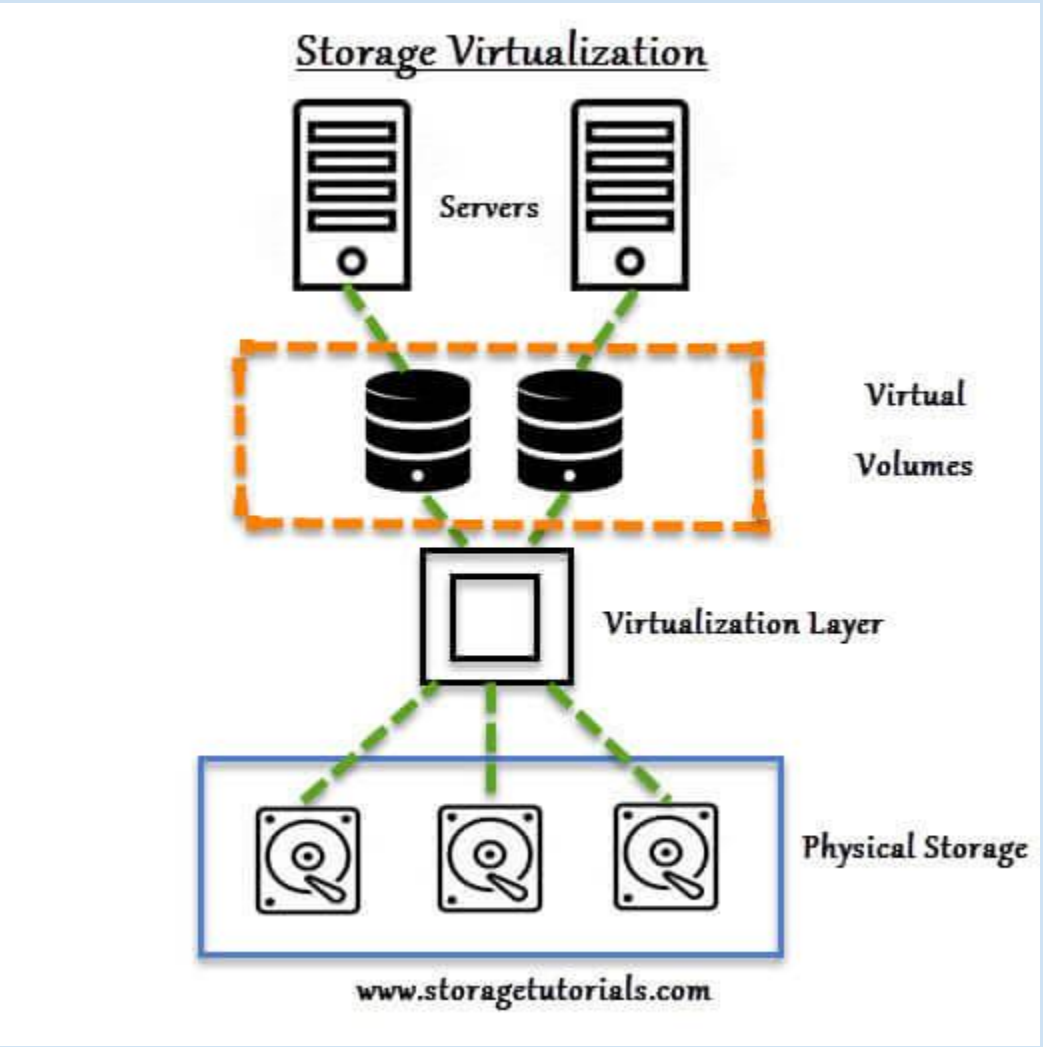
CLOUD COMPUTING

Virtualization and Cloud Computing

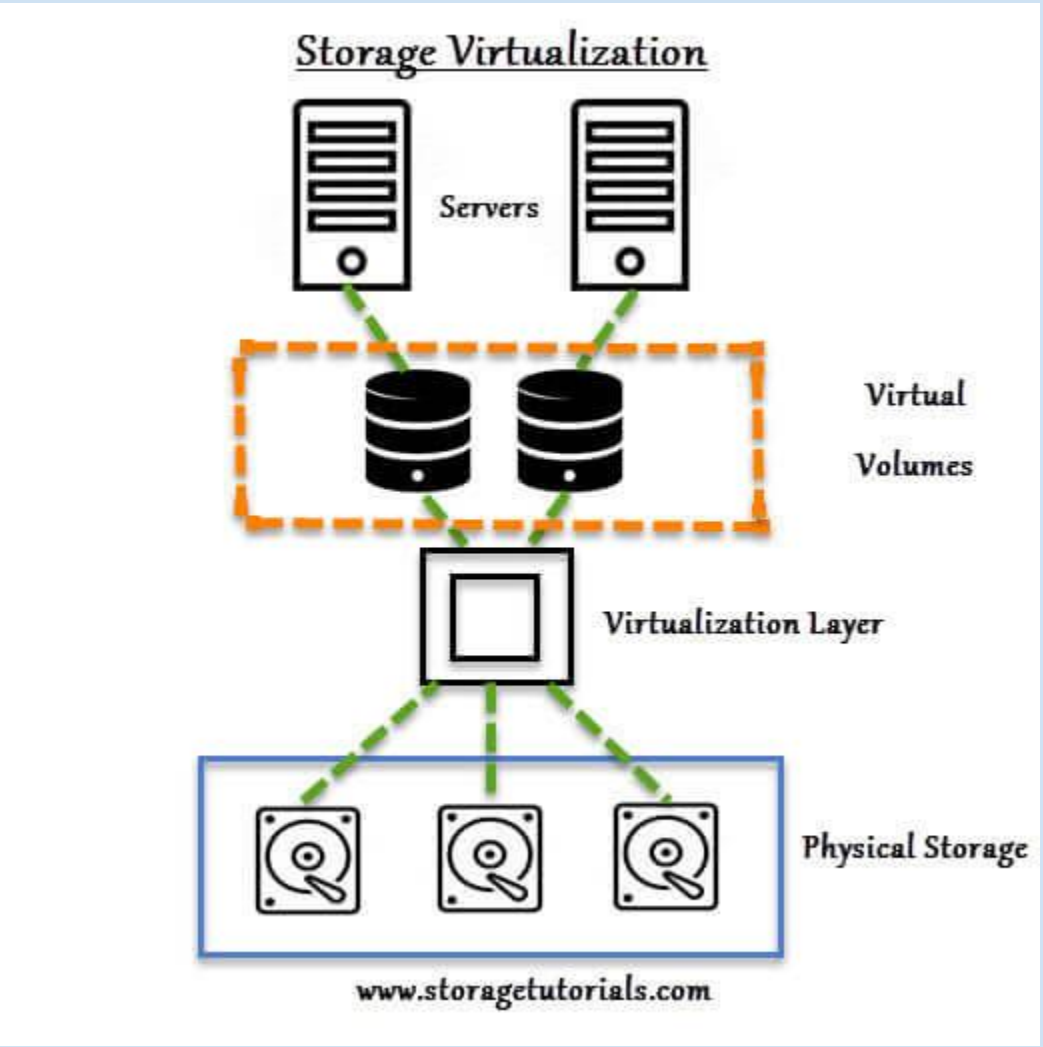
Jannatun Noor
BRAC University
Jannatun.noor@bracu.ac.bd

Storage Virtualization



- Multiple physical storage devices are grouped together, which then appear as a single storage device.
- This provides various advantages such as homogenization of storage across storage devices of multiple capacity and speeds, reduced downtime, load balancing and better optimization of performance and speed.

Storage Virtualization

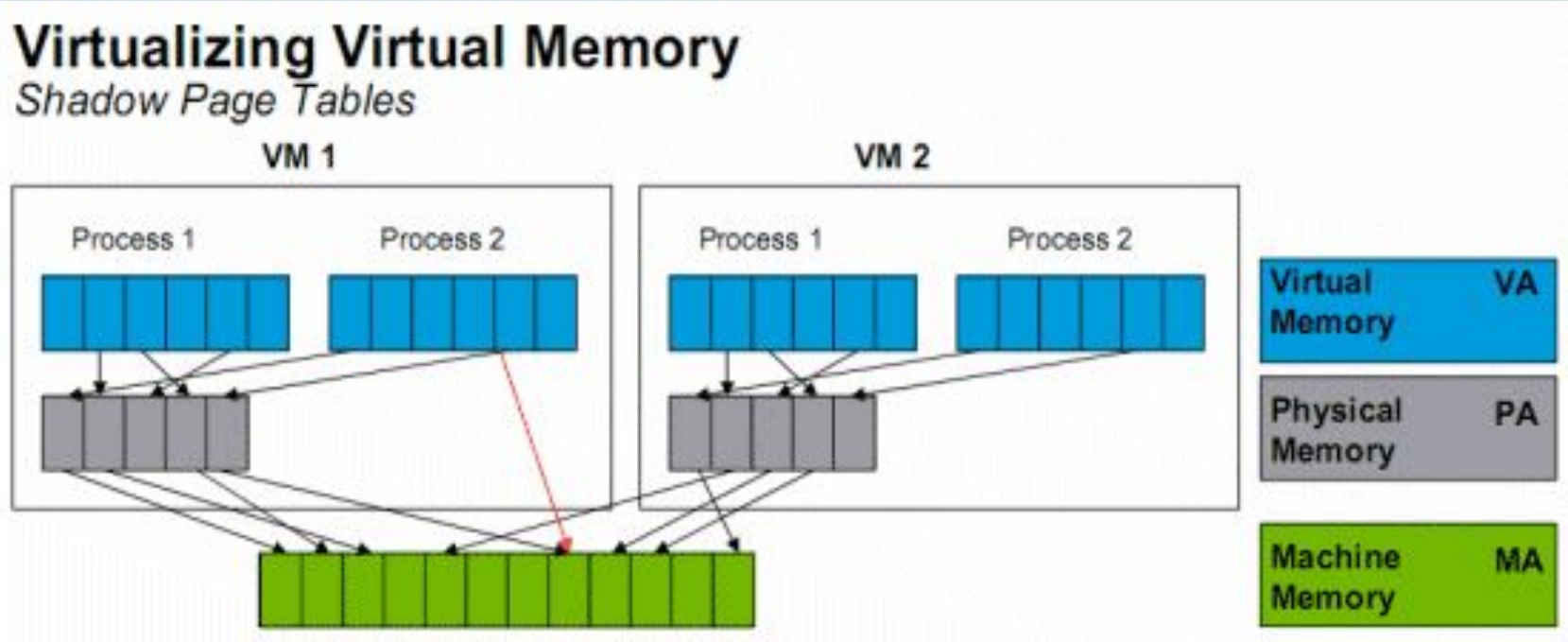


- Partitioning your hard drive into multiple partitions is an example of this virtualization.

Subtype:

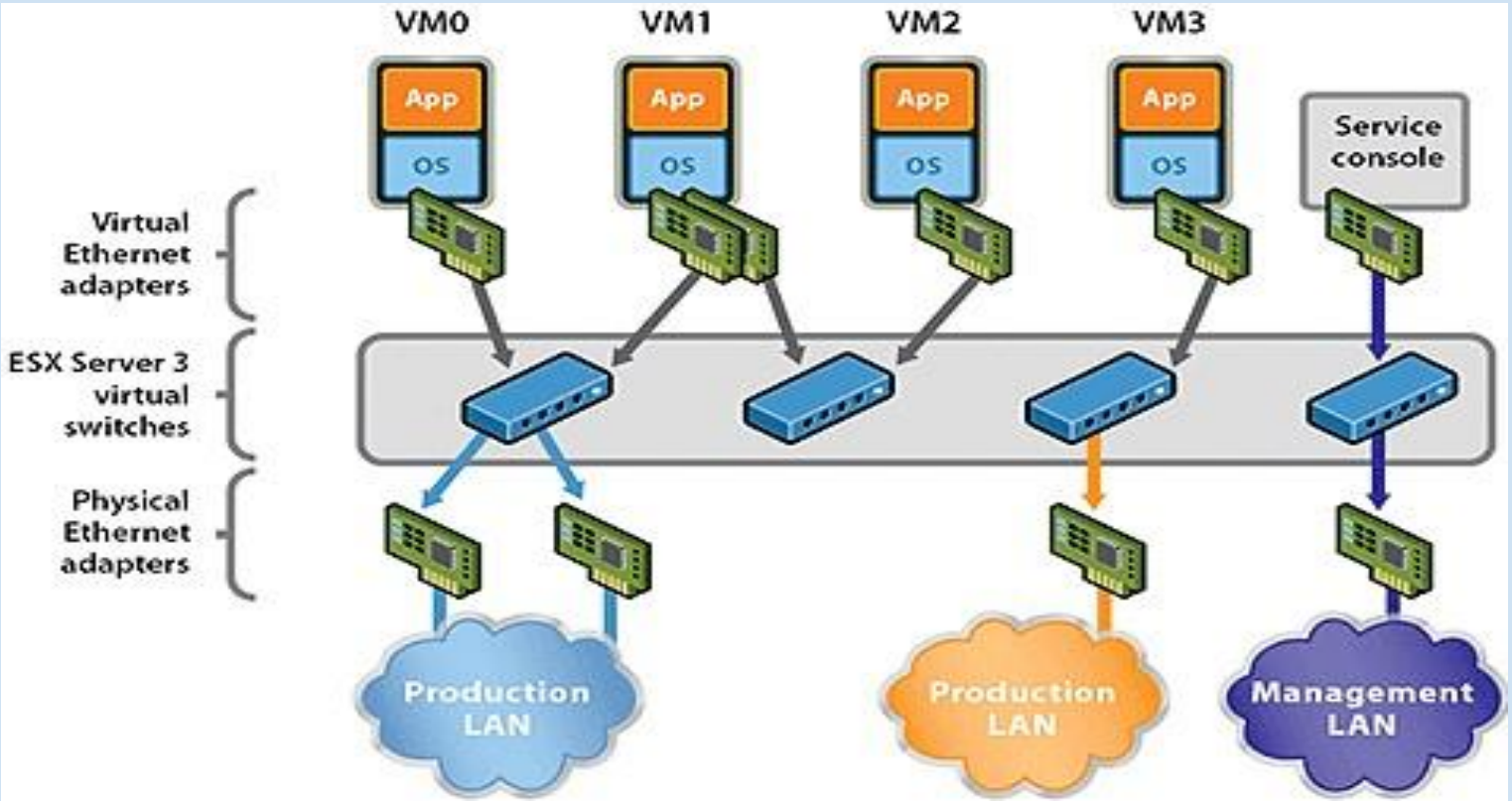
- Block Virtualization – Multiple storage devices are consolidated into one
- File Virtualization – Storage system grants access to files that are stored over multiple hosts

Memory Virtualization



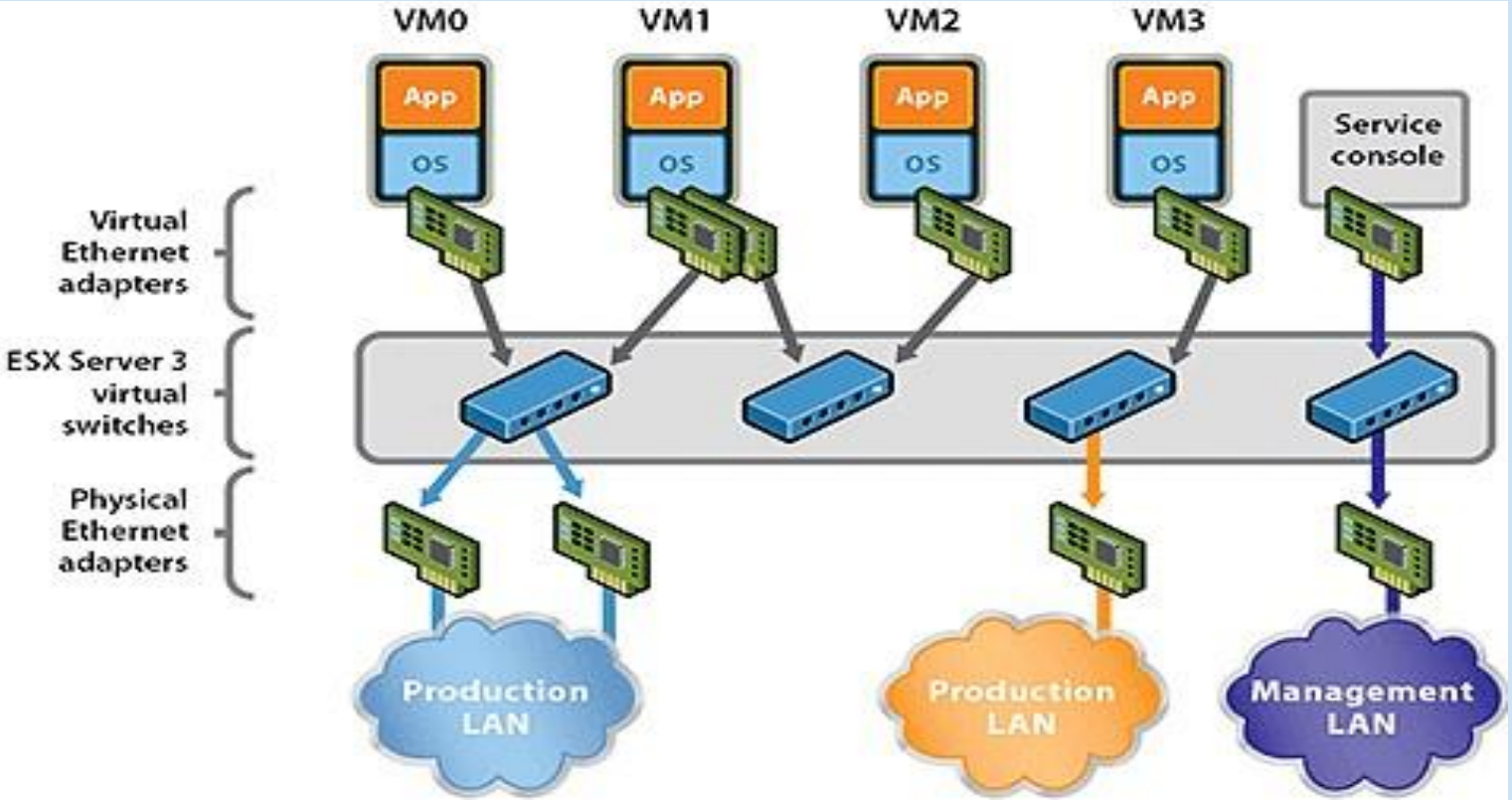
- Physical memory across different servers is aggregated into a single virtualized memory pool.
- It provides the benefit of an enlarged contiguous working memory.
- You may already be familiar with this, as some OS such as Microsoft Windows OS allows a portion of your storage disk to serve as an extension of your RAM.

Network Virtualization



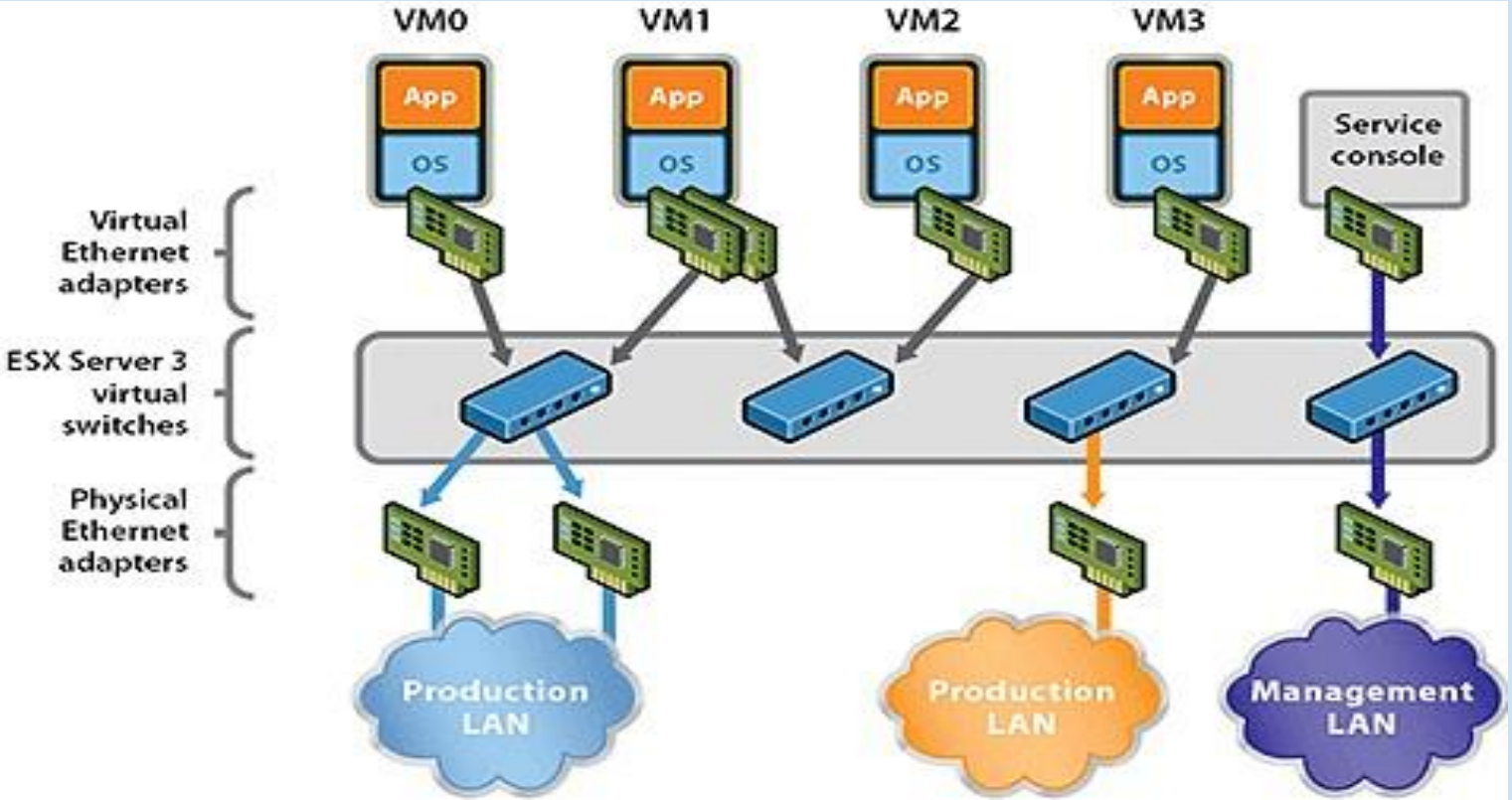
- Multiple sub-networks can be created on the same physical network, which may or may not is authorized to communicate with each other.

Network Virtualization



- This enables restriction of file movement across networks and enhances security, and allows better monitoring and identification of data usage which lets the network administrator's scale up the network appropriately.

Network Virtualization



- It also increases reliability as a disruption in one network doesn't affect other networks, and the diagnosis is easier.

Server Virtualization

- Software (SoftV)
- Hardware (HardV)

Software Virtualization

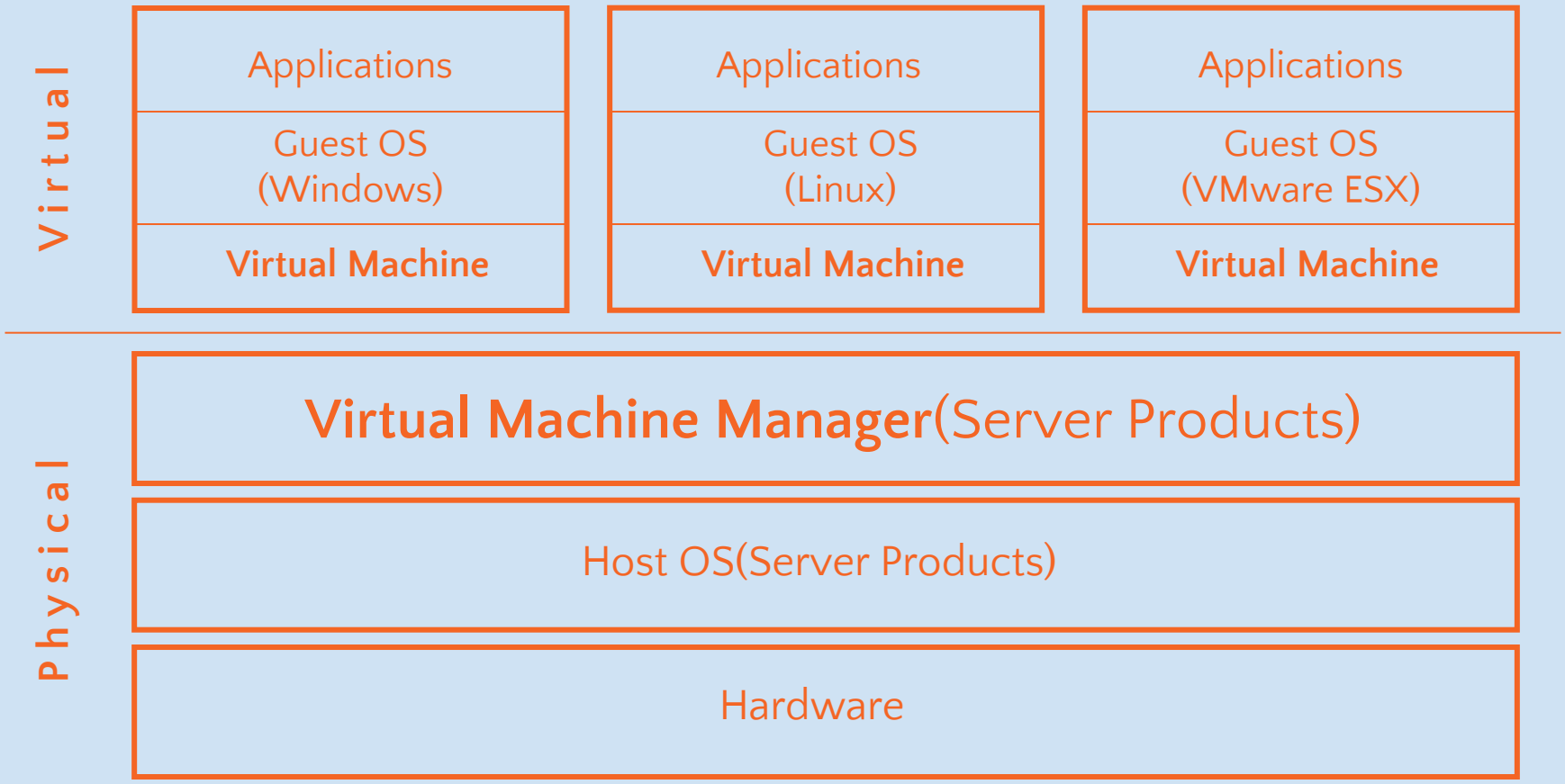
- Software Virtualization involves the creation of an operation of multiple virtual environments on the host machine.
- It creates a computer system complete with hardware that lets the guest operating system to run.
- For example, it lets you run Android OS on a host machine natively using a Microsoft Windows OS, utilizing the same hardware as the host machine does.

Software Virtualization

Subtypes:

- **Operating System Virtualization** – hosting multiple OS on the native OS
- **Application Virtualization** – hosting individual applications in a virtual environment separate from the native OS
- **Service Virtualization** – hosting specific processes and services related to a particular application

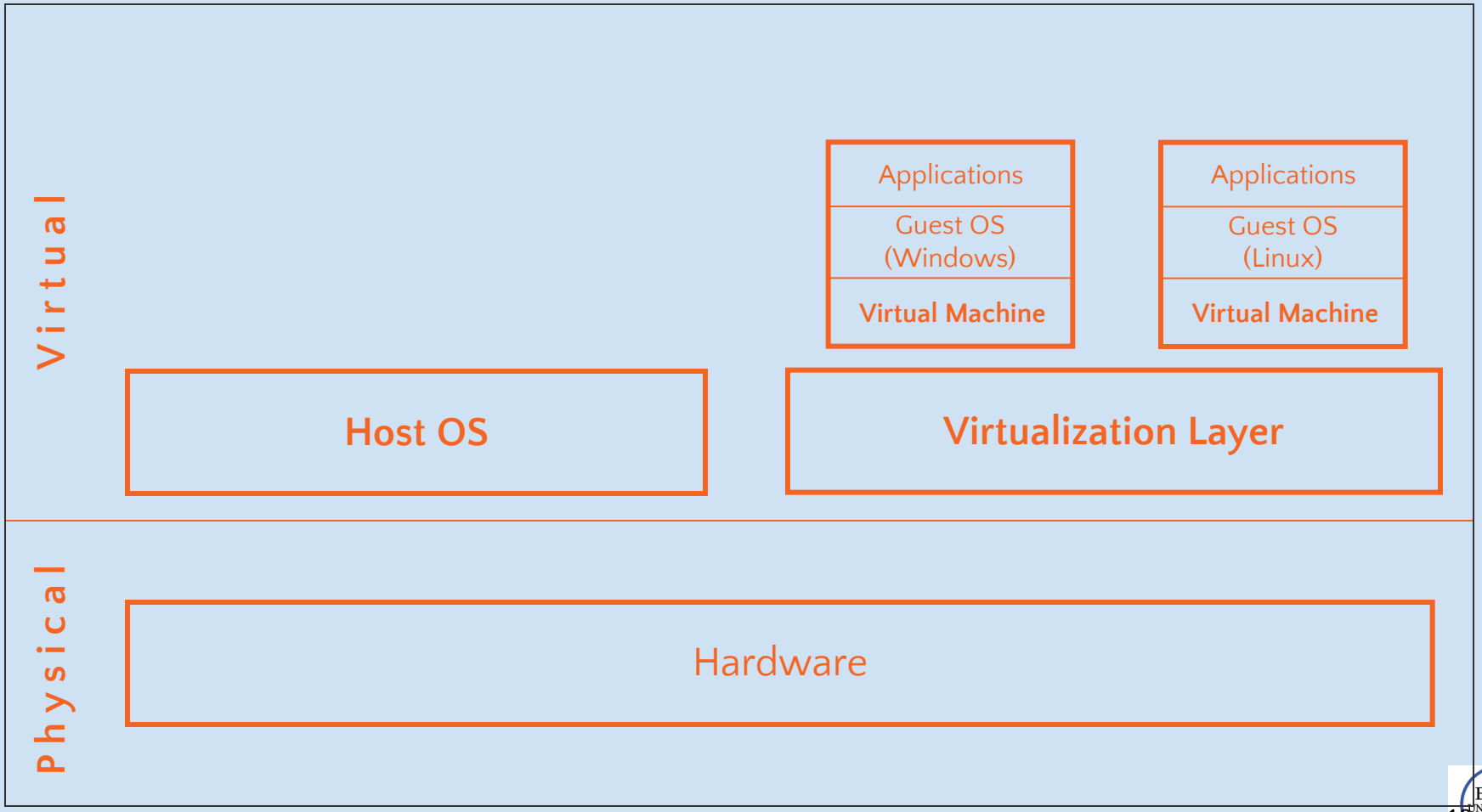
SoftV Server Virtualization Architecture



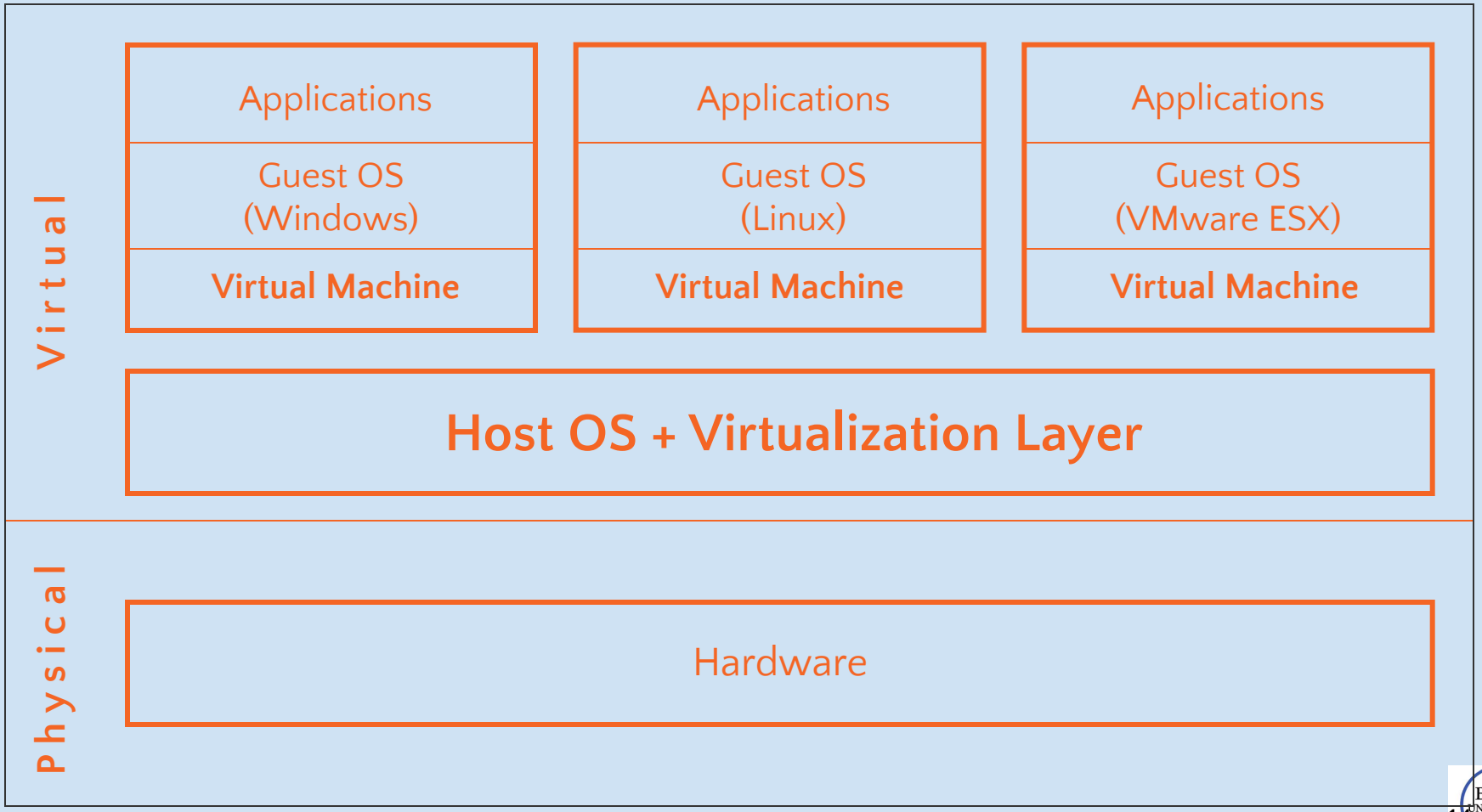
Hardware Virtualization

- Hardware virtualization also known as hardware-assisted virtualization or server virtualization runs on the concept that an individual independent segment of hardware or a physical server, may be made up of multiple smaller hardware segments or servers, essentially consolidating multiple physical servers into virtual servers that run on a single primary physical server.
- The main advantages include increased processing power as a result of maximized hardware utilization and application uptime.
- Each small server can host a virtual machine, but the entire cluster of servers is treated as a single device by any process requesting the hardware.
- The hardware resource allotment is done by the hypervisor.

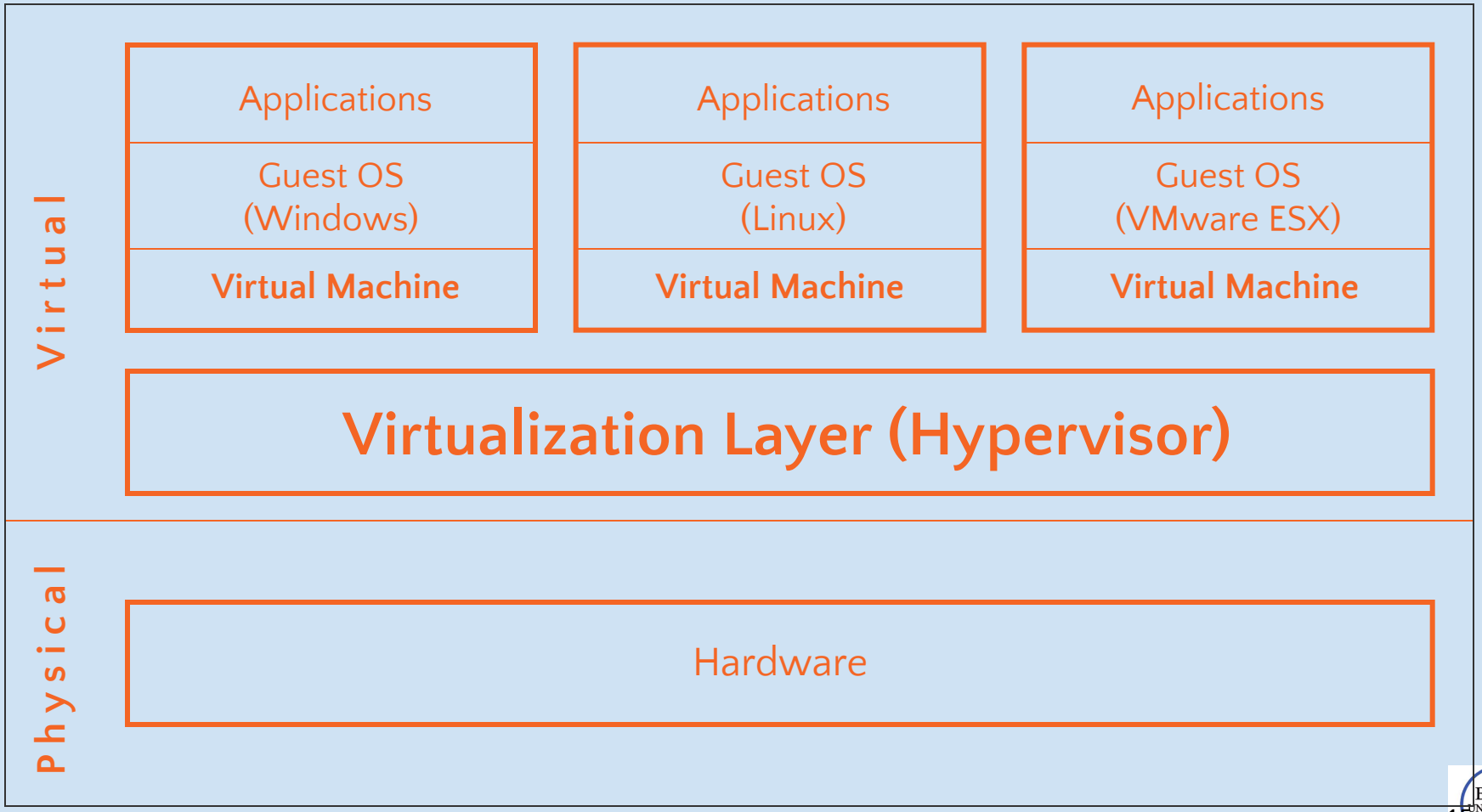
HardV Server Virtualization Architecture



HardV Server Virtualization Architecture



HardV Server Virtualization Architecture



References

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- https://www.redswitches.com/blog/different-types-virtualization-cloud-computing-explained/
- Storage: https://youtu.be/5cYwcM8WQss
- Memory: https://youtu.be/cZNUve70dmY
- Network: https://youtu.be/5xTx6qQ-kfo
  https://youtu.be/HFQdbOY8Ams
- Server: https://youtu.be/p11lJOnALS4
  https://youtu.be/jHcvNxGfqfs