

Hyper-V Virtual Switches

External, Internal and Private switches, when to use each, and how to create them.

01 What it is

A virtual switch connects the network adapters of VMs to each other and, depending on its type, to the host and the physical network. Hyper-V has three types: External, Internal and Private.

02 Why it matters in a UAE IT job

Network access is the first thing people ask about when a VM is built. Choosing the right switch type decides whether a VM can reach the internet, the host, or only other VMs.

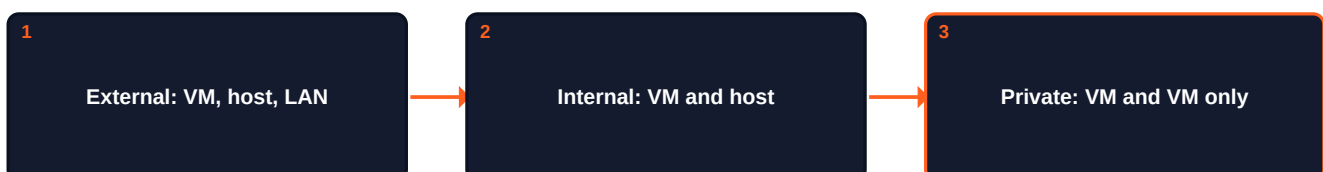
It is also the key to building safe isolated labs.

03 Key terms

Term	Meaning
External switch	Bound to a physical network adapter, giving VMs access to the physical network.
Internal switch	Connects VMs and the host only. No physical network.
Private switch	Connects VMs only. Even the host is excluded.
VLAN ID	A tag that separates traffic on the same switch.
NAT	Network address translation. It can let an internal network reach the internet through the host.
Management OS	On an External switch you can allow the host to share the same adapter.
MAC address	The hardware address of a virtual NIC. Can be dynamic or static.

04 How it works

External switches suit VMs that must be reachable like normal machines. Internal switches suit host-to-VM labs. Private switches suit fully isolated labs such as testing a domain controller. Remember that an External switch ties up a physical adapter, and on a laptop using Wi-Fi it can behave differently from wired Ethernet.



Pick the smallest reach that does the job.

05 Hands-on lab

Goal: create one switch of each type and attach a VM to each. Use fictional names such as LabExternal, LabInternal and LabPrivate. On a work machine, ask before creating an External switch.

Step 1. List physical adapters.

```
Get-NetAdapter
```

```
Administrator: Windows PowerShell

PS C:\Users\LabAdmin> Get-NetAdapter
Name      InterfaceDescription      ifIndex Status      MacAddress      LinkSpeed
-----
Ethernet  Intel(R) Ethernet Connection I219-LM      12 Up          AA-BB-CC-00-11-22 1 Gbps
Wi-Fi     Intel(R) Wi-Fi 6 AX201 160MHz      7 Disconnected AA-BB-CC-00-11-33 0 bps
PS C:\Users\LabAdmin> _
```

Example output from the fictional lab (names and IPs are made up). Yours should look similar.

Step 2. Create an Internal switch.

```
New-VMSwitch -Name LabInternal -SwitchType Internal
```

```
Administrator: Windows PowerShell

PS C:\Users\LabAdmin> New-VMSwitch -Name LabInternal -SwitchType Internal
Name      SwitchType NetAdapterInterfaceDescription
-----
LabInternal Internal
PS C:\Users\LabAdmin> _
```

Example output from the fictional lab (names and IPs are made up). Yours should look similar.

Step 3. Create a Private switch.

```
New-VMSwitch -Name LabPrivate -SwitchType Private
```

```
Administrator: Windows PowerShell

PS C:\Users\LabAdmin> New-VMSwitch -Name LabPrivate -SwitchType Private
Name      SwitchType NetAdapterInterfaceDescription
-----
LabPrivate Private
PS C:\Users\LabAdmin> _
```

Example output from the fictional lab (names and IPs are made up). Yours should look similar.

Step 4. Create an External switch (replace Ethernet with your adapter name).

```
New-VMSwitch -Name LabExternal -NetAdapterName "Ethernet" -AllowManagementOS $true
```

```
Administrator: Windows PowerShell

PS C:\Users\LabAdmin> New-VMSwitch -Name LabExternal -NetAdapterName "Ethernet" -AllowManagementOS $true
Name      SwitchType NetAdapterInterfaceDescription
-----
LabExternal External      Intel(R) Ethernet Connection I219-LM
PS C:\Users\LabAdmin> _
```

Example output from the fictional lab (names and IPs are made up). Yours should look similar.

Step 5. Connect a VM to the Private switch.

```
Connect-VMNetworkAdapter -VMName LAB-SRV01 -SwitchName LabPrivate
```

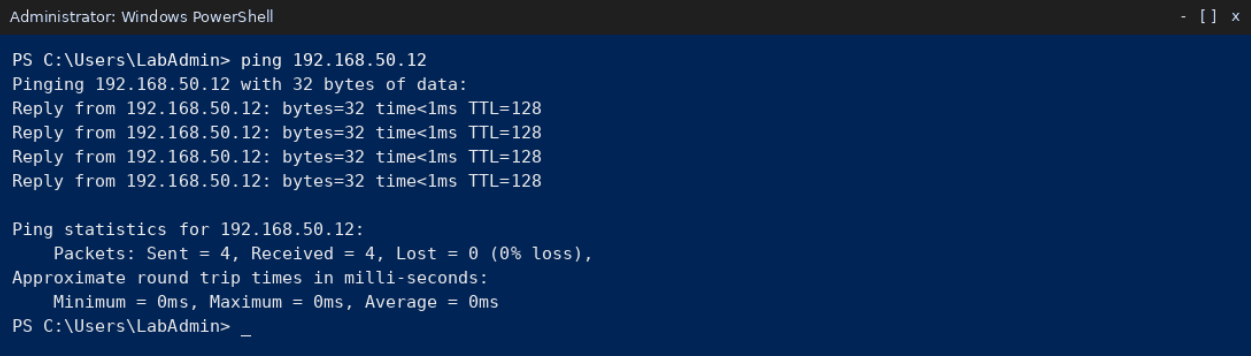
```
Administrator: Windows PowerShell

PS C:\Users\LabAdmin> Connect-VMNetworkAdapter -VMName LAB-SRV01 -SwitchName LabPrivate
PS C:\Users\LabAdmin> _
```

Example output from the fictional lab (names and IPs are made up). Yours should look similar.

Step 6. Give two VMs static IPs on 192.168.50.0/24, then ping one from the other.

```
ping 192.168.50.12
```



```
Administrator: Windows PowerShell - [ ] x
PS C:\Users\LabAdmin> ping 192.168.50.12
Pinging 192.168.50.12 with 32 bytes of data:
Reply from 192.168.50.12: bytes=32 time<1ms TTL=128
Reply from 192.168.50.12: bytes=32 time<1ms TTL=128
Reply from 192.168.50.12: bytes=32 time<1ms TTL=128
Reply from 192.168.50.12: bytes=32 time<1ms TTL=128

Ping statistics for 192.168.50.12:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 0ms, Average = 0ms
PS C:\Users\LabAdmin> _
```

Example output from the fictional lab (names and IPs are made up). Yours should look similar.

06 Common mistakes

- Creating an External switch and losing the host's network briefly.
- Using Private switches and expecting internet access.
- Duplicate IP addresses between VMs.
- Forgetting the VM network adapter is disconnected.
- Mixing lab and production VMs on the same switch.

07 Five interview questions

1. What are the three virtual switch types?

External, Internal and Private.

2. Which type gives VMs access to the physical network?

External.

3. When would you use a Private switch?

For fully isolated labs where VMs talk only to each other.

4. What does AllowManagementOS do?

It lets the host share the physical adapter with the external switch so the host keeps its network access.

5. How would you give an isolated lab VM internet access?

Use an External switch, or an Internal switch with NAT on the host, or a router VM.

08 Check yourself

1. Which switch reaches the LAN?

- a) Private
- b) External
- c) Internal only

2. Which switch excludes the host?

- a) External
- b) Internal
- c) Private

3. Which cmdlet creates a switch?

- a) New-VMSwitch
- b) Add-Wire
- c) Make-Net

4. Can a Private switch reach the internet?

- a) Yes
- b) Always
- c) No

5. Static IPs on a lab need to be?

- a) Identical
- b) Unique
- c) Random

Answer key: 1-b, 2-c, 3-a, 4-c, 5-b

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