Virtualization

Traditional vs Virtualization

Traditional

X Cores
XX GB Ram
XXX GB HDD
30% Utilization

X Cores
XX GB Ram
XXX GB HDD
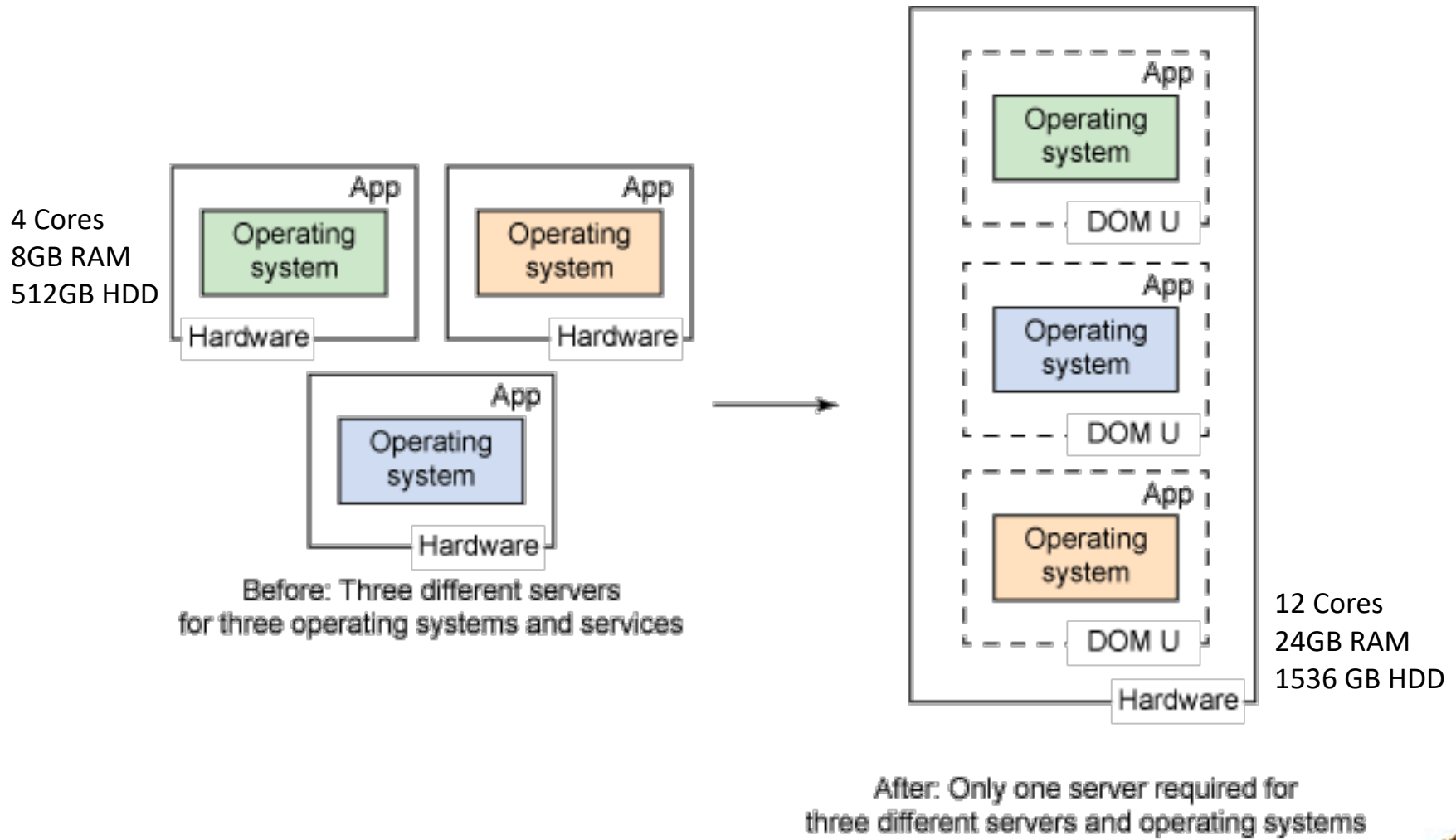**6%** Utilization

Virtualization

Hypervisor

X Cores
XX GB Ram
XXX GB HDD
60% Utilization

Deployment using Traditional vs Virtualization

4 Cores
8GB RAM
512GB HDD

App

Operating system

Hardware

App

Operating system

Hardware

App

Operating system

Hardware

Before: Three different servers
for three operating systems and services

App

Operating system

DOM U

App

Operating system

DOM U

App

Operating system

DOM U

Hardware

12 Cores
24GB RAM
1536 GB HDD

After: Only one server required for
three different servers and operating systems

Properties of Virtualization

Partitioning

- **Divide resources** between virtual machines
- Run **multiple** OS or virtual machines **in a single physical machine**

Isolation

- **Fault isolation** at the hardware level
- **Reduce** risk of **dependencies** and conflicts
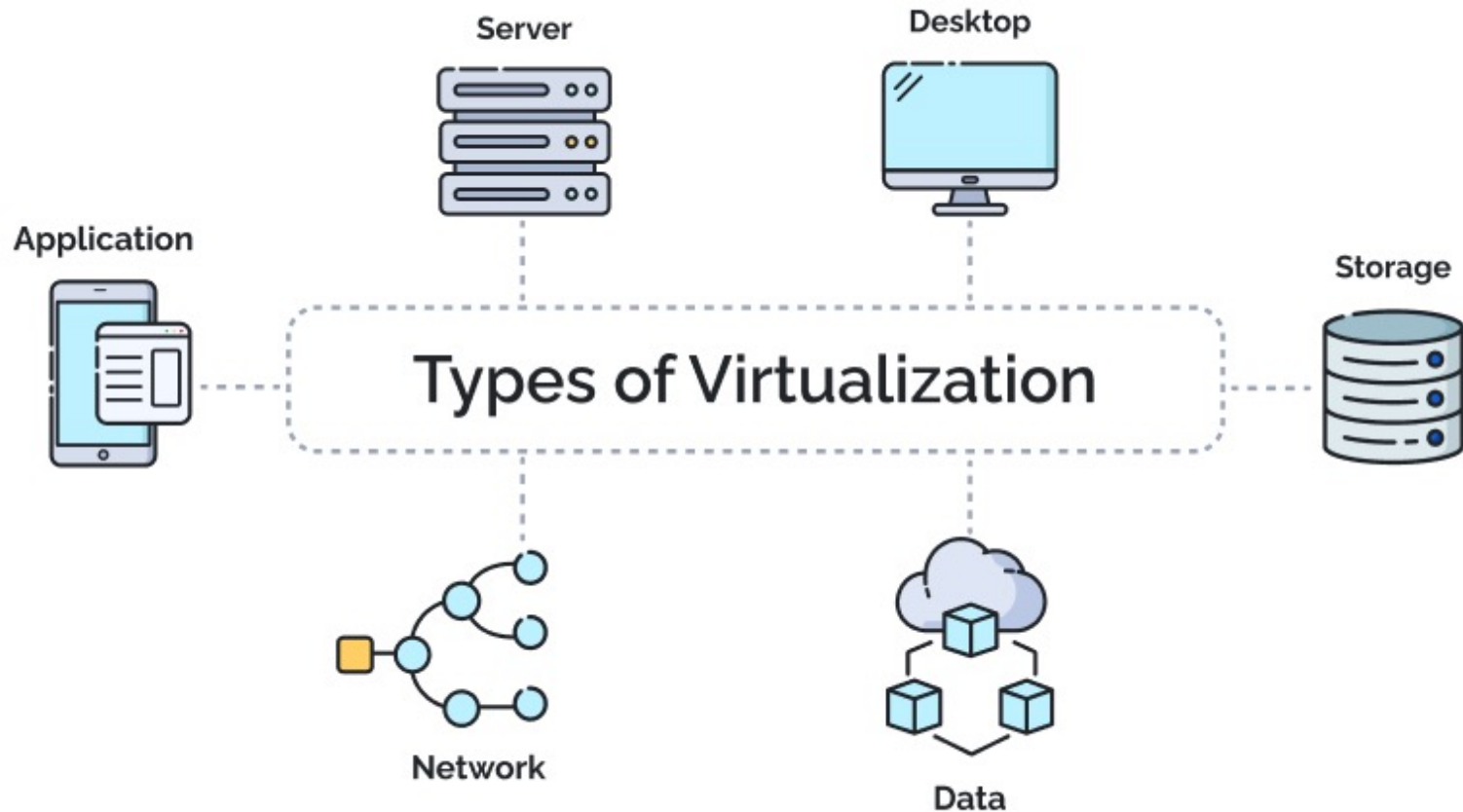
Encapsulation

- Move and copy **virtual machines as files**
- Improved **portability**

Hardware Independence

- **Provision or migrate** to any server **without** the need to perform **reconfigurations** on the virtual machine

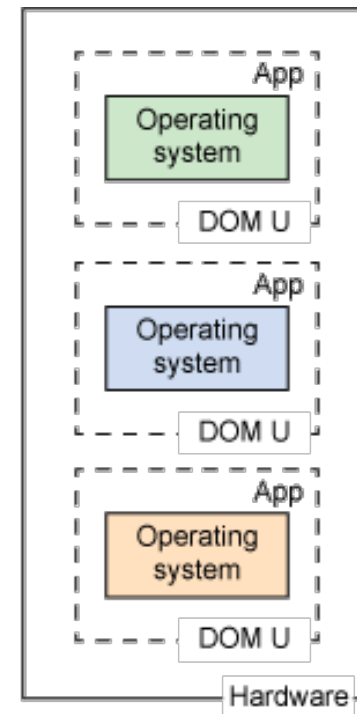# Types of Virtualization

1 – Server Virtualization

Enable multiple OS to **run on a single physical server**

Partitions a physical server into multiple virtual servers

Benefits include:
- Greater IT efficiencies
- Reduced operating costs
- Maximization of resource
- Faster workload deployment
- Increased application performance
- Higher server availability
- Eliminated server sprawl and complexity

2 – Network Virtualization

Completely **reproduces a physical network**, allowing applications to run on a virtual network **as if they were running on a physical network**

Achieves greater **operational benefits** and all the **hardware independencies** of virtualization

Network virtualization presents logical networking devices and services to connected workloads, such as:

- Logical ports
- Switches
- Routers
- Firewalls
- Load balancers
- VPNs and more

3 – Desktop Virtualization

Deploying **desktops as a managed service** enables IT organizations to **respond faster** to changing workplace needs and emerging opportunities

Virtualized desktops and applications can also be **quickly and easily delivered** to branch offices, outsourced and offshore employees, and mobile workers using tablets

Typically categorized as <u>Local Desktop Virtualization</u> or <u>Remote Desktop Virtualization</u>

Makes desktop management efficient, secure, and saves money on desktop hardware

3 – Desktop Virtualization (cont)

Types include:

Desktop as a Service (DaaS)
- Cloud service that delivers virtualized desktops and applications
- Types: client-defined, vendor-defined, and managed DaaS

Virtual Desktop Infrastructure (VDI)
- A product usually deployed on an on-premise datacenter
- Users access the virtual desktop on the server by using client devices

Local Desktop Virtualization (LDV)
- Hypervisor runs on a local computer containing virtual machines
- Switch between local and virtual environment as applications

Remote Desktop Services (RDS)
- Remote access Windows desktop sessions, also called Terminal Service
- Multiple users are using a shared virtual machine

Take care

4 – Storage Virtualization

Storage virtualization combines the functions of physical storage devices such as <u>network attached storage</u> (NAS) and <u>storage area network</u> (SAN)

Storage can be pooled despite being **heterogeneous**, from different vendors or of different types

<u>Storage virtualization </u>**uses multiple physical data storage** and **creates a large unit of virtual storage** that you can assign and control by using management software

IT administrators can streamline storage activities, such as archiving, backup, and recovery, because multiple storage devices are **virtually combined into a single storage device**.

5 – Data Virtualization

Data virtualization creates a **software layer** between this **data and the applications** that need it

Modern organizations **collect data from several sources** and in **different formats** and are **stored in different places**, such as in a cloud infrastructure or on-premises data center

Data virtualization tools process an **application's data request** and **return results in a suitable format**

This results in increased **flexibility for data integration** and support **cross-functional data analysis**
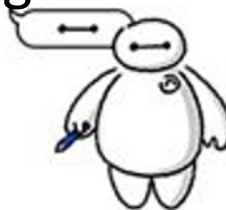
6 – Application Virtualization

Application virtualization pulls out the functions of applications to r**un on operating systems other than** the operating systems for **which they were designed** (i.e. run Linux apps on a Windows machine w/o any configurations)

Application streaming – Users str**eam the application from a remote server**. Runs only on the user's device when needed

Server-based application virtualization – Users **access the remote application from their browser** or client interface without installing

Local application virtualization – The application **code is deployed with its own environment** to run on all operating systems without changes

Virtualization