applications.

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Virtualization: is the process of running a virtual instance of a computer system in a layer separate from the actual hardware. It is often inefficient and costly for organizations to deploy multiple servers to keep pace with their storage and processing needs. Instead, virtualization provides the ability to create multiple simulated environments from a single physical hardware system. The hypervisor provides the ability to separate the machines resources - such as CPU, memory, storage and more - from the hardware and distribute them appropriately.

These virtual machines are self-contained and completely independent from each other. One common use is running applications meant for a different operating system on the virtualized system, so you don't have to switch computers or reboot.

Types of Virtualization

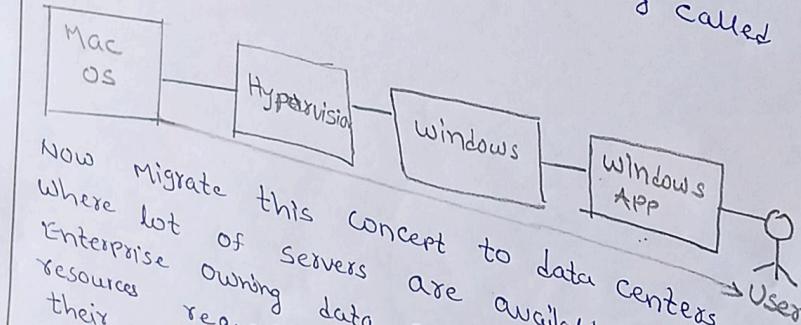
There are many different ways to utilize virtualization to meet your needs and revolutionize your business. Here are a just a few examples of how virtualization can be used to benefit your business.

Server Virtualization: You can use virtualization operating systems to enable multiple servers to run on a single physical machine. This eliminates the need for multiple physical servers, reducing server performance overhead and costs. It also allows for faster deployment and increased efficiency.

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Cloud Server Virtualization

Cloud server virtualization is most important part of cloud computing it is composed of two words cloud and computing cloud means Internet and computing means to solve problems with help of computers computing is related to CPU & RAM in digital world. Now consider situation you are using Mac OS on your machine but particular application only on windows. You can either buy windows. You can either buy because of less cost and easy implementation This scenario is called virtualization it virtual resources CPU RAM NIC and other needed to run. This resources is virtually provided to OS which it controlled by an application called Hypervisor. The new OS running on virtual hardware resources is collectively called Virtual Machine (VM)



Now migrate this concept to data centers where lot of servers are available Enterprise owning data centre provide resources requested by customers as per their need. Data centers have all

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- Resources and on user request Particular amount of CPU RAM NIC and Storage with Preferred OS is Provided to users.
- => Each Server in Server virtualization is restarted separately without affecting the operation of other virtual servers.
 - => Server virtualization can be hardware virtualization.
 - => It divides a single server into several virtual servers by dividing the cost of information users into several servers.
 - => Disadvantage in the data centers their private network of servers to keep their private information.
 - => It can be measured of virtualization consumed.
 - => Setting it up and maintaining environments virtualization is keeping it up amount of RAM and supported for challenging many databases.

Storage Area Network (SAN)

A Storage Area Network is a high speed dedicated network that connects servers to centralized storage devices. It allows multiple servers to access storage as if it were locally attached disks, but with much higher performance.

Architecture of SAN:

1. Hosts (servers)
 - ⇒ Systems that request storage
 - ⇒ Connected to Storage Area network Using Host Bus Adapters (HBAs)

2. SAN Fabric:
Network that connects servers and storage

Uses Fibre channel switches or Ethernet (iSCSI)

3. Storage Devices

- Disk arrays SSDs

Provide large storage capacity

Types of SAN:

I. Fibre channel SAN (FC SAN)

Explanation

- Uses Fibre channel technology for data transfer
- Provides very high speed and low latency
- Commonly used in large enterprises and data centers

Features

- High Performance
- Highly Reliable
- Expensive hardware

Example Use

- Databases
- ERP Systems
- Cloud data centers



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2. ISCSI SAN

- Uses TCP/IP networks (Ethernet) to transfer storage data
- Data is sent using the iSCSI Protocol
- cost-effective compared to Fibre channel
- Features existing LAN infrastructure
- uses existing LAN infrastructure
- easy to implement
- slightly slower than FC SAN
- Example: use in small and medium enterprise virtualization environments
- Features (Fibre Channel over Ethernet) SAN
- Evolution
- combines Fibre Channel and Ethernet
- Runs Fibre Channel Protocols Over Ethernet Networks
- Reduces network infrastructure
- High Performance
- Lower cabling cost
- Requires specialized equipment
- Example: use in modern cloud data centers
- Wireless SAN
- Expanding wireless
- =) uses wireless technology to connect storage and servers
- =) Rely on due to Performance and Security issues
- Features
- easy setup
- Working of SAN
- 1. Server sends a storage request
- 2. Storage request travels through SAN fabric
- 3. Storage device responds with data access like a local disk