

Міністерство освіти і науки України
Національний технічний університет України “Київський політехнічний
інститут імені Ігоря Сікорського”

Звіт

з лабораторної роботи №1 з дисципліни
“Організація комп’ютерних мереж”

“ПІДГОТОВКА ВІРТУАЛЬНИХ МАШИН”

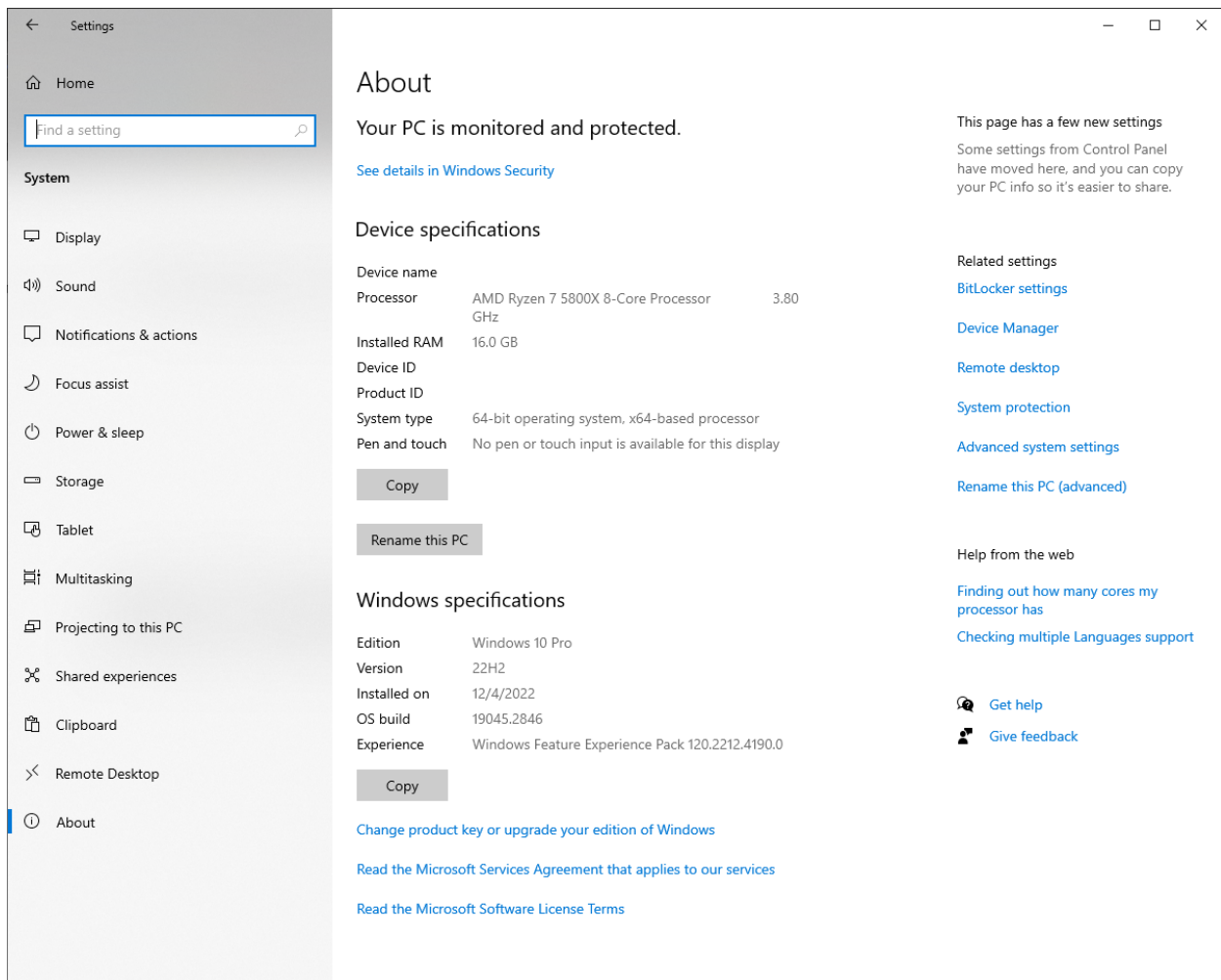
Виконав студент Флорчук Назарій Петрович

Перевірив викладач Катін Павло Юрійович

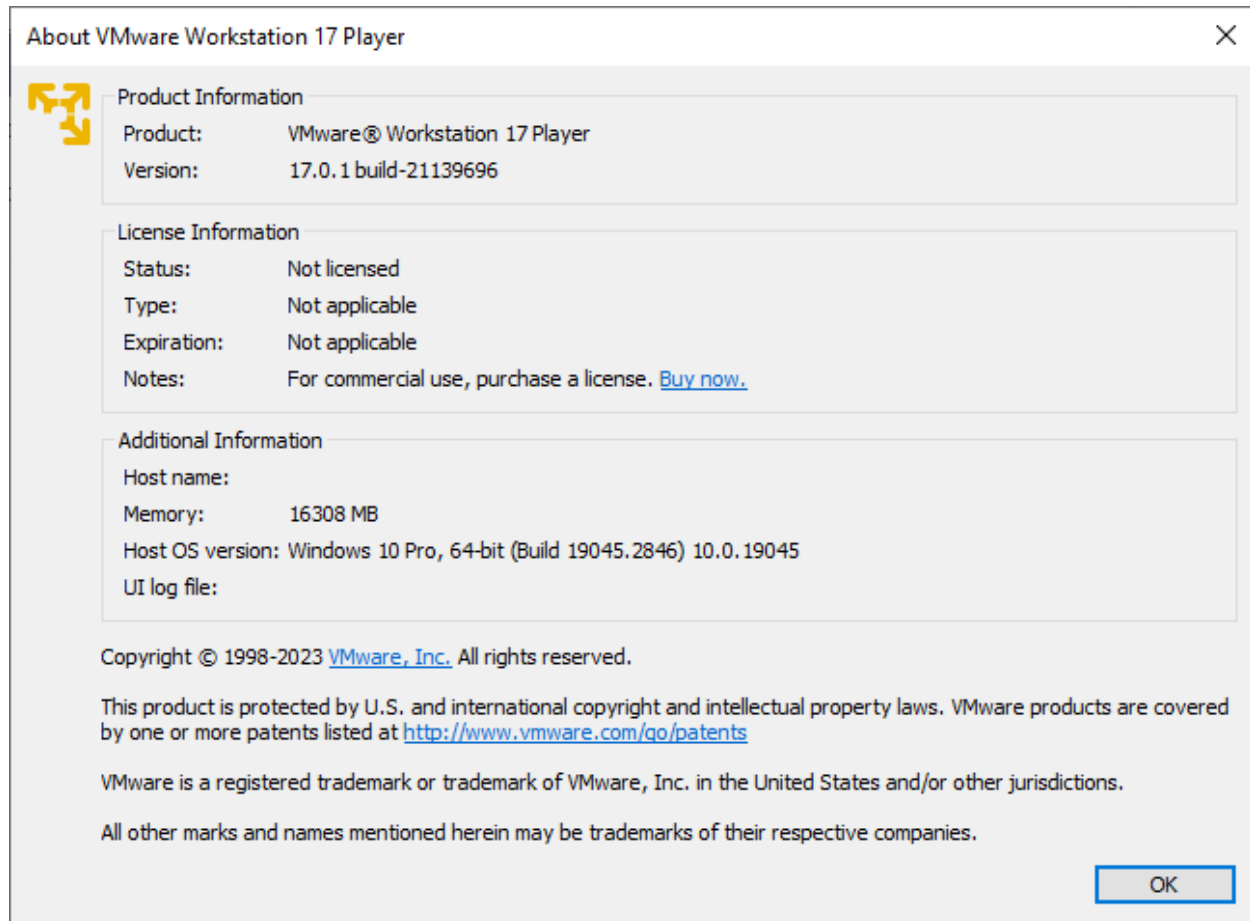
Мета роботи:

1. Створити віртуальні машини у програмі VMware Workstation Player.
2. Встановити на віртуальні машини ОС Windows Server 2019 та ОС Windows 10.
3. Здійснити базові налаштування віртуальних машин та операційних систем.
4. Налаштувати протокол TCP/IP v4.
5. Об'єднати віртуальні машини, із встановленими операційними системами, у одну локальну мережу.

Виконання лабораторної роботи здійснюється на машині:

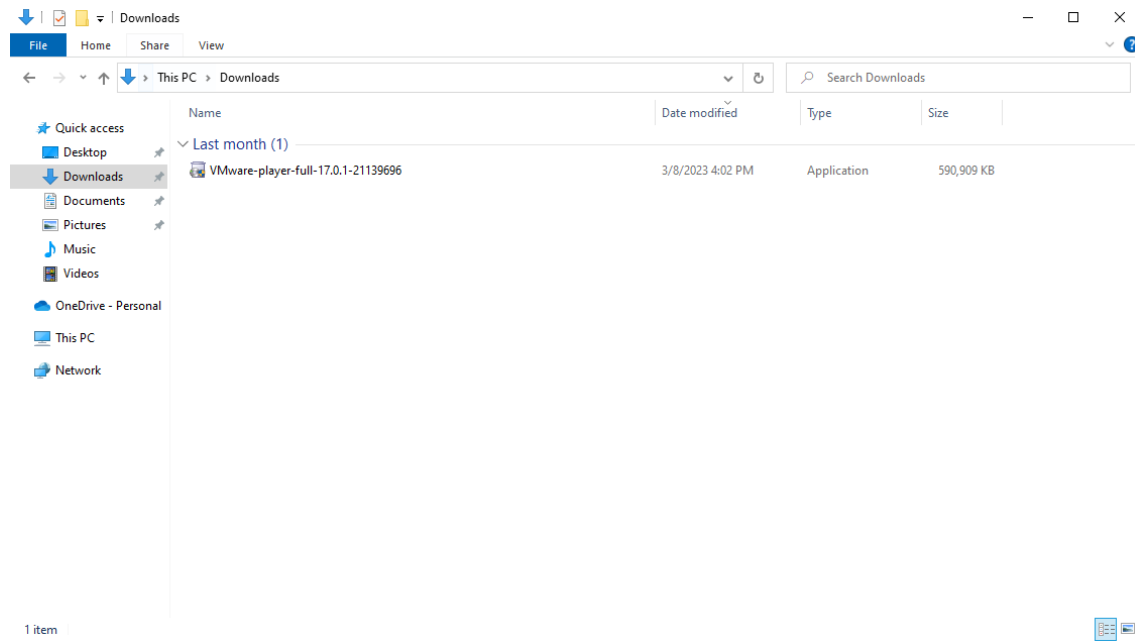


Версія VMware Workstation Player:

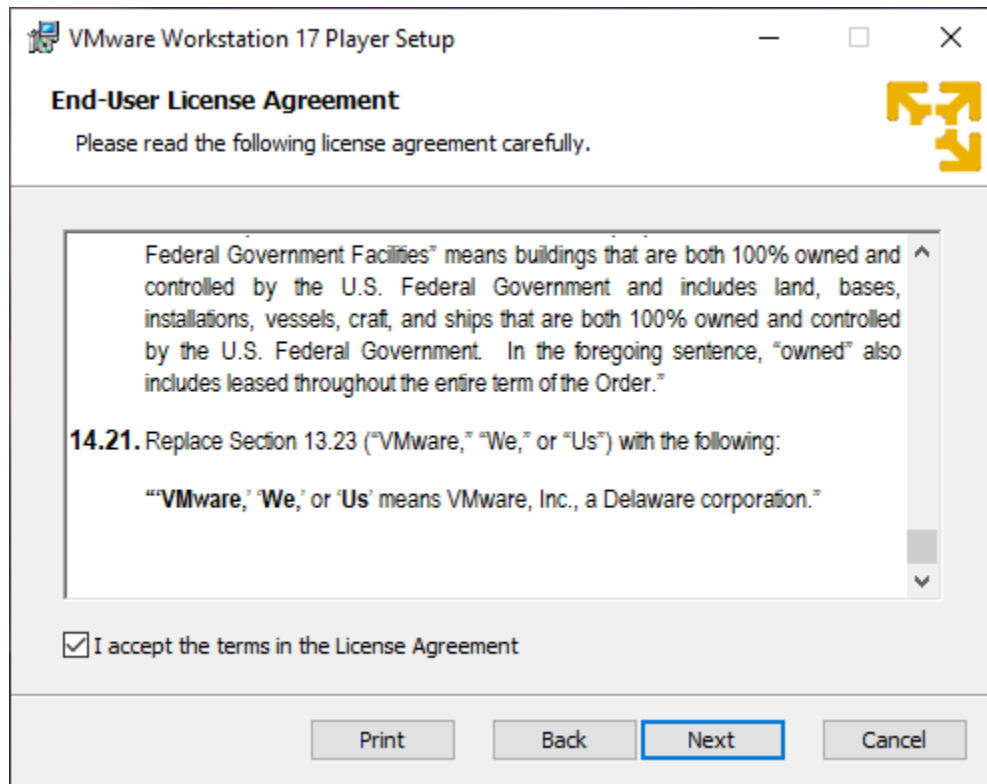


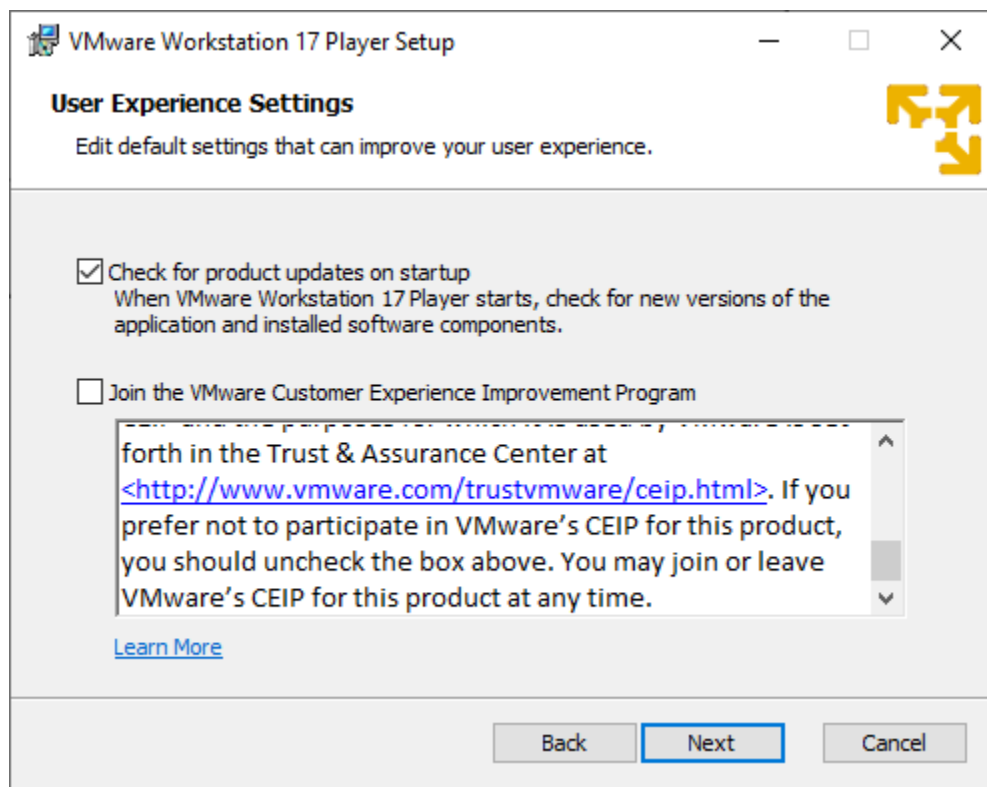
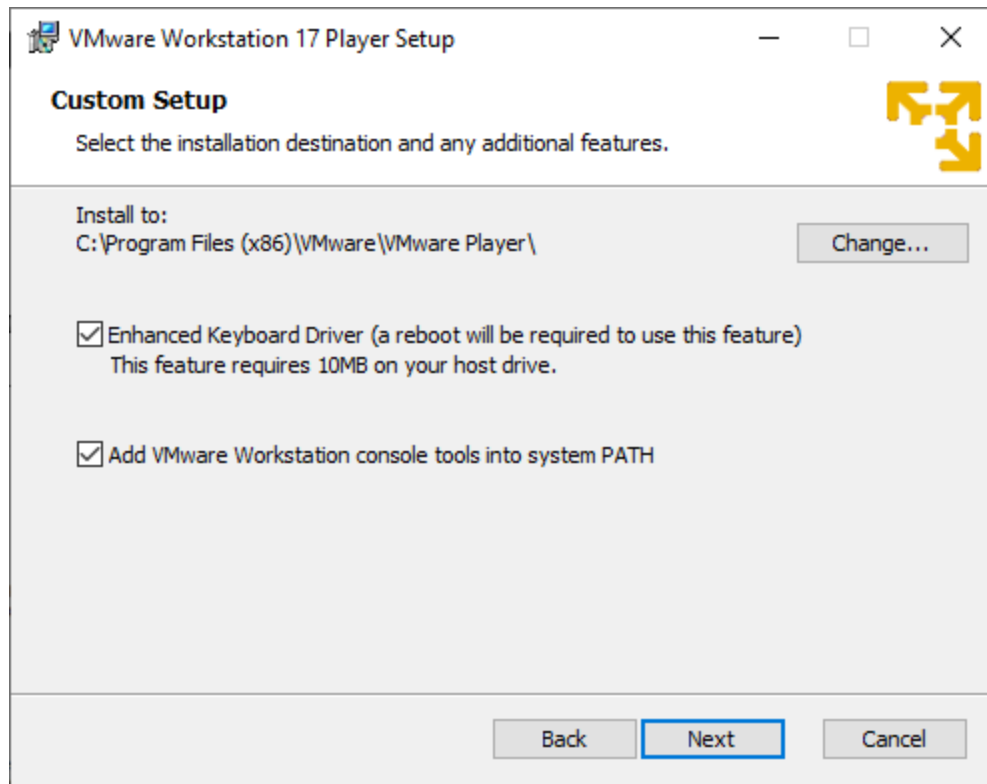
1. Встановлення VMware Workstation Player і створення віртуальних машин.

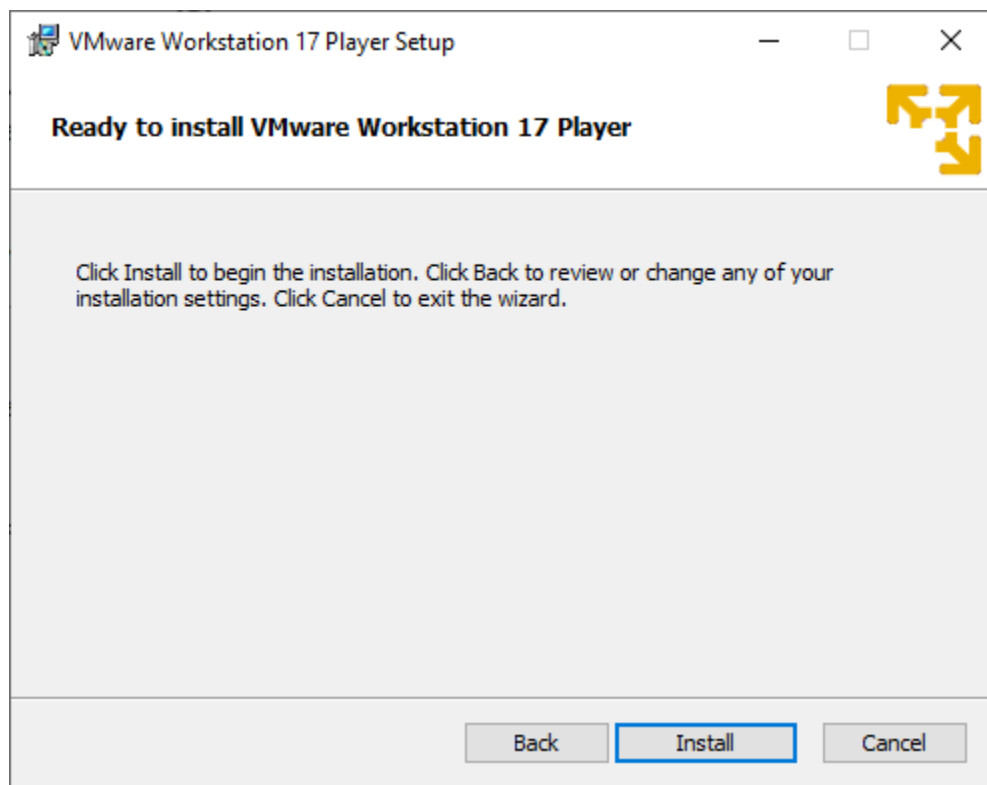
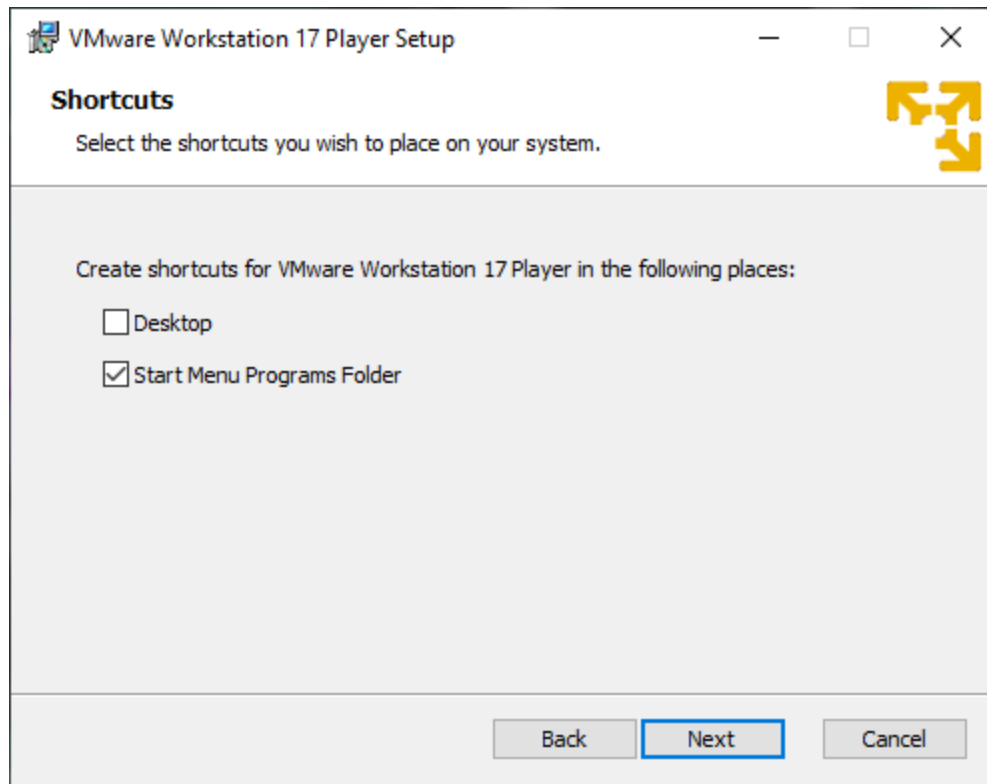
VMware Workstation Player можна завантажити із [офіційного сайту](#) проекту.

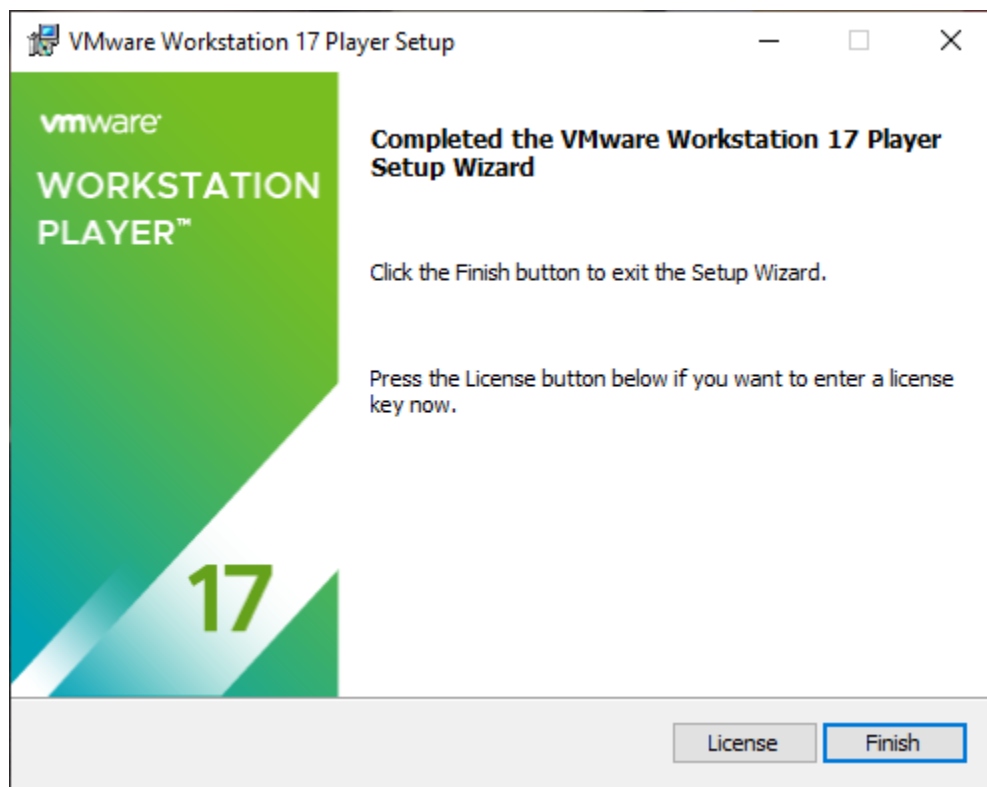
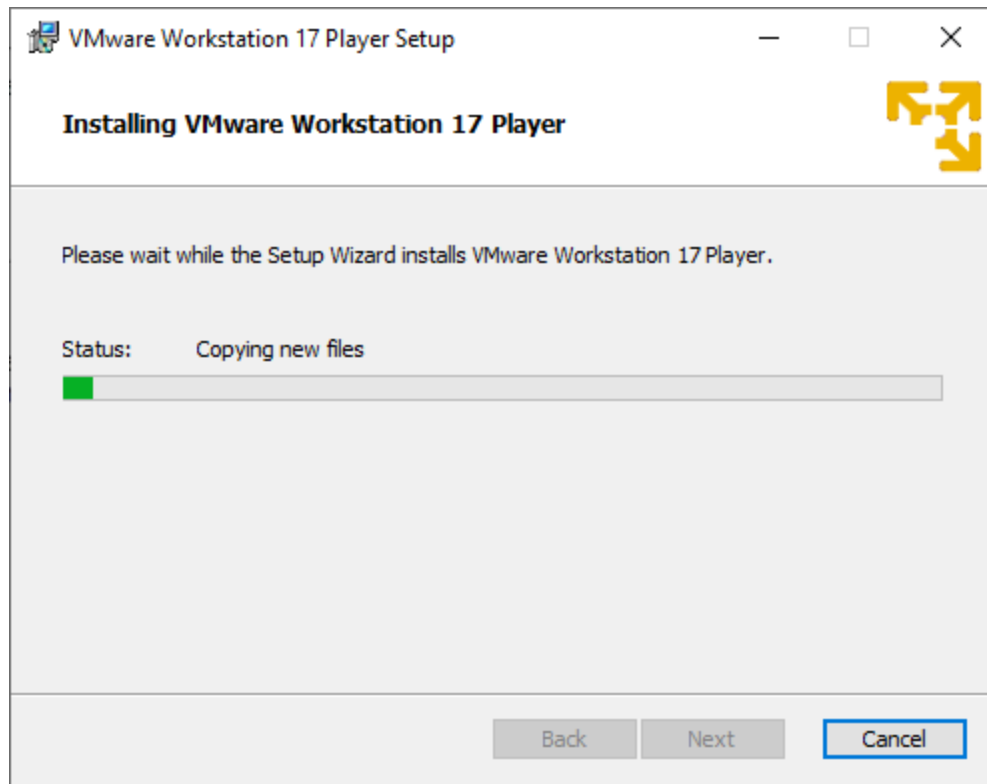


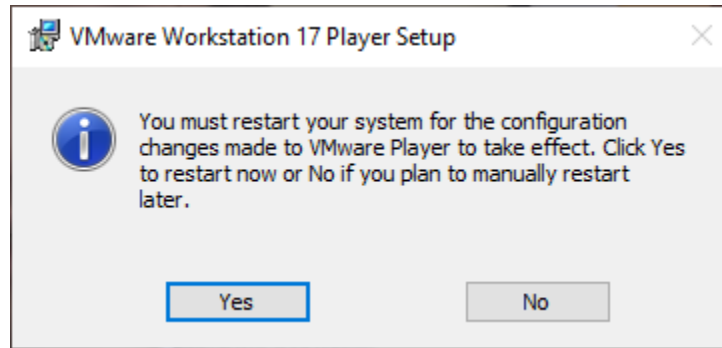
Встановлення програми інтуїтивно зрозуміле.



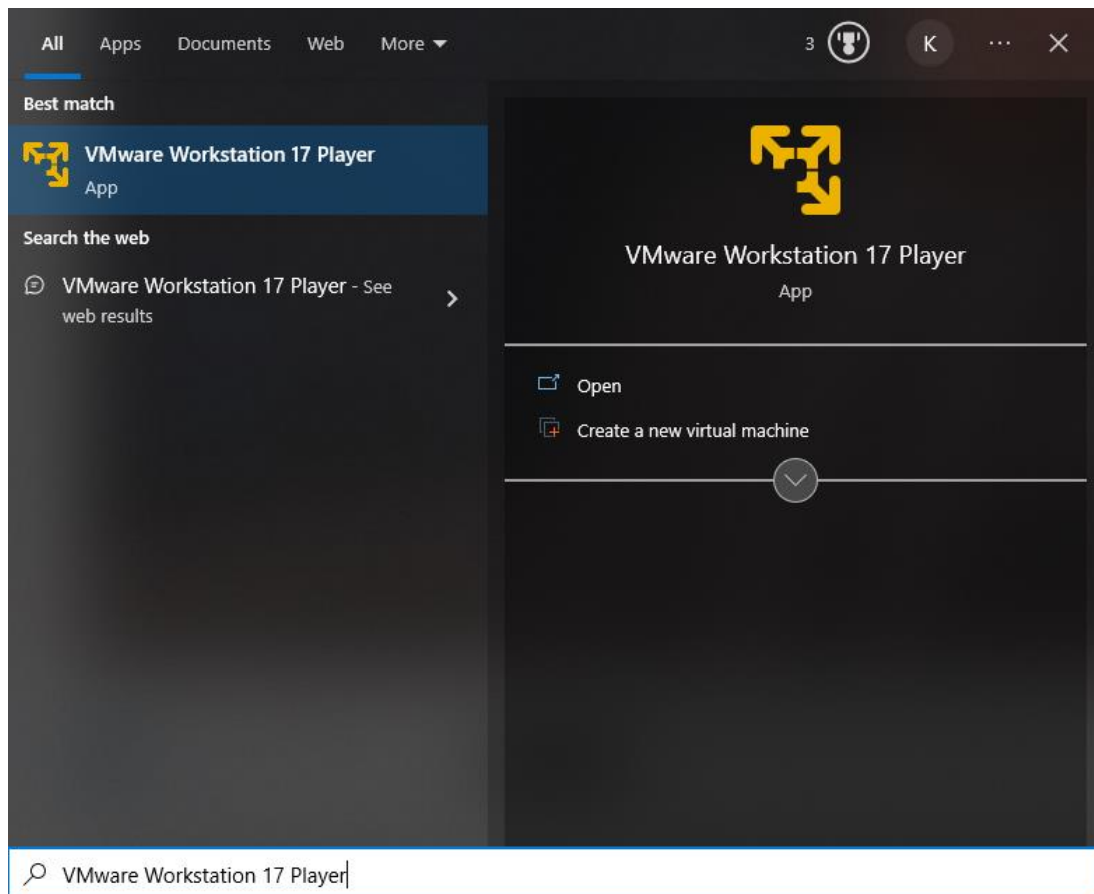


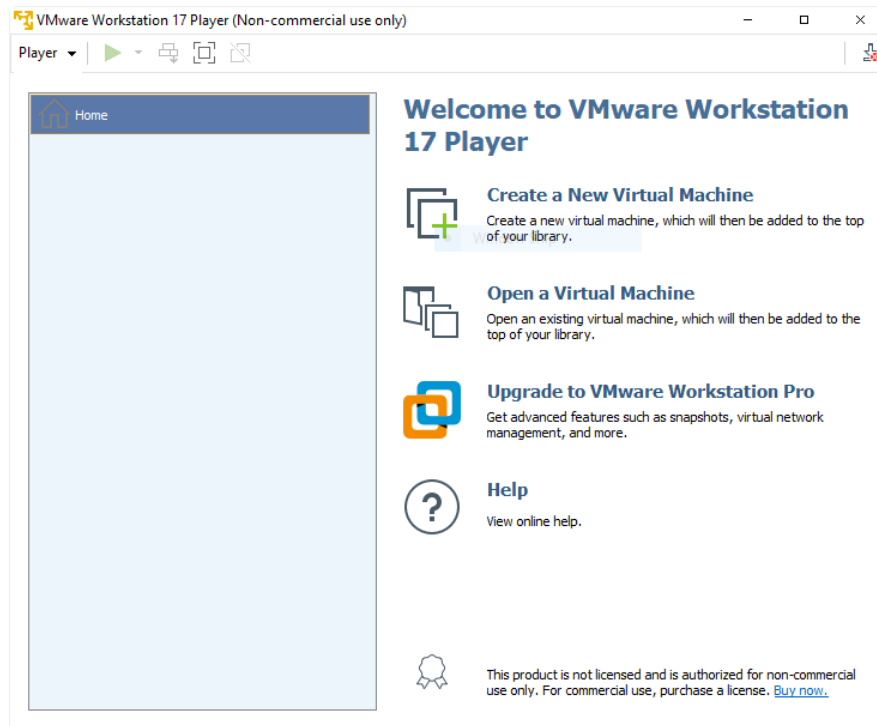




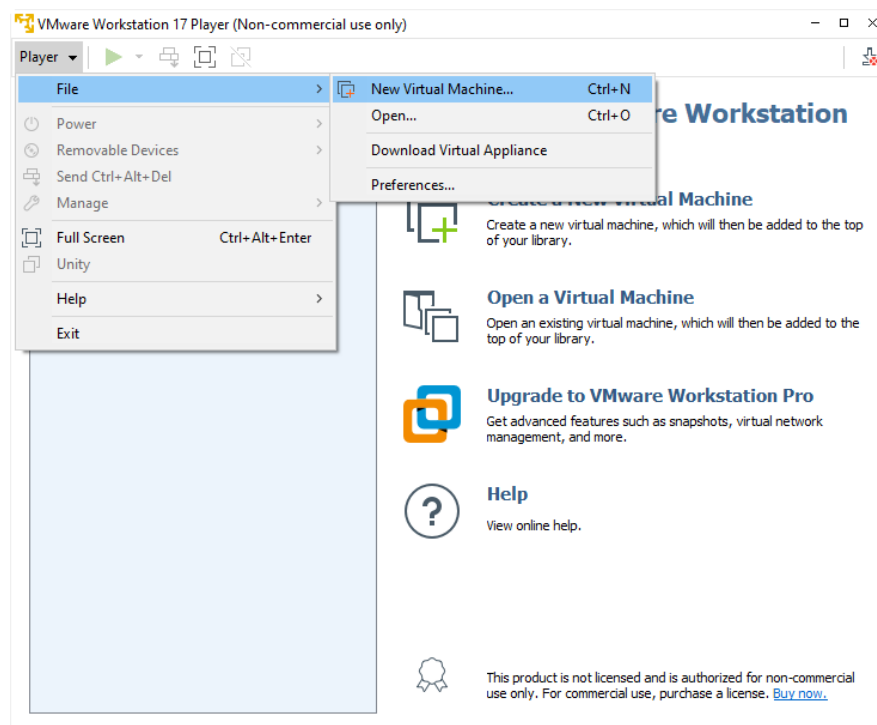


Після перезавантаження, програма VMware Workstation Player готова до використання.





Процес створення віртуальної машини, для ОС Windows Server 2019 (Core).



New Virtual Machine Wizard

Welcome to the New Virtual Machine Wizard

A virtual machine is like a physical computer; it needs an operating system. How will you install the guest operating system?

Install from:

☐ Installer disc:

No drives available

☐ Installer disc image file (iso):

E:\17763.3650.221105-1748.rs5_release_svc_refresh

Browse...

☒ I will install the operating system later.

The virtual machine will be created with a blank hard disk.

Help

< Back

Next >

Cancel

New Virtual Machine Wizard

Select a Guest Operating System

Which operating system will be installed on this virtual machine?

Guest operating system

☒ Microsoft Windows

☐ Linux

☐ Other

Version

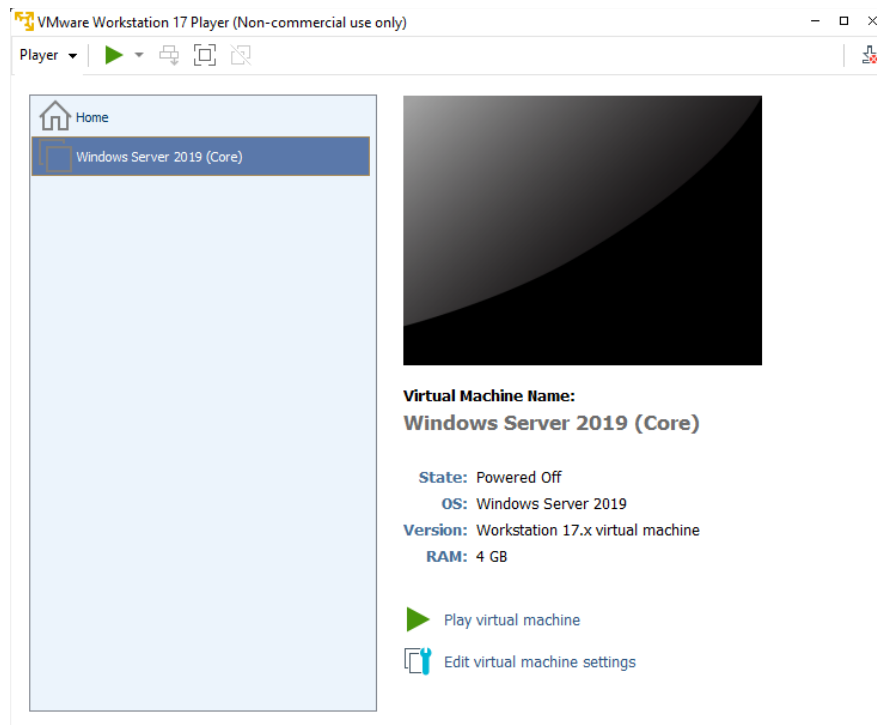
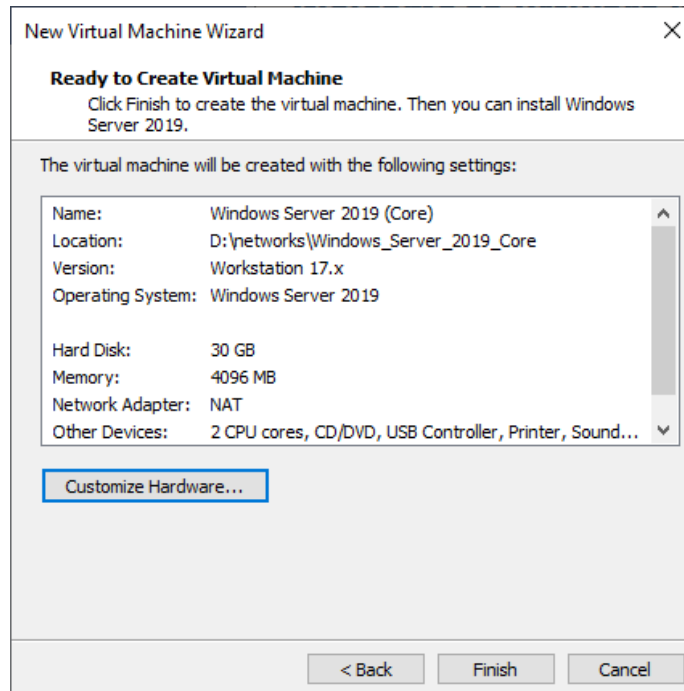
Windows Server 2019

Help

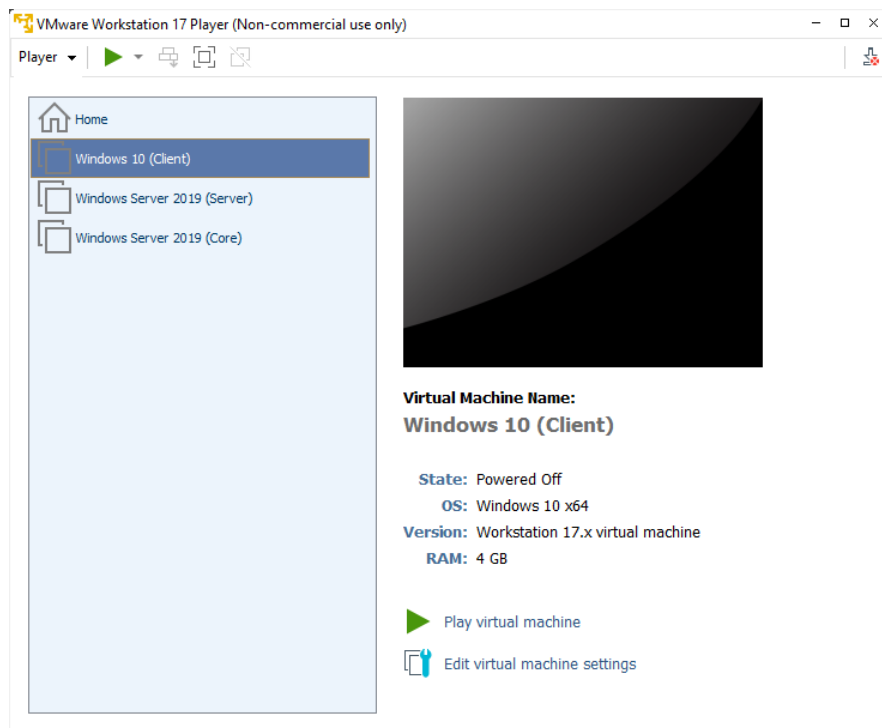
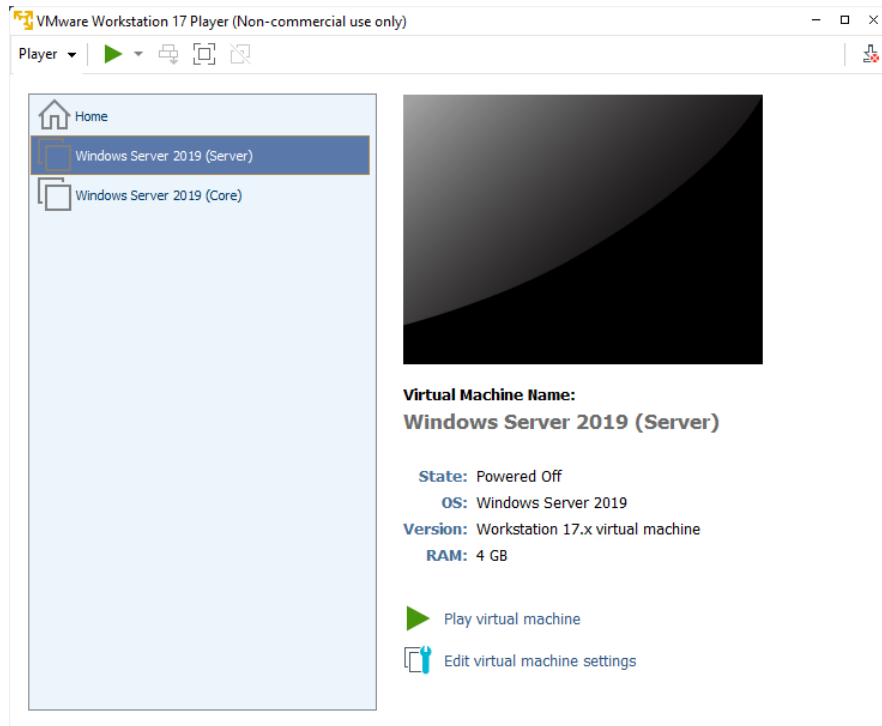
< Back

Next >

Cancel



Віртуальна машина для ОС Windows Server 2019 (Core) успішно створена. Аналогічно створюю і віртуальні машини для ОС Windows Server 2019 (Server) та Windows 10 (Client).

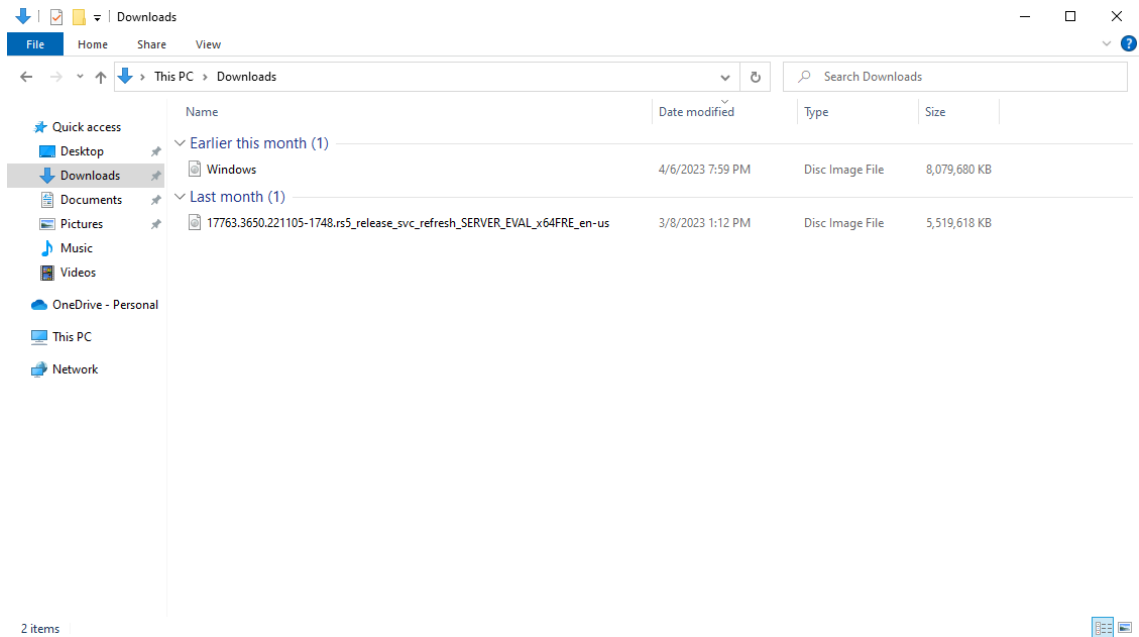


Як результат, створено такі віртуальні машини:

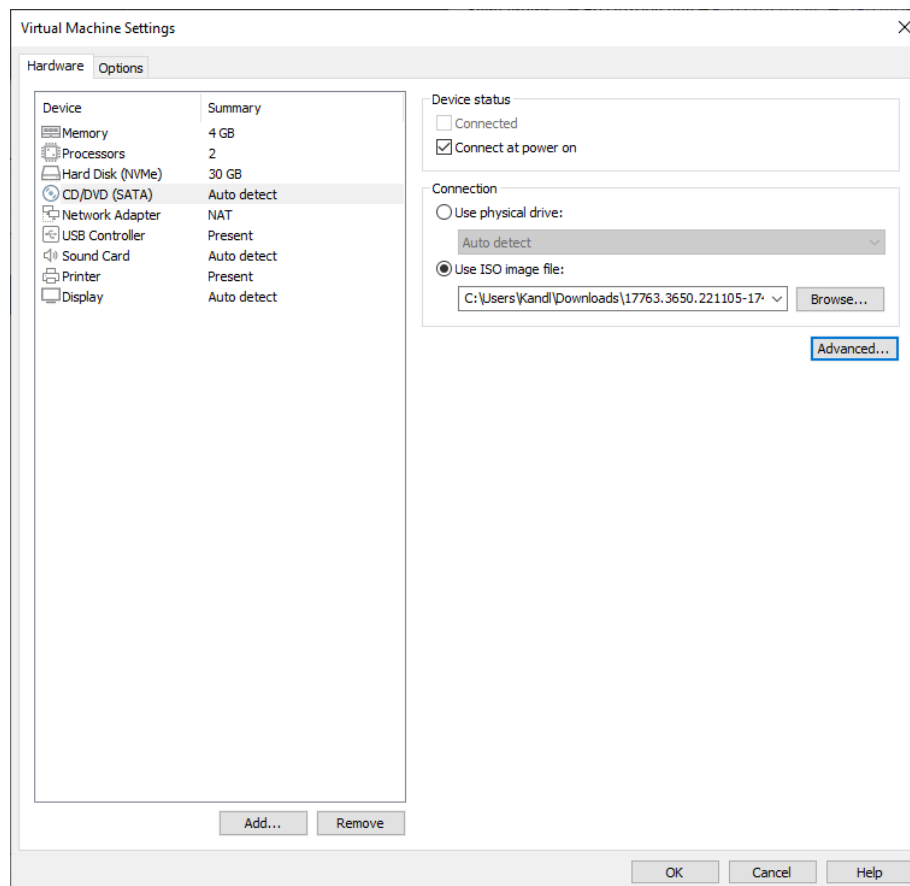
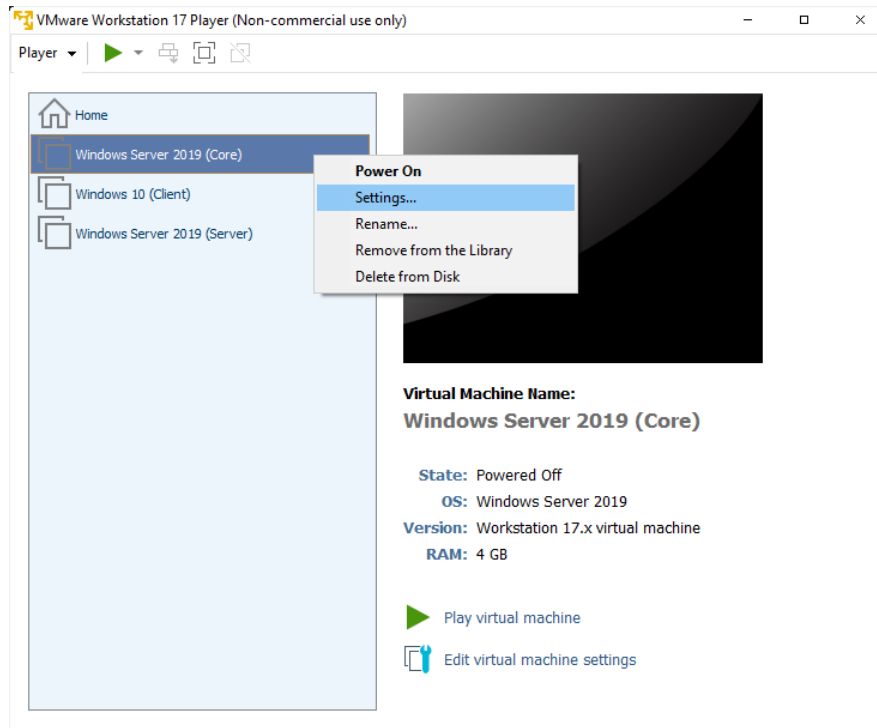
Назва віртуальної машини	Назва операційної системи	RAM	Ємність диску віртуальної машини
Windows Server 2019 (Core)	Windows Server 2019	4GB	30GB
Windows Server 2019 (Server)	Windows Server 2019	4GB	30GB
Windows 10 (Client)	Windows 10	4GB	30GB

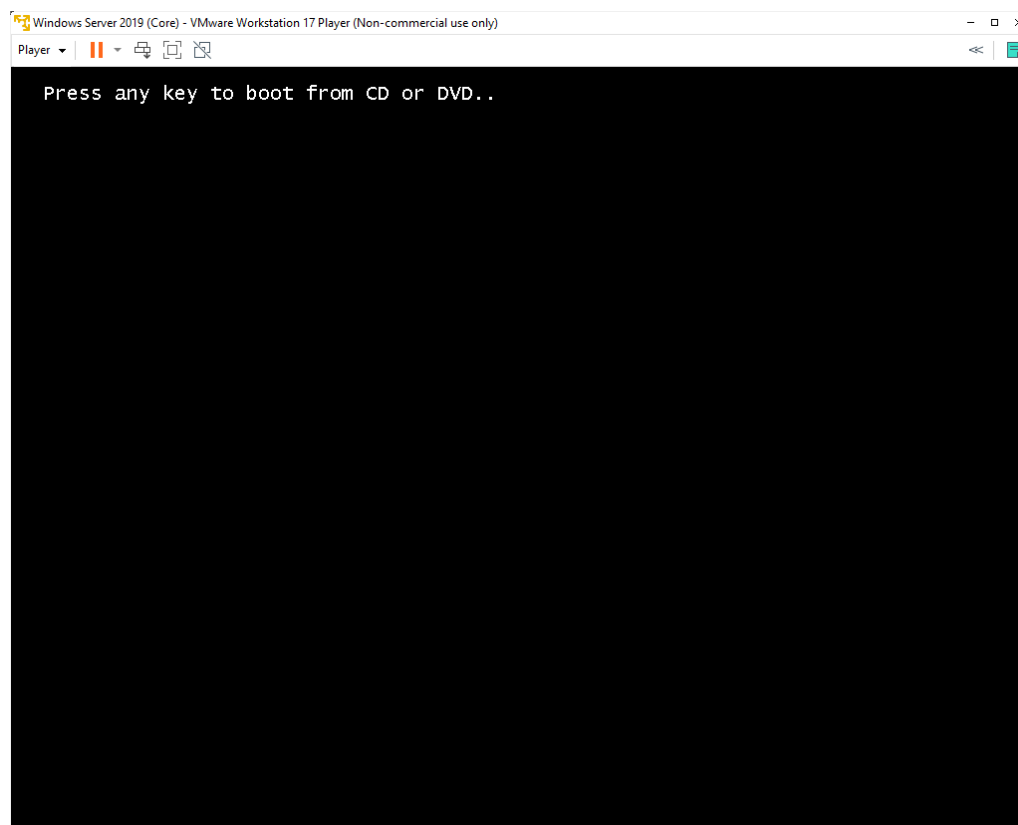
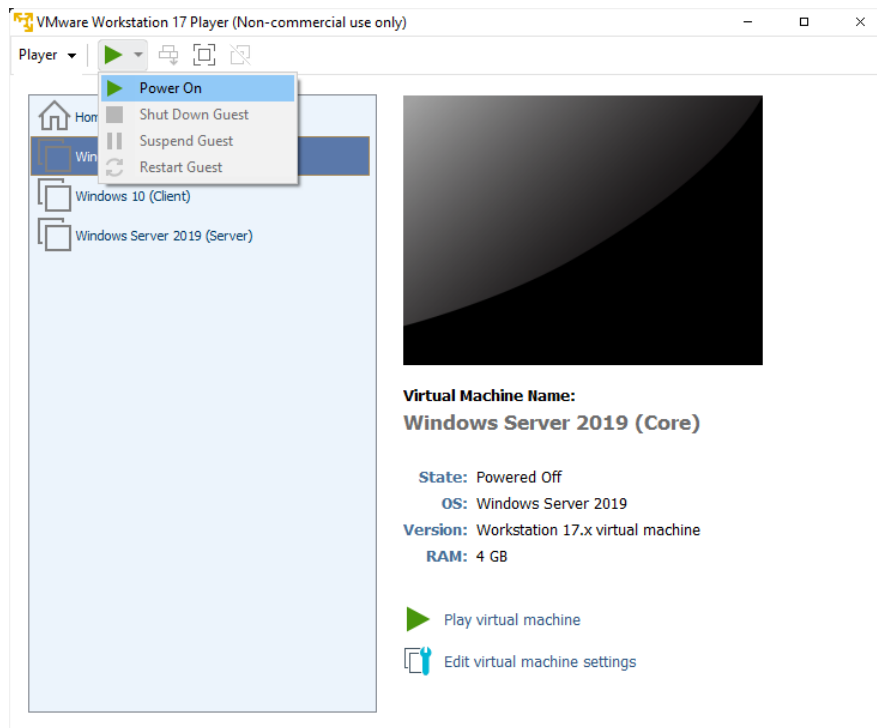
2. Встановлення та налаштування, на створених віртуальних машинах, відповідних операційних систем.

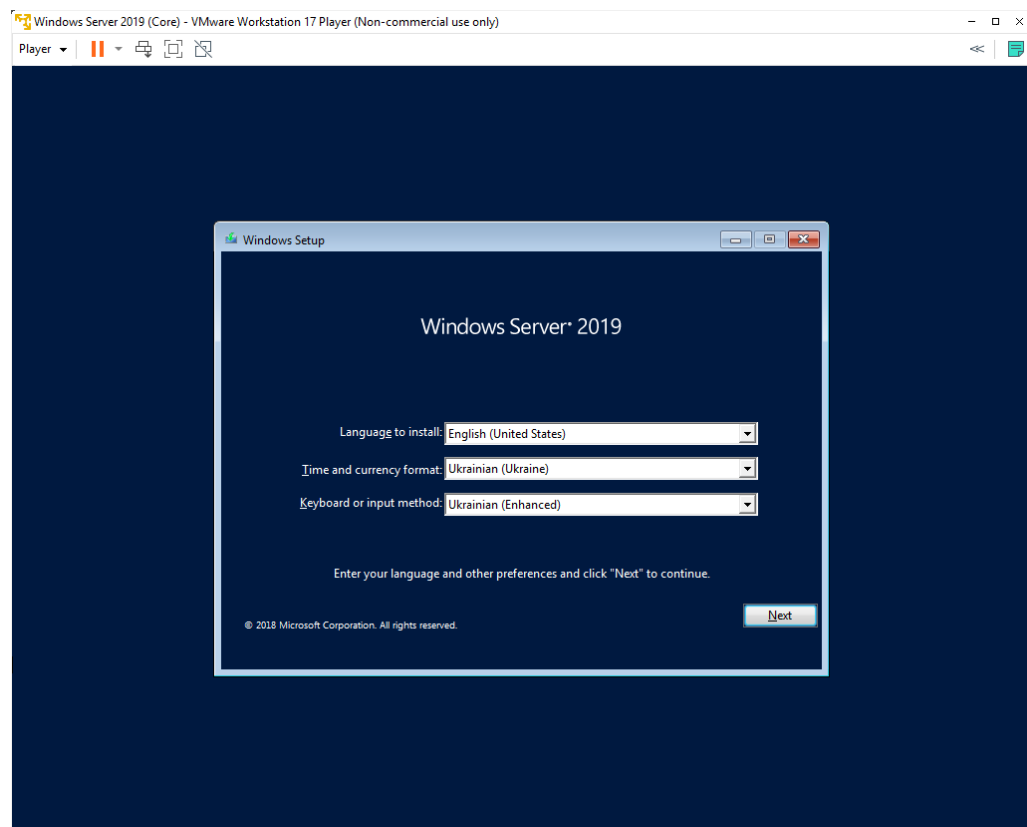
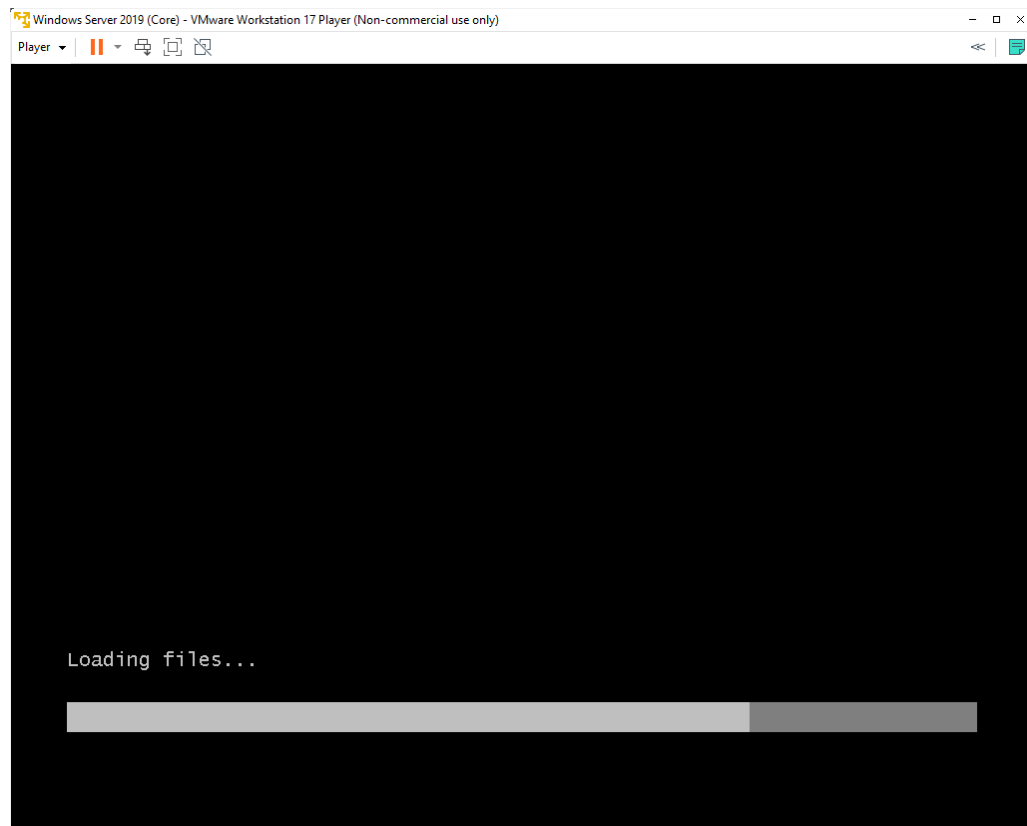
Образи операційних систем Windows Server 2019 та Windows 10 (файли із розширенням .iso) можна завантажити із [офіційного сайту](#) Microsoft.

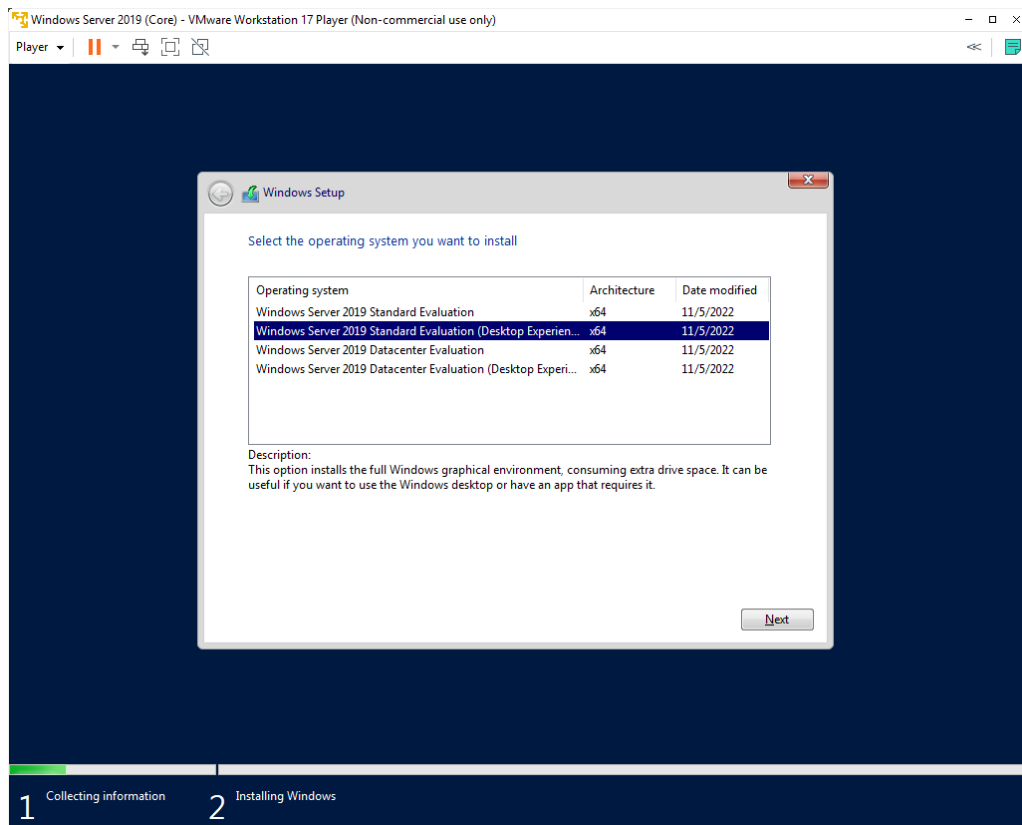
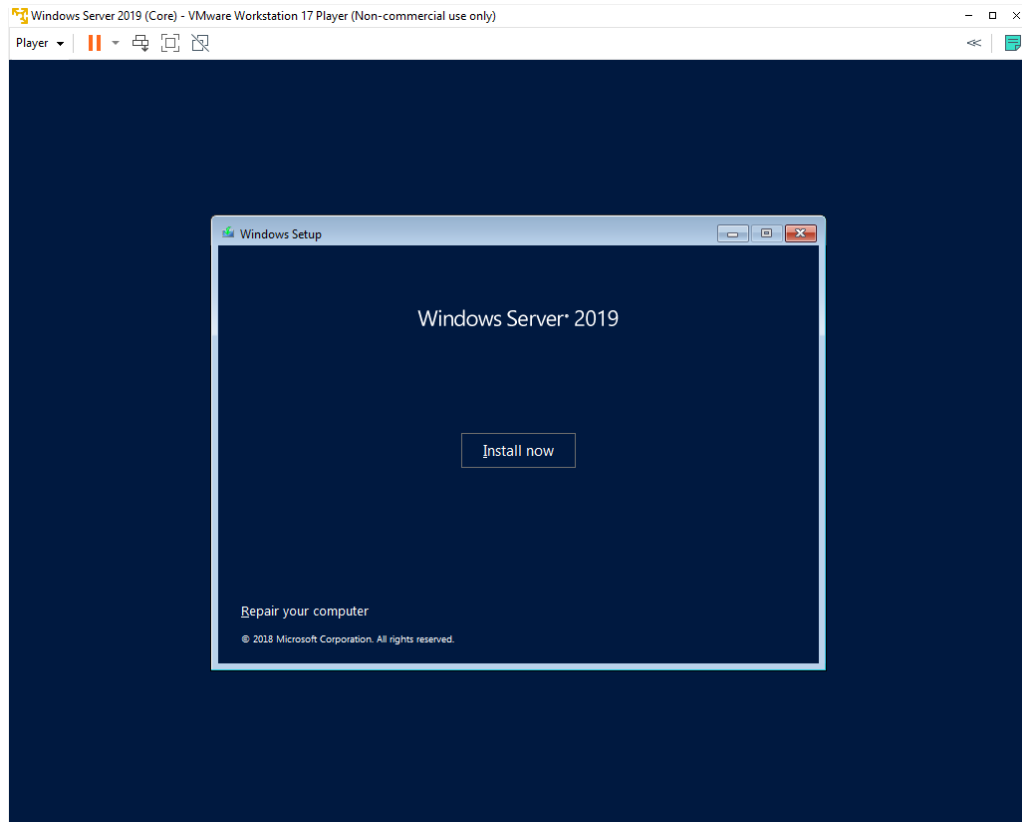


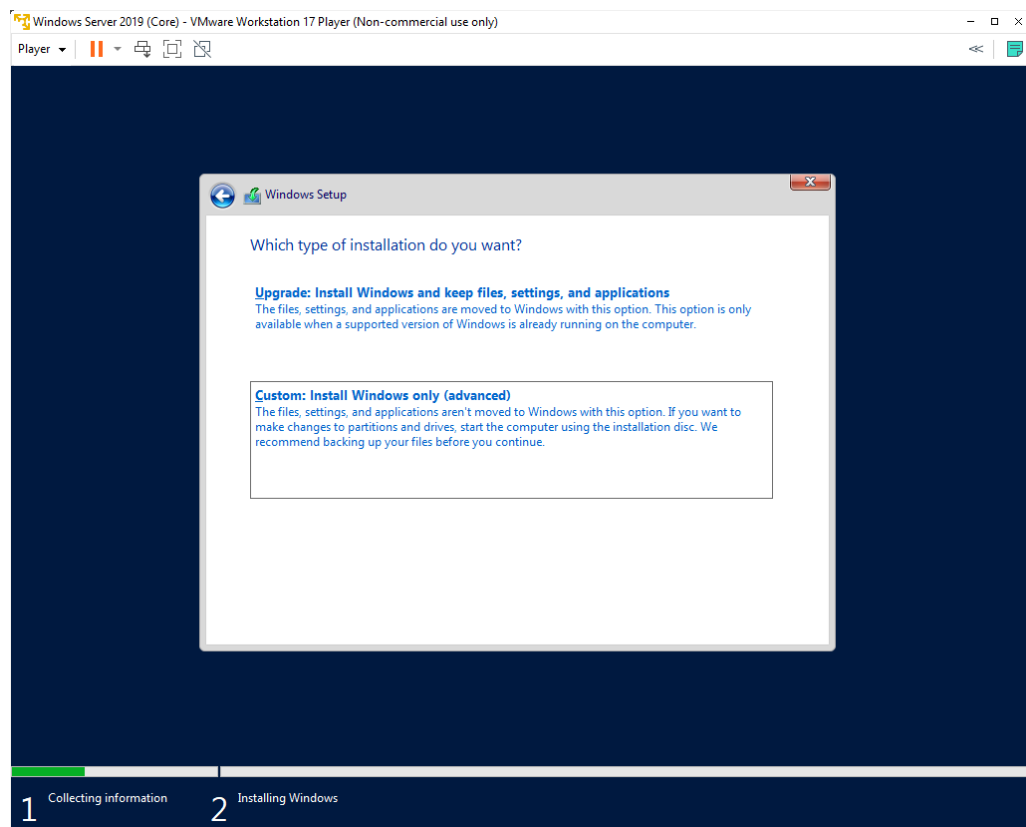
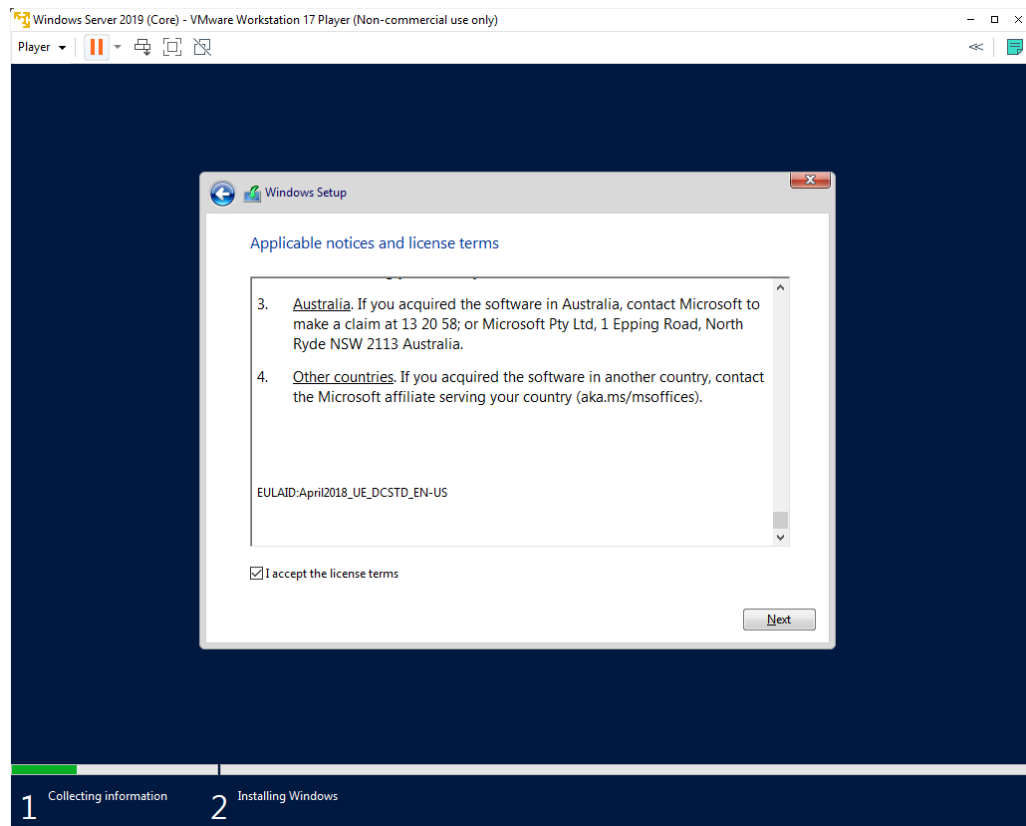
Встановлення операційної системи Windows Server 2019, на віртуальну машину Windows Server 2019 (Core).

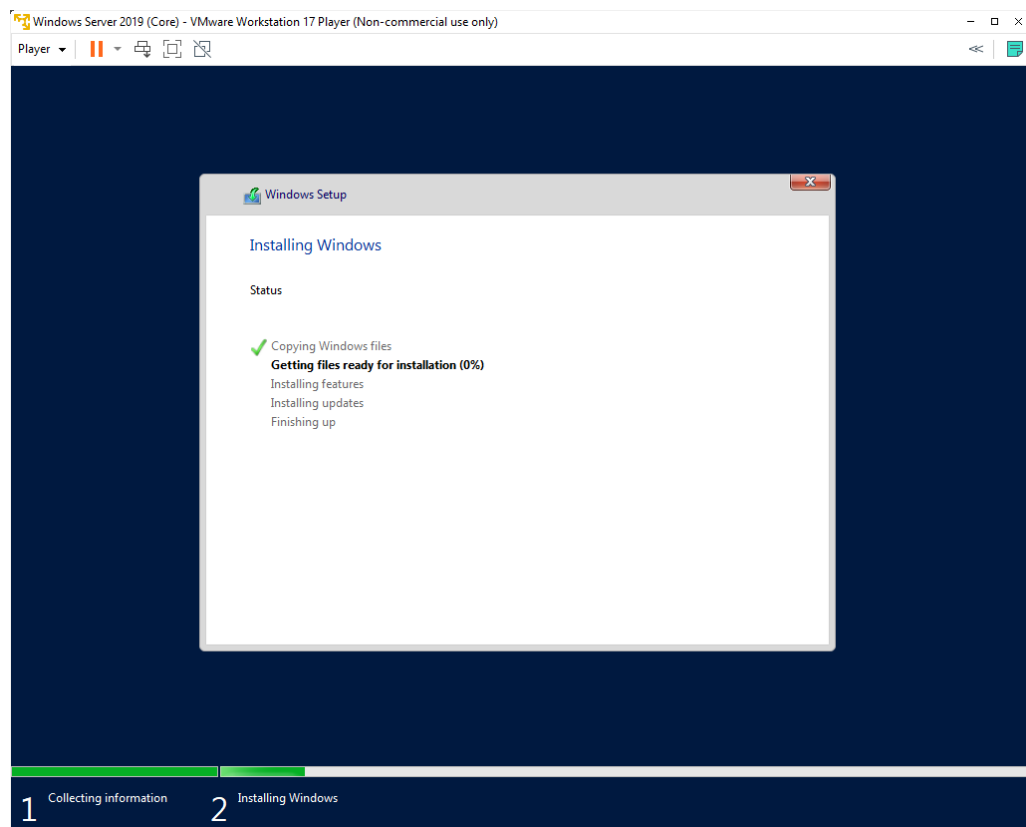
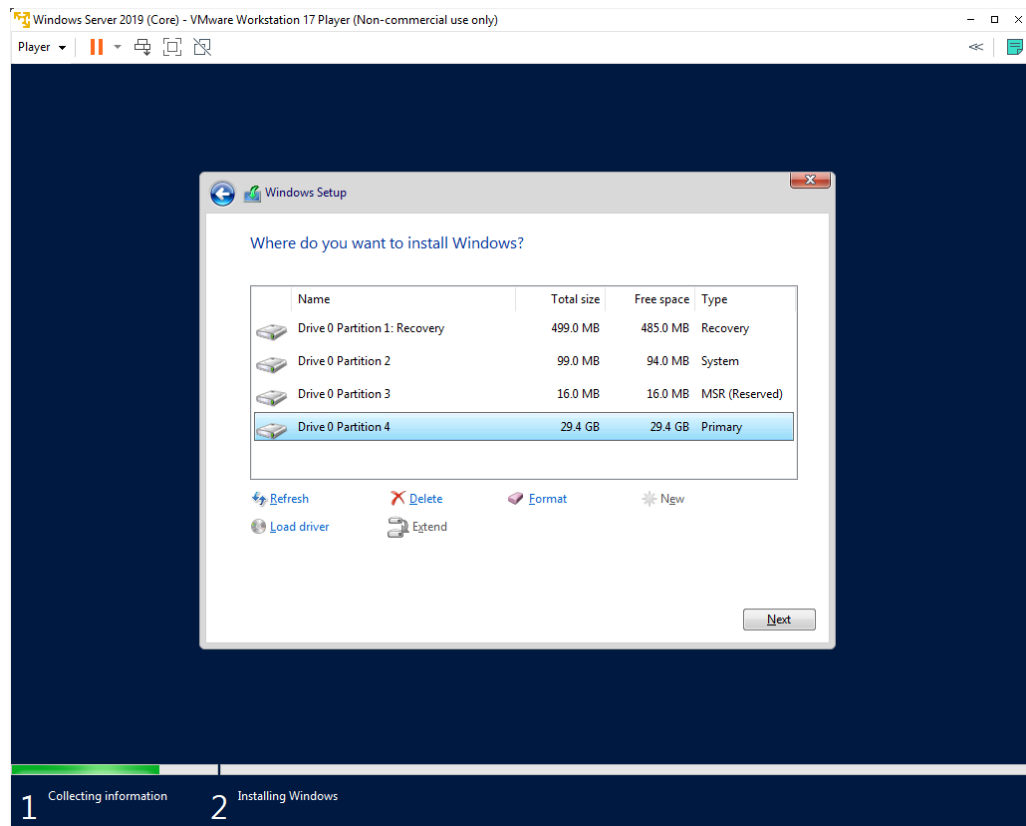


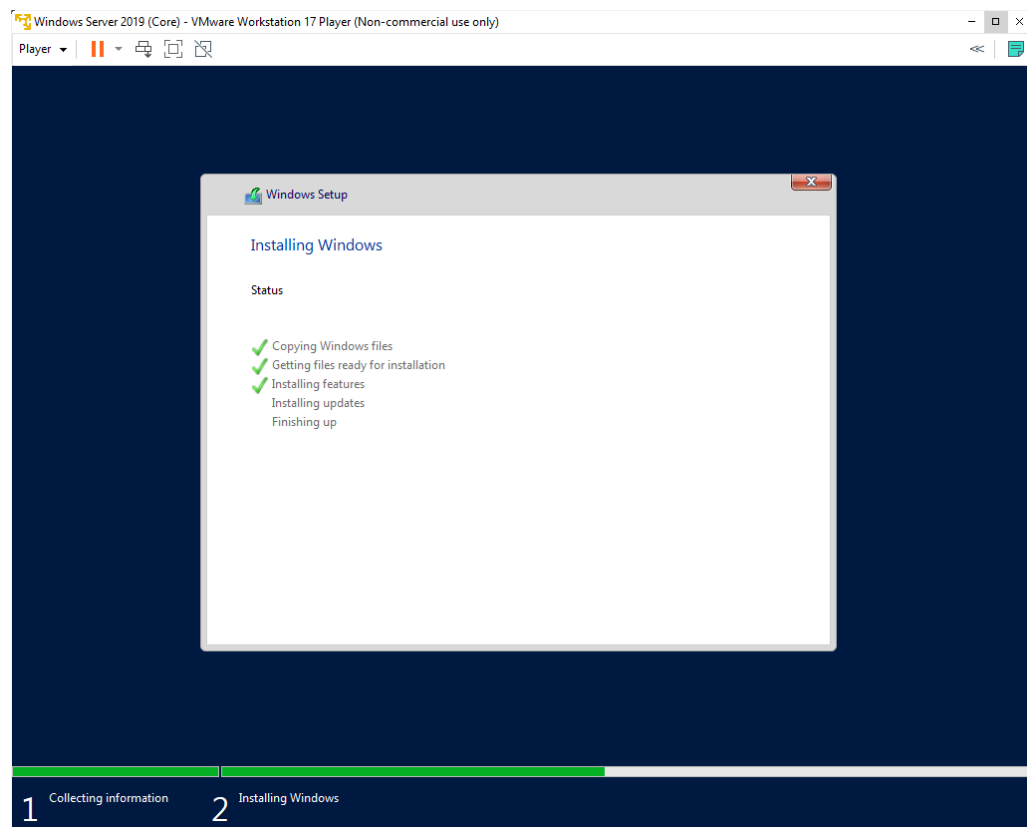
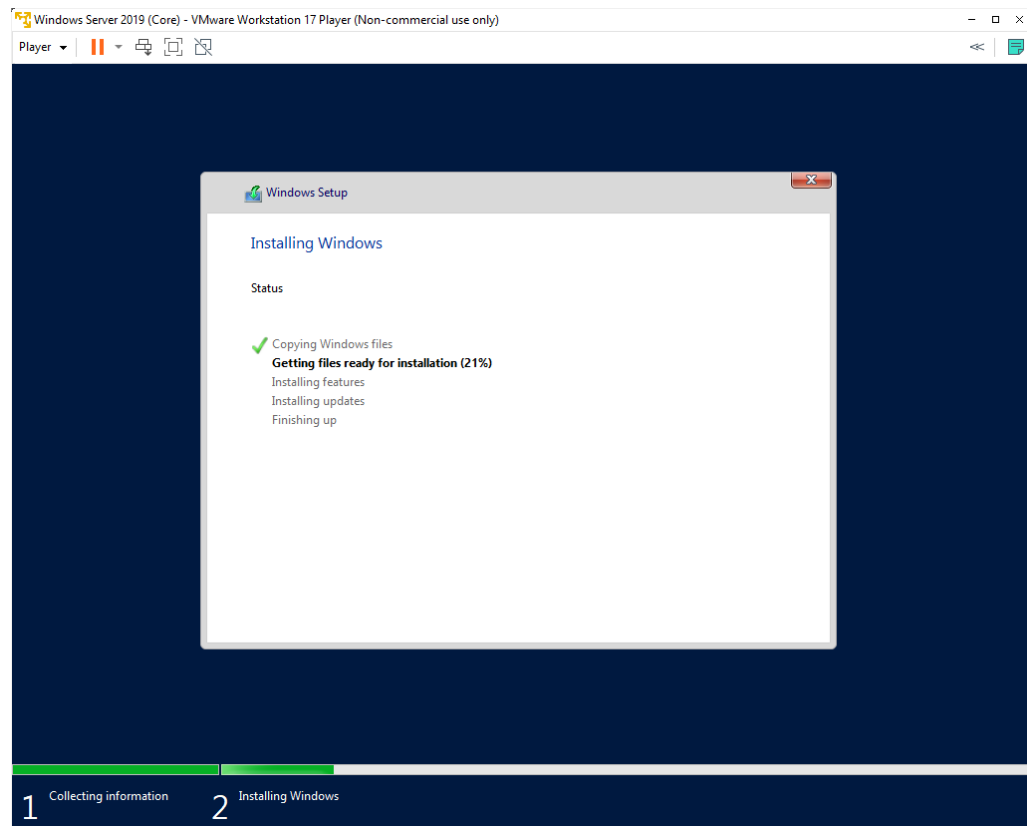


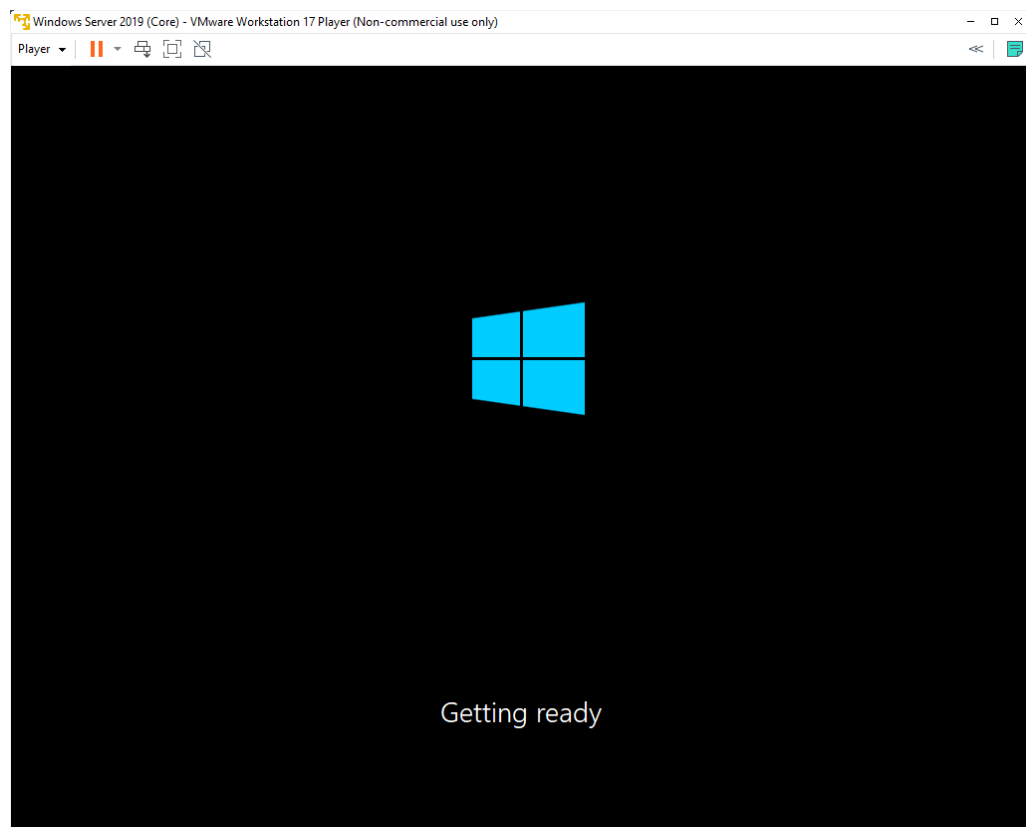
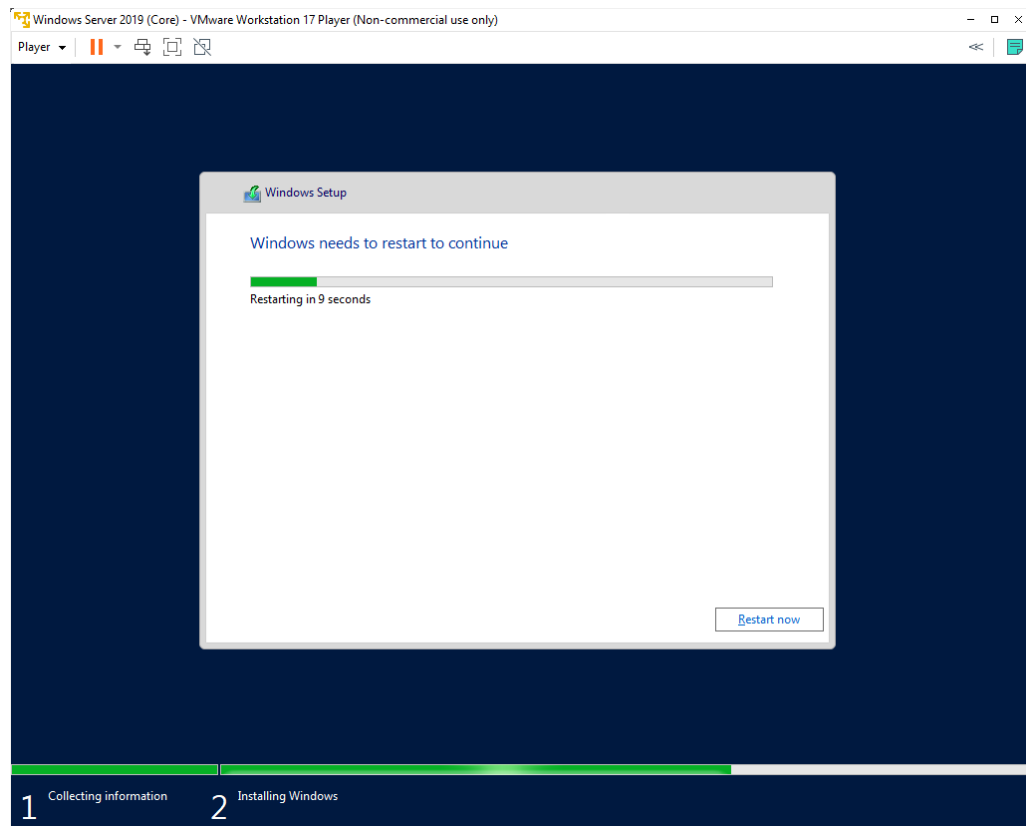


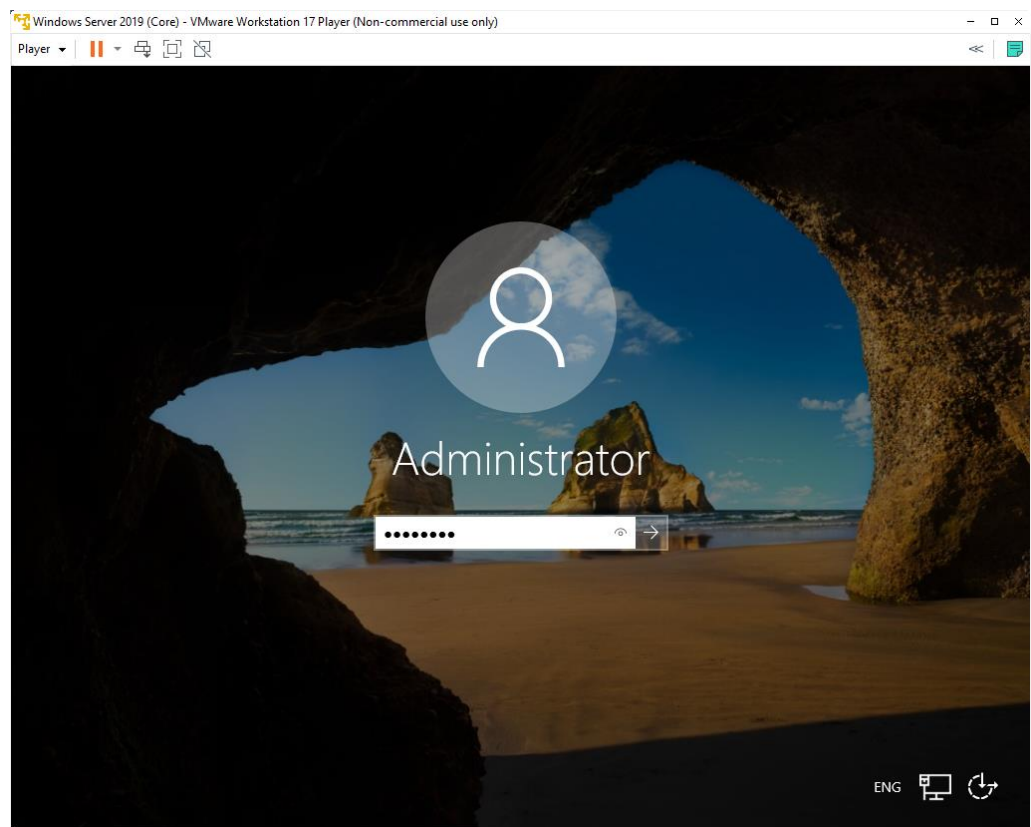
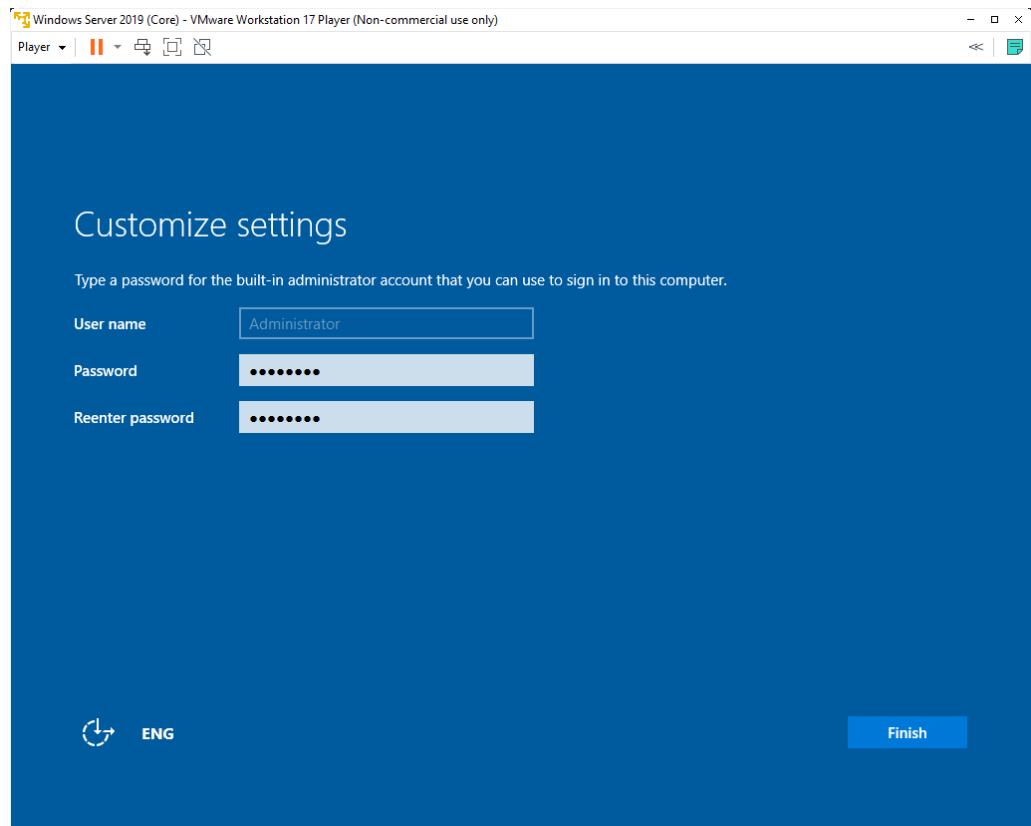


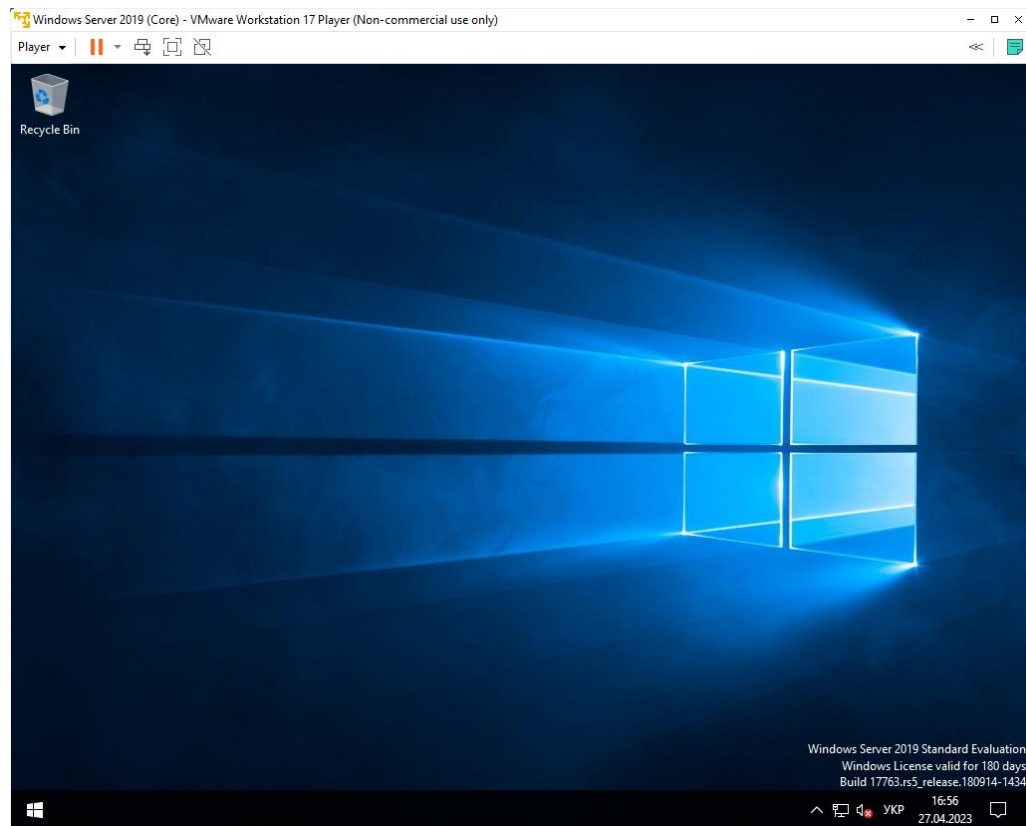












Аналогічно виконується встановлення операційної системи Windows Server 2019 для віртуальної машини Windows Server 2019 (Server), та із не значними відмінностями, для віртуальної машини Windows 10 (Client) операційної системи Windows 10.

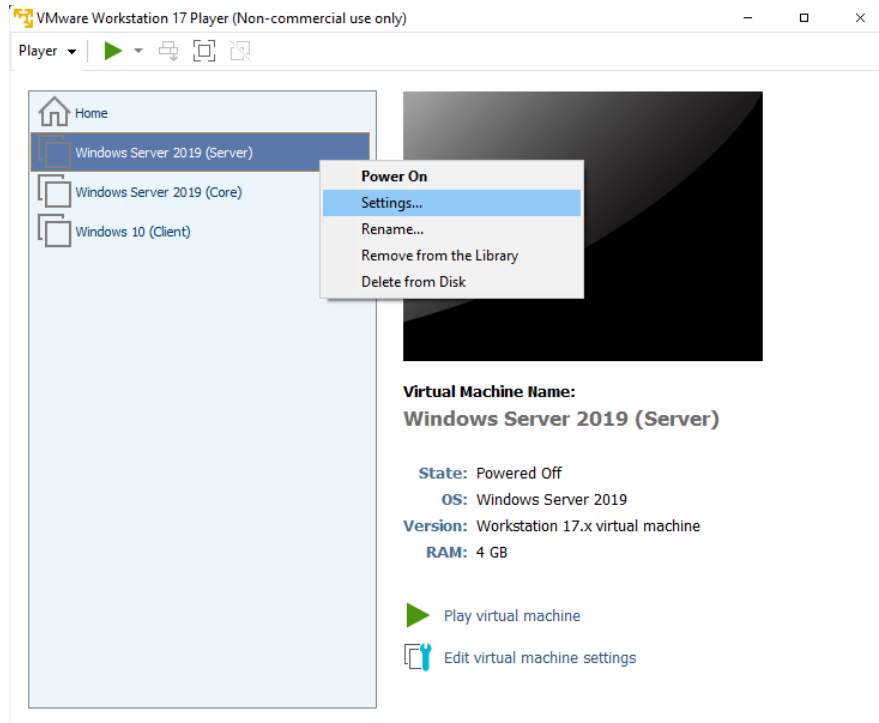
Як результат, встановлені і налаштовані такі операційні системи для віртуальних машин:

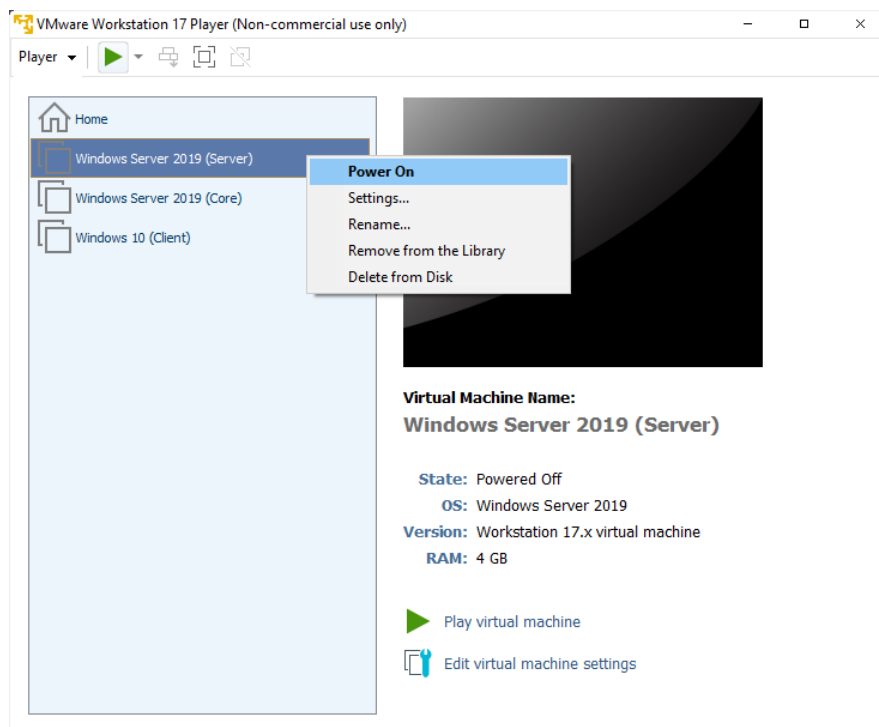
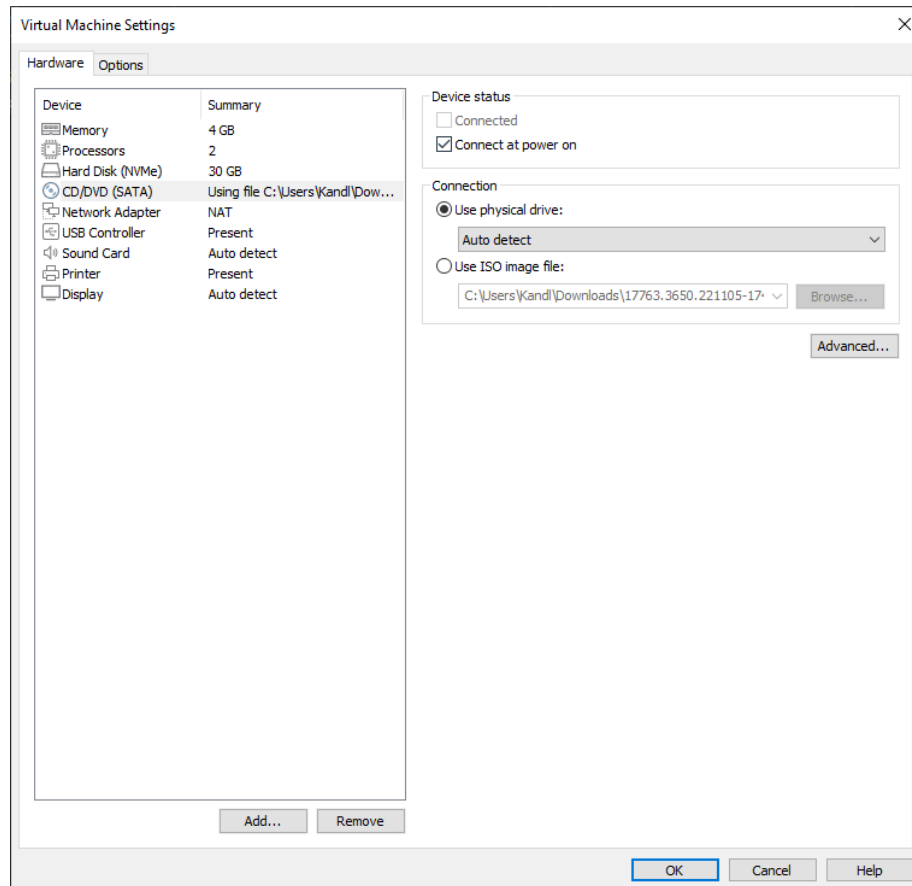
Ім'я комп'ютера*	Назва віртуальної машини	Назва операційної системи	Назва облікового запису	Пароль облікового запису
WIN-E3LFSR2E80S	Windows Server 2019 (Core)	Windows Server 2019	Administrator	P@\$w0rd
WIN-DRSEKG02P35	Windows Server 2019 (Server)	Windows Server 2019	Administrator	P@\$w0rd
DESKTOP-EF52UAL	Windows 10 (Client)	Windows 10	User	P@\$w0rd

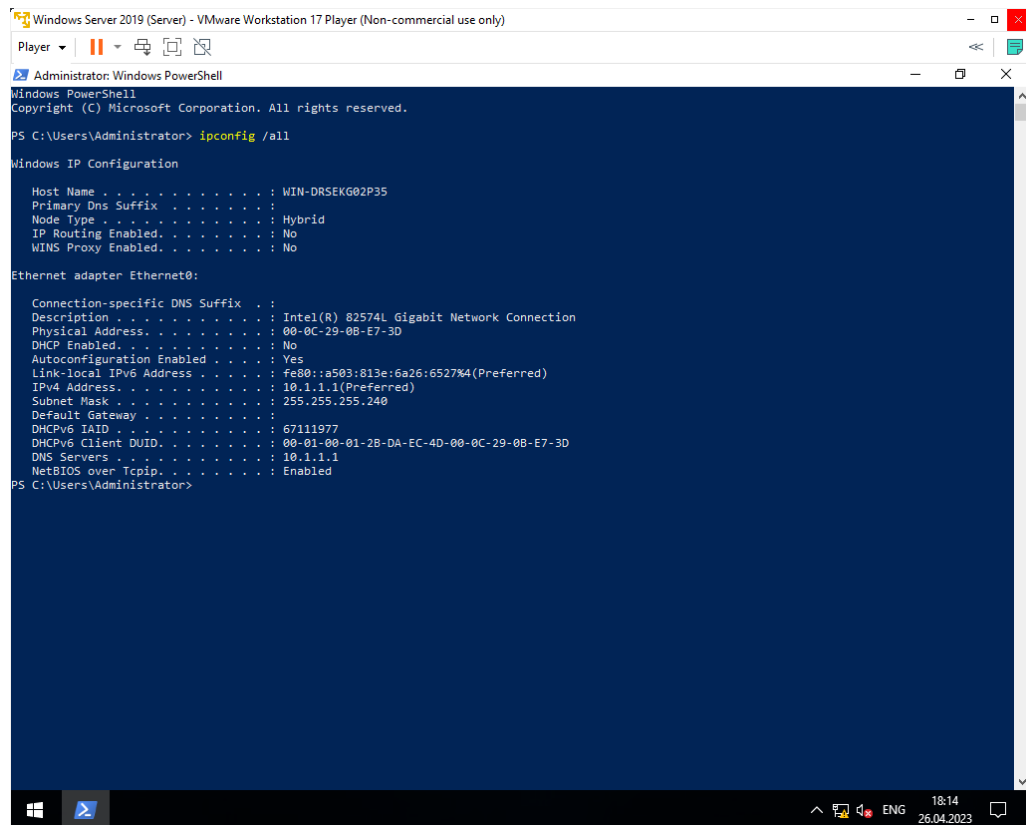
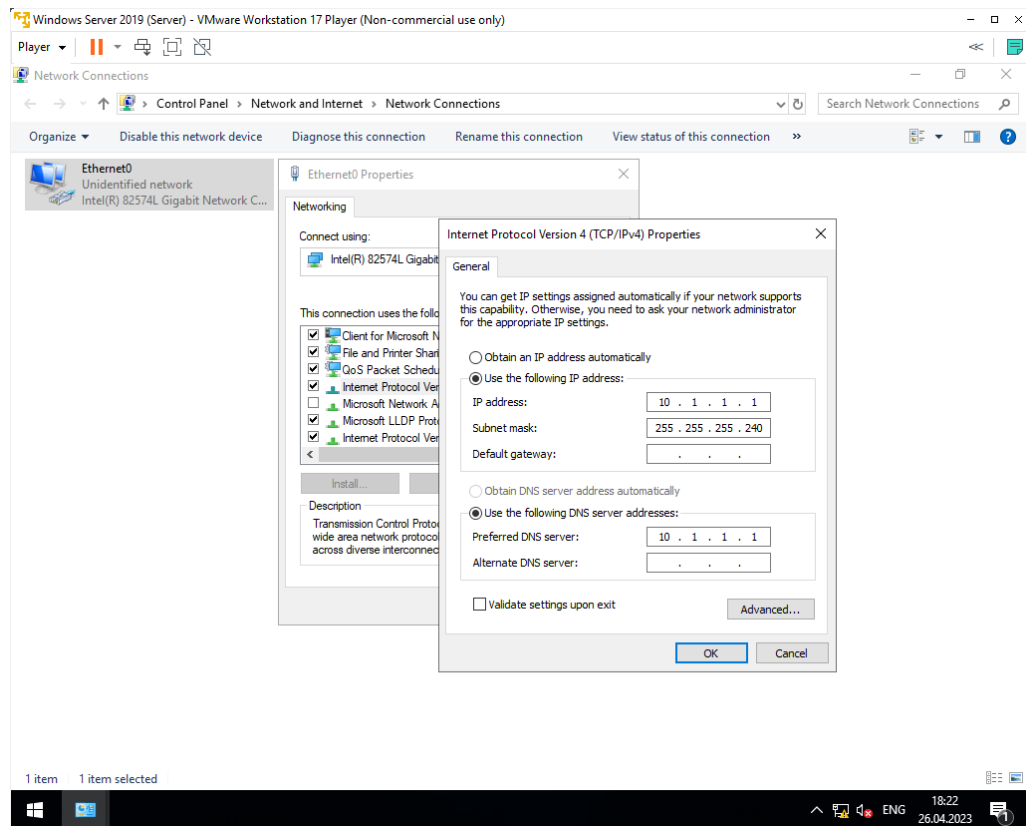
* – значення згенеровано автоматично при встановленні операційної системи на віртуальну машину.

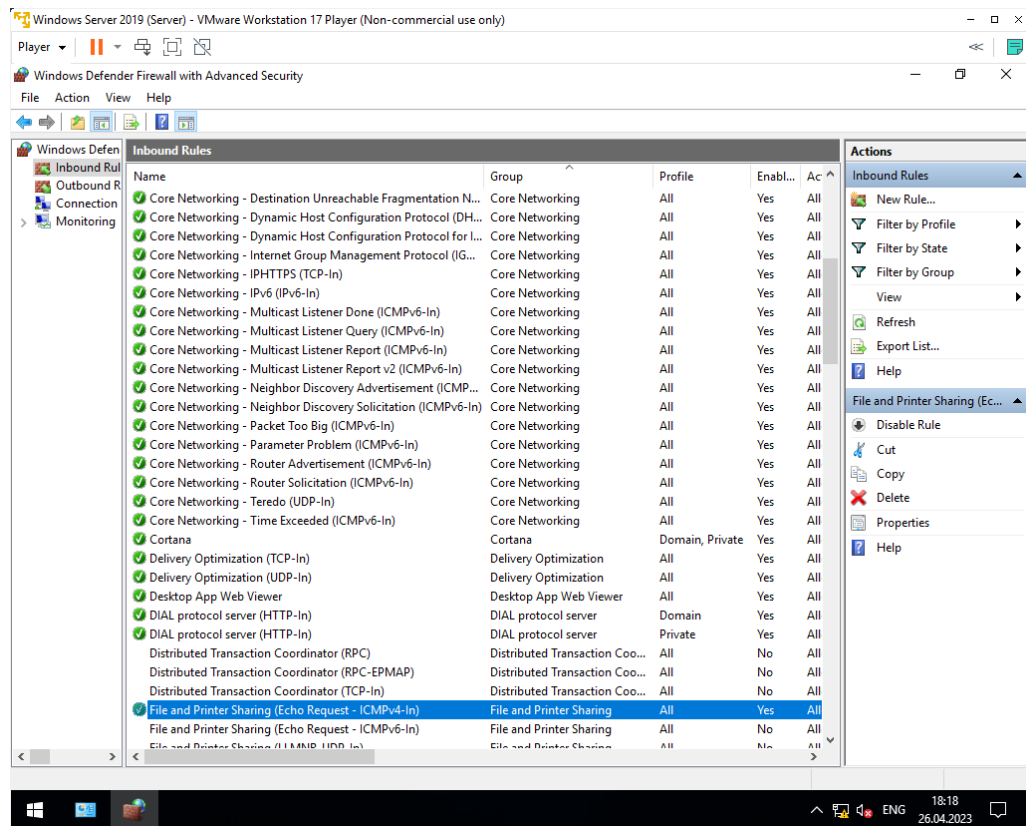
3. Налаштування TCP/IP v4, та об'єднання віртуальних машин у одну локальну мережу.

Починаю налаштування з віртуальної машини Windows Server 2019 (Server).

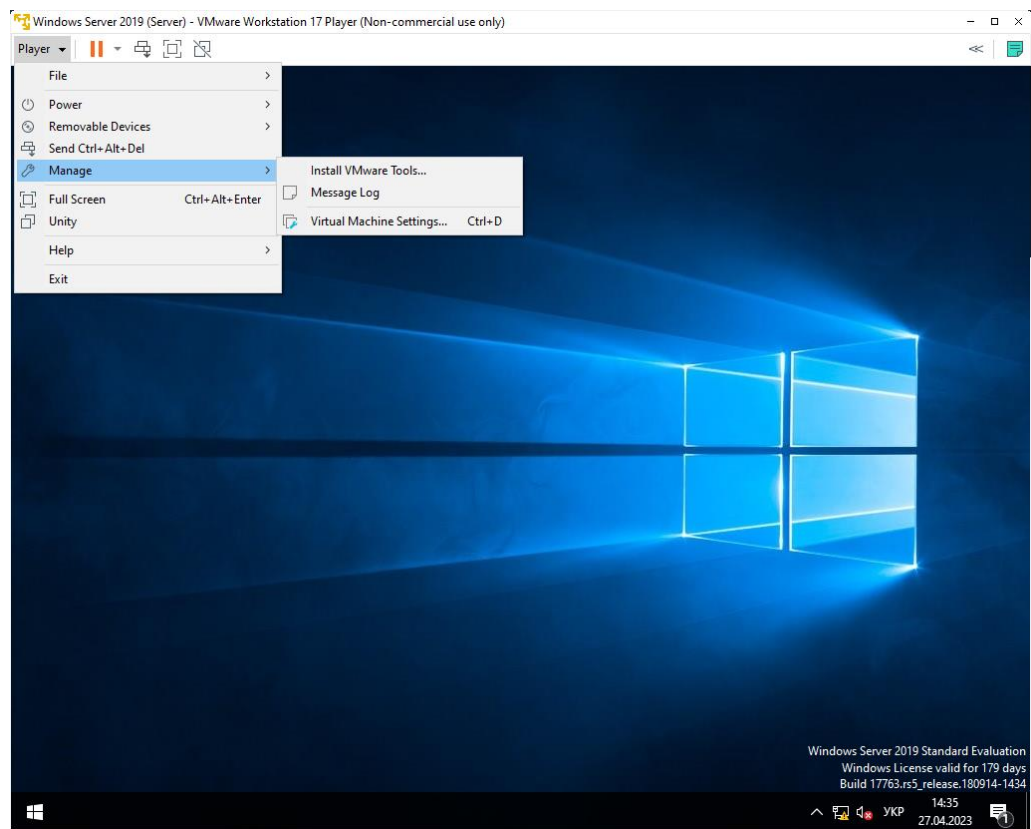


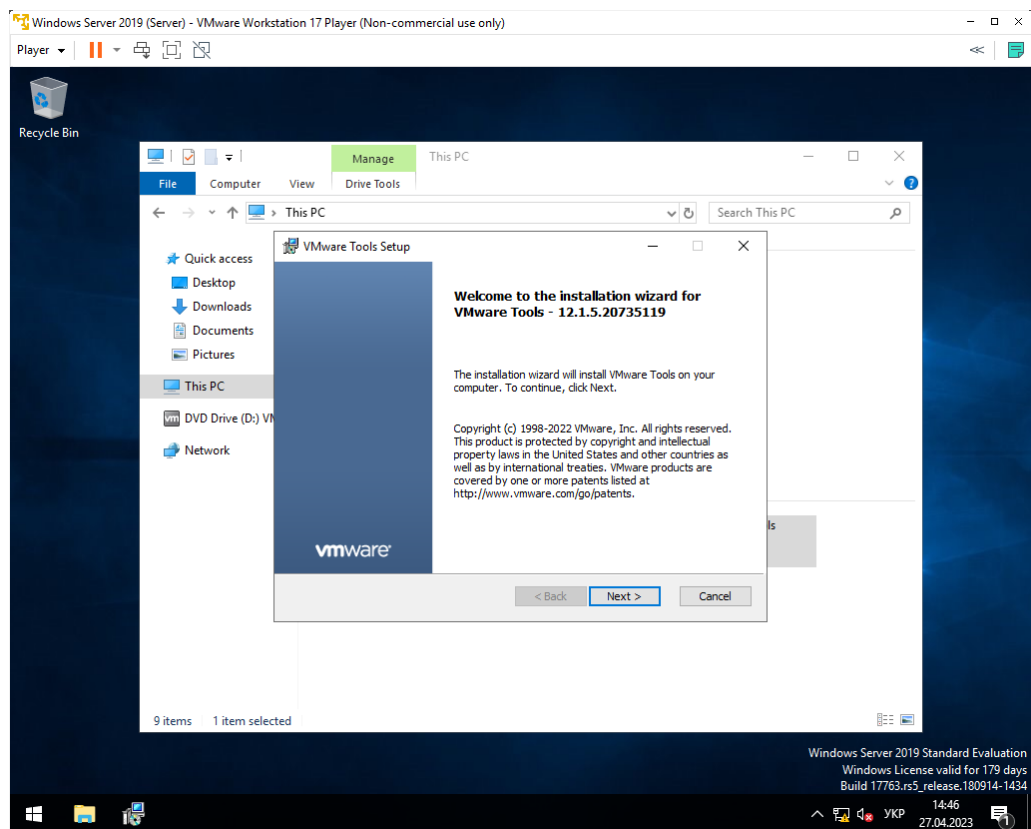
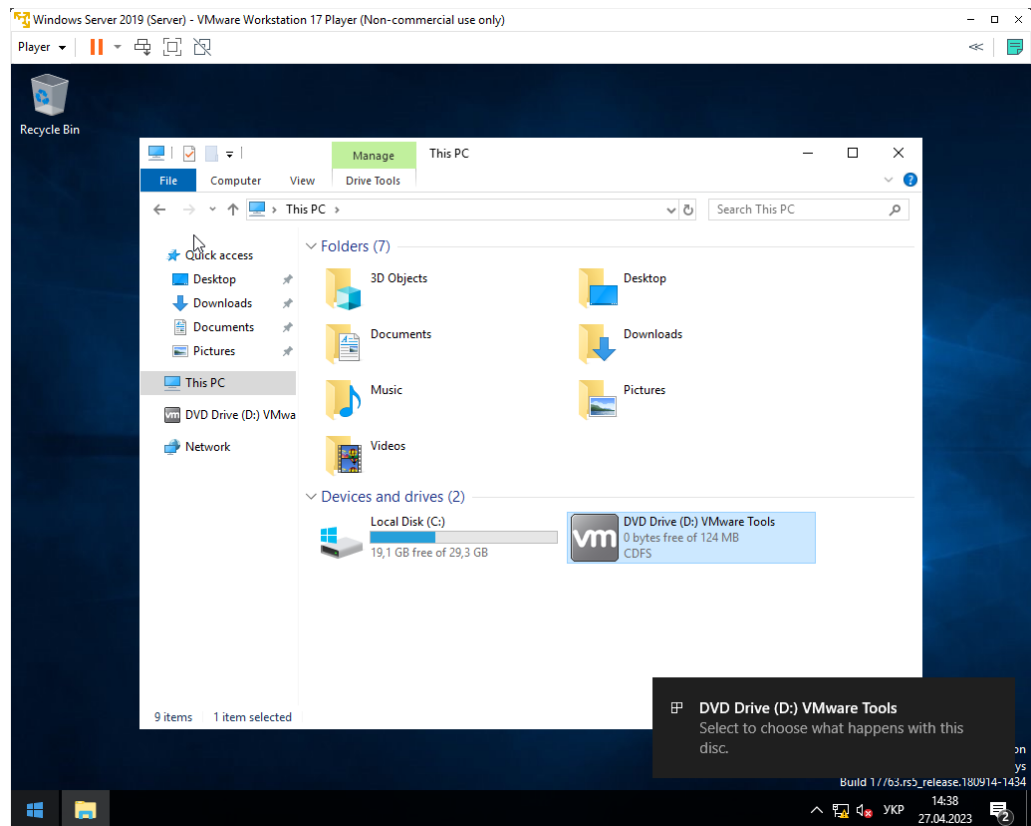


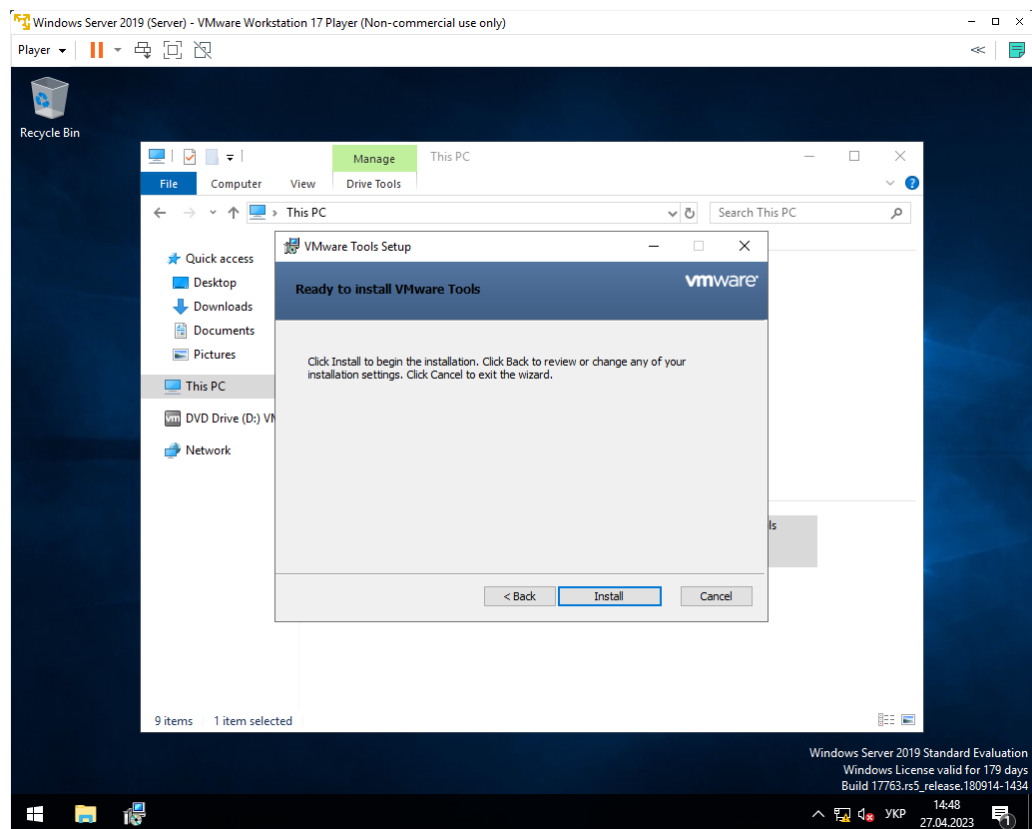
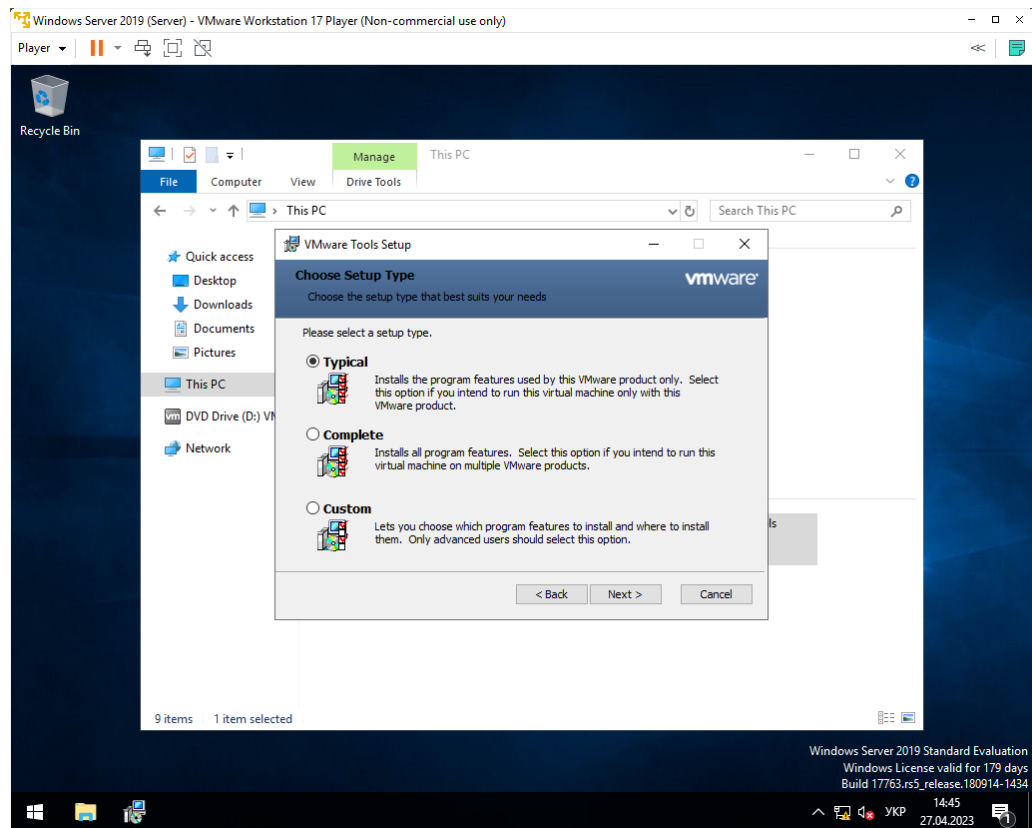


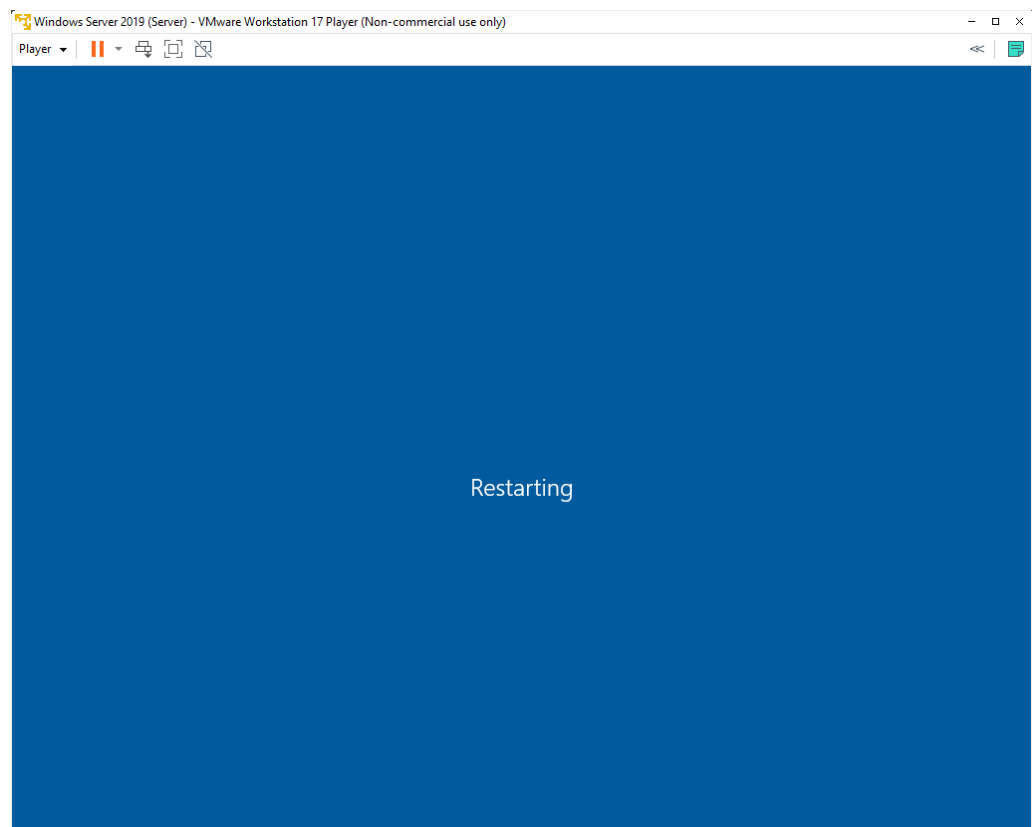
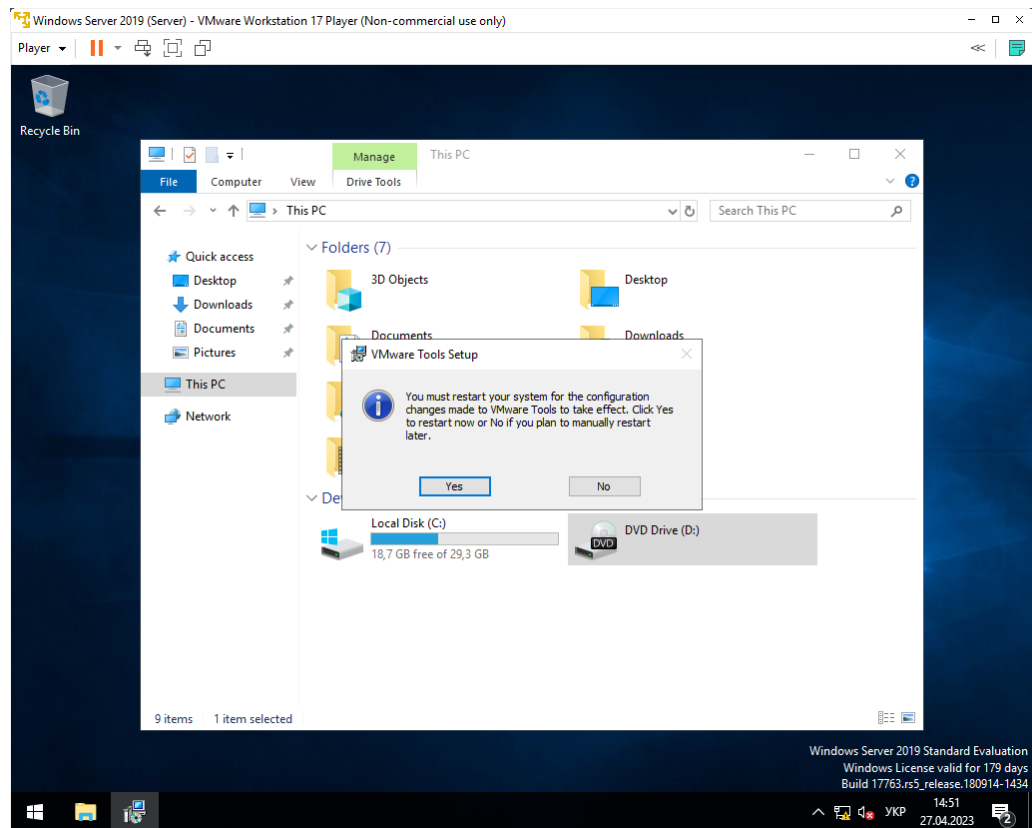


Встановлення VMware Tools.



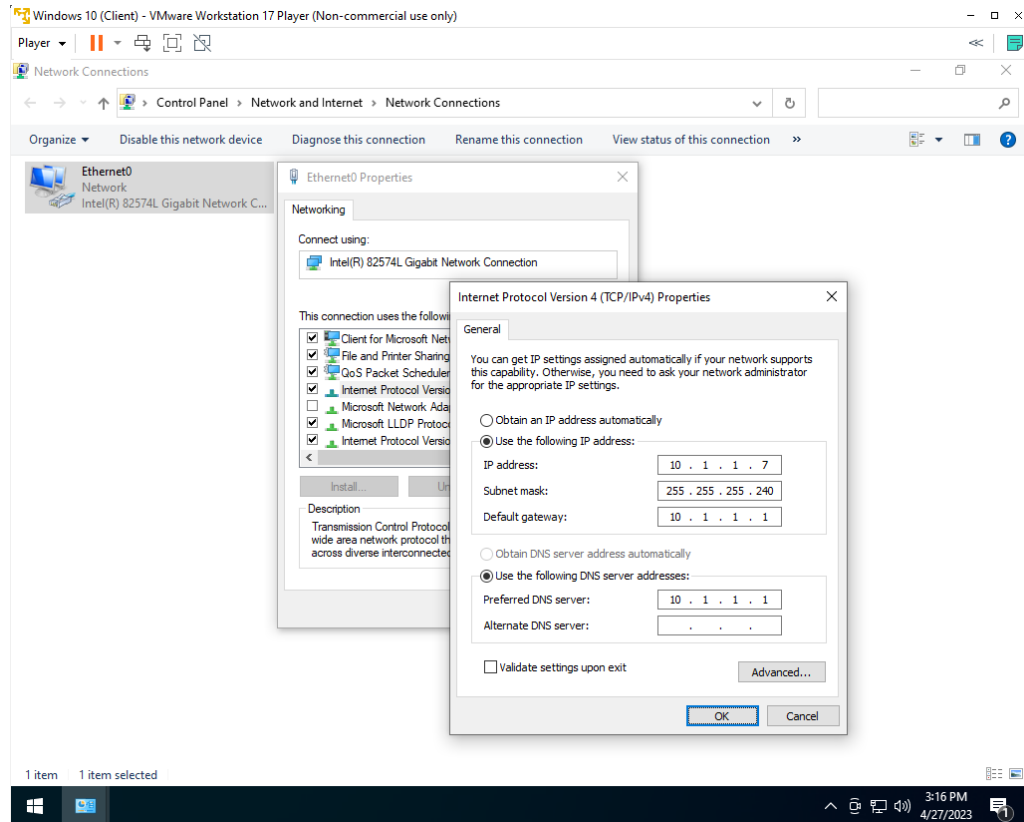






VMware Tools встановлено. Далі аналогічно, але із не значними відмінностями, налаштовую віртуальні машини Windows 10 (Client) та Windows Server 2019 (Core).

Для віртуальної машини Windows 10 (Client) налаштування мають такий вигляд:



Windows 10 (Client) - VMware Workstation 17 Player (Non-commercial use only)

Player

Windows PowerShell

Windows PowerShell
Copyright (C) Microsoft Corporation. All rights reserved.
Try the new cross-platform PowerShell https://aka.ms/pscore6

PS C:\Users\User> ipconfig /all

Windows IP Configuration

Host Name : DESKTOP-EF52UAL
Primary Dns Suffix :
Node Type : Hybrid
IP Routing Enabled. : No
WINS Proxy Enabled. : No

Ethernet adapter Ethernet0:

Connection-specific DNS Suffix . :
Description : Intel(R) 82574L Gigabit Network Connection
Physical Address. : 00-0C-29-D2-99-57
DHCP Enabled. : No
Autoconfiguration Enabled : Yes
Link-local IPv6 Address : fe80::405b:ecde:2fa5:7a10%6(Preferred)
IPv4 Address. : 10.1.1.7(Preferred)
Subnet Mask : 255.255.255.240
Default Gateway : 10.1.1.1
DHCPv6 IAID : 100666409
DHCPv6 Client DUID. : 00-01-00-01-2B-DC-1D-4B-00-0C-29-D2-99-57
DNS Servers : 10.1.1.1
NetBIOS over Tcpip. : Enabled

PS C:\Users\User>

3:19 PM
4/27/2023

Windows 10 (Client) - VMware Workstation 17 Player (Non-commercial use only)

Player

Windows Defender Firewall with Advanced Security

File Action View Help

Windows Defender Firewall with Advanced Security

Inbound Rules

Name	Group	Profile	Enabled	Action
Core Networking - Time Exceeded (ICMPv6-In)	Core Networking	All	Yes	Allow
Core Networking Diagnostics - ICMP Echo Request (Inbound)	Core Networking Diagnostics	Private, Public	No	Allow
Core Networking Diagnostics - ICMP Echo Request (Inbound)	Core Networking Diagnostics	Domain	No	Allow
Core Networking Diagnostics - ICMP Echo Request (Inbound)	Core Networking Diagnostics	Domain	No	Allow
Core Networking Diagnostics - ICMP Echo Request (Inbound)	Core Networking Diagnostics	Private, Public	No	Allow
Cortana	Cortana	All	Yes	Allow
Delivery Optimization (TCP-In)	Delivery Optimization	All	Yes	Allow
Delivery Optimization (UDP-In)	Delivery Optimization	All	Yes	Allow
DIAL protocol server (HTTP-In)	DIAL protocol server	Domain	Yes	Allow
DIAL protocol server (HTTP-In)	DIAL protocol server	Private	Yes	Allow
Distributed Transaction Coordinator (RPC)	Distributed Transaction Coordinator	Domain	No	Allow
Distributed Transaction Coordinator (RPC)	Distributed Transaction Coordinator	Private, Public	No	Allow
Distributed Transaction Coordinator (RPC-EPMAP)	Distributed Transaction Coordinator	Domain	No	Allow
Distributed Transaction Coordinator (RPC-EPMAP)	Distributed Transaction Coordinator	Private, Public	No	Allow
Distributed Transaction Coordinator (TCP-In)	Distributed Transaction Coordinator	Private, Public	No	Allow
Distributed Transaction Coordinator (TCP-In)	Distributed Transaction Coordinator	Domain	No	Allow
File and Printer Sharing (Echo Request - ICMPv4-In)	File and Printer Sharing	Private, Public	Yes	Allow
File and Printer Sharing (Echo Request - ICMPv4-In)	File and Printer Sharing	Domain	Yes	Allow
File and Printer Sharing (Echo Request - ICMPv6-In)	File and Printer Sharing	Private, Public	No	Allow
File and Printer Sharing (LLMNR-UDP-In)	File and Printer Sharing	Domain	No	Allow
File and Printer Sharing (NB-Datagram-In)	File and Printer Sharing	Domain	No	Allow
File and Printer Sharing (NB-Datagram-In)	File and Printer Sharing	Private, Public	No	Allow
File and Printer Sharing (NB-Name-In)	File and Printer Sharing	Private, Public	No	Allow
File and Printer Sharing (NB-Name-In)	File and Printer Sharing	Domain	No	Allow
File and Printer Sharing (NB-Session-In)	File and Printer Sharing	Private, Public	No	Allow
File and Printer Sharing (NB-Session-In)	File and Printer Sharing	Domain	No	Allow
File and Printer Sharing (SMB-In)	File and Printer Sharing	Private, Public	No	Allow
File and Printer Sharing (SMB-In)	File and Printer Sharing	Domain	No	Allow
File and Printer Sharing (SMB-In)	File and Printer Sharing	Domain	No	Allow

Actions

Inbound Rules

New Rule...

Filter by Profile

Filter by State

Filter by Group

View

Refresh

Export List...

Help

Selected Items

Disable Rule

Cut

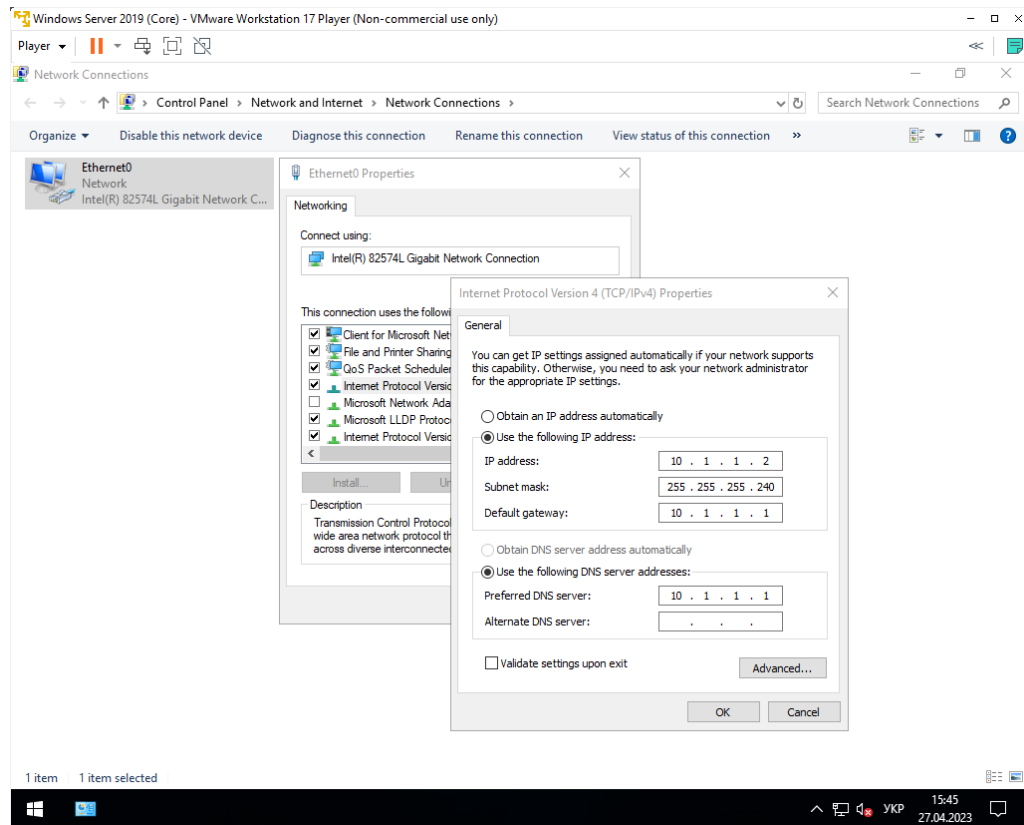
Copy

Delete

Help

3:25 PM
4/27/2023

Для віртуальної машини Windows Server 2019 (Core) налаштування мають такий вигляд:



Windows Server 2019 (Core) - VMware Workstation 17 Player (Non-commercial use only)

Administrator Windows PowerShell

```
Windows PowerShell
Copyright (C) Microsoft Corporation. All rights reserved.

PS C:\Users\Administrator> ipconfig /all

Windows IP Configuration

Host Name . . . . . : WIN-E3LFSR2E805
Primary Dns Suffix . . . . . :
Node Type . . . . . : Hybrid
IP Routing Enabled. . . . . : No
WINS Proxy Enabled. . . . . : No

Ethernet adapter Ethernet0:

Connection-specific DNS Suffix . . . :
Description . . . . . : Intel(R) 82574L Gigabit Network Connection
Physical Address. . . . . : 00-0C-29-08-14-70
Dhcp Enabled. . . . . : No
Autoconfiguration Enabled . . . . : Yes
Link-local IPv6 Address . . . . . : fe80::dc99:c5d5:1002:fe9b%5 (Preferred)
IPv4 Address. . . . . : 10.1.1.2 (Preferred)
Subnet Mask . . . . . : 255.255.255.240
Default Gateway . . . . . : 10.1.1.1
Dhcpv6 IAID . . . . . : 83889193
Dhcpv6 Client DUID. . . . . : 00-01-00-01-2B-DA-E5-D6-00-0C-29-08-14-70
DNS Servers . . . . . : 10.1.1.1
NetBIOS over Tcpip. . . . . : Enabled

PS C:\Users\Administrator>
```

15:46
27.04.2023

Windows Server 2019 (Core) - VMware Workstation 17 Player (Non-commercial use only)

Windows Defender Firewall with Advanced Security

File Action View Help

Name	Group	Profile	Enabled	Action	Overl...
Core Networking - Internet Group Management Protocol ...	Core Networking	All	Yes	Allow	No
Core Networking - IPHTTPS (TCP-In)	Core Networking	All	Yes	Allow	No
Core Networking - IPv6 (IPv6-In)	Core Networking	All	Yes	Allow	No
Core Networking - Multicast Listener Done (ICMPv6-In)	Core Networking	All	Yes	Allow	No
Core Networking - Multicast Listener Query (ICMPv6-In)	Core Networking	All	Yes	Allow	No
Core Networking - Multicast Listener Report (ICMPv6-In)	Core Networking	All	Yes	Allow	No
Core Networking - Multicast Listener Report v2 (ICMPv6-In)	Core Networking	All	Yes	Allow	No
Core Networking - Neighbor Discovery Advertisement (IC...	Core Networking	All	Yes	Allow	No
Core Networking - Neighbor Discovery Solicitation (ICMP...	Core Networking	All	Yes	Allow	No
Core Networking - Packet Too Big (ICMPv6-In)	Core Networking	All	Yes	Allow	No
Core Networking - Parameter Problem (ICMPv6-In)	Core Networking	All	Yes	Allow	No
Core Networking - Router Advertisement (ICMPv6-In)	Core Networking	All	Yes	Allow	No
Core Networking - Router Solicitation (ICMPv6-In)	Core Networking	All	Yes	Allow	No
Core Networking - Teredo (UDP-In)	Core Networking	All	Yes	Allow	No
Core Networking - Time Exceeded (ICMPv6-In)	Core Networking	All	Yes	Allow	No
Cortana	Cortana	Domain...	Yes	Allow	No
Delivery Optimization (TCP-In)	Delivery Optimization	All	Yes	Allow	No
Delivery Optimization (UDP-In)	Delivery Optimization	All	Yes	Allow	No
Desktop App Web Viewer	Desktop App Web Viewer	All	Yes	Allow	No
DIAL protocol server (HTTP-In)	DIAL protocol server	Private	Yes	Allow	No
DIAL protocol server (HTTP-In)	DIAL protocol server	Domain	Yes	Allow	No
Distributed Transaction Coordinator (RPC)	Distributed Transaction Coo...	All	No	Allow	No
Distributed Transaction Coordinator (RPC-EPMAP)	Distributed Transaction Coo...	All	No	Allow	No
Distributed Transaction Coordinator (TCP-In)	Distributed Transaction Coo...	All	No	Allow	No
File and Printer Sharing (Echo Request - ICMPv4-In)	File and Printer Sharing	All	Yes	Allow	No
File and Printer Sharing (Echo Request - ICMPv6-In)	File and Printer Sharing	All	No	Allow	No
File and Printer Sharing (LLMNR-UDP-In)	File and Printer Sharing	All	No	Allow	No
File and Printer Sharing (NB-Datagram-In)	File and Printer Sharing	All	No	Allow	No
File and Printer Sharing (NB-Name-In)	File and Printer Sharing	All	No	Allow	No
File and Printer Sharing (NB-Session-In)	File and Printer Sharing	All	No	Allow	No

15:49
27.04.2023

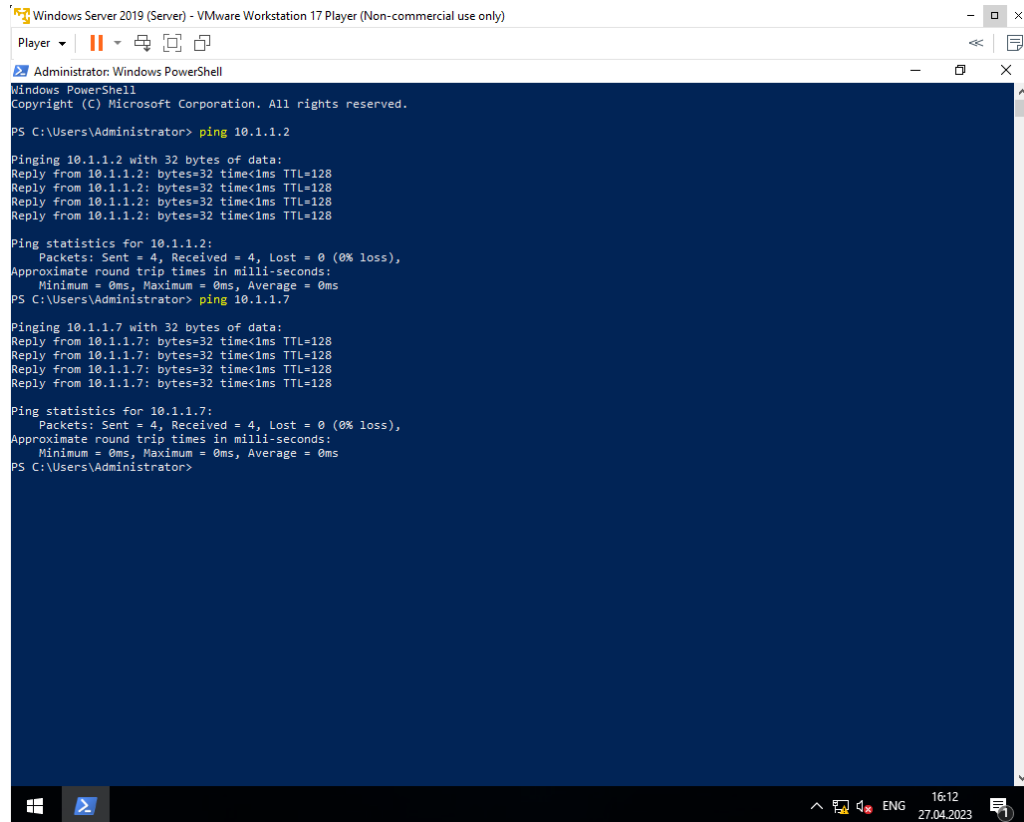
Як результат, налаштування TCP/IP v4, у об'єднаних у одну локальну мережу віртуальних машин, мають такий вигляд:

Назва віртуальної машини	IP address	Subnet mask	Default gateway	Preferr ed DNS server	Правило <i>File and Printer Sharing (Echo Request - ICMPv4-In)</i> увімкнене для таких профілів
Windows Server 2019 (Server)	10.1.1.1	255.255.255.240	—	10.1.1.1	All (Private, Public, Domain)
Windows Server 2019 (Core)	10.1.1.2	255.255.255.240	10.1.1.1	10.1.1.1	All (Private, Public, Domain)
Windows 10 (Client)	10.1.1.7	255.255.255.240	10.1.1.1	10.1.1.1	All (Private, Public, Domain)

Налаштування завершені.

4. Перевірка конфігурації локальної мережі на віртуальних машинах Windows Server 2019 (Server), Windows Server 2019 (Core) та Windows 10 (Client) відповідно.

Для перевірки, усі віртуальні машини мають бути запущені.



The screenshot shows a Windows PowerShell terminal window titled "Administrator: Windows PowerShell". The window is running a Windows Server 2019 (Server) virtual machine in VMware Workstation 17 Player. The terminal output shows the following commands and results:

```
PS C:\Users\Administrator> ping 10.1.1.2

Pinging 10.1.1.2 with 32 bytes of data:
Reply from 10.1.1.2: bytes=32 time<1ms TTL=128
Reply from 10.1.1.2: bytes=32 time<1ms TTL=128
Reply from 10.1.1.2: bytes=32 time<1ms TTL=128
Reply from 10.1.1.2: bytes=32 time<1ms TTL=128

Ping statistics for 10.1.1.2:
    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\Administrator> ping 10.1.1.7

Pinging 10.1.1.7 with 32 bytes of data:
Reply from 10.1.1.7: bytes=32 time<1ms TTL=128
Reply from 10.1.1.7: bytes=32 time<1ms TTL=128
Reply from 10.1.1.7: bytes=32 time<1ms TTL=128
Reply from 10.1.1.7: bytes=32 time<1ms TTL=128

Ping statistics for 10.1.1.7:
    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\Administrator>
```

The taskbar at the bottom shows the system clock as 16:12 on 27.04.2023, and the language is set to ENG.


```
Windows Server 2019 (Core) - VMware Workstation 17 Player (Non-commercial use only)
Player
Administrator Windows PowerShell
Windows PowerShell
Copyright (C) Microsoft Corporation. All rights reserved.

PS C:\Users\Administrator> ping 10.1.1.1

Pinging 10.1.1.1 with 32 bytes of data:
Reply from 10.1.1.1: bytes=32 time<1ms TTL=128
Reply from 10.1.1.1: bytes=32 time<1ms TTL=128
Reply from 10.1.1.1: bytes=32 time<1ms TTL=128
Reply from 10.1.1.1: bytes=32 time<1ms TTL=128

Ping statistics for 10.1.1.1:
    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\Administrator> ping 10.1.1.7

Pinging 10.1.1.7 with 32 bytes of data:
Reply from 10.1.1.7: bytes=32 time<1ms TTL=128
Reply from 10.1.1.7: bytes=32 time<1ms TTL=128
Reply from 10.1.1.7: bytes=32 time<1ms TTL=128
Reply from 10.1.1.7: bytes=32 time<1ms TTL=128

Ping statistics for 10.1.1.7:
    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\Administrator>
```

```
Windows 10 (Client) - VMware Workstation 17 Player (Non-commercial use only)
Player
Windows PowerShell
Windows PowerShell
Copyright (C) Microsoft Corporation. All rights reserved.

Try the new cross-platform PowerShell https://aka.ms/powershell

PS C:\Users\User> ping 10.1.1.1

Pinging 10.1.1.1 with 32 bytes of data:
Reply from 10.1.1.1: bytes=32 time<1ms TTL=128
Reply from 10.1.1.1: bytes=32 time<1ms TTL=128
Reply from 10.1.1.1: bytes=32 time<1ms TTL=128
Reply from 10.1.1.1: bytes=32 time<1ms TTL=128

Ping statistics for 10.1.1.1:
    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\User> ping 10.1.1.2

Pinging 10.1.1.2 with 32 bytes of data:
Reply from 10.1.1.2: bytes=32 time<1ms TTL=128
Reply from 10.1.1.2: bytes=32 time<1ms TTL=128
Reply from 10.1.1.2: bytes=32 time<1ms TTL=128
Reply from 10.1.1.2: bytes=32 time<1ms TTL=128

Ping statistics for 10.1.1.2:
    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\User>
```