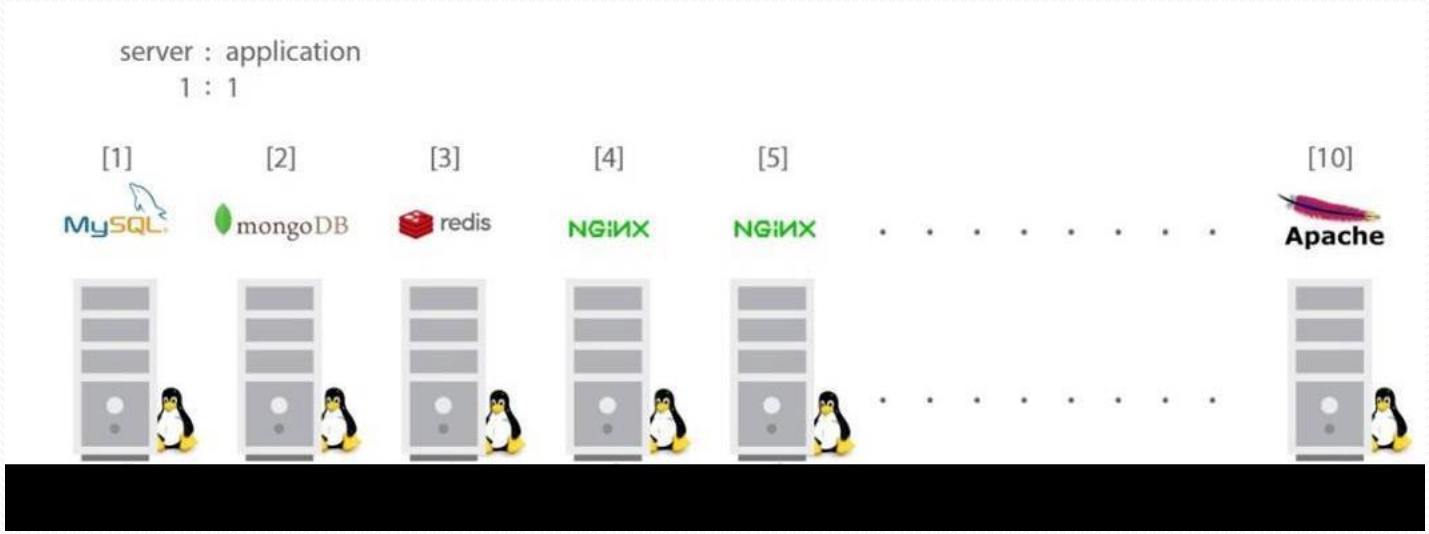
VIRTUALIZATION

What is Virtualization?

- Virtualization is a technology to run multiple same or different operating systems which are completely isolated from each other on the same machine.
  - Example: Run both Windows and Linux on the same machine

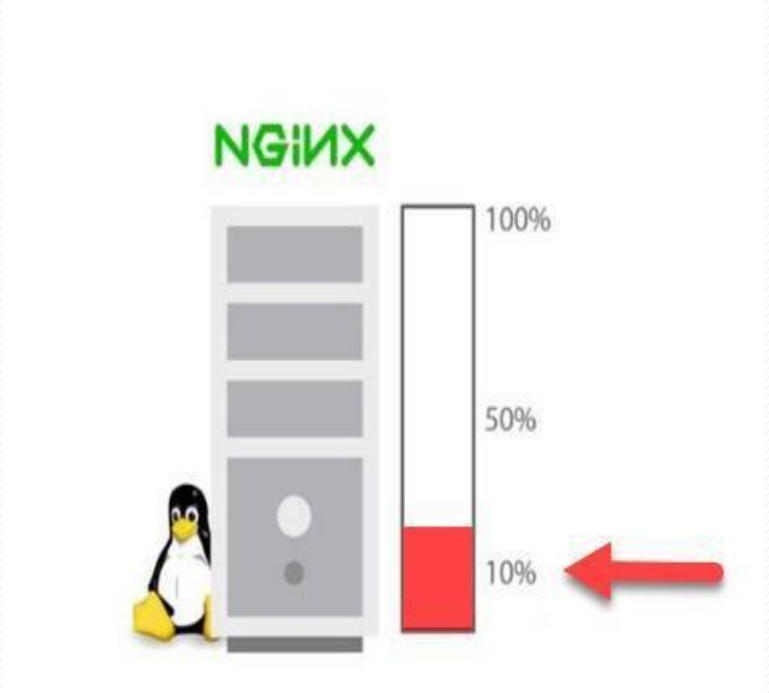
VIRTUALIZATION

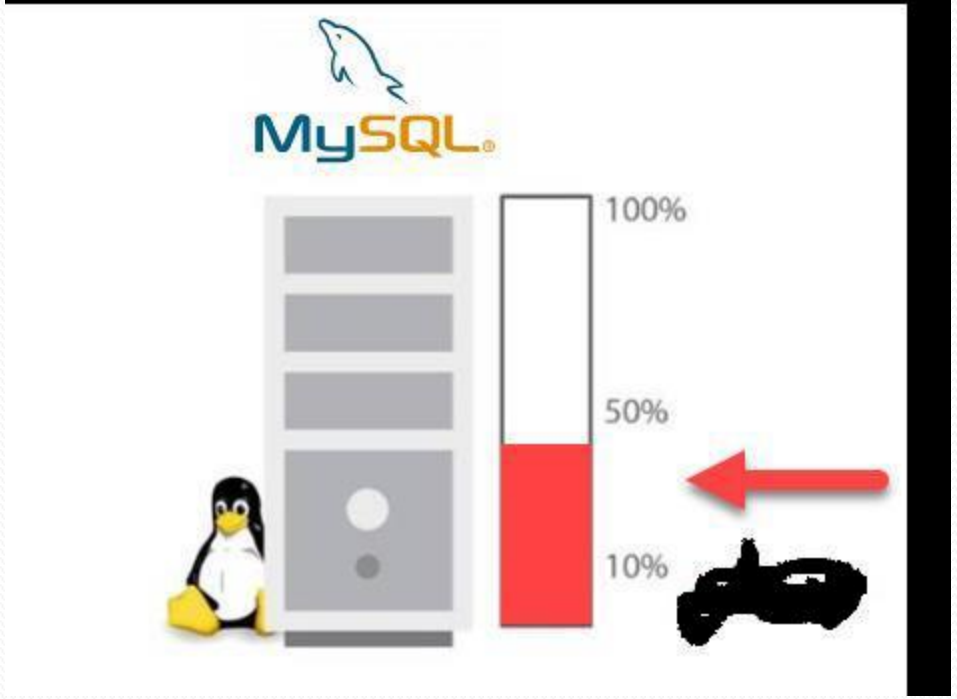
Problem



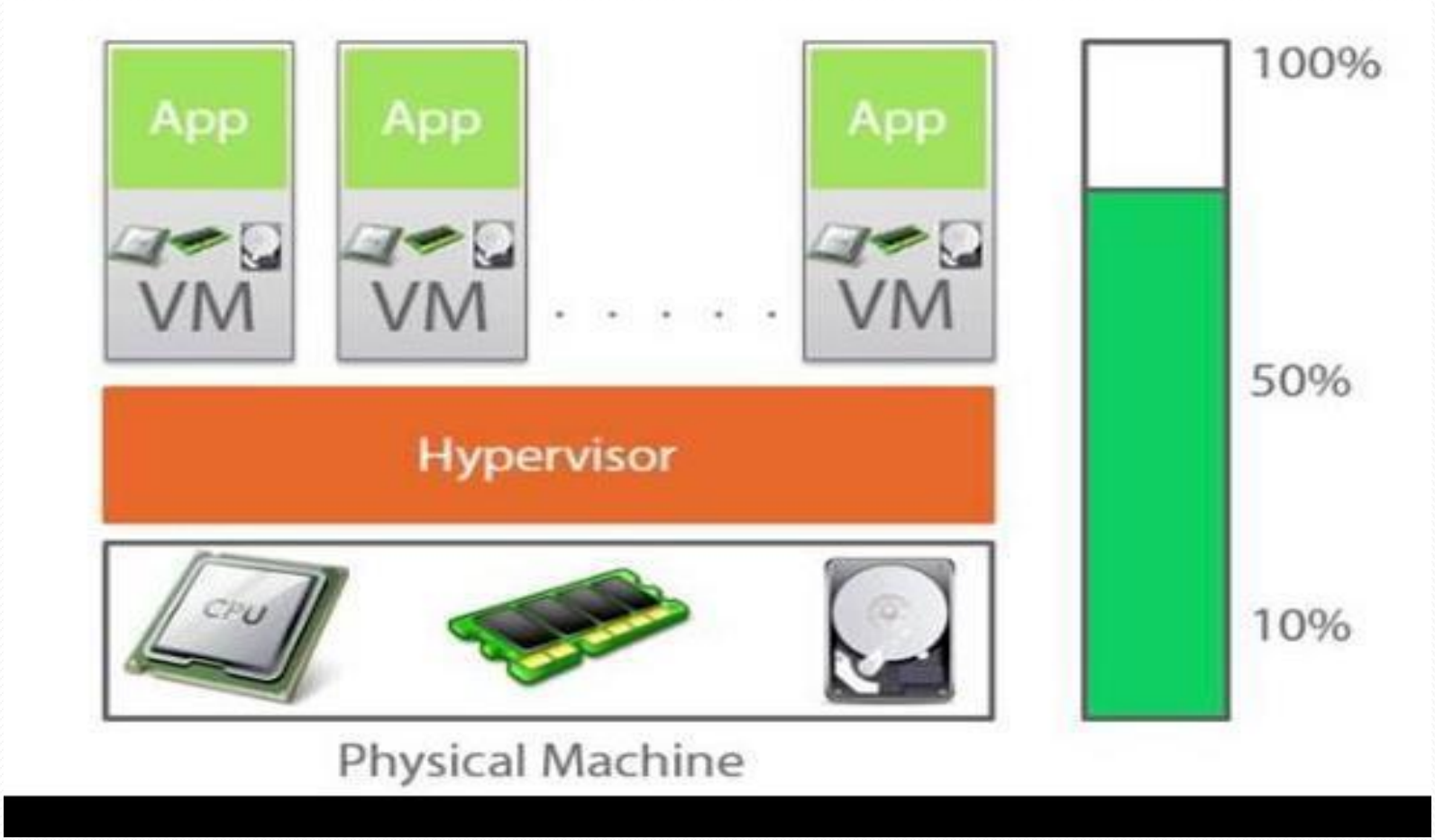
RESOURCE UTILIZATION

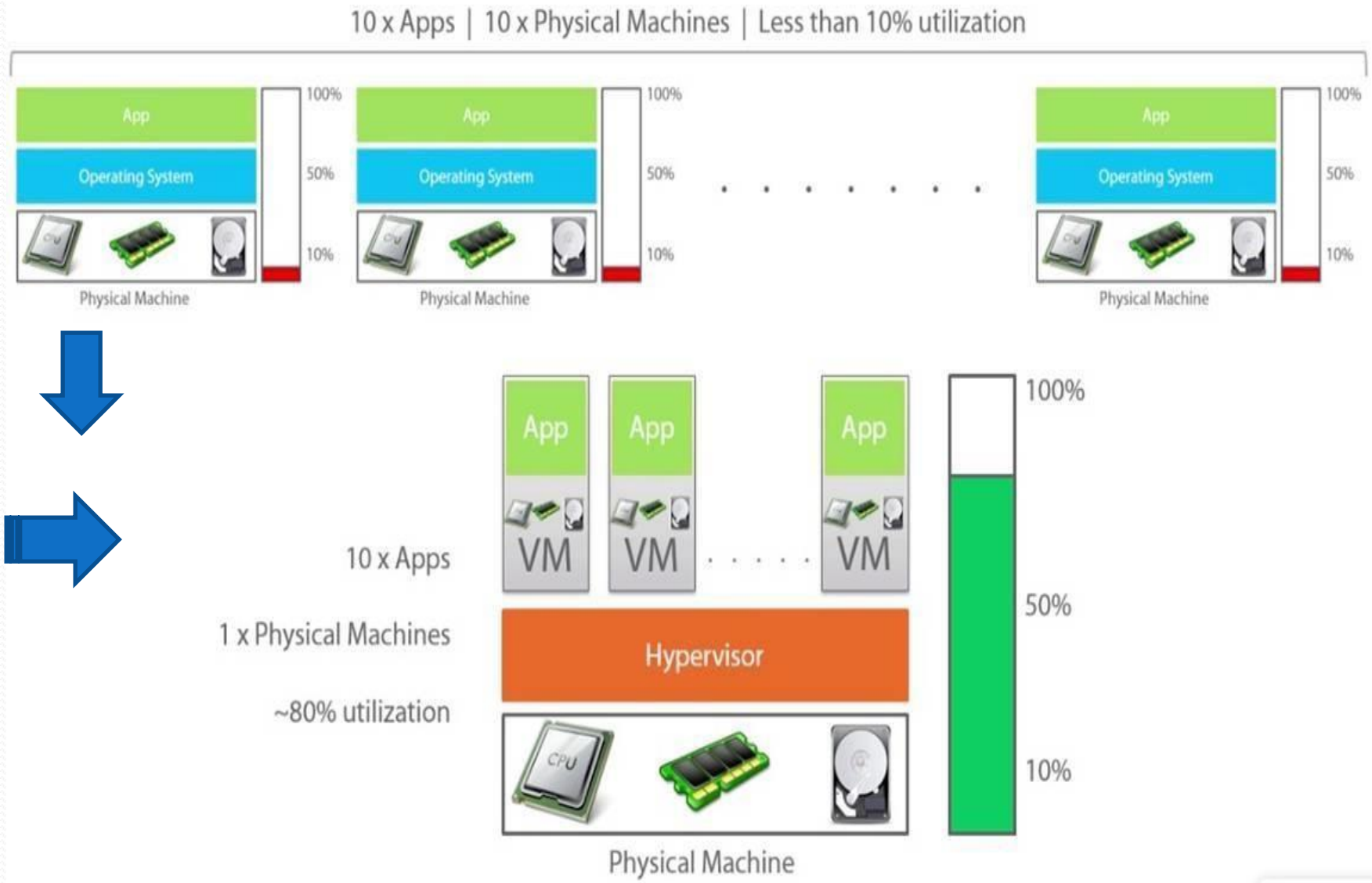
WASTING A LOT OF RESOURCES





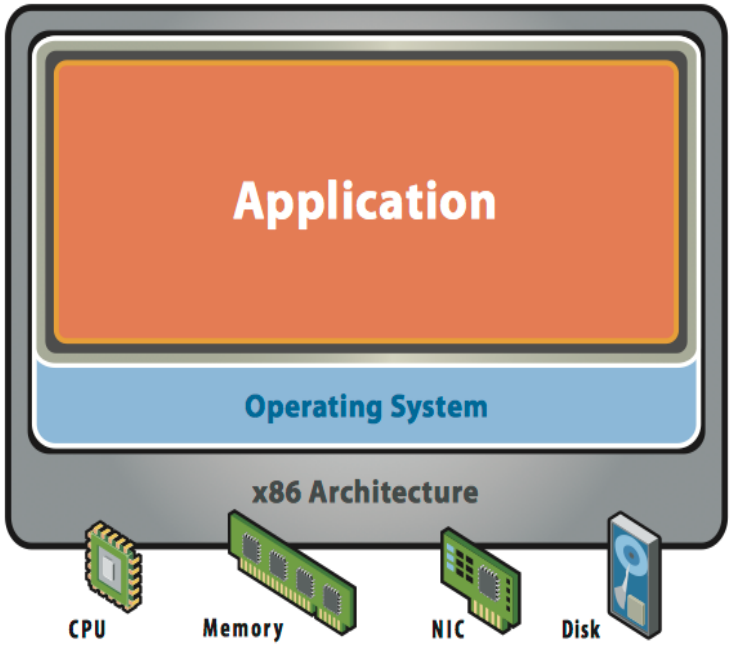
SOLUTION – VIRTUALIZATION




10 x Apps | 10 x Physical Machines | Less than 10% utilization
App
Operating System
100%
50%
10%
Physical Machine
App
Operating System
100%
50%
10%
Physical Machine
App
Operating System
100%
50%
10%
Physical Machine
10 x Apps
1 x Physical Machines
~80% utilization
App
App
App
VM
VM
VM
Hypervisor
CPU
100%
50%
10%
Physical Machine

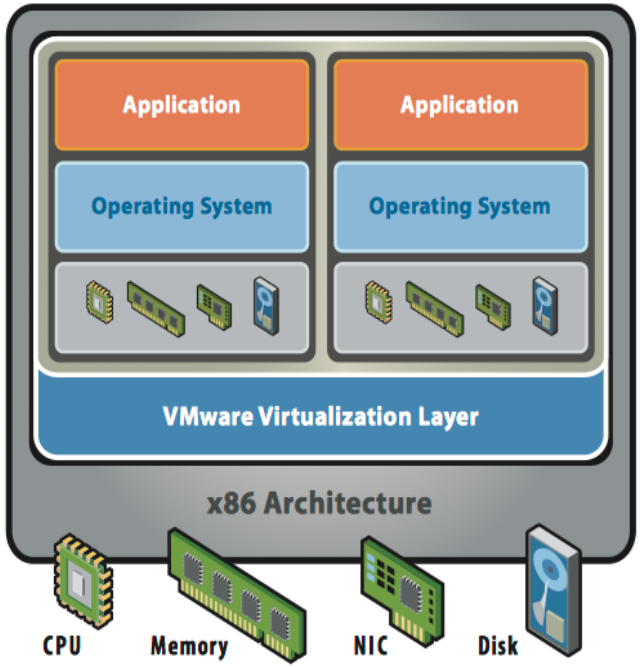
HOW IT IS DIFFERENT FROM DUAL BOOT?

- **Dual boot** is having 2 OS installed on same computing and choosing which to turn on at boot time
- With Virtualization, both OSes run simultaneously



Before Virtualization:

- Single OS image per machine
- Software and hardware tightly coupled
- Running multiple applications on same machine often creates conflict
- Underutilized resources
- Inflexible and costly infrastructure



After Virtualization:

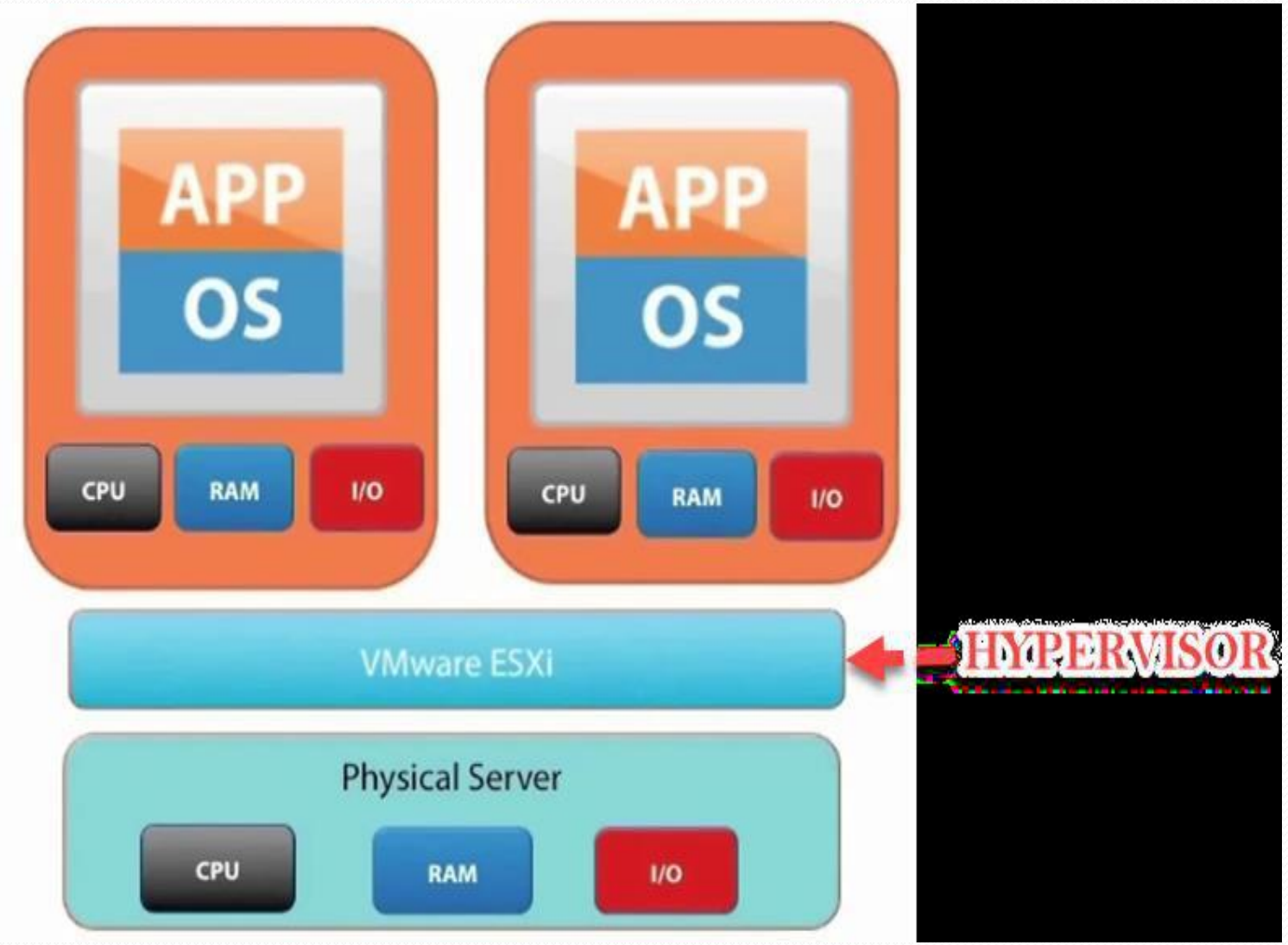
- Hardware-independence of operating system and applications
- Virtual machines can be provisioned to any system
- Can manage OS and application as a single unit by encapsulating them into virtual machines

Virtualization and Cloud Computing

- Virtualization is a technology whereas Cloud Computing is a service.
- Without virtualization, there is no Cloud Computing.
- Cloud Computing is built on top of Virtualization.

What IS Hypervisor?

- Hypervisor is a software layer that sits between Hardware and OS which will interact with hardware and resources and provide an interface to share the available resources to virtual containers.


APP
OS
CPU
RAM
I/O
APP
OS
CPU
RAM
I/O
VMware ESXi
HYPERVISOR
Physical Server
CPU
RAM
I/O

Virtualization Benefits

- Virtualization offers major savings in data center operations.
- Virtualization makes possible significant reductions in the costs of managing data centers, with simplification of systems management tasks.
- Virtualization offers back-up and increased redundancy for delivery of high performance and high availability services.
- Virtualization is a step in the direction of “cloud computing”.
- Centralized management

Vendors