



SNS COLLEGE OF TECHNOLOGY



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DEPARTMENT OF COMPUTER APPLICATIONS

COURSE

23CAE717
Cloud Computing

UNIT II

Virtualization

TOPIC

Basics of
Virtualization

Semester

II Semester /
I MCA



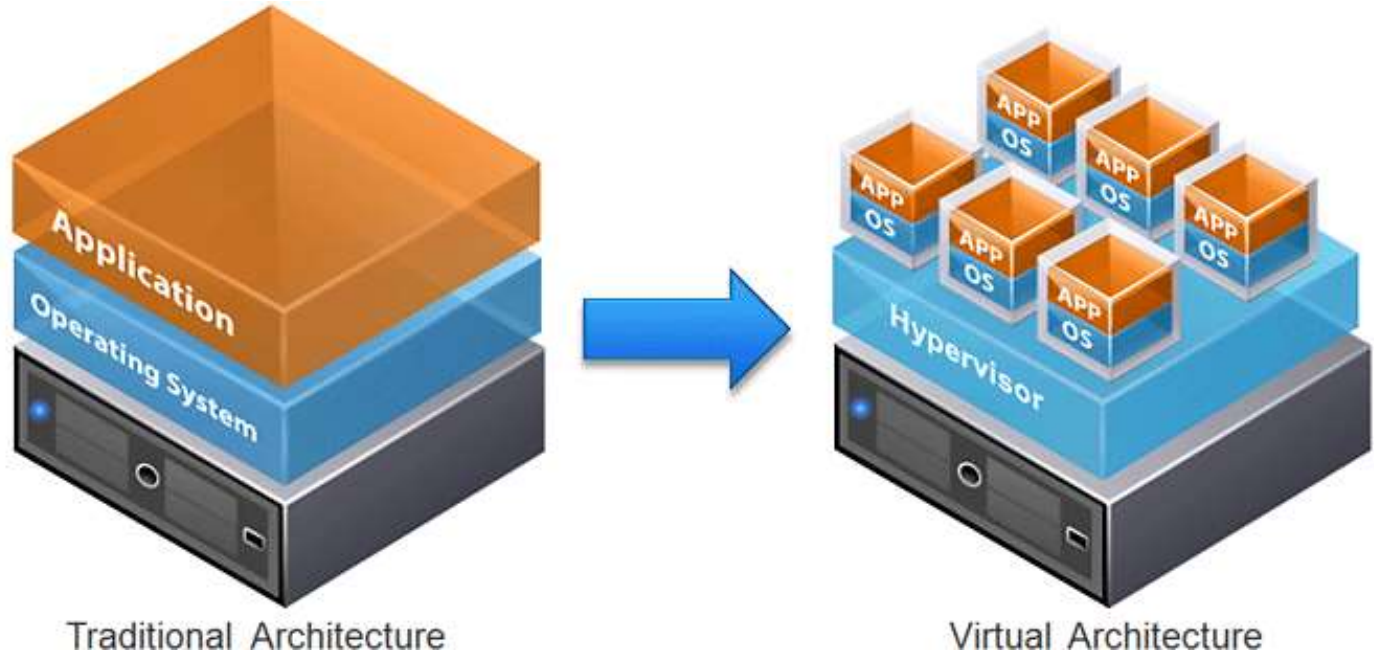
Unit Outline



- ❑ Basics of Virtualization
- ❑ Types of Virtualization
- ❑ Implementation Levels of Virtualization
- ❑ Virtualization Structures – Tools & Mechanisms
- ❑ Virtualization of CPU, Memory, I/O Devices
- ❑ Virtual Clusters and Resource management
- ❑ Virtualization for Data-center Automation



Basics of Virtualization

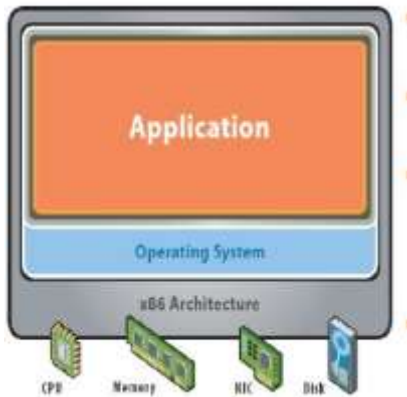


Traditional Architecture

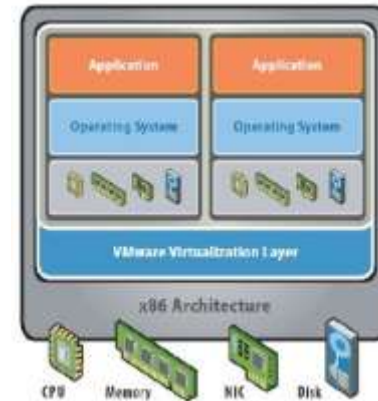
Virtual Architecture



- ❑ Technology to transfer hardware into software
- ❑ Allow you to run multiple OS as virtual machines in one computer



Before Virtualization



After Virtualization



Basics of Virtualization



- Software Developing
- Application monitoring
- Network management
- Server management
- Security management
- Data management
- Too many CO2



- Software as a Service
- Platform as a Service
- Infrastructure as a Service
- Data as a Service
- IT as a Service
- Green IT





Basics of Virtualization

- Ability to run multiple OS on a single physical system
- share the underlying hardware resources
- Virtual environment can be a single instance or a combination of many such as OS, Network or application servers, computing environments, storage devices and other such environments
- Improves IT throughput

Virtualization refers act of creating virtual version of something



Virtualization Structures



- ❑ VM is an isolated runtime environment (guest OS and applications)
- ❑ Multiple VMs can run on a single physical system
- ❑ **Hypervisor**/VM Monitor (VMM), is a program that allows multiple OS to share a single hardware host
- ❑ Each guest OS appears to have the host's processor, memory, and other resources all to itself.
- ❑ However, the hypervisor is actually controlling the host processor and resources, allocating what is needed to each operating system in turn and
- ❑ It ensures that the guest operating systems (called virtual machines) cannot disrupt each other



Benefits of Virtualization



- Sharing of resources helps cost reduction
- Centralized management
- Isolation:** Virtual machines are isolated from each other as if they are physically separated
- Encapsulation:** Virtual machines encapsulate a complete computing environment
- Hardware Independence:** Virtual machines run independently of underlying hardware
- Portability:** Virtual machines can be migrated between different hosts



Partition

- Multiple VMs utilizes physical system by **partitioning the accessible assets**

Isolation

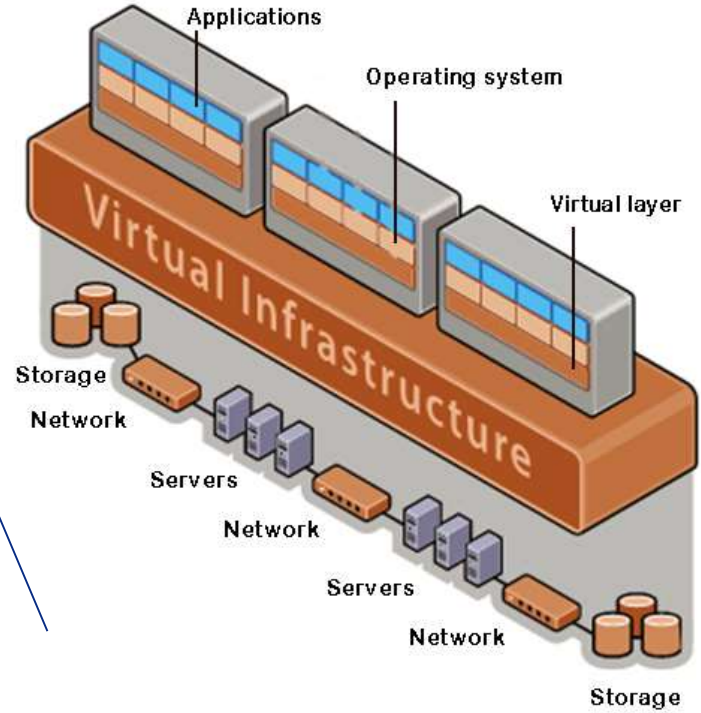
- Each VM is segregated from other physical system and virtualized resources

Encapsulation

- Viewed as a package of resources



Traditional Vs Virtualization





TYPES OF VIRTUALIZATION



Hardware Virtualization

- ❑ Common type provides hardware utilization
- ❑ Basic idea is to combine many **small physical servers into one large physical server**
- ❑ Hypervisor controls all peripherals
 - Full virtualization
 - Para virtualization
 - Partial virtualization

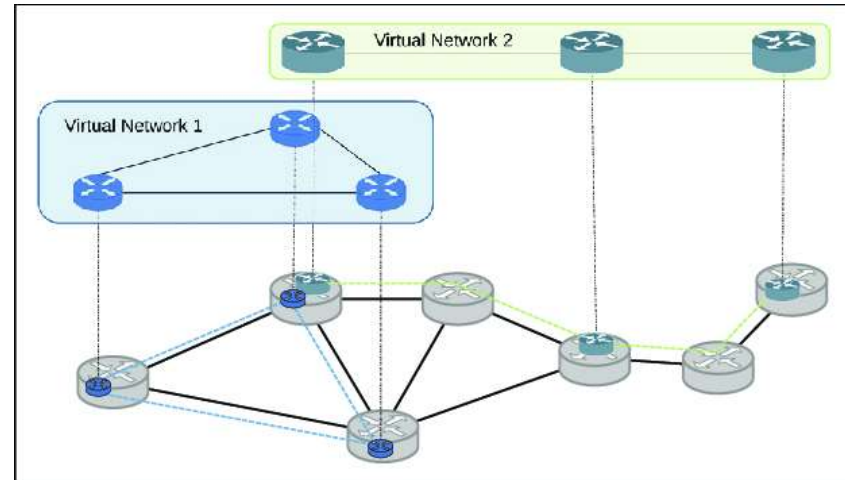


Network Virtualization



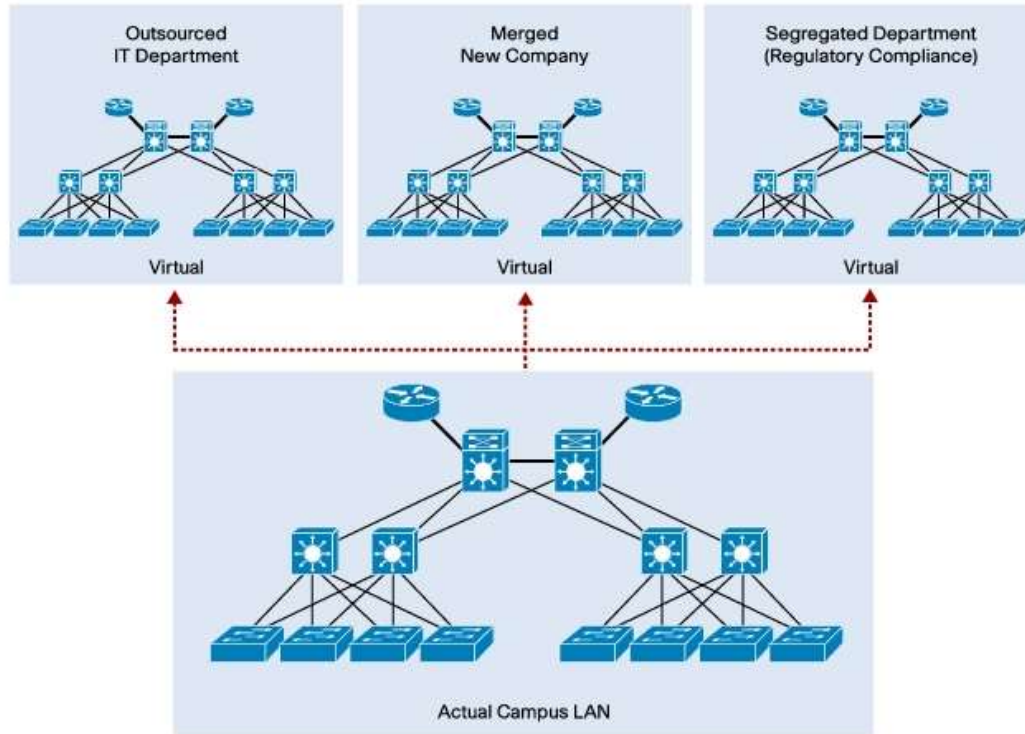
Refers to the **management and monitoring of a computer network** as a single managerial entity from a single software-based administrator's console

- ❑ Automates many network administrative tasks
- ❑ useful for networks experiencing a huge, rapid, and unpredictable increase of usage





Network Virtualization





Storage Virtualization

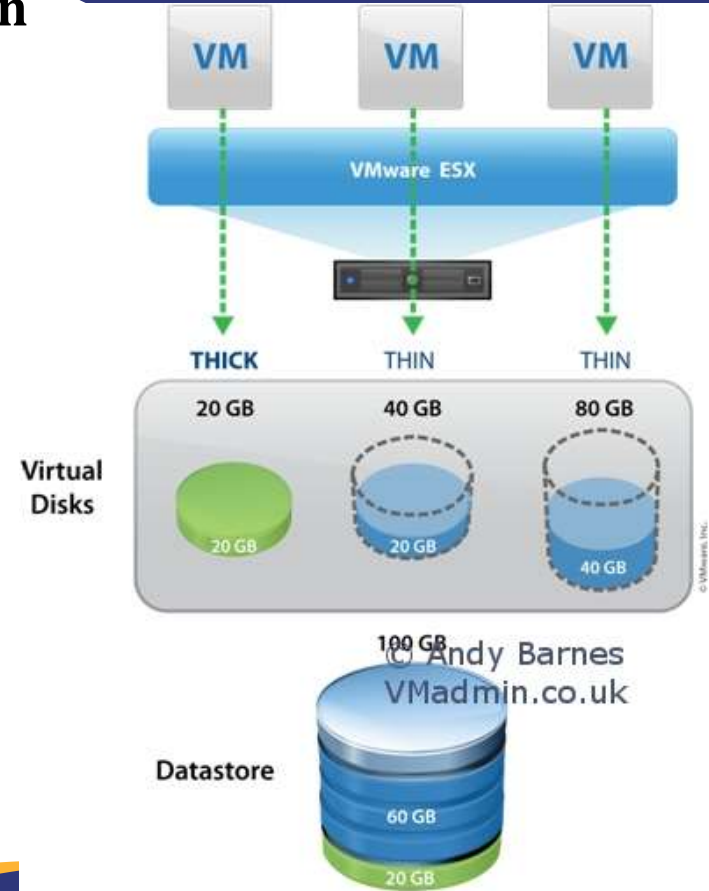


- ❑ Multiple network storage resources are present as a single storage device for easier and more efficient management of these resources
- ❑ Improved storage management in a heterogeneous IT environment
- ❑ Easy updates, better availability
- ❑ Reduced downtime
- ❑ Better storage utilization
- ❑ Automated management



Memory Virtualization

- ❑ Decouple memory from the server
- ❑ provides a shared, distributed or networked function
- ❑ It may integrate in
 - [Application-level](#)
 - [OS-level](#)





Software Virtualization

- ❑ Ability to the main computer to run and create one or more virtual environments.
- ❑ Used to enable a complete computer system in order to allow a guest OS to run

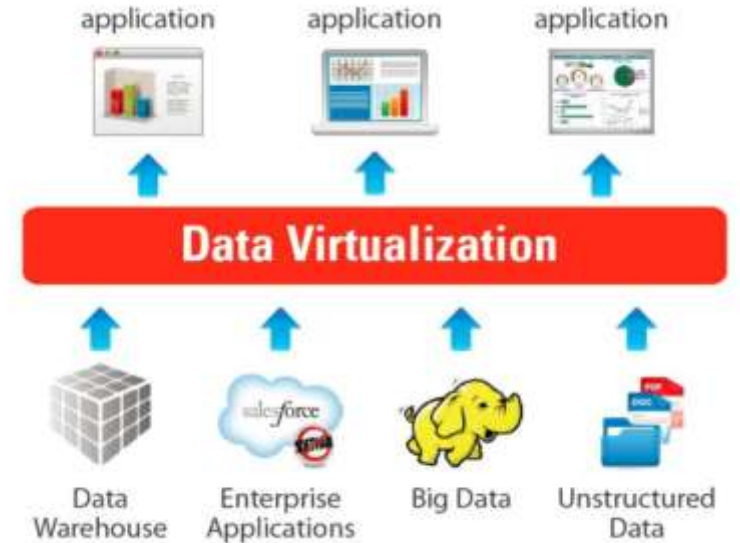




Data Virtualization



- Easily manipulate data and know how it is formatted or where it is physically located





Desktop Virtualization



- ❑ Provides the work convenience and security
- ❑ As one can access remotely, you are able to work from any location and on any PC





References



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