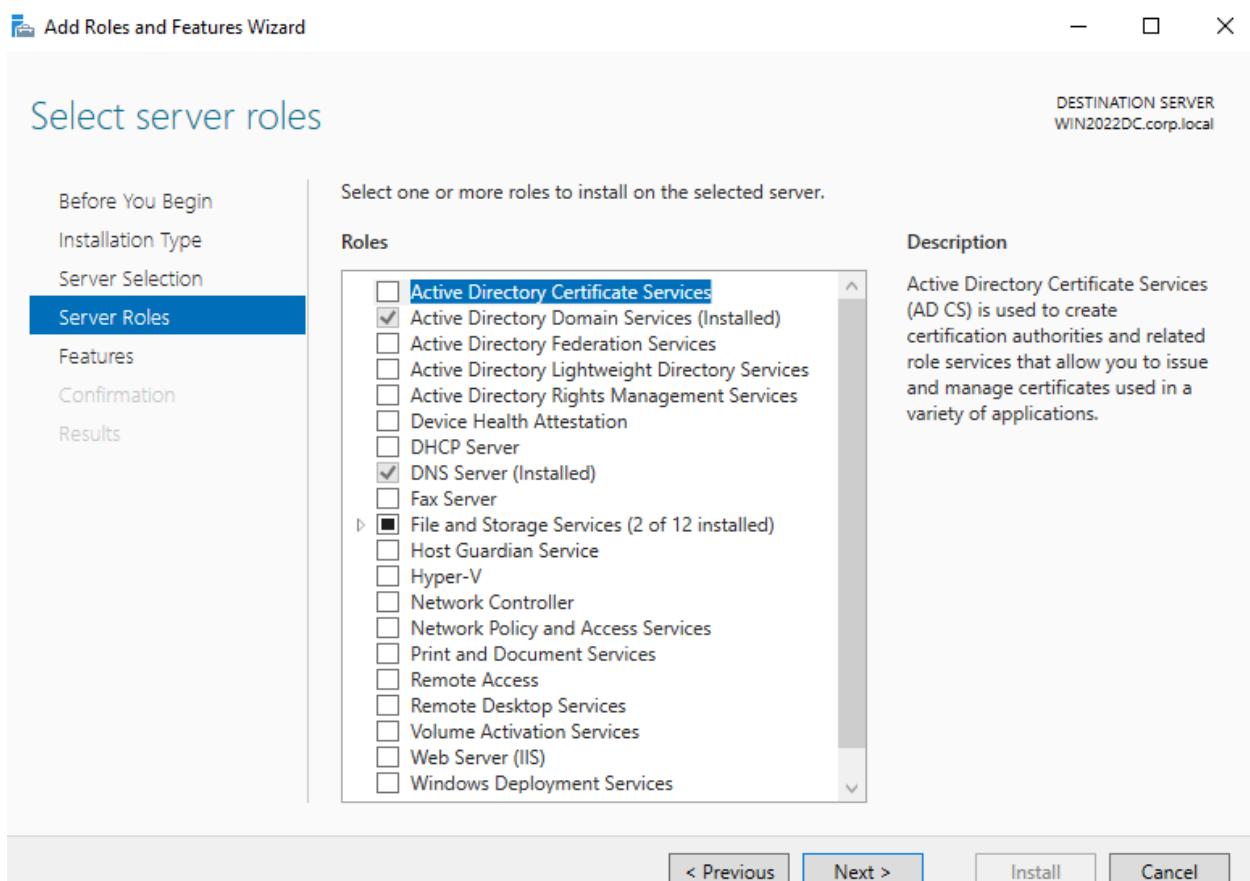


# Enterprise-Windows-Server-2022-IT-Infrastructure-Lab Workflow

Author: Brennan Tong

## Install Active Directory DS and DNS:



## Results

TARGET SERVER  
WIN2022DC

This server was successfully configured as a domain controller

[Show more](#) [Deployment Configuration](#)[Domain Controller Options](#)[DNS Options](#)[Additional Options](#)[Paths](#)[Review Options](#)[Prerequisites Check](#)[Installation](#)[Results](#)[View detailed operation results](#)

Windows Server 2022 domain controllers have a default for the security setting named "Allow cryptography algorithms compatible with Windows NT 4.0" that prevents weaker cryptography algorithms when establishing security channel sessions.

For more information about this setting, see Knowledge Base article 942564 (<http://go.microsoft.com/fwlink/?LinkId=104751>).

A delegation for this DNS server cannot be created because the authoritative parent zone cannot be found or it does not run Windows DNS server. If you are integrating with an existing DNS infrastructure, you should manually create a delegation to this DNS server in the parent zone to ensure reliable name resolution from outside the domain "corp.local". Otherwise, no action is required.

[More about results](#)[< Previous](#)[Next >](#)[Close](#)[Cancel](#)

AD DS and DNS installed:

The screenshot shows the Windows Server 2022 Server Manager Dashboard. The left sidebar lists "Local Server", "All Servers", "AD DS", "DNS", and "File and Storage Services". The main area displays four cards under "ROLES AND SERVER GROUPS":

- AD DS**: Manageability, Events, Services, Performance, BPA results. (1 server)
- DNS**: Manageability, Events, Services, Performance, BPA results. (1 server)
- File and Storage Services**: Manageability, Events, Services, Performance, BPA results. (1 server)
- Local Server**: Manageability, Events (1), Services (3). (1 server)  
Last updated: 6/1/2025 11:25 PM

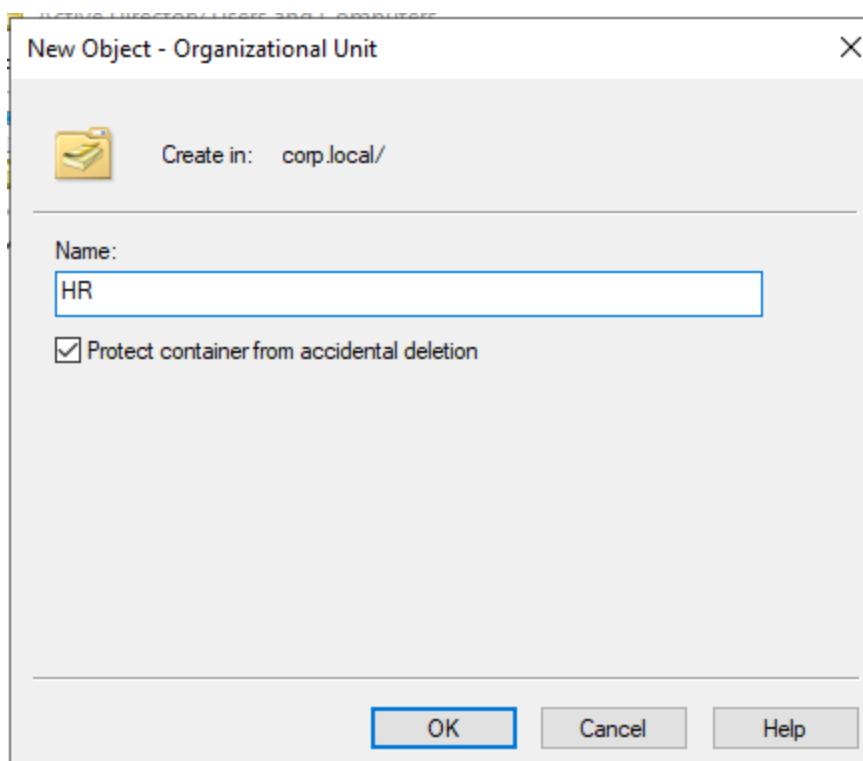
**All Servers**: Manageability, Events (1), Services (3).

## Open Active Directory Users and Computers (ADUC)

Create Users and Groups, HR, IT, Finance

The screenshot shows the Windows Active Directory Users and Computers (ADUC) management console. The title bar reads "Active Directory Users and Computers". The menu bar includes "File", "Action", "View", and "Help". Below the menu is a toolbar with various icons for navigation and search. The left pane displays a tree view of the directory structure under "corp.local": "Saved Queries", "corp.local" (expanded to show "BuiltIn", "Computers", "Domain Controllers", "ForeignSecurityPrincipals", "Managed Service Accounts", and "Users"). The right pane is a table with three columns: "Name", "Type", and "Description". It lists one item: "corp.local" (Type: Domain, Description: "Folder to store your favo..."). At the bottom of the right pane, there is a scroll bar.

Name	Type	Description
corp.local	Domain	Folder to store your favo...
Saved Queries		



Active Directory Users and Computers

File Action View Help

Active Directory Users and Com  
Saved Queries  
corp.local  
Builtin  
Computers  
Domain Controllers  
ForeignSecurityPrincipal:  
Managed Service Account  
Users  
HR  
IT  
Finance

Name Type Description

There are no items to show in this view.

This screenshot shows the 'Active Directory Users and Computers' window. The left pane displays a navigation tree with 'corp.local' selected, revealing its sub-objects like 'Builtin', 'Computers', and 'Users'. The right pane contains a table with columns 'Name', 'Type', and 'Description', which is currently empty, displaying the message 'There are no items to show in this view.'

## New Object - User

X



Create in: corp.local/HR

First name:  Initials:   
Last name:   
Full name:

User logon name:

@corp.local

User logon name (pre-Windows 2000):

< Back  Cancel

Password123!

## New Object - User

X



Create in: corp.local/HR

Password:   
Confirm password:

User must change password at next logon

User cannot change password

Password never expires

Account is disabled

< Back  Cancel

### New Object - User

X



Create in: corp.local/HR

When you click Finish, the following object will be created:

Full name: Alice HR  
User logon name: alice.hr@corp.local

< Back

Finish

Cancel

### Active Directory Users and Computers

- □ X

File Action View Help



Active Directory Users and Computers

Saved Queries

corp.local

Builtin

Computers

Domain Controllers

ForeignSecurityPrincipal

Managed Service Account

Users

HR

IT

Finance

Name	Type	Description
------	------	-------------

Charlie IT	User	
------------	------	--

Dana IT	User	
---------	------	--

Active Directory Users and Computers

File Action View Help

Active Directory Users and Computers

Saved Queries

corp.local

Builtin

Computers

Domain Controllers

ForeignSecurityPrincipals

Managed Service Accounts

Users

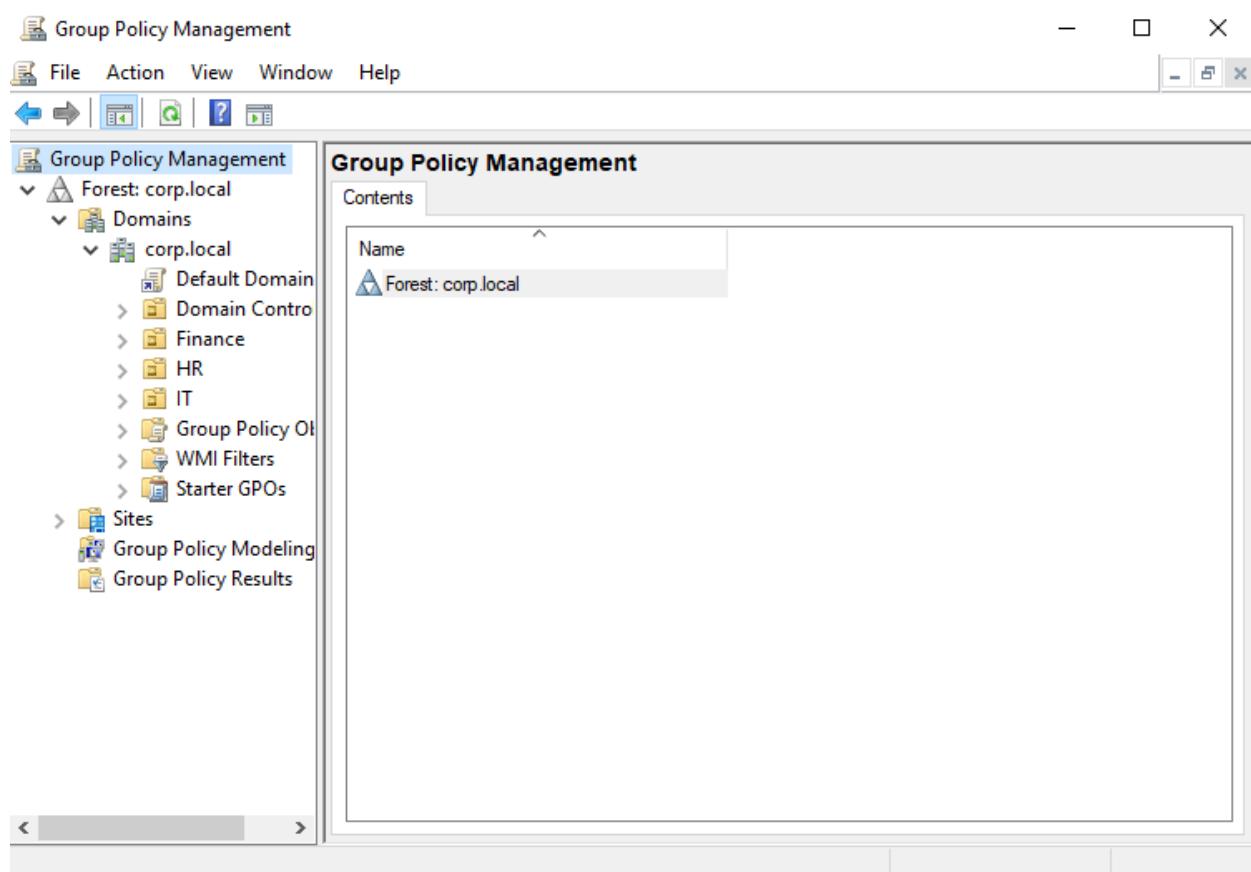
HR

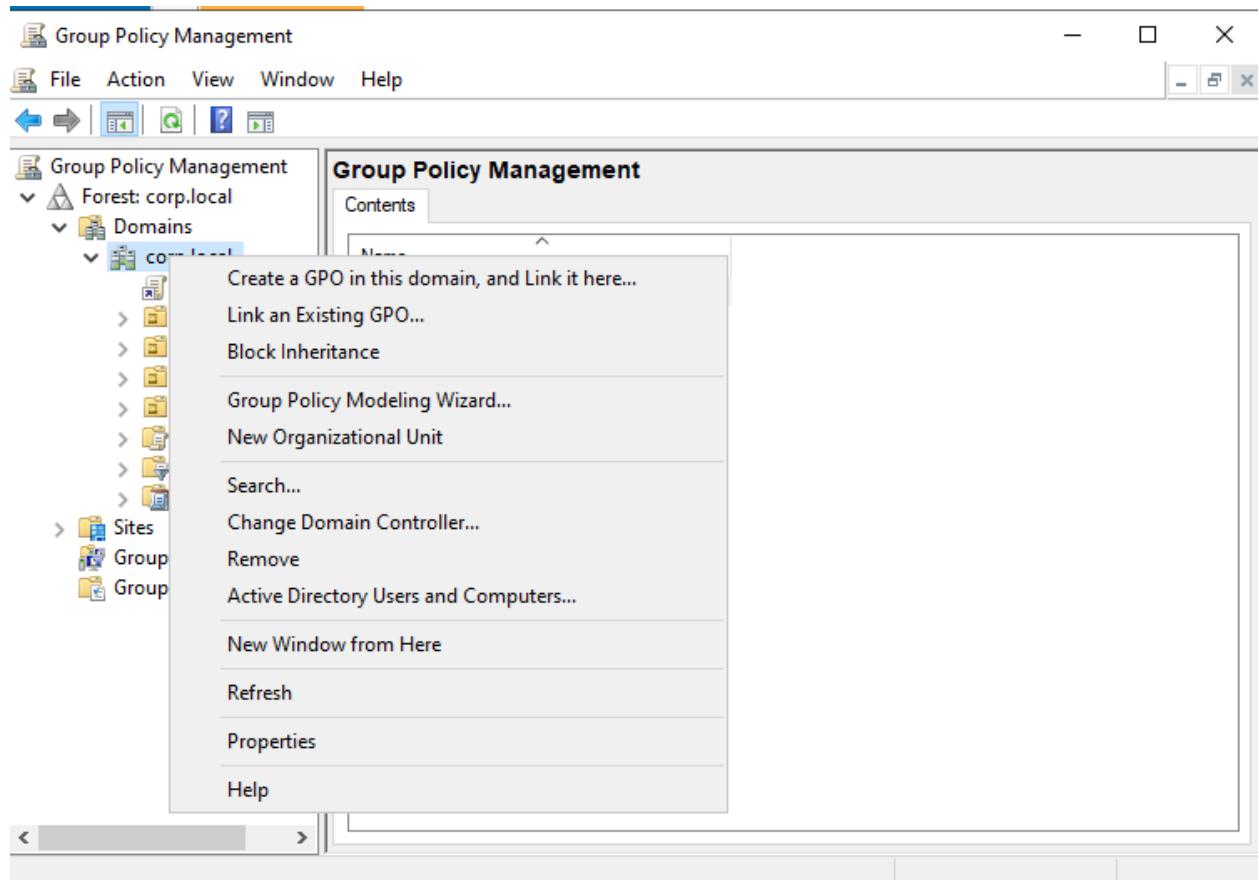
IT

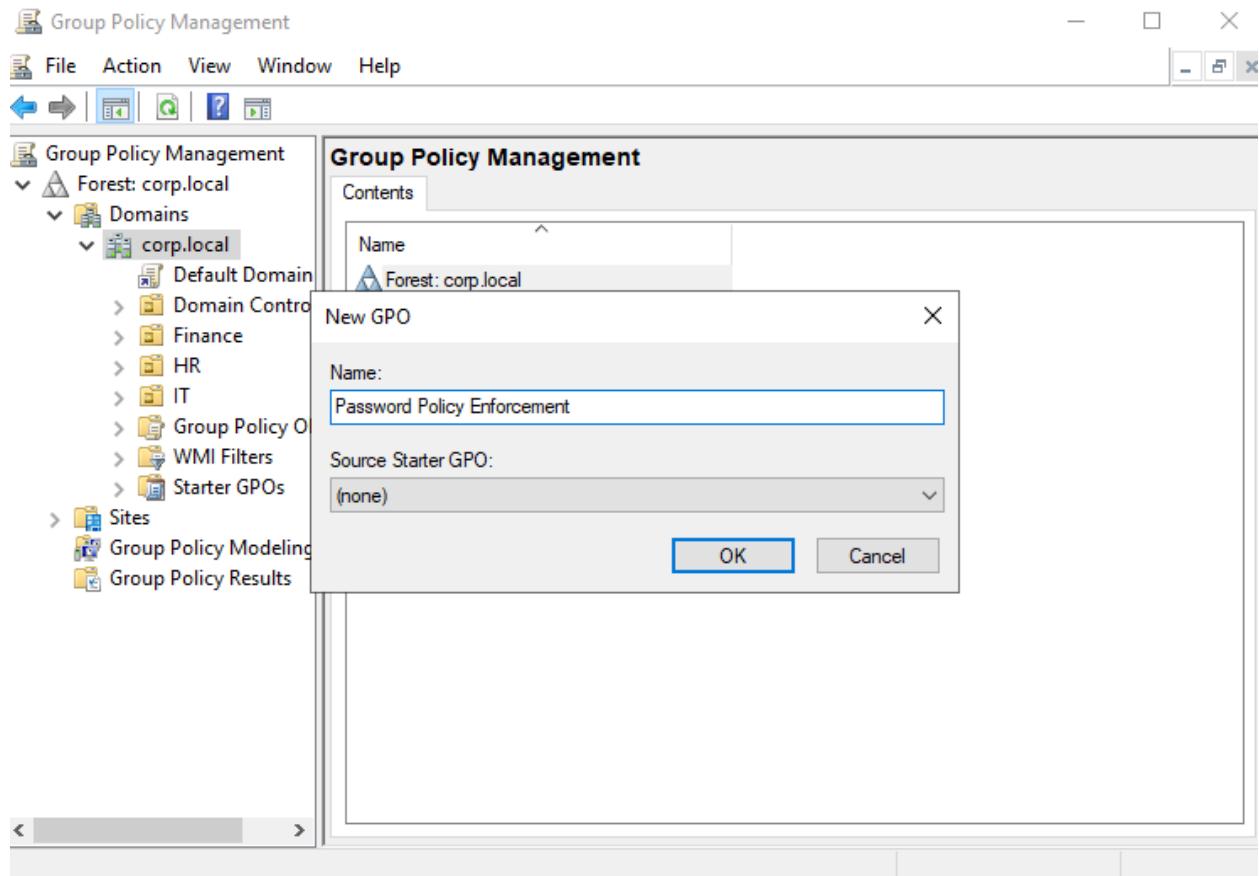
Finance

Name	Type	Description
Eva Finance	User	
Frank Finance	User	

## Create Group Policies: Password Policy, Disable USB Storage, Audit Logon Events







Group Policy Management Editor

File Action View Help

password Policy Enforcement [WI ^]

Policy	Policy Setting
Enforce password history	Not Defined
Maximum password age	Not Defined
Minimum password age	Not Defined
Minimum password length	Not Defined
Minimum password length audit	Not Defined
Password must meet complexity requirements	Not Defined
Relax minimum password length limits	Not Defined
Store passwords using reversible encryption	Not Defined

Computer Configuration

- Policies
  - Software Settings
  - Windows Settings
    - Name Resolution P
    - Scripts (Startup/Shutdow
    - Security Settings
      - Account Policies
        - Account Po
        - Account Logon
        - Kerberos Po
      - Local Policies
      - Event Log
      - Restricted Grou
      - System Services
      - Registry
      - File System
      - Wired Network
      - Windows Defen
      - Network List M
      - Wireless Netwo
      - Public Key Polic
      - Software Restrict
      - Application Cont
      - IP Security Polic
      - Advanced Audit
    - Policy-based QoS
  - Administrative Template

User Configuration

Group Policy Management Editor

File Action View Help

Group Policy Enforcement [W1]

Computer Configuration

Policies

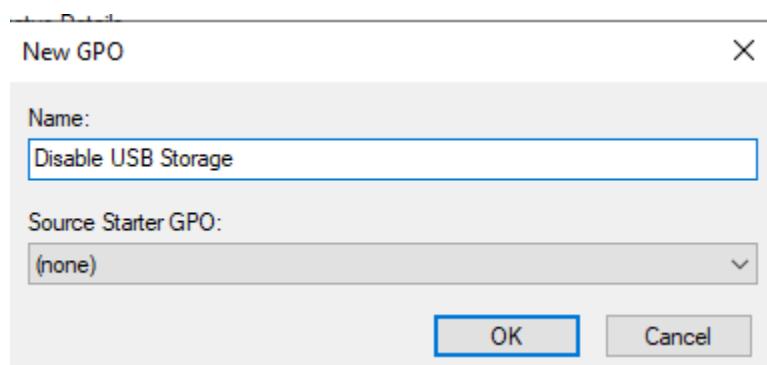
- Software Settings
- Windows Settings
- Name Resolution P
- Scripts (Startup/Shut)
- Security Settings
  - Account Policies
    - Password Policies
    - Account Lockout
    - Kerberos Policies
  - Local Policies
  - Event Log
  - Restricted Groups
  - System Services
  - Registry
  - File System
  - Wired Network
  - Windows Defense
  - Network List Manager
  - Wireless Network
  - Public Key Policies
  - Software Restrictions
  - Application Control
  - IP Security Policies
  - Advanced Audit Policies
  - Policy-based QoS
- Administrative Templates

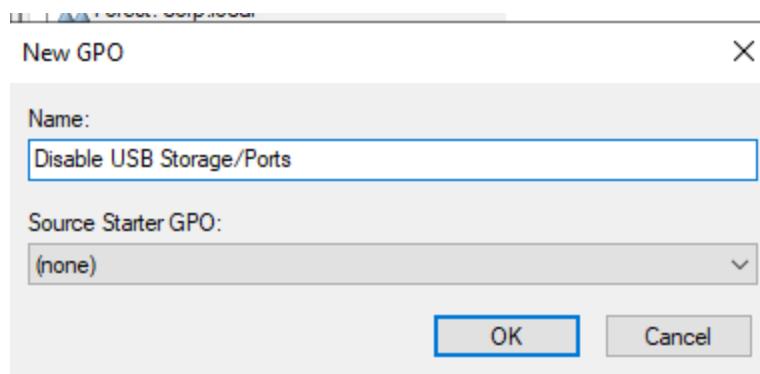
Preferences

User Configuration

Policy

Policy	Policy Setting
Enforce password history	5 passwords remembered
Maximum password age	90 days
Minimum password age	30 days
Minimum password length	8 characters
Minimum password length audit	Not Defined
<b>Password must meet complexity requirements</b>	<b>Enabled</b>
Relax minimum password length limits	Not Defined
Store passwords using reversible encryption	Not Defined





Group Policy Management Editor

File Action View Help

Kerberos Kernel DM Locale Ser Logon Mitigation Net Logor OS Policie PIN Comp Power Ma Recovery Remote A Remote Pr Removable Scripts Security A Server Mai Service Co Shutdown Shutdown Storage H Storage Se System Re Troublesho Trusted Pl

Removable Storage Access

All Removable Storage classes: Deny Setting all access

Edit policy setting Requirements: At least Windows Vista Description: Configure access to all removable storage classes.

This policy setting takes precedence over any individual removable storage policy settings. To manage individual classes, use the policy settings available for each class.

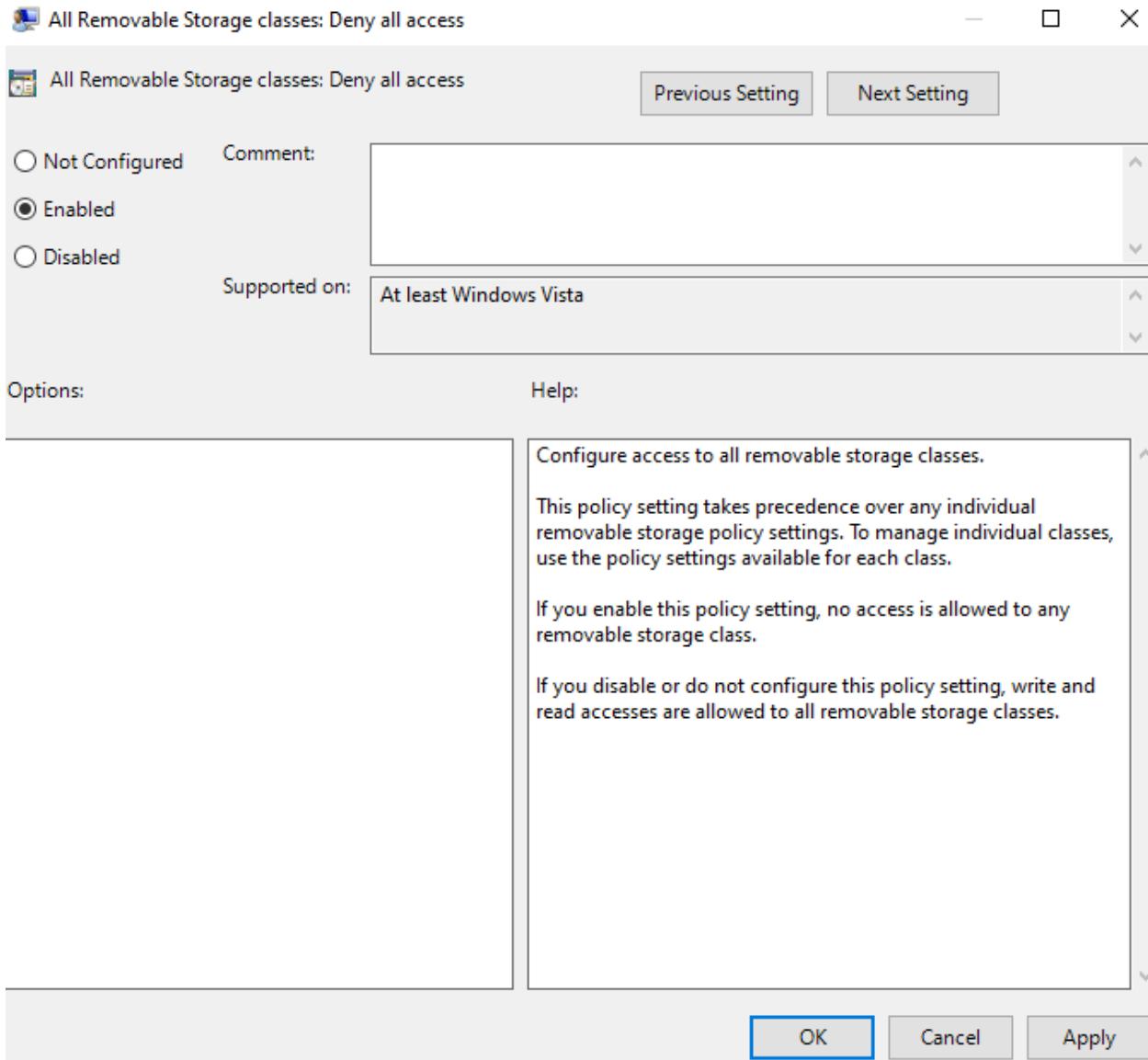
If you enable this policy setting, no access is allowed to any removable storage class.

If you disable or do not configure this policy setting, write and read accesses are allowed to all removable storage classes.

Set time (in seconds) to force reboot CD and DVD: Deny execute access CD and DVD: Deny read access CD and DVD: Deny write access Custom Classes: Deny read access Custom Classes: Deny write access Floppy Drives: Deny execute access Floppy Drives: Deny read access Floppy Drives: Deny write access Removable Disks: Deny execute access Removable Disks: Deny read access Removable Disks: Deny write access All Removable Storage classes: Deny all access All Removable Storage: Allow direct access in remote sessions Tape Drives: Deny execute access Tape Drives: Deny read access Tape Drives: Deny write access WPD Devices: Deny read access WPD Devices: Deny write access

Extended Standard

19 setting(s)



**Group Policy Management**

File Action View Window Help

**Audit Logon Events**

Scope Details Settings Delegation

**Links**  
Display links in this location: corp.local  
The following sites, domains, and OUs are linked to this GPO:

Location	Enforced	Link Enabled	Path
corp.local	No	Yes	corp.local

**Security Filtering**  
The settings in this GPO can only apply to the following groups, users, and computers:

Name
Authenticated Users

Add... Remove Properties

**WMI Filtering**  
This GPO is linked to the following WMI filter:

...

**Group Policy Management Editor**

File Action View Help

**Audit Logon Events [WIN202]**

Policy

Policy	Policy Setting
Audit account logon events	Success, Failure
Audit account management	Not Defined
Audit directory service access	Not Defined
Audit logon events	Success, Failure
Audit object access	Not Defined
Audit policy change	Not Defined
Audit privilege use	Not Defined
Audit process tracking	Not Defined
Audit system events	Not Defined

The screenshot shows the Windows Group Policy Management console. On the left, the navigation pane displays the forest and domain structure under 'Forest: corp.local'. A red box highlights the 'Audit Logon Events' node under the 'corp.local' domain. The main pane, titled 'Audit Logon Events', contains several tabs: Scope, Details, Settings, and Delegation. The 'Details' tab is selected. It shows a table of links to other sites, domains, and OUs, with 'corp.local' listed. Below this is a 'Security Filtering' section where 'Authenticated Users' is selected. At the bottom, there's a 'WMI Filtering' section indicating no filter is applied.

GPOs Successfully Created

## Install DHCP

Add Roles and Features Wizard

DESTINATION SERVER  
WIN2022DC.corp.local

### Select server roles

Before You Begin  
Installation Type  
Server Selection  
**Server Roles**  
Features  
DHCP Server  
Confirmation  
Results

Select one or more roles to install on the selected server.

Roles	Description
<input type="checkbox"/> Active Directory Certificate Services	Dynamic Host Configuration
<input checked="" type="checkbox"/> Active Directory Domain Services (Installed)	Protocol (DHCP) Server enables you to centrally configure, manage, and provide temporary IP addresses and related information for client computers.
<input type="checkbox"/> Active Directory Federation Services	
<input type="checkbox"/> Active Directory Lightweight Directory Services	
<input type="checkbox"/> Active Directory Rights Management Services	
<input type="checkbox"/> Device Health Attestation	
<input checked="" type="checkbox"/> DHCP Server	
<input checked="" type="checkbox"/> DNS Server (Installed)	
<input type="checkbox"/> Fax Server	
<input checked="" type="checkbox"/> File and Storage Services (2 of 12 installed)	
<input type="checkbox"/> Host Guardian Service	
<input type="checkbox"/> Hyper-V	
<input type="checkbox"/> Network Controller	
<input type="checkbox"/> Network Policy and Access Services	
<input type="checkbox"/> Print and Document Services	
<input type="checkbox"/> Remote Access	
<input type="checkbox"/> Remote Desktop Services	
<input type="checkbox"/> Volume Activation Services	
<input type="checkbox"/> Web Server (IIS)	
<input type="checkbox"/> Windows Deployment Services	

< Previous    Next >    Install    Cancel

Add Roles and Features Wizard

## Installation progress

DESTINATION SERVER  
WIN2022DC.corp.local

Before You Begin  
Installation Type  
Server Selection  
Server Roles  
Features  
DHCP Server  
Confirmation  
**Results**

View installation progress

1 Feature installation

Configuration required. Installation succeeded on WIN2022DC.corp.local.

**DHCP Server**  
Launch the DHCP post-install wizard  
[Complete DHCP configuration](#)

**Remote Server Administration Tools**  
Role Administration Tools  
DHCP Server Tools

You can close this wizard without interrupting running tasks. View task progress or open this page again by clicking Notifications in the command bar, and then Task Details.

Export configuration settings

< Previous Next > Close Cancel

**Post-deployment Configuration**

Configuration required for DHCP Server at  
WIN2022DC

[Complete DHCP configuration](#)

**i Feature installation**

Configuration required. Installation succeeded on  
WIN2022DC.corp.local.

[Add Roles and Features](#)

Task Details

## Authorization

Description

Authorization

Summary

Specify the credentials to be used to authorize this DHCP server in AD DS.

Use the following user's credentials

User Name: CORP\Administrator

Use alternate credentials

UserName:  [Specify...](#)

Skip AD authorization

< Previous

Next >

Commit

Cancel

## Summary

Description

Authorization

Summary

The status of the post install configuration steps are indicated below:

Creating security groups ..... Done

Please restart the DHCP server service on the target computer for the security groups to be effective.

Authorizing DHCP server ..... Done

< Previous

Next >

Close

Cancel

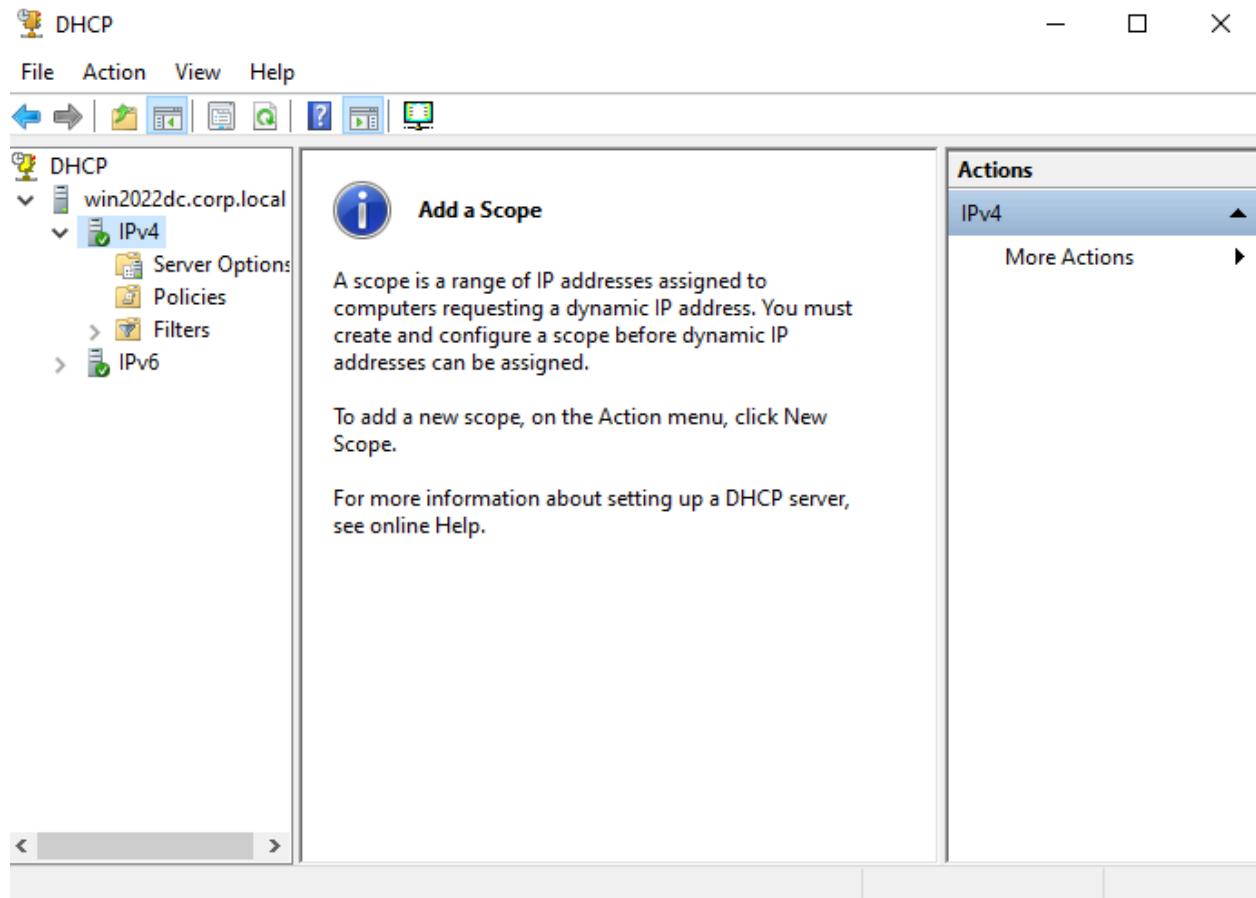
The screenshot shows the Microsoft Server Manager dashboard. On the left, a navigation pane lists "Dashboard", "Local Server", "All Servers", "AD DS", "DHCP", "DNS", and "File and Storage Services". The main area displays four cards representing installed roles:

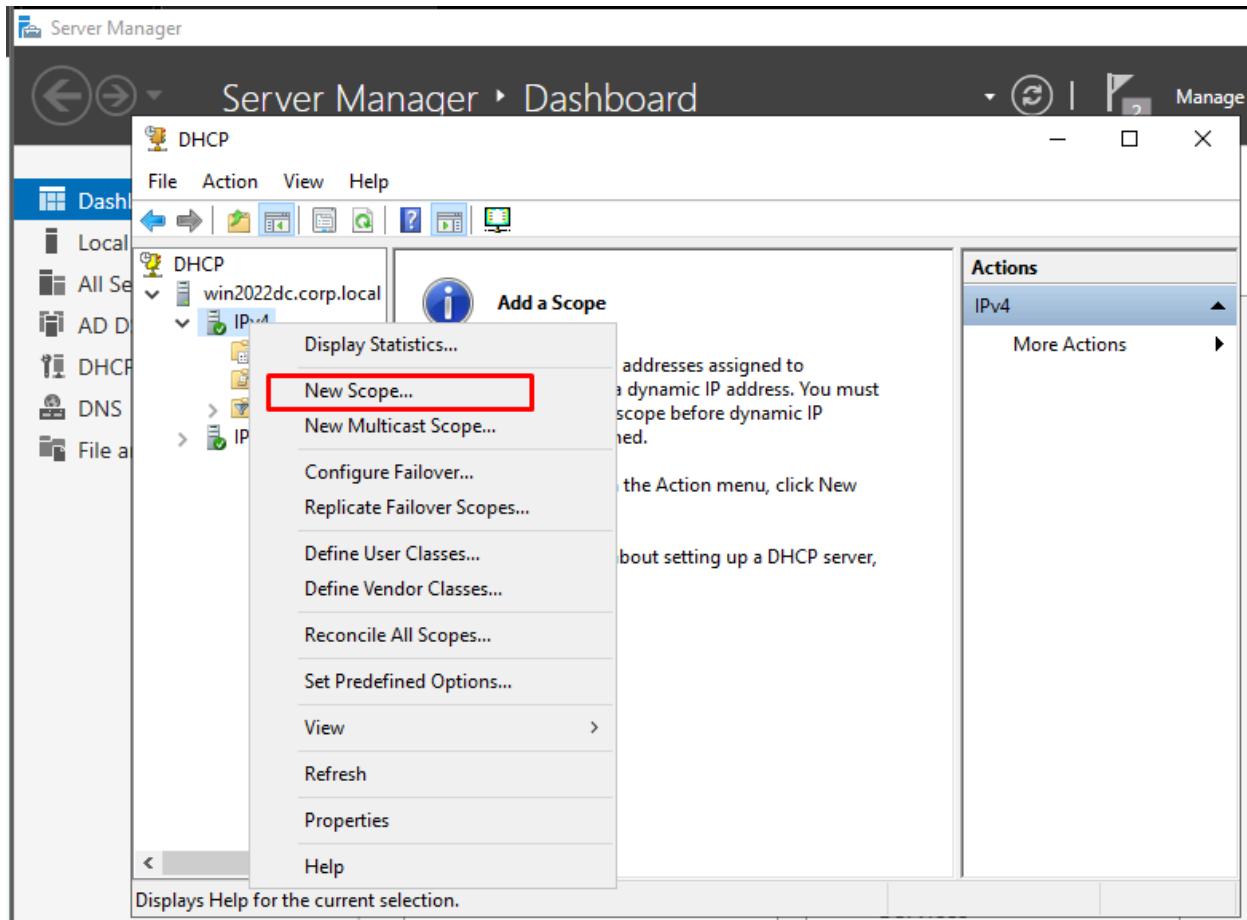
- AD DS**: 1 instance. Sub-options: Manageability, Events, Services, Performance, BPA results.
- DHCP**: 1 instance. Sub-options: Manageability, Events, Services, Performance, BPA results.
- DNS**: 1 instance. Sub-options: Manageability, Events, Services, Performance, BPA results.
- File and Storage Services**: 1 instance. Sub-options: Manageability, Events, Services, Performance, BPA results.

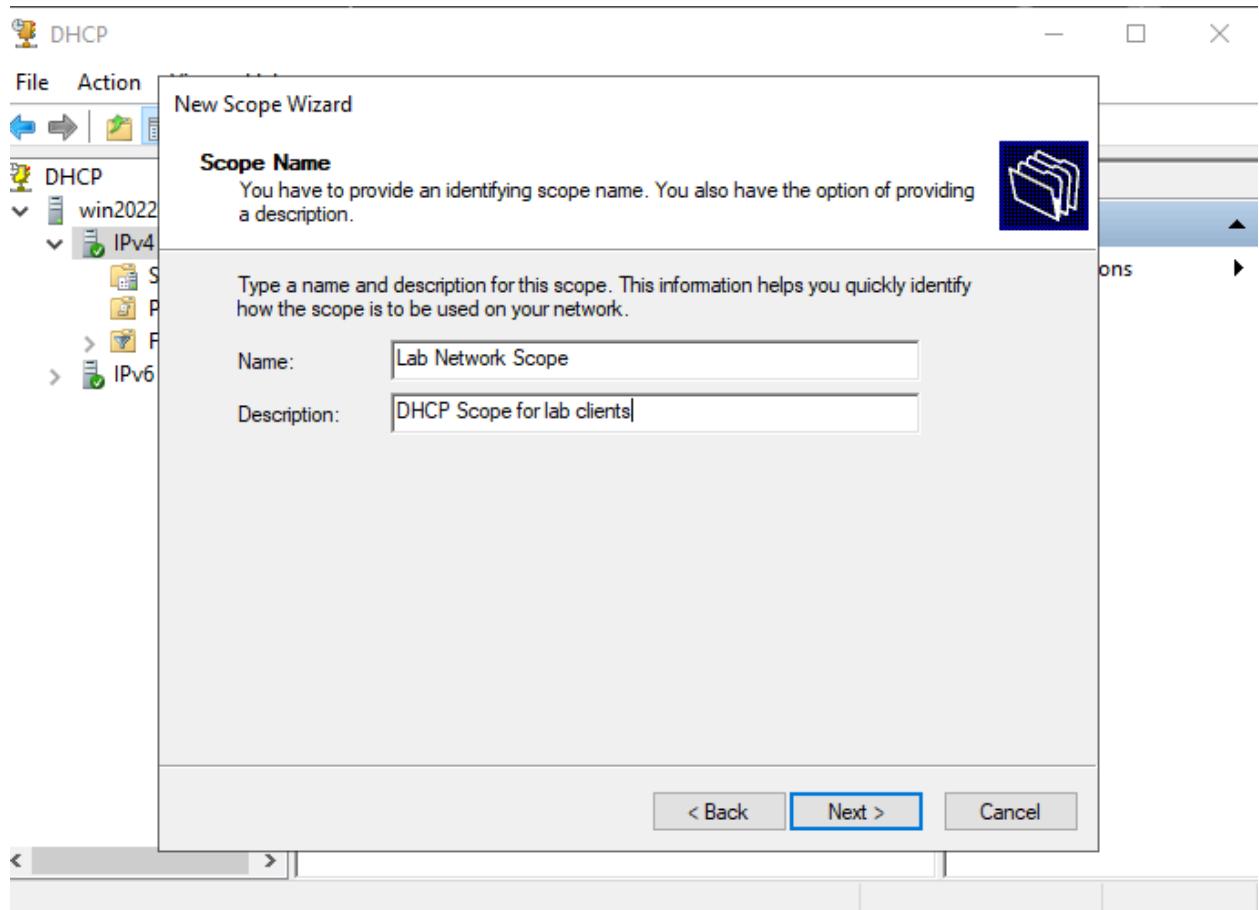
At the top right, there is a callout bubble with the text "Create a server group" and "5 Connect this server to cloud services". A "LEARN MORE" button is also present in the top right corner of the dashboard area.

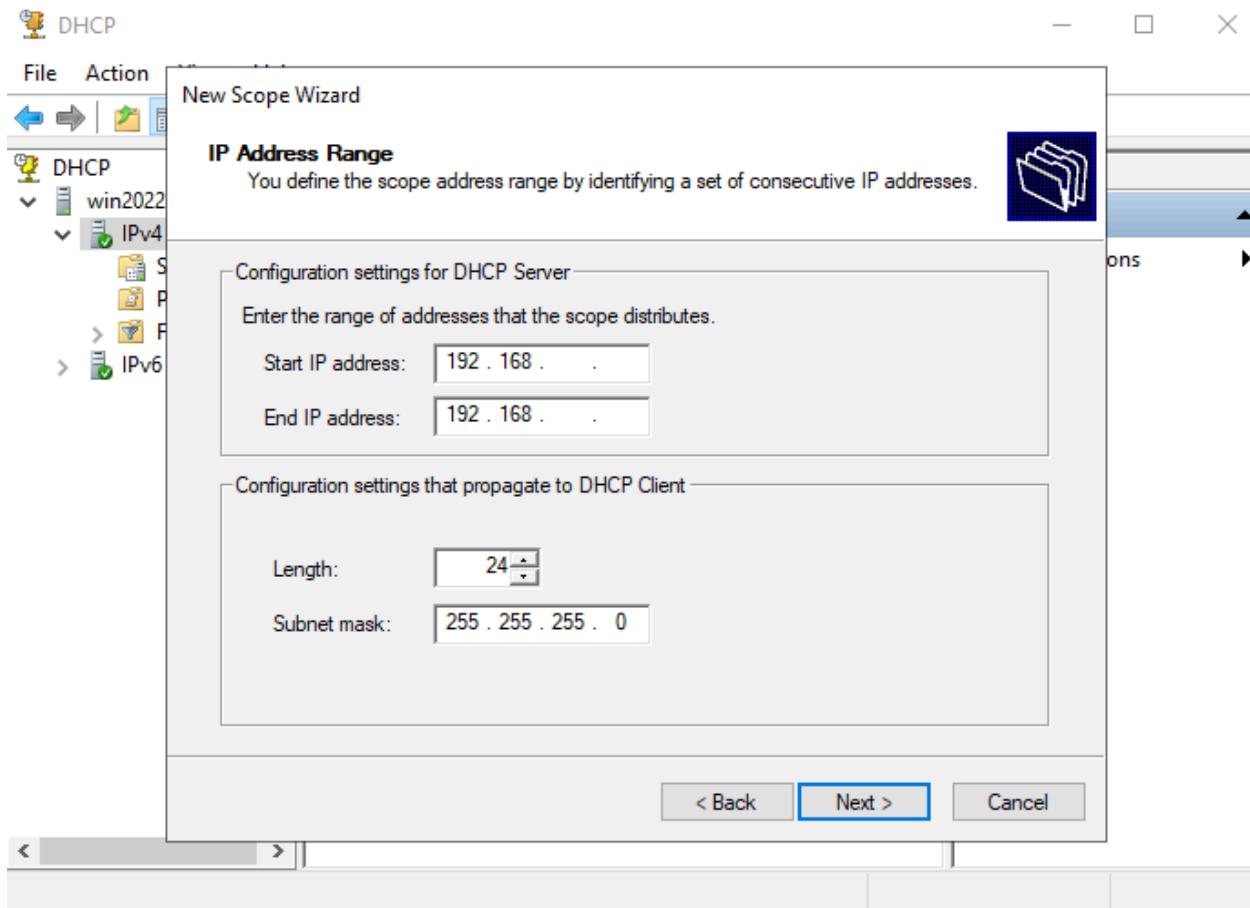
AD DS, DHCP, DNS Successfully Installed

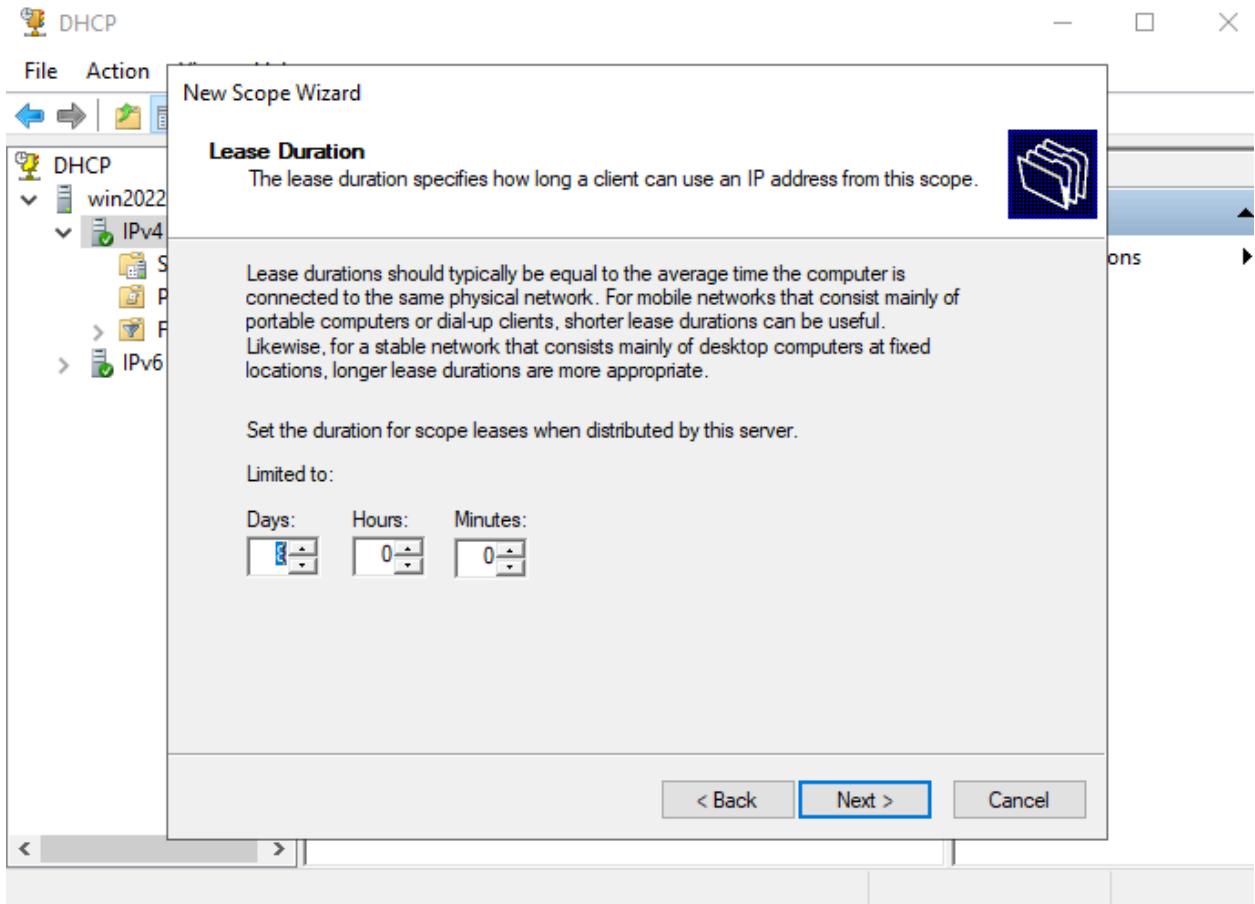
## Create DHCP Scope

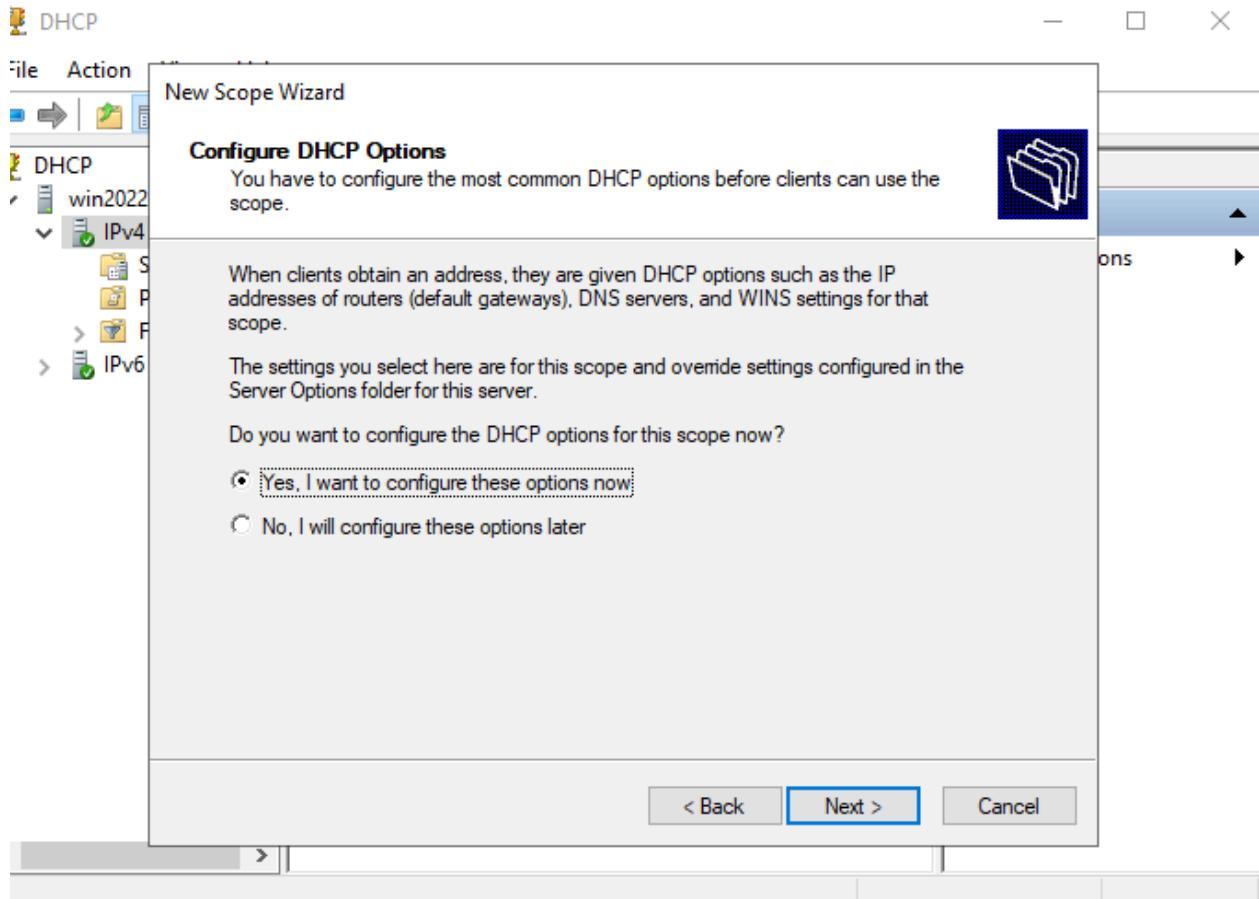


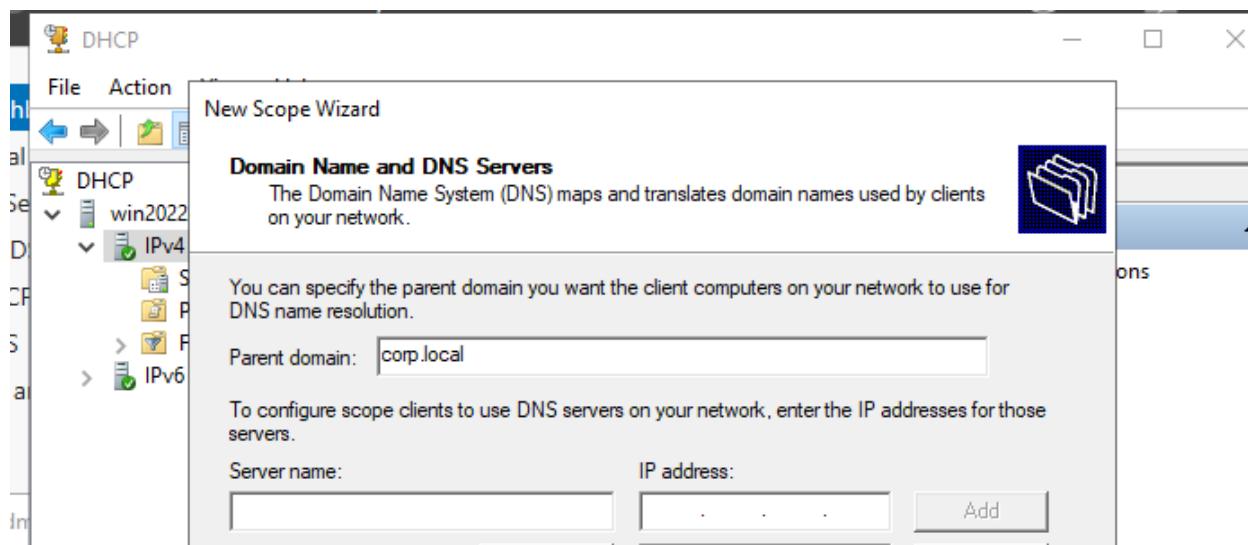
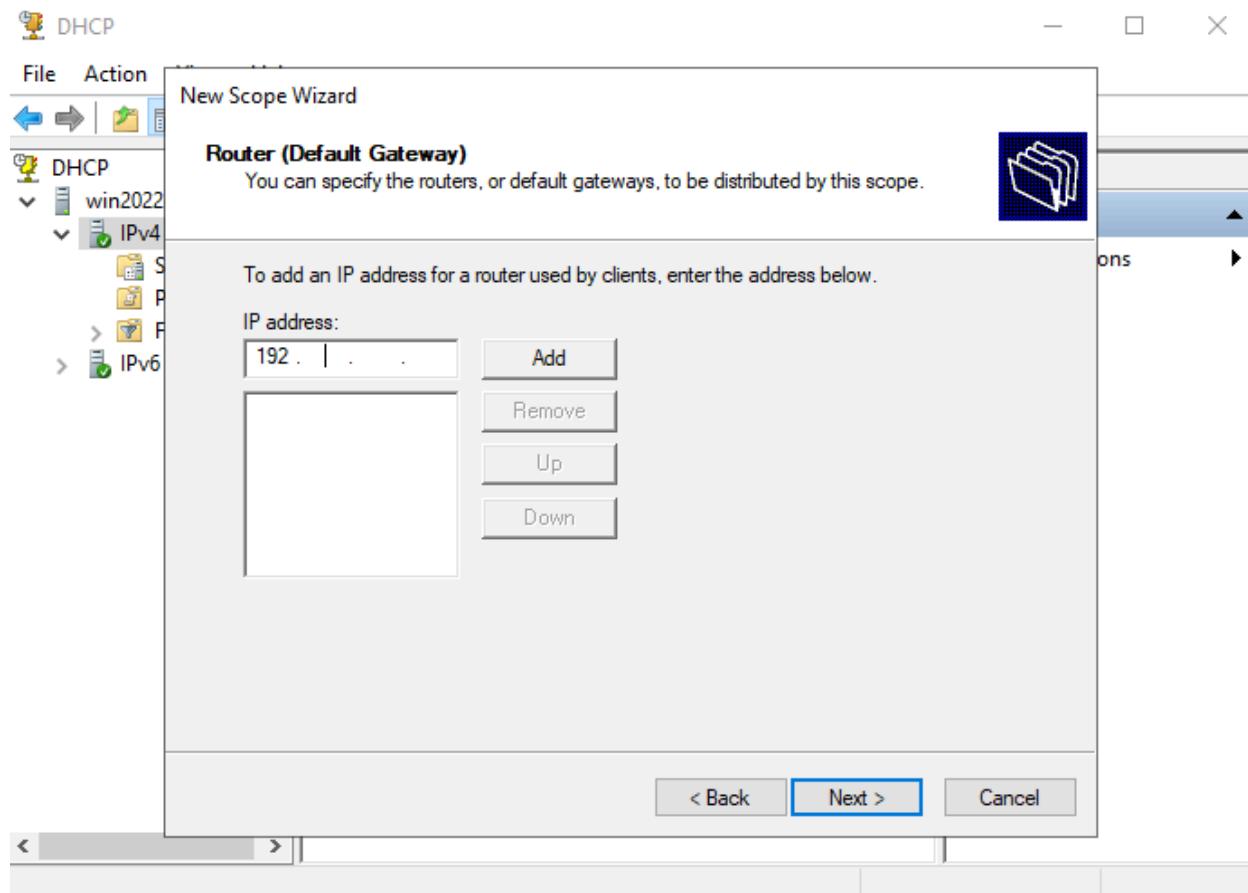


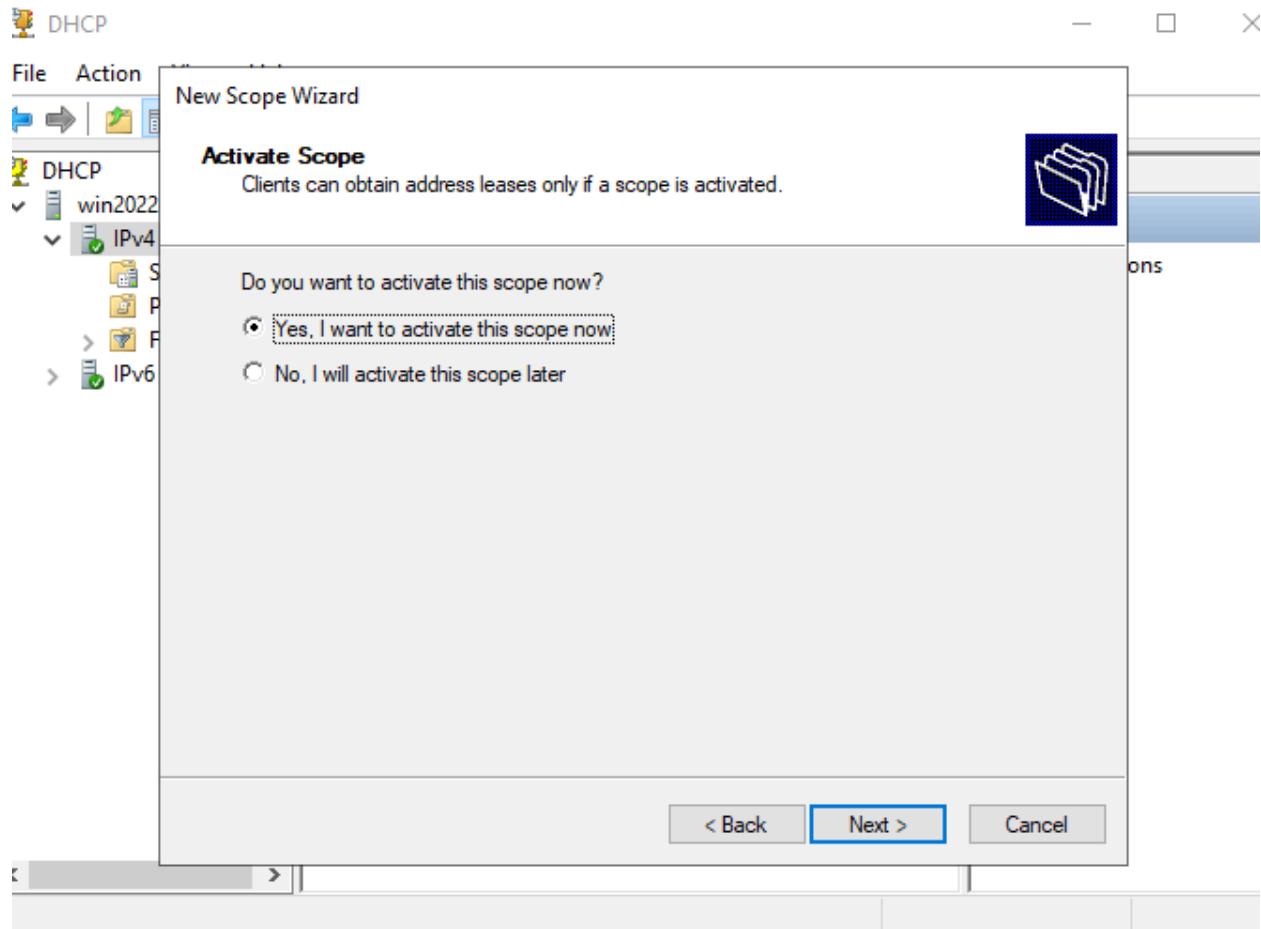


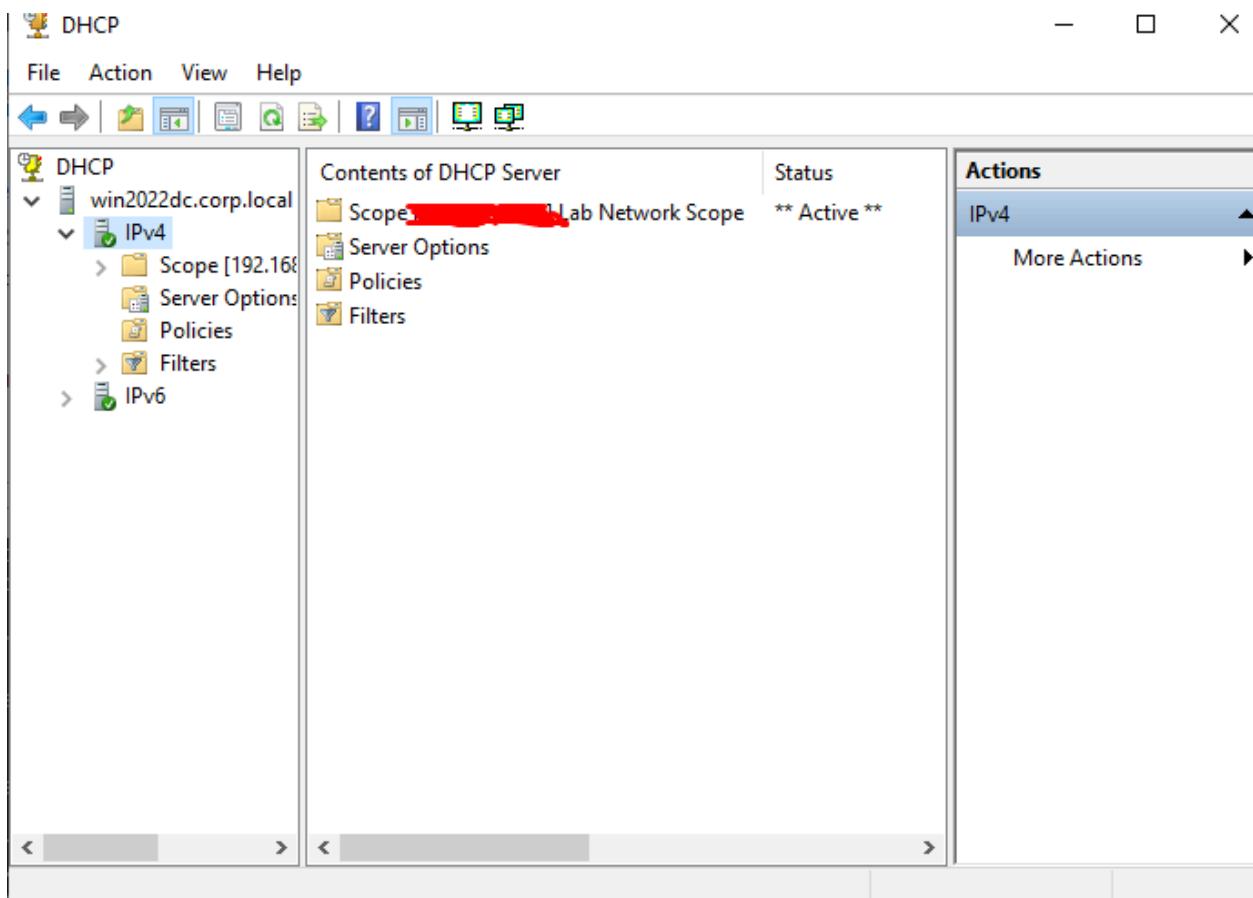






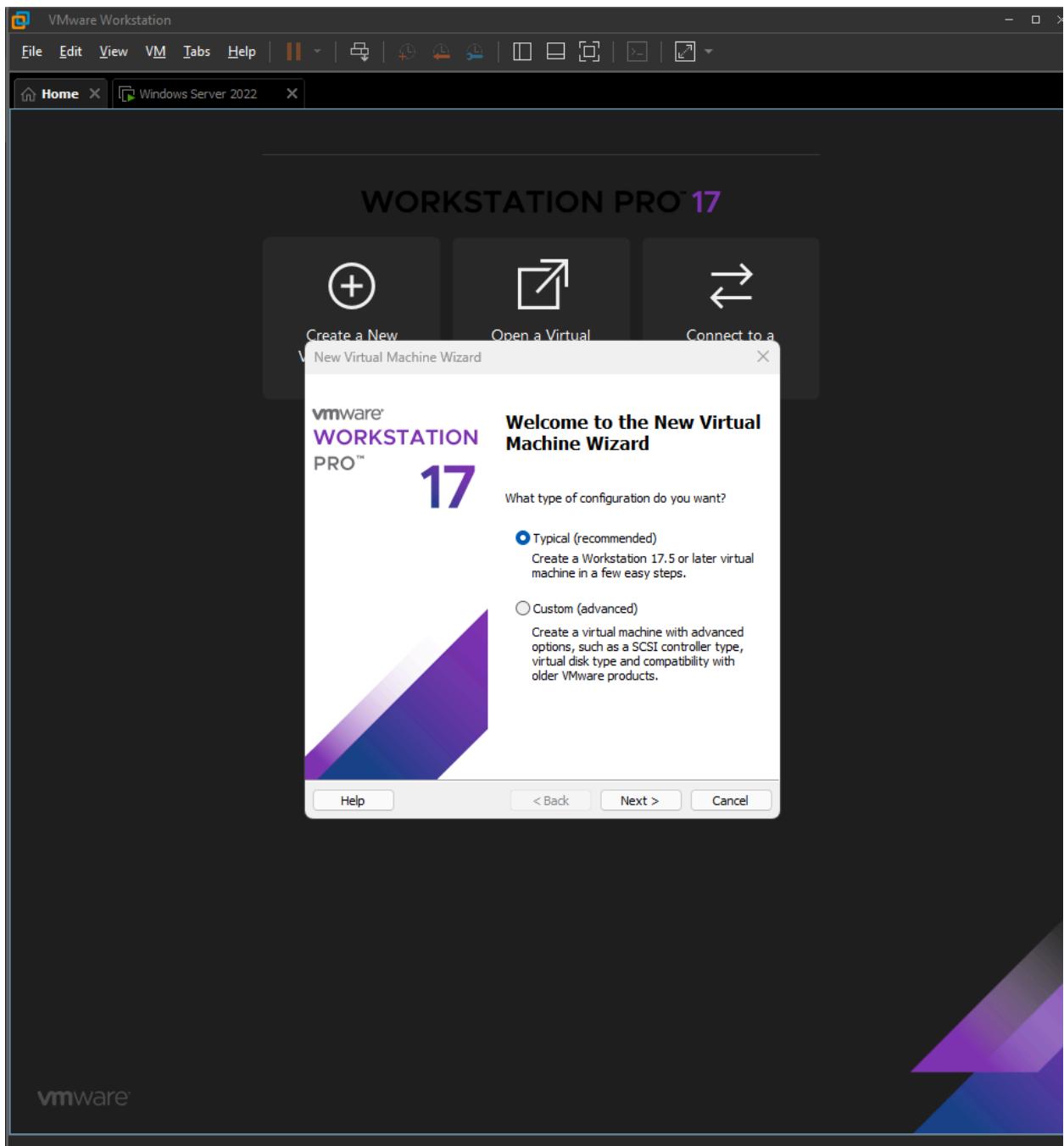


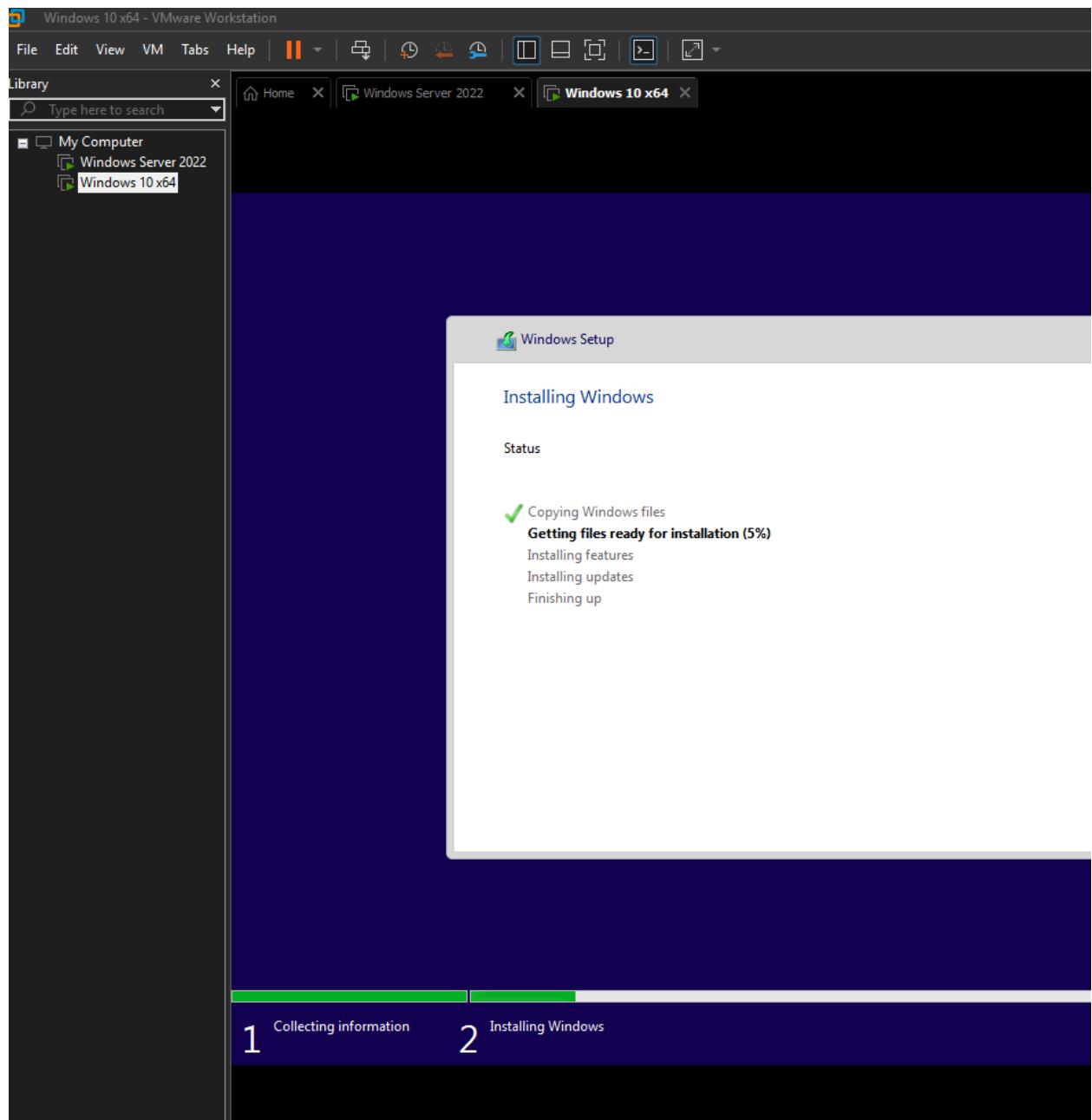




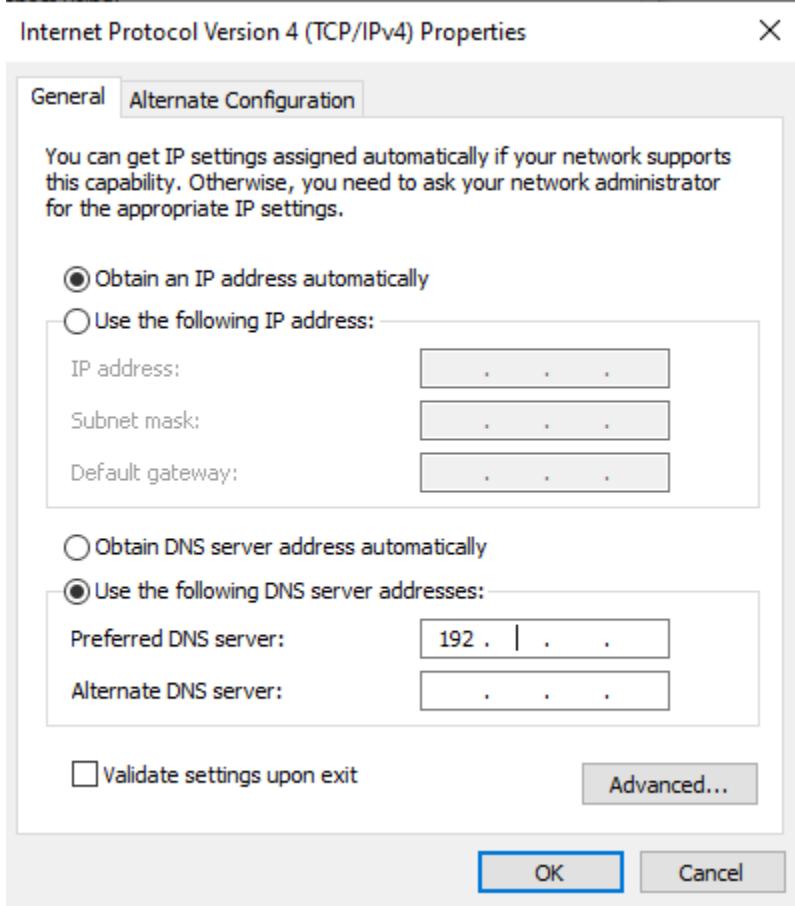
Configured DHCP scope for lab network with IP range and DNS settings

## Create new Windows 10 VM with VMware (Acting as user)

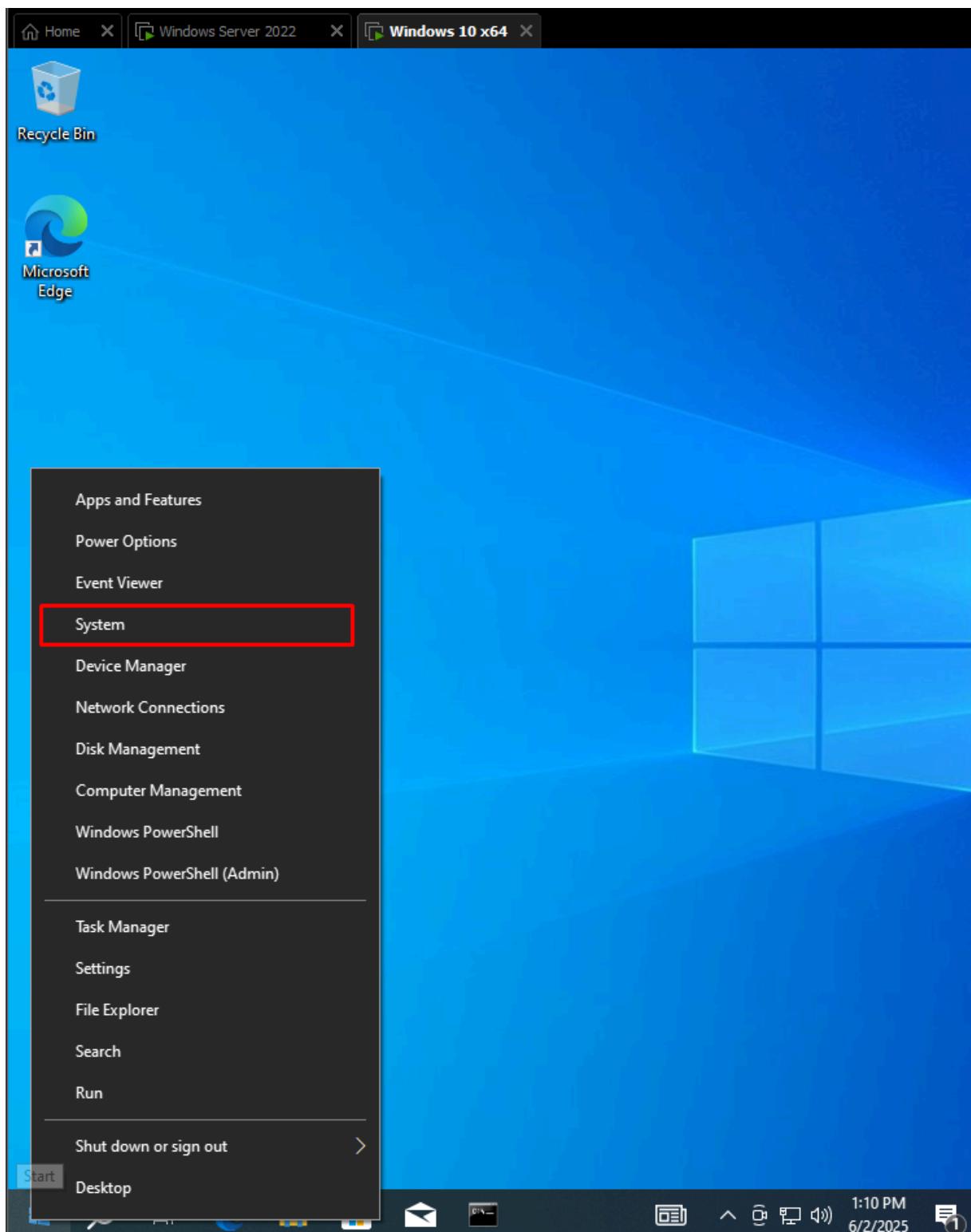


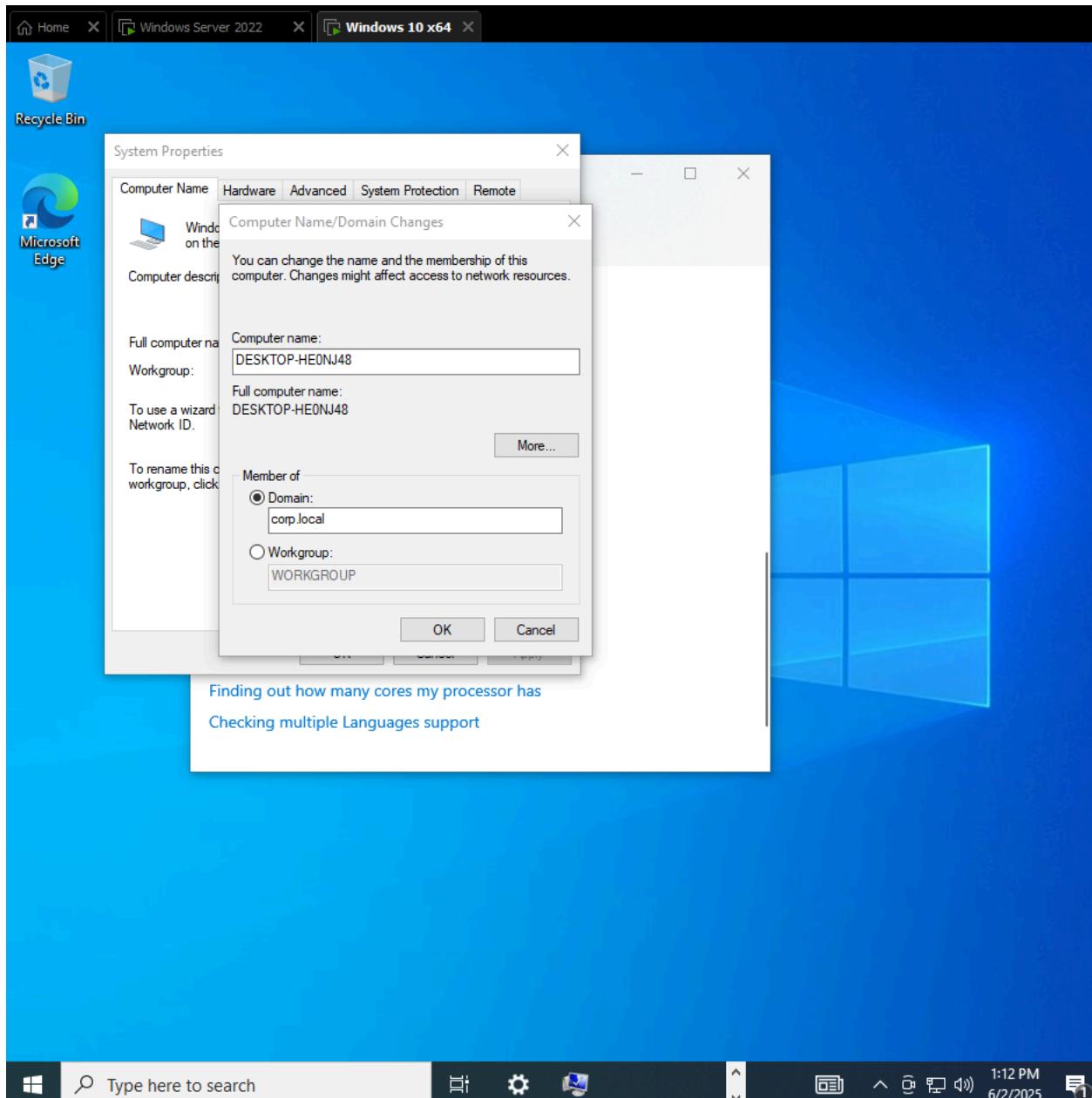


## Set DNS on new Windows 10 VM to the Windows Server 2022 static Domain Controller IP



## Windows 10 VM: Connect to CORP.LOCAL domain created by Windows Server 2022



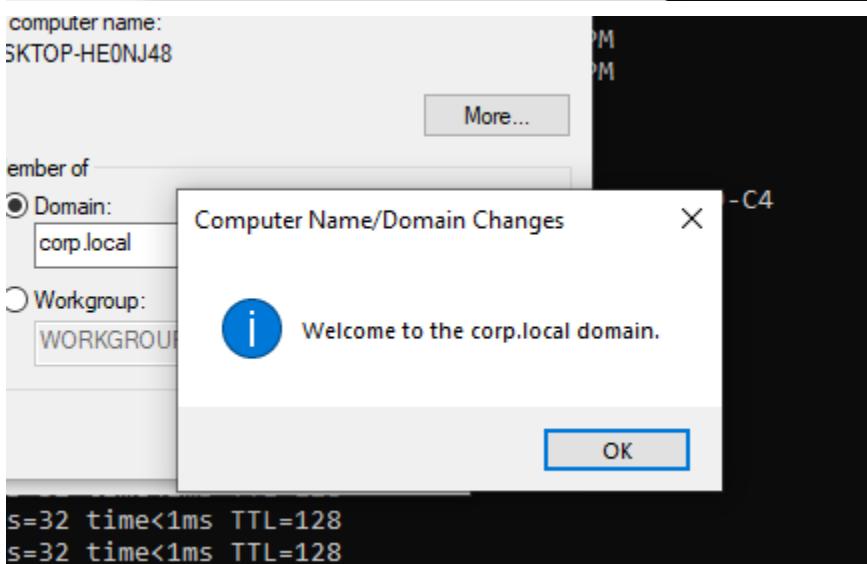
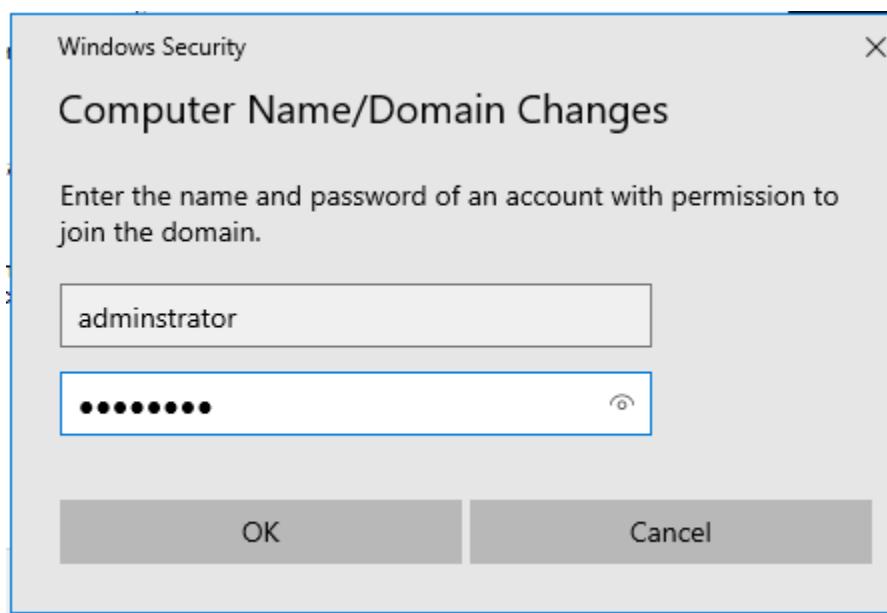


```
C:\Windows\system32>ipconfig /registerdns
Windows IP Configuration

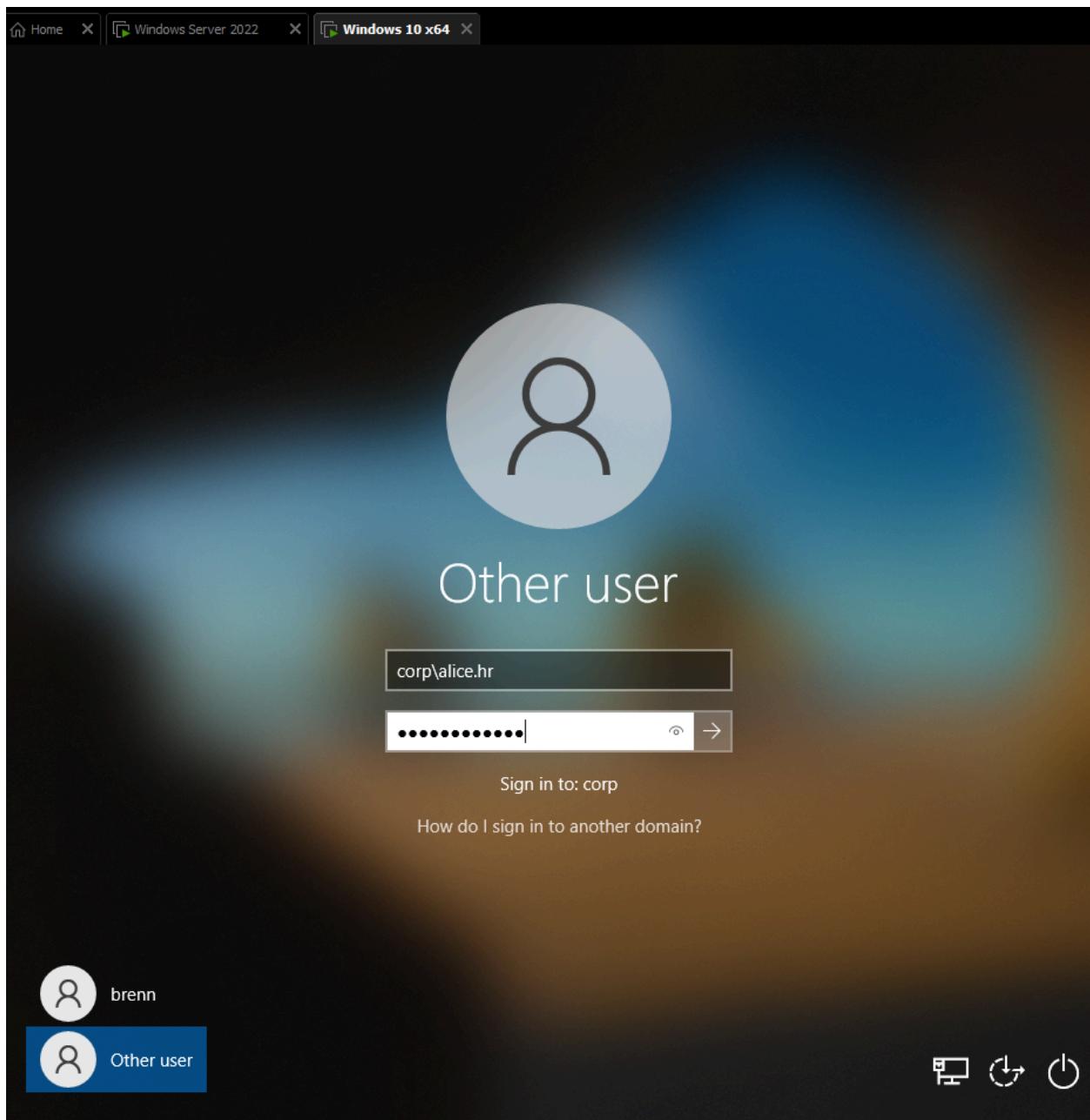
Registration of the DNS resource records for all adapters of this computer has been initiated. Any errors will be reported in the Event Viewer in 15 minutes.
```

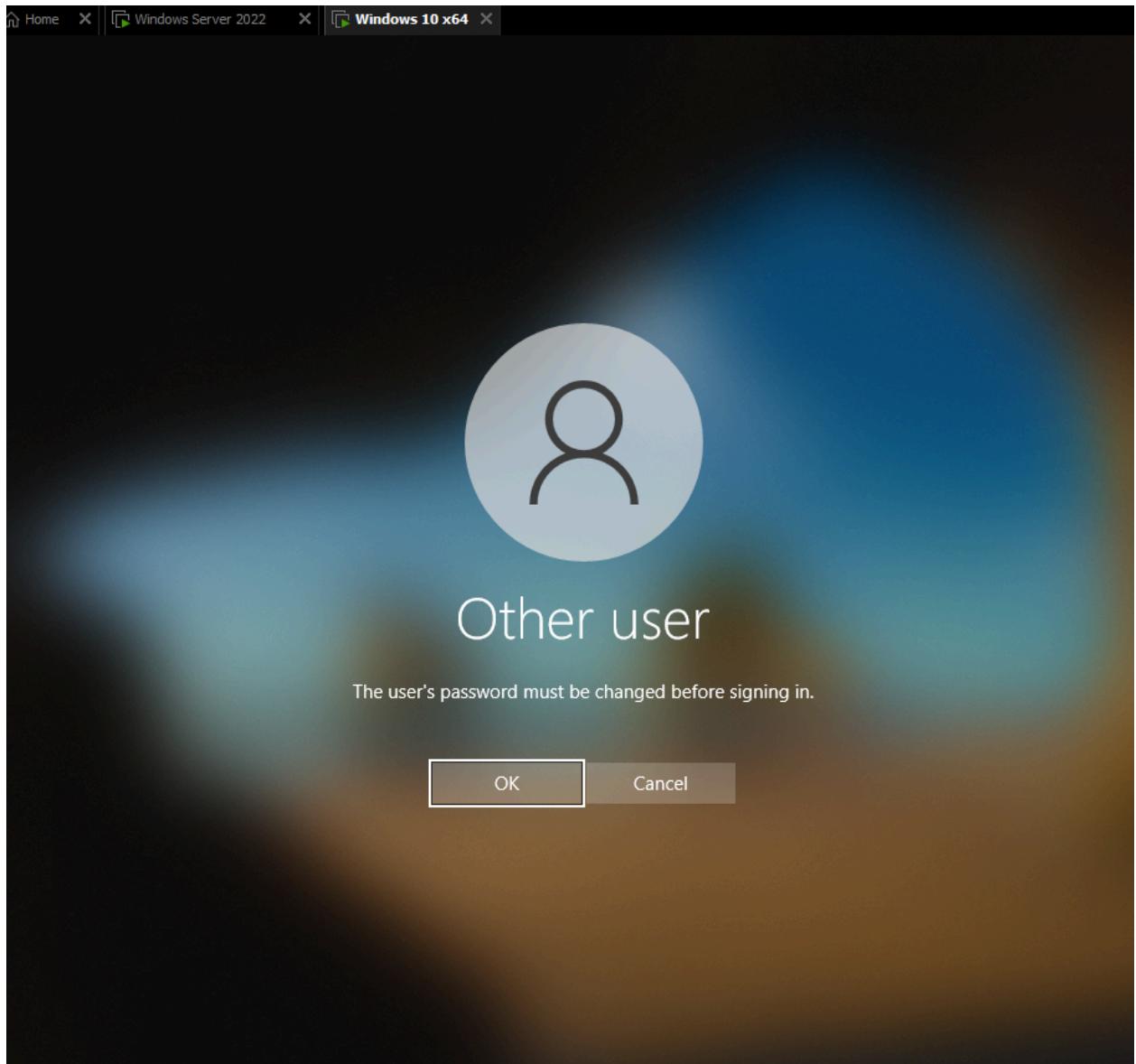
```
C:\Windows\system32>ping corp.local

Pinging corp.local [192.168.137.222] with 32 bytes of data:
Reply from 192.168.137.222: bytes=32 time<1ms TTL=128
Reply from 192.168.137.222: bytes=32 time<1ms TTL=128
Reply from 192.168.137.222: bytes=32 time<1ms TTL=128
```



## Windows 10 VM: Log in to an account of the Corp.local domain: alice.hr







# Other user

corp\alice.hr

X

••••••••••

••••••••••

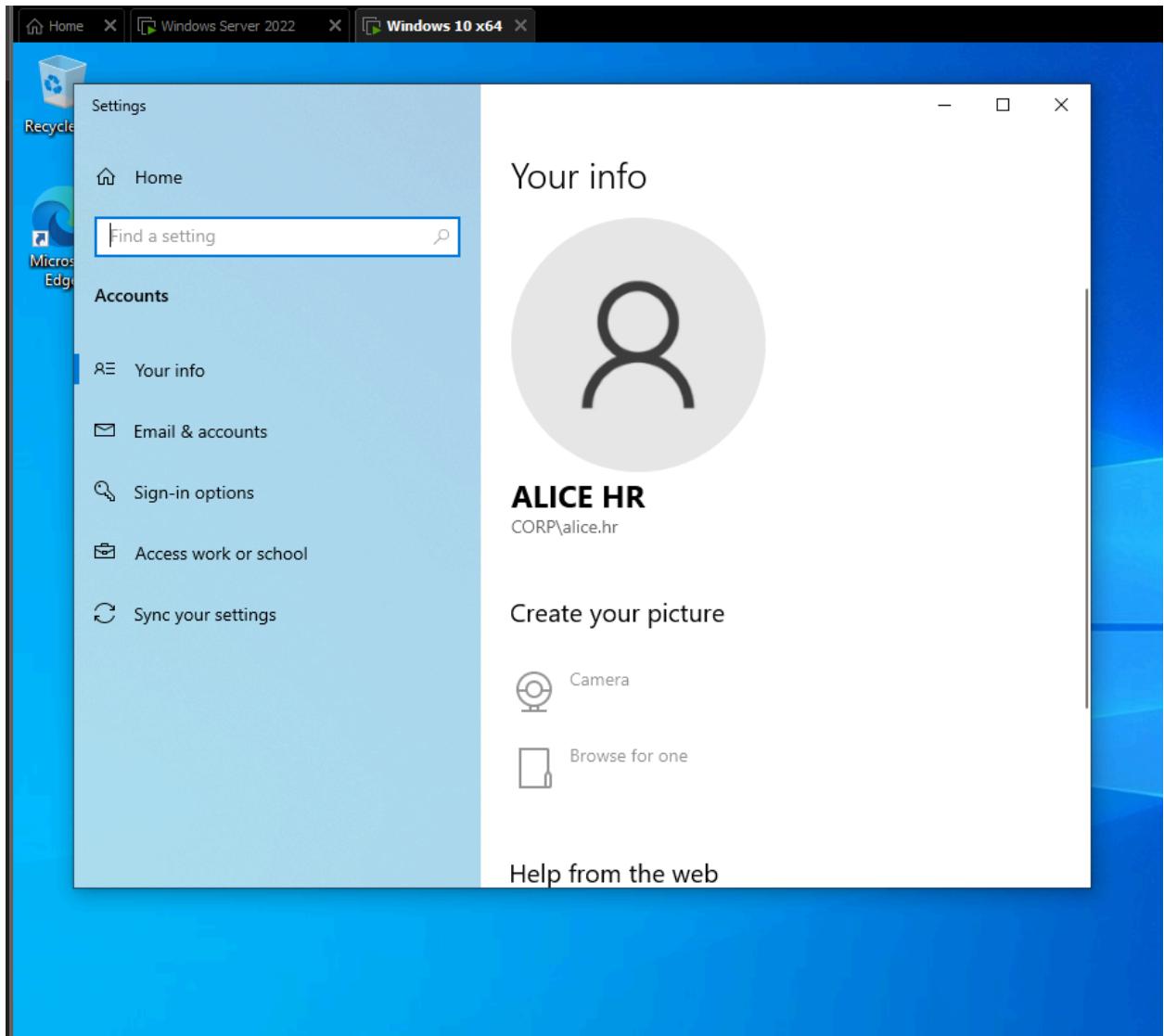
••••••••••

→

Sign in to: corp

How do I sign in to another domain?

Cancel



```
C:\Users\alice.hr>gpupdate /force
Updating policy...
Computer Policy update has completed successfully.
User Policy update has completed successfully.
```

## 1. Check GPO Application on Client

The screenshot shows the Windows Server 2022 Group Policy Management console. The left pane displays the navigation tree under 'Forest: corp.local' and 'Domains'. The 'corp.local' node is expanded, showing 'Audit Logon Events', 'Default Domain Policy', 'Disable USB Storage...', 'Password Policy Enf...', 'Domain Controllers', 'Finance', 'HR' (which is selected), 'IT', 'Group Policy Objects', 'WMI Filters', and 'Starter GPOs'. The right pane is titled 'HR' and contains three tabs: 'Linked Group Policy Objects', 'Group Policy Inheritance', and 'Delegation'. The 'Linked Group Policy Objects' tab is selected. It displays a message: 'This list does not include any GPOs linked to sites. For more details, see Help.' Below this message is a table showing four GPOs:

Precedence	GPO	Location	GPO Status	WMI Filter
1	Default Domain Policy	corp.local	Enabled	None
2	Password Policy Enf...	corp.local	Enabled	None
3	Disable USB Storag...	corp.local	Enabled	None
4	Audit Logon Events	corp.local	Enabled	None

```
C:\Windows\system32>gpresult /scope computer /h gpo_report_computer.html
```

CORP\DESKTOP-HE0NJ48    Welcome    Welcome to Microsoft Edge

File | C:/Windows/system32/gpo\_report\_computer.html

General

Computer name	CORP\DESKTOP-HE0NJ48
Domain	corp.local
Site	Default-First-Site-Name
Security Group Membership	<a href="#">show</a>

Component Status

Component Name	Status	Time Taken	Last Process Time	Event Log
Group Policy Infrastructure	Success	854 Millisecond(s)	6/2/2025 2:09:27 PM	<a href="#">View Log</a>
Registry	Success	15 Millisecond(s)	6/2/2025 2:09:26 PM	<a href="#">View Log</a>
Security	Success	328 Millisecond(s)	6/2/2025 2:09:27 PM	<a href="#">View Log</a>

Settings

Policies

Windows Settings

Security Settings

Administrative Templates

Group Policy Objects

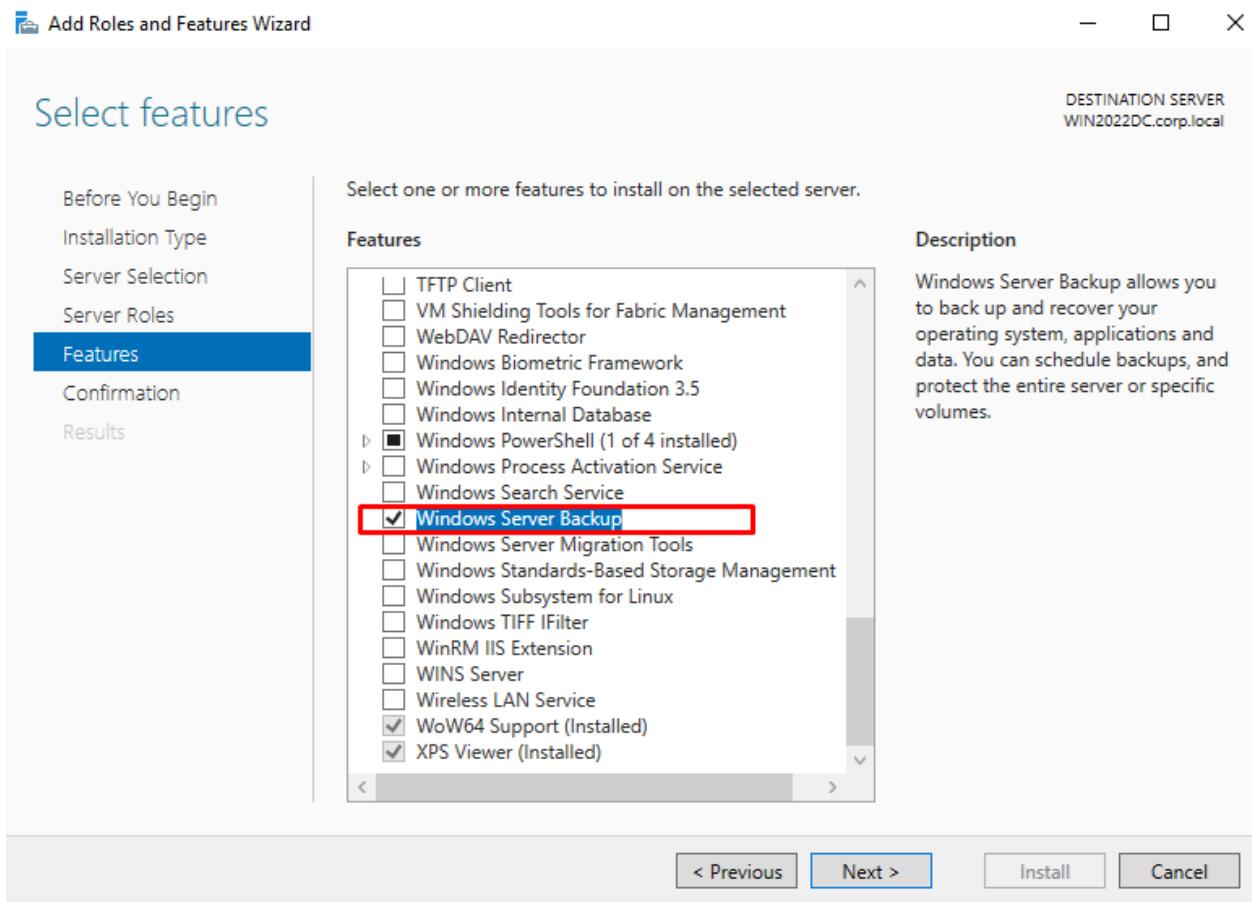
Applied GPOs

- Audit Logon Events [{226CECC9-6CEE-4E18-8A87-BDBCBA40ASA}]
- Default Domain Policy [{31B2F340-016D-11D2-945F-00C04FB984F9}]
- Disable USB Storage/Ports [{D425CD85-300B-494A-9115-392DBD318539}]
- Password Policy Enforcement [{40FEB35C-75F2-49FA-A235-F0ADF3541D31}]

Denied GPOs

Local Group Policy [LocalGPO]

## Windows Server 2022: Create Windows Server Backup



## Installation progress

DESTINATION SERVER  
WIN2022DC.corp.local

Before You Begin  
Installation Type  
Server Selection  
Server Roles  
Features  
Confirmation  
**Results**

### View installation progress

#### Feature installation

Installation started on WIN2022DC.corp.local

#### Windows Server Backup

 You can close this wizard without interrupting running tasks. View task progress or open this page again by clicking Notifications in the command bar, and then Task Details.

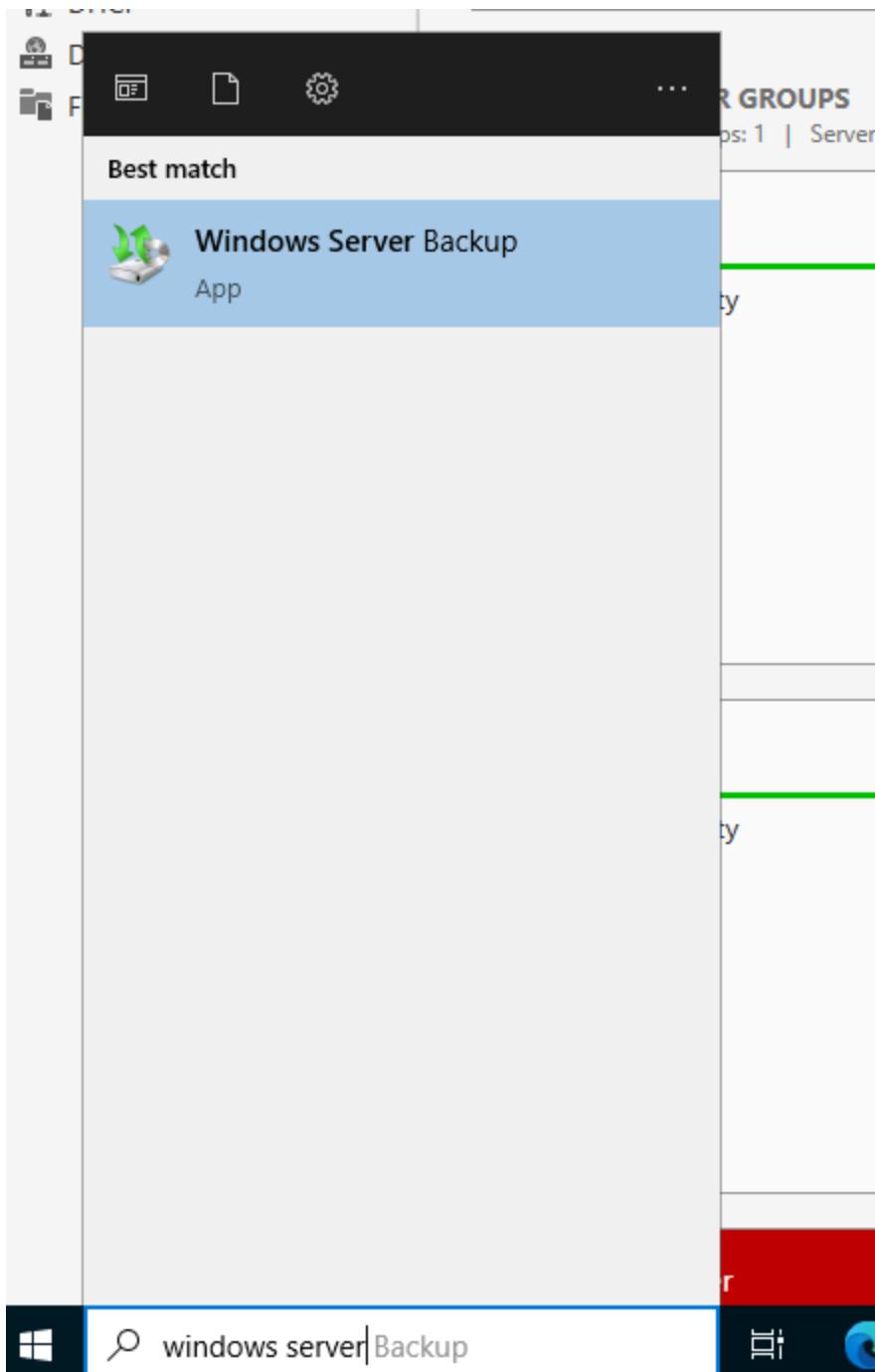
[Export configuration settings](#)

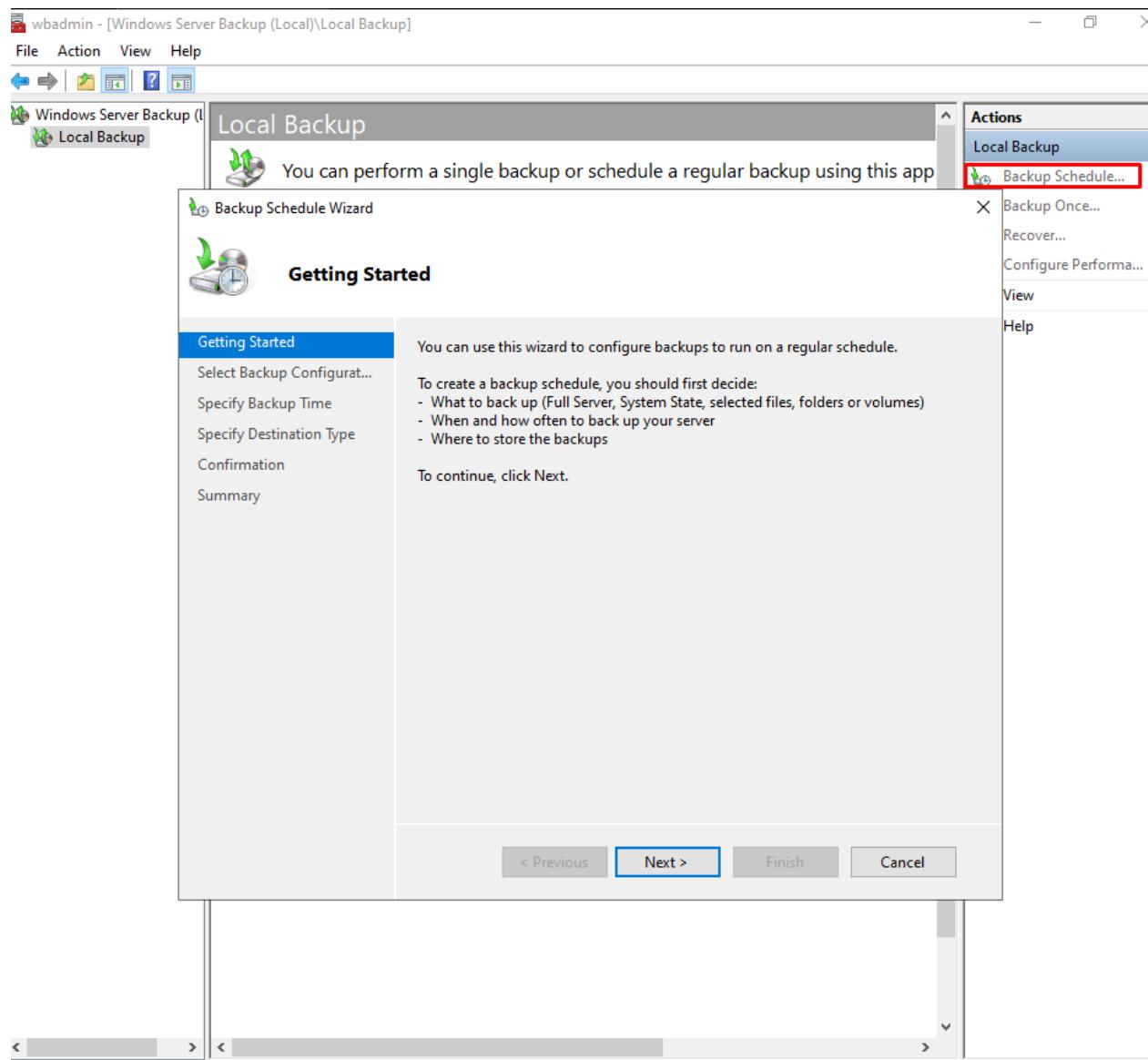
< Previous

Next >

**Close**

**Cancel**







## Select Backup Configuration

Getting Started

Select Backup Configurat...

Specify Backup Time

Specify Destination Type

Confirmation

Summary

What type of configuration do you want to schedule?

Full server (recommended)

I want to back up all my server data, applications and system state.

Backup size: 12.96 GB

Custom

I want to choose custom volumes, files for backup.

< Previous

Next >

Finish

Cancel

## Backup Schedule Wizard



### Specify Backup Time

Getting Started

Select Backup Configurat...

Specify Backup Time

Specify Destination Type

Confirmation

Summary

How often and when do you want to run backups?

Once a day

Select time of day: 2:00 AM

More than once a day

Click an available time and then click Add to add it to the backup schedule.

Available time:

- 12:00 AM
- 12:30 AM
- 1:00 AM
- 1:30 AM
- 2:00 AM
- 2:30 AM
- 3:00 AM
- 3:30 AM
- 4:00 AM
- 4:30 AM

Scheduled time:

- 9:00 PM

Add >

< Remove

< Previous

Next >

Finish

Cancel



## Specify Destination Type

[Getting Started](#)[Select Backup Configurat...](#)[Specify Backup Time](#)[Specify Destination Type](#)[Select Destination Disk](#)[Confirmation](#)[Summary](#)

Where do you want to store the backups?

- Back up to a hard disk that is dedicated for backups (recommended)

Choose this option for the safest way to store backups. The hard disk that you use will be formatted and then dedicated to only store backups.

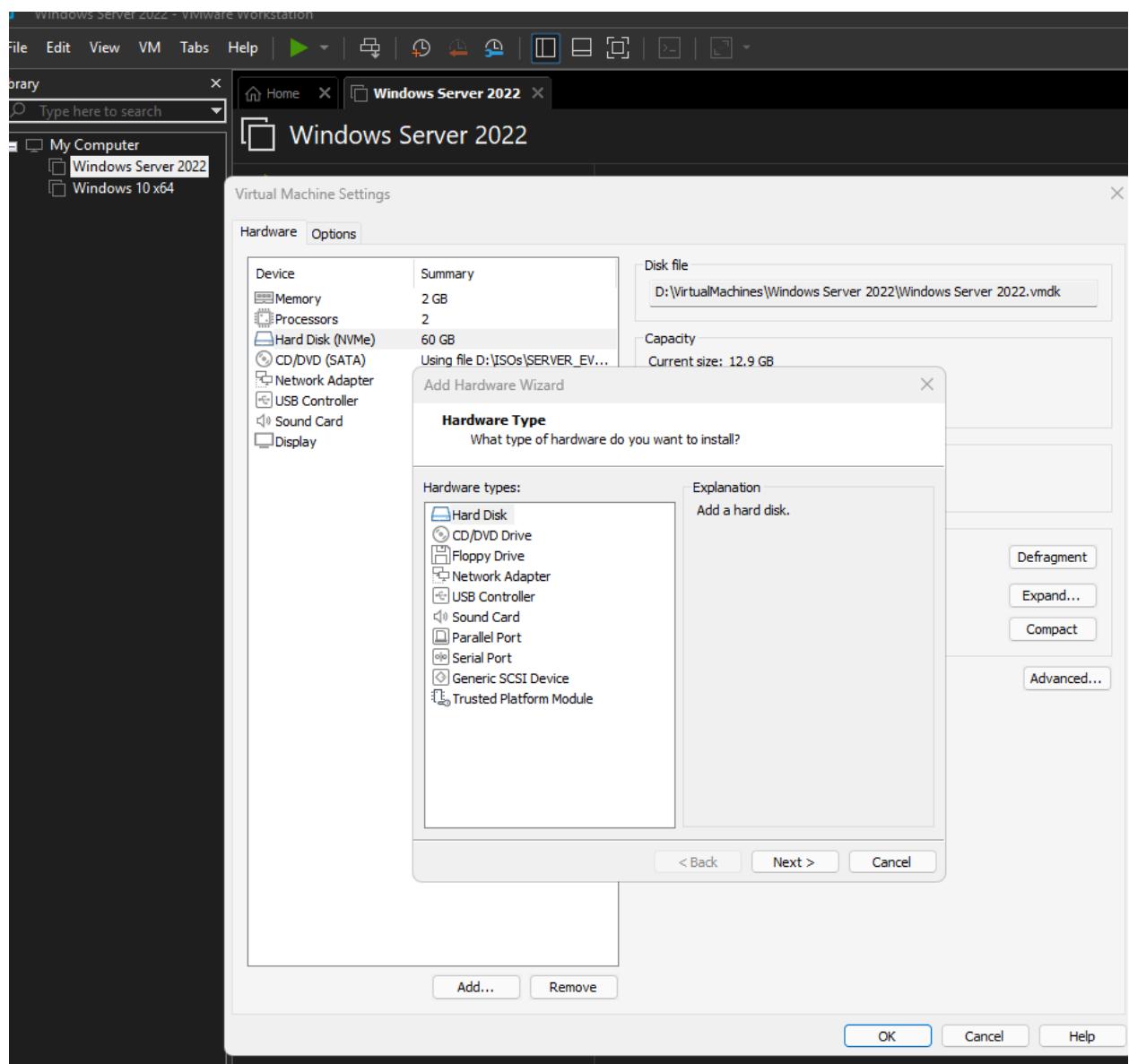
- Back up to a volume

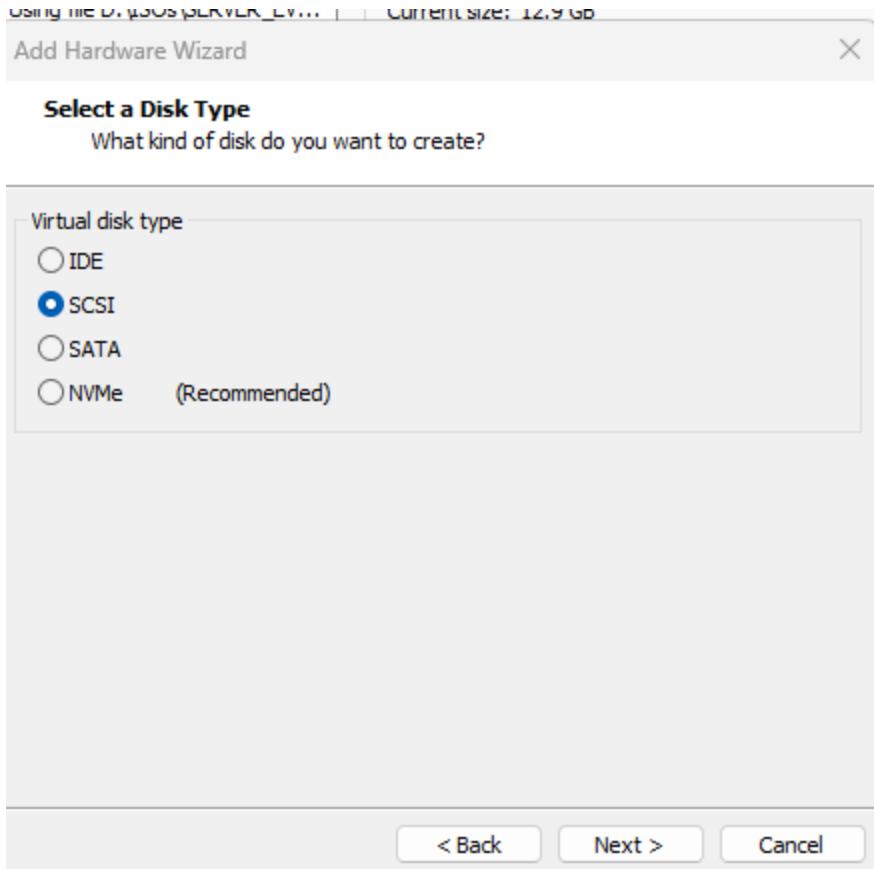
Choose this option if you cannot dedicate an entire disk for backups. Note that the performance of the volume may be reduced by up to 200 percent while it is used to store backups. We recommend that you do not store other server data on the same volume.

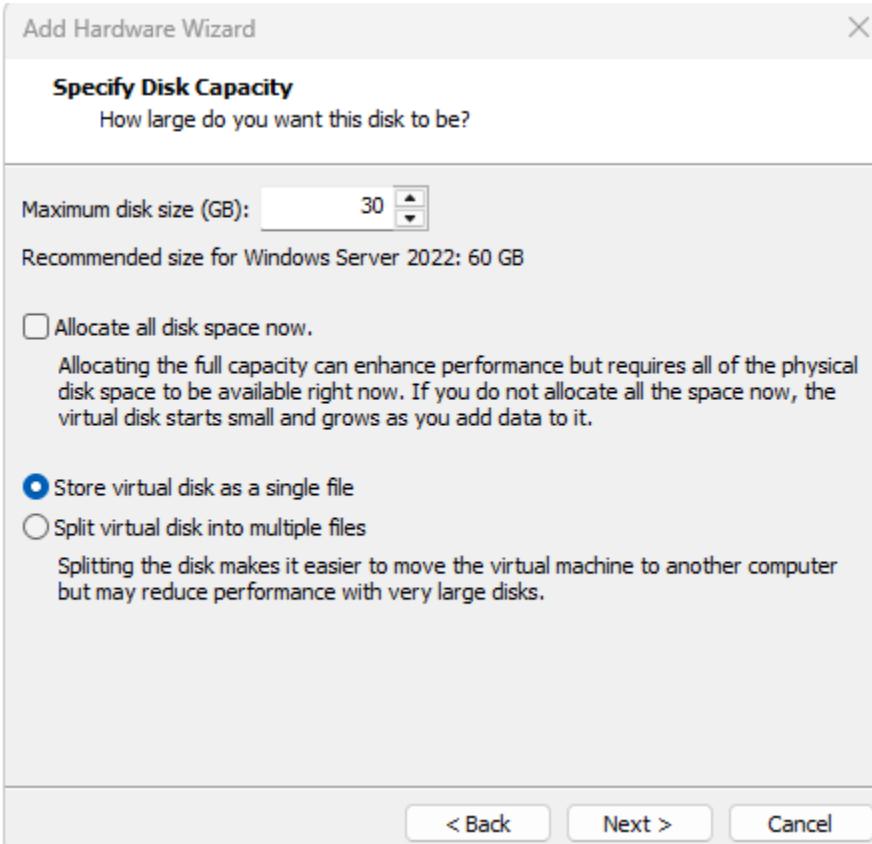
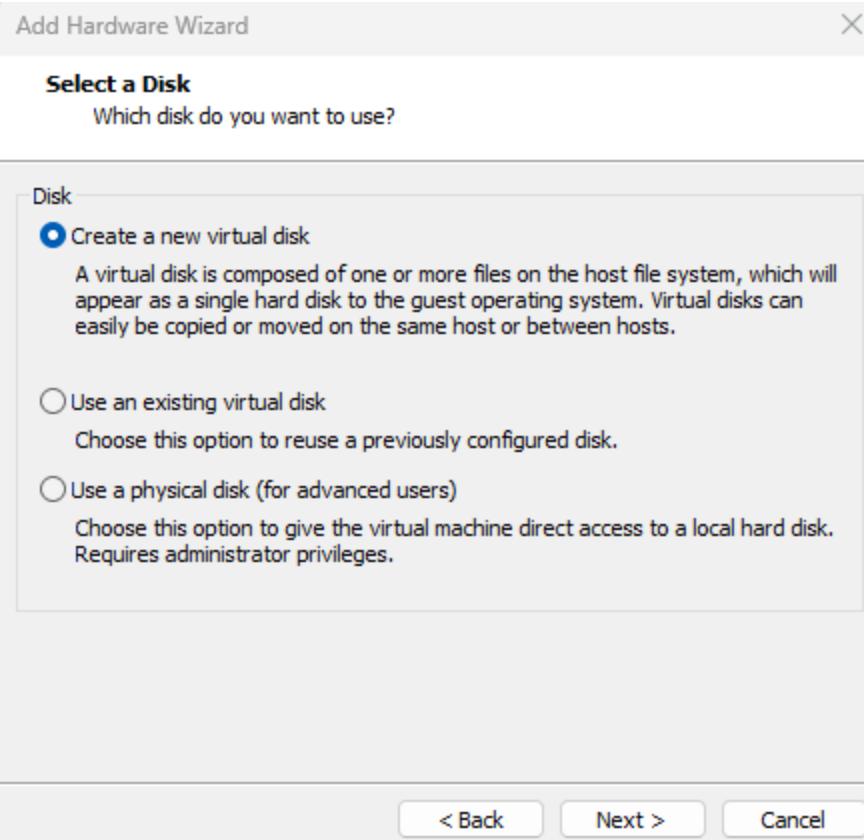
- Back up to a shared network folder

Choose this option if you do not want to store backups locally on the server. Note that you will only have one backup at a time because when you create a new backup it overwrites the previous backup.

[\*\*< Previous\*\*](#)[\*\*Next >\*\*](#)[Finish](#)[Cancel](#)







Add Hardware Wizard

X

**Specify Disk File**

Where would you like to store the disk file?

Disk file

One 30 GB disk file will be created using this file name.

Windows Server 2022-0.vmdk

Browse...

< Back

Finish

Cancel

Disk Management

File Action View Help

Volume Layout Type File System Status Capacity Free Spa... % Free

(C:)	Simple	Basic	NTFS	Healthy (B...)	59.37 GB	46.89 GB	79 %
(Disk 0 partition 1)	Simple	Basic		Healthy (E...)	100 MB	100 MB	100 %
(Disk 0 partition 4)	Simple	Basic		Healthy (R...)	524 MB	524 MB	100 %
SSS_X64FREE_EN...	Simple	Basic	UDF	Healthy (P...)	4.70 GB	0 MB	0 %

Disk 0 Basic 59.98 GB Online

Disk 1 Unknown 30.00 GB Offline

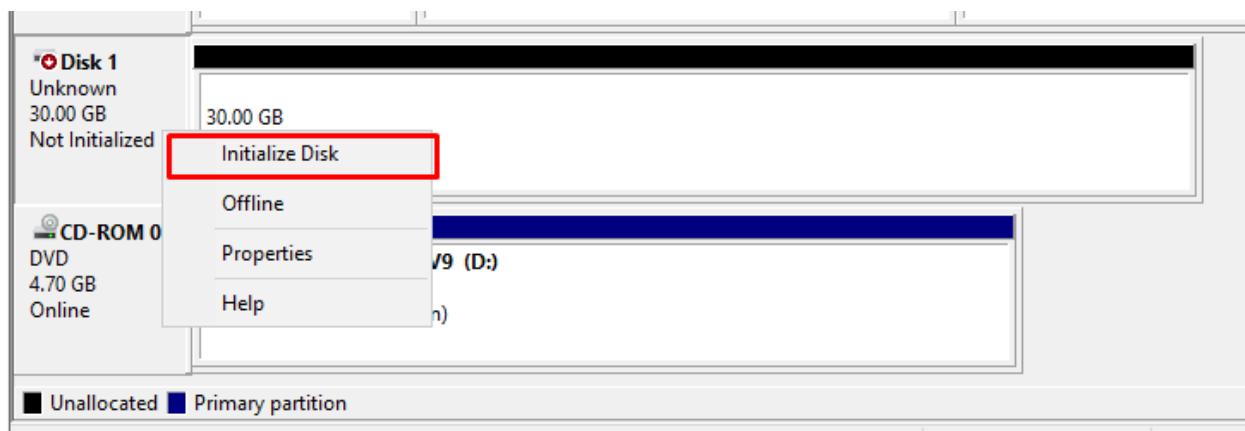
CD-ROM 0 DVD 4.70 GB Online

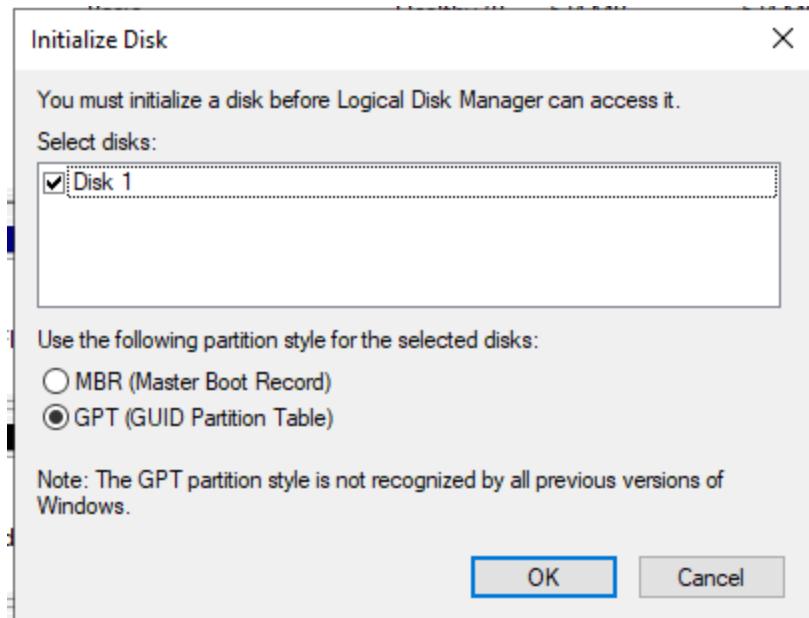
Unallocated Primary partition

Disk 1 Unknown 30.00 GB Not Initialized

CD-ROM 0 DVD 4.70 GB Online

Unallocated Primary partition



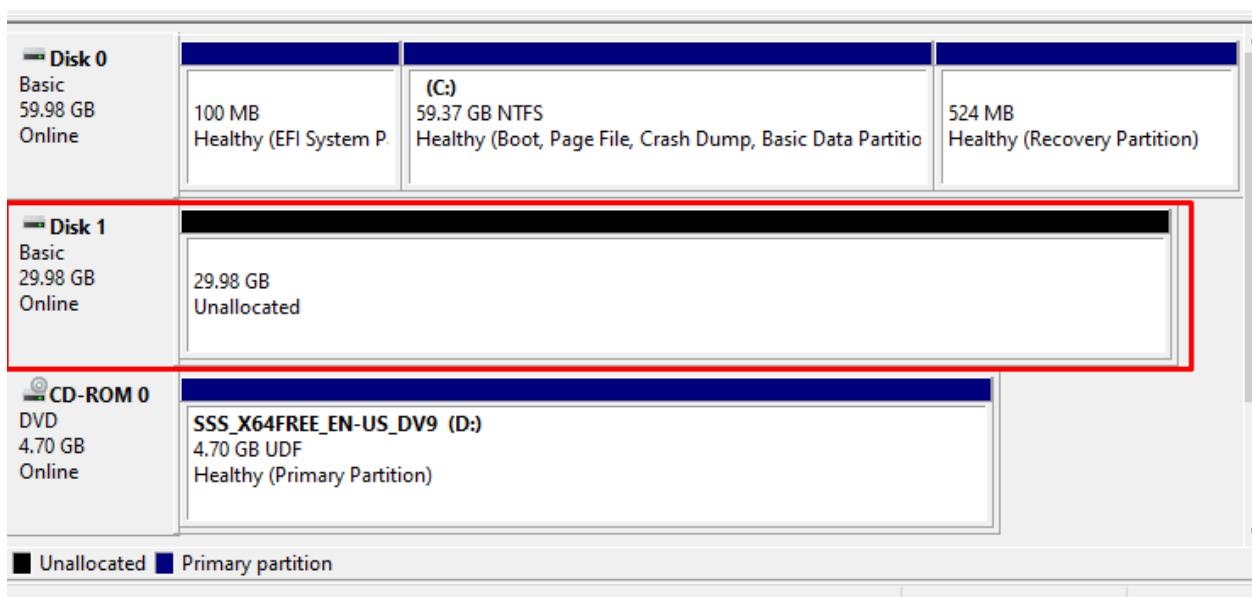


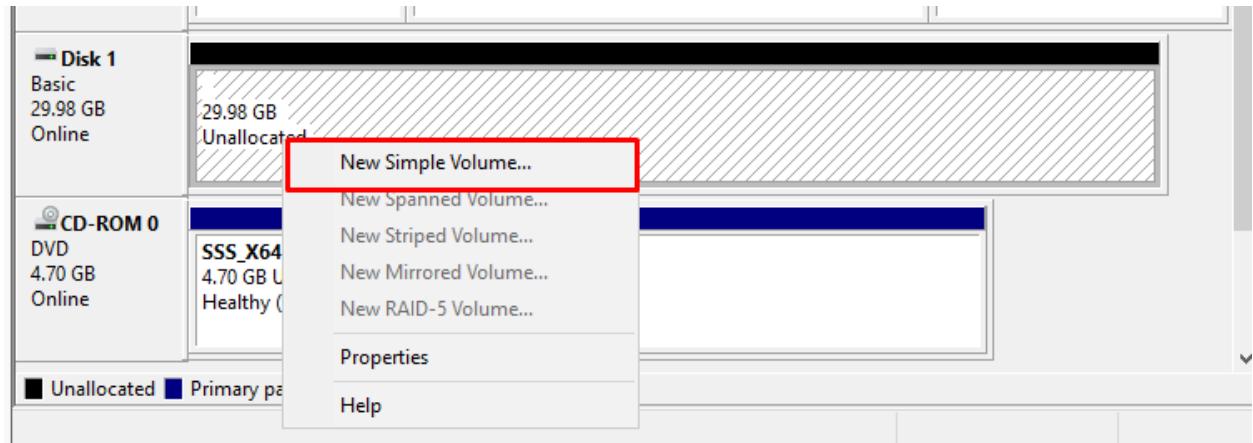
Disk Management

File Action View Help

Volume	Layout	Type	File System	Status	Capacity	Free Spa...	% Free
(C:)	Simple	Basic	NTFS	Healthy (B...)	59.37 GB	46.89 GB	79 %
(Disk 0 partition 1)	Simple	Basic		Healthy (E...)	100 MB	100 MB	100 %
(Disk 0 partition 4)	Simple	Basic		Healthy (R...)	524 MB	524 MB	100 %
SSS_X64FREE_EN...	Simple	Basic	UDF	Healthy (P...)	4.70 GB	0 MB	0 %

This screenshot shows the main interface of the Windows Disk Management tool. It lists several disk volumes: 'C:' (59.37 GB NTFS), '(Disk 0 partition 1)' (100 MB), '(Disk 0 partition 4)' (524 MB), and 'SSS\_X64FREE\_EN...' (4.70 GB UDF). The 'C:' volume is highlighted. The top menu bar includes File, Action, View, and Help. Below the menu is a toolbar with various icons. The bottom status bar indicates 'Unallocated' and 'Primary partition' status.





## New Simple Volume Wizard

X

### Specify Volume Size

Choose a volume size that is between the maximum and minimum sizes.

Maximum disk space in MB:	30702
Minimum disk space in MB:	8
Simple volume size in MB:	<input type="text" value="30702"/> <span style="border: 1px solid blue; padding: 2px;">▲</span> <span style="border: 1px solid blue; padding: 2px;">▼</span>

< Back Next > Cancel

## New Simple Volume Wizard

X

### Assign Drive Letter or Path

For easier access, you can assign a drive letter or drive path to your partition.

Assign the following drive letter:

E ▾

Mount in the following empty NTFS folder:

Browse...

Do not assign a drive letter or drive path

< Back

Next >

Cancel

## New Simple Volume Wizard

X

### Format Partition

To store data on this partition, you must format it first.

Choose whether you want to format this volume, and if so, what settings you want to use.

Do not format this volume

Format this volume with the following settings:

File system:

NTFS ▾

Allocation unit size:

Default ▾

Volume label:

BackupDisk

Perform a quick format

Enable file and folder compression

< Back

Next >

Cancel



Backup Schedule Wizard X

Select Destination Disk

Getting Started  
Select Backup Configuration...  
Specify Backup Time  
Specify Destination Type  
**Select Destination Disk**  
Confirmation  
Summary

Select one or more disks to store your backups. You can use multiple backup disks if you want to store disks offsite.

Available disks:

Disk	Name	Size	Used Space	Volumes in D...

Show All Available Disks...

No external disks or disks attached to Universal Serial Bus (USB) or IEEE 1394 ports were found.

< Previous Next > Finish Cancel



## Select Destination Disk

Getting Started  
Select Backup  
Specify Backup  
Specify Destination  
**Select Destination**  
Confirmation  
Summary

### Show All Available Disks

On the wizard page (by default), only the disk you are most likely to use is shown. In the list below, all the disks that are attached to this server are shown, both internal and external disks. The list excludes critical disks that contain system files, and cluster shared volume disks.

Select the check box for a disk to make it appear in the list of available disks in the wizard page.

Available disks:

Disk	Name	Size	Used Space	Volumes
<input type="checkbox"/> 1	VMware, VMwar...	30.00 GB	87.35 MB	E:\

OK

Cancel

kup disks if

able Disks...

EEE 1394

< Previous

Next >

Finish

Cancel

 Backup Schedule Wizard

 **Select Destination Disk**

Getting Started  
Select Backup Configurat...  
Specify Backup Time  
Specify Destination Type  
**Select Destination Disk**  
Confirmation  
Summary

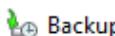
Select one or more disks to store your backups. You can use multiple backup disks if you want to store disks offsite.

Available disks:

Disk	Name	Size	Used Space	Volumes in D...
<input type="checkbox"/> 1	VMware, V...	30.00 GB	87.35 MB	E:\

[Show All Available Disks...](#)

< Previous    Next >    Finish    Cancel

 Backup Schedule Wizard

 Confirmation

Getting Started

Select Backup Configuration...

Specify Backup Time

Specify Destination Type

Select Destination Disk

**Confirmation**

Summary

You are about to create the following backup schedule.

Backup times: 2:00 AM

Files excluded: None

Advanced option: VSS Full Backup

Backup destinations

Name	Label	Size	Used Space
VMware, VM...	WIN2022 2025_...	30.00 GB	87.35 MB

Backup items

Name
(Disk does not have drive letter) (\\\?\Volume\{903e68c9-01bb...)
Bare metal recovery
EFI System Partition
Local disk (C:)
System state

< Previous Next > **Finish** Cancel

Backup Schedule Wizard



## Summary

Getting Started

Select Backup Configurat...

Specify Backup Time

Specify Destination Type

Select Destination Disk

Confirmation

Summary

Status: You have successfully created the backup schedule.

Your first scheduled backup will happen at 6/3/2025 2:00 AM.

Make sure that the disks you are using to store scheduled backups are attached to this computer and are available.

< Previous

Next >

**Close**

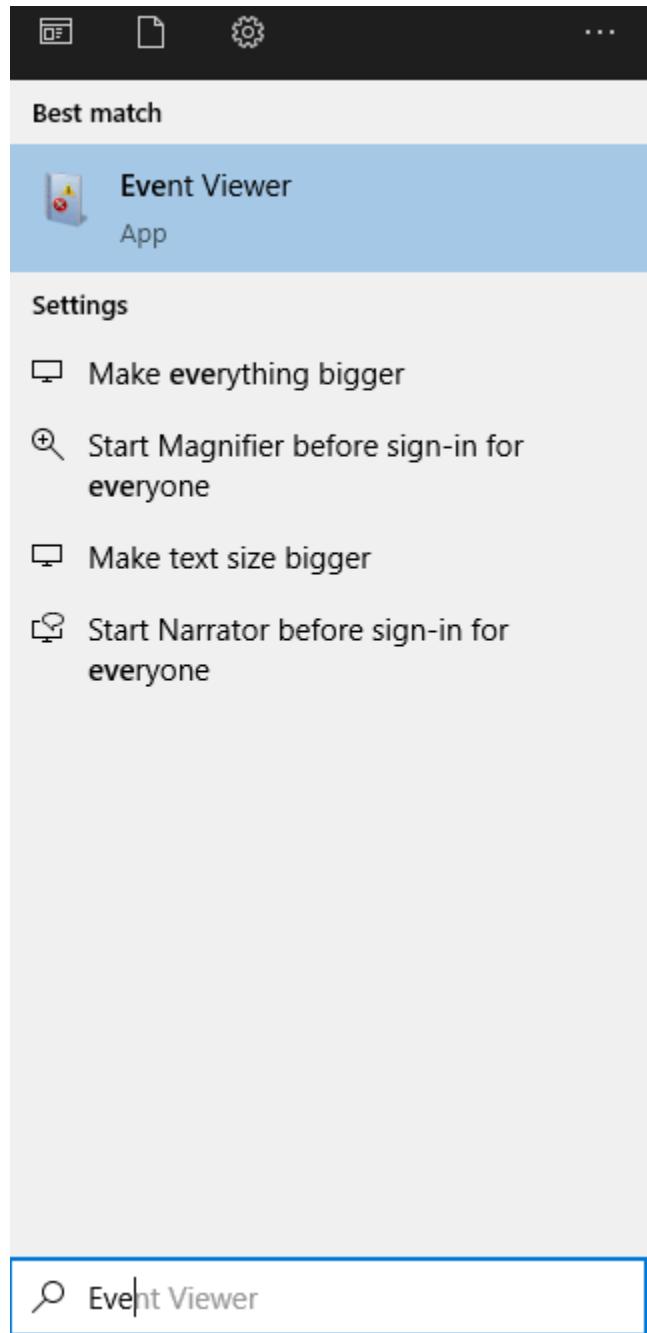
Cancel

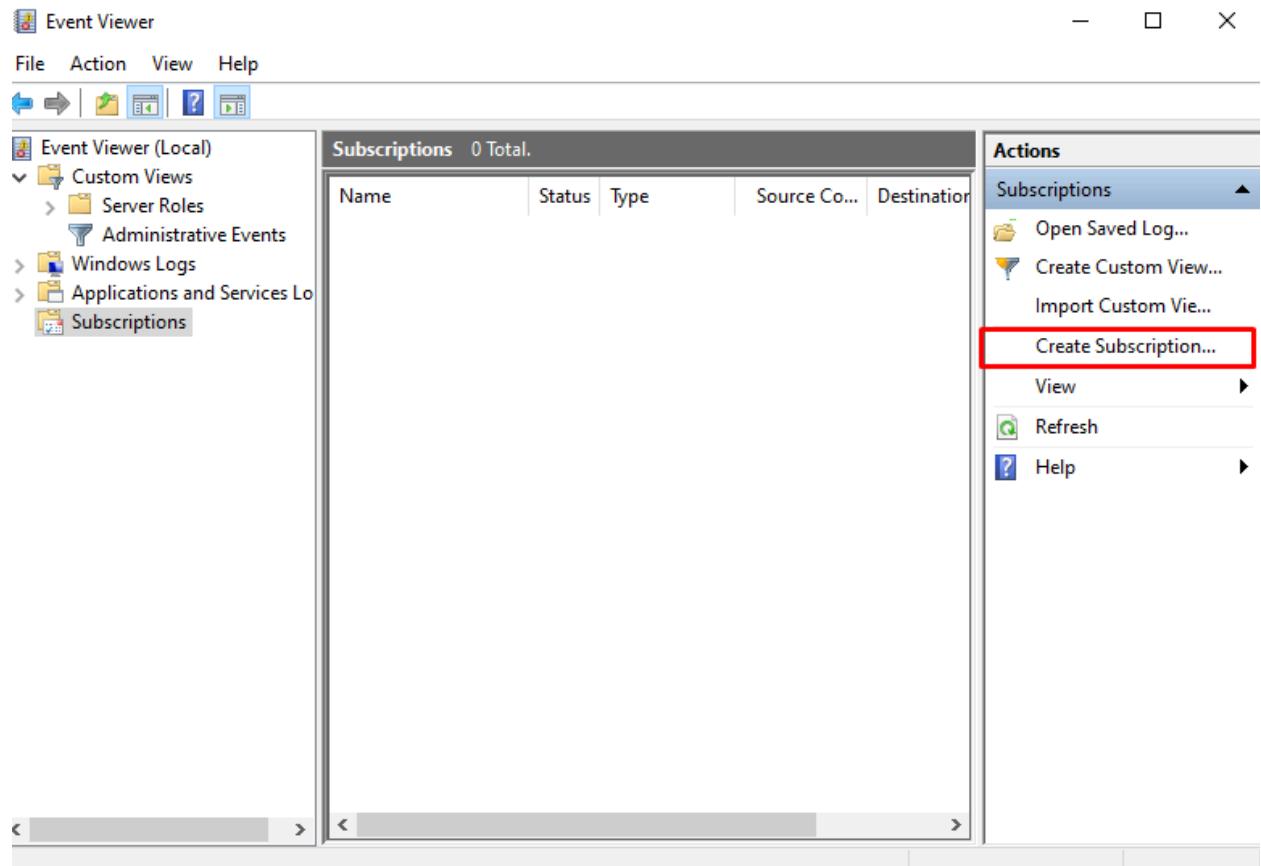
Backup successful scheduled and created to run every day.

## Next Step: Set Up Windows Event Forwarding (WEF)

```
C:\Users\Administrator>winrm quickconfig  
WinRM service is already running on this machine.  
WinRM is already set up for remote management on this computer.
```

```
C:\Users\Administrator>_
```





Subscription Properties - Security Logon Events X

Subscription name:

Description:

Destination log:

Subscription type and source computers

Collector initiated Select Computers...

This computer contacts the selected source computers and provides the subscription.

Source computer initiated Select Computer Groups...

Source computers in the selected groups must be configured through policy or local configuration to contact this computer and receive the subscription.

Events to collect: <filter not configured> Select Events...

User account (the selected account must have read access to the source logs):  
Machine Account

Change user account or configure advanced settings: Advanced...

OK Cancel

Computers

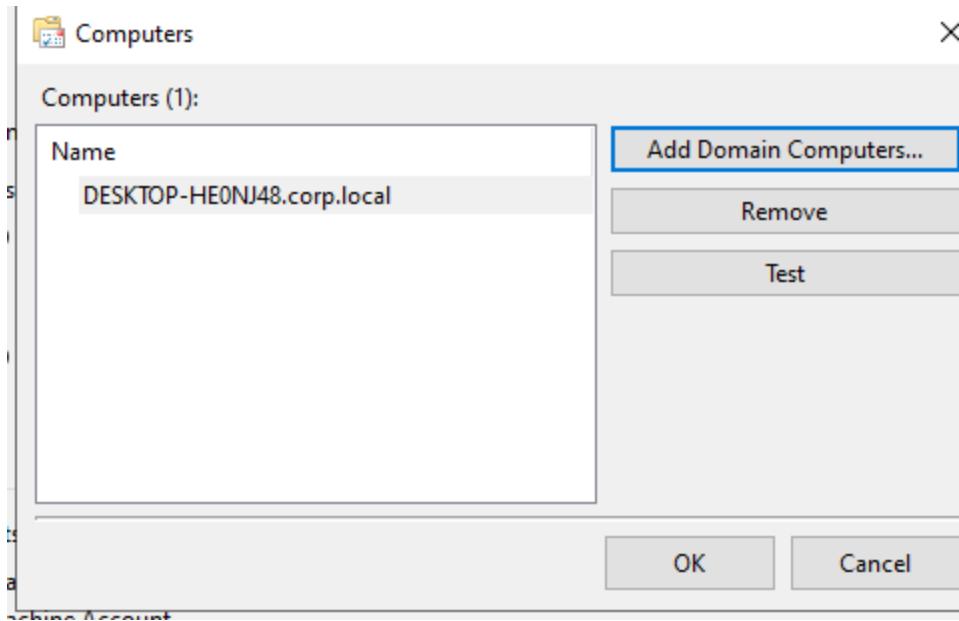
Select Computer X

Select this object type:  Object Types...

From this location:  Locations...

Enter the object name to select ([examples](#)):  Check Names

OK Cancel



```
Select C:\Windows\system32\cmd.exe
Microsoft Windows [Version 10.0.19045.2965]
(c) Microsoft Corporation. All rights reserved.

C:\Users\alice.hr>hostname
DESKTOP-HE0NJ48

C:\Users\alice.hr>
```

Subscription Properties - Security Logon Events X

Subscription name:

Description:

Destination log:

Subscription type and source computers

Collector initiated

This computer contacts the selected source computers and provides the subscription.

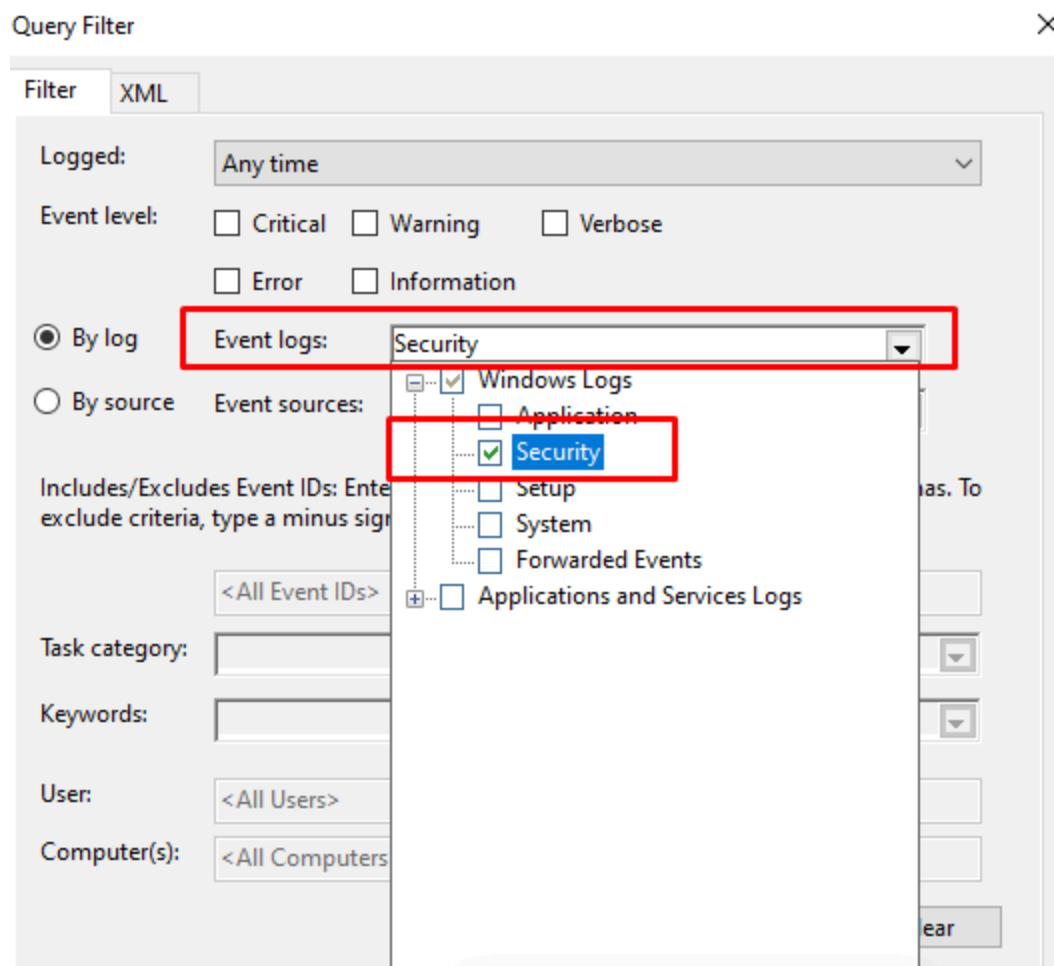
Source computer initiated

Source computers in the selected groups must be configured through policy or local configuration to contact this computer and receive the subscription.

Events to collect:

User account (the selected account must have read access to the source logs):  
Machine Account

Change user account or configure advanced settings:



Computer name WIN2022DC

Query Filter X

Filter XML

Logged: Any time

Event level:  Critical  Warning  Verbose  
 Error  Information

By log Event logs: Security

By source Event sources:

Includes/Excludes Event IDs: Enter ID numbers and/or ID ranges separated by commas. To exclude criteria, type a minus sign first. For example 1,3,5-99,-76

4624, 4625

Task category:

Keywords:

User: <All Users>

Computer(s): <All Computers>

## Subscription Properties - Security Logon Events

X

Subscription name: **Security Logon Events**

Description:

Destination log: **Forwarded Events**

### Subscription type and source computers

Collector initiated

**Select Computers...**

This computer contacts the selected source computers and provides the subscription.

Source computer initiated

**Select Computer Groups...**

Source computers in the selected groups must be configured through policy or local configuration to contact this computer and receive the subscription.

Events to collect: **Select Events...**

User account (the selected account must have read access to the source logs):

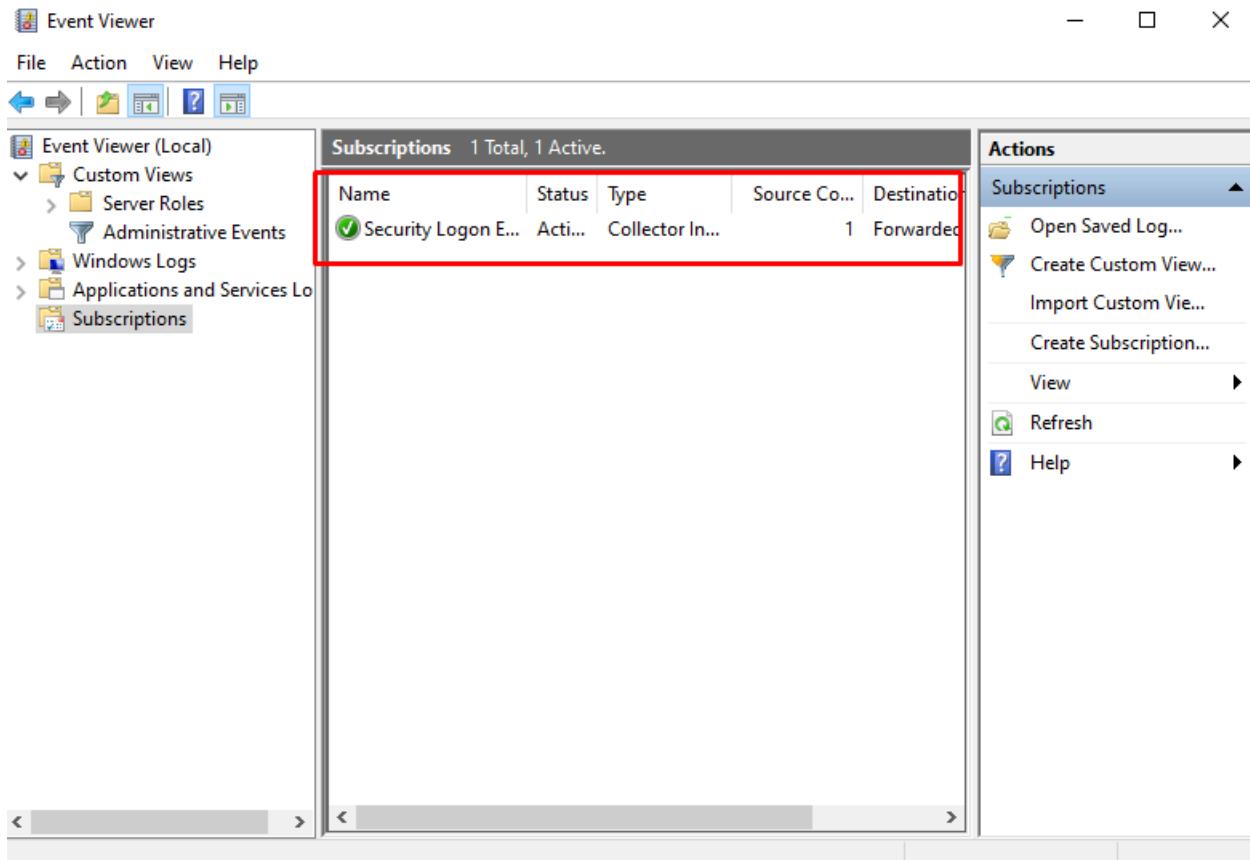
Machine Account

Change user account or configure advanced settings:

**Advanced...**

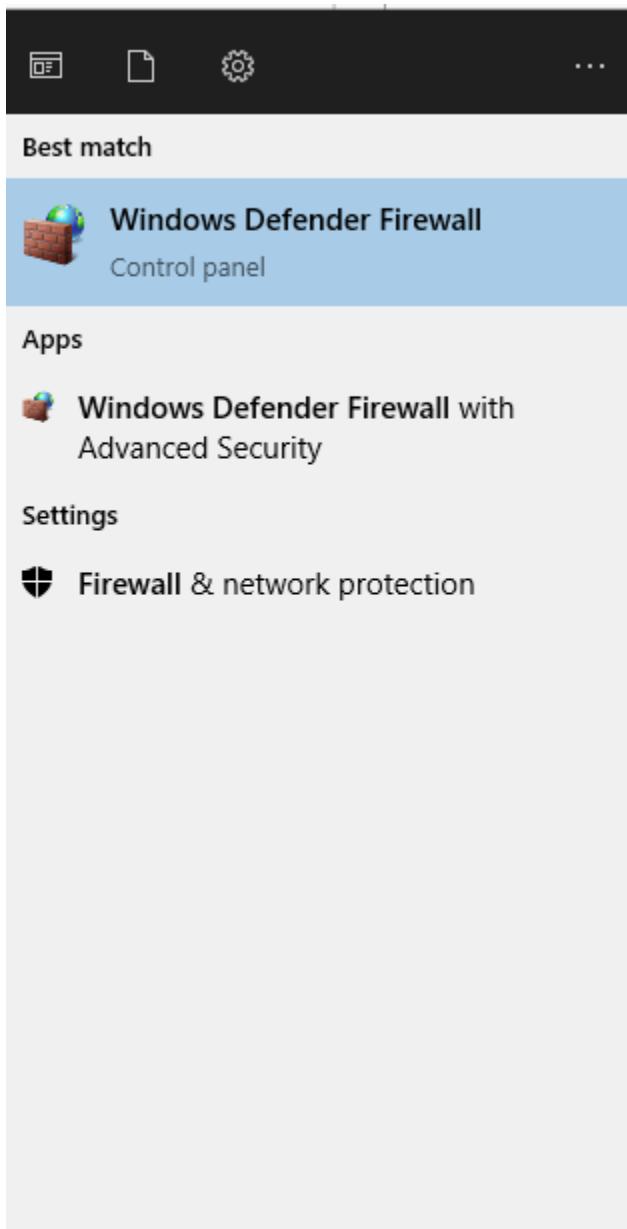
**OK**

**Cancel**



WEF Event Successfully Created

## Windows Server 2022: Create Firewall



Windows Defender Firewall with Advanced Security

File Action View Help

Windows Defender Firewall with Advanced Security on Local Computer

Actions

- Windows Defender Fire... ▾
- Import Policy...
- Export Policy...
- Restore Default Policy
- Diagnose / Repair
- View
- Refresh
- Properties
- Help

Windows Defender Firewall with Advanced Security provides network security for Windows computers.

Overview

**Domain Profile**

- Windows Defender Firewall is on.
- Inbound connections that do not match a rule are blocked.
- Outbound connections that do not match a rule are allowed.

**Private Profile is Active**

- Windows Defender Firewall is on.
- Inbound connections that do not match a rule are blocked.
- Outbound connections that do not match a rule are allowed.

**Public Profile**

- Windows Defender Firewall is on.
- Inbound connections that do not match a rule are blocked.
- Outbound connections that do not match a rule are allowed.

[Windows Defender Firewall Properties](#)

Getting Started

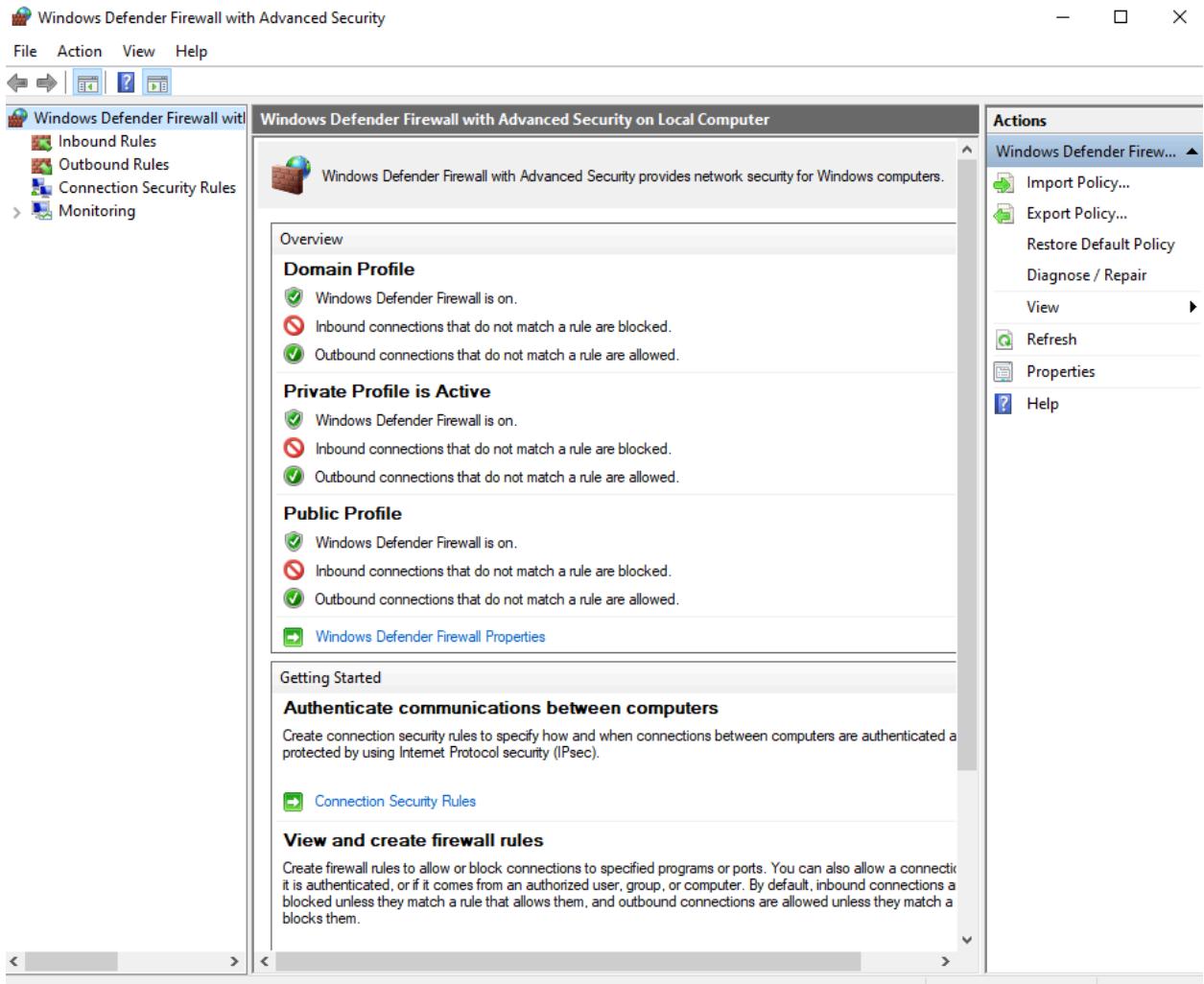
**Authenticate communications between computers**

Create connection security rules to specify how and when connections between computers are authenticated a protected by using Internet Protocol security (IPsec).

[Connection Security Rules](#)

**View and create firewall rules**

Create firewall rules to allow or block connections to specified programs or ports. You can also allow a connection if it is authenticated, or if it comes from an authorized user, group, or computer. By default, inbound connections are blocked unless they match a rule that allows them, and outbound connections are allowed unless they match a rule that blocks them.



Windows Defender Firewall with Advanced Security

File Action View Help

Inbound Rules

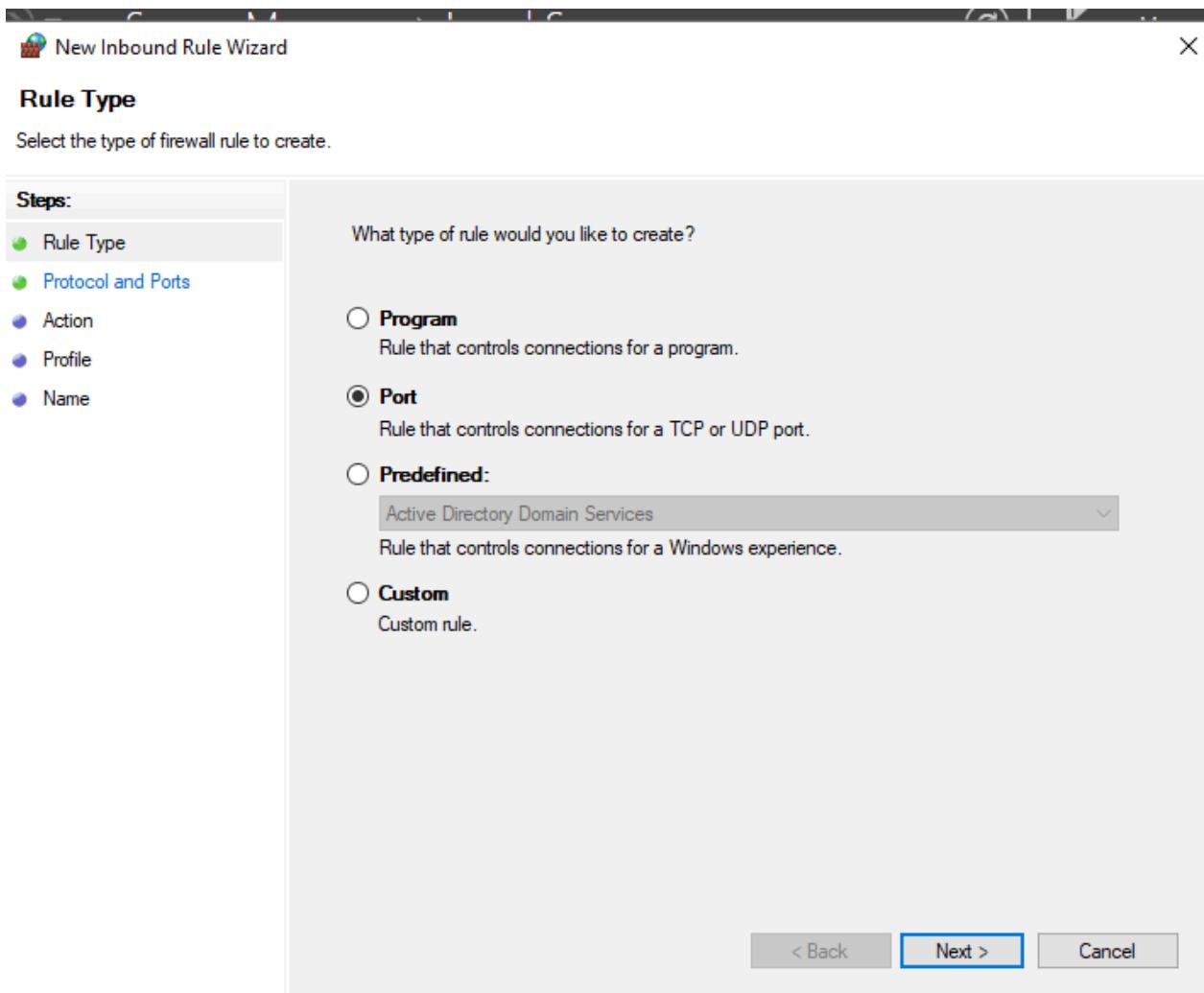
New Rule...

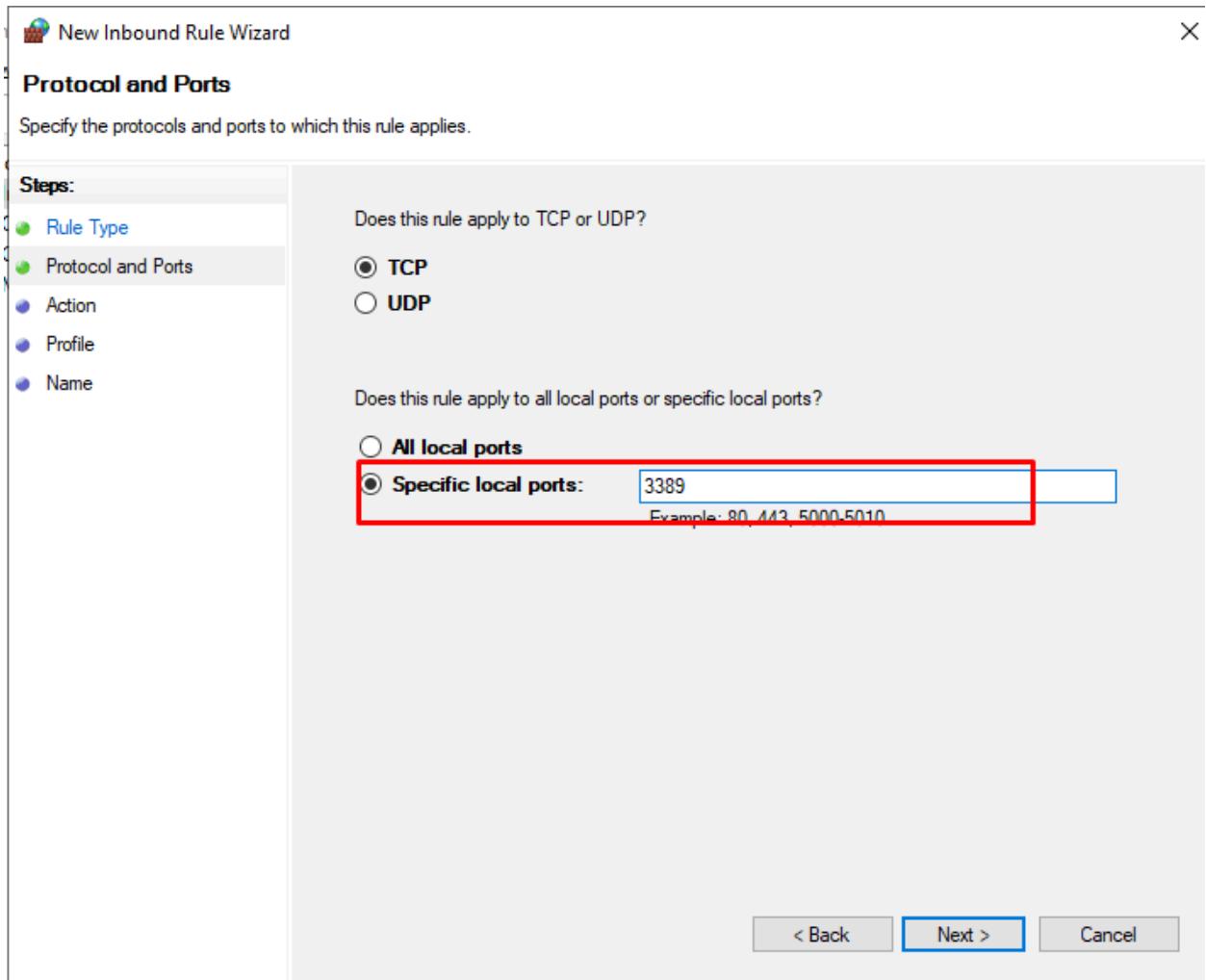
	Group	Profile	Enabled
Allow Domain Controller - Ec...	Active Directory Domain Ser...	All	Yes
Allow Domain Controller - Ec...	Active Directory Domain Ser...	All	Yes
Allow Domain Controller - LD...	Active Directory Domain Ser...	All	Yes
Allow Domain Controller - LD...	Active Directory Domain Ser...	All	Yes
Allow Domain Controller - SA...	Active Directory Domain Ser...	All	Yes
Allow Domain Controller - SA...	Active Directory Domain Ser...	All	Yes
Allow Domain Controller - Sec...	Active Directory Domain Ser...	All	Yes
Allow Domain Controller - Sec...	Active Directory Domain Ser...	All	Yes
Allow Active Directory Domain Controller - W3...	Active Directory Domain Ser...	All	Yes
Allow Active Directory Domain Controller (RPC)	Active Directory Domain Ser...	All	Yes
Allow Active Directory Domain Controller (RPC)	Active Directory Domain Ser...	All	Yes
Allow Active Directory Web Services (TCP-In)	Active Directory Web Services	All	Yes
Allow AllJoyn Router (TCP-In)	AllJoyn Router	Domain	Yes
Allow AllJoyn Router (UDP-In)	AllJoyn Router	Domain	Yes
Allow BranchCache Content Retrieval (HTTP-In)	BranchCache - Content Retr...	All	No
Allow BranchCache Hosted Cache Server (HTTP...	BranchCache - Hosted Cach...	All	No
Allow BranchCache Peer Discovery (WSD-In)	BranchCache - Peer Discove...	All	No
Allow Cast to Device functionality (qWave-TCP...	Cast to Device functionality	Private	Yes
Allow Cast to Device functionality (qWave-UDP...	Cast to Device functionality	Private	Yes
Allow Cast to Device SSDP Discovery (UDP-In)	Cast to Device functionality	Public	Yes
Allow Cast to Device streaming server (HTTP-St...	Cast to Device functionality	Domain	Yes
Allow Cast to Device streaming server (HTTP-St...	Cast to Device functionality	Private	Yes
Allow Cast to Device streaming server (HTTP-St...	Cast to Device functionality	Public	Yes
Allow Cast to Device streaming server (RTCP-Str...	Cast to Device functionality	Domain	Yes
Allow Cast to Device streaming server (RTCP-Str...	Cast to Device functionality	Private	Yes
Allow Cast to Device streaming server (RTCP-Str...	Cast to Device functionality	Public	Yes
Allow Cast to Device streaming server (RTSP-Str...	Cast to Device functionality	Domain	Yes
Allow Cast to Device streaming server (RTSP-Str...	Cast to Device functionality	Public	Yes
Allow Cast to Device streaming server (RTSP-Str...	Cast to Device functionality	Private	Yes
Allow Cast to Device UPnP Events (TCP-In)	Cast to Device functionality	Public	Yes

Actions

- New Rule...
- Filter by Profile
- Filter by State
- Filter by Group
- View
- Refresh
- Export List...
- Help

SERVICES





## New Inbound Rule Wizard

X

### Action

Specify the action to be taken when a connection matches the conditions specified in the rule.

#### Steps:

-  Rule Type
-  Protocol and Ports
-  Action
-  Profile
-  Name

What action should be taken when a connection matches the specified conditions?

**Allow the connection**

This includes connections that are protected with IPsec as well as those are not.

**Allow the connection if it is secure**

This includes only connections that have been authenticated by using IPsec. Connections will be secured using the settings in IPsec properties and rules in the Connection Security Rule node.

[Customize...](#)

**Block the connection**

< Back

Next >

Cancel

 New Inbound Rule Wizard

X

**Profile**

Specify the profiles for which this rule applies.

**Steps:**

- Rule Type
- Protocol and Ports
- Action
- Profile
- Name

When does this rule apply?

 **Domain**

Applies when a computer is connected to its corporate domain.

 **Private**

Applies when a computer is connected to a private network location, such as a home or work place.

 **Public**

Applies when a computer is connected to a public network location.

[< Back](#)[Next >](#)[Cancel](#)



## New Inbound Rule Wizard



### Name

Specify the name and description of this rule.

#### Steps:

- Rule Type
- Protocol and Ports
- Action
- Profile
- Name

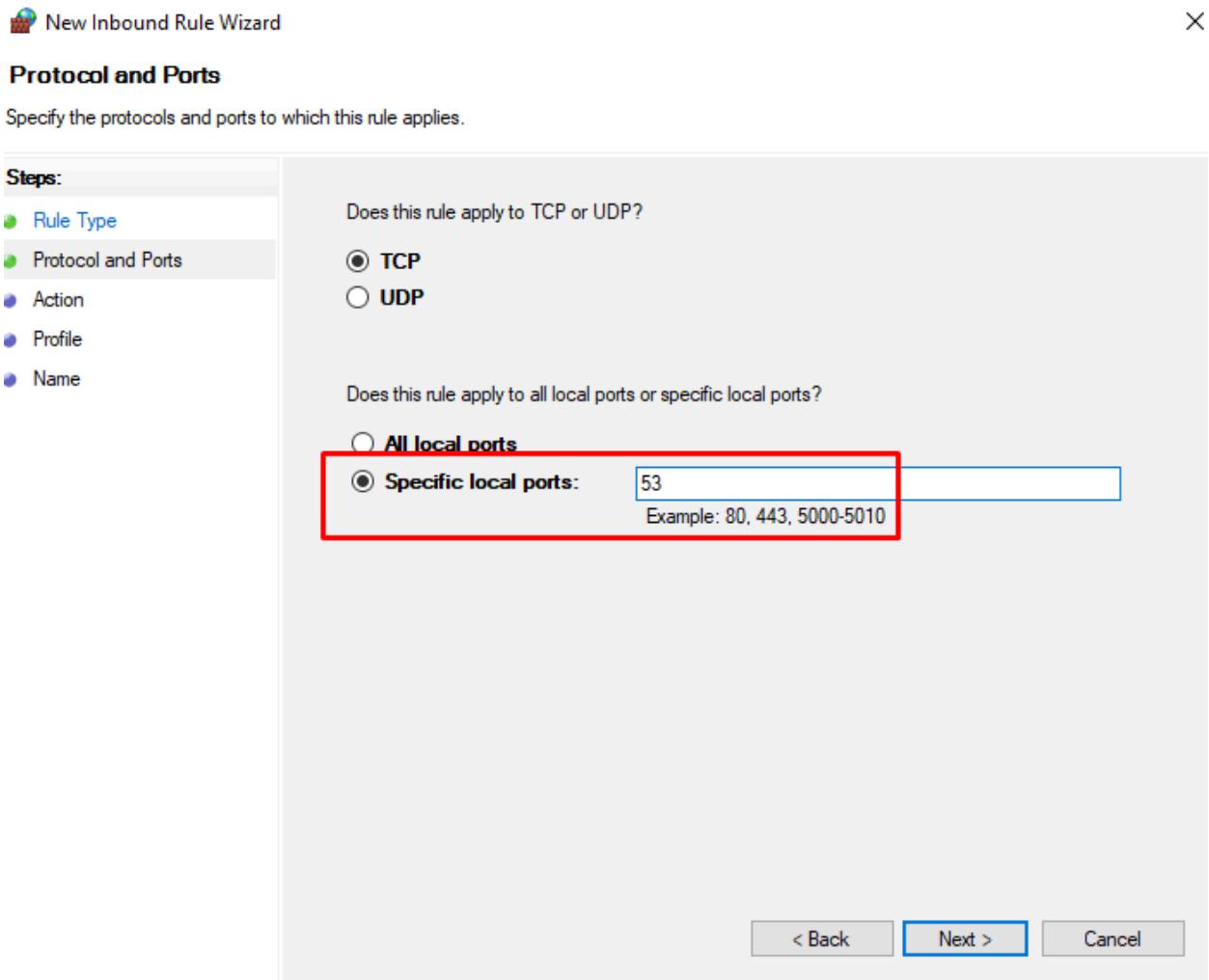
Name:

Description (optional):

The screenshot shows the Windows Defender Firewall with Advanced Security interface. The left navigation pane includes File, Action, View, Help, and icons for Back, Forward, Refresh, Stop, Help, and Exit. The main pane displays the 'Inbound Rules' list. A red box highlights the first rule, 'Allow RDP 3389'. The table has columns for Name, Group, Profile, and Enabled.

Name	Group	Profile	Enabled
Allow RDP 3389		Domain	Yes
Active Directory Domain Controller - Ec...	Active Directory Domain Ser...	All	Yes
Active Directory Domain Controller - Ec...	Active Directory Domain Ser...	All	Yes
Active Directory Domain Controller - LD...	Active Directory Domain Ser...	All	Yes
Active Directory Domain Controller - LD...	Active Directory Domain Ser...	All	Yes
Active Directory Domain Controller - LD...	Active Directory Domain Ser...	All	Yes
Active Directory Domain Controller - Net...	Active Directory Domain Ser...	All	Yes
Active Directory Domain Controller - SA...	Active Directory Domain Ser...	All	Yes
Active Directory Domain Controller - SA...	Active Directory Domain Ser...	All	Yes
Active Directory Domain Controller - Sec...	Active Directory Domain Ser...	All	Yes
Active Directory Domain Controller - Sec...	Active Directory Domain Ser...	All	Yes
Active Directory Domain Controller - W3...	Active Directory Domain Ser...	All	Yes
Active Directory Domain Controller (RPC)	Active Directory Domain Ser...	All	Yes
Active Directory Domain Controller (RPC...)	Active Directory Domain Ser...	All	Yes
Active Directory Web Services (TCP-In)	Active Directory Web Services	All	Yes
AllJoyn Router (TCP-In)	AllJoyn Router	Domai...	Yes
AllJoyn Router (UDP-In)	AllJoyn Router	Domai...	Yes
BranchCache Content Retrieval (HTTP-In)	BranchCache - Content Retr...	All	No
BranchCache Hosted Cache Server (HTTP...)	BranchCache - Hosted Cach...	All	No
BranchCache Peer Discovery (WSD-In)	BranchCache - Peer Discove...	All	No
Cast to Device functionality (qWave-TCP...)	Cast to Device functionality	Private...	Yes
Cast to Device functionality (qWave-UDP...)	Cast to Device functionality	Private...	Yes
Cast to Device SSDP Discovery (UDP-In)	Cast to Device functionality	Public	Yes
Cast to Device streaming server (HTTP-St...)	Cast to Device functionality	Domain	Yes
Cast to Device streaming server (HTTP-St...)	Cast to Device functionality	Private	Yes
Cast to Device streaming server (HTTP-St...)	Cast to Device functionality	Public	Yes
Cast to Device streaming server (RTCP-Str...)	Cast to Device functionality	Domain	Yes
Cast to Device streaming server (RTCP-Str...)	Cast to Device functionality	Private	Yes
Cast to Device streaming server (RTCP-Str...)	Cast to Device functionality	Public	Yes
Cast to Device streaming server (RTSP-Str...)	Cast to Device functionality	Domain	Yes
Cast to Device streaming server (RTSP-Str...)	Cast to Device functionality	Public	Yes
Cast to Device streaming server (RTSP-Str...)	Cast to Device functionality	Private	Yes

RDP 3389 successfully added to inbound rules



Repeat for other ports:

Rule	Port	Purpose
RDP	3389	Remote Desktop
DNS	53	DNS Queries
LDAP	389	Directory Access
SMB	445	File Sharing (GPOs and Sysvol use this)

Windows Defender Firewall with Advanced Security

File Action View Help

Inbound Rules

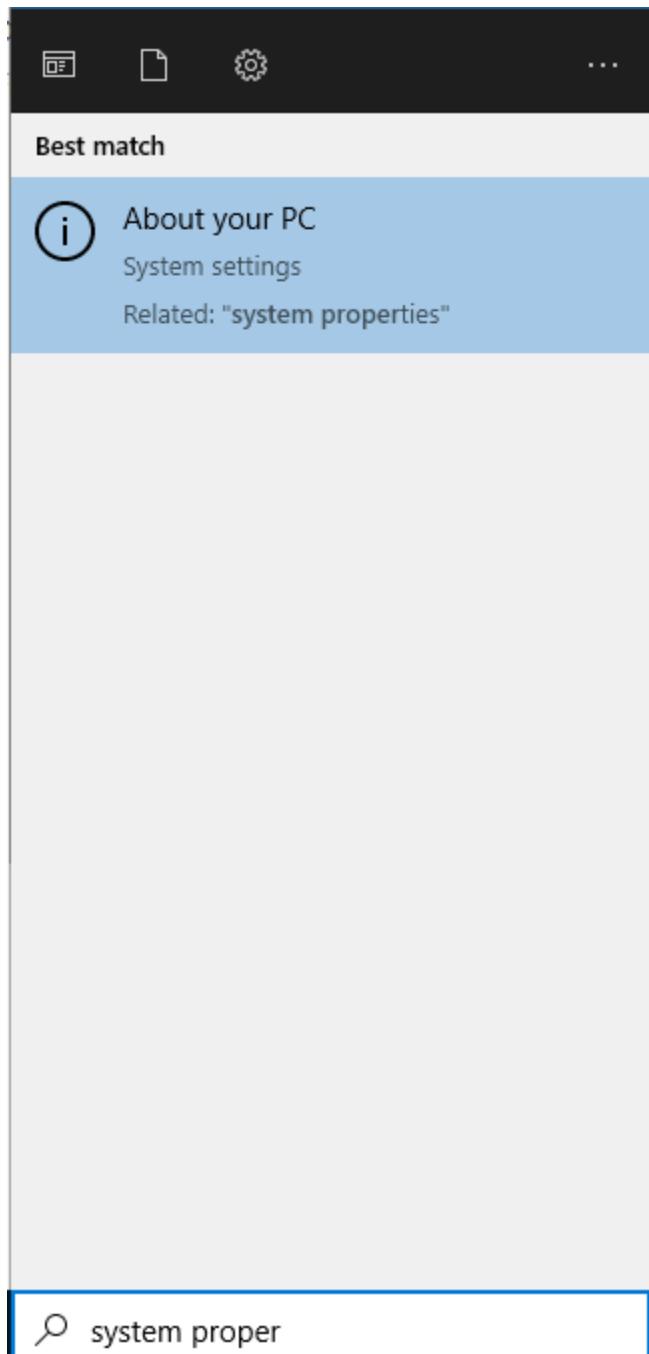
Outbound Rules

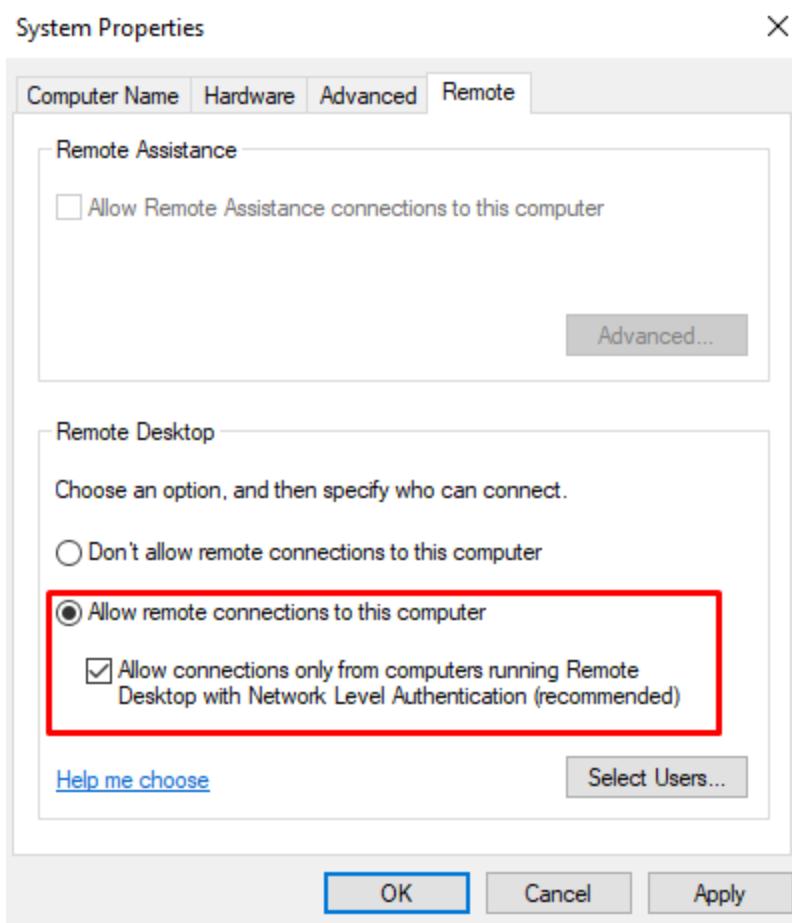
Connection Security Rules

Monitoring

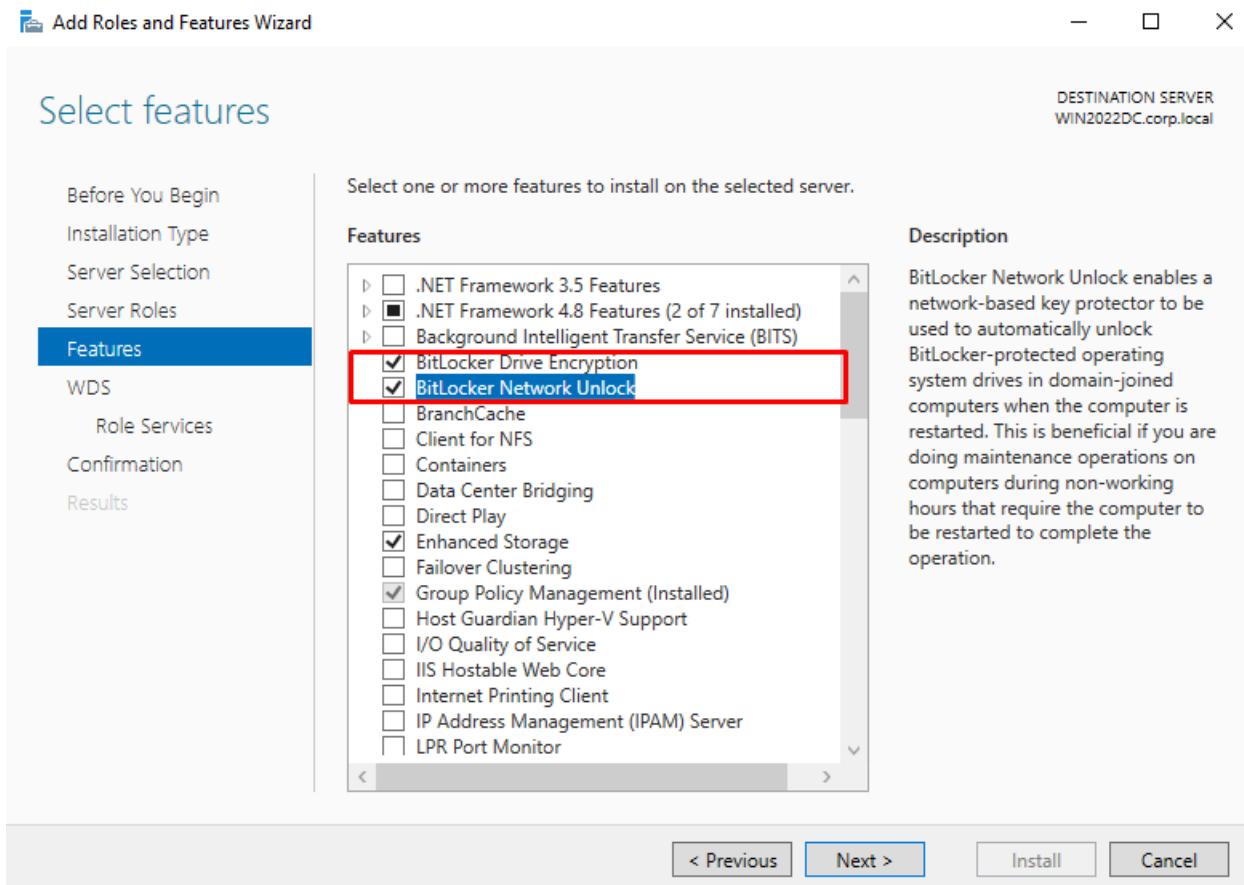
Name	Group	Profile	Enabled
Allow File Sharing (GPOs and Sysvol)		Domain	Yes
Allow Directory Access		Domain	Yes
Allow DNS Queries		Domain	Yes
Allow RDP 3389		Domain	Yes
Active Directory Domain Controller - Ec...	Active Directory Domain Ser...	All	Yes
Active Directory Domain Controller - Ec...	Active Directory Domain Ser...	All	Yes
Active Directory Domain Controller - LD...	Active Directory Domain Ser...	All	Yes
Active Directory Domain Controller - LD...	Active Directory Domain Ser...	All	Yes
Active Directory Domain Controller - LD...	Active Directory Domain Ser...	All	Yes
Active Directory Domain Controller - Net...	Active Directory Domain Ser...	All	Yes
Active Directory Domain Controller - SA...	Active Directory Domain Ser...	All	Yes
Active Directory Domain Controller - SA...	Active Directory Domain Ser...	All	Yes
Active Directory Domain Controller - Sec...	Active Directory Domain Ser...	All	Yes
Active Directory Domain Controller - Sec...	Active Directory Domain Ser...	All	Yes
Active Directory Domain Controller - W3...	Active Directory Domain Ser...	All	Yes
Active Directory Domain Controller (RPC)	Active Directory Domain Ser...	All	Yes
Active Directory Domain Controller (RPC...)	Active Directory Domain Ser...	All	Yes
Active Directory Web Services (TCP-In)	Active Directory Web Services	All	Yes
AllJoyn Router (TCP-In)	AllJoyn Router	Domai...	Yes
AllJoyn Router (UDP-In)	AllJoyn Router	Domai...	Yes
BranchCache Content Retrieval (HTTP-In)	BranchCache - Content Retr...	All	No
BranchCache Hosted Cache Server (HTTP...)	BranchCache - Hosted Cach...	All	No
BranchCache Peer Discovery (WSD-In)	BranchCache - Peer Discove...	All	No
Cast to Device functionality (qWave-TCP...)	Cast to Device functionality	Private...	Yes
Cast to Device functionality (qWave-UDP...)	Cast to Device functionality	Private...	Yes
Cast to Device SSDP Discovery (UDP-In)	Cast to Device functionality	Public	Yes
Cast to Device streaming server (HTTP-St...)	Cast to Device functionality	Domain	Yes
Cast to Device streaming server (HTTP-St...)	Cast to Device functionality	Private	Yes
Cast to Device streaming server (HTTP-St...)	Cast to Device functionality	Public	Yes
Cast to Device streaming server (RTCP-Str...	Cast to Device functionality	Domain	Yes
Cast to Device streaming server (RTCP-Str...	Cast to Device functionality	Private	Yes
Cast to Device streaming server (RTCP-Str...	Cast to Device functionality	Public	Yes

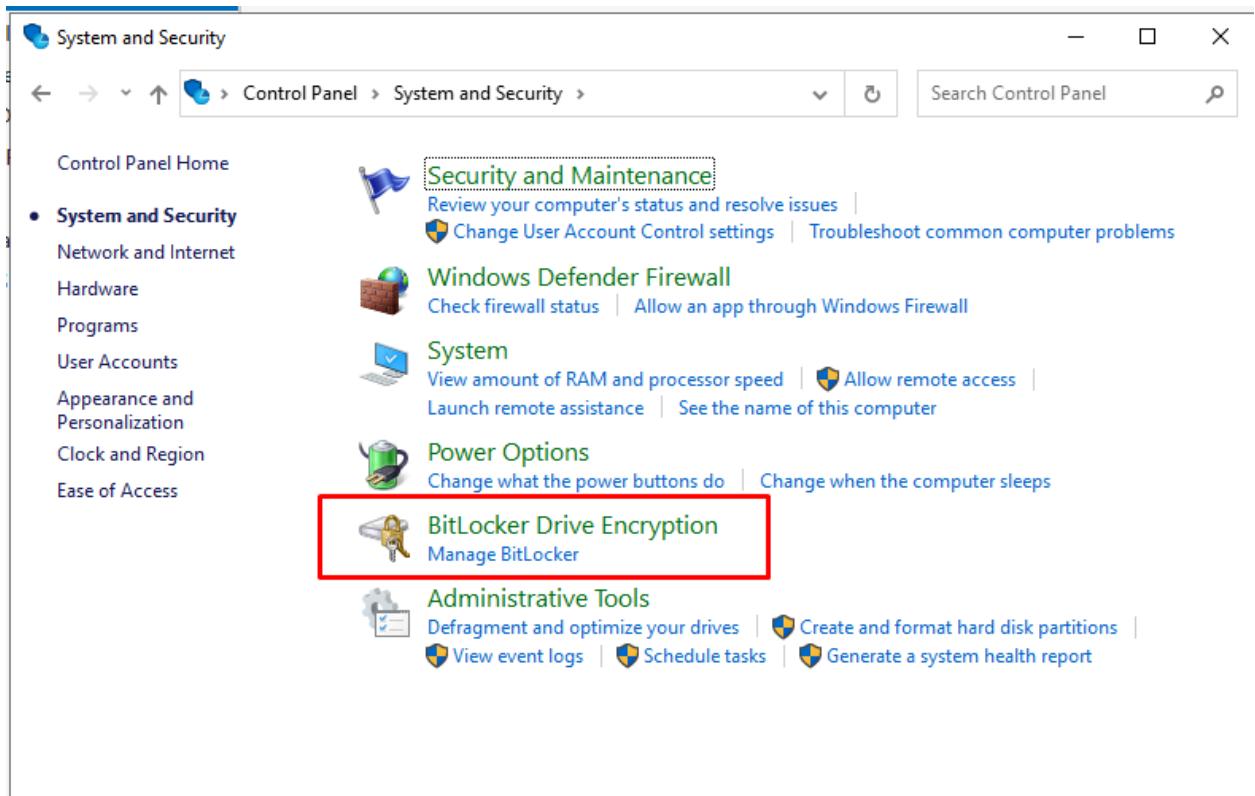
## Windows Server 2022: Enable NLA (Network Level Authentication) for RDP





## Windows Server 2022: Install and Enable BitLocker





BitLocker Drive Encryption

Control Panel Home BitLocker Drive Encryption

Help protect your files and folders from unauthorized access by protecting your drives with BitLocker.

Operating system drive

C: BitLocker off

Turn on BitLocker

Fixed data drives

Removable data drives - BitLocker To Go

Insert a removable USB flash drive to use BitLocker To Go.

See also

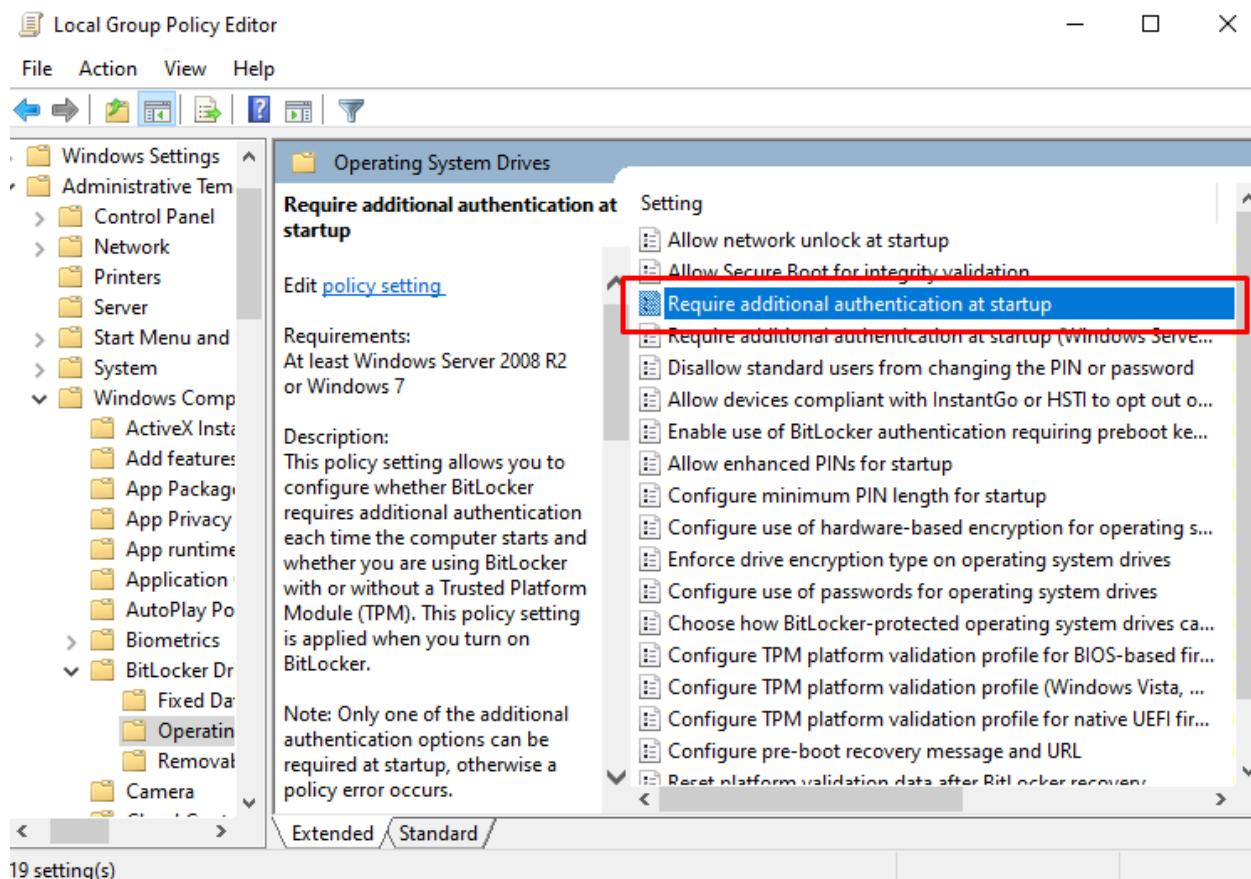
- TPM Administration
- Disk Management
- Privacy statement

Control Panel BitLocker Drive Encryption (C:)

Starting BitLocker

This device can't use a Trusted Platform Module. Your administrator must set the "Allow BitLocker without a compatible TPM" option in the "Require additional authentication at startup" policy for OS volumes.

TO fix:



 **Require additional authentication at startup**

 **Require additional authentication at startup**

Previous Setting Next Setting

Not Configured      Comment:

Enabled

Disabled

Supported on: At least Windows Server 2008 R2 or Windows 7

Options:

Allow BitLocker without a compatible TPM  
 (requires a password or a startup key on a USB flash drive)

Settings for computers with a TPM:

Configure TPM startup:  
Allow TPM

Configure TPM startup PIN:  
Allow startup PIN with TPM

Configure TPM startup key:  
Allow startup key with TPM

Configure TPM startup key and PIN:  
Allow startup key and PIN with TPM

Help:

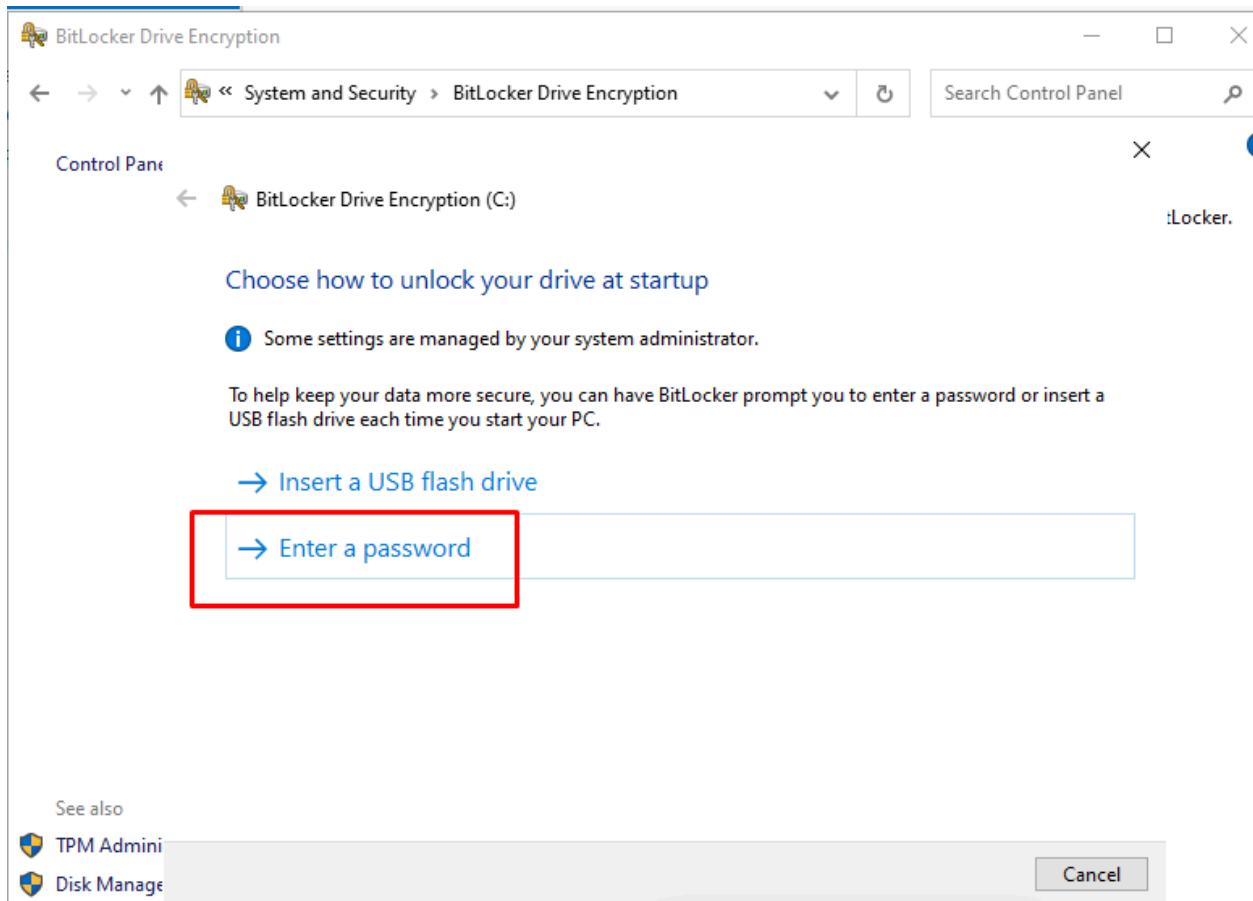
This policy setting allows you to configure whether BitLocker requires additional authentication each time the computer starts and whether you are using BitLocker with or without a Trusted Platform Module (TPM). This policy setting is applied when you turn on BitLocker.

Note: Only one of the additional authentication options can be required at startup, otherwise a policy error occurs.

If you want to use BitLocker on a computer without a TPM, select the "Allow BitLocker without a compatible TPM" check box. In this mode either a password or a USB drive is required for start-up. When using a startup key, the key information used to encrypt the drive is stored on the USB drive, creating a USB key. When the USB key is inserted the access to the drive is authenticated and the drive is accessible. If the USB key is lost or unavailable or if you have forgotten the password then you will need to use one of the BitLocker recovery options to access the drive.

On a computer with a compatible TPM, four types of

OK Cancel Apply



X

← BitLocker Drive Encryption (C:)

## How do you want to back up your recovery key?

- Your recovery key was printed.

A recovery key can be used to access your files and folders if you're having problems unlocking your PC. It's a good idea to have more than one and keep each in a safe place other than your PC.

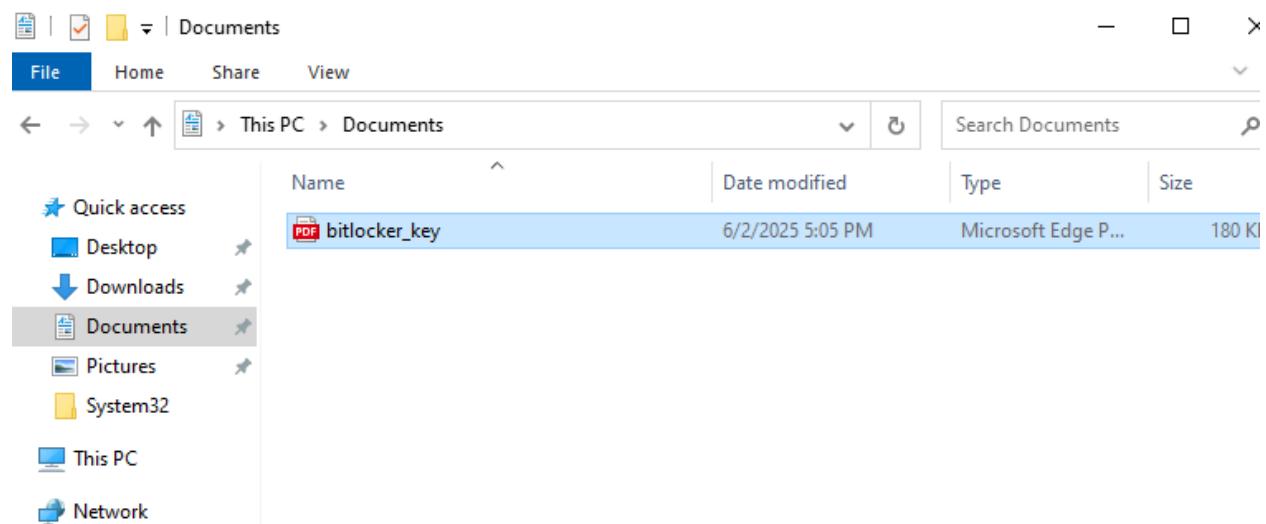
→ Save to a USB flash drive

→ Save to a file

→ Print the recovery key

How can I find my recovery key later?

**Next** **Cancel**





BitLocker Drive Encryption

Control Panel Home BitLocker Drive Encryption

Help protect your files and folders from unauthorized access by protecting your drives with BitLocker.

Operating system drive

C: BitLocker Encrypting

Back up your recovery key  
Change password  
Remove password  
Turn off BitLocker

Fixed data drives

Removable data drives - BitLocker To Go

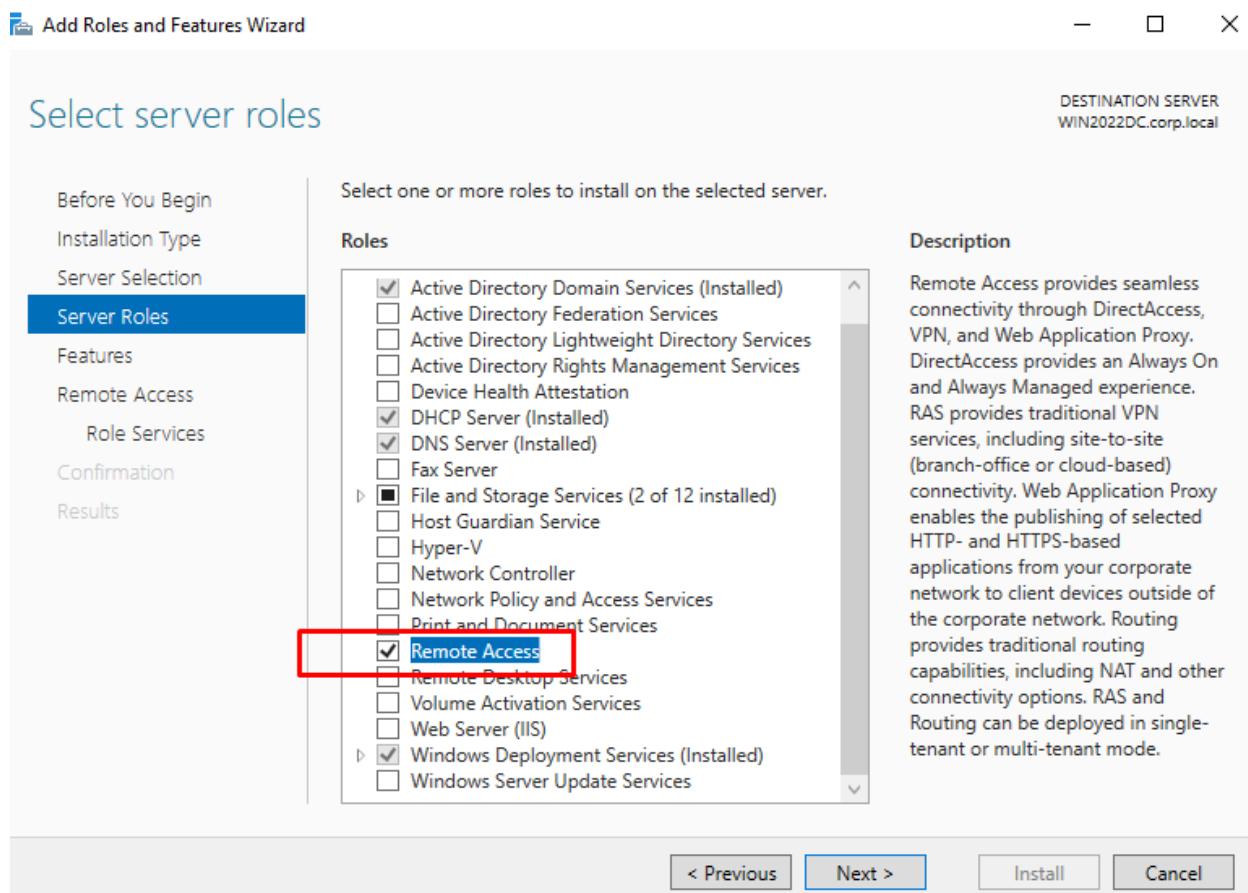
Insert a removable USB flash drive to use BitLocker To Go.

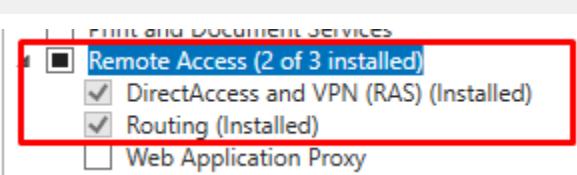
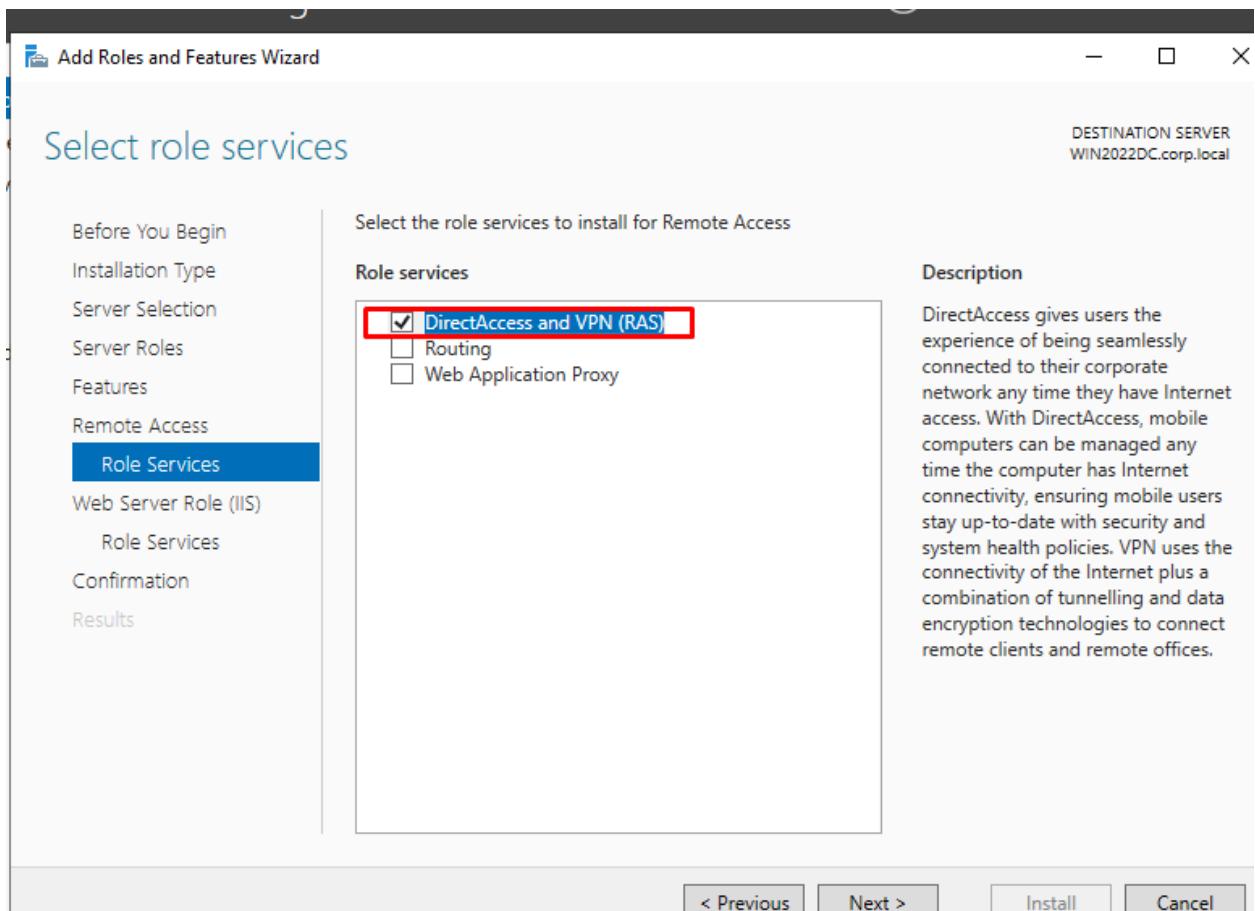
See also

- TPM Administration
- Disk Management
- Privacy statement

Bitlocker successfully enabled

## Windows Server 2022: Install and use Remote Access





## Add Roles and Features Wizard

— □ ×

### Installation progress

DESTINATION SERVER  
WIN2022DC.corp.local

Before You Begin  
Installation Type  
Server Selection  
Server Roles  
Features  
Remote Access  
Role Services  
Web Server Role (IIS)  
Role Services  
Confirmation  
**Results**

View installation progress

#### Feature installation

Configuration required. Installation succeeded on WIN2022DC.corp.local.

#### Remote Access

##### DirectAccess and VPN (RAS)

Configure the role

[Open the Getting Started Wizard](#)

##### RAS Connection Manager Administration Kit (CMAK)

##### Remote Server Administration Tools

###### Role Administration Tools

###### Remote Access Management Tools

Remote Access GUI and Command-Line Tools

Remote Access module for Windows PowerShell

#### Web Server (IIS)

 You can close this wizard without interrupting running tasks. View task progress or open this page again by clicking Notifications in the command bar, and then Task Details.

[Export configuration settings](#)

< Previous

Next >

**Close**

**Cancel**

Server Manager

Server Manager › Dashboard

Dashboard

- Local Server
- All Servers
- AD DS
- DHCP
- DNS
- File and Storage Services
- IIS
- Remote Access
- WDS

WELCOME TO SERVER MANAGER

QUICK START

WHAT'S NEW

LEARN MORE

1 Configure this local server

2 Add roles and features

3 Add other servers

4 Create a server group

5 Connect this server to a domain

ROLES AND SERVER GROUPS

Roles: 7 | Server groups: 1 | Servers total: 1

Role	Count
AD DS	1
DNS	1
DHCP	1
File and Storage Services	1
IIS	1
Remote Access	1
WDS	1

AD DS

- Manageability
- Events
- Services
- Performance
- BPA results

DHCP

- Manageability
- Events
- Services
- Performance
- BPA results

DNS

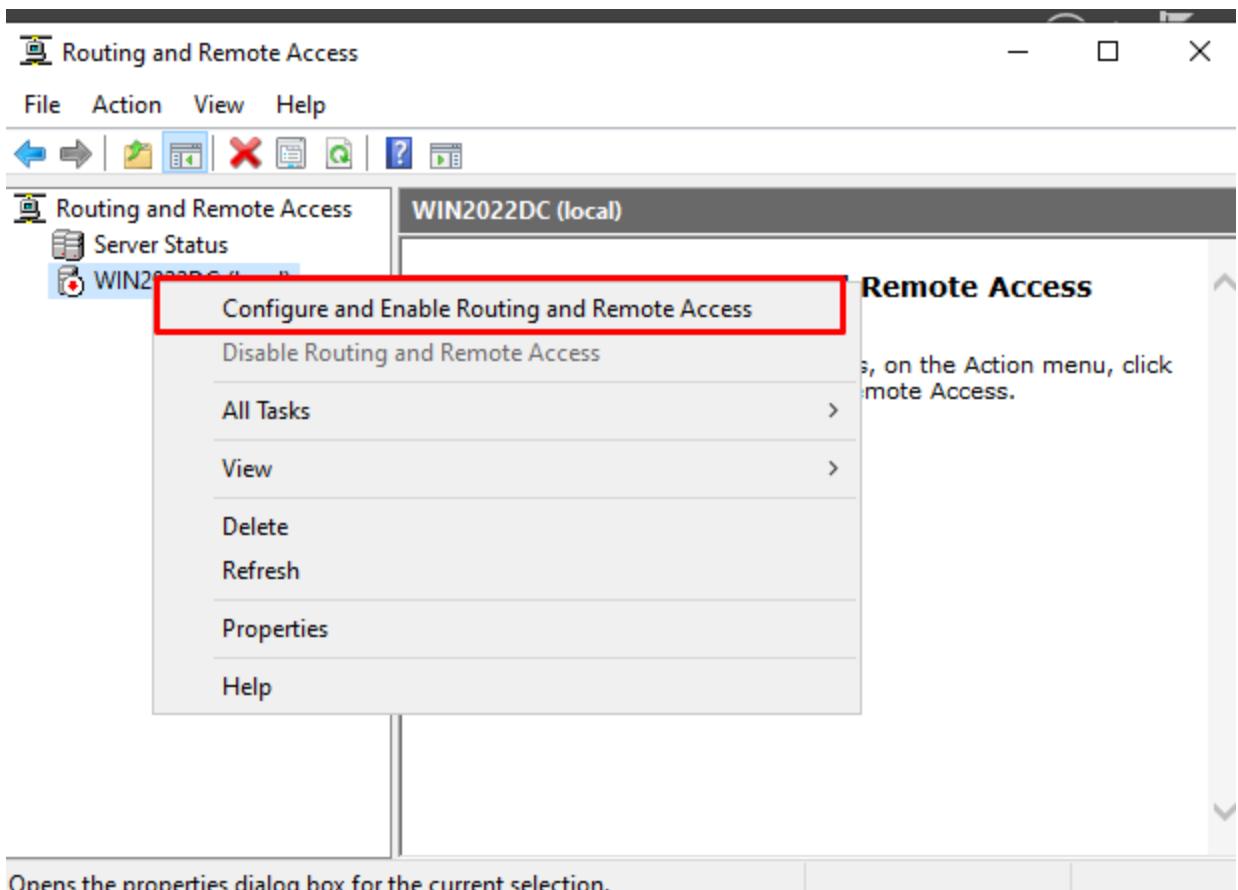
- Manageability
- Events

File and Storage Services

- Manageability
- Events

ACTIVE DIRECTORY DOMAINS AND TRUSTS

- Active Directory Module for Windows PowerShell
- Active Directory Sites and Services
- Active Directory Users and Computers
- ADSI Edit
- Component Services
- Computer Management
- Connection Manager Administration Kit
- Defragment and Optimize Drives
- DHCP
- Disk Cleanup
- DNS
- Event Viewer
- Group Policy Management
- Internet Information Services (IIS) Manager
- iSCSI Initiator
- Local Security Policy
- Microsoft Azure Services
- Network Policy Server
- ODBC Data Sources (32-bit)
- ODBC Data Sources (64-bit)
- Performance Monitor
- Recovery Drive
- Registry Editor
- Remote Access Management
- Resource Monitor
- Routing and Remote Access
- Services
- System Configuration
- System Information
- Task Scheduler
- Windows Defender Firewall with Advanced Security
- Windows Deployment Services
- Windows Memory Diagnostic
- Windows PowerShell
- Windows PowerShell (x86)



## Routing and Remote Access Server Setup Wizard

### Configuration

You can enable any of the following combinations of services, or you can customize this server.

- Remote access (dial-up or VPN)  
Allow remote clients to connect to this server through either a dial-up connection or a secure virtual private network (VPN) Internet connection.
- Network address translation (NAT)  
Allow internal clients to connect to the Internet using one public IP address.
- Virtual private network (VPN) access and NAT  
Allow remote clients to connect to this server through the Internet and local clients to connect to the Internet using a single public IP address.
- Secure connection between two private networks  
Connect this network to a remote network, such as a branch office.
- Custom configuration  
Select any combination of the features available in Routing and Remote Access.

< Back

Next >

Cancel

## Routing and Remote Access Server Setup Wizard

### Custom Configuration

When this wizard closes, you can configure the selected services in the Routing and Remote Access console.

Select the services that you want to enable on this server.

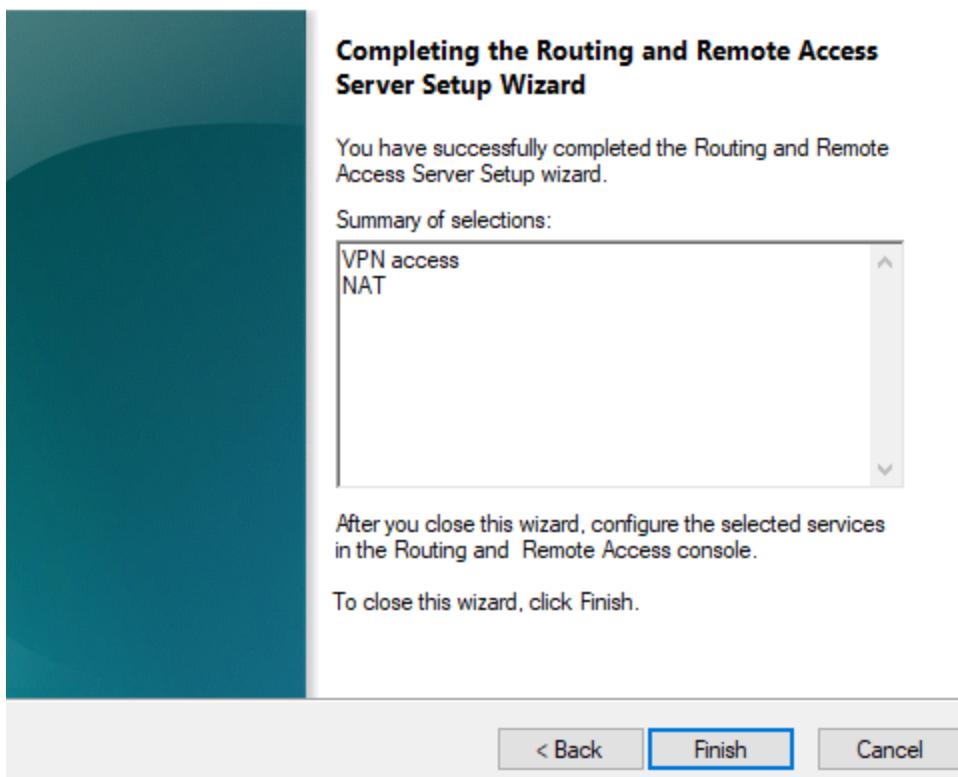
- VPN access
- Dial-up access
- Demand-dial connections ( used for branch office routing )
- NAT
- LAN routing

< Back

Next >

Cancel

Routing and Remote Access Server Setup Wizard

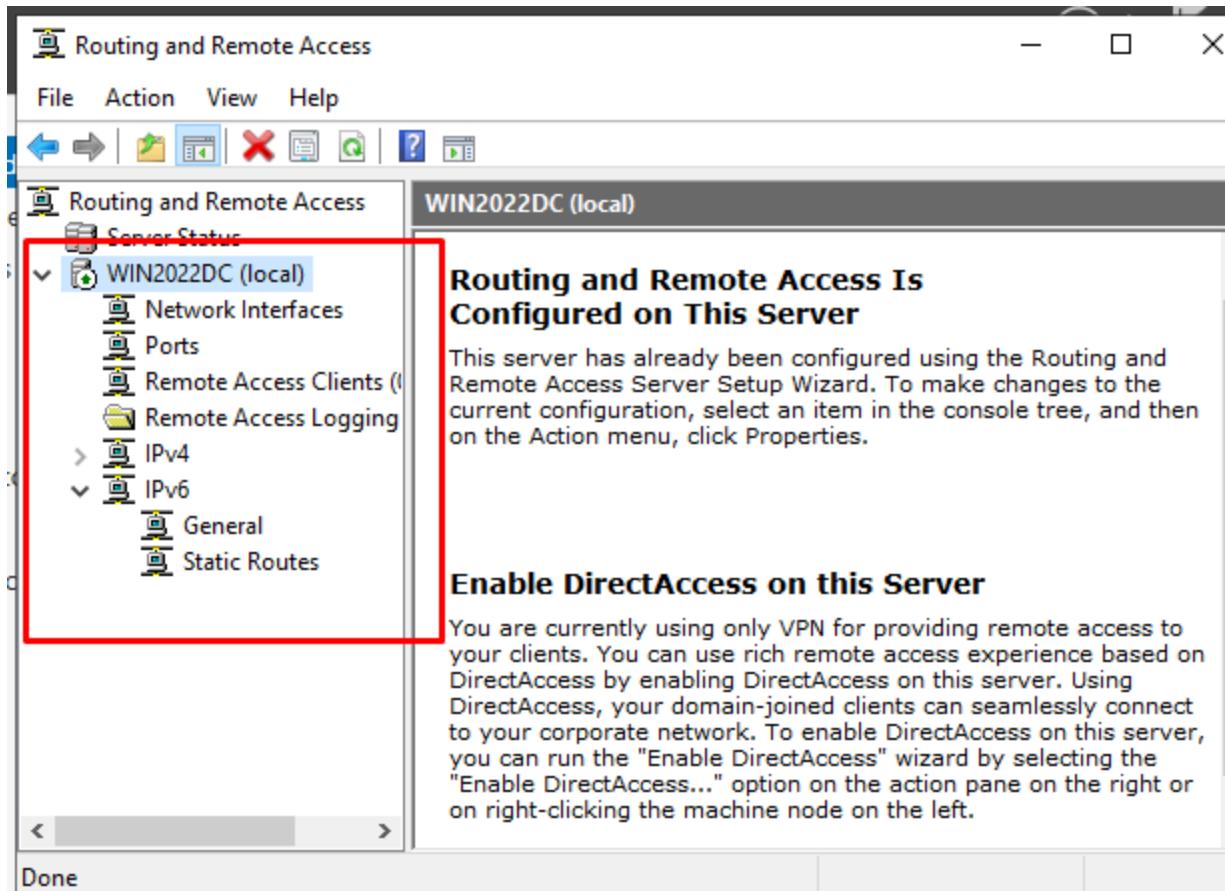


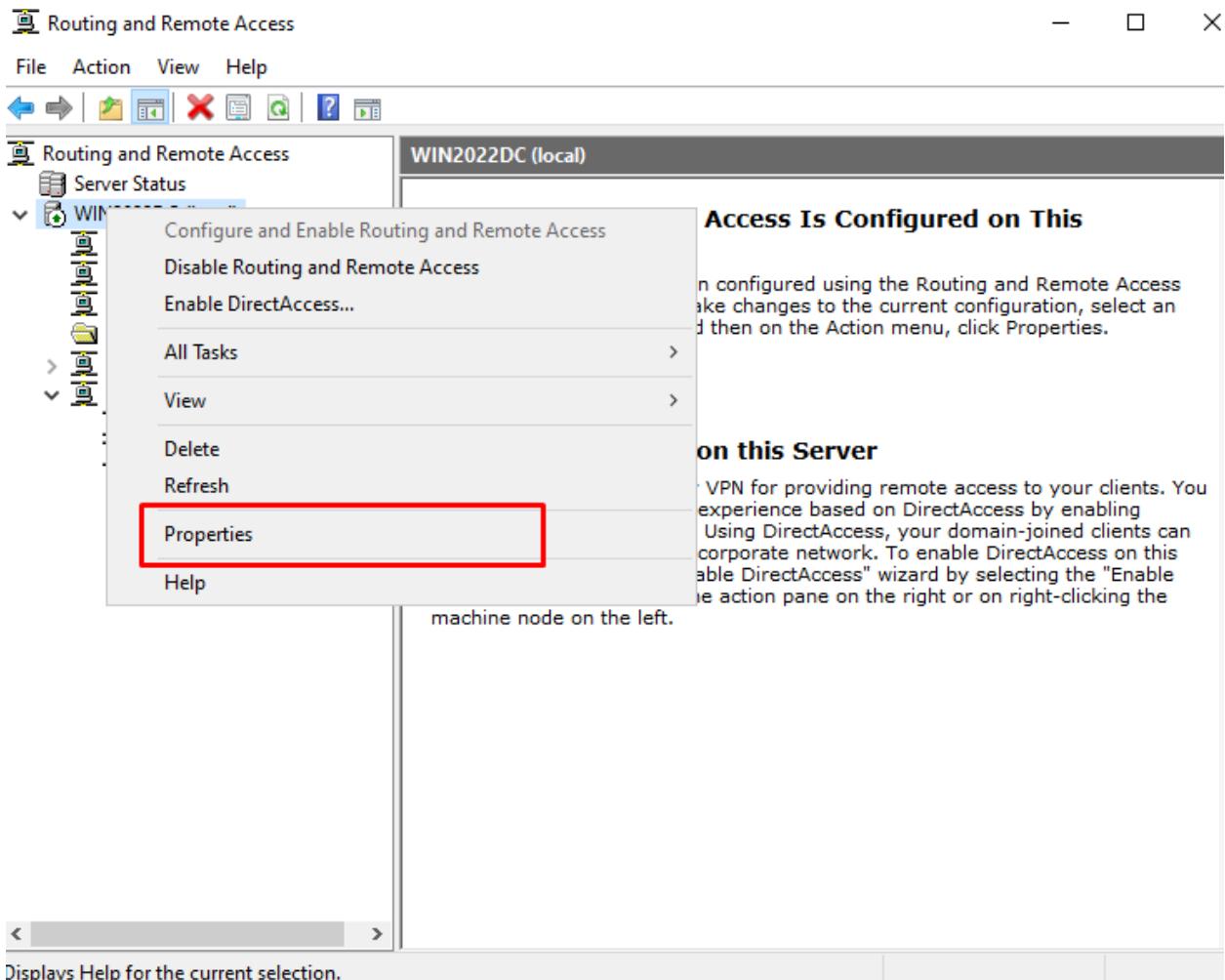
---

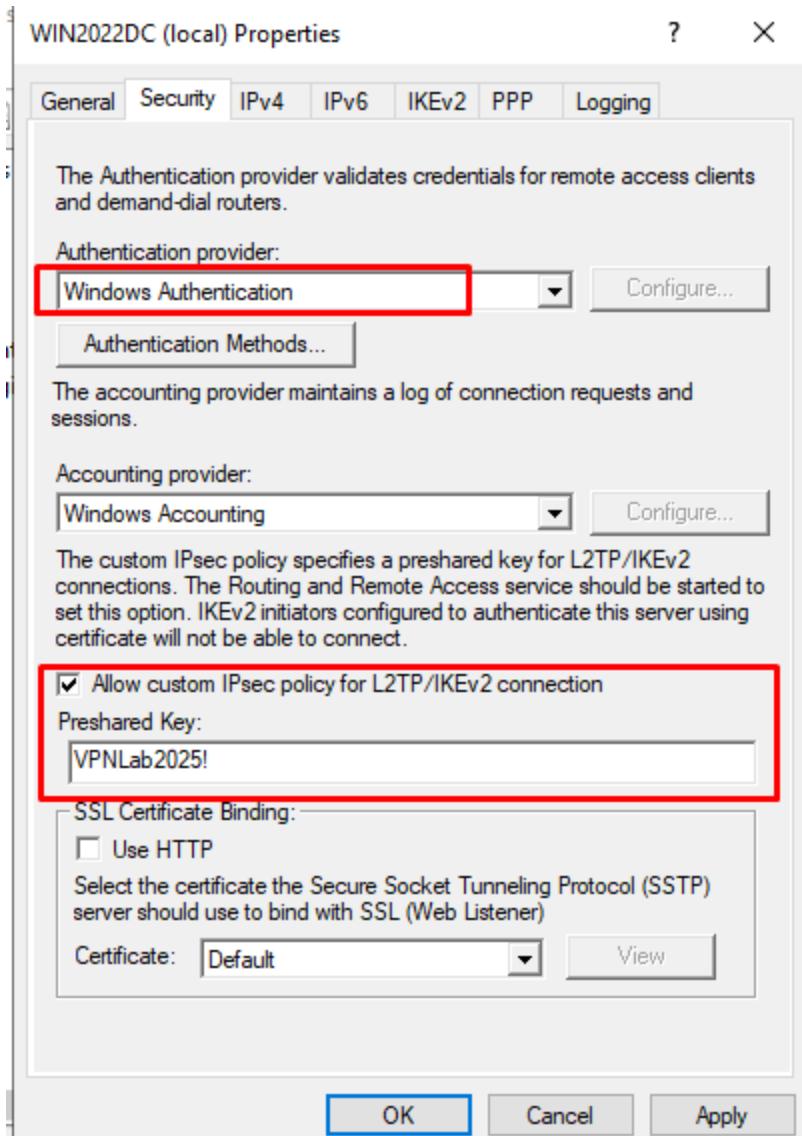
Routing and Remote Access

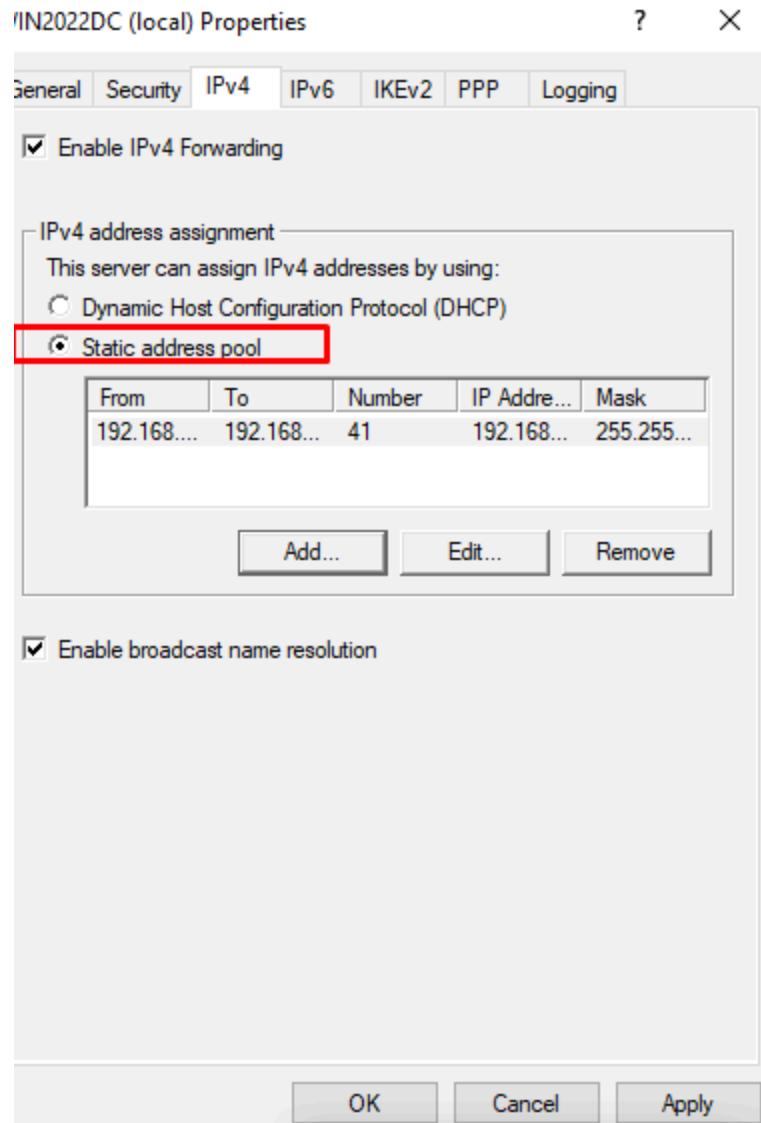
**Start the service**

The Routing and Remote Access service is ready to use.









Administrator: Windows PowerShell

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

Install the latest PowerShell for new features and improvements! <https://aka.ms/PSWindows>

```
PS C:\Users\Administrator> # UDP Ports for VPN
>> New-NetFirewallRule -DisplayName "VPN UDP 500" -Direction Inbound -Protocol UDP -LocalPort 500 -Action Allow
>> New-NetFirewallRule -DisplayName "VPN UDP 4500" -Direction Inbound -Protocol UDP -LocalPort 4500 -Action Allow
>>
>> # TCP 1723 for PPTP fallback (Optional)
>> New-NetFirewallRule -DisplayName "VPN TCP 1723" -Direction Inbound -Protocol TCP -LocalPort 1723 -Action Allow
>>
>> # Allow Protocol 50 (ESP for IPsec)
>> New-NetFirewallRule -DisplayName "VPN ESP Protocol 50" -Direction Inbound -Protocol 50 -Action Allow
>>
```

Detailed description: This screenshot shows a Windows PowerShell window running as Administrator. The title bar says 'Administrator: Windows PowerShell'. The console displays PowerShell commands to create firewall rules for VPN traffic. The commands include 'New-NetFirewallRule' for UDP ports 500 and 4500, a comment block for TCP port 1723, and a comment block for Protocol 50 (ESP). The PowerShell window has a dark theme.

```
Name : {c5985086-e4d6-45e0-bd45-8d0a4d23f6d7}
DisplayName : VPN UDP 500
Description :
DisplayGroup :
Group :
Enabled : True
Profile : Any
Platform : {}
Direction : Inbound
Action : Allow
EdgeTraversalPolicy : Block
LooseSourceMapping : False
LocalOnlyMapping : False
Owner :
PrimaryStatus : OK
Status : The rule was parsed successfully from the store. (65536)
EnforcementStatus : NotApplicable
PolicyStoreSource : PersistentStore
PolicyStoreSourceType : Local
RemoteDynamicKeywordAddresses : {}

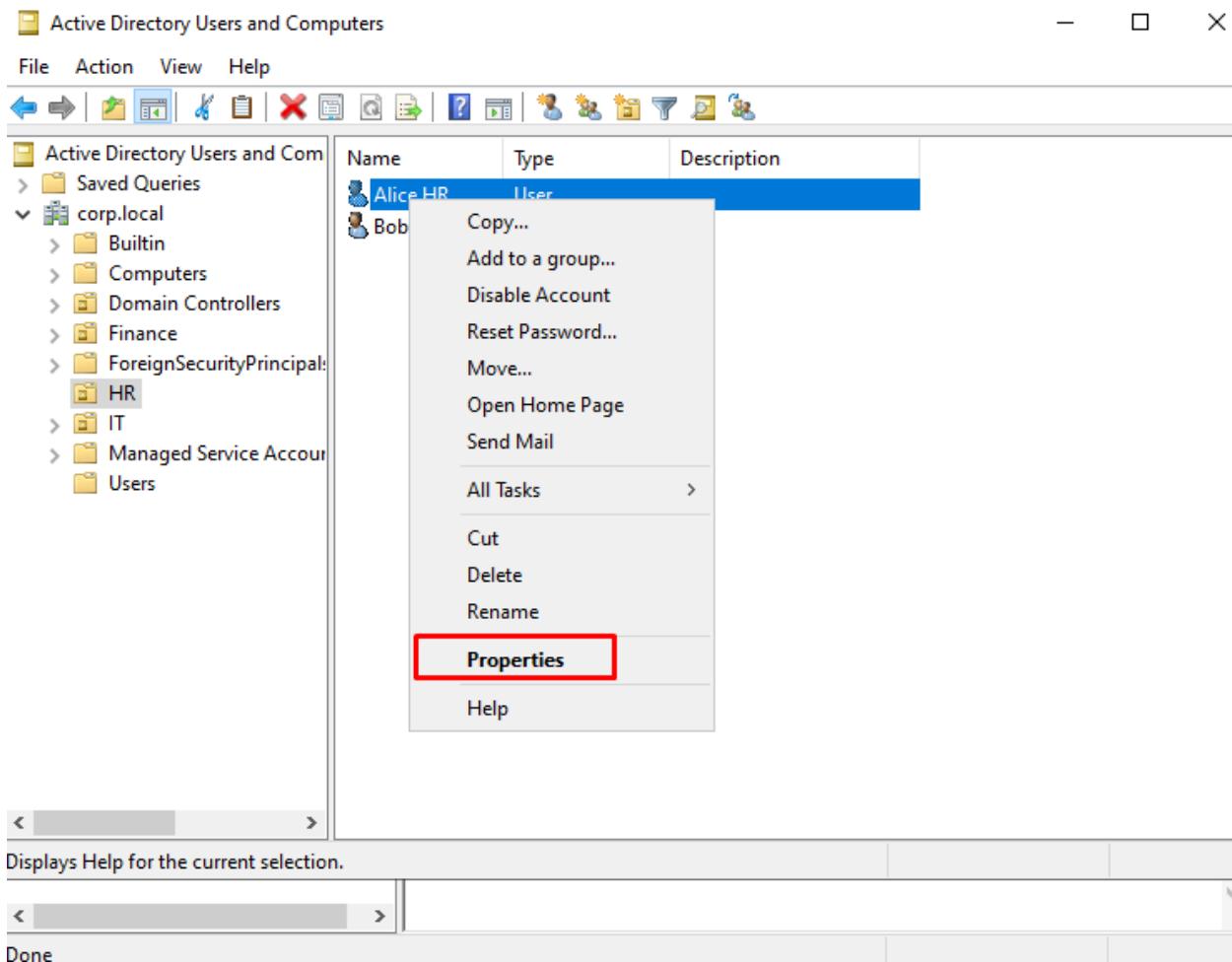
Name : {22651a48-7725-40bd-b5ef-f3f4051967ad}
```

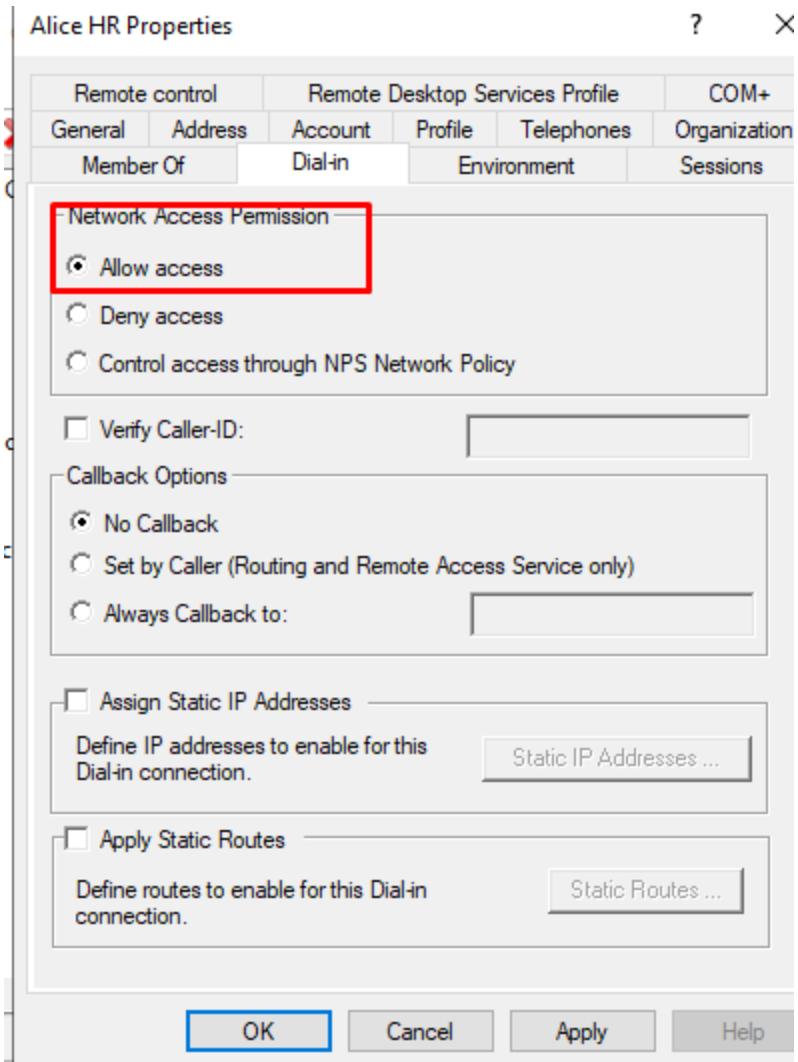
## Windows Defender Firewall with Advanced Security

File Action View Help

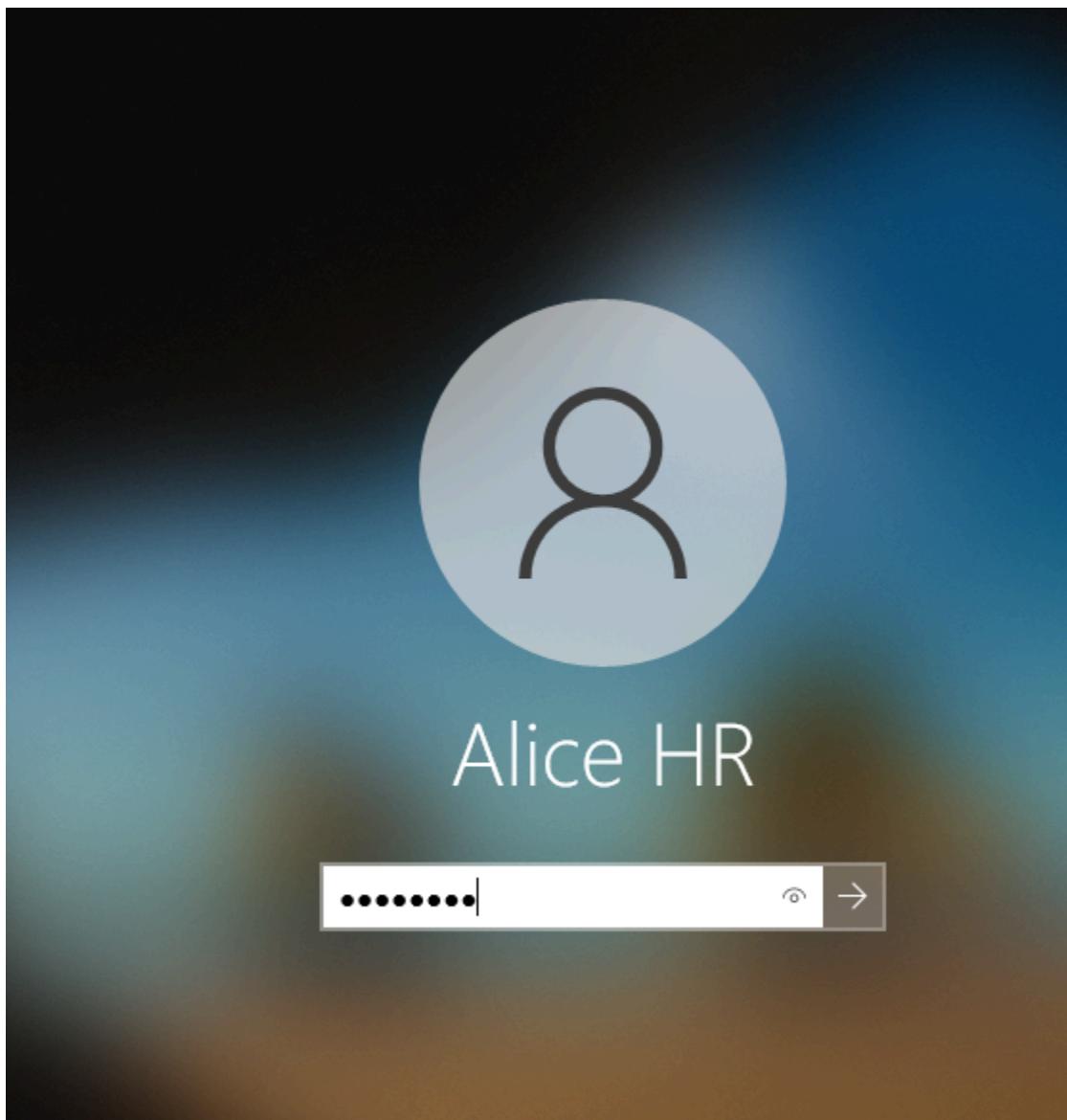
Name	Group	Profile	Enabled
Allow Directory Access		Domain	Yes
Allow DNS Queries		Domain	Yes
Allow File Sharing (GPOs and Sysvol)		Domain	Yes
Allow RDP 3389		Domain	Yes
VPN ESP Protocol 50		All	Yes
VPN TCP 1723		All	Yes
VPN UDP 4500		All	Yes
VPN UDP 500		All	Yes
Active Directory Domain Controller - Ec...	Active Directory Domain Ser...	All	Yes
Active Directory Domain Controller - Ec...	Active Directory Domain Ser...	All	Yes
Active Directory Domain Controller - LD...	Active Directory Domain Ser...	All	Yes
Active Directory Domain Controller - LD...	Active Directory Domain Ser...	All	Yes
Active Directory Domain Controller - LD...	Active Directory Domain Ser...	All	Yes
Active Directory Domain Controller - Net...	Active Directory Domain Ser...	All	Yes
Active Directory Domain Controller - SA...	Active Directory Domain Ser...	All	Yes
Active Directory Domain Controller - SA...	Active Directory Domain Ser...	All	Yes
Active Directory Domain Controller - Sec...	Active Directory Domain Ser...	All	Yes
Active Directory Domain Controller - Sec...	Active Directory Domain Ser...	All	Yes
Active Directory Domain Controller - W3...	Active Directory Domain Ser...	All	Yes
Active Directory Domain Controller (RPC)	Active Directory Domain Ser...	All	Yes
Active Directory Domain Controller (RPC...	Active Directory Domain Ser...	All	Yes
Active Directory Web Services (TCP-In)	Active Directory Web Services	All	Yes
AllJoyn Router (TCP-In)	AllJoyn Router	Domai...	Yes
AllJoyn Router (UDP-In)	AllJoyn Router	Domai...	Yes
BranchCache Content Retrieval (HTTP-In)	BranchCache - Content Retr...	All	No
BranchCache Hosted Cache Server (HTTP...	BranchCache - Hosted Cach...	All	No
BranchCache Peer Discovery (WSD-In)	BranchCache - Peer Discove...	All	No
Cast to Device functionality (qWave-TCP...	Cast to Device functionality	Private...	Yes
Cast to Device functionality (qWave-UDP...	Cast to Device functionality	Private...	Yes
Cast to Device SSDP Discovery (UDP-In)	Cast to Device functionality	Public	Yes
Cast to Device streaming server (HTTP-St...	Cast to Device functionality	Private	Yes
Cast to Device streaming server (HTTP-St...	Cast to Device functionality	Public	Yes

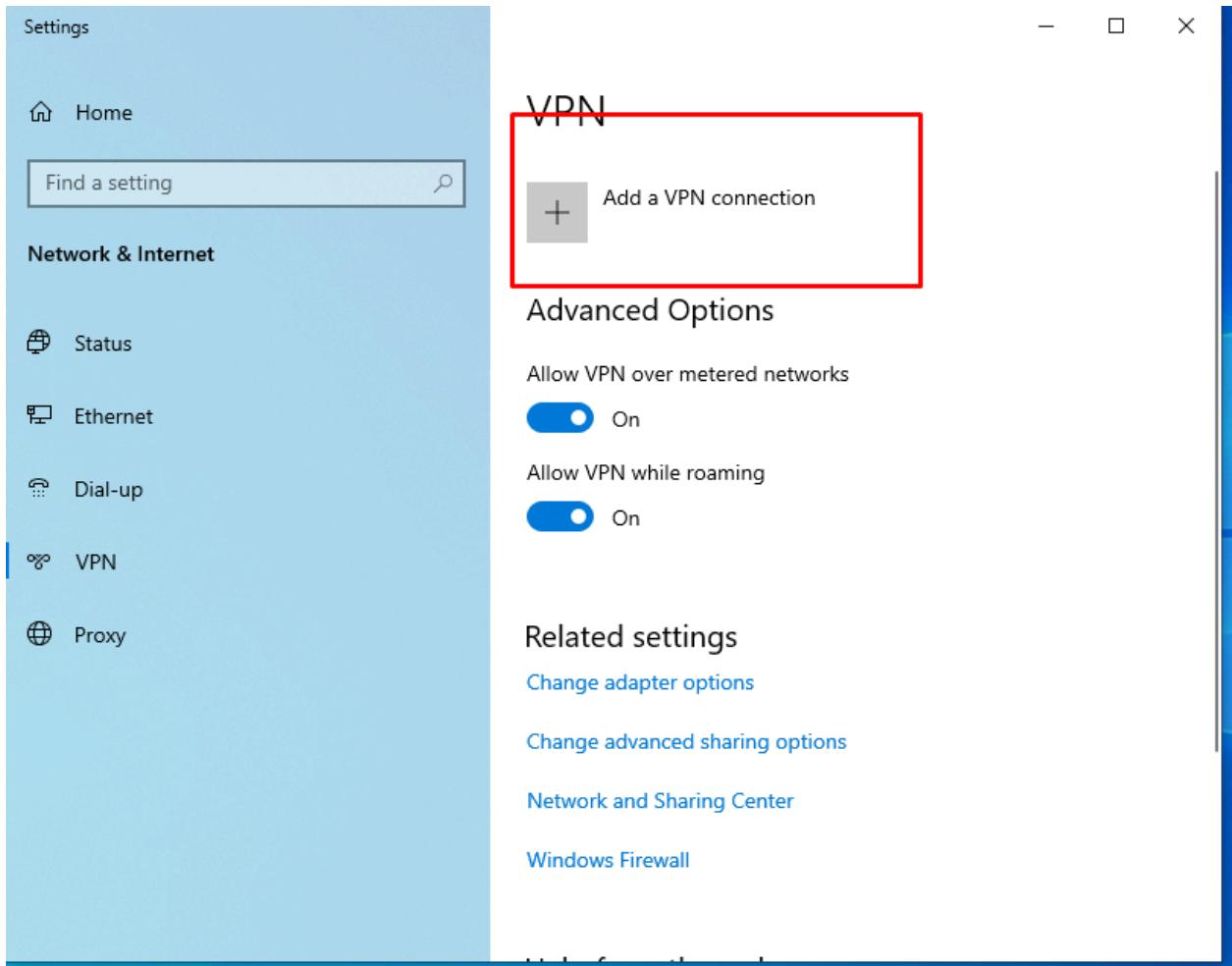
## Enable VPN Access for a User





**Login Windows 10 VM: Connect to created VPN**





## Add a VPN connection

VPN provider

Windows (built-in)

Connection name

CorpVpn

Server name or address

192....

VPN type

Automatic

Type of sign-in info

User name and password

User name (optional)

Save

Cancel

## Add a VPN connection

VPN type

L2TP/IPsec with pre-shared key

Pre-shared key

\*\*\*\*\*

Type of sign-in info

User name and password

User name (optional)

alice

Password (optional)

\*\*\*\*\*

Remember my sign-in info

Save

Cancel

Settings

Home

Find a setting

Network & Internet

- Status
- Ethernet
- Dial-up
- VPN
- Proxy

VPN

Add a VPN connection

CorpVpn

Connect Advanced options Remove

Advanced Options

Allow VPN over metered networks

On

Allow VPN while roaming

On

Related settings

[Change adapter options](#)

[Change advanced sharing options](#)

Settings

Home

Find a setting

Network & Internet

Status

Ethernet

Dial-up

VPN

Proxy

VPN

+

Add a VPN connection

CorpVPN  
Connected

Advanced options

Disconnect

Advanced Options

Allow VPN over metered networks

On

Allow VPN while roaming

On

Related settings

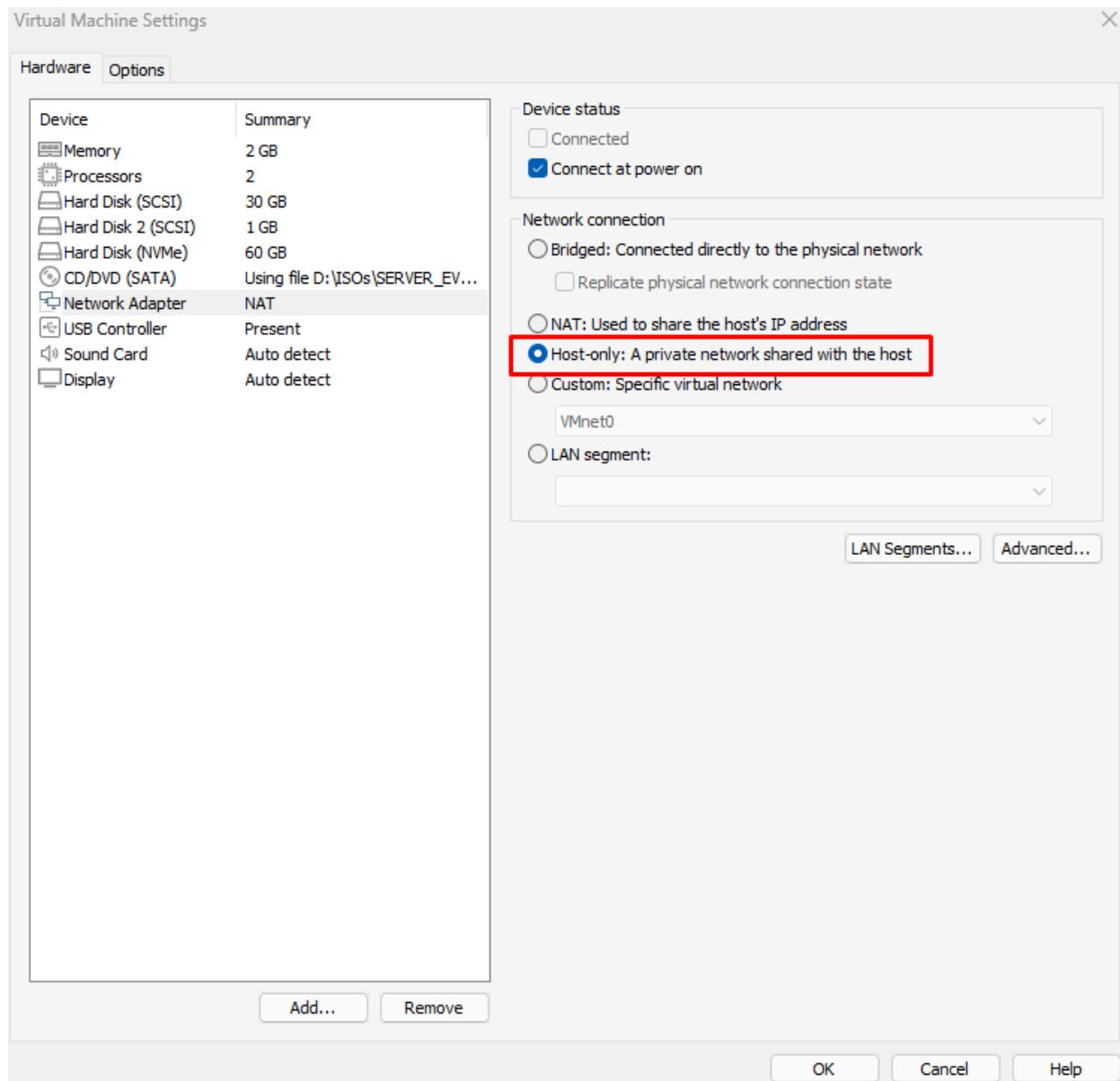
[Change adapter options](#)

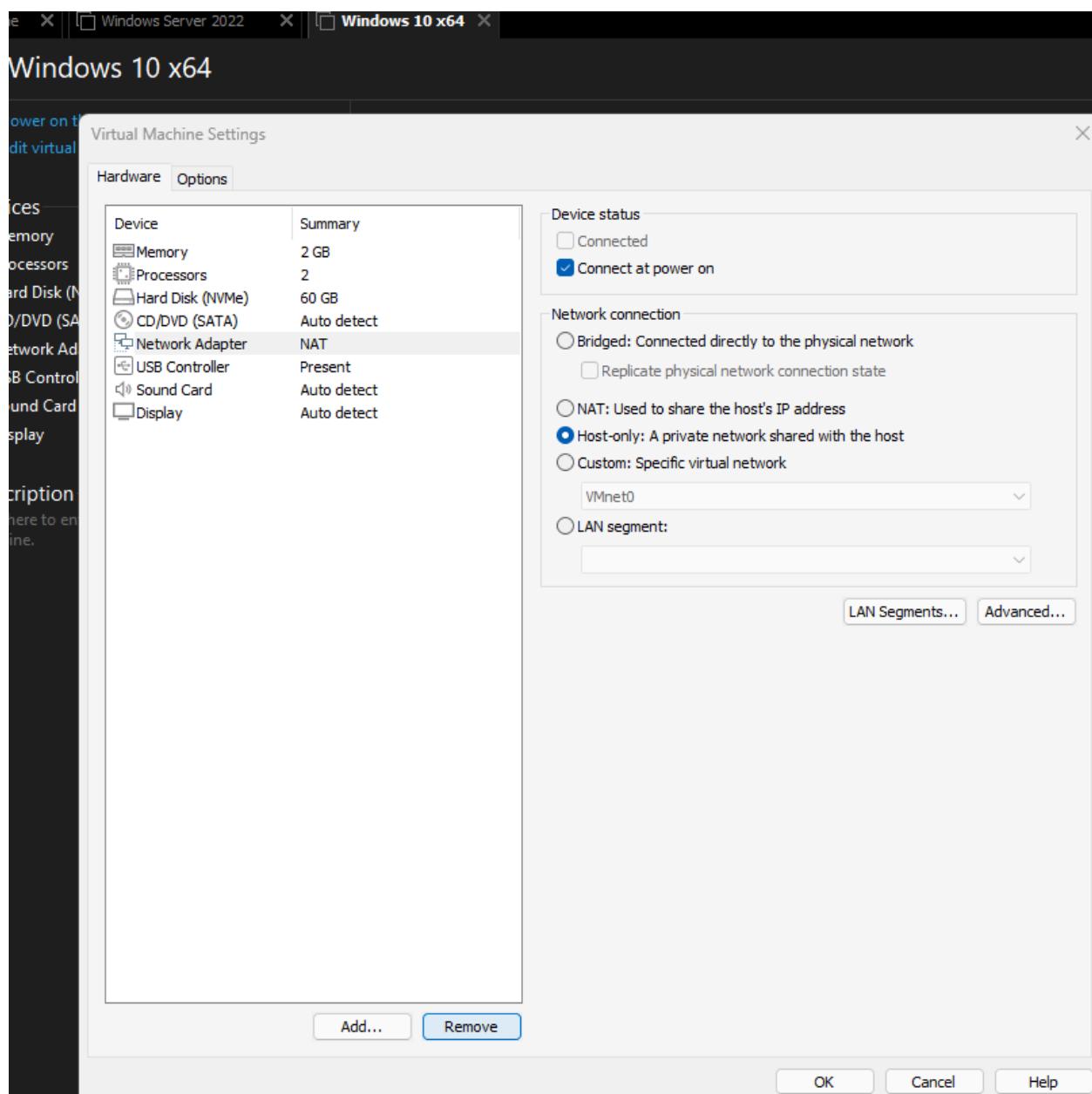
[Change advanced sharing options](#)

The screenshot shows the Windows Settings interface. On the left, under 'Network & Internet', the 'VPN' option is selected. The main area displays the 'CorpVPN' connection, which is currently 'Connected'. A large '+' button allows adding a new VPN connection. Below the connection status are two toggle switches: 'Allow VPN over metered networks' (on) and 'Allow VPN while roaming' (on). At the bottom, there are 'Advanced Options' and 'Disconnect' buttons. The 'Advanced Options' section includes links to 'Change adapter options' and 'Change advanced sharing options'. The overall title of the window is 'VPN'.

VPN successfully connected

## Windows Server 2022 & Windows 10 VM: Switch from NAT to Host-only network





Complete steps above for both machines

Virtual Network Editor						
Name	Type	External Connection	Host Connection	DHCP	Subnet Address	
VMnet1	Custom	-	-	Enabled	192.168.1.1	

Network and Sharing Center

Control Panel Home

Change adapter settings

Change advanced sharing settings

View your active networks  
You are currently not connected to any networks.

Change your networking settings

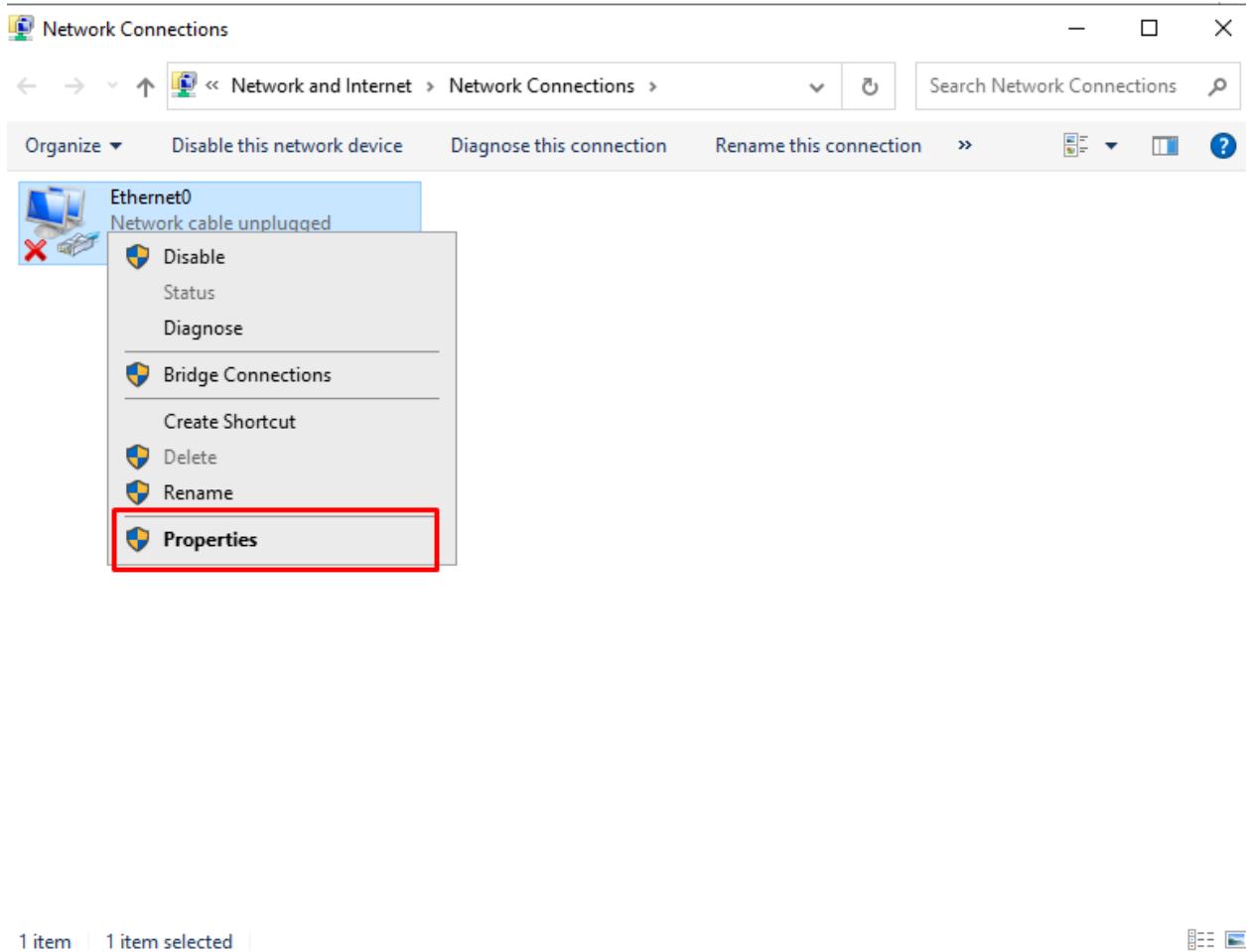
 Set up a new connection or network  
Set up a broadband, dial-up, or VPN connection; or set up a router or access point.

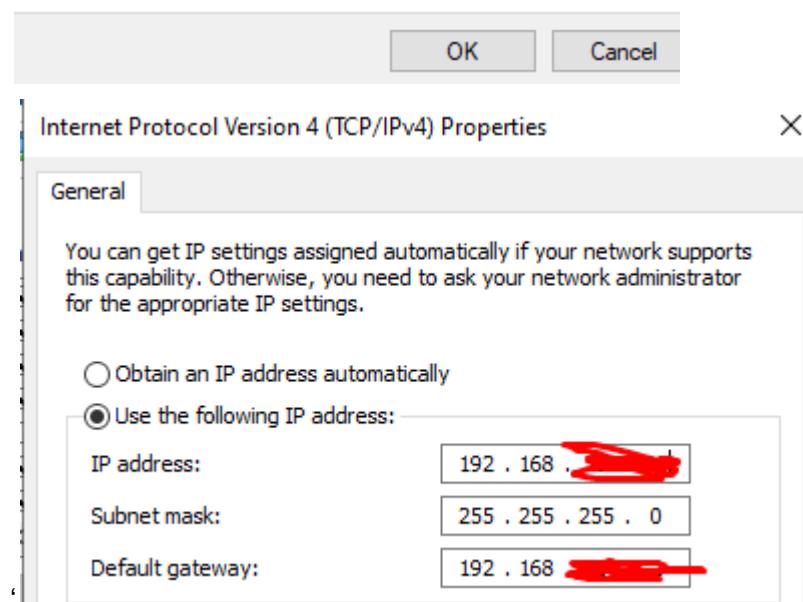
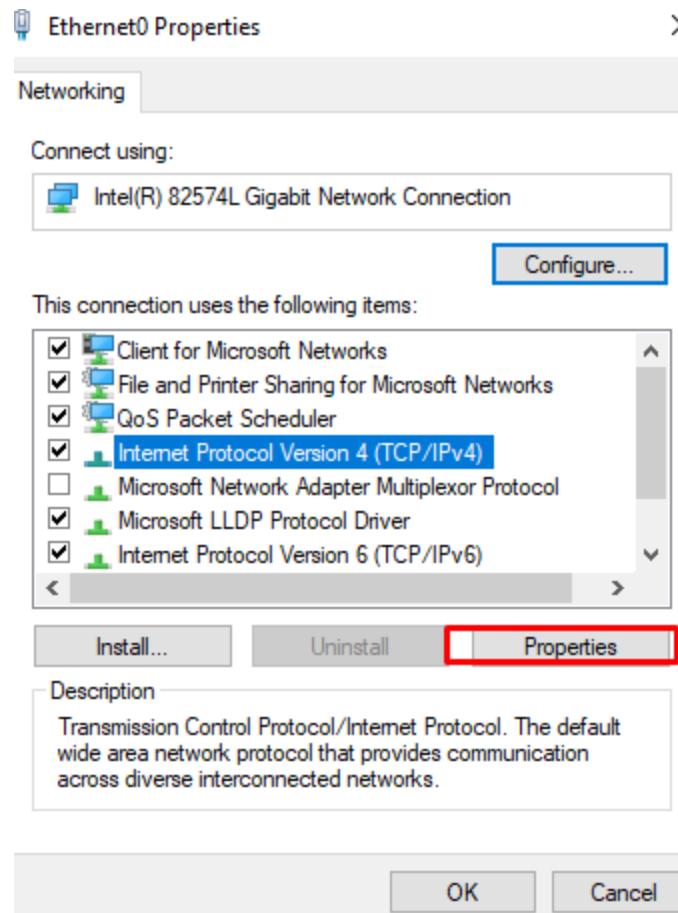
 Troubleshoot problems  
Diagnose and repair network problems, or get troubleshooting information.

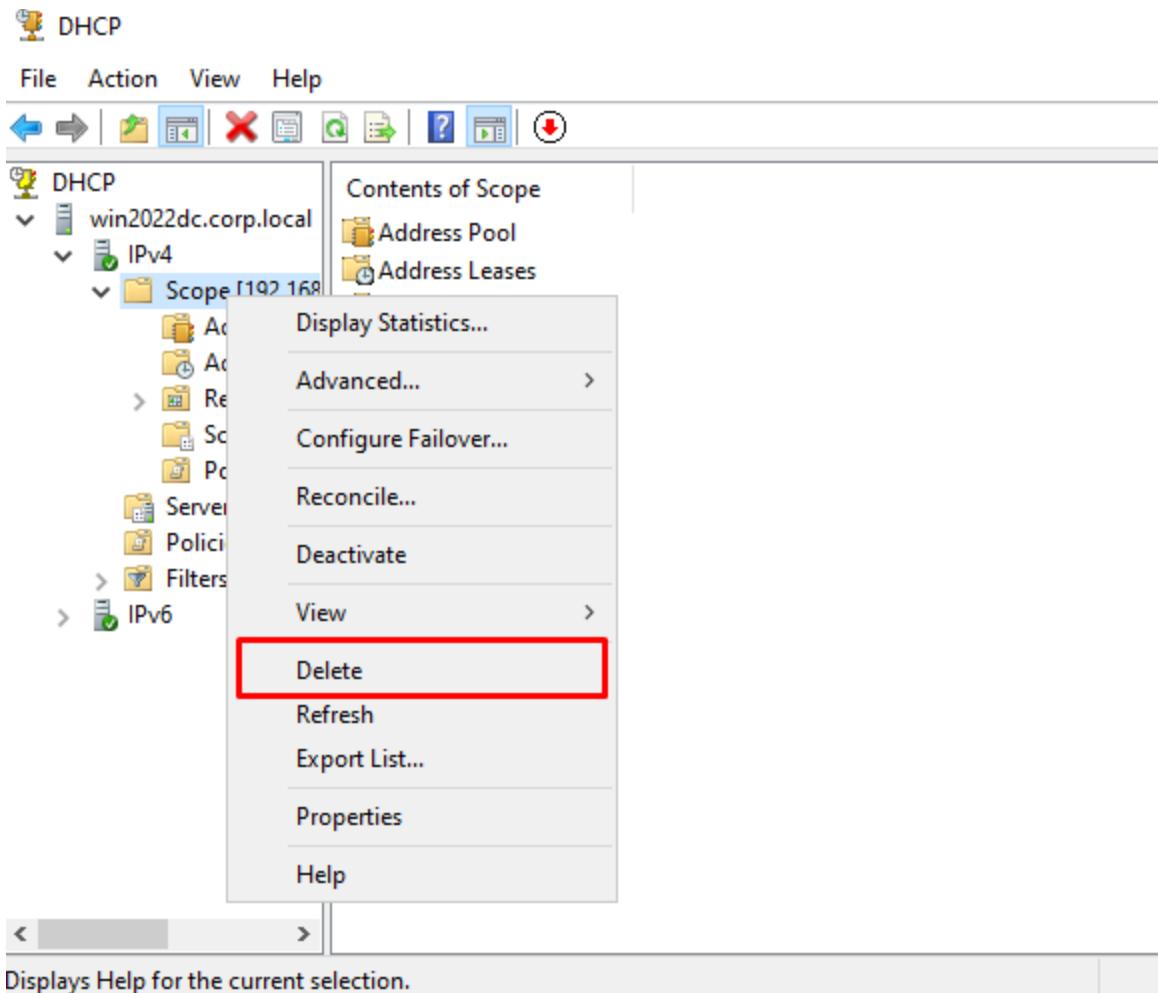
See also

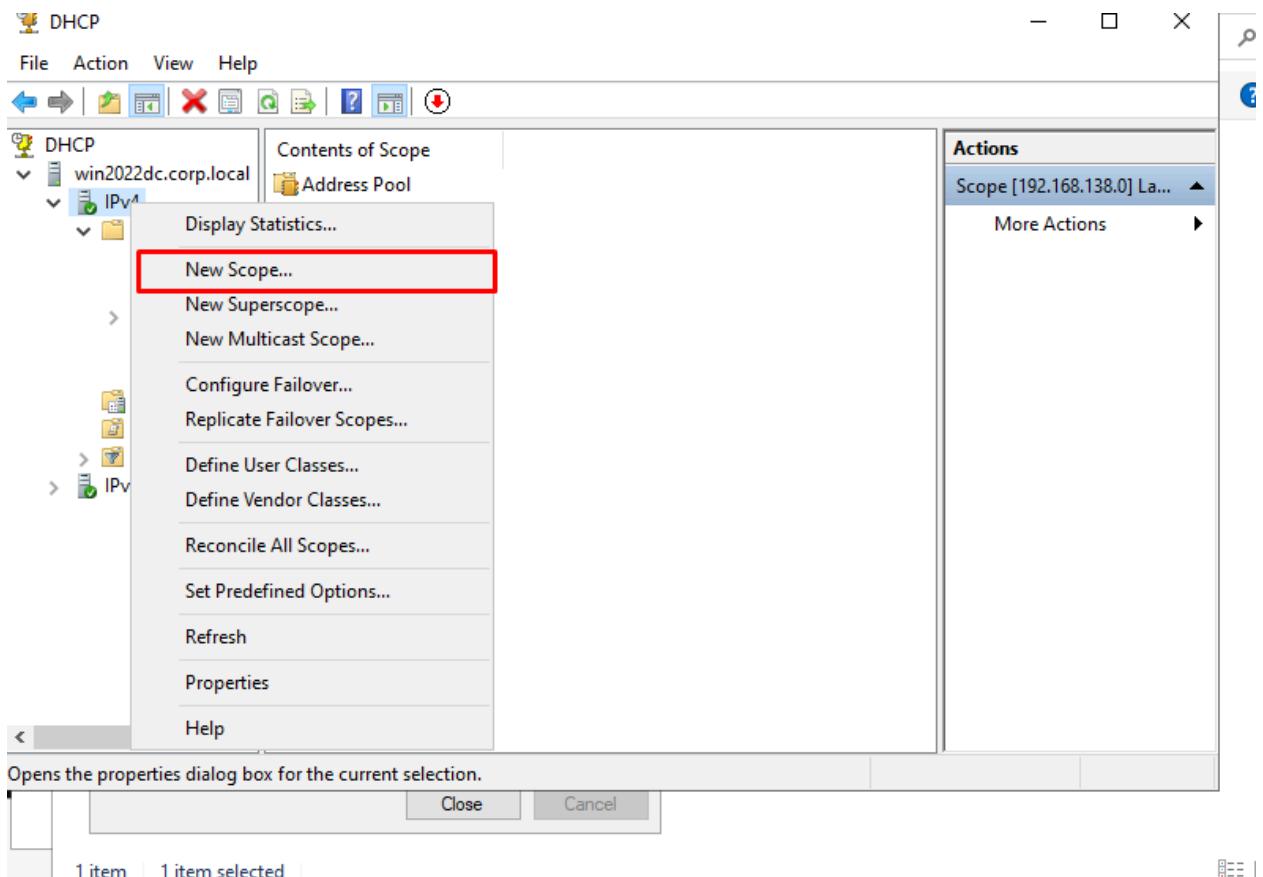
[Internet Options](#)

[Windows Defender Firewall](#)









## New Scope Wizard

### Scope Name

You have to provide an identifying scope name. You also have the option of providing a description.



Type a name and description for this scope. This information helps you quickly identify how the scope is to be used on your network.

Name:

Description:

< Back

Next >

Cancel

## New Scope Wizard

### IP Address Range

You define the scope address range by identifying a set of consecutive IP addresses.



#### Configuration settings for DHCP Server

Enter the range of addresses that the scope distributes.

Start IP address: 192 . [REDACTED]

End IP address: 192 . [REDACTED]

#### Configuration settings that propagate to DHCP Client

Length: 24

Subnet mask: 255 . 255 . 255 . 0

< Back

Next >

Cancel

## New Scope Wizard

### Configure DHCP Options

You have to configure the most common DHCP options before clients can use the scope.



When clients obtain an address, they are given DHCP options such as the IP addresses of routers (default gateways), DNS servers, and WINS settings for that scope.

The settings you select here are for this scope and override settings configured in the Server Options folder for this server.

Do you want to configure the DHCP options for this scope now?

Yes, I want to configure these options now

No, I will configure these options later

< Back

Next >

Cancel

New Scope Wizard

**Router (Default Gateway)**

You can specify the routers, or default gateways, to be distributed by this scope.

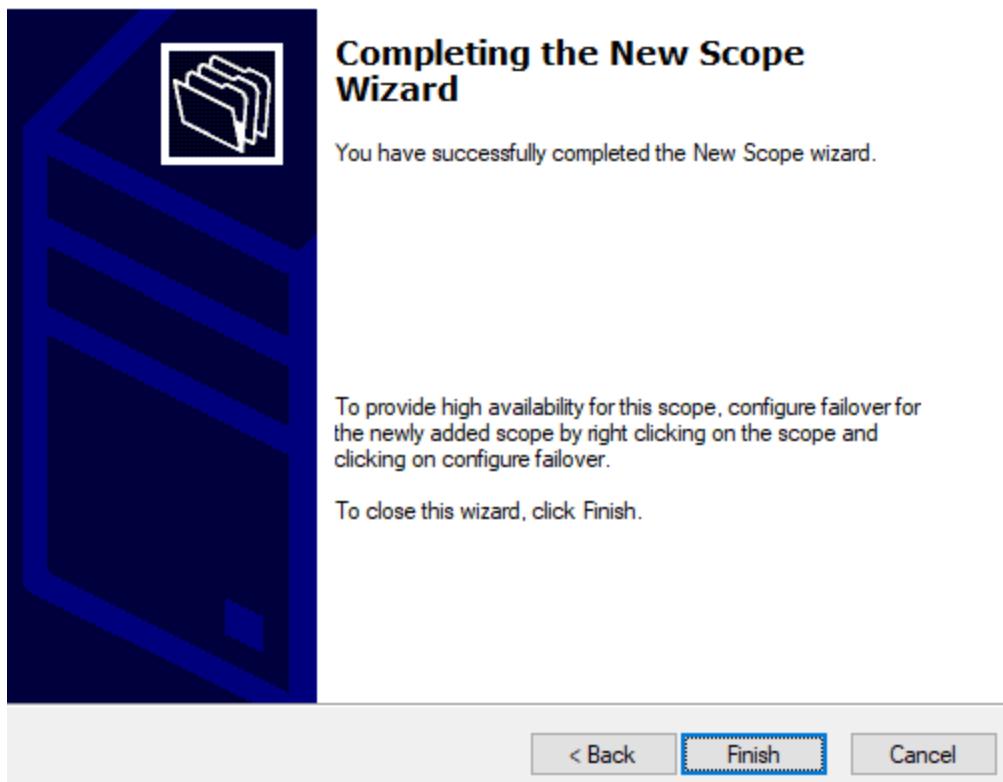


To add an IP address for a router used by clients, enter the address below.

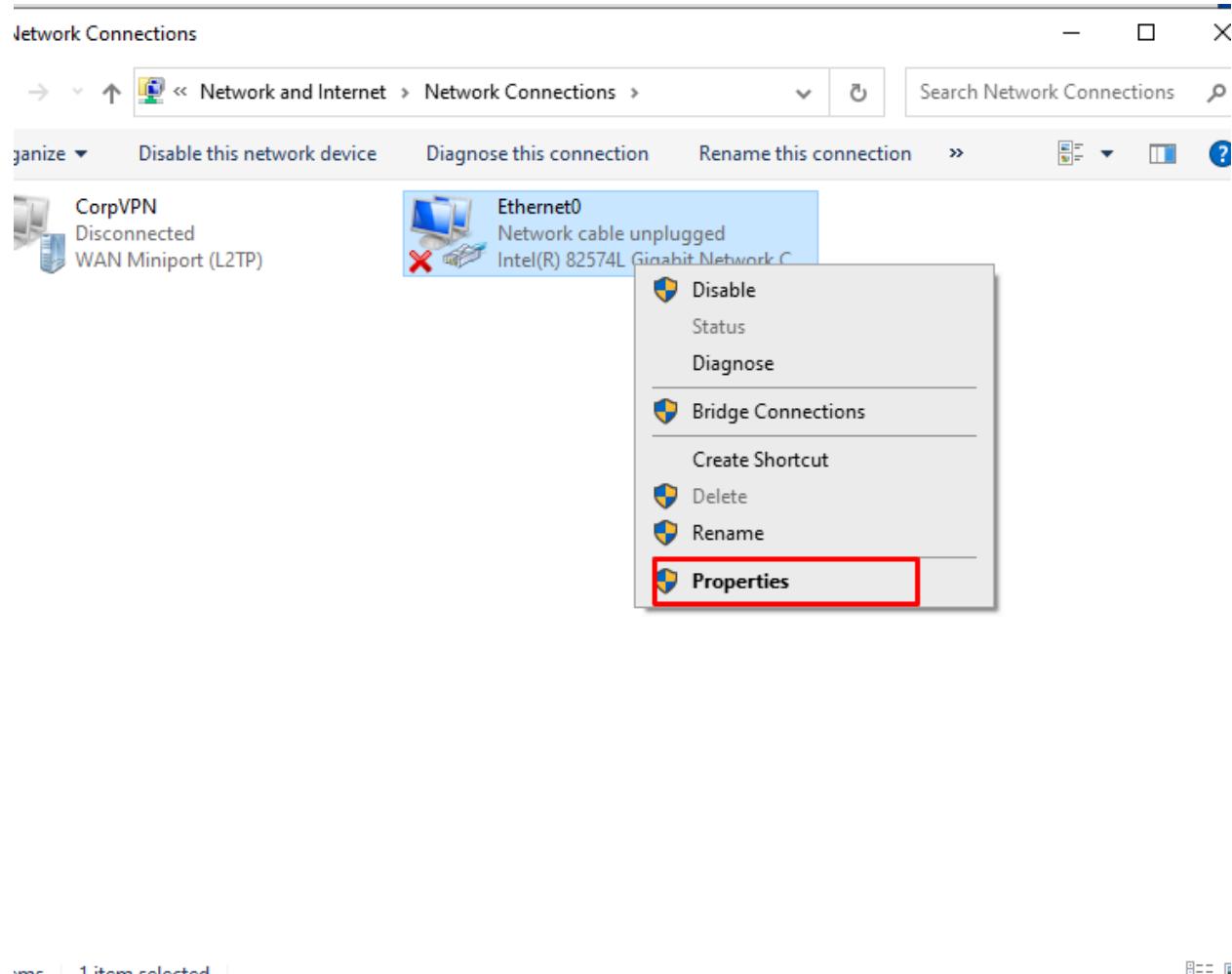
IP address:

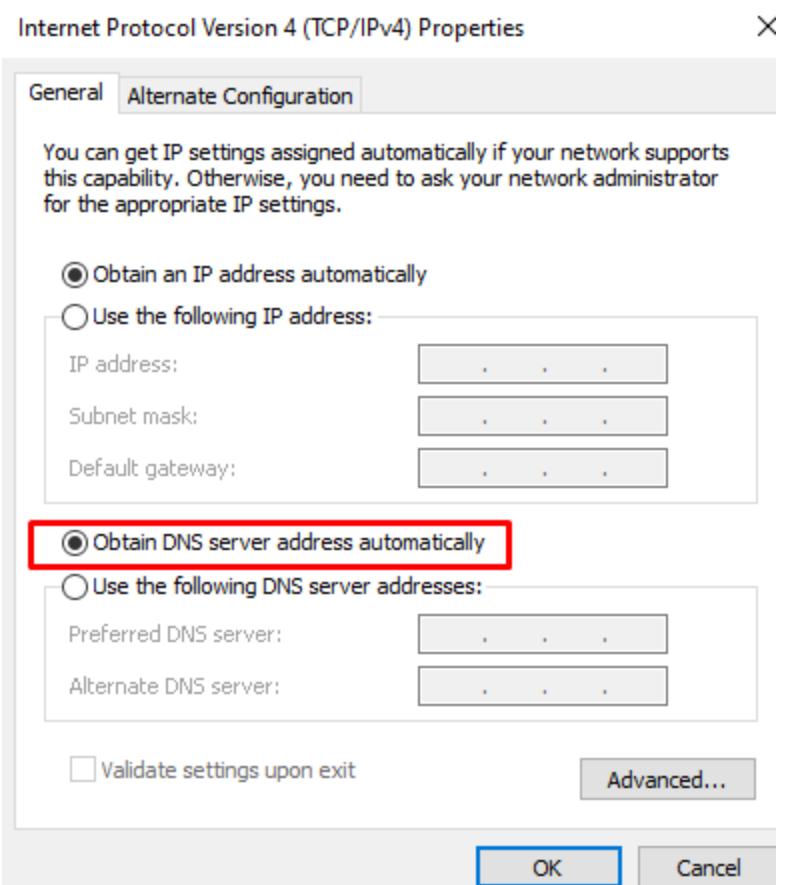
Add  
Remove  
Up  
Down

< Back      Next >      Cancel

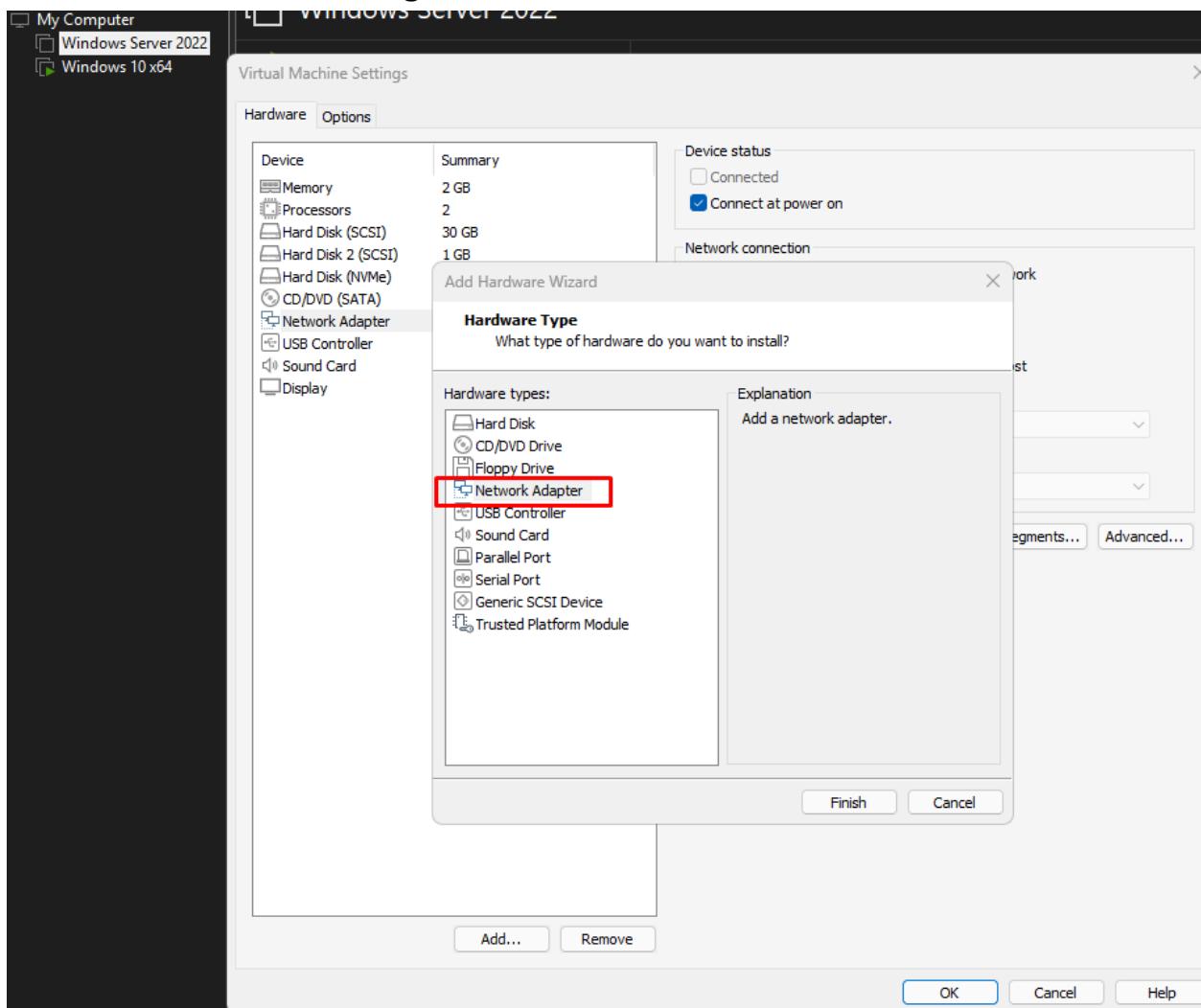


## Windows 10 VM: Change to Host Network



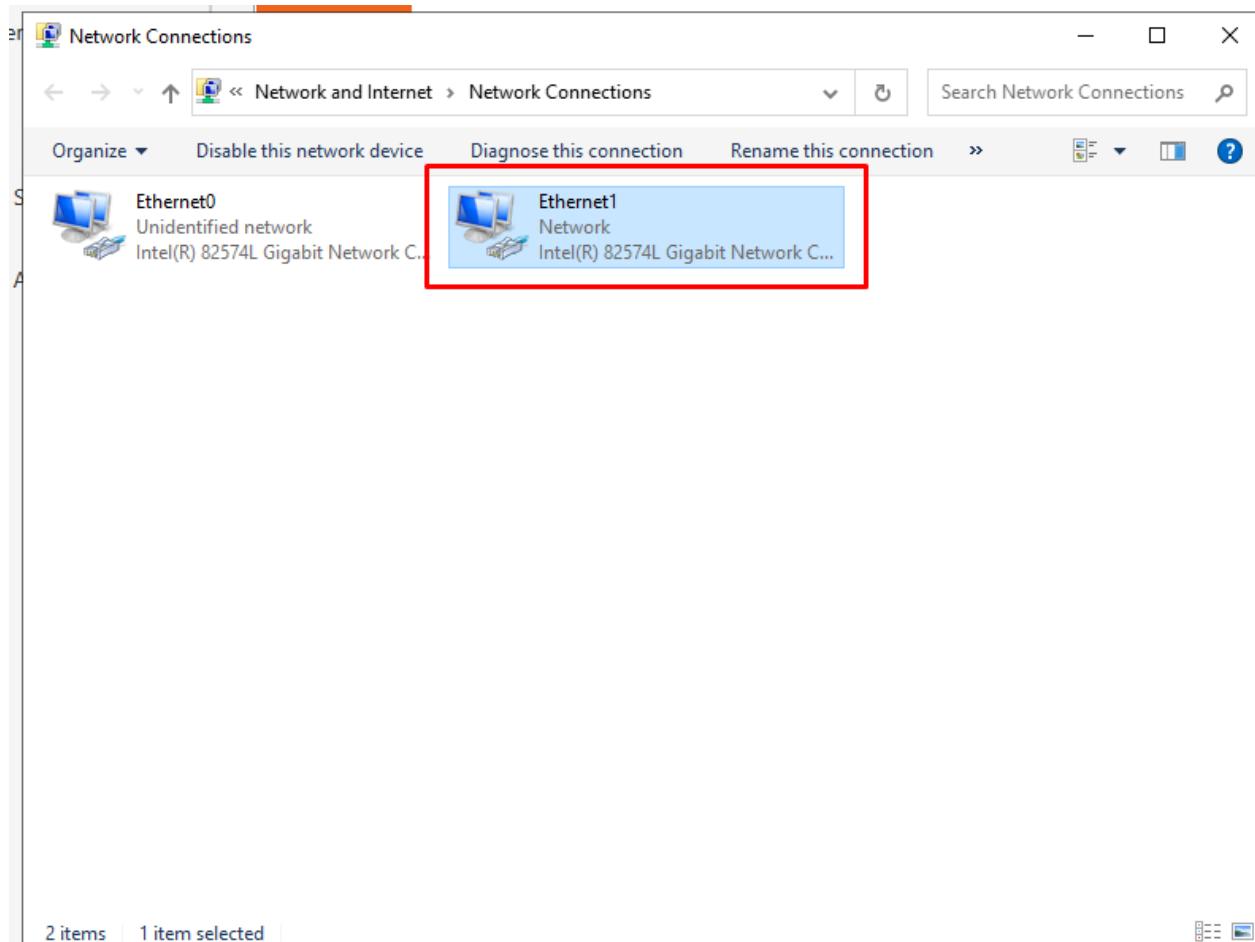


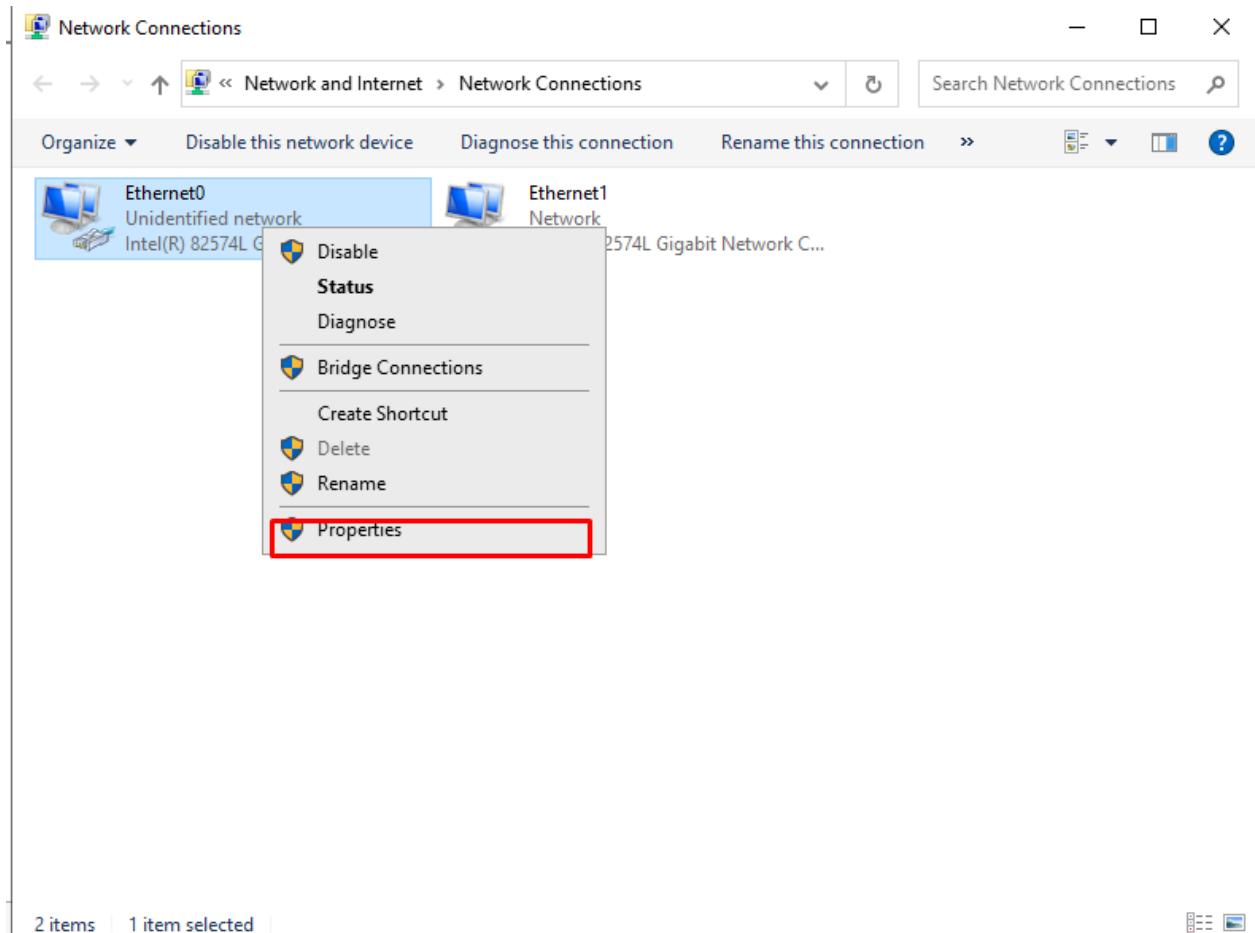
## Windows Server 2022 & Windows 10 VM: Add new network adapter 2 for internet connection, Using both NAT & Host:

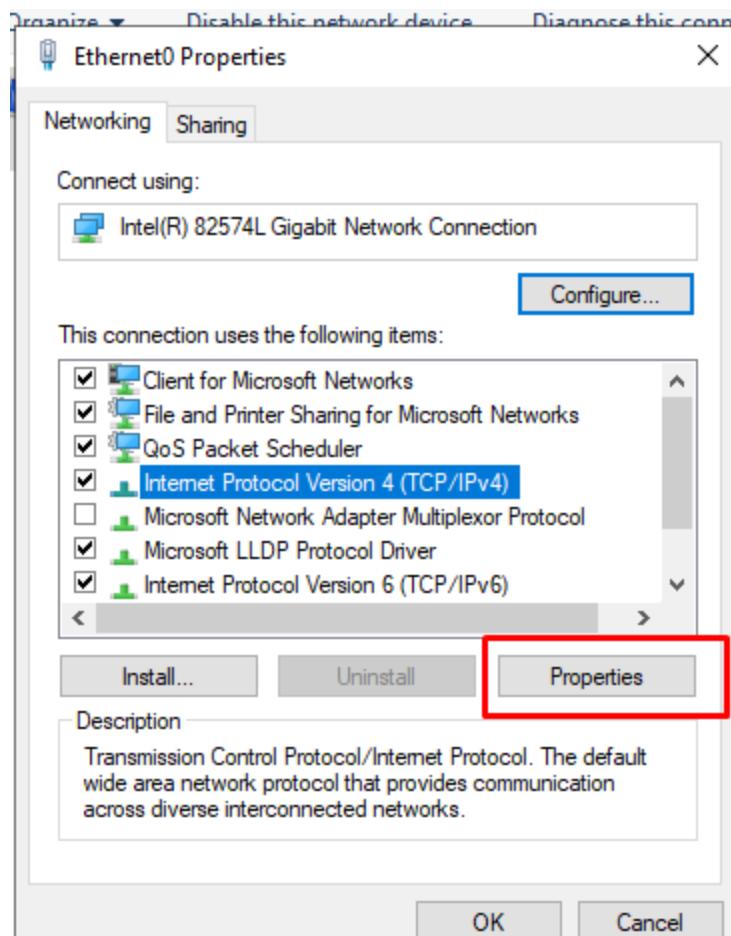


Repeat Above Step for Windows 10 VM

## Windows Server 2022: Configure Both NAT and Host Networks







## Internet Protocol Version 4 (TCP/IPv4) Properties

X

### General

You can get IP settings assigned automatically if your network supports this capability. Otherwise, you need to ask your network administrator for the appropriate IP settings.

Obtain an IP address automatically

Use the following IP address:

IP address:

[REDACTED]

Subnet mask:

255 . 255 . 255 . 0

Default gateway:

[REDACTED]

Obtain DNS server address automatically

Use the following DNS server addresses:

Preferred DNS server:

127 . 0 . 0 . 1

Alternate DNS server:

[REDACTED]

Validate settings upon exit

Advanced...

OK

Cancel

## Advanced TCP/IP Settings

X

IP Settings DNS WINS

### IP addresses

IP address	Subnet mask
192.168.72.10	255.255.255.0

Add...

Edit...

Remove

### Default gateways:

Gateway	Metric
192.168.56.2	Automatic

Add...

Edit...

Remove

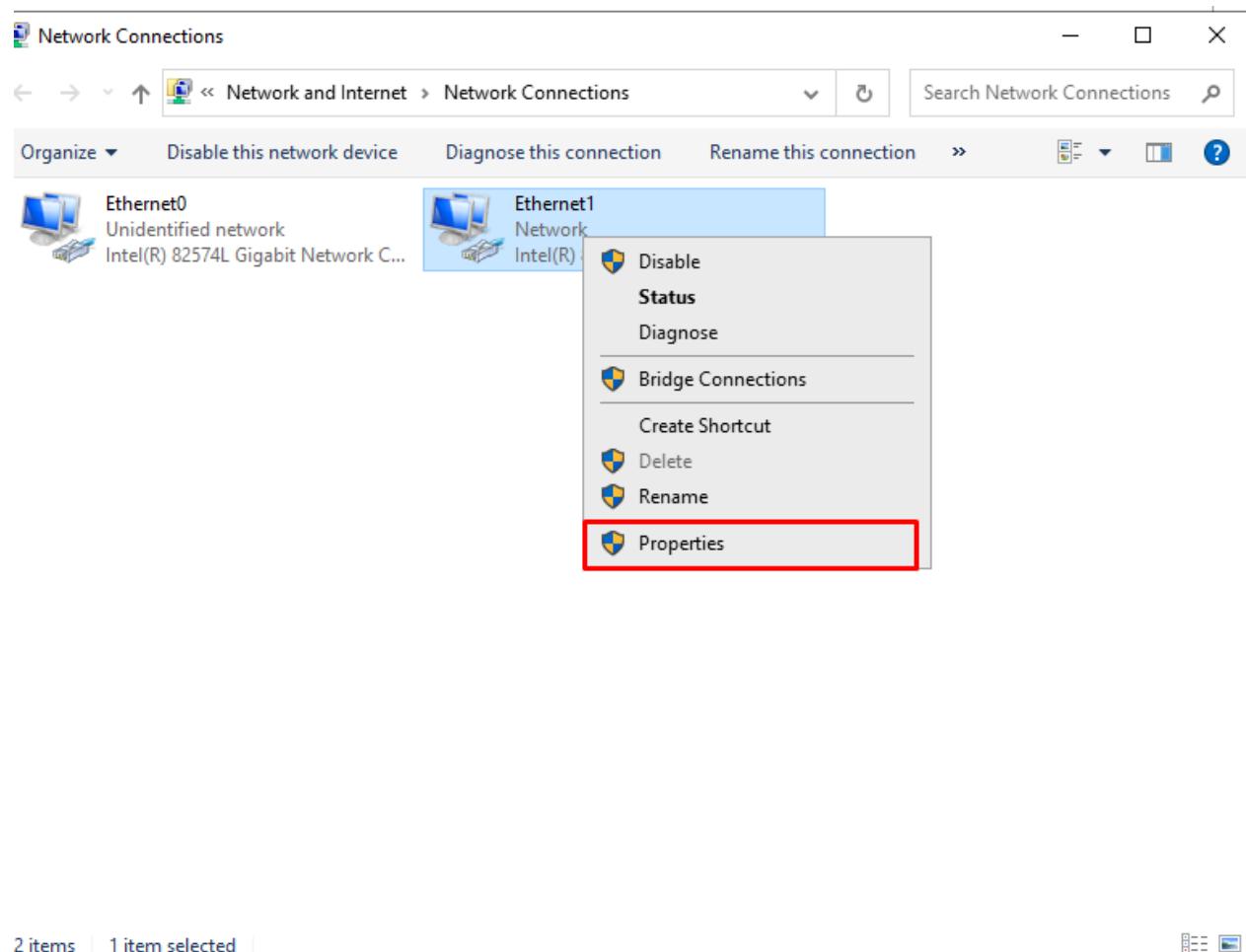
Automatic metric

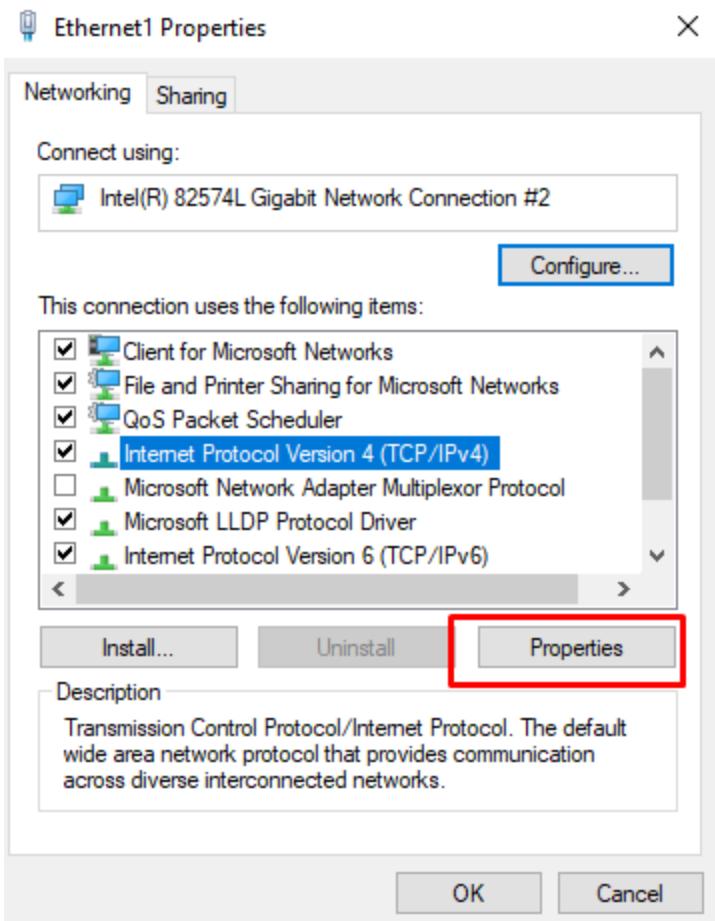
Interface metric:

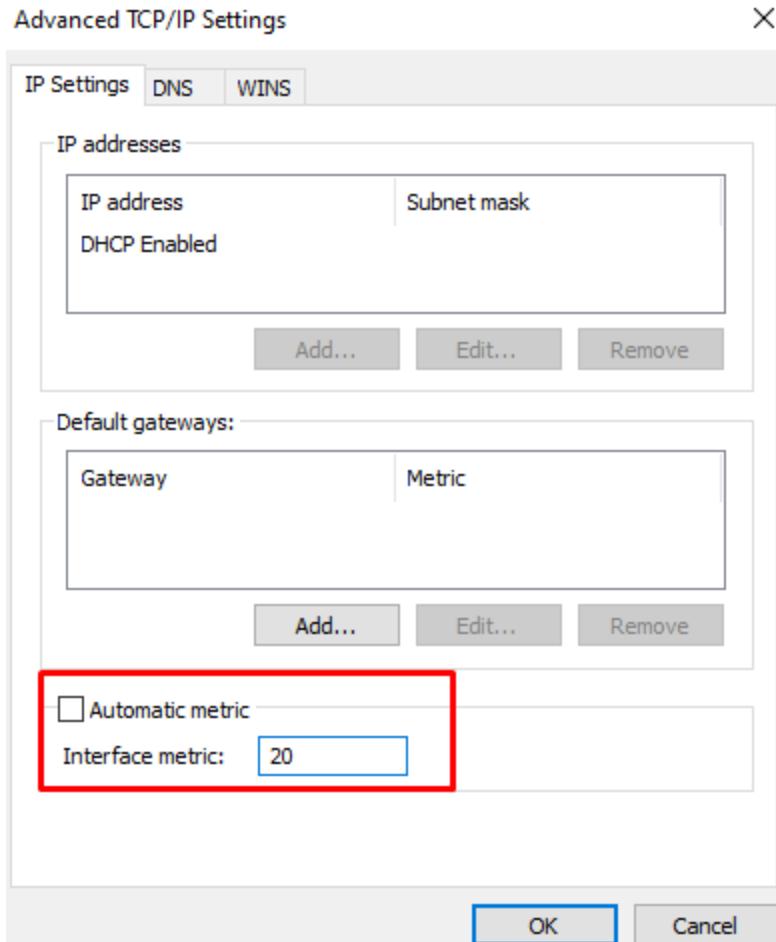
5

OK

Cancel





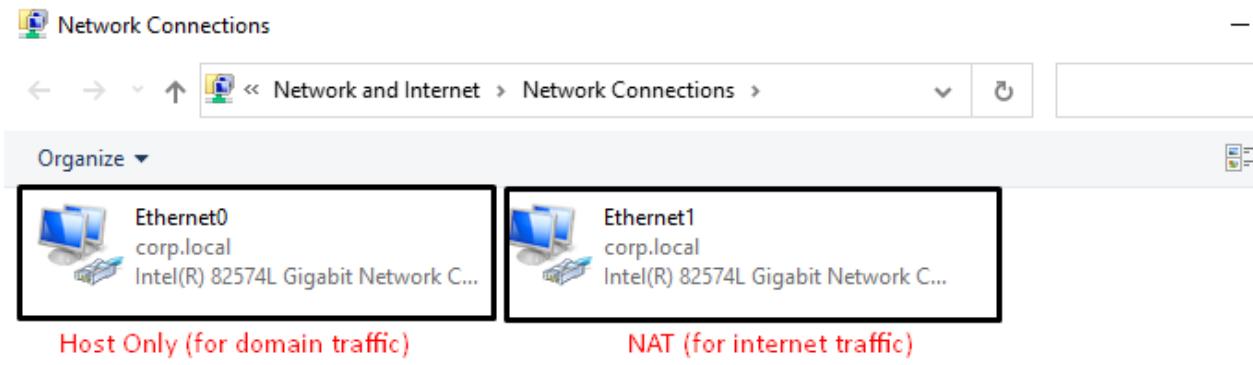


Windows uses Interface Metrics to decide which adapter to prefer:

- Lower number = preferred.
- Higher number = fallback.

**Host-Only** (for domain traffic) = **lower metric (5)**.

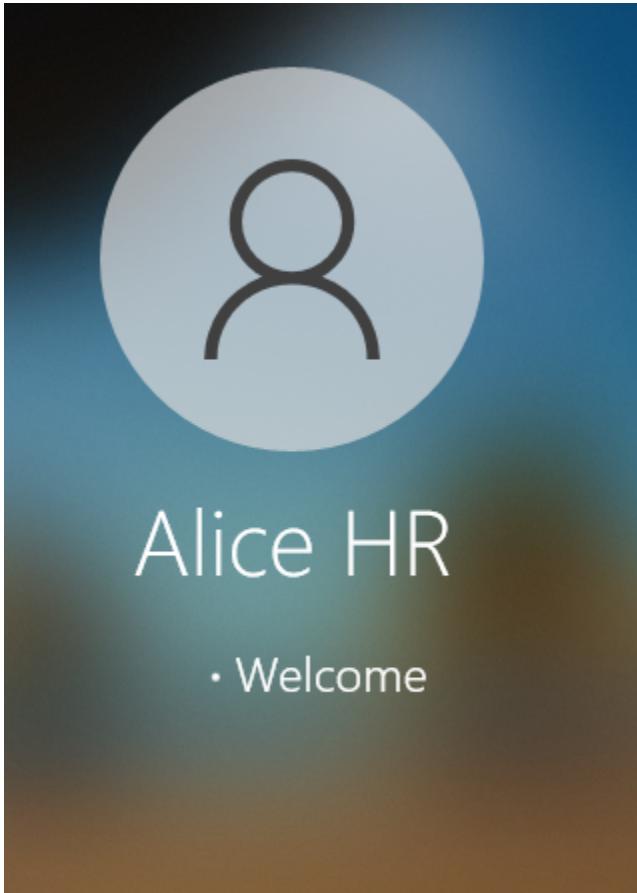
**NAT** (for internet traffic) = **higher metric (20)**.



Successfully Created and Configured:

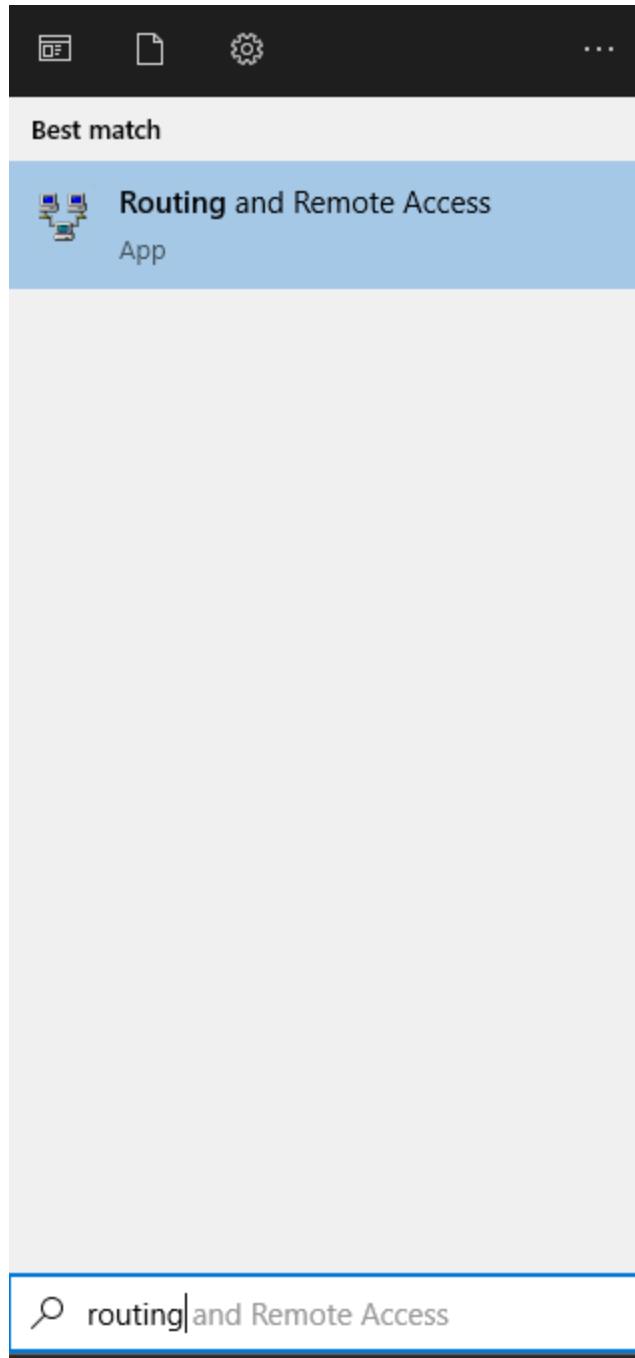
- Domain Controller traffic (corp.local, DNS, LDAP) = Host-Only adapter.
- Internet traffic = NAT adapter.

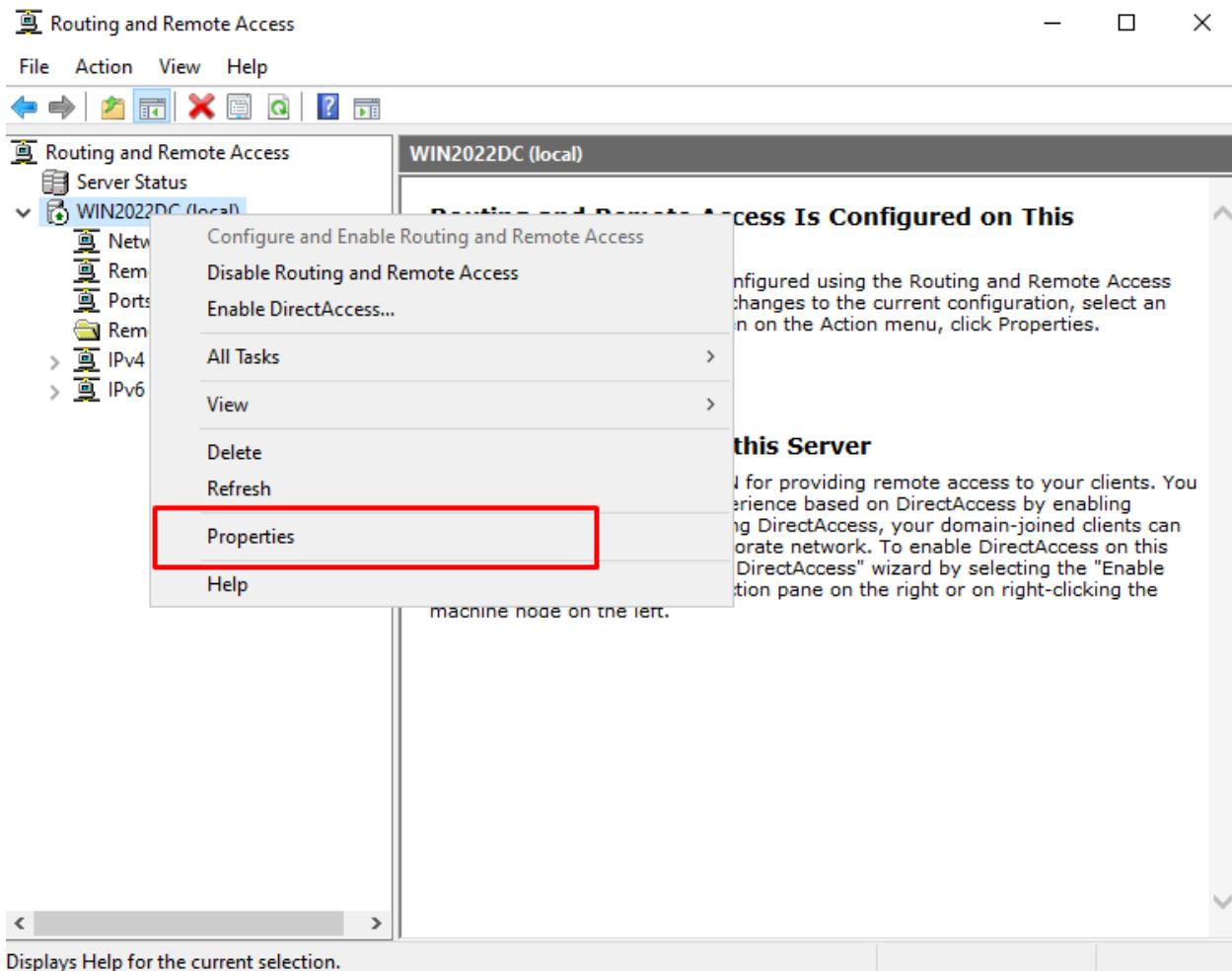
Repeat Above Steps for Windows 10 VM:

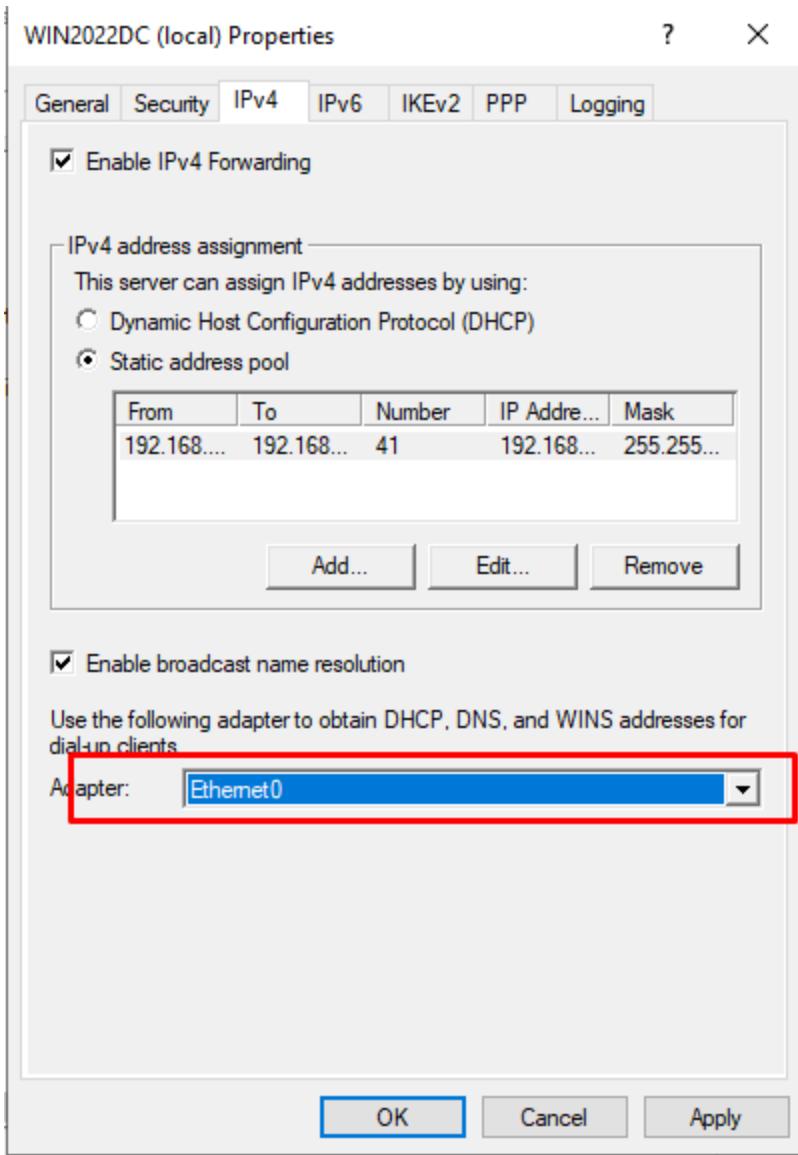


## **Configure VPN with newly added network:**

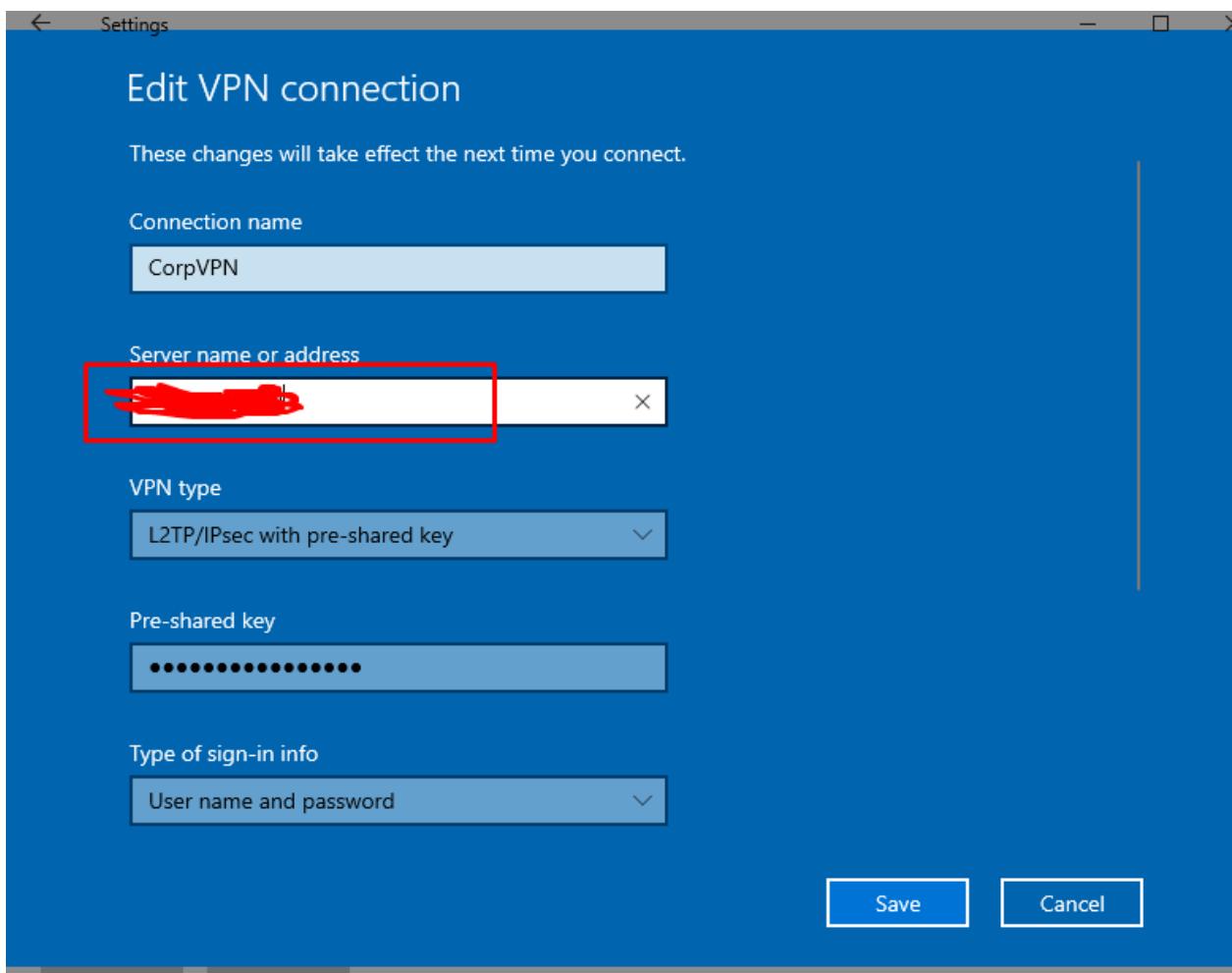
Go on windows server 2022







Go to Windows 10 VM:



The image shows two windows side-by-side. On the left is the 'Settings' app with a light blue header. It has a 'Find a setting' search bar at the top. Below it is a sidebar titled 'Network & Internet' with icons for Home, Find a setting, Network & Internet, Status, Ethernet, Dial-up, VPN (which is selected and highlighted in blue), and Proxy. On the right is the 'VPN' page, which has a title 'VPN' and a sub-section 'Add a VPN connection'. It shows a connection named 'CorpVPN' with a status of 'Connected'. There are 'Advanced options' and 'Disconnect' buttons below it. At the bottom of the right window is a section titled 'Advanced Options' with two toggle switches: 'Allow VPN over metered networks' (On) and 'Allow VPN while roaming' (On). Below this are sections for 'Related settings' with links to 'Change adapter options' and 'Change advanced sharing options'.

Settings

Home

Find a setting

Network & Internet

Status

Ethernet

Dial-up

VPN

Proxy

VPN

Add a VPN connection

CorpVPN  
Connected

Advanced options

Disconnect

Advanced Options

Allow VPN over metered networks

On

Allow VPN while roaming

On

Related settings

[Change adapter options](#)

[Change advanced sharing options](#)

VPN successful on the newly created Host-only and NAT network.