Cloud Computing

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CSI ZG527/ SE ZG527 – Virtualization Techniques and Types – L2

Agenda

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- ✓ Introduction to Virtualization
- ✓ Use & demerits of Virtualization
- ✓ Types of Virtualization
- ✓ Examples
- ✓ x86 Hardware Virtualization
- ✓ Manage the resources for the SaaS, PaaS and IaaS models

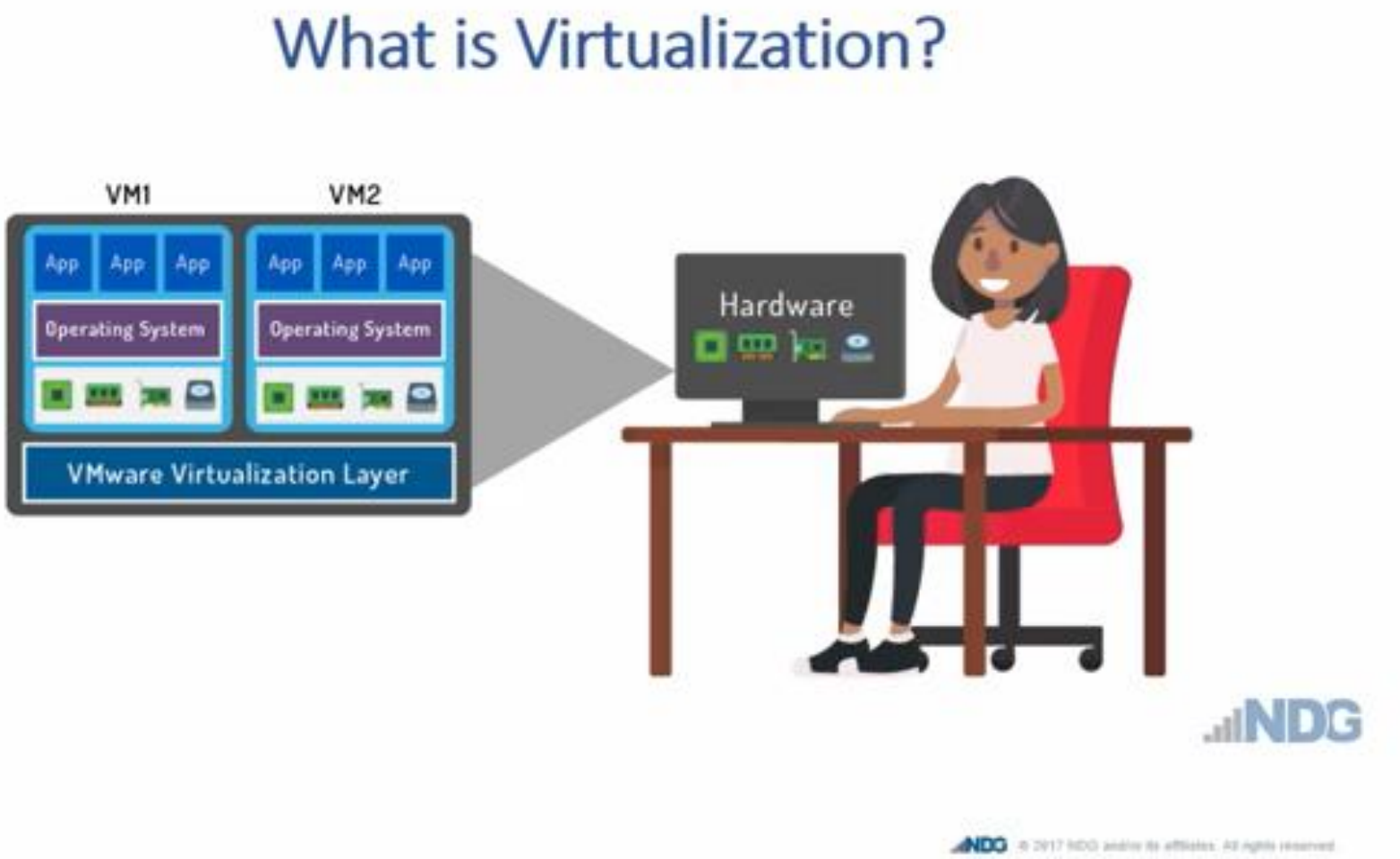
Virtualization

- ✓ Virtualization refers to the **creation of a virtual resource** such as a **server, desktop, operating system, file, storage or network**.
- ✓ Virtualization is a **computer architecture technology** by which multiple virtual machines (VMs) are **multiplexed in the same hardware machine.** The idea of VMs can be dated back to the 1960s .
- ✓ The purpose of a VM is to **enhance resource sharing** by many users and **improve computer performance in terms of resource utilization and application flexibility**.

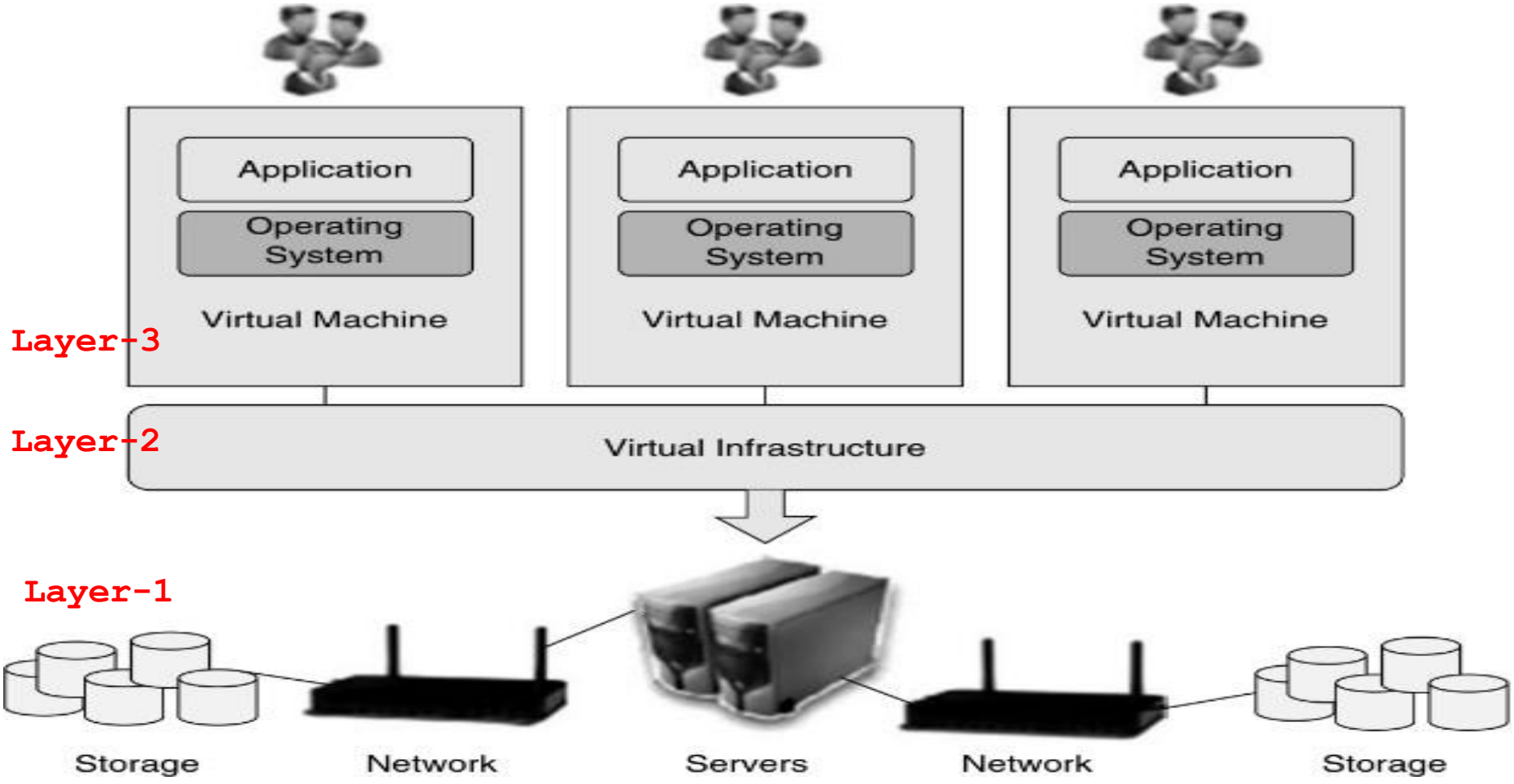
Virtualization

- ✓ **Host Machine:** The machine on which the **virtual machine** is going to be created is known as **Host Machine.**
- ✓ **Guest Machine:** The virtual machines that are created on the Host Machine are called **Guest Machines.**

Virtualization Explanation



Virtualization Explanation

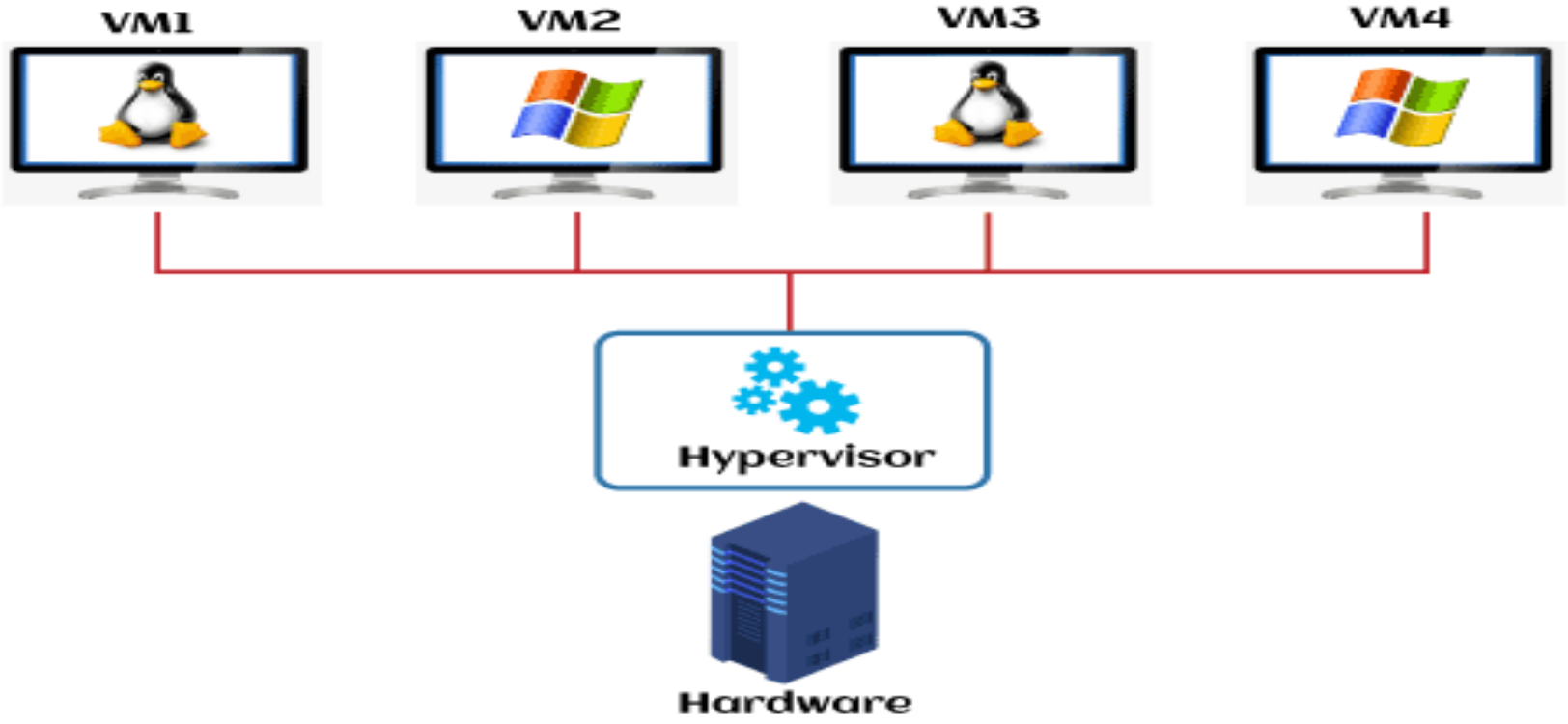


Hypervisor

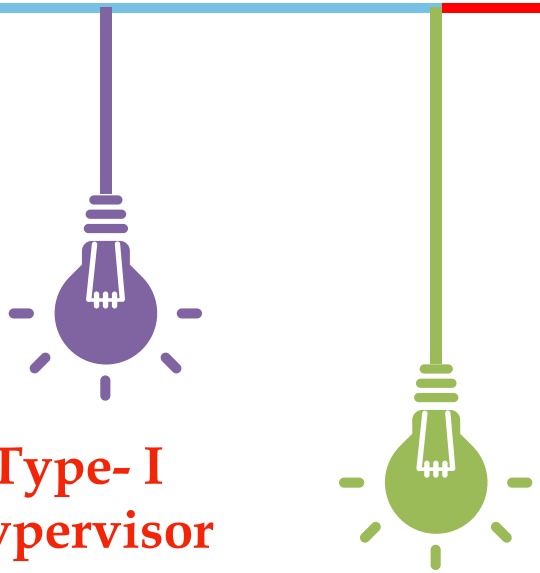
- A hypervisor is a form of **virtualization software used in Cloud hosting** to divide and allocate the resources on various pieces of hardware.
- The program which provides **partitioning, isolation, or abstraction** is called a virtualization hypervisor.
- The hypervisor is a **hardware virtualization technique** that allows multiple guest operating systems (OS) to run on a single host system at the same time.
- A hypervisor is sometimes also called a **virtual machine manager(VMM).**

Hypervisor

- ✓ A hypervisor is a **process or a function** to help admins **isolate operating systems and applications from the underlying hardware**.



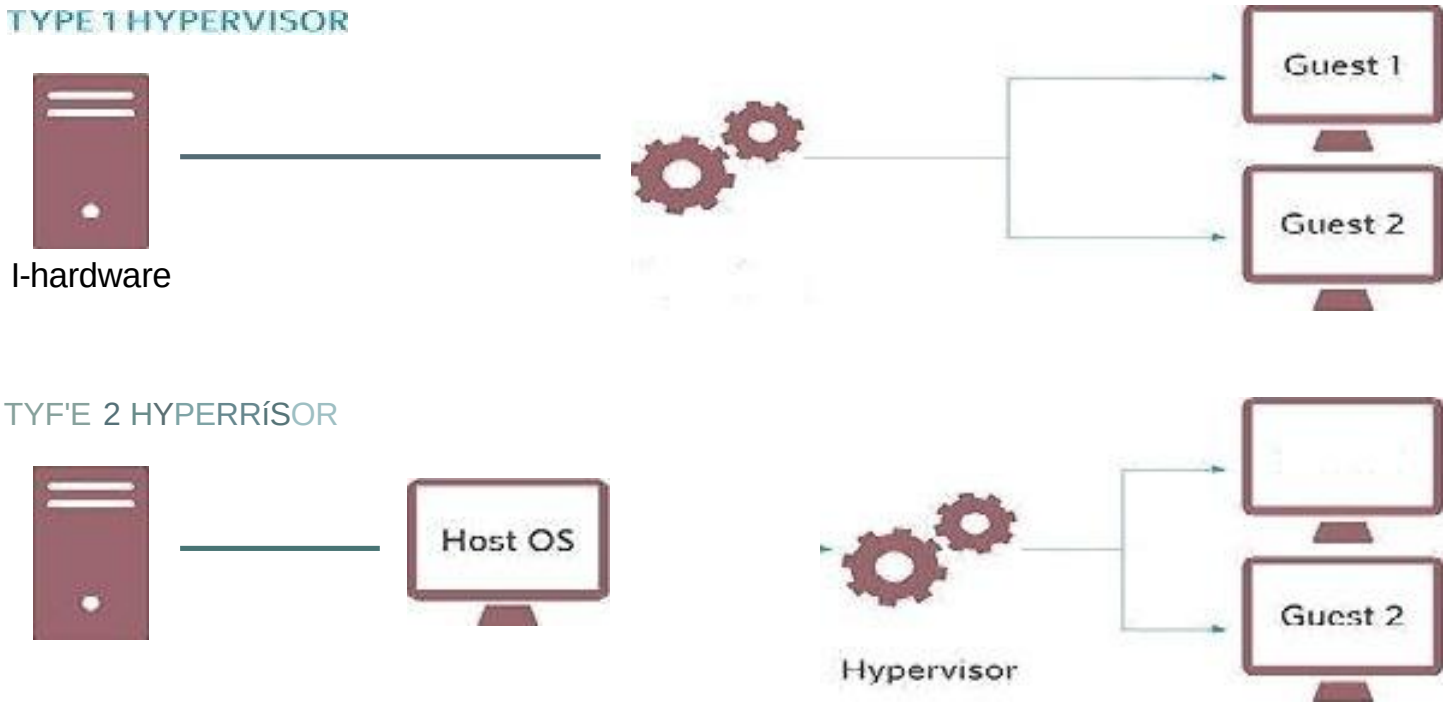
Types of Hypervisor



Type- I Hypervisor

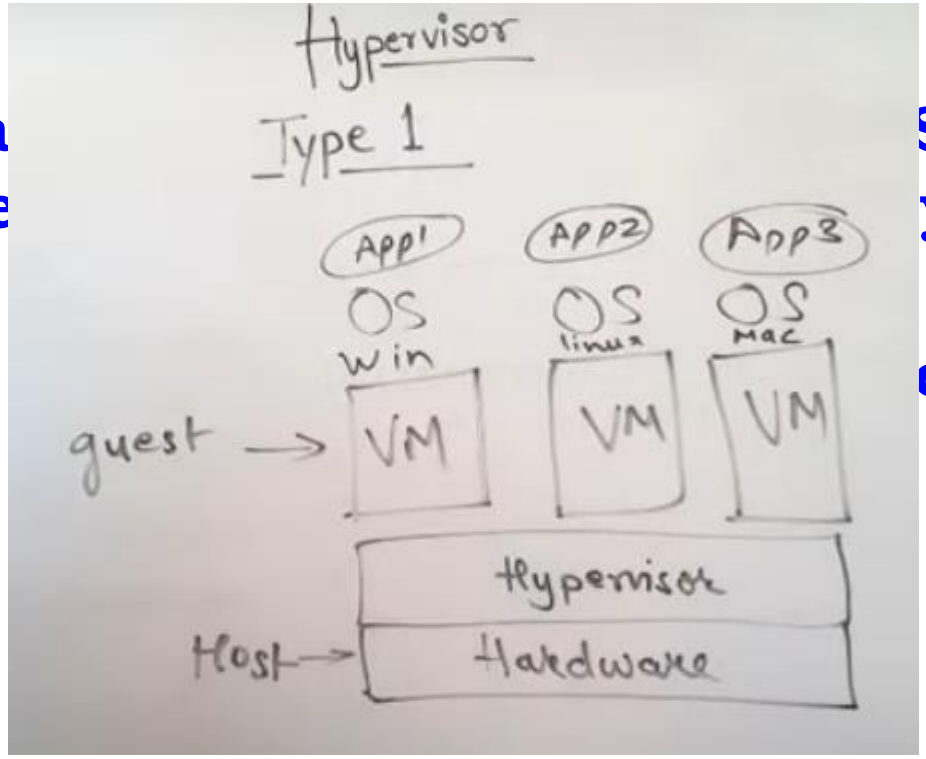
Type-II Hypervisor

Hypervisor Types



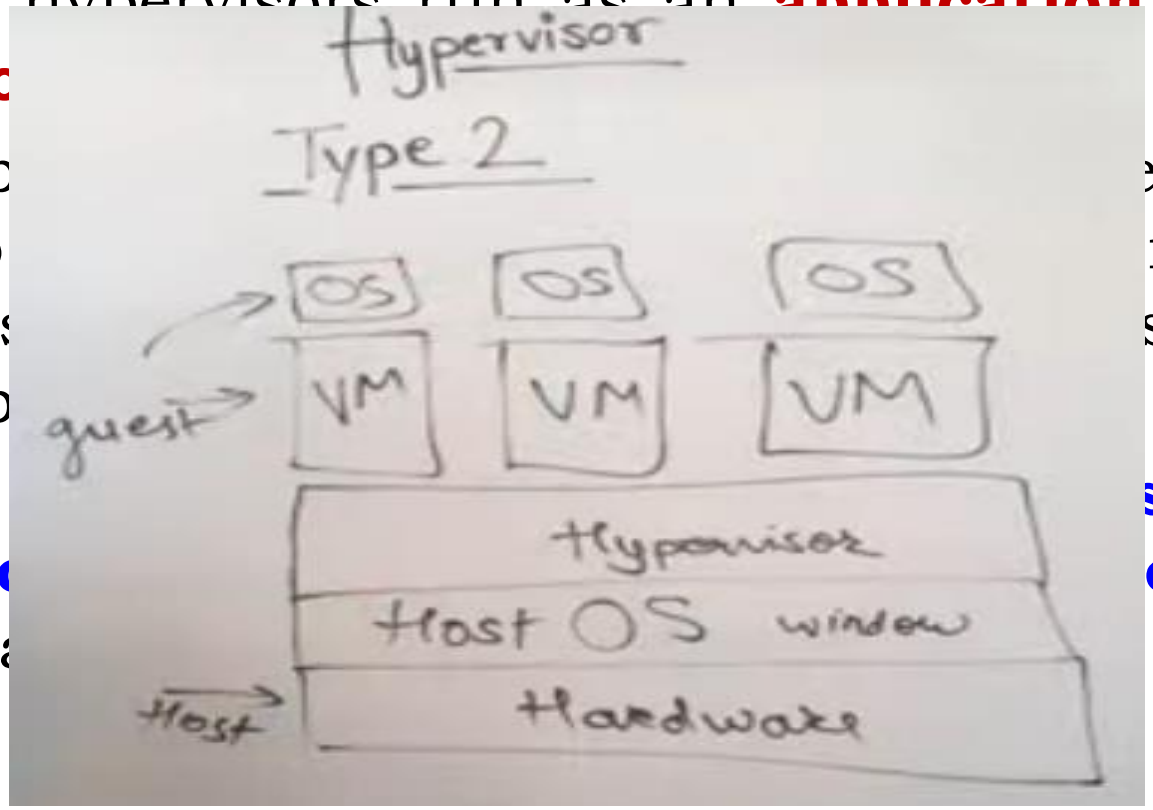
Type I Hypervisor

- ✓ A Type I hypervisor **operates directly on the host's hardware** to monitor the **hardware and guest virtual machines**, and is referred to as **bare metal.**
- ✓ **Example: Ora** **SPARC, Oracle VM Se** **yper-V, and VMware's**
- ✓ Its also known **e Metal Hypervisor**

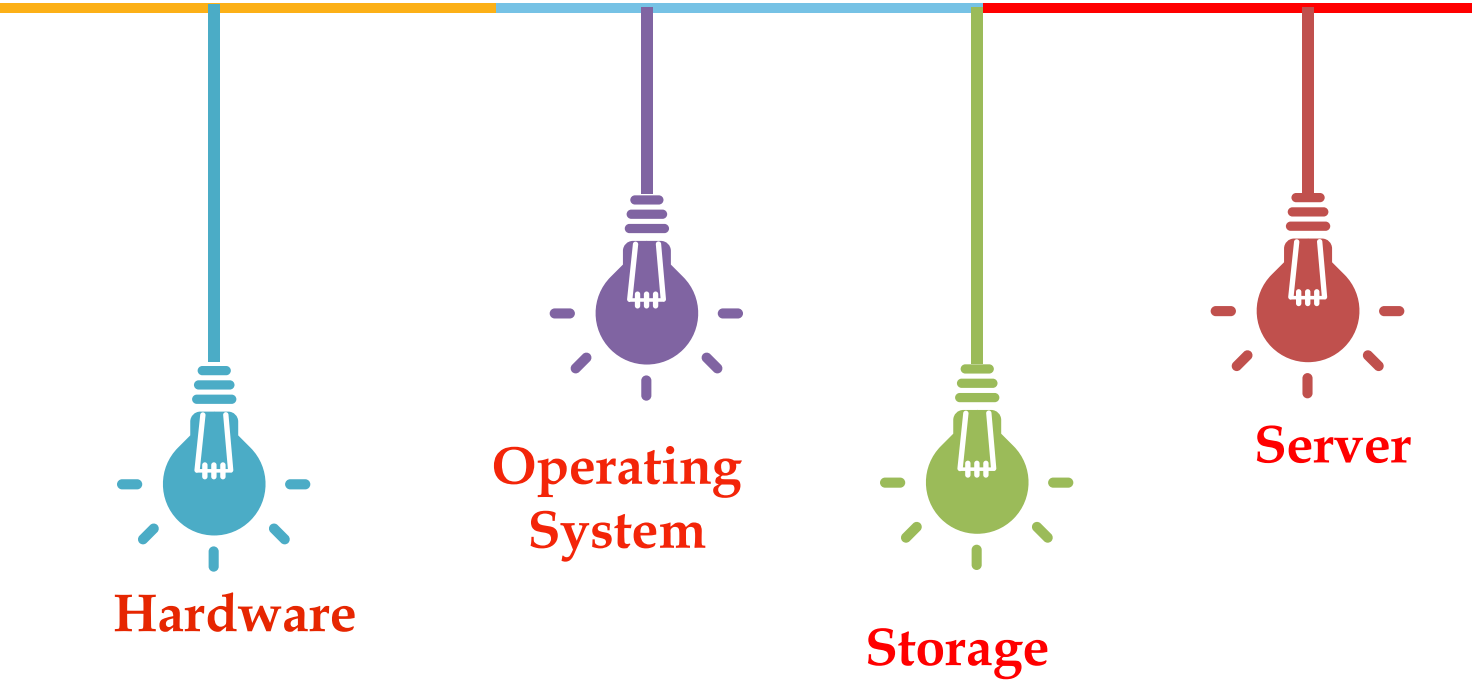


Type II Hypervisor

- ✓ Type 2 hypervisors run as an **application over a traditic**
- ✓ Develop ers who need to n select OS vers sors for their op
- ✓ **KVM, station, Microso ox, and QEMU** a
- ✓ Its also



Types of Virtualization



Hardware Virtualization

- ✓ When the virtual machine **software or virtual machine manager *(VMM)*** *is directly installed on the hardware system* is known as hardware virtualization.
- ✓ The main job of hypervisor is to control and monitoring the **processor, memory and other hardware resources.**
- ✓ After virtualization of hardware system we can **install different operating system on it and run different applications on those OS.**
- ✓ Hardware virtualization is mainly done for the **server platforms**, because controlling virtual machines is much easier than controlling a physical server.

Operating System Virtualization

- ✓ When the virtual machine **software or virtual**
- ✓

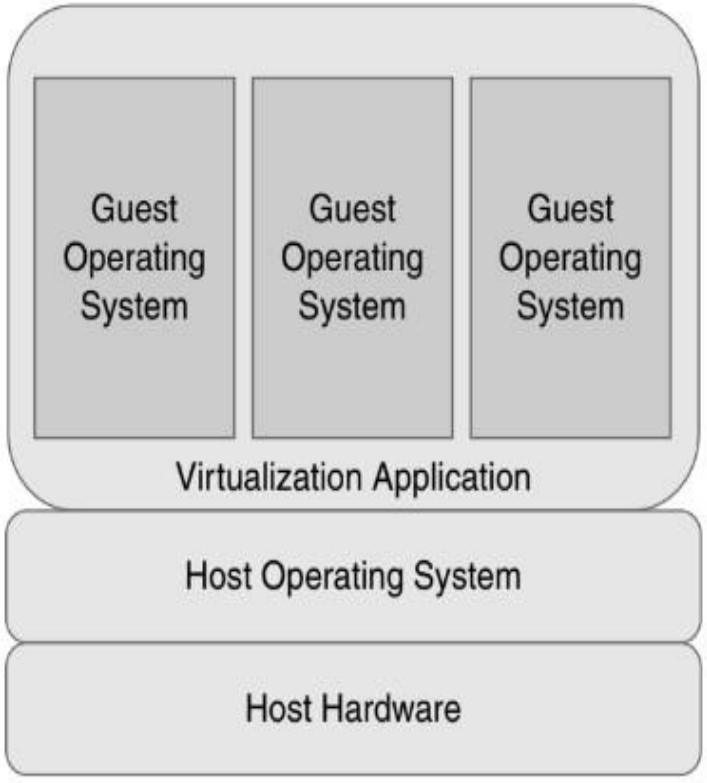


Figure 8.6 OS Virtualization

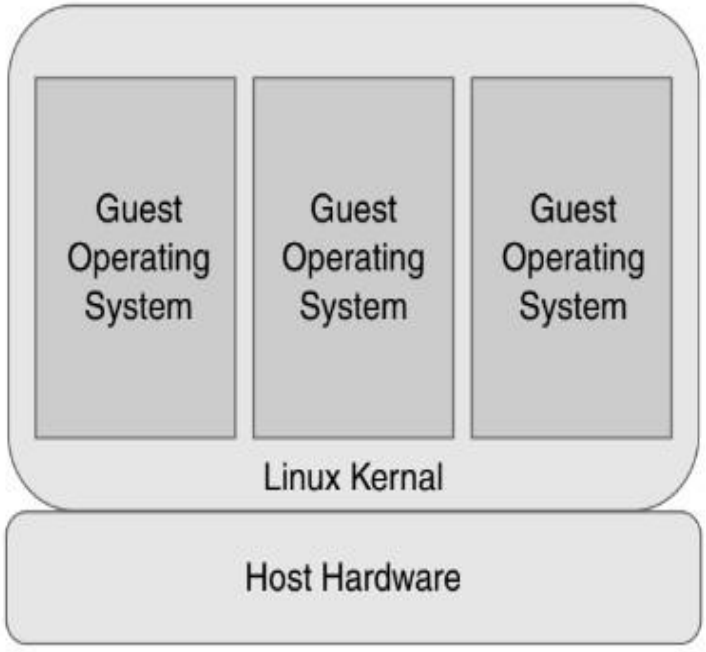
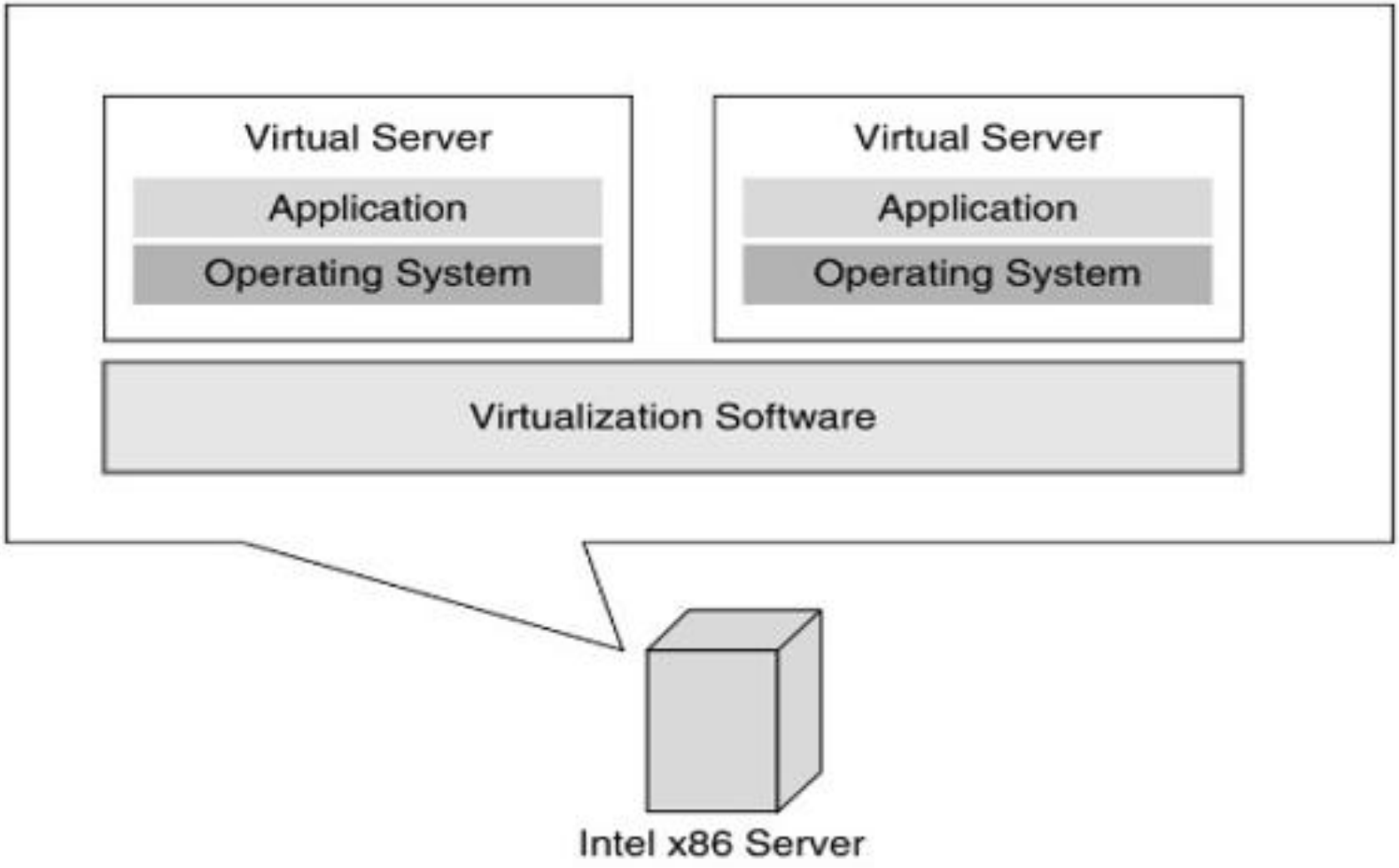
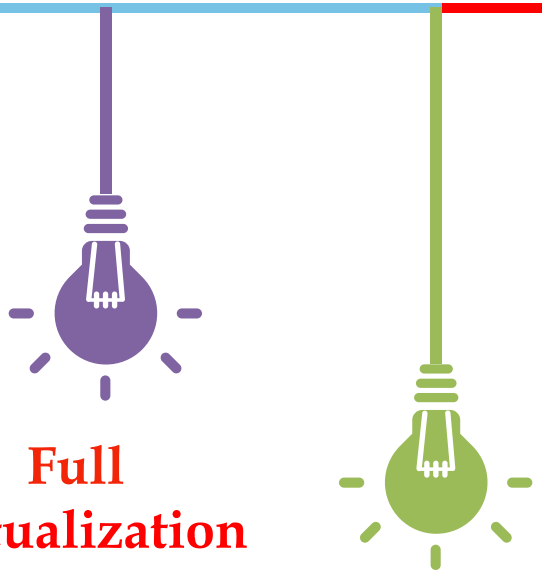


Figure 8.7 Kernel Level Virtualization

Server Virtualization



Types of Server Virtualization



Full Virtualization

Para Virtualization

Full Virtualization

- The physical server's resources are monitored by the hypervisor.
- Virtual servers operate independently and are not aware of other virtual servers using hypervisor.

Para Virtualization

- Hypervisor uses less processing power to manage virtual OS.
- It work based on network administrator

Uses of Virtualization

- Cost reduction in infrastructure such as hardware and its maintenance
- Utilization of resource to the fullest
- Increased efficiency of server
- Increased security

Storage Virtualization

- ✓ Storage virtualization is the *process of* **grouping the physical storage from multiple network storage devices** *so that it looks like a single storage device*.
- ✓ Storage virtualization is also implemented by using **software applications**.
- ✓ Storage virtualization is mainly done for **back-up and recovery purposes.**

Virtualization Characteristics

- ✓ Increased Security
- ✓ Managed Execution
- ✓ Sharing
- ✓ Aggregation
- ✓ Emulation
- ✓ Isolation
- ✓ Portability

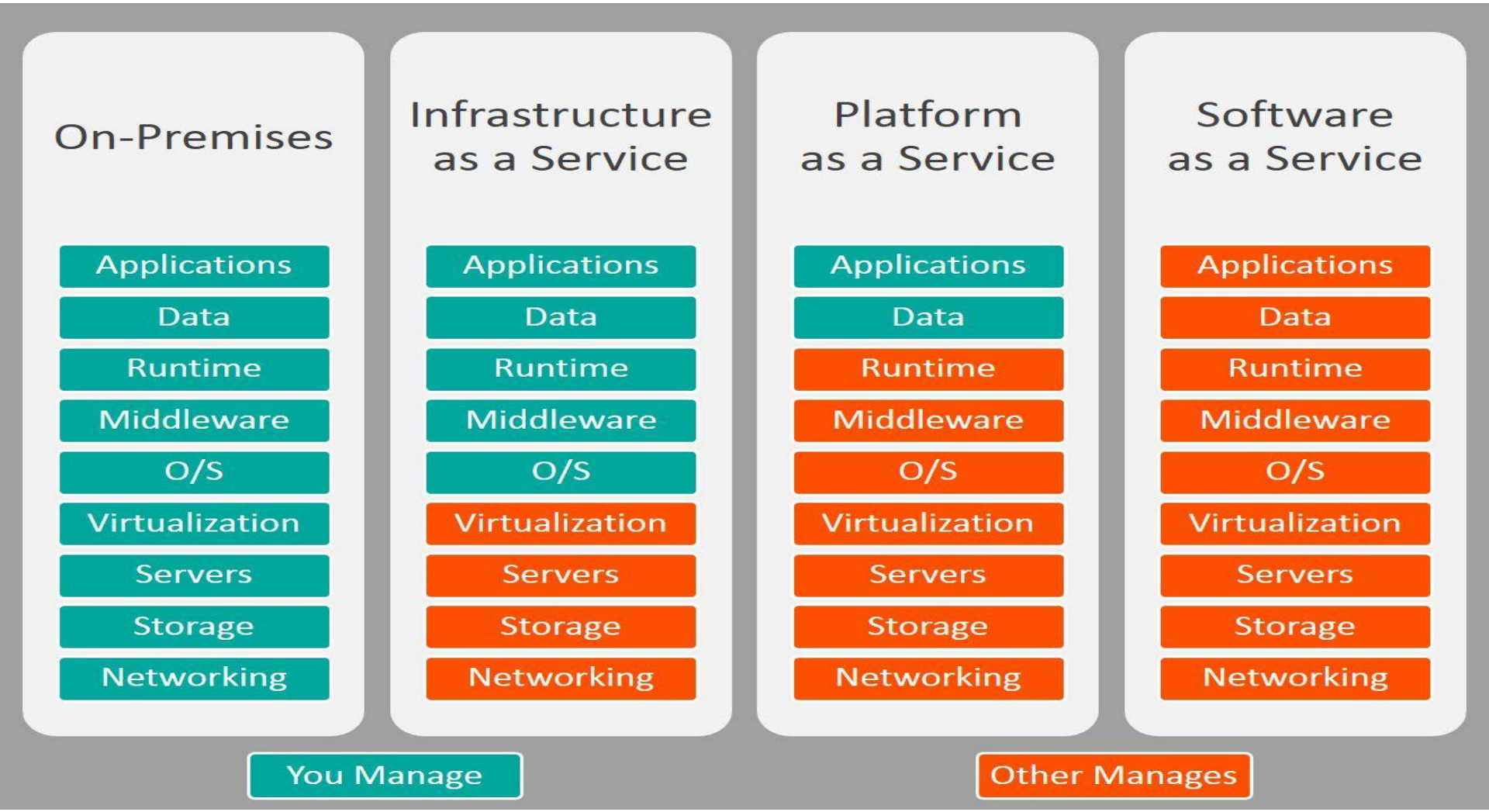
Benefits of Virtualization

- ✓ More flexible and efficient allocation of resources.
- ✓ Enhance development productivity.
- ✓ It lowers the cost of IT infrastructure.
- ✓ Remote access and rapid scalability.
- ✓ High availability and disaster recovery.
- ✓ Pay peruse of the IT infrastructure on demand.
- ✓ Enables running multiple operating systems.

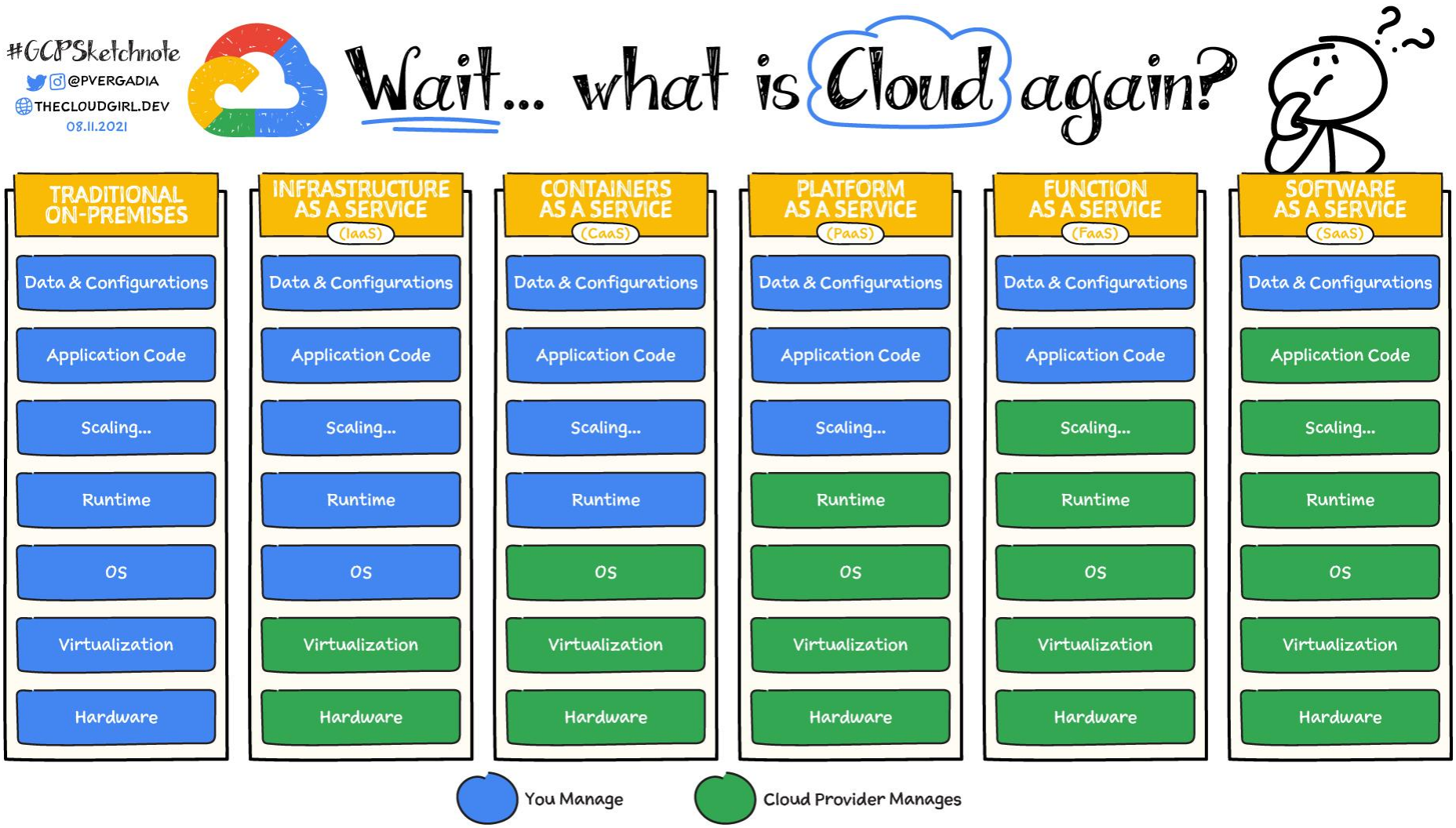
X86 Virtualization

- ✓ Hardware-Assisted Virtualization can be related to Full Virtualization and Paravirtualization in operational terms except that it **requires Hardware support**.

Manage Resources in Cloud Service Models



Manage Resources in Cloud Service Models



Thank You