

Network & Multimedia Lab

Software-Defined Data Center

Fall 2022

# Download

VMware Workstation Pro  
VMware vSphere Hypervisor (ESXi) 6.7U3b  
VMware vCenter Server 6.7U3b  
Tiny Core Linux

# Install VMware Workstation Pro

- <https://www.vmware.com/products/workstation-pro/workstation-pro-evaluation.html>

Workstation 16 Pro for Windows

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Workstation 16 Pro for Linux

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- <https://www.vmware.com/products/fusion/fusion-evaluation.html>

Fusion 12 Pro for macOS 11+

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# VMware vSphere Hypervisor (ESXi) 6.7U3b

Home / VMware vSphere Hypervisor (ESXi) 6.7U3b

## Download Product

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Drivers & Tools

Open Source

Custom ISOs

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?

File

Information

VMware vSphere Hypervisor (ESXi ISO) image (Includes VMware Tools)

File size: 335.02 MB

File type: iso

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# VMware vCenter Server 6.7U3b

Home / VMware vCenter Server 6.7U3b

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File

Information

**VMware vCenter Server Appliance**

**VMware vCenter Server Appliance**

File size: 3.95 GB

File type: iso

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# Tiny Core Linux 13.1

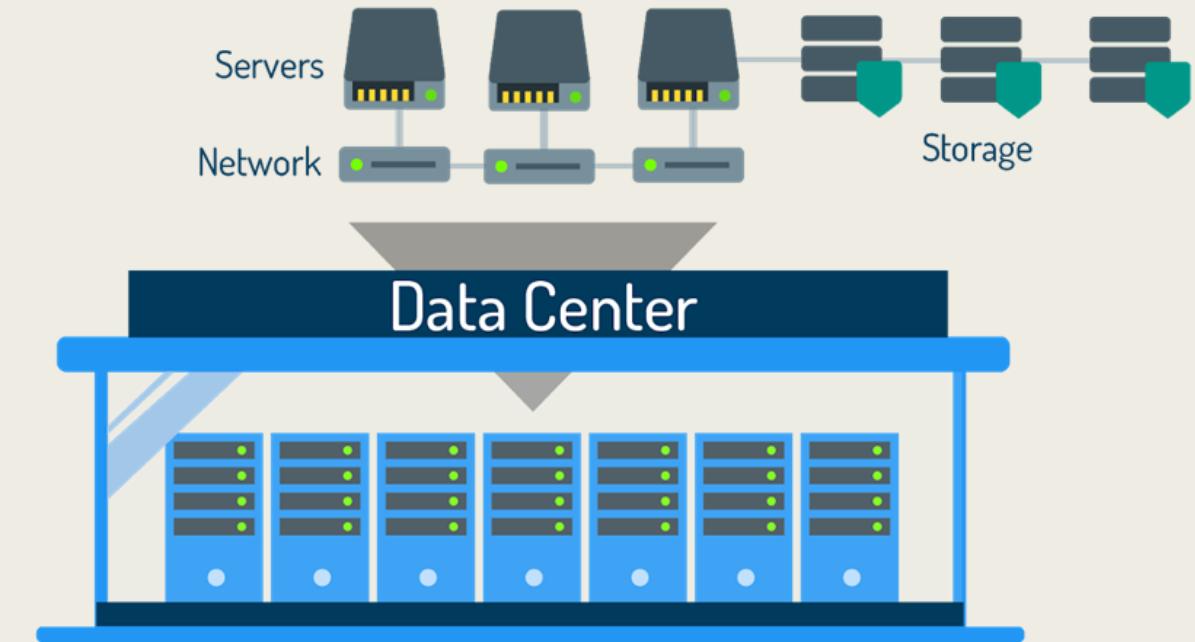
- <http://www.tinycorelinux.net/13.x/x86/release/Core-13.1.iso>

# Software-Defined Data Center

# Software-Defined Data Center (SDDC)

In SDDC, hardware resources are virtualized into virtual resources:

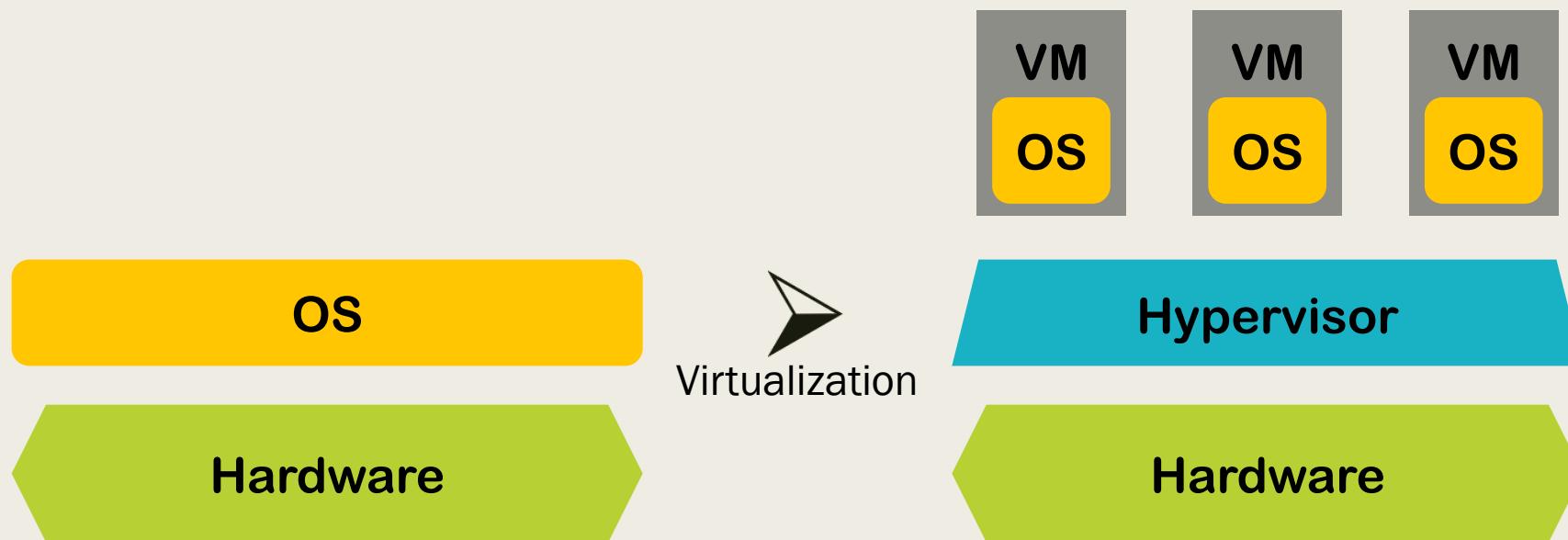
- Compute Virtualization
  - Virtual machine (VM)
- Network Virtualization
  - Virtual switch/router/firewall...
- Storage Virtualization
  - Storage area network (SAN), Network-attached storage (NAS)



# Virtual Machine

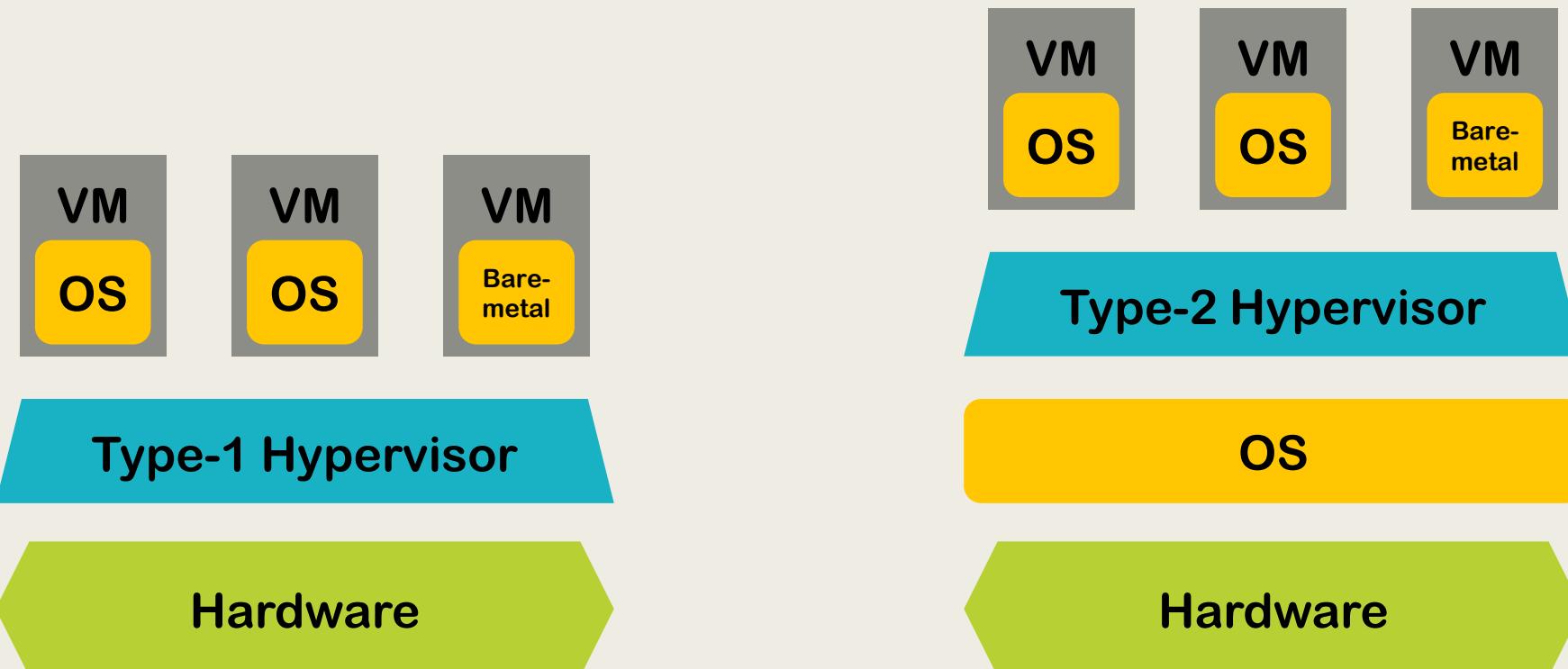
A **Virtual Machine** (VM) is a compute resource that uses software (hypervisor) instead of a physical computer to run programs and deploy apps.

A **Hypervisor** creates a virtualized hardware layer, which is able to host multiple isolated VMs.



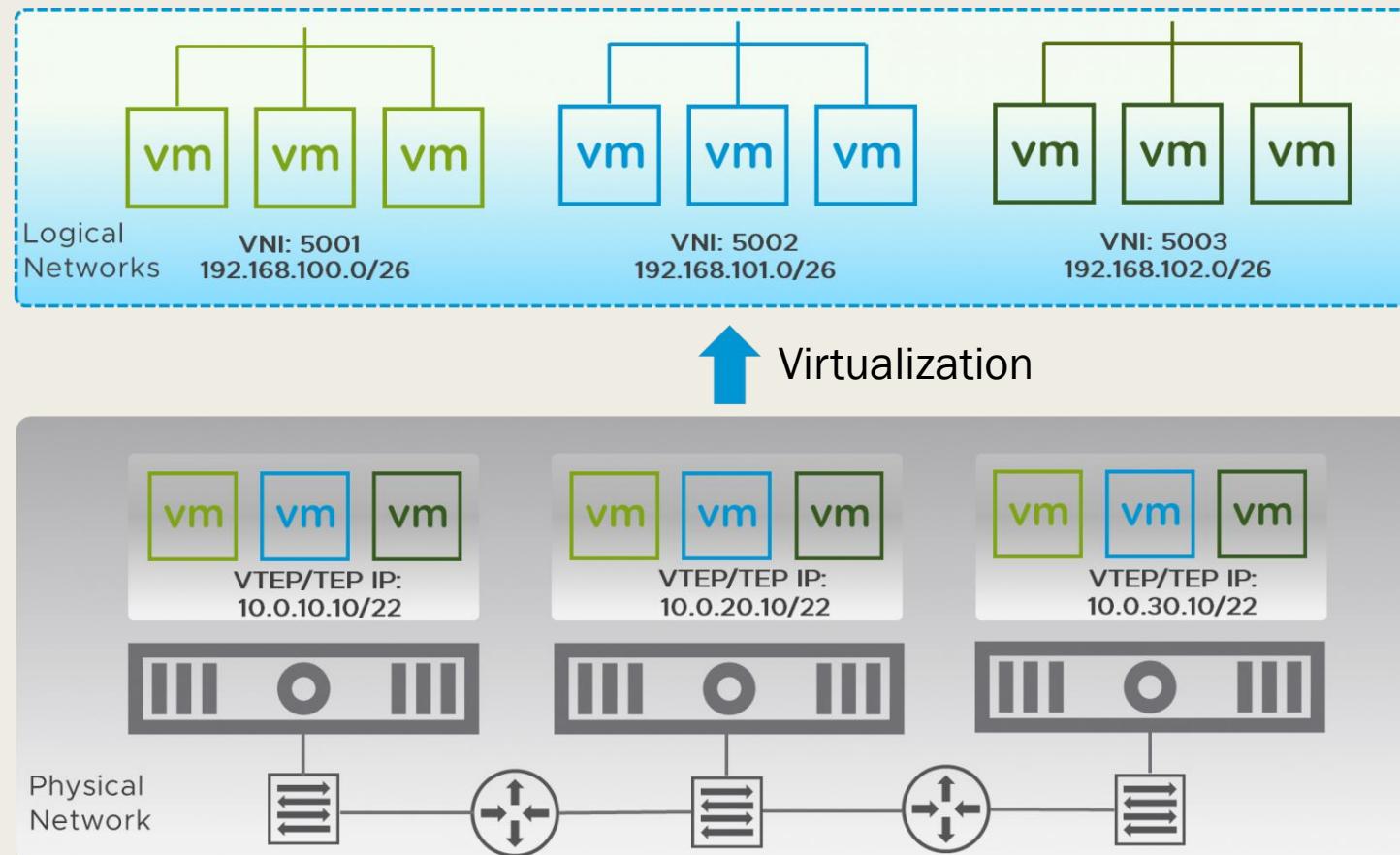
# Types of Hypervisors

- Type-1 (Native / Bare-metal) hypervisors run directly on the host machine hardware.
- Type-2 (Hosted) hypervisors are installed and run on a conventional operating system.



# Network Virtualization

Network virtualization emulates the network components and services in software.



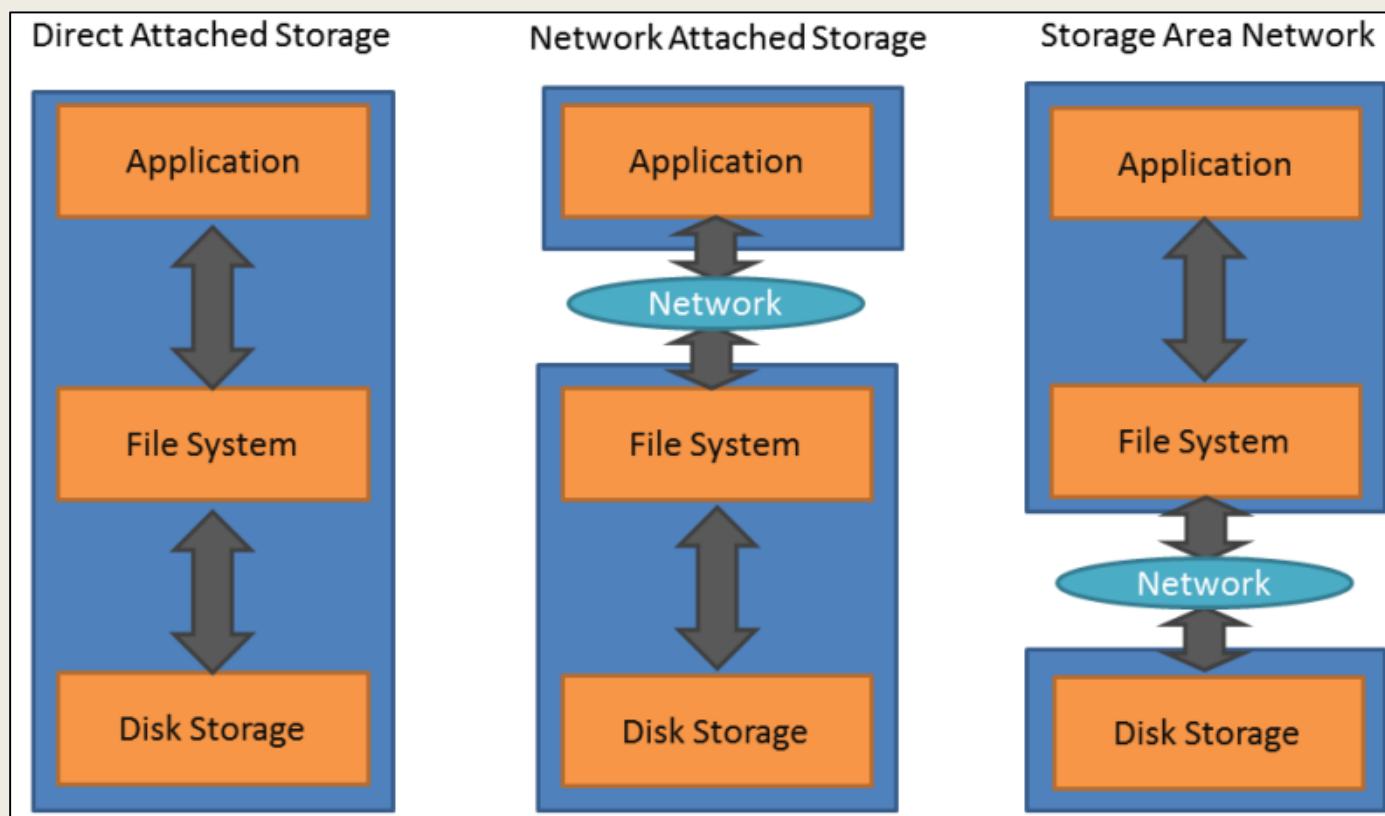
# Types of Storage Virtualization

File-level virtualization, which is implemented in **Network Attached Storage (NAS)** server.

- Application sees a file.

Block-level virtualization ,which is implemented in **Storage Area Network (SAN)** server.

- Application sees a disk.



# VMware's SDDC Platform – vSphere

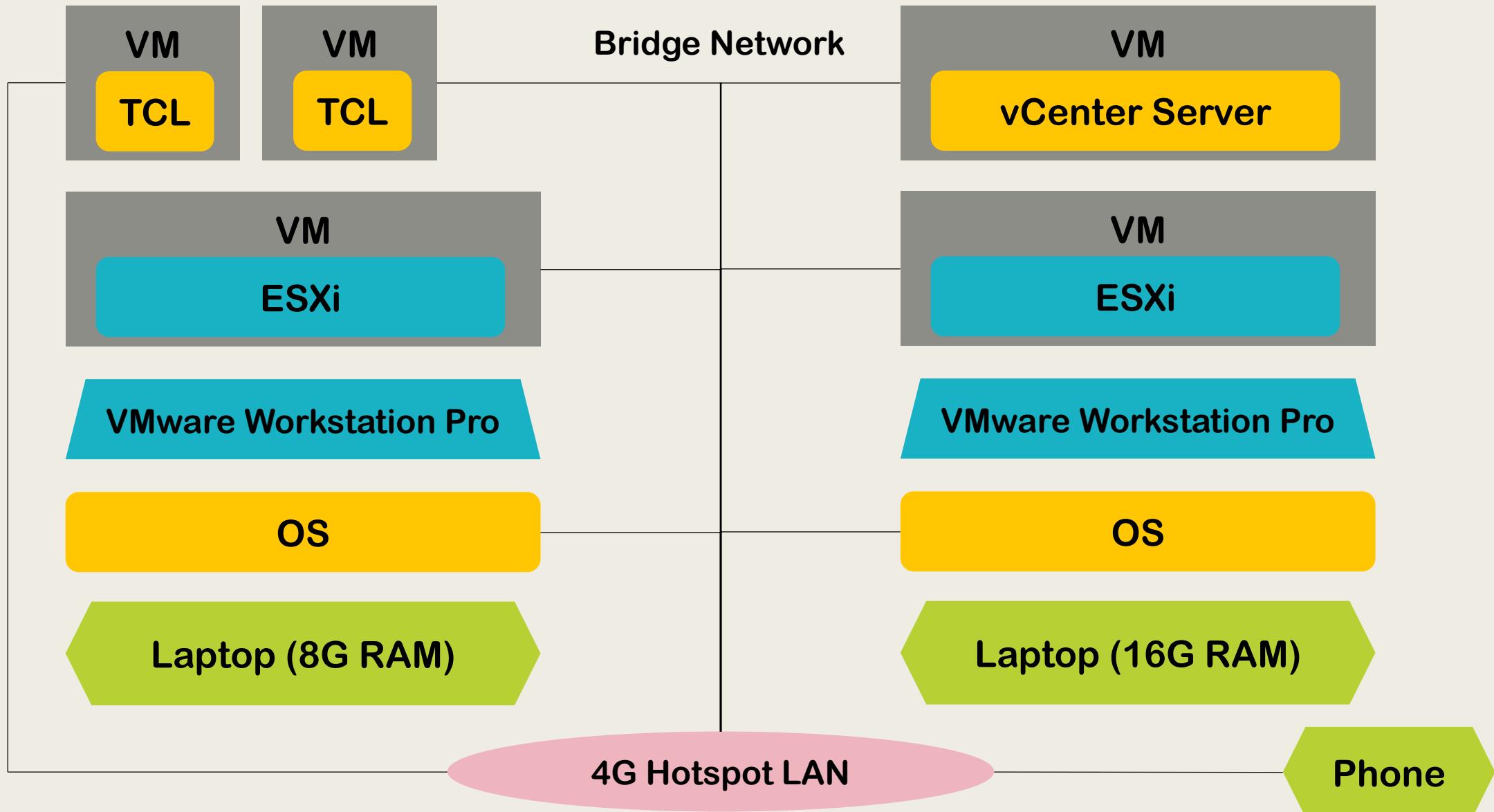
The screenshot shows the 'Product Downloads' section of the VMware website. At the top, there are tabs for 'Product Downloads', 'Drivers & Tools', and 'Open Source'. Below these, a sidebar on the left lists product categories: 'Product', 'Essentials', 'Essentials Plus', and 'Standard'. Under 'Essentials', items include 'VMware vSphere Hypervisor (ESXi) 6.7U3b', 'VMware vCenter Server 6.7U3r', and 'VMware Tools 12.1.0'. Under 'Essentials Plus', items include 'VMware vSphere Hypervisor (ESXi) 6.7U3b', 'VMware vCenter Server 6.7U3r', 'VMware NSX for vSphere 6.4.13', 'VMware vSphere Replication 8.5.0.5', and 'VMware Tools 12.1.0'. Under 'Standard', no items are listed.

Compute Virtualization

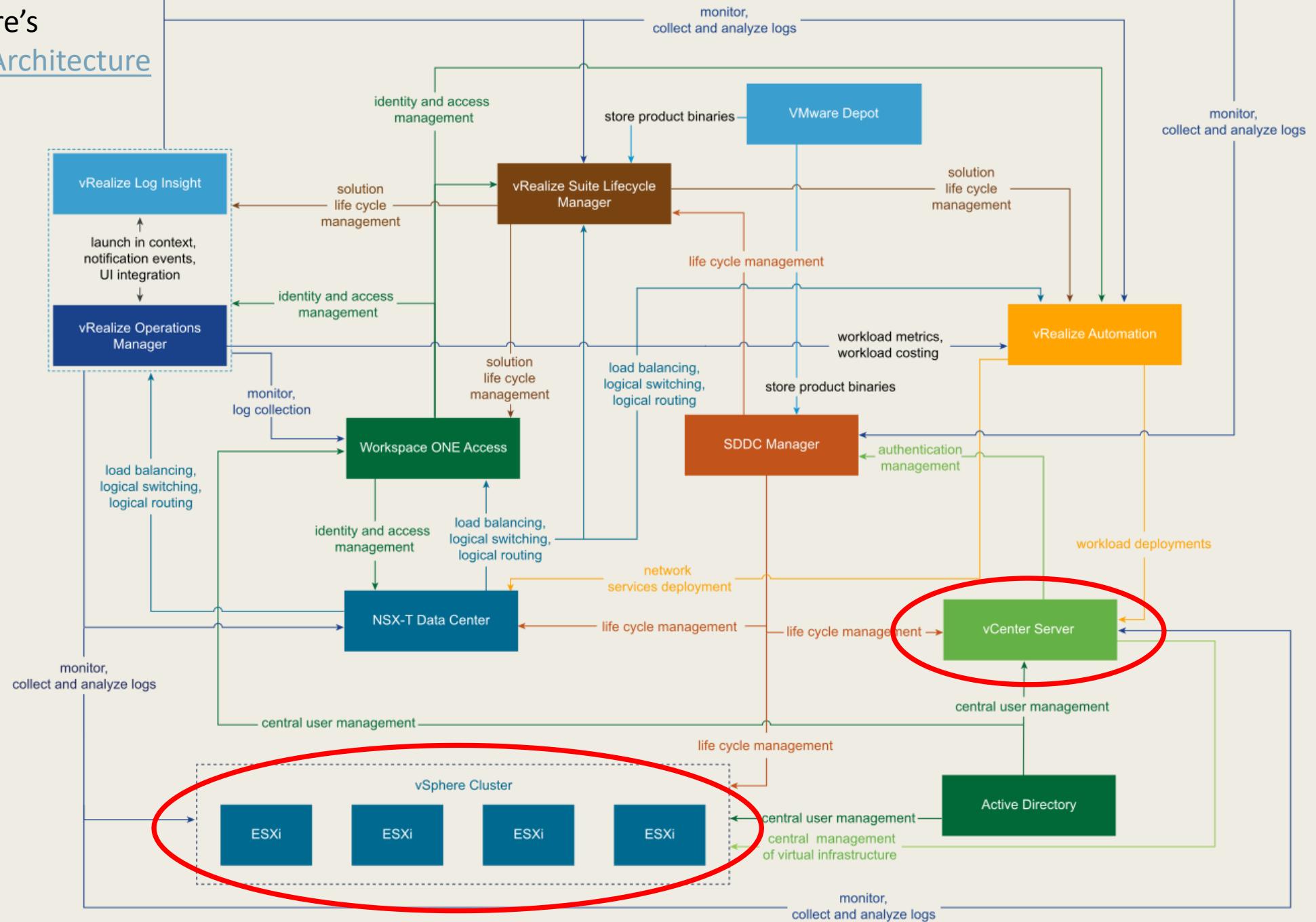
Management + Storage Virtualization

Network Virtualization

# vSphere Lab



## **VMware's SDDC Architecture**



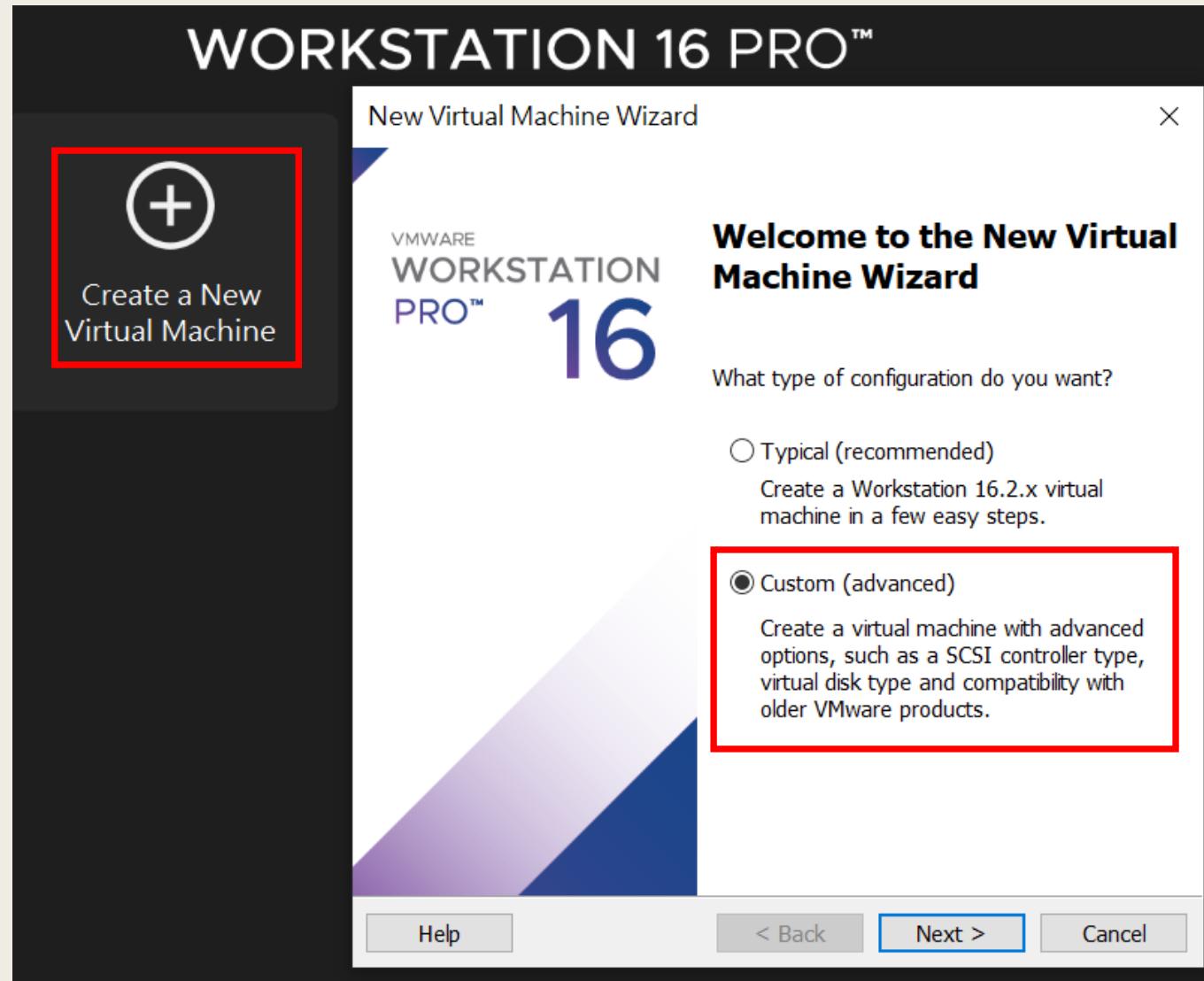
# vSphere Lab

- Installation
  - VMware ESXi
  - VMware vCenter Server Appliance (VCSA)
- ESXi
  - Create VM on ESXi
  - Configure Virtual Switch on ESXi
- VCSA
  - Configure Distributed Virtual Switch on VCSA

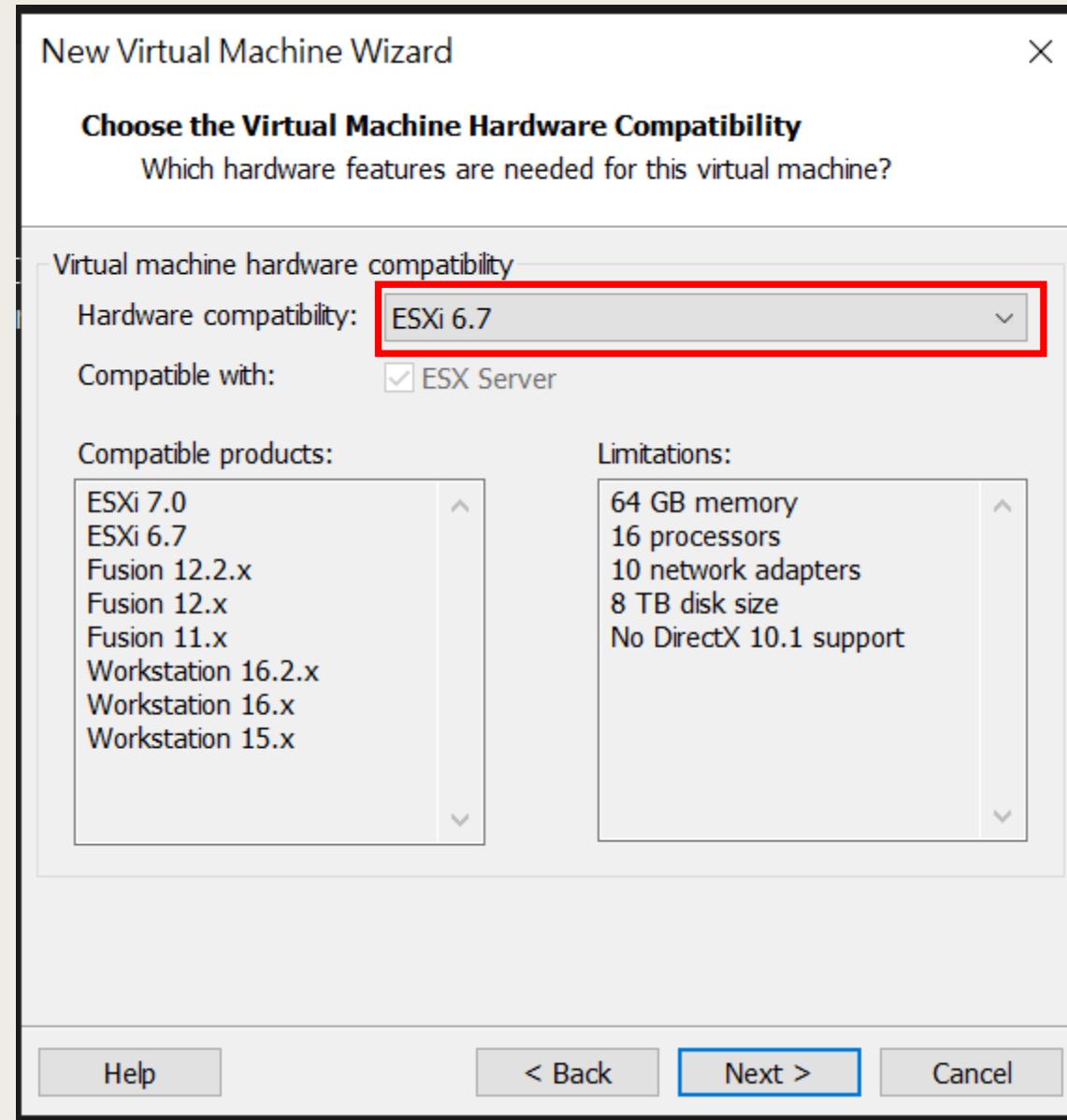
# VMware ESXi

Installation

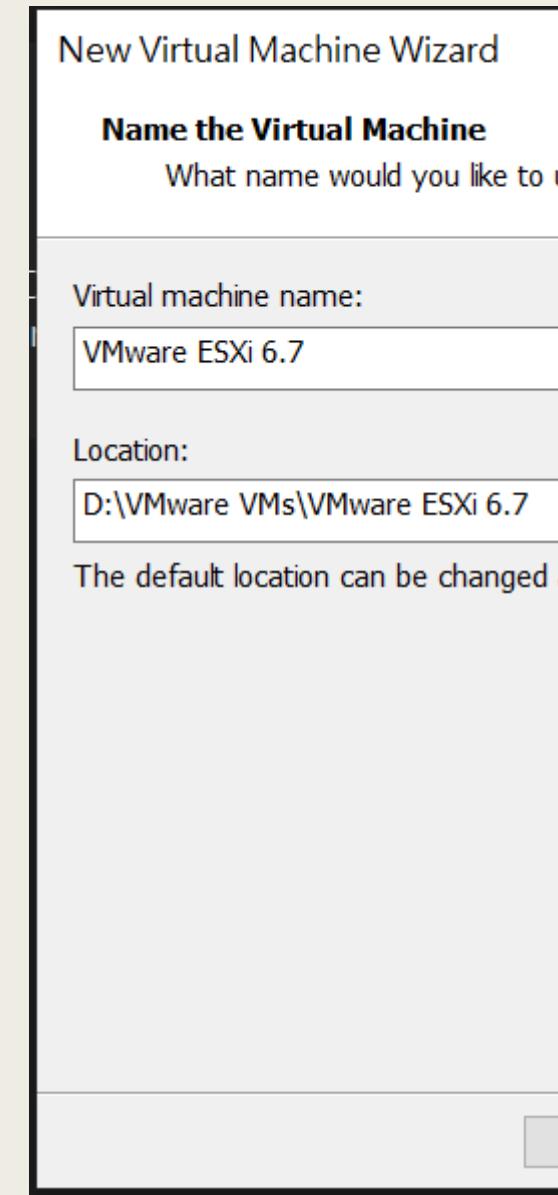
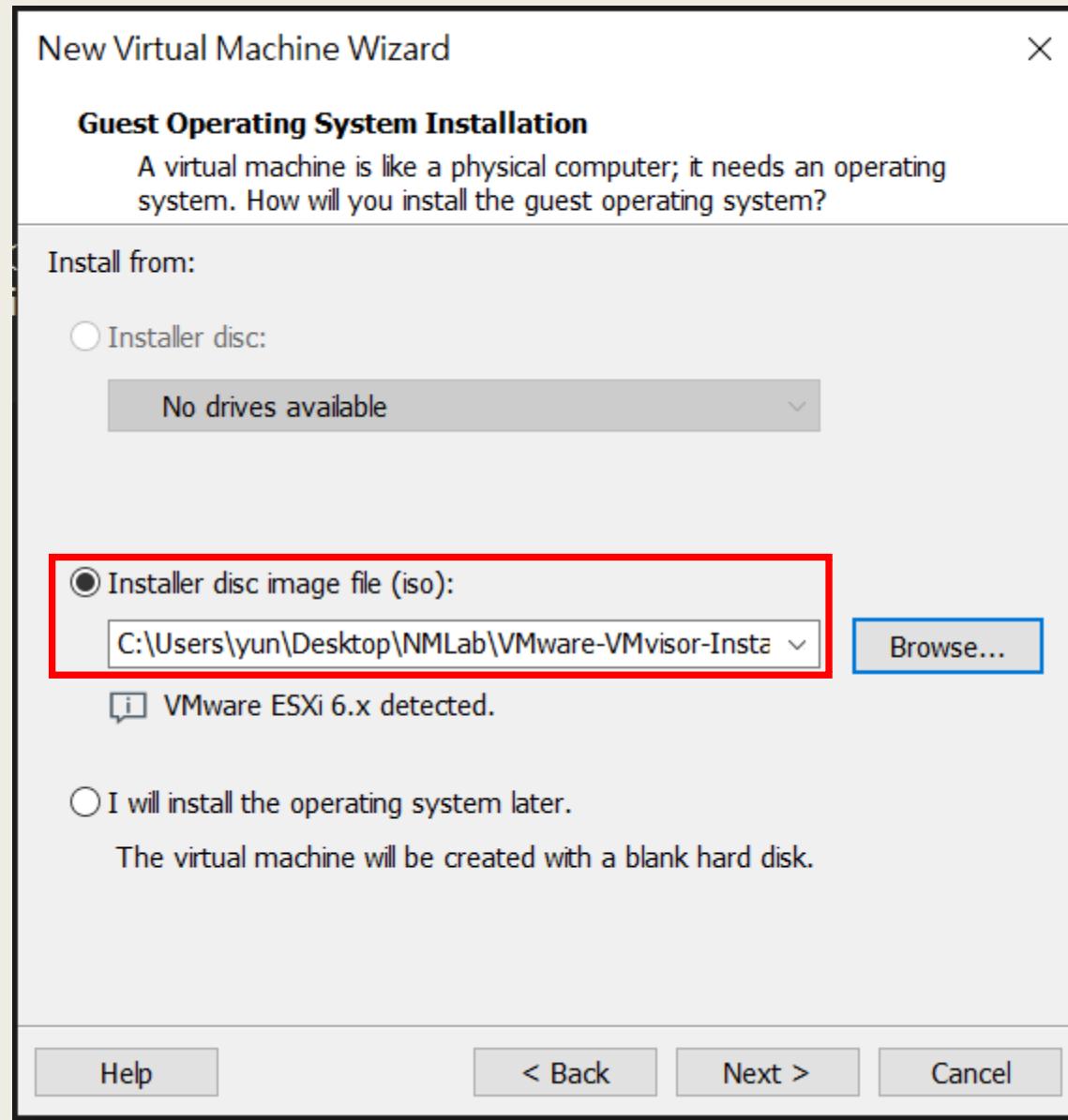
# VMware ESXi



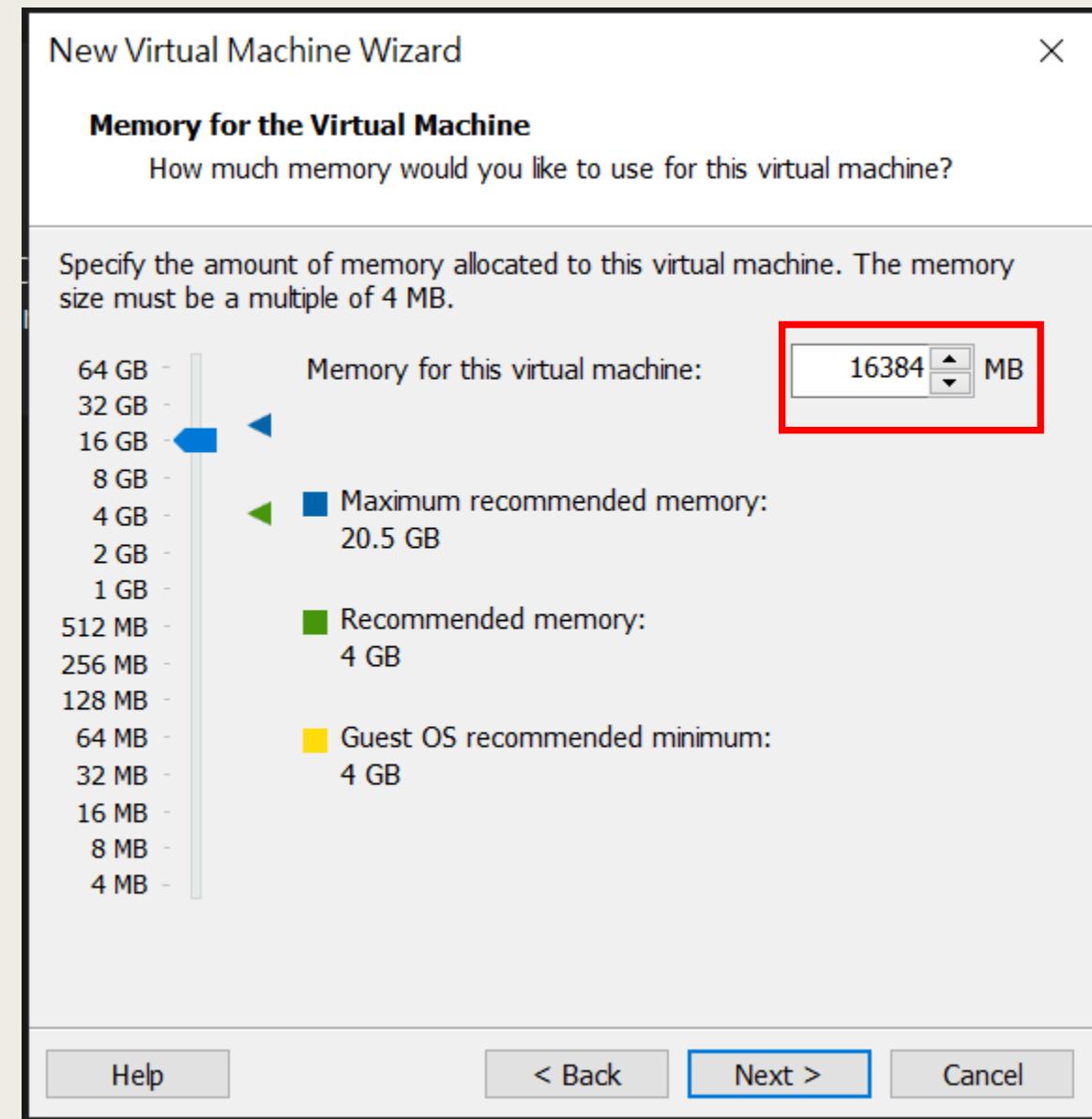
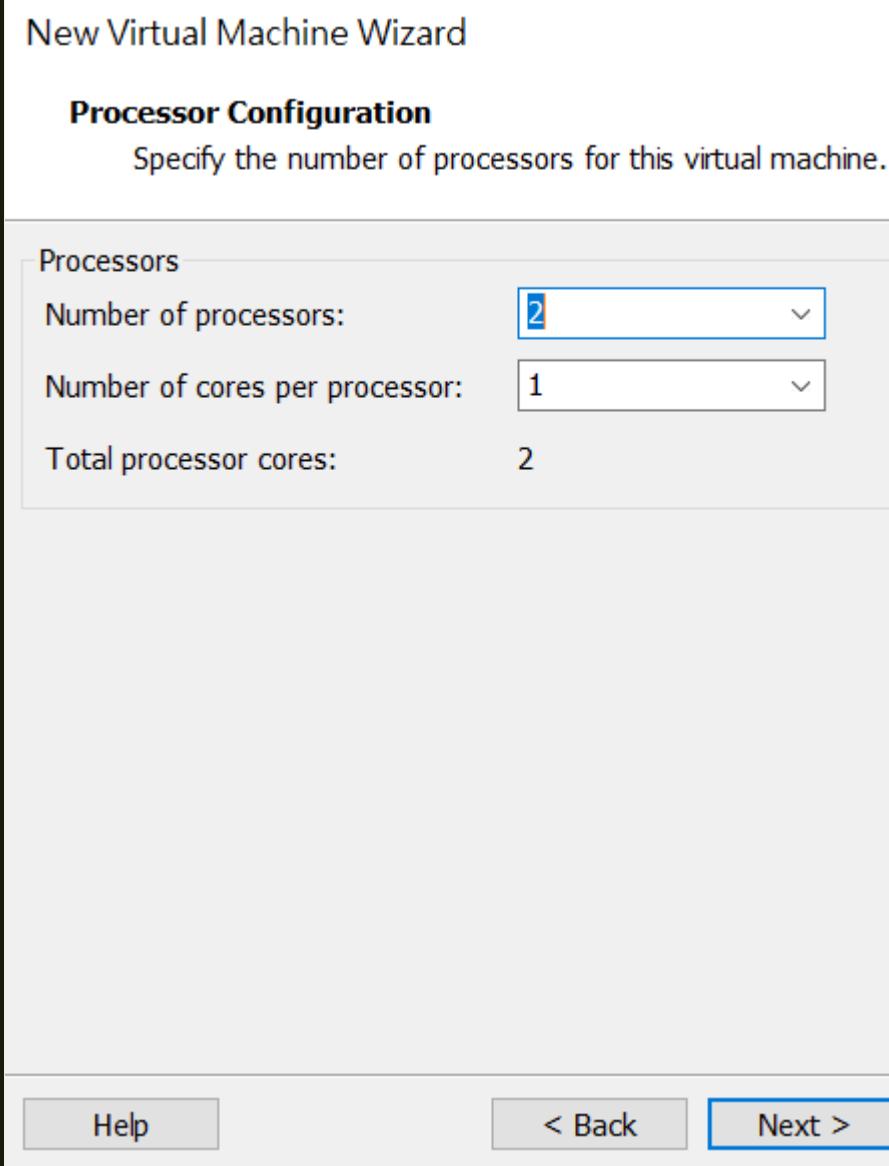
# VMware ESXi



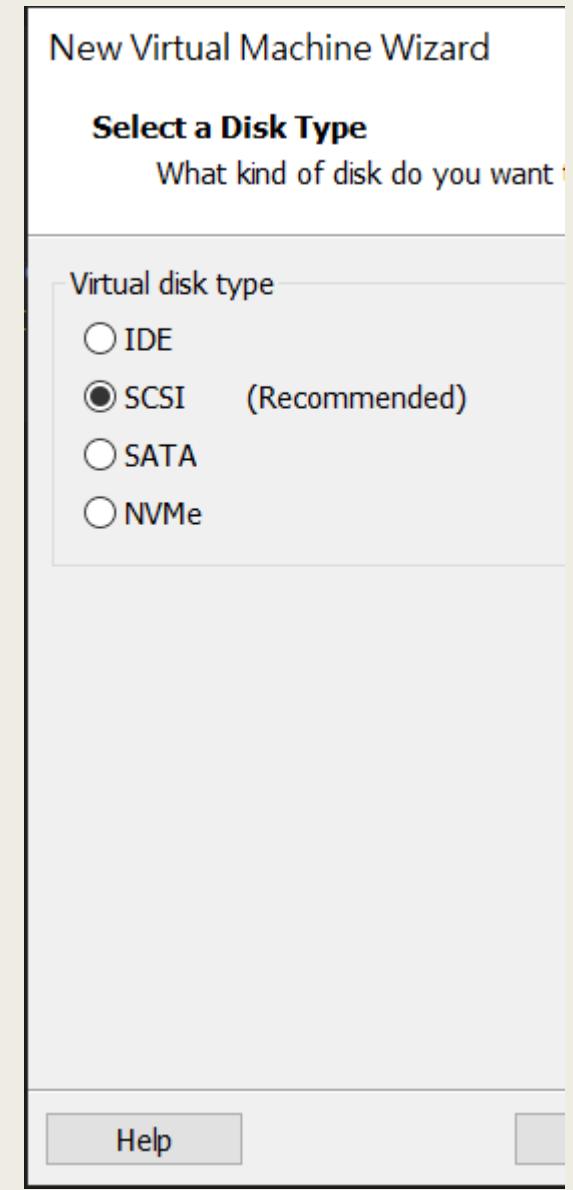
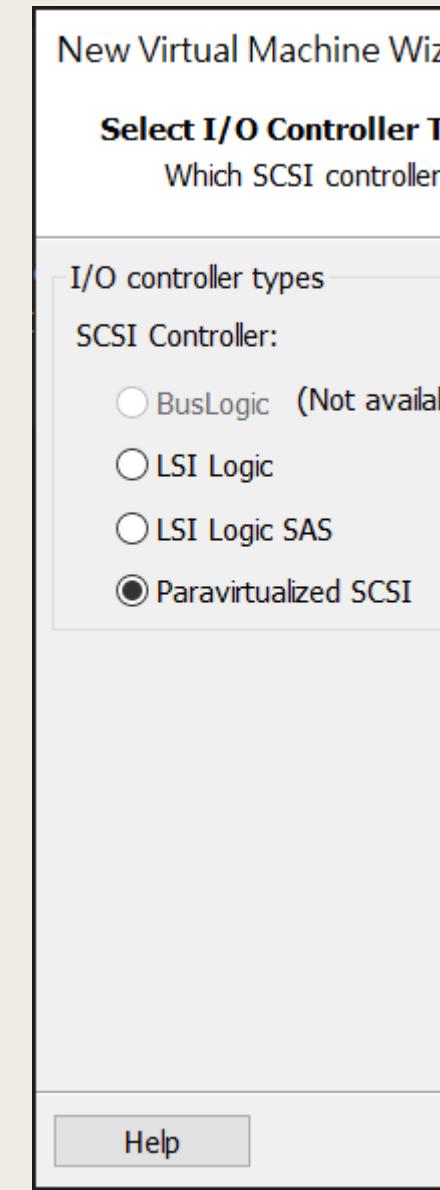
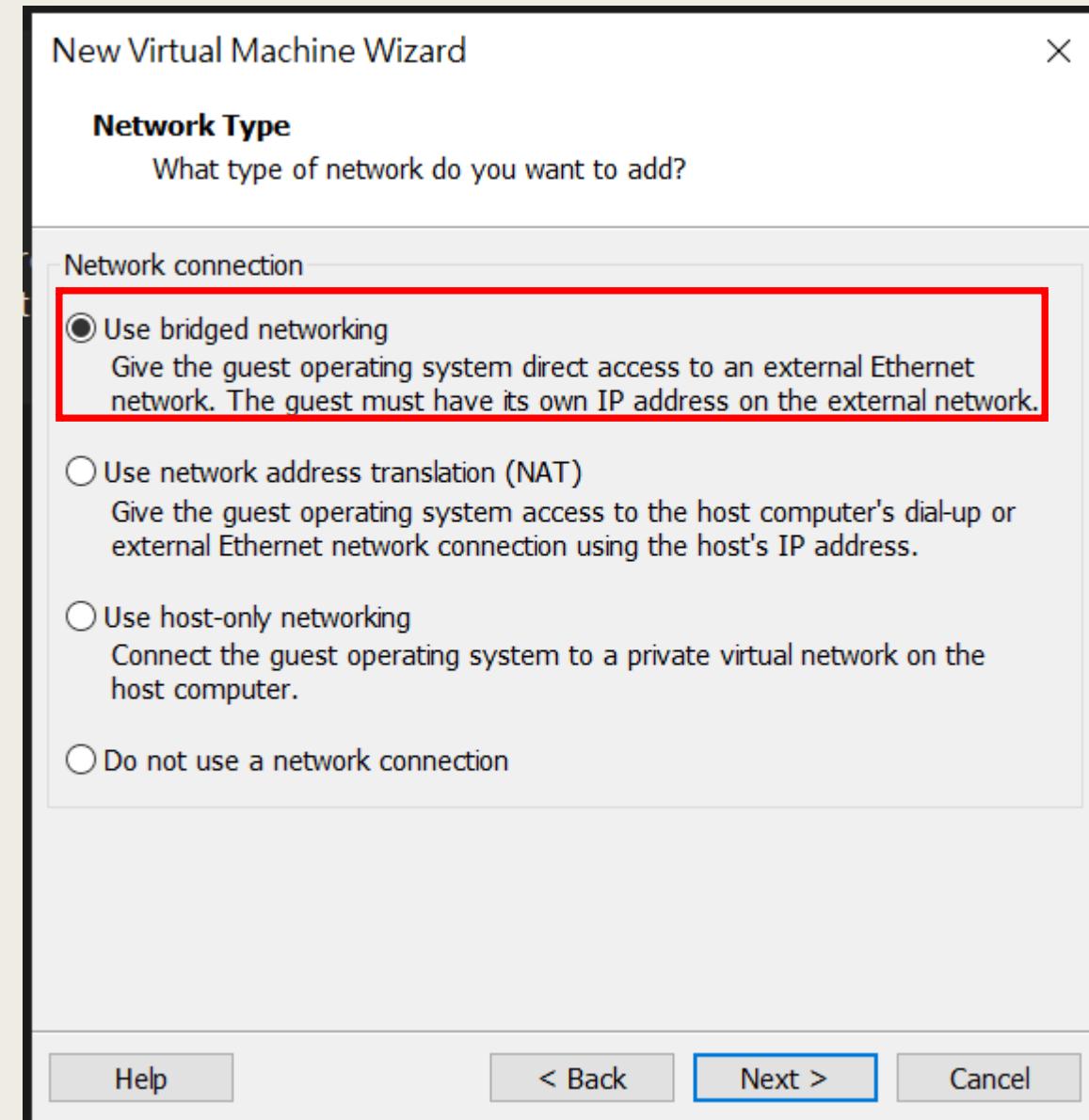
# VMware ESXi



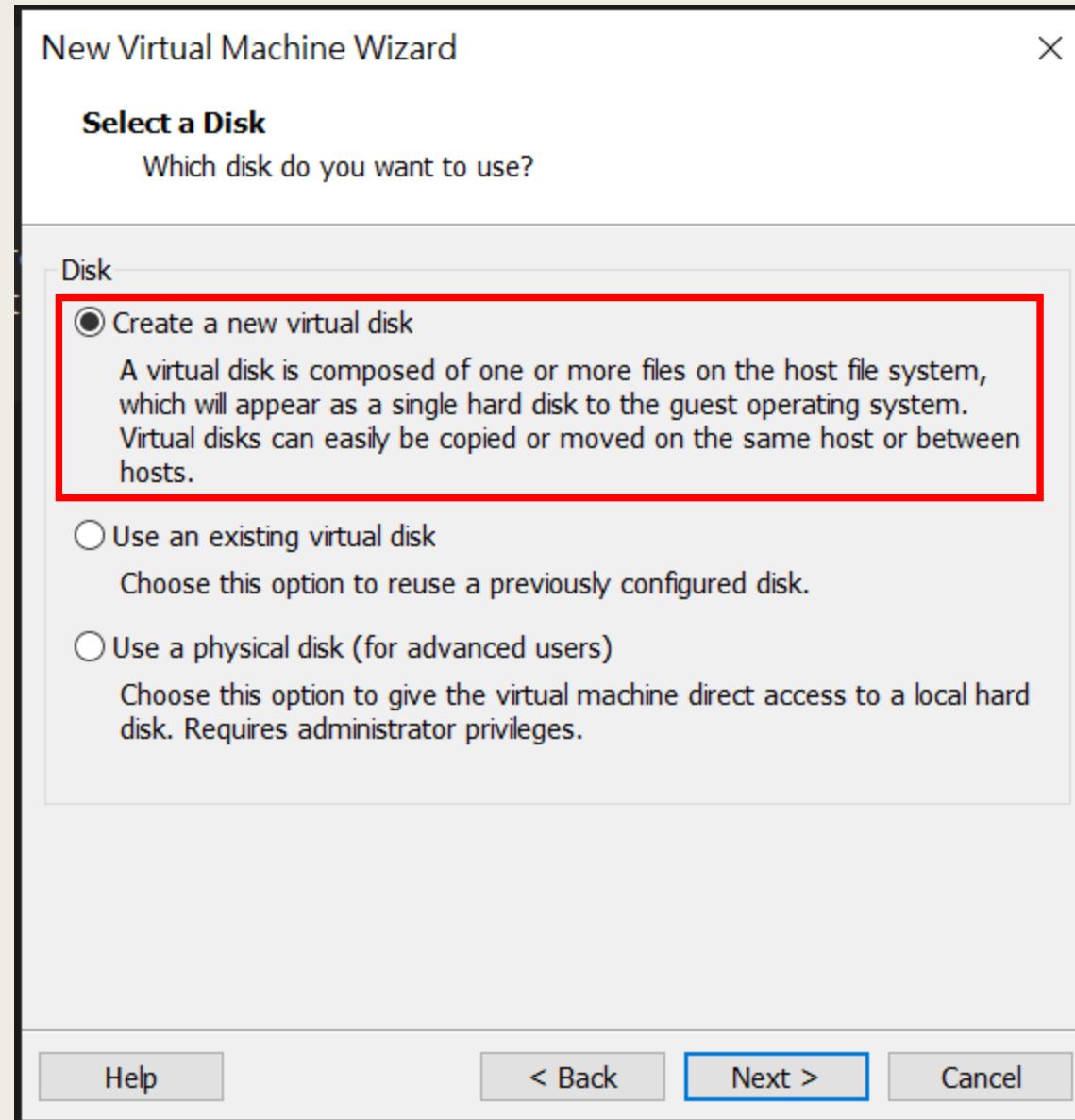
# VMware ESXi



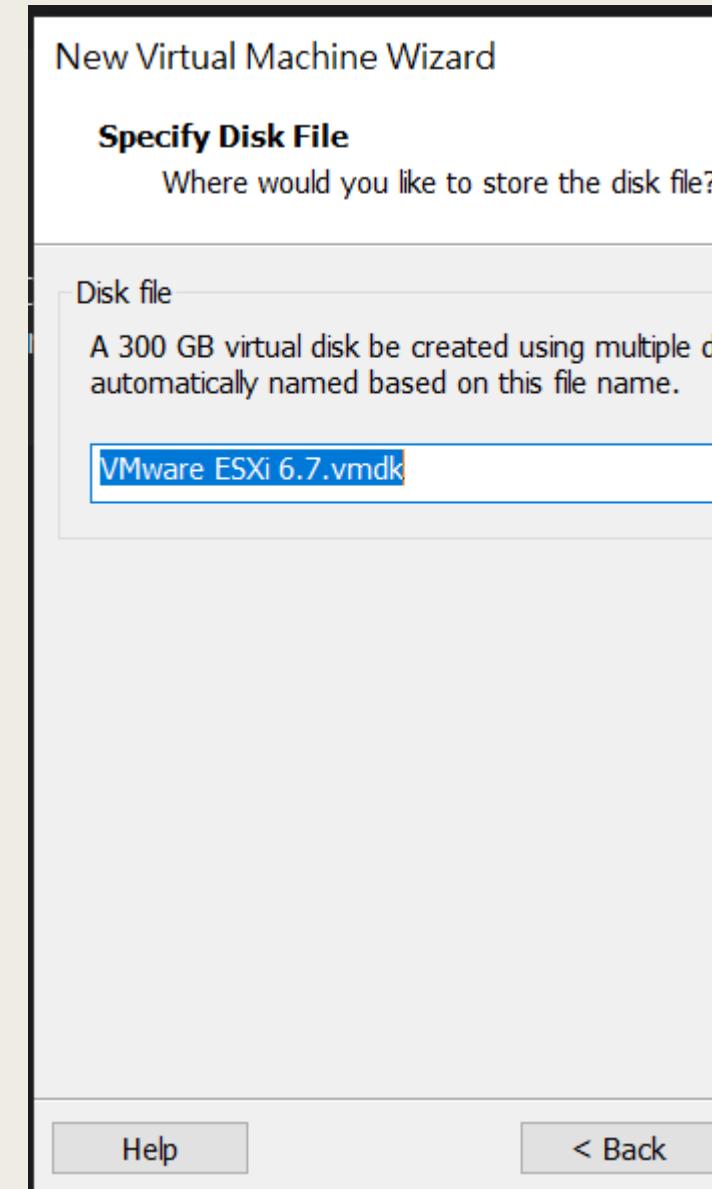
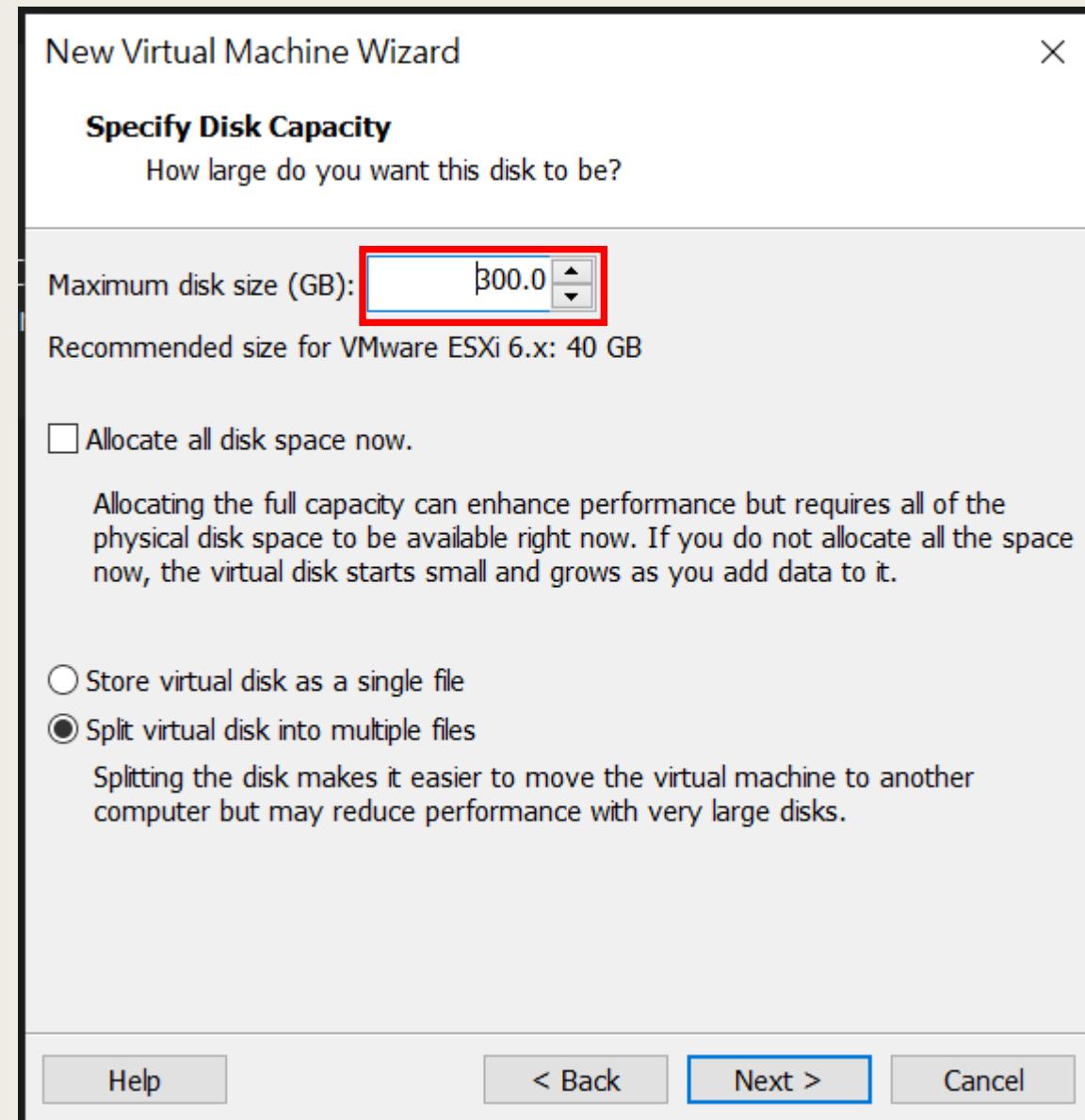
# VMware ESXi



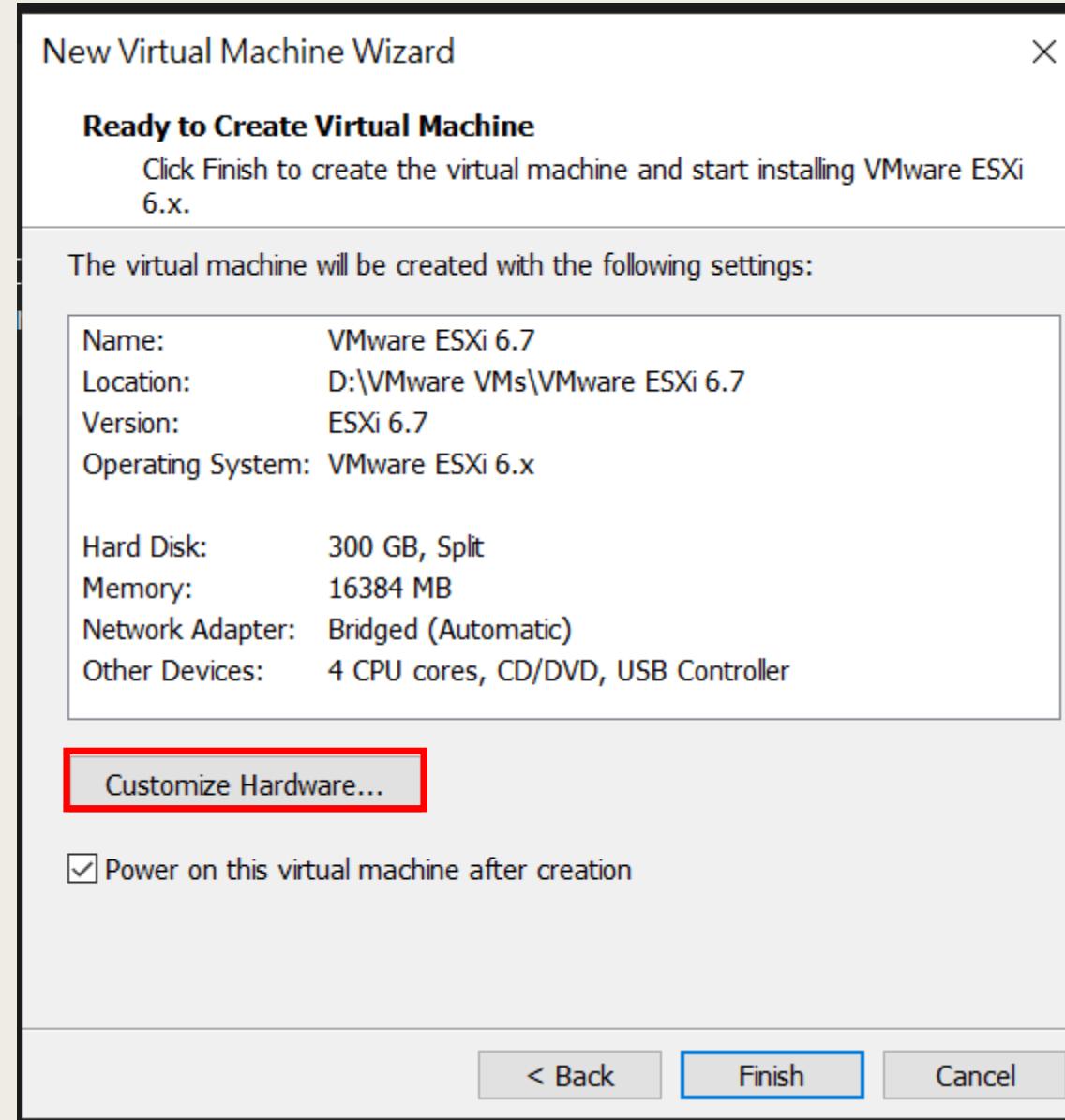
# VMware ESXi



# VMware ESXi



# VMware ESXi



# VMware ESXi

Hardware

Device	Summary
Memory	16 GB
Processors	2
New CD/DVD (IDE)	Using file C:\Users\yun\Desktop\...
Network Adapter	Bridged (Automatic)
USB Controller	
Display	

Memory  
Specify the amount of memory allocated to this virtual machine. The size must be a multiple of 4 MB.  
Memory for this virtual machine:  MB

Add Hardware Wizard

**Hardware Type**  
What type of hardware do you want to install?

Hardware types:

- CD/DVD Drive
- Floppy Drive
- Network Adapter
- USB Controller
- Sound Card
- Parallel Port
- Serial Port
- Printer
- Generic SCSI Device
- Trusted Platform Module

Explanation  
Add a network adapter.

Finish Cancel

Add... Remove

# VMware ESXi

Hardware

Device	Summary
Memory	16 GB
Processors	2
New CD/DVD (IDE)	Using file C:\Users\yun\Desktop\ISO\CentOS-7-x86_64-GenericCloud.iso
Network Adapter	Bridged (Automatic)
Network Adapter 2	Bridged (Automatic)
Network Adapter 3	Bridged (Automatic)
Network Adapter 4	Bridged (Automatic)
USB Controller	Present
Display	Auto detect

**4 Bridged Adapters**

Device status

Connected  
 Connect at power on

Network connection

Bridged: Connected directly to the physical network  
 Replicate physical network connection state

NAT: Used to share the host's IP address

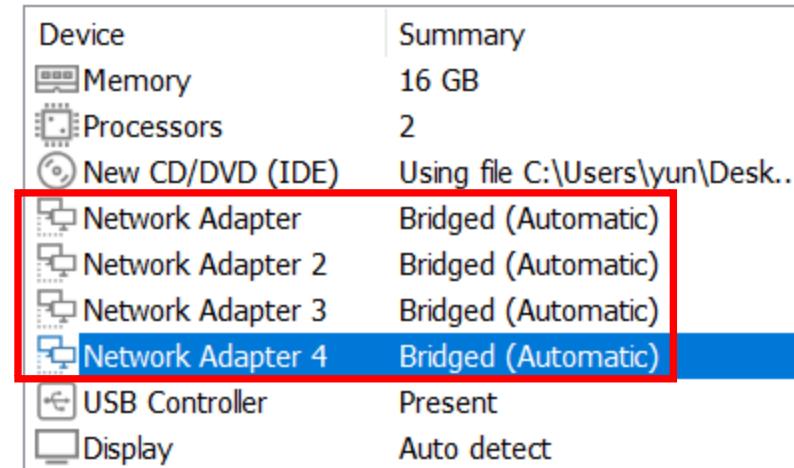
Host-only: A private network shared with the host

Custom: Specific virtual network

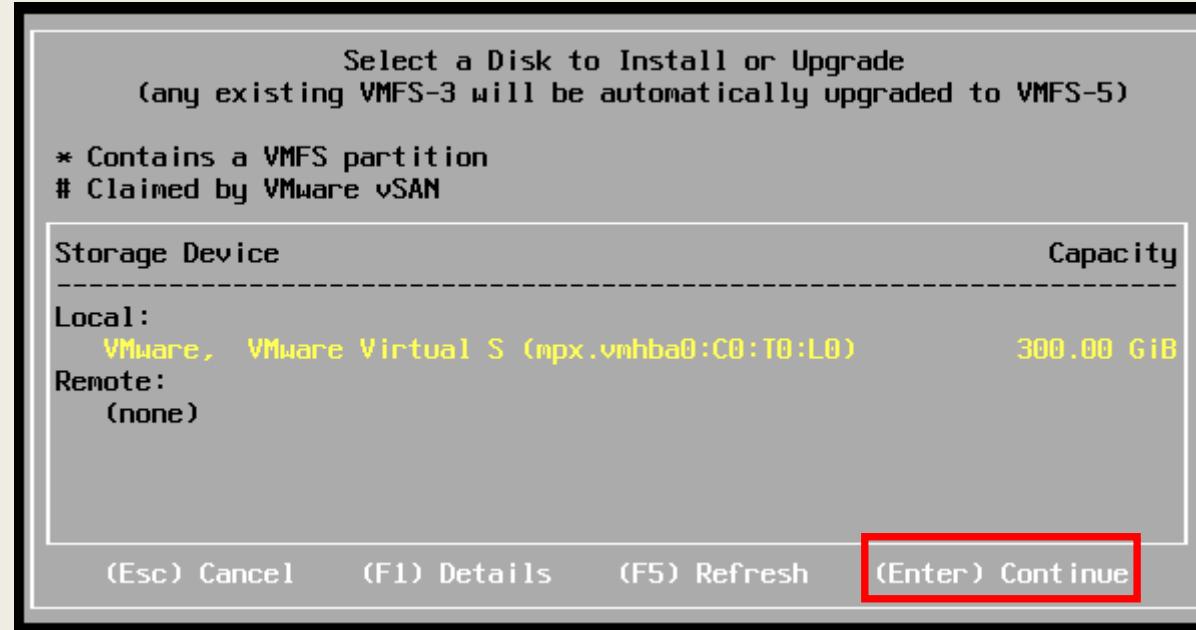
VMnet0

LAN segment:

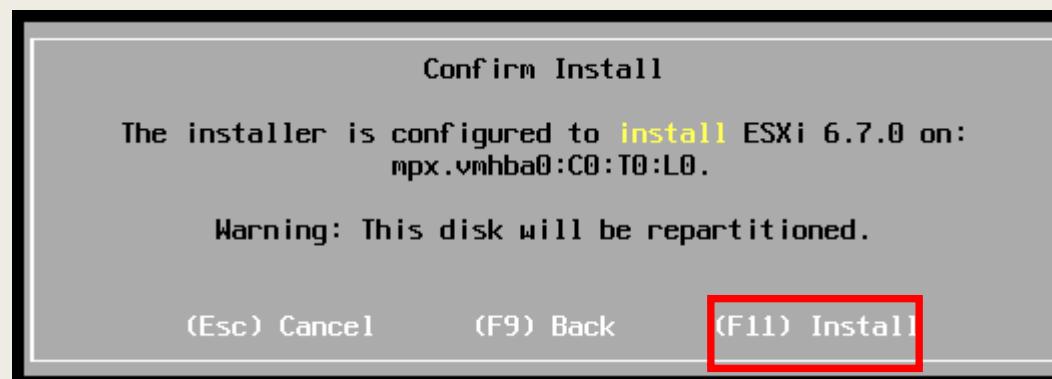
LAN Segments... Advanced...



# VMware ESXi



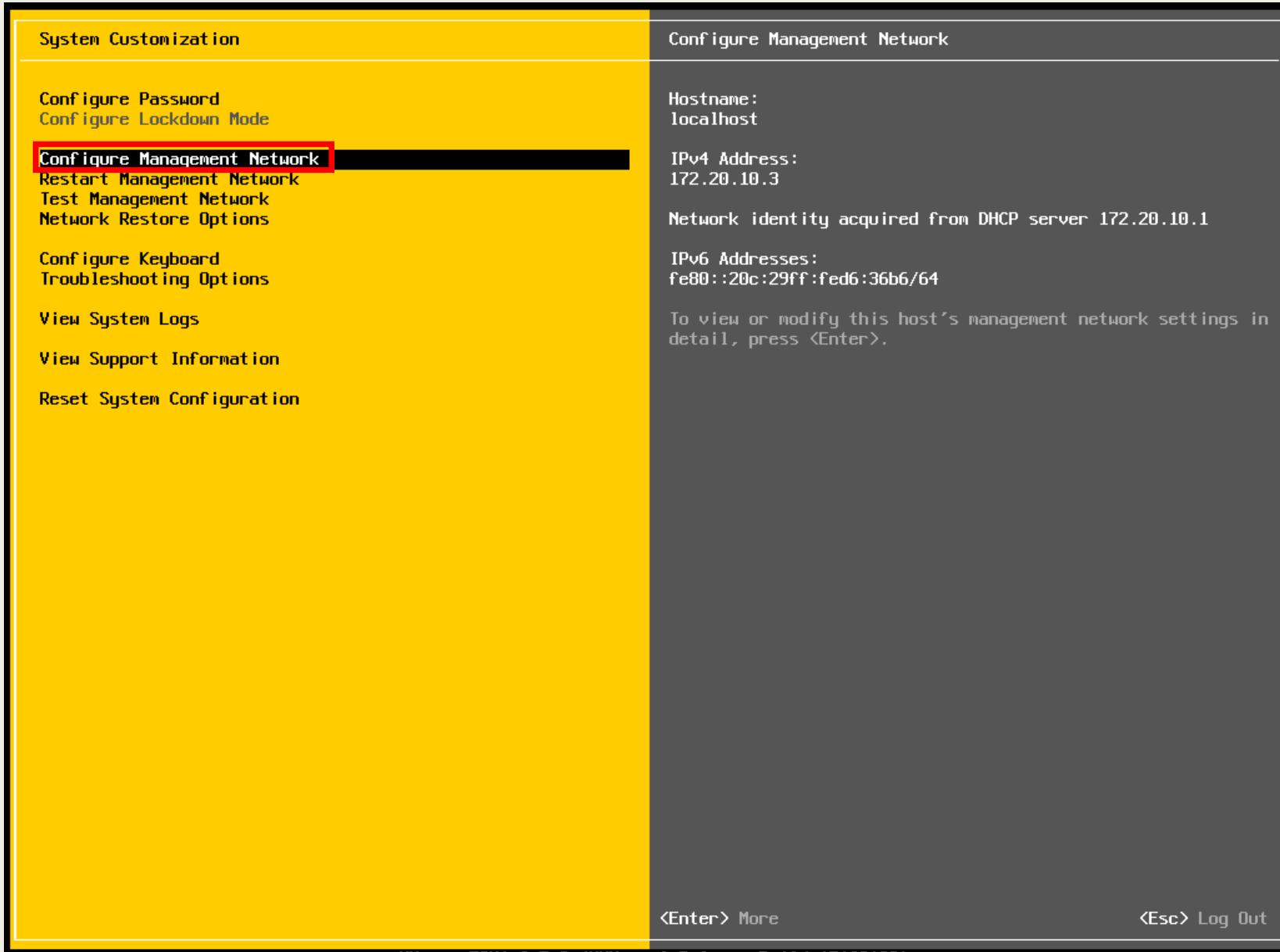
# VMware ESXi



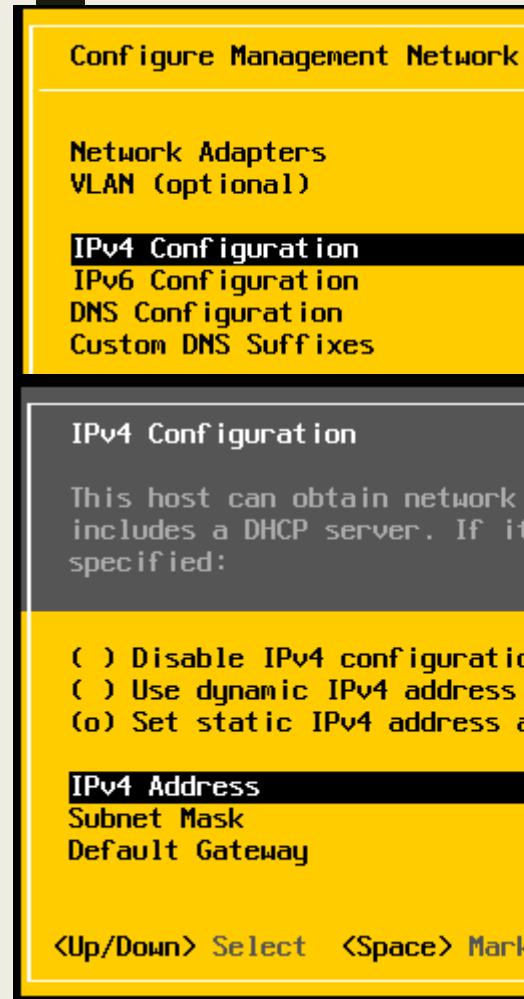
# VMware ESXi



# VMware ESXi



# VMware ESXi



```
wifi0: flags=4163<UP,BROADCAST,RUNNING,MULTICAST> mtu 1500
        inet 172.20.10.8 netmask 255.255.255.240 broadcast 172.20.10.15
              ether c8:e2:65:ff:32:5f  (Ethernet)
```

Netmask: 255.255.255.240 (11111111.11111111.11111111.11110000)

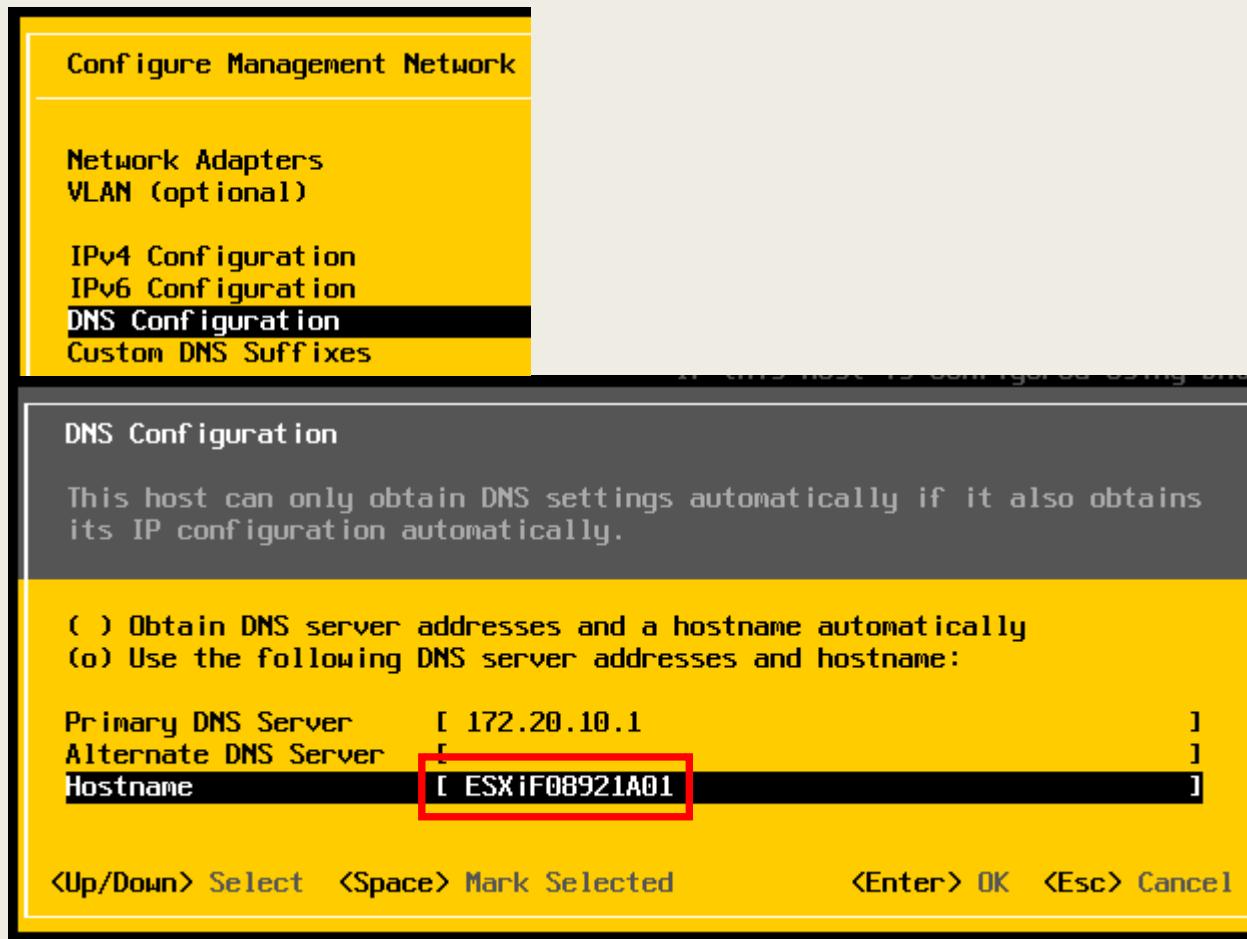
Host address: 1~14 (0 是網段 · 15 是 broadcast address)

```
> ip route show | grep default
none default via 140.112.233.254 dev eth5 proto unspec metric 256
none default via 172.20.10.1 dev wifi0 proto unspec metric 0
>
```

根據自己的網路環境決定，IP 不衝突即可。

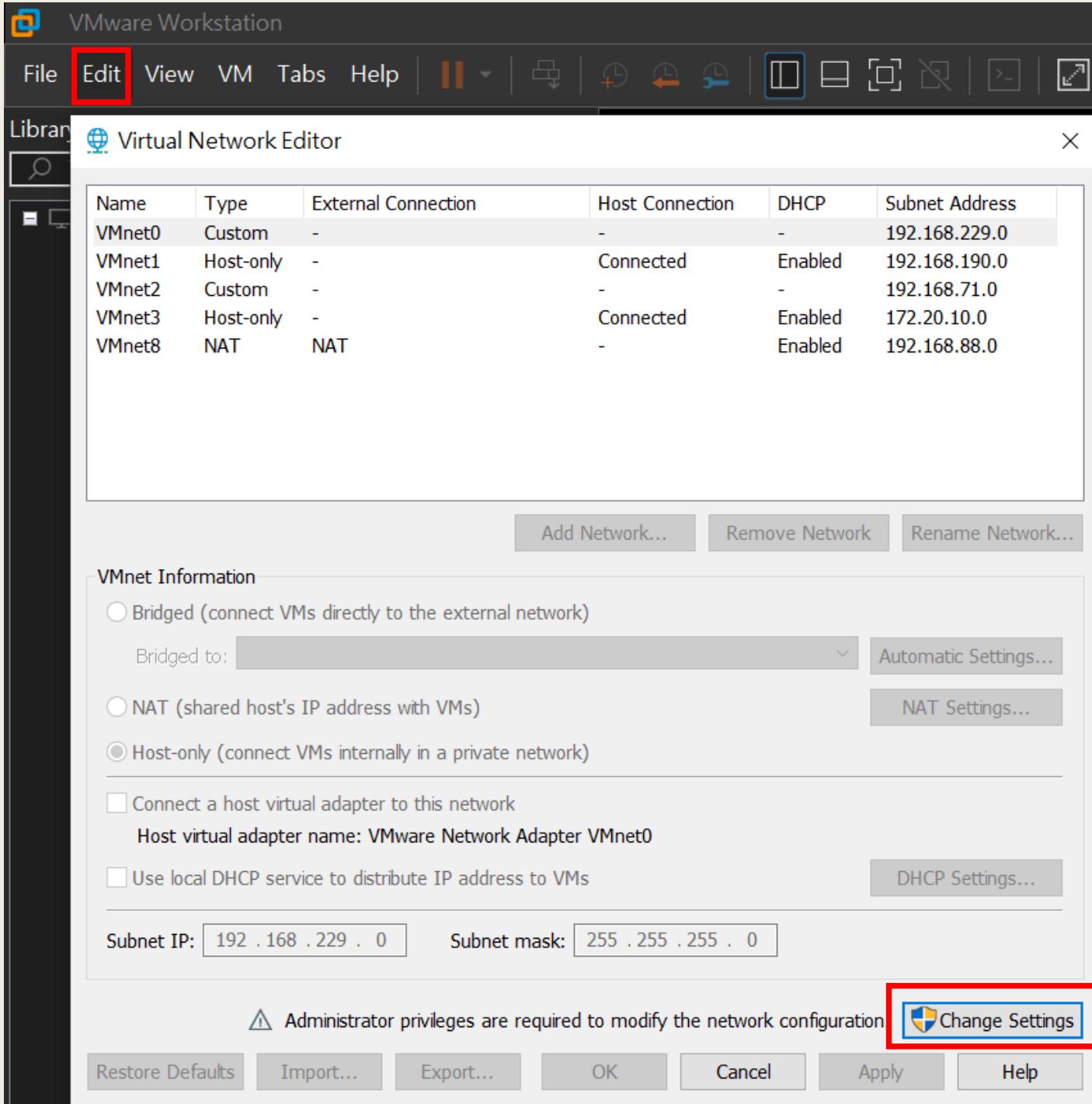
正常來講要設定 DHCP address range，但手機網路無法設定。

# VMware ESXi



Hostname 加個學號，避免衝突

# VMware ESXi



# VMware ESXi

Virtual Network Editor

Name	Type	External Connection	Host Connection	DHCP	Subnet Address
VMnet0	Bridged	Intel(R) Wi-Fi 6 AX200 160MHz	-	-	-
VMnet1	Host-only	-	Connected	Enabled	192.168.190.0
VMnet2	Bridged	Realtek USB FE Family Controller	-	-	-
VMnet3	Host-only	-	Connected	Enabled	172.20.10.0
VMnet8	NAT	NAT	-	Enabled	192.168.88.0

Add Network... Remove Network... Rename Network...

VMnet Information

Bridged (connect VMs directly to the external network)

Bridged to: Intel(R) Wi-Fi 6 AX200 160MHz

NAT (shared)

Host-only (shared)

Connect a host virtual machine to this network

Use local DHCP settings for this network

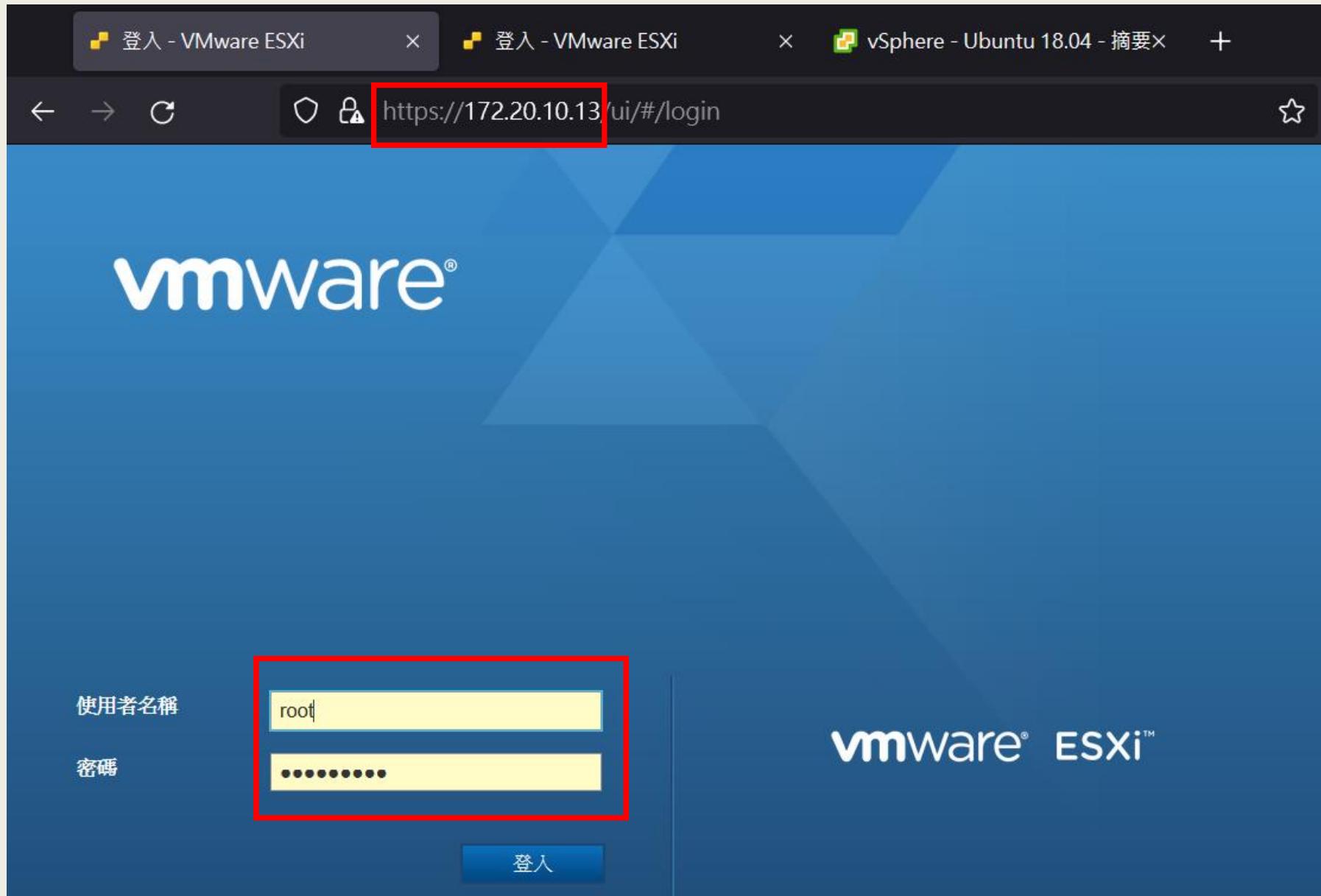
Subnet IP:

Automatic Settings...  
NAT Settings...  
DHCP Settings...

Restore Defaults Apply Help

The screenshot displays the VMware ESXi Virtual Network Editor interface. At the top, there's a table showing five virtual networks: VMnet0 (Bridged, Intel(R) Wi-Fi 6 AX200 160MHz), VMnet1 (Host-only, -), VMnet2 (Bridged, Realtek USB FE Family Controller), VMnet3 (Host-only, -), and VMnet8 (NAT, NAT). Below the table are three buttons: 'Add Network...', 'Remove Network...', and 'Rename Network...'. The main area is titled 'VMnet Information' and contains a section for 'Bridged' connections. A radio button for 'Bridged (connect VMs directly to the external network)' is selected and highlighted with a red box. A dropdown menu labeled 'Bridged to:' shows 'Intel(R) Wi-Fi 6 AX200 160MHz' as the current selection, also highlighted with a red box. Other options in the dropdown include 'Automatic', 'VirtualBox Host-Only Ethernet Adapter #8', 'VirtualBox Host-Only Ethernet Adapter #9', 'VirtualBox Host-Only Ethernet Adapter #6', 'VirtualBox Host-Only Ethernet Adapter #14', 'VirtualBox Host-Only Ethernet Adapter #13', 'VirtualBox Host-Only Ethernet Adapter #3', 'VirtualBox Host-Only Ethernet Adapter', 'VirtualBox Host-Only Ethernet Adapter #12', 'VirtualBox Host-Only Ethernet Adapter #10', 'VirtualBox Host-Only Ethernet Adapter #7', 'VirtualBox Host-Only Ethernet Adapter #5', 'Bluetooth Device (Personal Area Network)', 'VirtualBox Host-Only Ethernet Adapter #2', 'Microsoft Wi-Fi Direct Virtual Adapter #3', 'VirtualBox Host-Only Ethernet Adapter #11', 'TAP-Windows Adapter V9 for OpenVPN Connect', and 'VirtualBox Host-Only Ethernet Adapter #4'. To the right of the dropdown are three buttons: 'Automatic Settings...', 'NAT Settings...', and 'DHCP Settings...'. At the bottom left is a 'Restore Defaults' button, and at the bottom right are 'Apply' and 'Help' buttons.

# VMware ESXi



# VMware ESXi

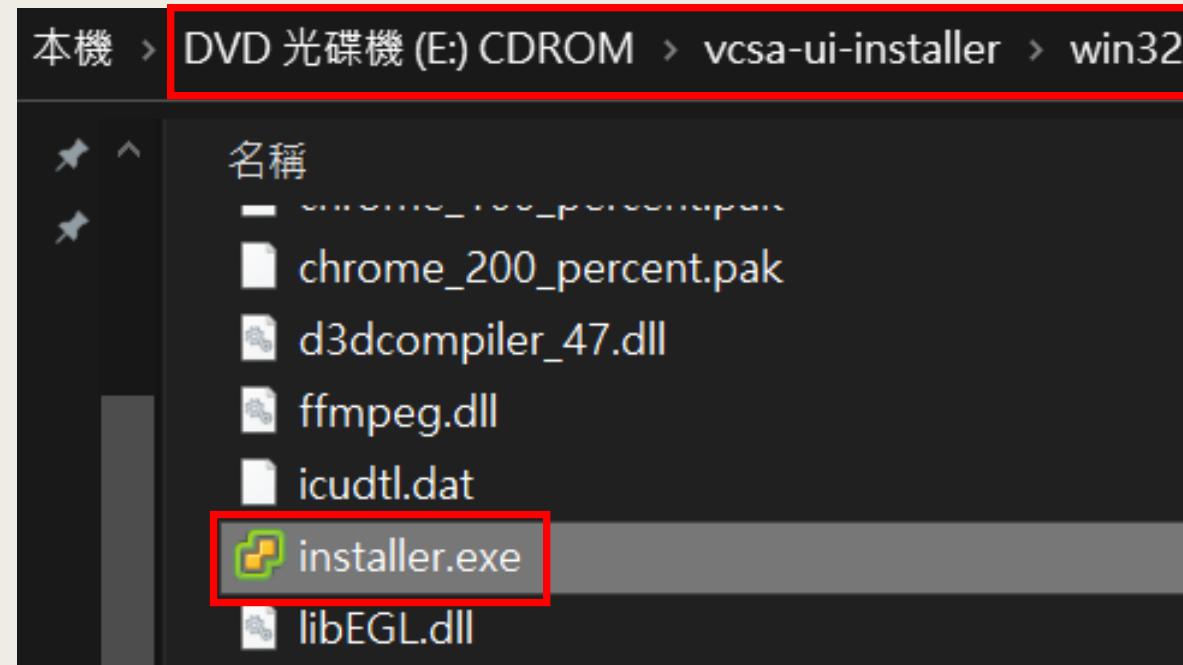
The screenshot shows a browser window titled "vSphere - Ubuntu 18.04 - 摘要" (Summary) with the URL <https://172.20.10.13/ui/#/host/vms>. The window displays the "ESXiF08921A01 - 虛擬機器" (Virtual Machines) section of the vSphere Client. On the left, a sidebar shows categories like "導覽器" (Navigator), "主機" (Host), "管理" (Management), and "監控" (Monitoring). Under "虛擬機器" (Virtual Machines), there is one item: "VMware vCenter Server Appliance". This item is highlighted with a red box. The main pane shows details for this VM, including its status (green checkmark), size (13.08 GB), operating system (Other 3.x Linux...), host name (photon-machine), and memory usage (247 MHz). A search bar at the top right is also visible.

Next step: install VCSA

# VMware vCenter Server Appliance (VCSA)

Installation

# VMware VCSA



# VMware VCSA

vCenter Server Appliance Installer

Installer

vCenter Server Appliance 6.7 Installer

English

The screenshot shows the main interface of the vCenter Server Appliance Installer. It features four large cards with icons and text:

- Install**: Represented by a box containing two interlocking gears. A red box highlights the "Install" button. Below it, text says: "Install a new vCenter Server Appliance or Platform Services Controller".
- Upgrade**: Represented by an open box with an upward arrow. Below it, text says: "Upgrade an existing vCenter Server Appliance or Platform Services Controller".
- Migrate**: Represented by a box with a blue "W" and a right-pointing arrow. Below it, text says: "Migrate from an existing vCenter Server or Platform Services Controller or Single Sign-On server for Windows to Appliance".
- Restore**: Represented by a box with a circular arrow. Below it, text says: "Restore from a previously created vCenter Server Appliance or Platform Services Controller Appliance backup".



## vm Install - Stage 1: Deploy appliance

- 1 Introduction
- 2 End user license agreement
- 3 Select deployment type
- 4 Appliance deployment target
- 5 Set up appliance VM
- 6 Select deployment size
- 7 Select datastore
- 8 Configure network settings
- 9 Ready to complete stage 1

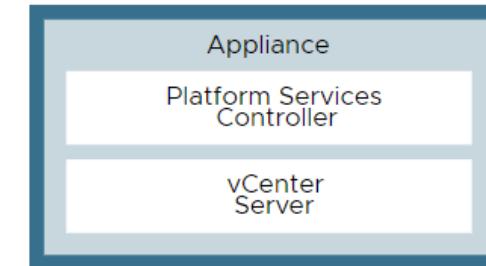
## Select deployment type

Select the deployment type you want to configure on the appliance.

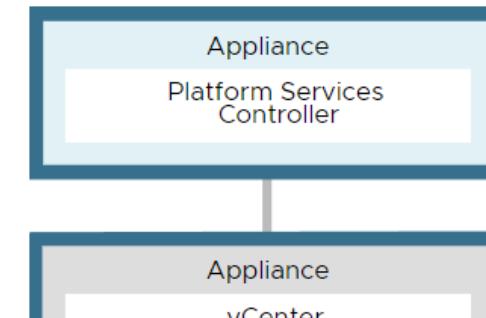
For more information on deployment types, refer to the vSphere 6.7 documentation.

**Embedded Platform Services Controller**

- vCenter Server with an Embedded Platform Services Controller

**External Platform Services Controller**

- Deprecated Deployment Model**
- Platform Services Controller
- vCenter Server (Requires External Platform Services Controller)



CANCEL

BACK

NEXT

## vm Install - Stage 1: Deploy vCenter Server Appliance with an Embedded Platform Services Controller

- 1 Introduction
- 2 End user license agreement
- 3 Select deployment type
- 4 Appliance deployment target
- 5 Set up appliance VM
- 6 Select deployment size
- 7 Select datastore
- 8 Configure network settings
- 9 Ready to complete stage 1

## Appliance deployment target

Specify the appliance deployment target settings. The target is the ESXi host or vCenter Server instance on which the appliance will be deployed.

ESXi 的 IP

ESXi host or vCenter Server name

172.20.10.13

(i)

HTTPS port

443

User name

root

(i)

Password

.....

ESXi 的 root 密碼

CANCEL

BACK

NEXT

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## vm Install - Stage 1: Deploy vCenter Server Appliance with an Embedded Platform Services Controller

- 1 Introduction
- 2 End user license agreement
- 3 Select deployment type
- 4 Appliance deployment target
- 5 Set up appliance VM
- 6 Select deployment size
- 7 Select datastore
- 8 Configure network settings
- 9 Ready to complete stage 1

## Set up appliance VM

Specify the VM settings for the appliance to be deployed.

VM name	VMware vCenter Server Appliance	(i)
Set root password	.....	(i)
Confirm root password	.....	

VCSA 的 root 密碼

CANCEL

BACK

NEXT 43



- 1 Introduction
- 2 End user license agreement
- 3 Select deployment type
- 4 Appliance deployment target
- 5 Set up appliance VM
- 6 Select deployment size**
- 7 Select datastore
- 8 Configure network settings
- 9 Ready to complete stage 1

## Select deployment size

Select the deployment size for this vCenter Server with an Embedded Platform Services Controller.

For more information on deployment sizes, refer to the vSphere 6.7 documentation.

Deployment size

Tiny

Storage size

Default



### Resources required for different deployment sizes

Deployment Size	vCPUs	Memory (GB)	Storage (GB)	Hosts (up to)	VMs (up to)
Tiny	2	10	300	10	100
Small	4	16	340	100	1000
Medium	8	24	525	400	4000
Large	16	32	740	1000	10000

CANCEL

BACK

NEXT  
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## Install - Stage 1: Deploy vCenter Server Appliance with an Embedded Platform Services Controller

- 1 Introduction
- 2 End user license agreement
- 3 Select deployment type
- 4 Appliance deployment target
- 5 Set up appliance VM
- 6 Select deployment size
- 7 Select datastore
- 8 Configure network settings
- 9 Ready to complete stage 1

## Select datastore

Select the storage location for this appliance

- Install on an existing datastore accessible from the target host

Name	Type	Capacity	Free	Provisioned	Thin Provisioning
datastore1	VMFS-6	292.5 GB	291.09 GB	1.41 GB	Supported

1 item

Enable Thin Disk Mode 

- Install on a new vSAN cluster containing the target host 

CANCEL

BACK

NEXT 45

# VMware VCSA



## Install - Stage 1: Deploy vCenter Server Appliance with an Embedded Platform Services Controller

1 Introduction

2 End user license agreement

3 Select deployment type

4 Appliance deployment target

5 Set up appliance VM

6 Select deployment size

7 Select datastore

8 Configure network settings

9 Ready to complete stage 1

### Configure network settings

Configure network settings for this appliance

Network

VM Network



IP version

IPv4



IP assignment

static



FQDN

FQDN (optional)



IP address

172.20.10.14



Subnet mask or prefix length

28

根據自己的網路環境決定，  
IP 不衝突即可。

Default gateway

172.20.10.1

DNS servers

1.1.1.1

Common Ports

CANCEL

BACK

NEXT 46

vm

Install - Stage 2: Set Up vCenter Server Appliance with an Embedded Platform Services Controller

1 Introduction

2 Appliance configuration

3 SSO configuration

4 Configure CEIP

5 Ready to complete

## Appliance configuration

Time synchronization mode

Synchronize time with the ESXi ho ▾

SSH access

Enabled ▾

CANCEL

BACK

NEXT



## Install - Stage 2: Set Up vCenter Server Appliance with an Embedded Platform Services Controller

- 1 Introduction
- 2 Appliance configuration
- 3 SSO configuration
- 4 Configure CEIP
- 5 Ready to complete

## SSO configuration

Create a new SSO domain

Single Sign-On domain name

vsphere.local



Single Sign-On user name

administrator



Single Sign-On password

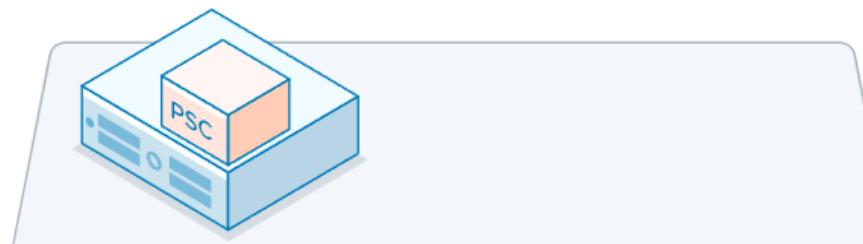
.....



Confirm password

.....

Join an existing SSO domain

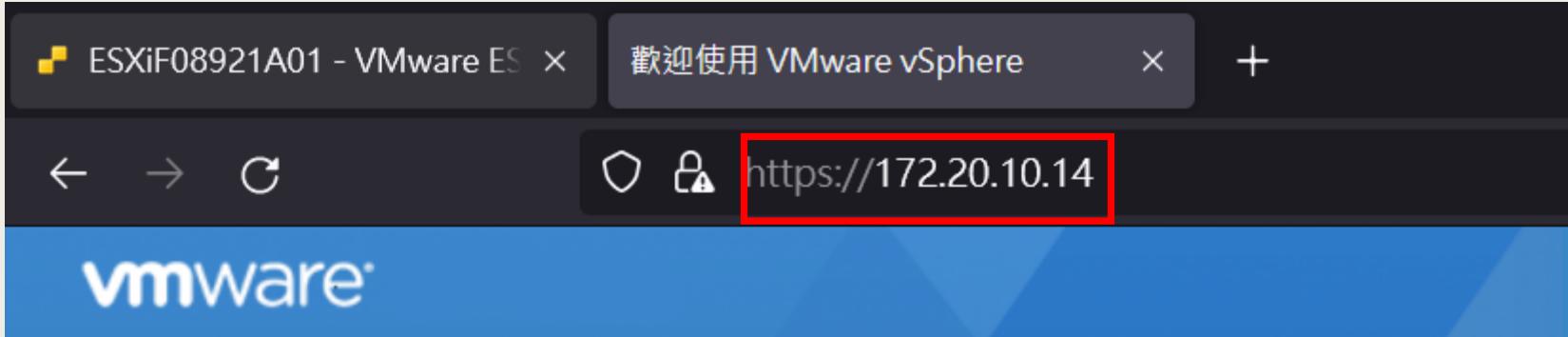


CANCEL

BACK

NEXT

# VMware VCSA



## 入門

The vSphere Flash-based Web Client is deprecated in vSphere 6.7. We recommend switching to the all-new modern HTML5-based vSphere client as the primary client and only reverting to the Flash-based Web Client when necessary.

[啟動 VSPHERE CLIENT \(HTML5\)](#)

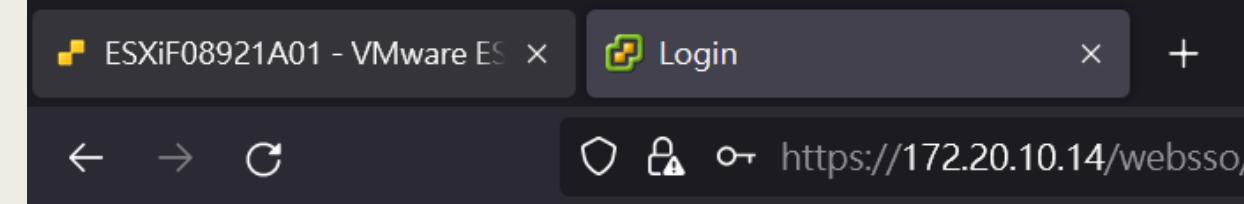
[啟動 VSPHERE WEB CLIENT \(FLEX\)](#)

*Deprecated*

## 說明文件

[VMware vSphere 說明文件中心](#)

[vSphere Client 的功能更新 \(HTML5\)](#)



administrator@vsphere.local

••••••••

使用 Windows 工作階段驗證

登入

# VMware VCSA

The screenshot shows the vSphere Client interface. In the top left, there's a tab for '登入 - VMware ESXi'. The main title bar says 'vSphere - 172.20.10.14 - 摘要' with a URL 'https://172.20.10.14/ui/#?exten...'. Below the title bar, there are navigation icons and a search bar. The main content area shows a summary for host '172.20.10.14' with icons for VMs, Datastores, and Networks. A sidebar on the left has tabs for 'vm', 'vSphere Client', '功能表', and a search bar. A context menu is open under the '172.20.10.14' entry, with the 'Actions' item expanded. The 'Add Datacenter...' option is highlighted with a red box.

新增資料中心

名稱: DatacenterF08921A01

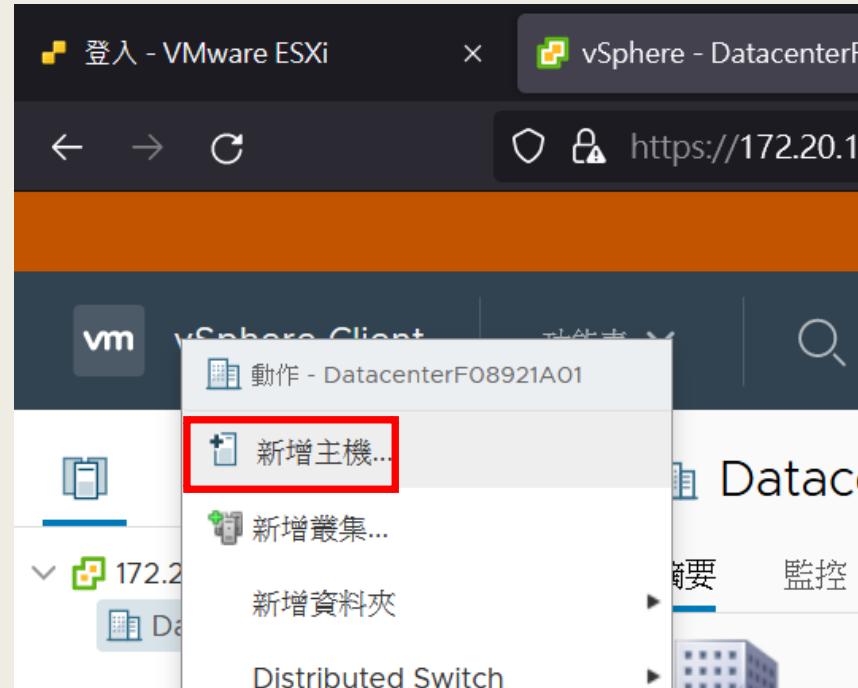
位置: 172.20.10.14

取消 確定

自訂屬性

屬性

# VMware VCSA



新增主機

1 名稱和位置

2 連線設定

3 主機摘要

4 指派授權

5 鎖定模式

6 虛擬機器位置

7 即將完成

名稱和位置

自己/同學的 ESXi 的靜態 IP

輸入要新增至 vCenter Server 之主機的名稱或 IP 位址。

主機名稱或 IP 位址:

位置: DatacenterF08921A01

## 新增主機

✓ 1 名稱和位置

2 連線設定

3 主機摘要

4 指派授權

5 鎖定模式

6 虛擬機器位置

7 即將完成

## 連線設定

輸入主機連線詳細資料

使用者名稱:

密碼:

root

\*\*\*\*\*

自己/同學的 ESXi root 密碼

## 新增主機

✓ 1 名稱和位置

✓ 2 連線設定

✓ 3 主機摘要

✓ 4 指派授權

✓ 5 鎖定模式

✓ 6 虛擬機器位置

7 即將完成

## 即將完成

按一下「完成」以新增主機

名稱

位置

版本

授權

網路

資料存放區

鎖定模式

虛擬機器位置

172.20.10.12

DatacenterF08921A01

VMware ESXi 6.7.0 組建版本-15160138

評估授權

VM Network

datastore1

已停用

DatacenterF08921A01

CANCEL

BACK

FINISH

# VMware VCSA

The screenshot shows the vSphere Client interface with a context menu open over a running virtual machine (Ubuntu 18.04). The menu items are:

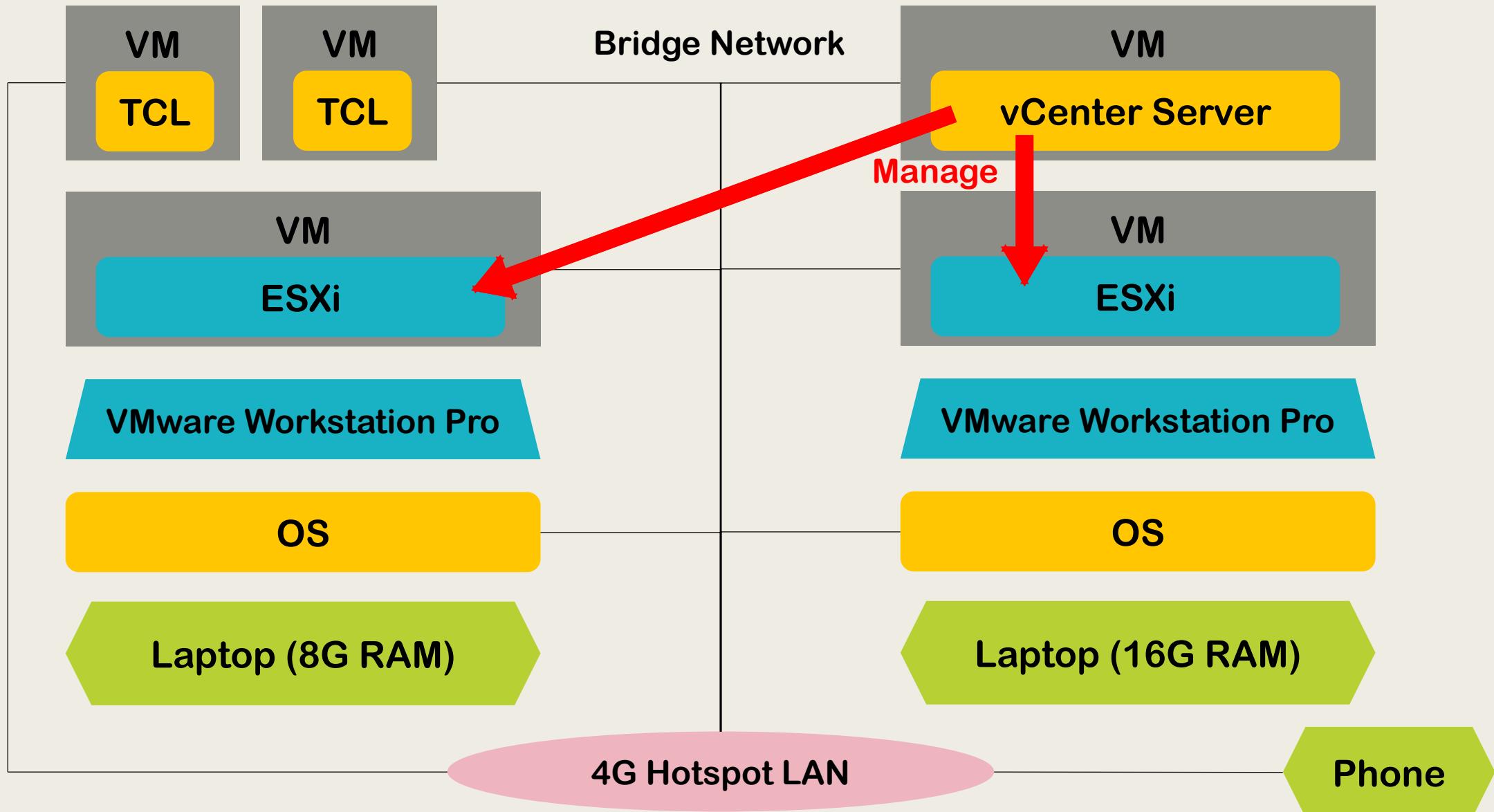
- 變更密碼
- 我的喜好設定
- 切換佈景主題** (highlighted with a red box)
- 登出

The main vSphere Client window displays the following information for the selected VM:

- 摘要** tab selected.
- 客體作業系統:** Ubuntu Linux (64-bit)
- 相容性:** ESXi 6.7 及更新版本 (虛擬)
- VMware Tools:** 不在執行中，未安裝
- DNS 名稱:** (empty)
- IP 位址:** 172.20.10.11
- 主機:** 172.20.10.11

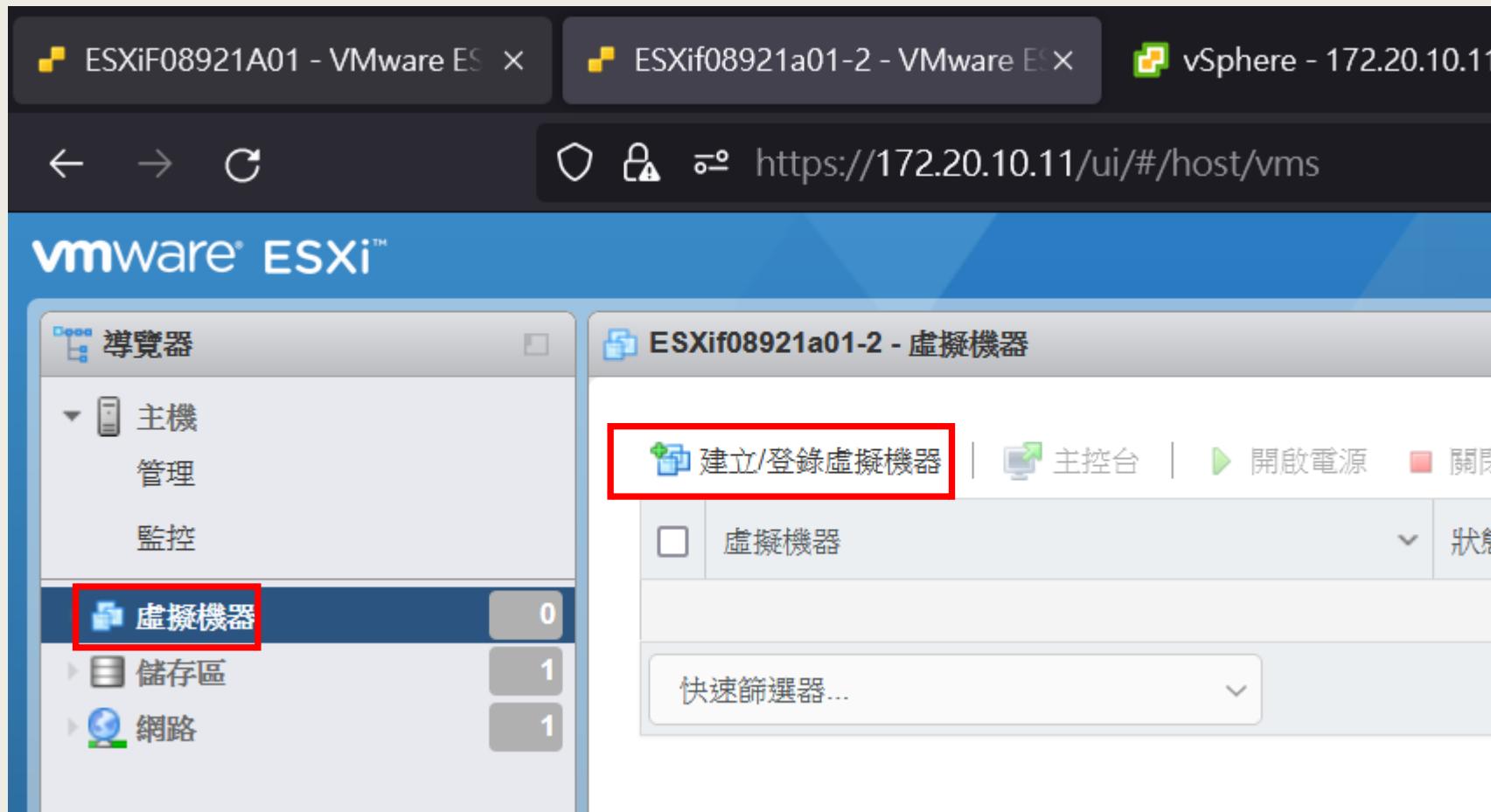
At the bottom of the screen, there is a yellow banner with the message: **⚠ 此虛擬機器上未安裝 VMware Tools。** and a link: [安裝 VMware Tools...](#).

# vSphere Lab

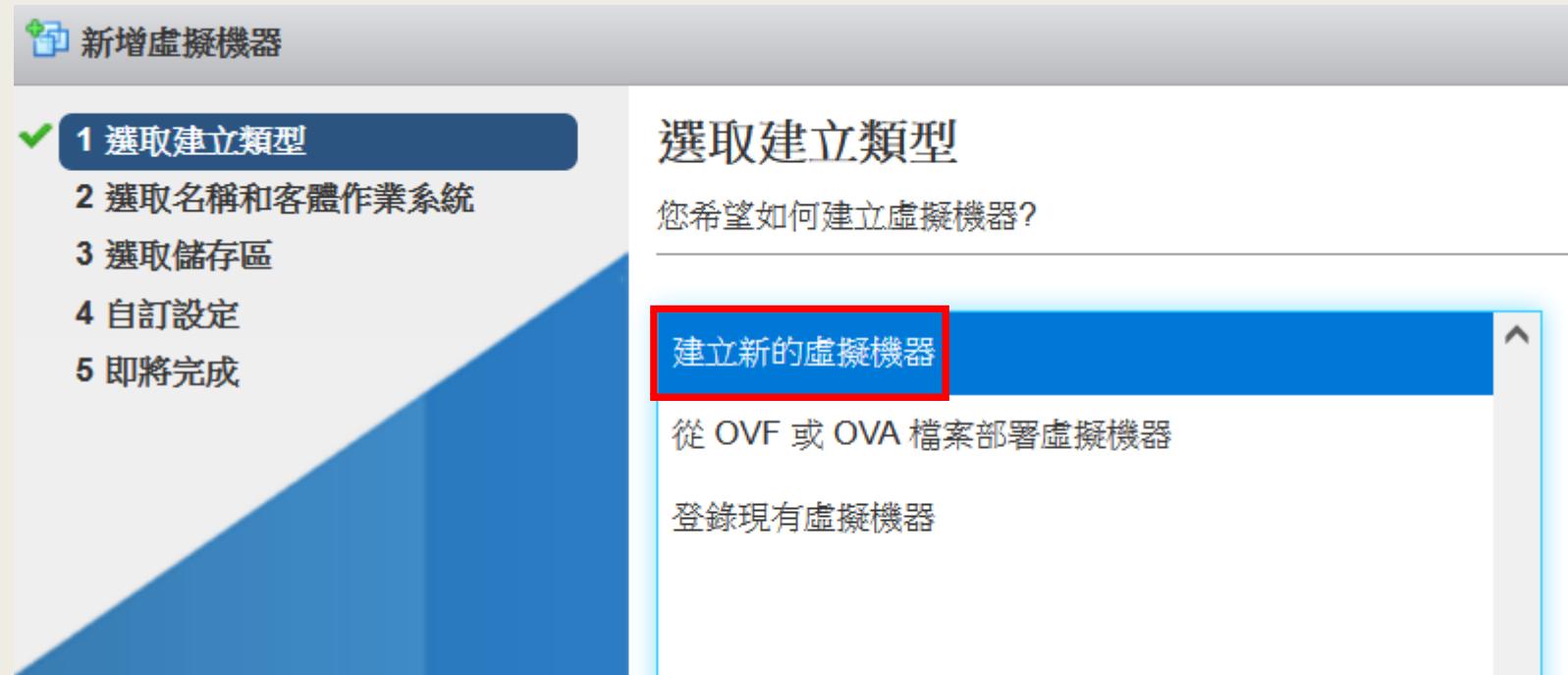


# Create VM on ESXi

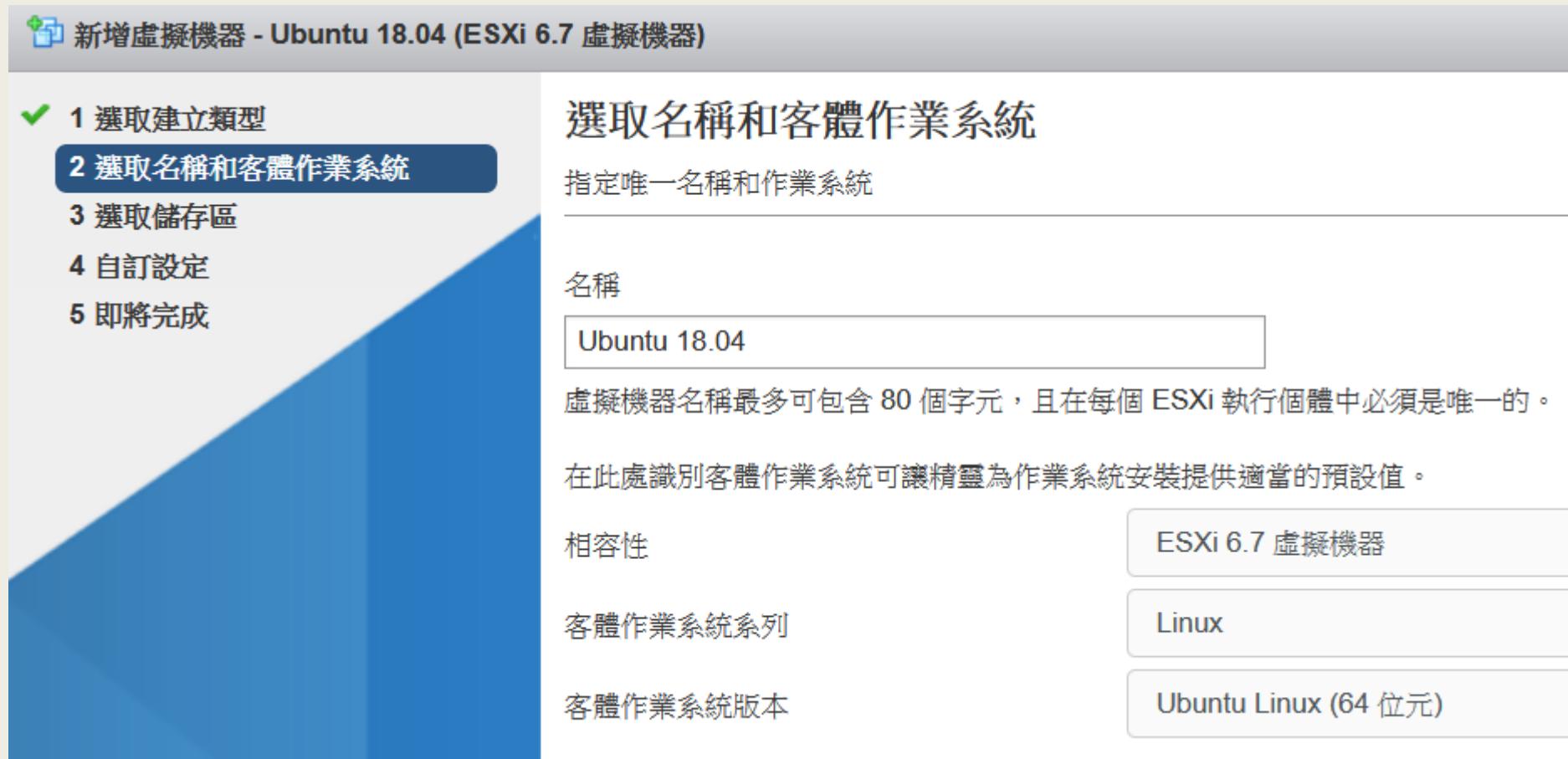
# Create VM on ESXi



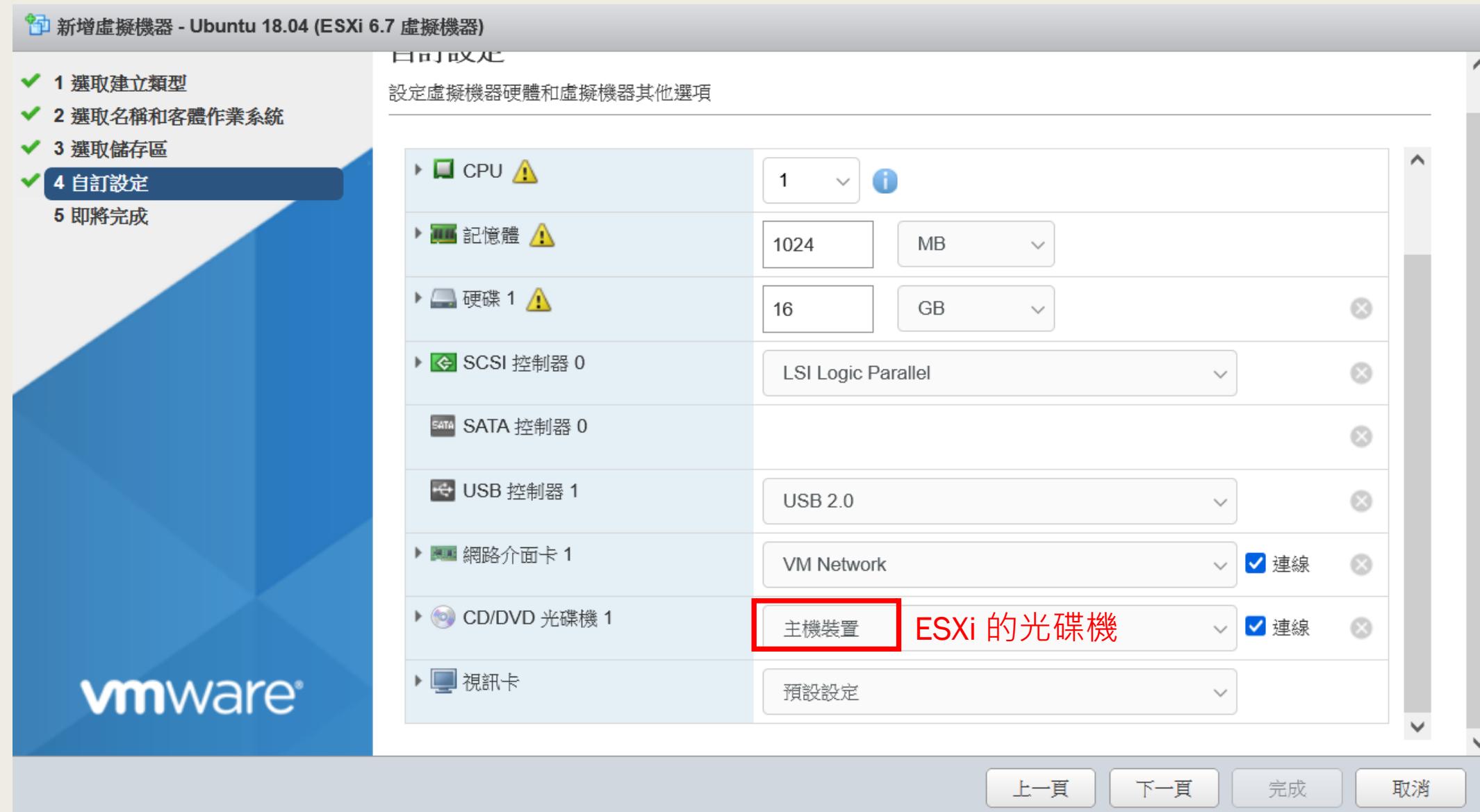
# Create VM on ESXi



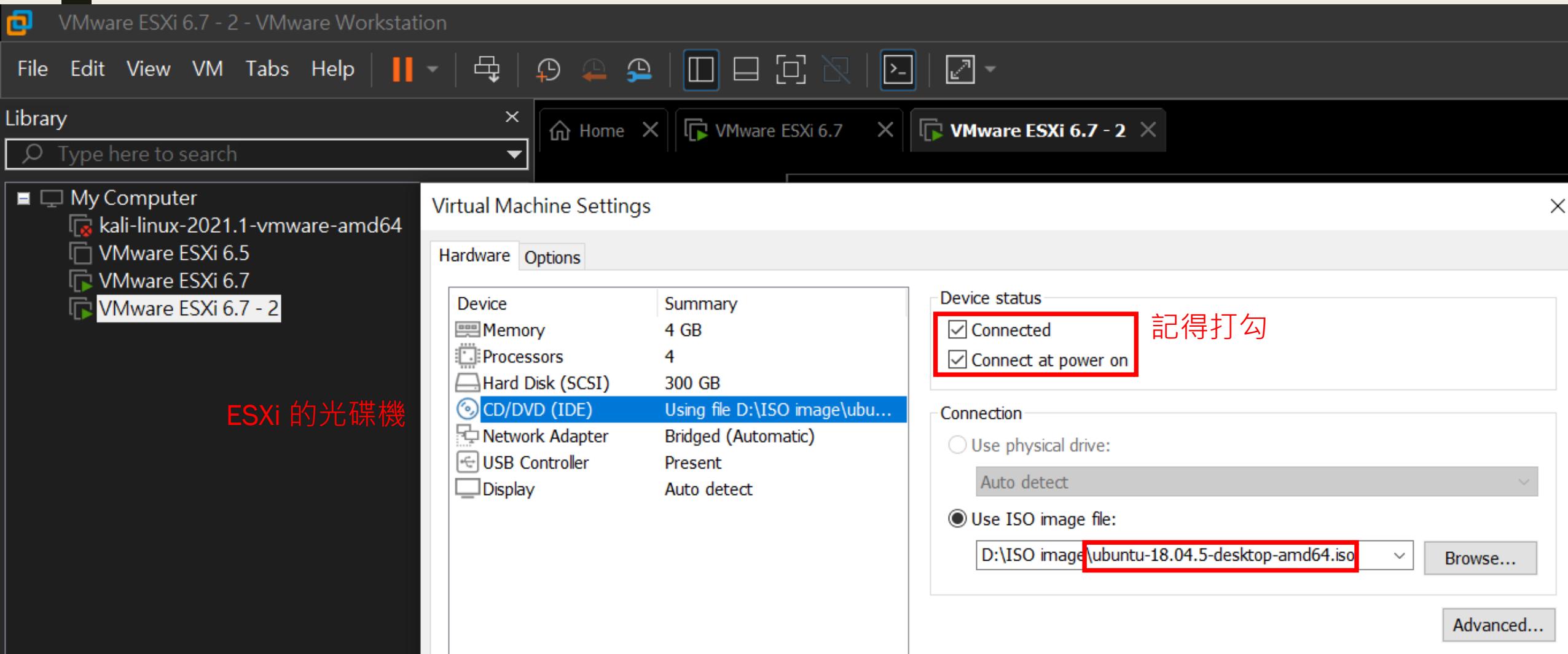
# Create VM on ESXi

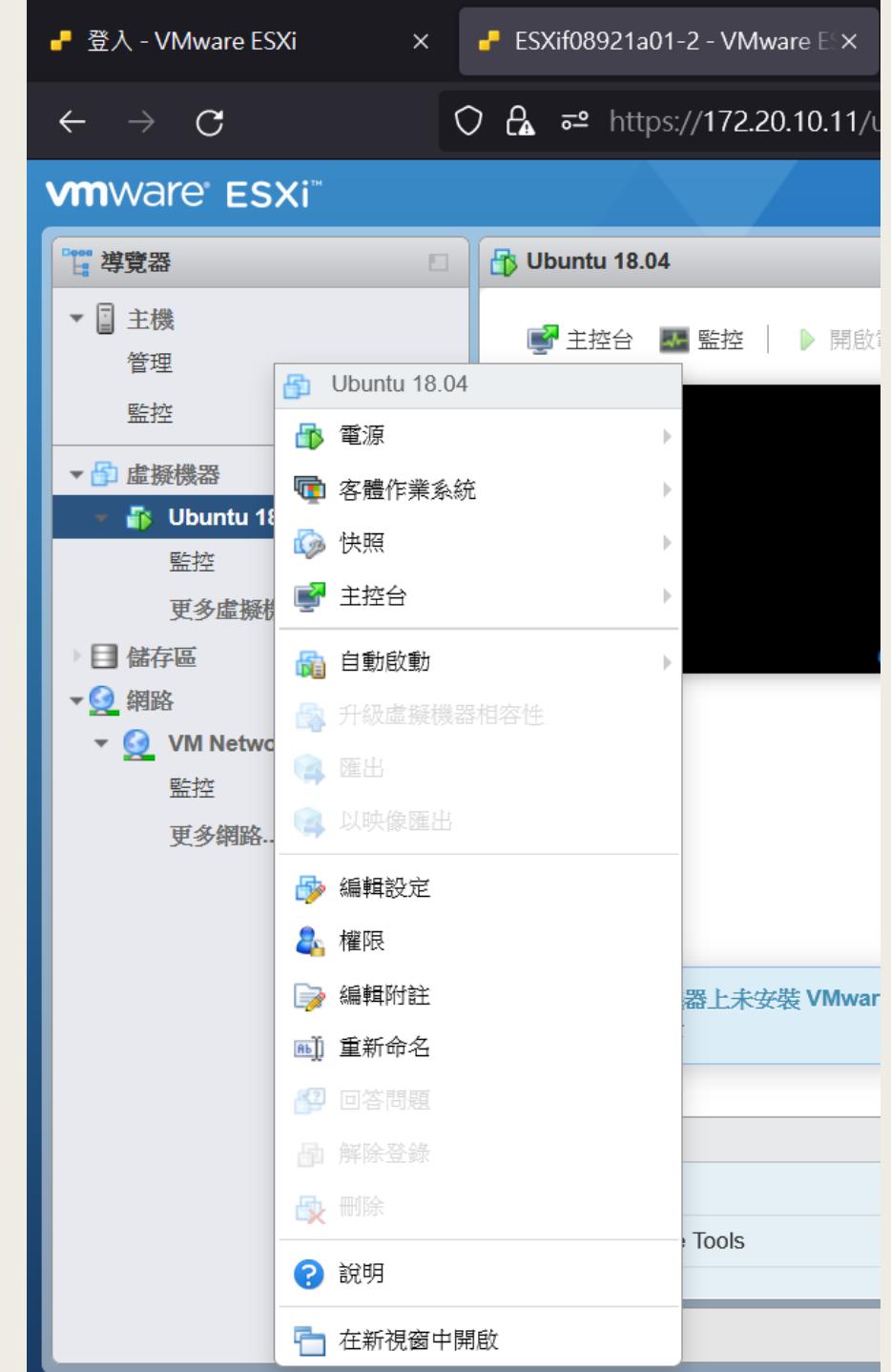


# Create VM on ESXi

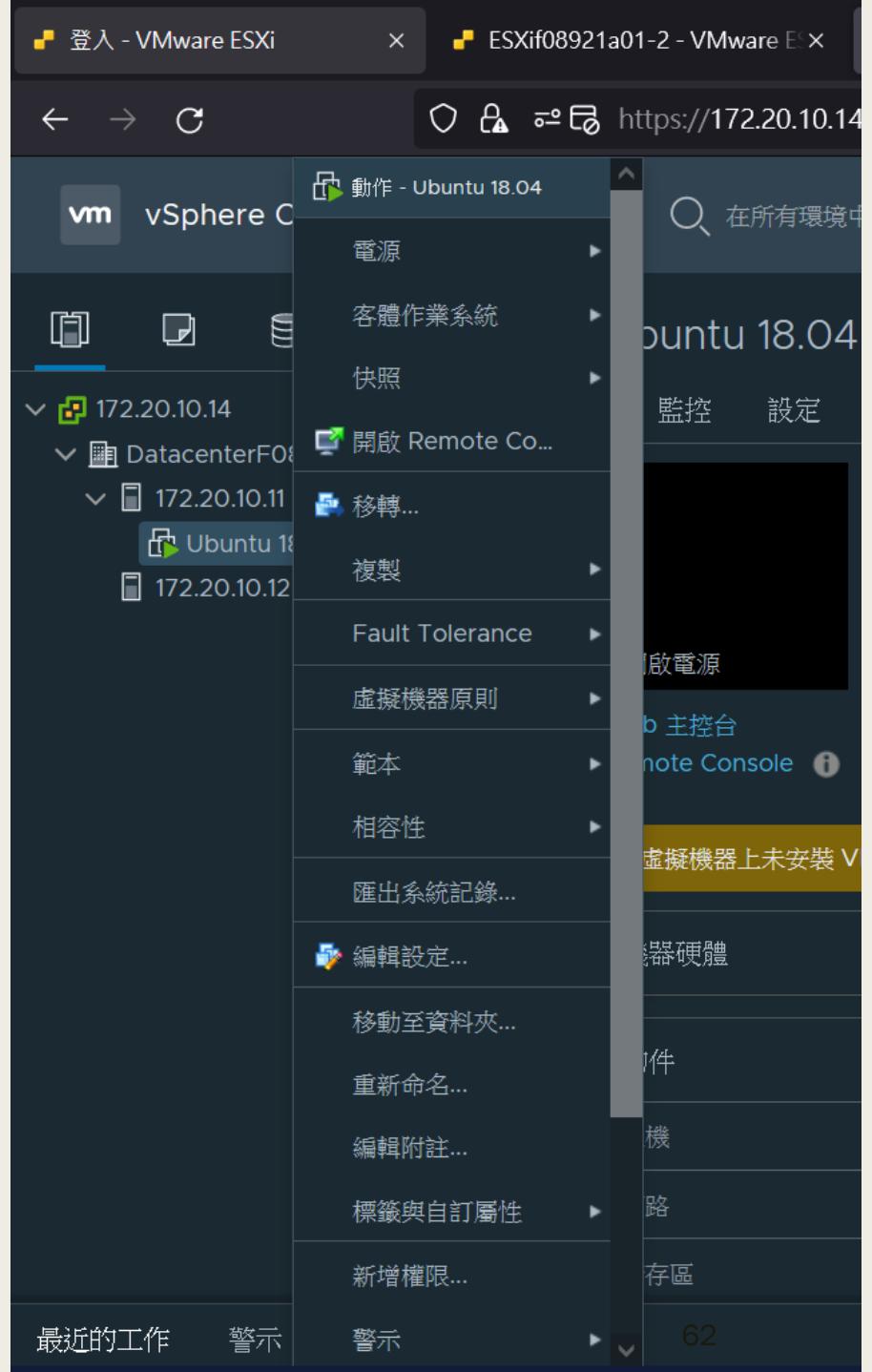


# Create VM on ESXi





# VCSA 有額外 管理功能



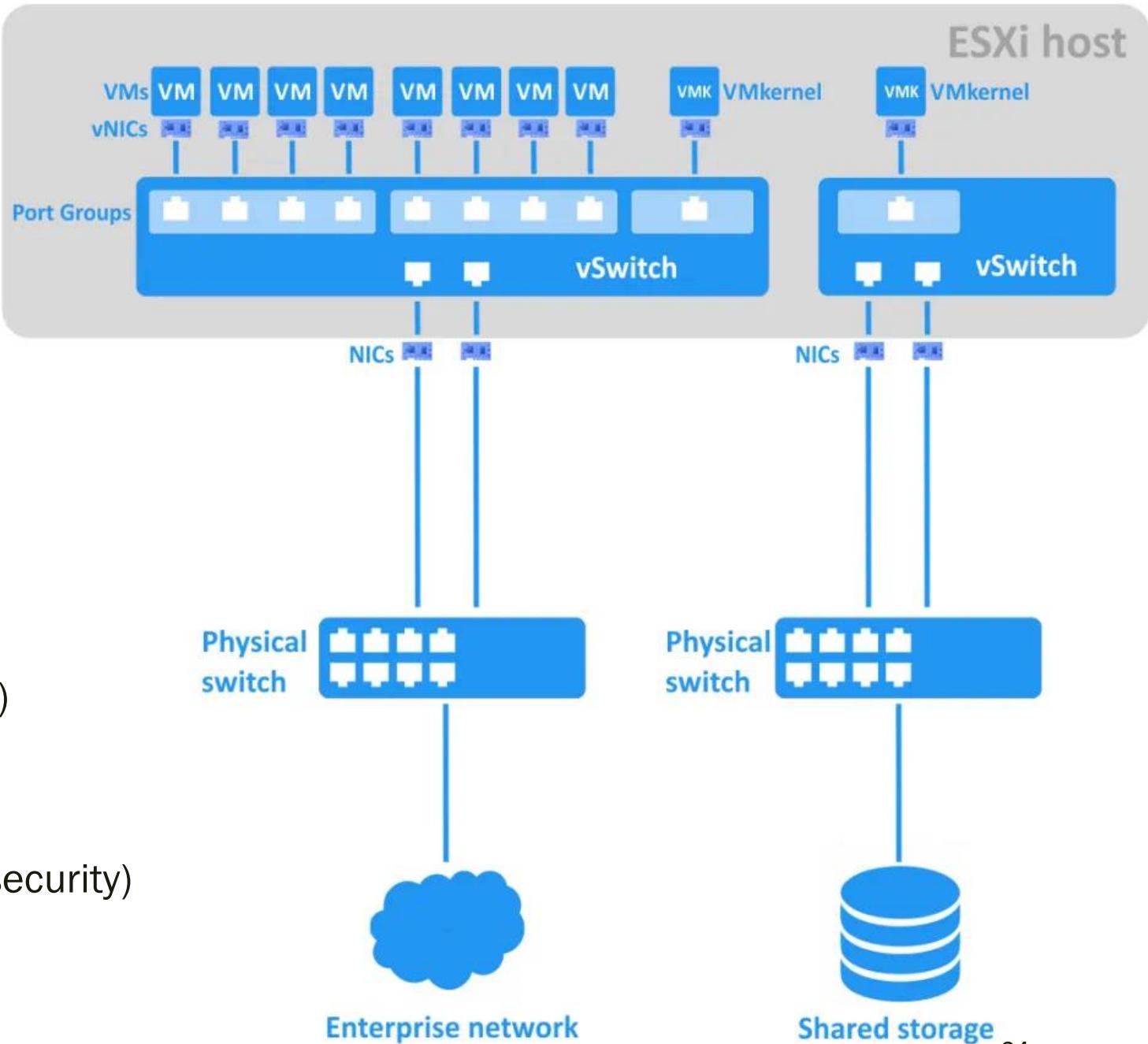
# Virtual Switch

vSwitch

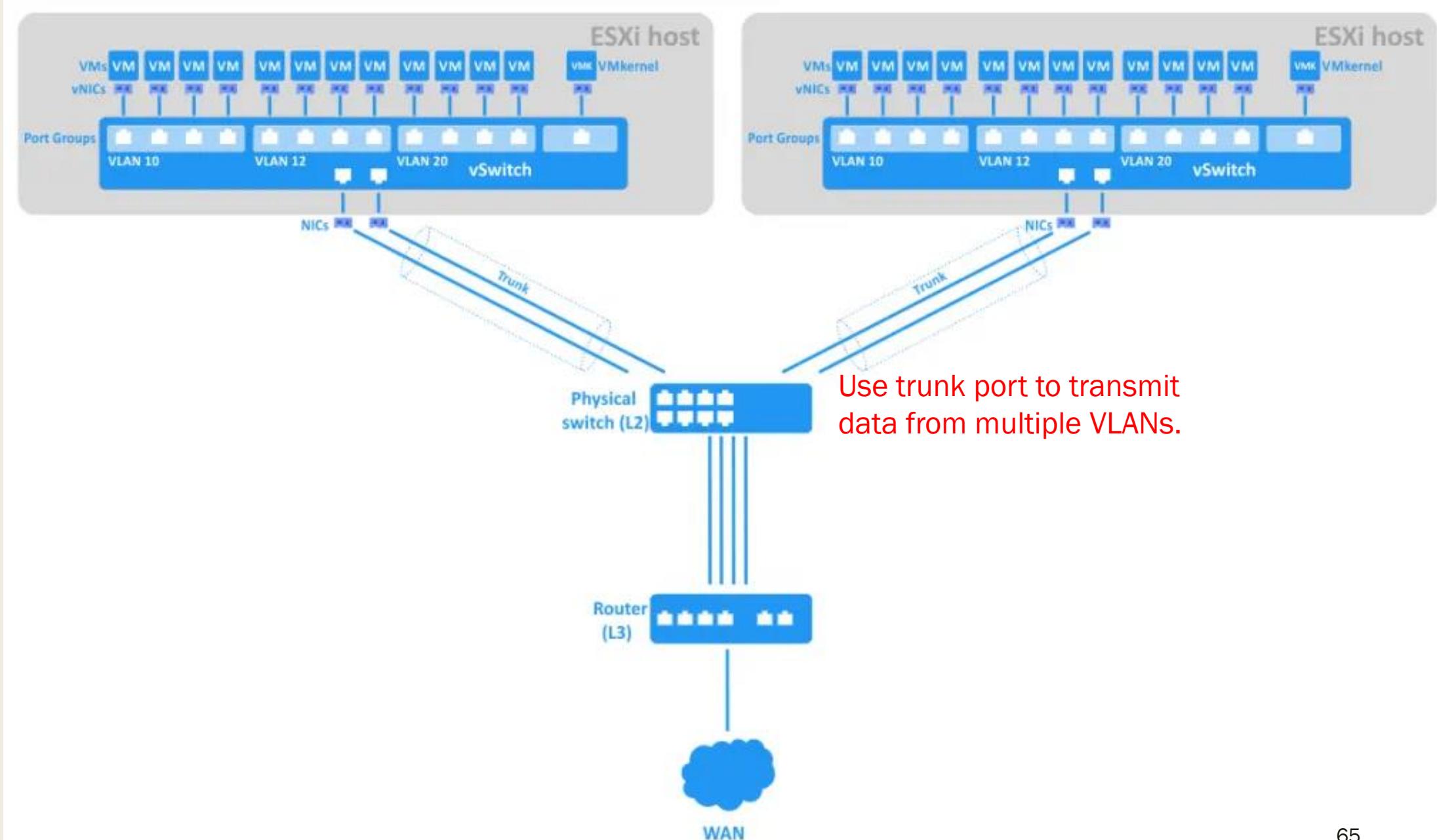
# Virtual Switch

Create any number of

- vNICs
  - for VMs
- VMkernel NIC
  - for ESXi host
- vSwitches
  - add uplinks (physical NICs)
- Port Groups
  - for network policy  
(e.g. VLAN, load balance, security)



# Virtual Switch



# Virtual Switch

172.20.10.11 動作 ▾

摘要 監控 設定 權限 虛擬機器 資源集區 資料存放區 網路 更新

新增網路 ...

儲存區

虛擬裝置介面卡  
儲存裝置  
主機快取組態  
通訊協定端點  
I/O 篩選器

網路

虛擬交換器  
VMkernel 介面卡  
實體介面卡  
TCP/IP 組態

虛擬機器

虛擬機器啟動/關閉  
代理程式虛擬機器設定  
預設虛擬機器相容性  
分頁檔位置

虛擬交換器

標準交換器: vSwitch0 新增網路 編輯 管理實體介面卡 ...

Management Network  
VLAN 識別碼: --  
VMkernel 連接埠 (1)  
vmk0 : 172.20.10.11 ESXi ...

VM Network  
VLAN 識別碼: --  
虛擬機器 (2)  
Tiny Core Linux - 1  
Ubuntu 18.04

實體介面卡  
vmnic0 10000 完整 ...

Bridge  
172.20.10.0/28

172.20.10.11

172.20.10.14

DatacenterF08921A01

172.20.10.11

Tiny Core Linux - 1

Ubuntu 18.04

172.20.10.12 (沒有回應)

Core 1 (已中斷連線)

Kolibri 1 (已中斷連線)

Tiny Core Linux 1 (已中斷...)

新增網路 ...

儲存區

虛擬裝置介面卡  
儲存裝置  
主機快取組態  
通訊協定端點  
I/O 篩選器

網路

虛擬交換器  
VMkernel 介面卡  
實體介面卡  
TCP/IP 組態

虛擬機器

虛擬機器啟動/關閉  
代理程式虛擬機器設定  
預設虛擬機器相容性  
分頁檔位置

虛擬交換器

標準交換器: vSwitch0 新增網路 編輯 管理實體介面卡 ...

Management Network  
VLAN 識別碼: --  
VMkernel 連接埠 (1)  
vmk0 : 172.20.10.11 ESXi ...

VM Network  
VLAN 識別碼: --  
虛擬機器 (2)  
Tiny Core Linux - 1  
Ubuntu 18.04

實體介面卡  
vmnic0 10000 完整 ...

Bridge  
172.20.10.0/28

# Virtual Switch

172.20.10.11 - 新增網路

✓ 1 選取連線類型

2 選取目標裝置

3 建立標準交換器

4 連線設定

5 即將完成

1

選取連線類型

選取要建立的連線類型。

VMkernel 網路介面卡

可用服務

已啟用的服務

vMotion

佈建

Fault Tolerance 記錄

管理

vSphere Replication

vSphere Replication NFC

vSAN

管理 ESXi、  
啟用 ESXi 的功能

VMkernel TCP/IP 堆疊可處理 vSphere vMotion、iSCSI、NFS、FCoE、Fault Tolerance、vSAN 和主機管理等 ESXi 服務的流量。

2

標準交換器的虛擬機器連接埠群組 Port Group

連接埠群組可處理標準交換器上的虛擬機器流量。

3

實體網路介面卡

實體網路介面卡可處理網路上其他主機的網路流量。

# Virtual Switch

172.20.10.11 - 新增網路

✓ 1 選取連線類型  
2 選取目標裝置  
3 建立標準交換器  
4 連線設定  
5 即將完成

選取目標裝置  
選取用於新連線的目標裝置。

選取現有的標準交換器

vSwitch0 瀏覽...

4  新增標準交換器 新增 vSwitch

MTU (位元組) 1500 ▲ ▼

# Virtual Switch

4 標準交換器: vSwitch1 | 新增網路 編輯 管理實體介面卡 ...

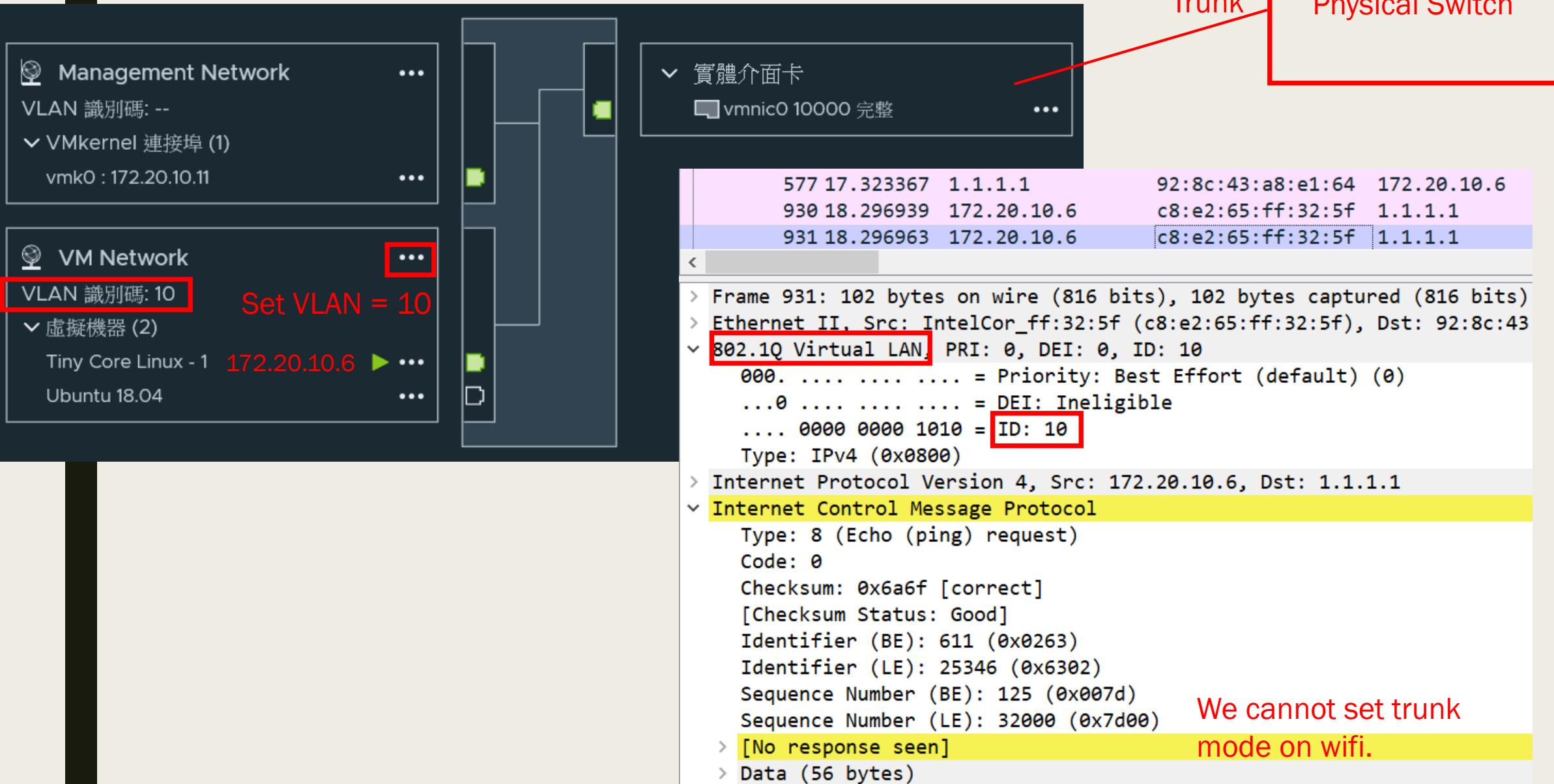
2 my VMkernel  
VLAN 識別碼: --  
VMkernel 連接埠 (1) 1  
vmk1 : 172.20.10.4

2 虛擬機器網路  
VLAN 識別碼: --  
虛擬機器 (0)

實體介面卡  
vmnic1 10000 完整 3  
vmnic2 10000 完整

...  
...  
...  
...  
...  
...

# Virtual Switch



# Virtual Switch

```
tc@box:~$ ifconfig | grep inet
    inet addr:172.20.10.6  Bcast:172.20.10.15  Mask:255.255.255.240
        inet addr:127.0.0.1  Mask:255.0.0.0
tc@box:~$ ping 172.20.10.1
PING 172.20.10.1 (172.20.10.1): 56 data bytes
^C
--- 172.20.10.1 ping statistics ---
20 packets transmitted, 0 packets received, 100% packet loss
```

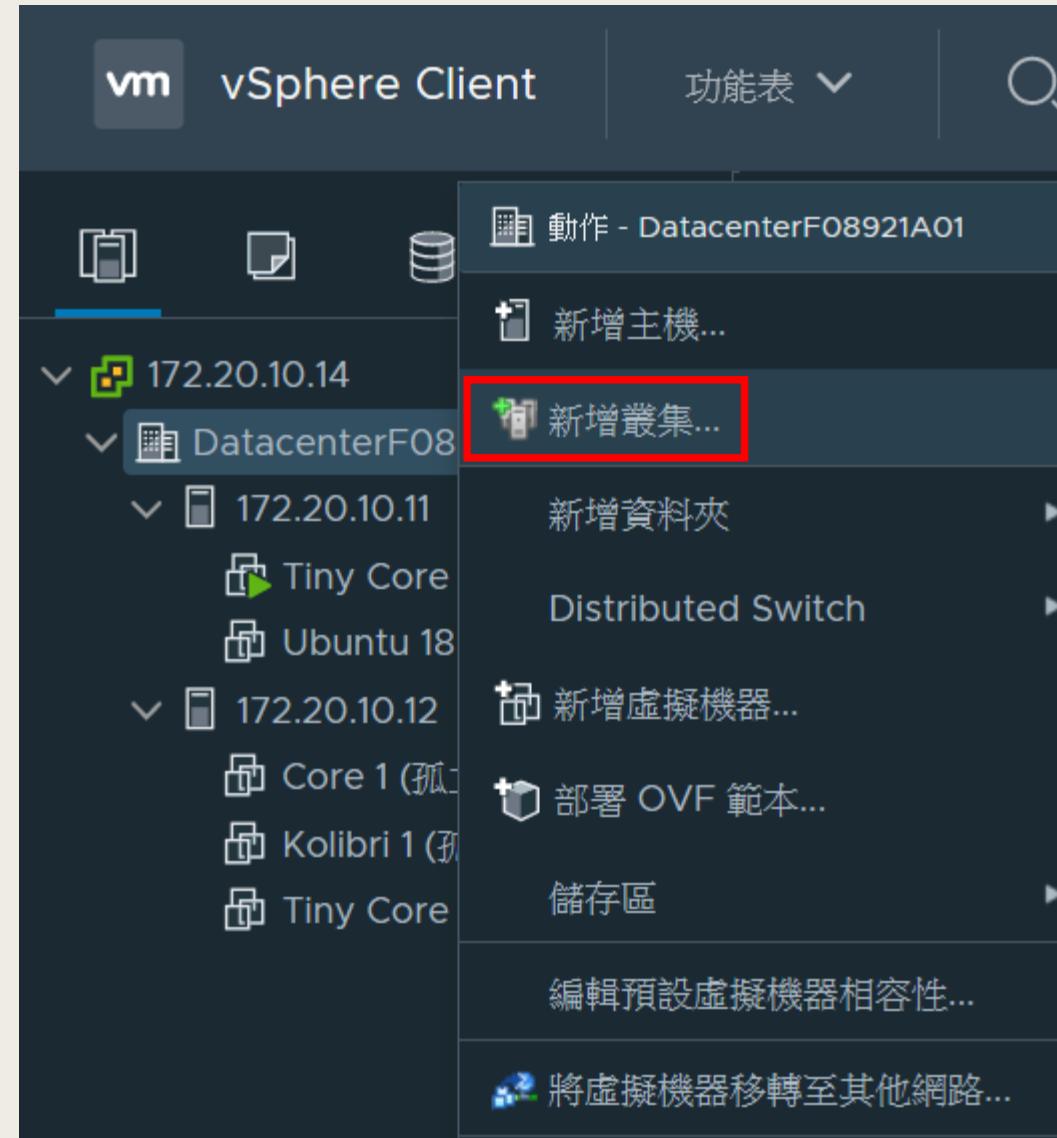


手機熱點沒有 Trunk mode ·  
VMkernel 設定 VLAN 就連不到你的 ESXi 囉 ^^

# Distributed Switch

DSwitch

# Cluster



# Cluster

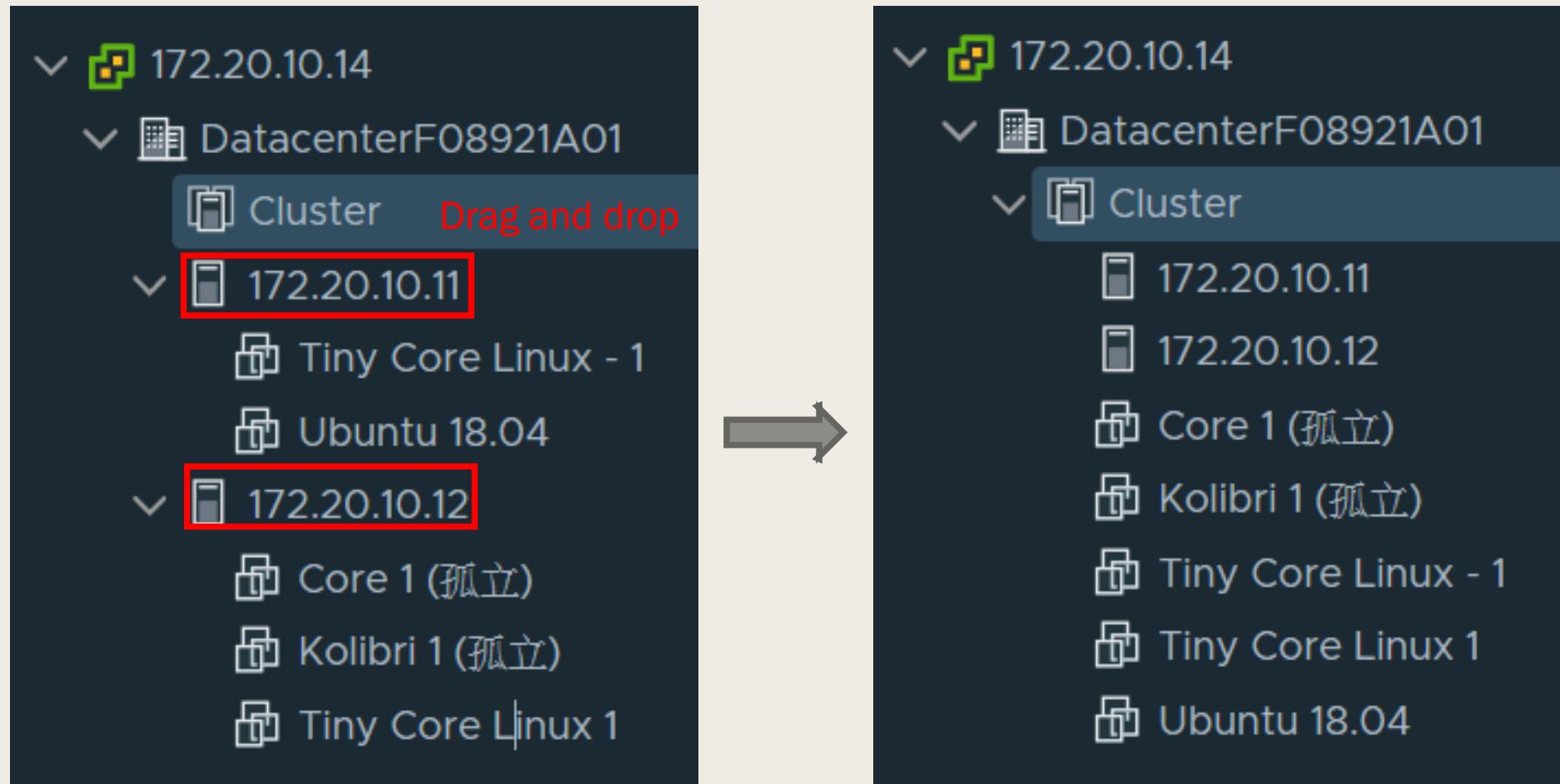
新增叢集 | DatacenterF08921A01 X

名稱	Cluster
位置	 DatacenterF08921A01
① DRS	<input checked="" type="checkbox"/>
① vSphere HA	<input checked="" type="checkbox"/>
vSAN	<input checked="" type="checkbox"/>

這些服務將具有預設設定，稍後可在叢集快速入門工作流程中變更這些設定。

取消 確定 |

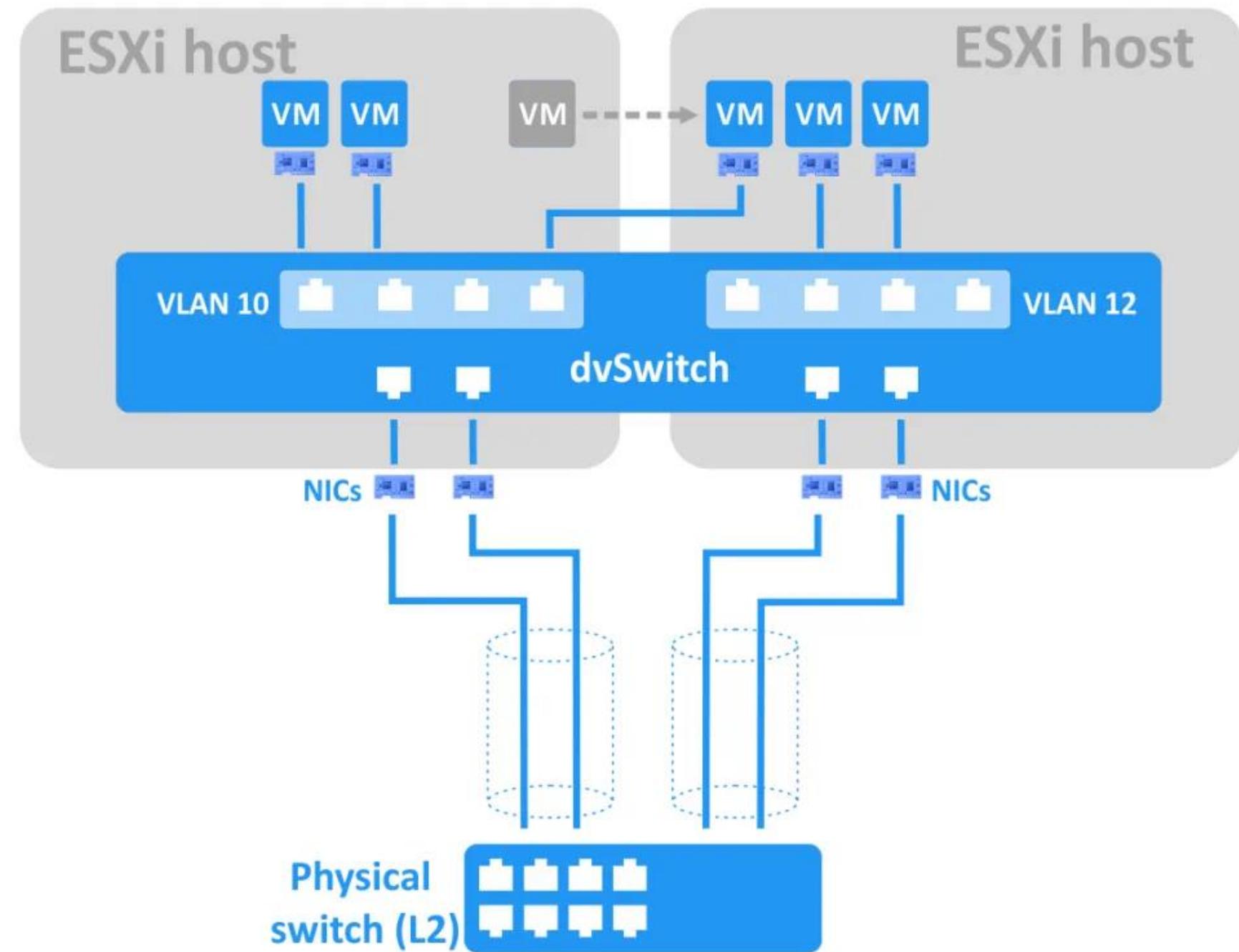
# Cluster



# Distributed Switch

Similar to vSwitch.

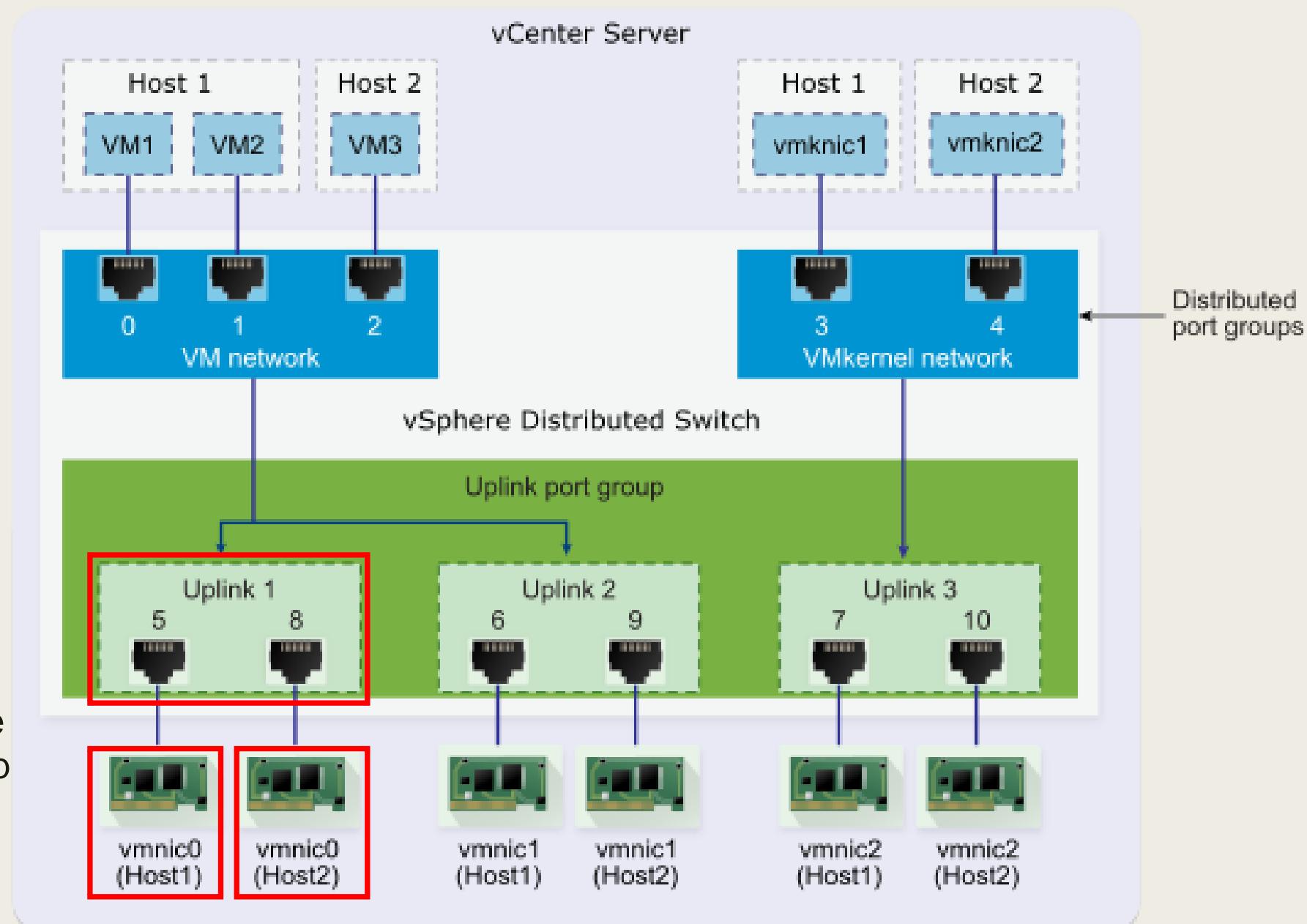
You can also create multiple DSwitches.



# Distributed Switch

Physical NICs of hosts are mapped to **uplinks** on the distributed switch.

You set failover and load balancing policies over uplinks and the policies are automatically propagated to the host proxy switches.



# Distributed Switch – create DSwitch

The screenshot shows the vSphere Client interface. In the left sidebar, under the Datacenter node, a new entry named "DatacenterF08921A01" has been created. The "Distributed Switch" tab is selected in the main content area, displaying a table with one item: "DSwitch" (Name) and "6.6.0" (Version). On the right, a context menu is open under the "動作" (Actions) heading, with the "新增 Distributed Switch..." option highlighted by a red box.

vSphere Client | 功能表 ▾ | 在所有環境中搜尋 | C | ?

vm 172.20.10.14 DatacenterF08921A01 Cluster 172.20.10.11 172.20.10.12 Core 1 (孤立) Kolibri 1 (孤立) Tiny Core Linux - 1 Tiny Core Linux - 2 Ubuntu 18.04

DatacenterF08921A01 | 動作 ▾

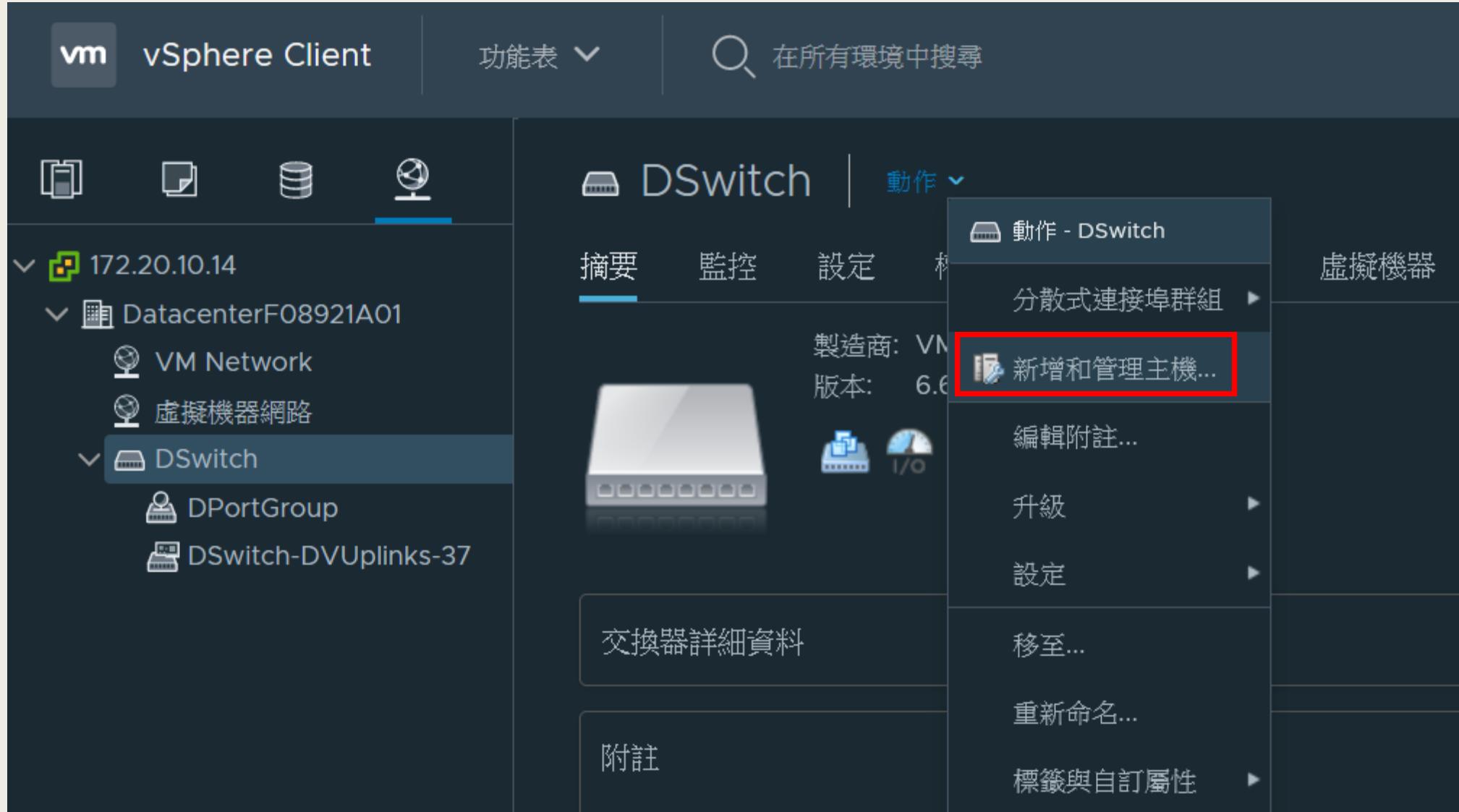
動作 - DatacenterF08921A01

- 新增主機...
- 新增叢集...
- 新增資料夾
- 新增 Distributed Switch...**
- 新增虛擬機器...
- 部署 OVF 範本...
- 匯入 Distributed Switch...

# Distributed Switch – create DSwitch



# Distributed Switch – add hosts



# Distributed Switch – add hosts

## DSwitch - 新增和管理主機

### 1 選取工作

- 2 選取主機
- 3 管理實體介面卡
- 4 管理 VMkernel 介面卡
- 5 移轉虛擬機器網路
- 6 即將完成

### 選取工作

選取要在此 Distributed Switch 上執行的工作。

#### 新增主機

將新主機新增至此 Distributed Switch。

#### 管理主機網路

管理附加至此 Distributed Switch 的主機的網路。

#### 移除主機

從此 Distributed Switch 中移除主機。

# Distributed Switch – add hosts

選取新主機 | Dswitch X

[顯示不相容的主機](#)

▼ 篩選器

	主機	主機狀態	叢集	相容性
<input checked="" type="checkbox"/>	172.20.10.11	已連線	Cluster	✓ 相容
<input checked="" type="checkbox"/>	172.20.10.12	已連線	Cluster	✓ 相容

# DSwitch - 新增和管理主機

- ✓ 1 選取工作
- ✓ 2 選取主機

## 3 管理實體介面卡

## 4 管理 VMkernel 介面卡

## 5 移轉虛擬機器網路

## 6 即將完成

### 管理實體介面卡

為此 Distributed Switch 新增或移除實體網路介面卡。

主機/實體網路介面卡	正由交換器使用	上行	上行連接埠群組
172.20.10.11			
位於此交換器上 DSwitch			
vmnic0	vSwitch0	--	--
vmnic1	vSwitch1	--	--
vmnic2	vSwitch1	--	--
vmnic3		--	--
172.20.10.12			
位於此交換器上			
位於其他交換器上/未宣告			
vmnic0	vSwitch0	--	--
vmnic1		--	--

# DSwitch - 新增和管理主機

- ✓ 1 選取工作
- ✓ 2 選取主機

## 3 管理實體介面卡

## 4 管理 VMkernel 介面卡

## 5 移轉虛擬機器網路

## 6 即將完成

### 管理實體介面卡

為此 Distributed Switch 新增或移除實體網路介面卡。

指派上行

取消指派介面卡

檢視設定

主機/實體網路介面卡	正由交換器使用	上行	上行連接埠群組
▲  172.20.10.11			
位於此交換器上			
▲ 位於其他交換器上/未宣告			
vmnic0	vSwitch0	--	--
vmnic1	vSwitch1	--	--
vmnic2	vSwitch1	--	--
vmnic3	Click to select	--	--
▲  172.20.10.12			
位於此交換器上			
▲ 位於其他交換器上/未宣告			
vmnic0	vSwitch0	--	--
vmnic1	--	--	--

- ✓ 1 選取工作
- ✓ 2 選取主機

3 管理實體介面卡

4 管理 VMkernel

5 移轉虛擬機器網關

6 即將完成

## 選取上行

vmnic3



上行	已指派的介面卡
上行 1	--
上行 2	--
上行 3	--
上行 4	--
(自動指派)	

Select any

5 items

 將此上行指派套用至其餘主機 

取消

確定

DEL

BACK

NEXT

# DSwitch - 新增和管理主機

✓ 1 選取工作

✓ 2 選取主機

**3 管理實體介面卡**

4 管理 VMkernel 介面卡

5 移轉虛擬機器網路

6 即將完成

## 管理實體介面卡

為此 Distributed Switch 新增或移除實體網路介面卡。

主機/實體網路介面卡	正在由交換器使用	上行	上行連接埠群組
172.20.10.11			
位於此交換器上			
vmnic3 (已指派)	--	上行 1	DSwitch-DVUplin...
位於其他交換器上/未宣告			
vmnic0	vSwitch0	--	--
vmnic1	vSwitch1	--	--
vmnic2	vSwitch1	--	--
172.20.10.12			
位於此交換器上			
vmnic3 (已指派)	--	上行 1	DSwitch-DVUplin...
位於其他交換器上/未宣告			
vmnic0	vSwitch0	--	--

# DSwitch - 新增和管理主機

- ✓ 1 選取工作
- ✓ 2 選取主機

## 3 管理實體介面卡

### 4 管理 VMkernel 介面卡

### 5 移轉虛擬機器網路

### 6 即將完成

#### 管理實體介面卡

為此 Distributed Switch 新增或移除實體網路介面卡。

指派上行   取消指派介面卡   檢視設定

主機/實體網路介面卡	正在由交換器使用	上行	上行連接埠群組
172.20.10.11			
▲ 位於此交換器上			
vmnic2 (已指派)	vSwitch1	上行 2	DSwitch-DVUplink...
vmnic3 (已指派)	--	上行 1	DSwitch-DVUplink...
▲ 位於其他交換器上/未宣告			
vmnic0	vSwitch0	--	--
vmnic1	vSwitch1	--	--
172.20.10.12			
▲ 位於此交換器上			
vmnic2 (已指派)	--	上行 2	DSwitch-DVUplink...
vmnic3 (已指派)	--	上行 1	DSwitch-DVUplink...
▲ 位於其他交換器上/未宣告			

# DSwitch - 新增和管理主機

- ✓ 1 選取工作
- ✓ 2 選取主機
- ✓ 3 管理實體介面卡

## 4 管理 VMkernel 介面卡

5 移轉虛擬機器網路

6 即將完成

### 管理 VMkernel 介面卡

管理 VMkernel 網路介面卡並將其指派給 Distributed Switch。

主機/VMkernel 網路介面卡	正由交換器使用	來源連接埠群組	目的地連接埠群組
172.20.10.11			
位於此交換器上			
位於其他交換器上/未宣告			
vmk0	vSwitch0	Management Net...	不移轉
vmk1	vSwitch1	my VMkernel	不移轉
172.20.10.12			
位於此交換器上			
位於其他交換器上/未宣告			
vmk0	vSwitch0	Management Net...	不移轉

CANCEL

BACK

NEXT

# DSwitch - 新增和管理主機

- ✓ 1 選取工作
- ✓ 2 選取主機
- ✓ 3 管理實體介面卡
- ✓ 4 管理 VMkernel 介面卡
- 5 移轉虛擬機器網路**

6 即將完成

## 移轉虛擬機器網路

選取要移轉至 Distributed Switch 的虛擬機器或網路介面卡。

Migrate virtual machine networking



指派連接埠群組



重設變更



檢視設定

主機/虛擬機器/網路介面卡	NIC 計數	來源連接埠群組	目的地連接埠群組
No records to display			

CANCEL

BACK

NEXT

# Distributed Switch – add hosts

DSwitch - 新增和管理主機

✓ 1 選取工作 即將完成  
✓ 2 選取主機 完成精靈前，請先檢閱設定選取項目。  
✓ 3 管理實體介面卡  
✓ 4 管理 VMkernel 介面卡  
✓ 5 移轉虛擬機器網路  
**6 即將完成**

受管理的主機數目  
要更新的主機 2

要更新的網路介面卡數目  
實體介面卡 4

# Distributed Switch – from ESXi's viewpoint

The screenshot shows the vSphere Web Client interface for managing a Distributed Switch (DSwitch) on an ESXi host. The host IP is 172.20.10.11. The main navigation bar includes icons for Host, Datastore, Network, and Power. The left sidebar shows the cluster structure under '172.20.10.14'.

The 'Setting' tab is selected. In the 'Virtual Switches' section, the 'Distributed Switch: DSwitch' is highlighted with a red box. Below it, two standard switches, 'vSwitch0' and 'vSwitch1', are listed. On the right, the 'Uplinks' for the DSwitch are shown, including four entries: 'DSwitch-DVUplinks-37' with uplinks 1 (vmnic3) and 2 (vmnic2), and 'Uplinks 3' and 'Uplinks 4' both with 0 uplinks.

Viewpoint of ESXi  
Next step:  
Create port groups.

# Distributed Switch – create distributed port group



# Distributed Switch – create distributed port group

## 新增分散式連接埠群組

✓ 1 名稱和位置

2 設定組態

3 即將完成

名稱和位置

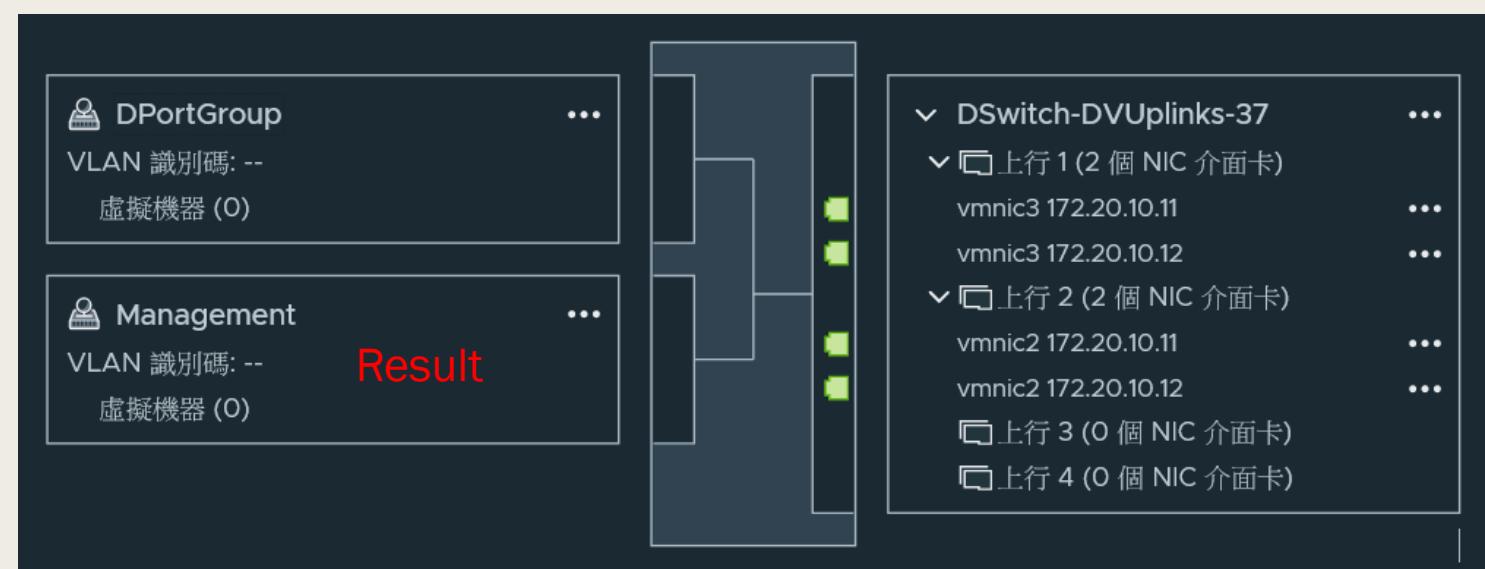
指定分散式連接埠群組的名稱和位置。

名稱

Management

位置

DSwitch



Next step:  
Migrate VMkernel ports to Dswitch.

# Distributed Switch – Migrate VMkernel ports

The screenshot shows the VMware vSphere Web Client interface. In the top left, it says "DSwitch". The top navigation bar has tabs for "摘要" (Summary), "監控" (Monitoring), "設定" (Settings), and "內容" (Content). The "設定" tab is selected. A dropdown menu under "動作" (Actions) is open, showing options: "動作 - DSwitch", "分散式連接埠群組" (Distributed Port Group), and "新增和管理主機..." (Add and Manage Host...). The last option is highlighted with a red box. The main content area is titled "DSwitch - 新增和管理主機". On the left, a vertical list of steps is shown: 1. 選取工作 (Select Task), 2. 選取主機 (Select Host), 3. 管理實體介面卡 (Manage Physical Adapter), 4. 管理 VMkernel 介面卡 (Manage VMkernel Adapter), 5. 移轉虛擬機器網路 (Move Virtual Machine Network), and 6. 即將完成 (Almost Done). Step 2 is highlighted with a blue box. To the right of step 2, there are two sections: "選取工作" (Select Task) which describes selecting work to be performed on the Distributed Switch, and "選取主機" (Select Host) which has three radio button options: "新增主機" (Add Host) which describes adding a host to the switch, "管理主機網路" (Manage Host Network) which describes managing the network of hosts added to the switch, and "移除主機" (Remove Host) which describes removing a host from the switch.

# DSwitch - 新增和管理主機

✓ 1 選取工作

✓ 2 選取主機

✓ 3 管理實體介面卡

**4 管理 VMkernel 介面卡**

5 移轉虛擬機器網路

6 即將完成

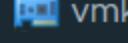
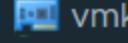
## 管理 VMkernel 介面卡

管理 VMkernel 網路介面卡並將其指派給 Distributed Switch。

 指派連接埠群組

 重設變更

 檢視設定

主機/VMkernel 網路介面卡	正在由交換器使用	來源連接埠群組	目的地連接埠群組
172.20.10.11			
位於此交換器上			
位於其他交換器上/未宣告			
 vmk0	vSwitch0	Management Net...	不移轉
 vmk1	vSwitch1	my VMkernel	不移轉
172.20.10.12			
位於此交換器上			
位於其他交換器上/未宣告			
 vmk0	vSwitch0	Management Net...	不移轉

# 選取網路

×

筛选器

名稱	Distributed Switch
 DPortGroup	DSwitch
 Management	DSwitch

2 items



將此連接埠群組指派套用至其餘主機 (i)

取消

確定

# DSwitch - 新增和管理主機

- ✓ 1 選取工作
- ✓ 2 選取主機
- ✓ 3 管理實體介面卡

## 4 管理 VMkernel 介面卡

5 移轉虛擬機器網路

6 即將完成

### 管理 VMkernel 介面卡

管理 VMkernel 網路介面卡並將其指派給 Distributed Switch。

主機/VMkernel 網路介面卡	正由交換器使用	來源連接埠群組	目的地連接埠群組
172.20.10.11	vSwitch0	Management Net...	Management
位於此交換器上			
vmk0 (已重新指派)	vSwitch0	Management Net...	Management
位於其他交換器上/未宣告			
vmk1	vSwitch1	my VMkernel	不移轉
172.20.10.12	vSwitch0	Management Net...	Management
位於此交換器上			
vmk0 (已重新指派)	vSwitch0	Management Net...	Management
位於其他交換器上/未宣告			

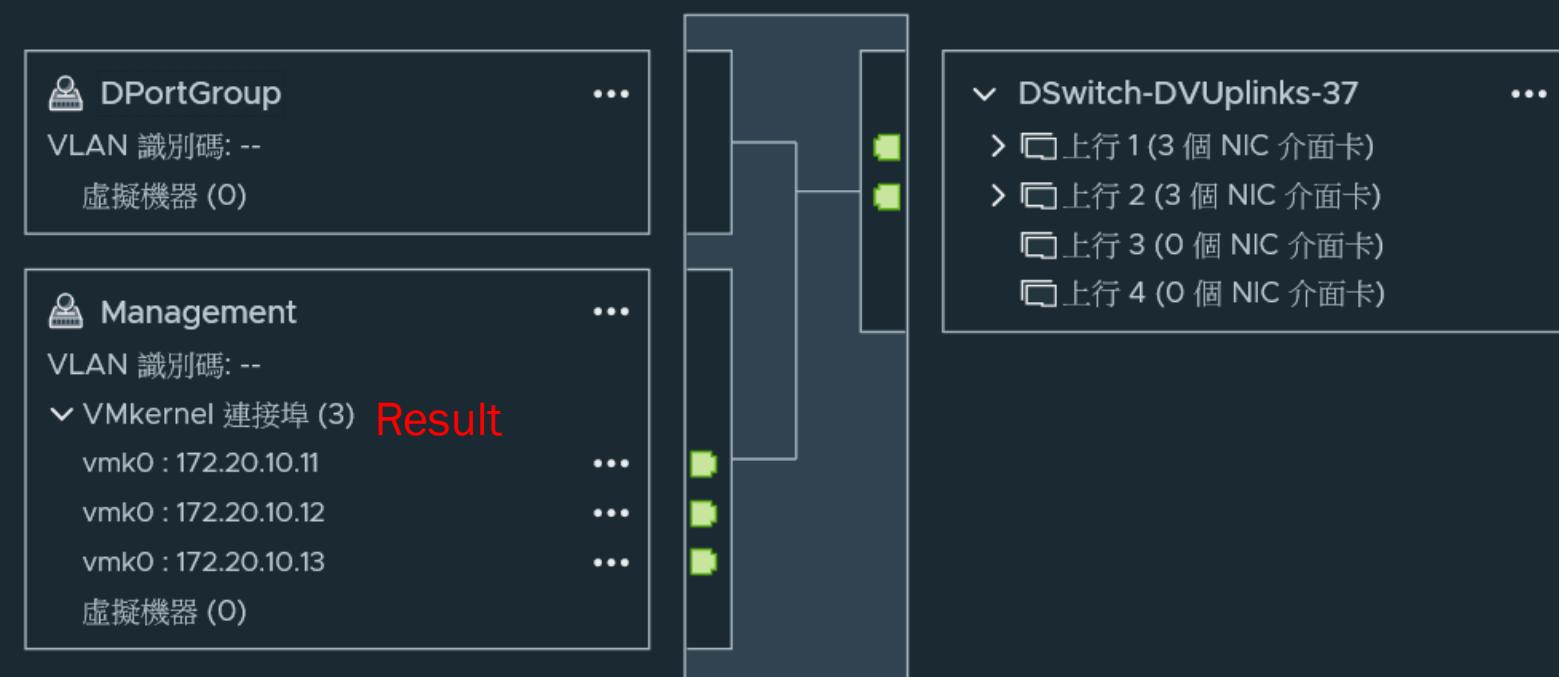
# Distributed Switch – manage hosts

## DSwitch - 新增和管理主機

- ✓ 1 選取工作
- ✓ 2 選取主機
- ✓ 3 管理實體介面卡
- ✓ 4 管理 VMkernel 介面卡
- ✓ 5 移轉虛擬機器網路
- 6 即將完成**



Next step:  
Migrate VM networking to DSwitch.



# Distributed Switch – Migrate VM networking

The screenshot shows the VMware interface for managing a Distributed Switch named 'DSwitch'. The 'Actions' dropdown menu is open, showing options like 'Actions - DSwitch', '分散式連接埠群組' (Distributed Port Group), and '新增和管理主機...' (Add and Manage Host...). The 'Add and Manage Host...' option is highlighted with a red box.

**DSwitch - 新增和管理主機**

1 選取工作  
2 選取主機  
3 管理實體介面卡  
4 管理 VMkernel 介面卡  
5 移轉虛擬機器網路  
6 即將完成

選取工作  
選取要在此 Distributed Switch 上執行的工作。

新增主機  
將新主機新增至此 Distributed Switch。

管理主機網路  
管理附加至此 Distributed Switch 的主機的網路。

移除主機  
從此 Distributed Switch 中移除主機。

# DSwitch - 新增和管理主機

- ✓ 1 選取工作
- ✓ 2 選取主機
- ✓ 3 管理實體介面卡
- ✓ 4 管理 VMkernel 介面卡

## 5 移轉虛擬機器網路

## 6 即將完成

### 移轉虛擬機器網路

選取要移轉至 Distributed Switch 的虛擬機器或網路介面卡。

#### Migrate virtual machine networking

 指派連接埠群組

 重設變更

 檢視設定

主機/虛擬機器/網路介面卡	NIC 計數	來源連接埠群組	目的地連接埠群組
172.20.10.11			
▶  Tiny Core Linux - 1	1		
▶  Ubuntu 18.04	1		
172.20.10.12			
▶  Core 1 (孤立)	1		
▶  Kolibri 1 (孤立)	1		
▶  Tiny Core Linux - 2	1		
172.20.10.13			
▶  VMware vCenter Server Appli...	1		

# DSwitch - 新增和管理主機

- ✓ 1 選取工作
- ✓ 2 選取主機
- ✓ 3 管理實體介面卡
- ✓ 4 管理 VMkernel 介面卡
- ✓ 5 移轉虛擬機器網路
- 6 即將完成

## 移轉虛擬機器網路

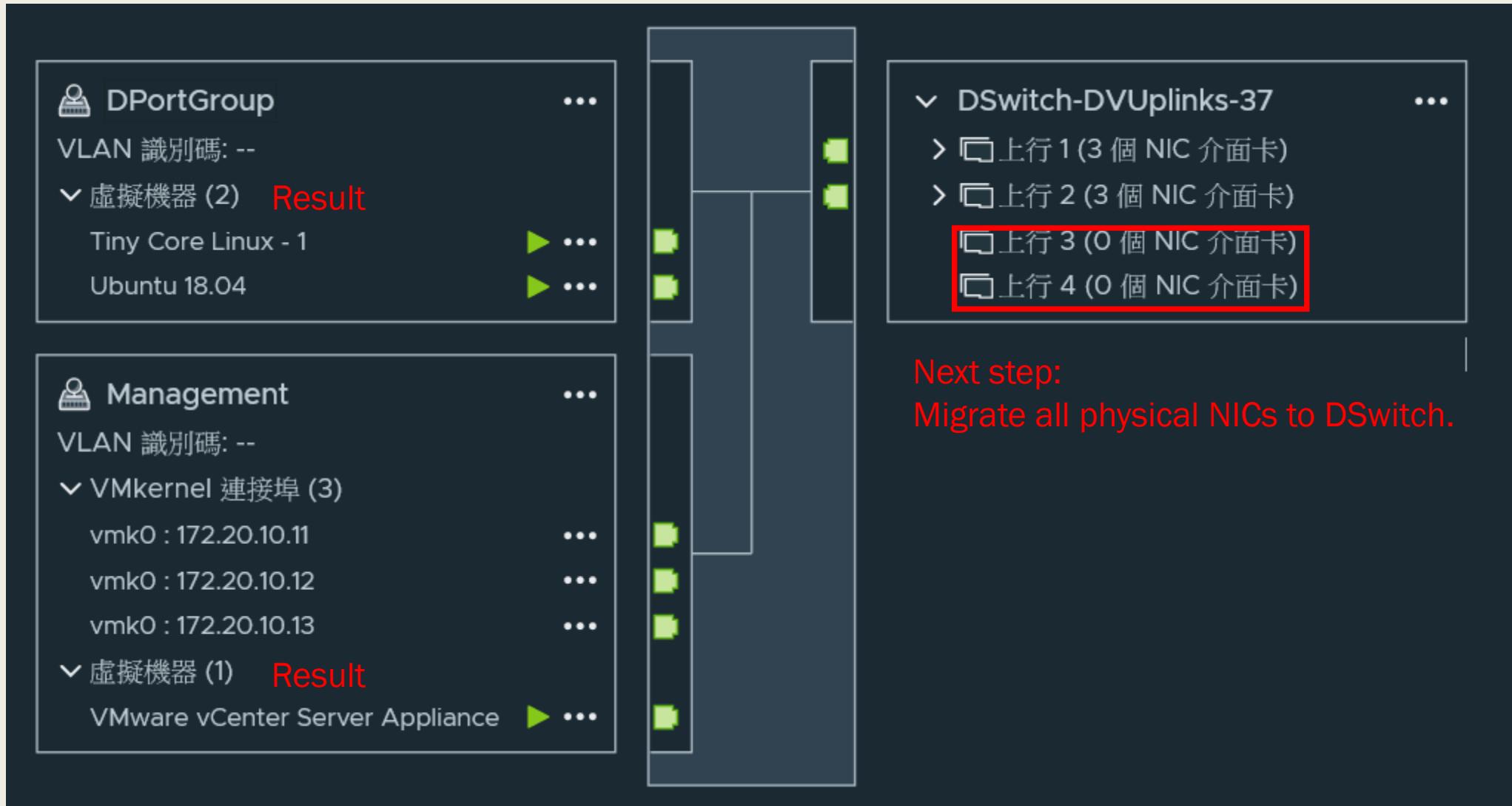
選取要移轉至 Distributed Switch 的虛擬機器或網路介面卡。

Migrate virtual machine networking

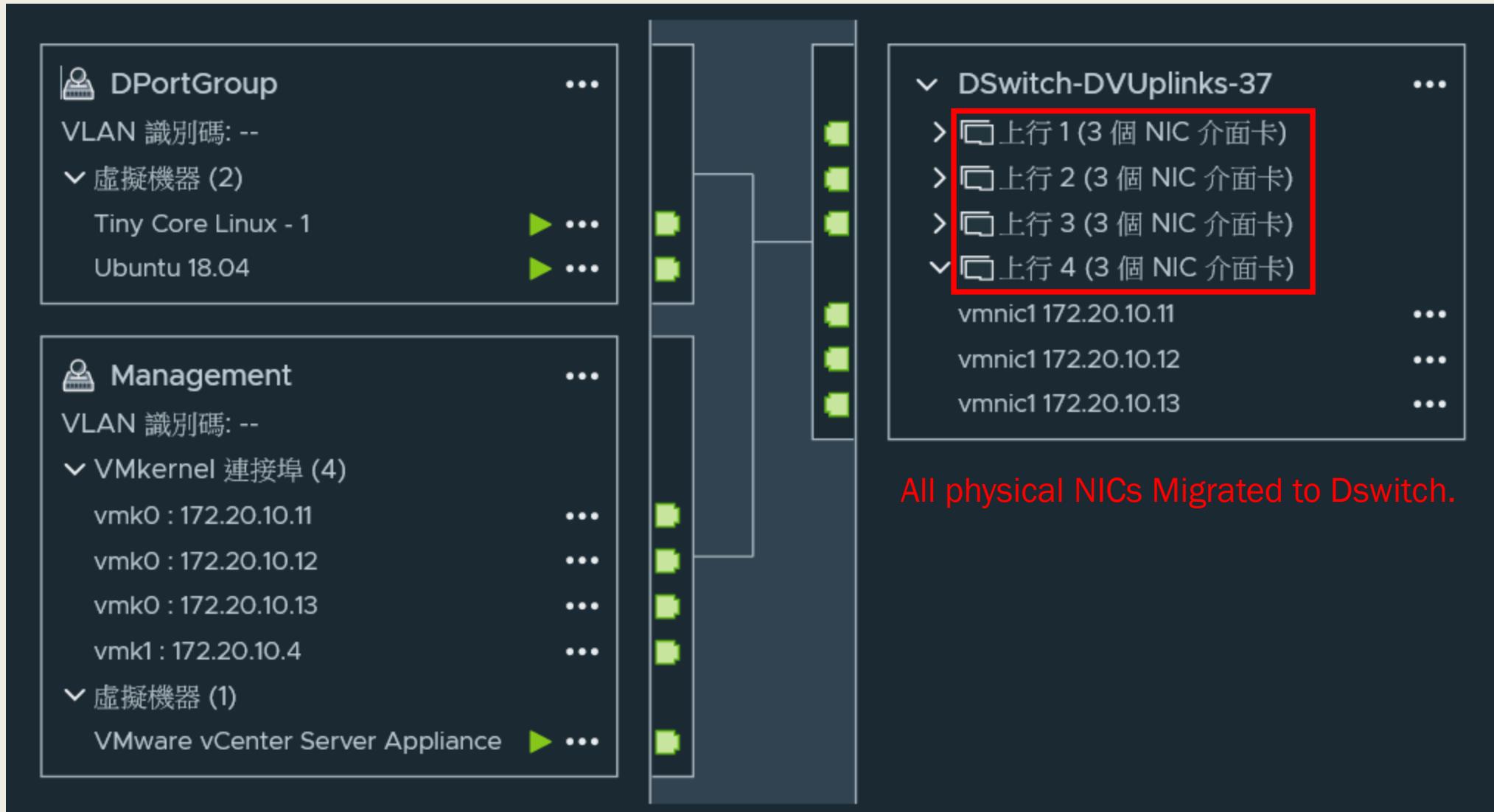
指派連接埠群組 重設變更 檢視設定

主機/虛擬機器/網路介面卡	NIC 計數	來源連接埠群組	目的地連接埠群組
172.20.10.11			
Tiny Core Linux - 1	1	VM Network	已重新指派 DPortGroup
Network adapter 1			
Ubuntu 18.04	1	VM Network	已重新指派 DPortGroup
Network adapter 1			
172.20.10.12			
172.20.10.13			
VMware vCenter Server Appli...	1	VM Network	已重新指派 Management
Network adapter 1			

# Distributed Switch – Migrate VM networking

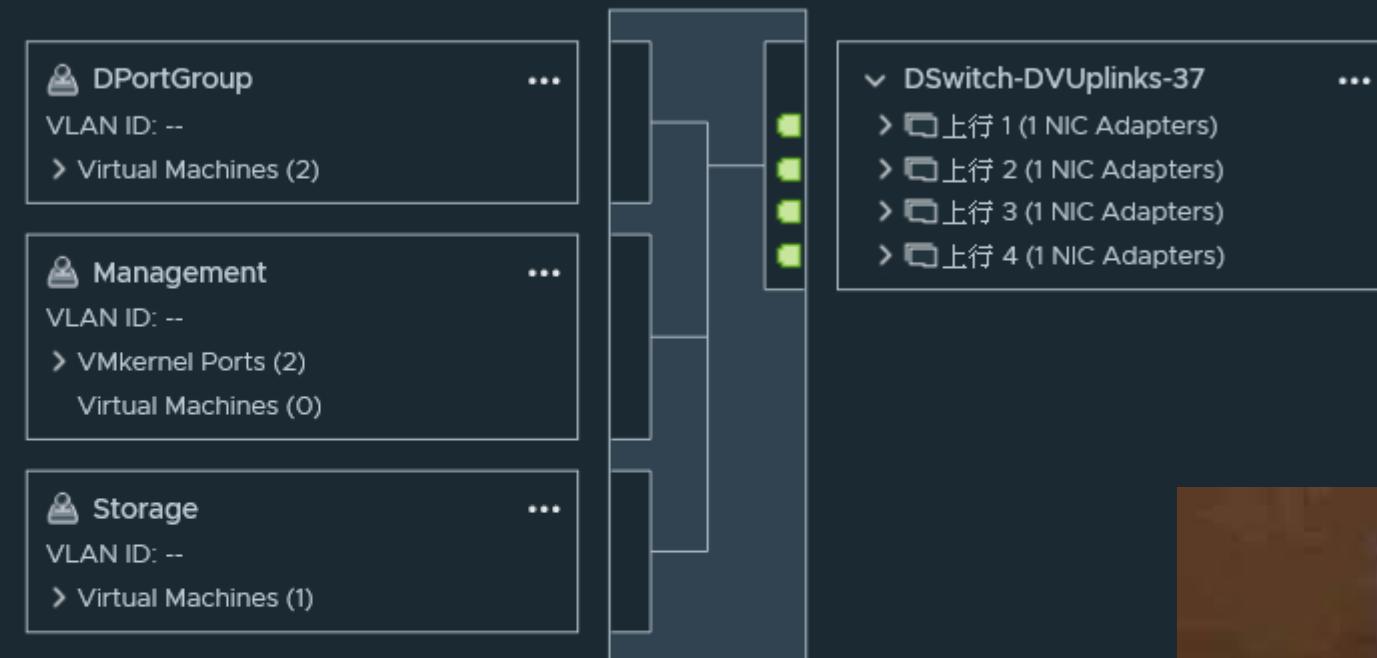


# Distributed Switch – Migrate all physical NICs



## Virtual switches

▼ Distributed Switch: DSwitch | MANAGE PHYSICAL ADAPTERS ...



Use DSswitch instead of vSwitch

▼ Standard Switch: vSwitch0 | ADD NETWORKING EDIT MANAGE PHYSICAL ADAPTERS ...



啊！沒了！

# Before the next class (11/02)

- Create an Ubuntu 18.04 VM on ESXi.
  - We will set up an iSCSI server on it.