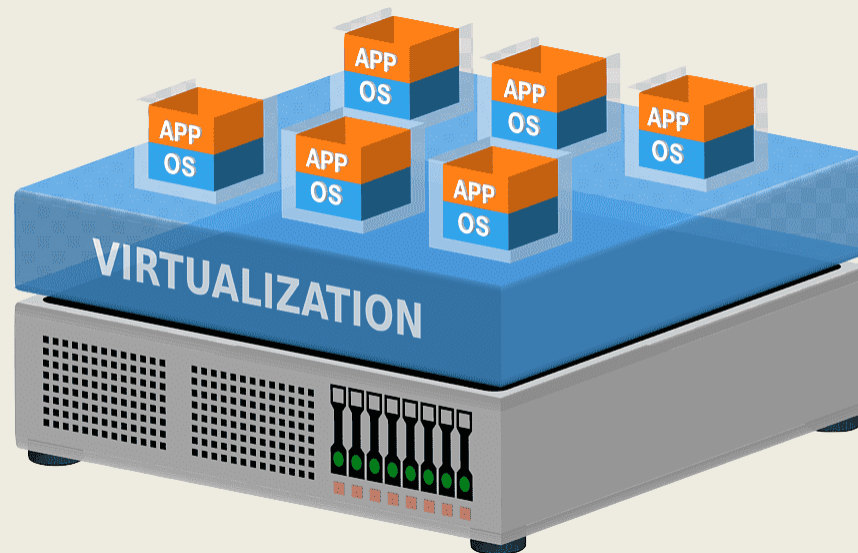


# VIRTUALIZATION

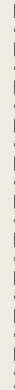


## Basics of Network Virtualization

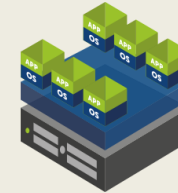
- The basic idea behind virtualization is to use software to simulate the existence of hardware. This powerful idea enables you to run more than one independent computer system on a single physical computer system.



Server Room



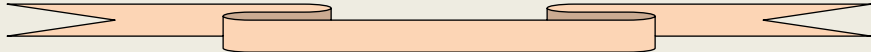
VM-1



VM-2

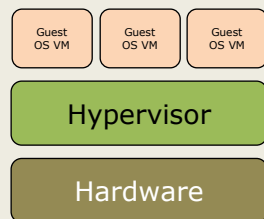
- Each of the simulated computers is called a **virtual machine** or **VM**. For all intents and purposes, each virtual machine appears to be a complete, self-contained computer system with its own processor (or, more likely, processors), memory, disk drives, CD-ROM/DVD drives, keyboard, mouse, monitor, network interfaces, USB ports, and so on.

## Basics of Network Virtualization

- Like a real computer, each virtual machine requires an operating system to do productive work. In a typical network server environment, each virtual machine runs its own copy of Windows Server 2019 (or an earlier version). The operating system has no idea that it's running on a virtual machine rather than on a real machine.
  - Here are a few terms you need to be familiar with if you expect to discuss virtualization intelligently:
    - **Host:** The actual physical computer on which one or more virtual machines run.
    - **Bare Metal:** Another term for the host computer that runs one or more virtual machines.
- 
- **Guest:** Another term for a virtual machine running on a host.
  - **Guest Operating System:** An operating system that runs within a virtual machine. By itself, a guest is just a machine; it requires an operating system to run. The guest operating system is what brings the guest to life.

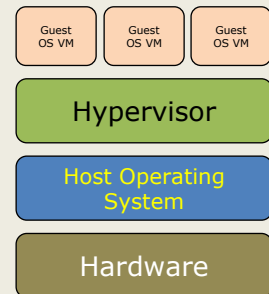
## Basics of Network Virtualization

- **Hypervisor:** The virtualization operating system that creates and runs virtual machines.
- There are **two basic types of hypervisors**:
  - **Type 1 hypervisor** is a hypervisor that **itself runs directly on the bare metal**.
  - **Type 2 hypervisor** is a hypervisor that **runs within an operating system**, which in turn runs on the bare metal.



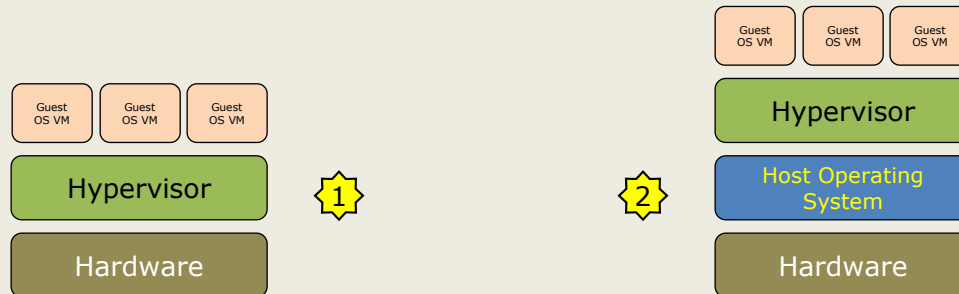
1

2



- For production use, you should always use a Type 1 hypervisor because **they're much more efficient than Type 2 hypervisors**.
- Type 1 hypervisors are considerably **more expensive than Type 2 hypervisors**.

## Basics of Network Virtualization



### Type 1 hypervisors:

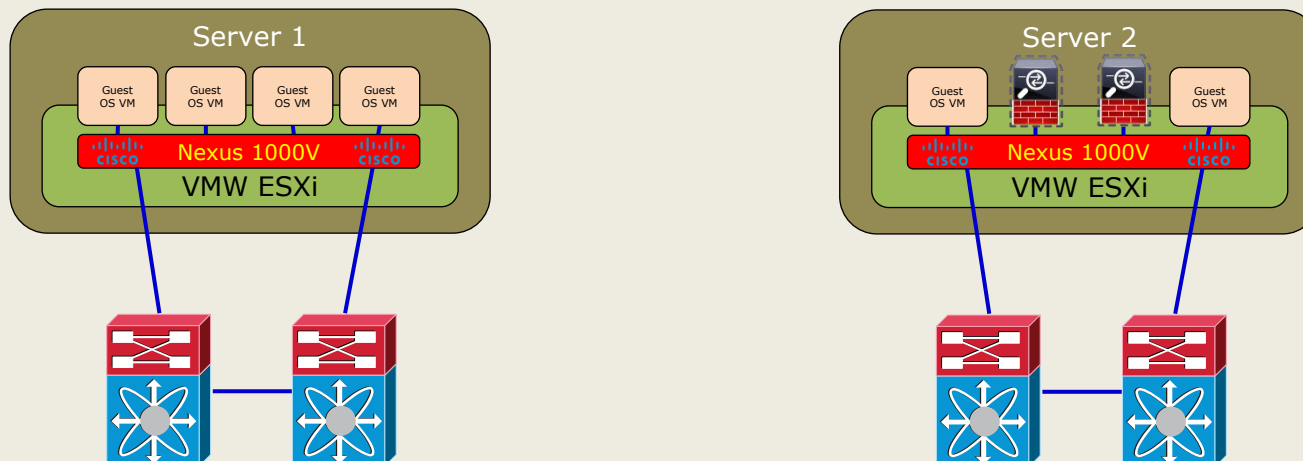
- VMware ESX and ESXi
- Microsoft Hyper-V
- Citrix XenServer
- Oracle VM

### Type 2 hypervisors:

- VMware Workstation/Fusion/Player
- VMware Server
- Microsoft Virtual PC
- Oracle VM VirtualBox
- Red Hat Enterprise Virtualization

## Cisco Network Virtualization

- The tight integration between **Cisco** and **VMware** has delivered a unique solutions that allows the network team **to manage virtual networking** with the same features and capabilities as the physical network without affecting the server team.





### Network & Device-Specific Virtualization

- These technologies specifically virtualize the functions of **routers and switches**:
  - **Virtual Routing and Forwarding (VRF)**: A Layer 3 technology that **allows multiple instances of a routing table to coexist on a single router**. This enables **overlapping IP addresses across different "virtual routers" without conflict**.
  - **Virtual Device Context (VDC)**: A Cisco Nexus-specific feature that **partitions a physical switch into multiple independent logical switches**. Each VDC has **its own unique configuration, administration, and data plane**.
  - **Virtual Switching System (VSS) / Virtual Port Channel (vPC)**: Technologies that **combine multiple physical switches to appear as a single logical unit to increase bandwidth and provide redundancy**.
  - **Network Functions Virtualization (NFV)**: **Decouples network services (like Cisco ASAv firewalls or CSR 1000v routers) from dedicated hardware** so they can run as virtual instances on standard servers.



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### Network Virtualization

- Next ?
- Go to **VRF, GRE, IPsec Tunnelling, and VXLAN** .pptx



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# QUESTIONS?



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