Project: Build Your First Active Directory (AD) Lab

I recently completed a project where I built a **virtual Active Directory lab environment** using VirtualBox, Windows Server 2022, and Windows 10/11. The goal was to simulate a small corporate network, configure a Domain Controller (DC), and join a client machine to the domain.

This project helped me gain practical experience with:

- Setting up an **isolated virtual network**
- Installing and configuring a **Windows Server as a Domain Controller**
- Managing **users, groups, and organizational units (OUs)** in Active Directory
- Joining a Windows client machine to the domain

The project is divided into **4 main parts**, and each part covers specific tasks:

📌 Part 0: Prerequisites & Software

- Hardware requirements (RAM, CPU, Disk space)
- VirtualBox setup with Extension Pack
- Windows Server 2022 & Windows 10/11 ISO downloads

📌 Part 1: Lab Network Setup

- Creating a **NAT Network** in VirtualBox
- Configuring an **isolated IP scheme** (10.0.2.0/24)

📌 Part 2: The Domain Controller (DC)

- Creating the **DC01 VM**
- Setting a **static IP address**
- Installing **Active Directory Domain Services (AD DS)**
- Promoting the server to a **Domain Controller** with domain name **CYBERLAB.LOCAL**

📌 Part 3: The Client Workstation

- Creating the **Windows 10/11 client VM**
- Configuring DNS to point to the DC
- Joining the client machine to the **CYBERLAB.LOCAL** domain

📌 Part 4: Active Directory Tasks

- Creating an **Organizational Unit (OU)**
- Adding a **user account (haroonz)**

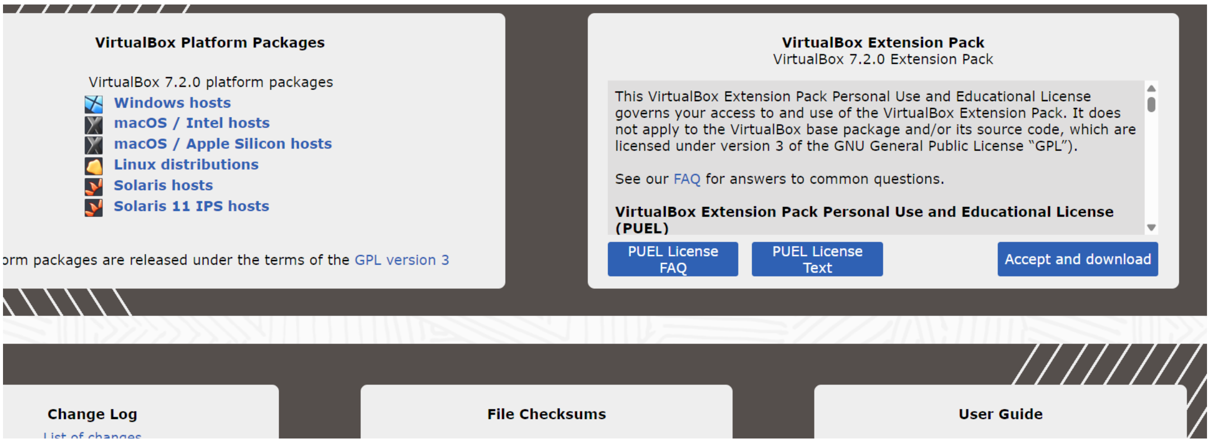
- Logging into the client machine with a **domain user account**

📌 Part 5: Applying a User Policy

- Created a new **Group Policy Object (GPO)** and linked it to the **HR OU**
- Configured a **user policy** (e.g., remove Recycle Bin from desktop)
- Forced policy update on the **WIN10-Client** using `gpupdate /force`
- Verified the policy applied successfully to the **domain user account**.

📌 Part 0: Prerequisites & Software

Step 1: I began by downloading and installing **Oracle VM VirtualBox**, which serves as the virtualization platform for creating and managing virtual machines.



VirtualBox Platform Packages

VirtualBox 7.2.0 platform packages

- Windows hosts
- macOS / Intel hosts
- macOS / Apple Silicon hosts
- Linux distributions
- Solaris hosts
- Solaris 11 IPS hosts

orm packages are released under the terms of the GPL version 3

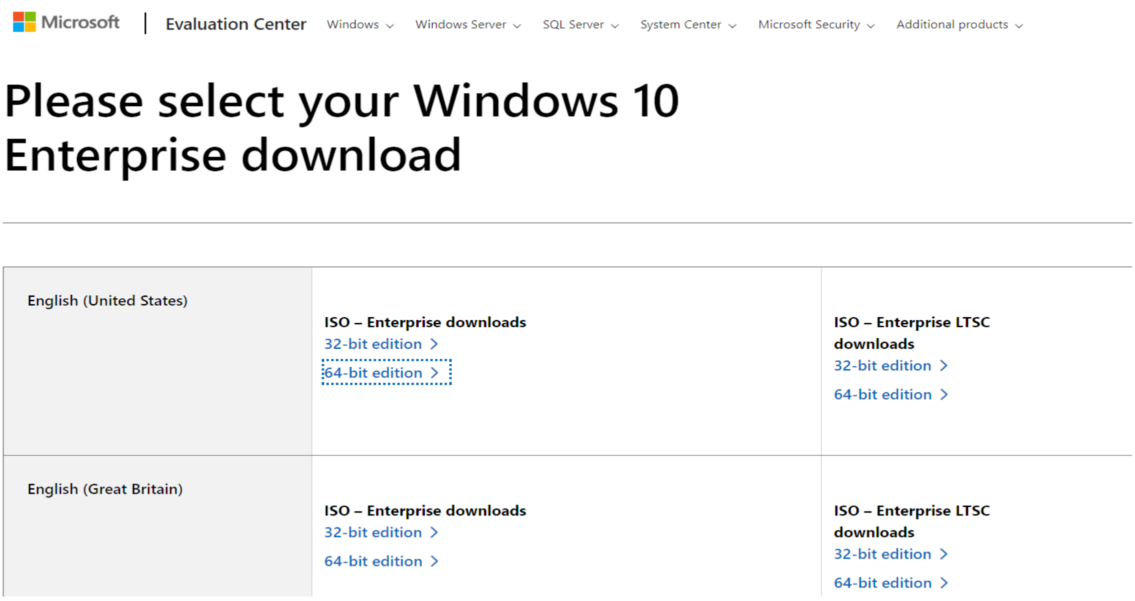
VirtualBox Extension Pack
VirtualBox 7.2.0 Extension Pack

This VirtualBox Extension Pack Personal Use and Educational License governs your access to and use of the VirtualBox Extension Pack. It does not apply to the VirtualBox base package and/or its source code, which are licensed under version 3 of the GNU General Public License "GPL").

See our FAQ for answers to common questions.

VirtualBox Extension Pack Personal Use and Educational License (PUEL)

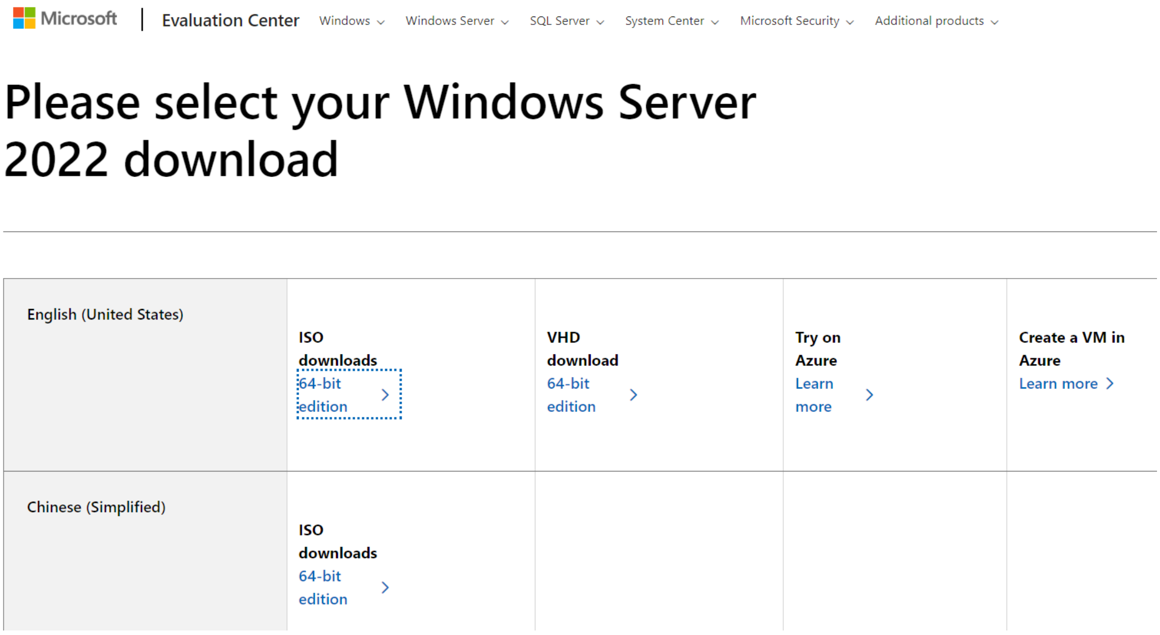
Step 2: Next, I downloaded the **Windows 10 Enterprise ISO image**, which was used as the client operating system within the virtual lab environment.



Please select your Windows 10 Enterprise download

English (United States)	ISO – Enterprise downloads 32-bit edition › 64-bit edition ›	ISO – Enterprise LTSC downloads 32-bit edition › 64-bit edition ›
English (Great Britain)	ISO – Enterprise downloads 32-bit edition › 64-bit edition ›	ISO – Enterprise LTSC downloads 32-bit edition › 64-bit edition ›

Step 3: I then downloaded the **Windows Server 2022 ISO image**, which was designated as the primary server operating system for configuring and managing the lab environment.

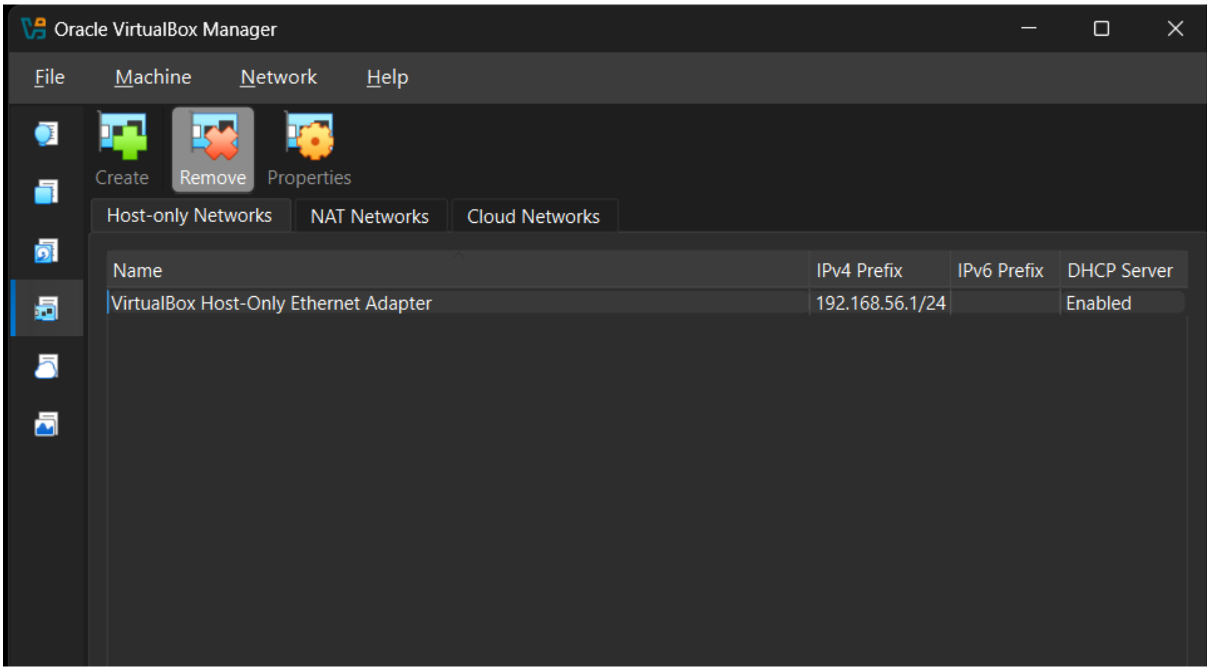


Please select your Windows Server 2022 download

English (United States)	ISO downloads 64-bit edition ›	VHD download 64-bit edition ›	Try on Azure Learn more ›	Create a VM in Azure Learn more ›
Chinese (Simplified)	ISO downloads 64-bit edition ›			

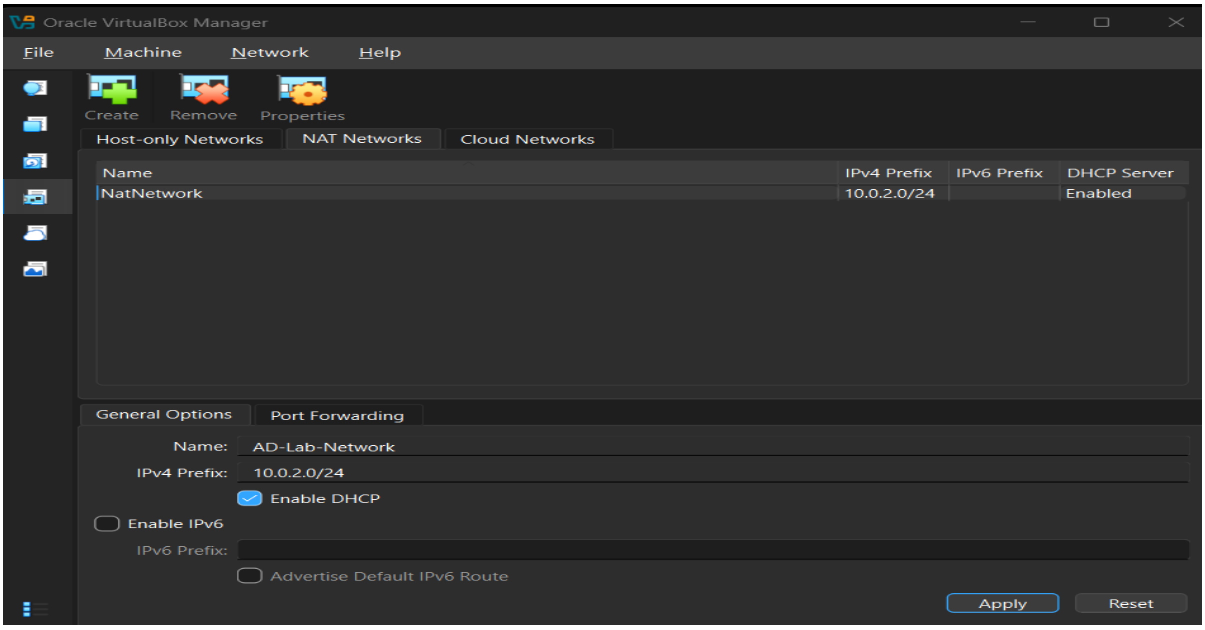
📌 Part 1: Lab Network Setup

Step 1: Upon launching VirtualBox, I navigated to the **Network** settings from the side panel. From the upper console, I selected **NAT Networks** to configure the virtual network environment for the lab.



Name	IPv4 Prefix	IPv6 Prefix	DHCP Server
VirtualBox Host-Only Ethernet Adapter	192.168.56.1/24		Enabled

Step 2: Next, I clicked **Create** to set up a new NAT network. I named it **"AD-Lab-Network"**, assigned the appropriate **IP address range**, enabled **DHCP**, and then applied the settings to make the network ready for the virtual lab environment.



Name	IPv4 Prefix	IPv6 Prefix	DHCP Server
NatNetwork	10.0.2.0/24		Enabled

Name: AD-Lab-Network

IPv4 Prefix: 10.0.2.0/24

☑ Enable DHCP

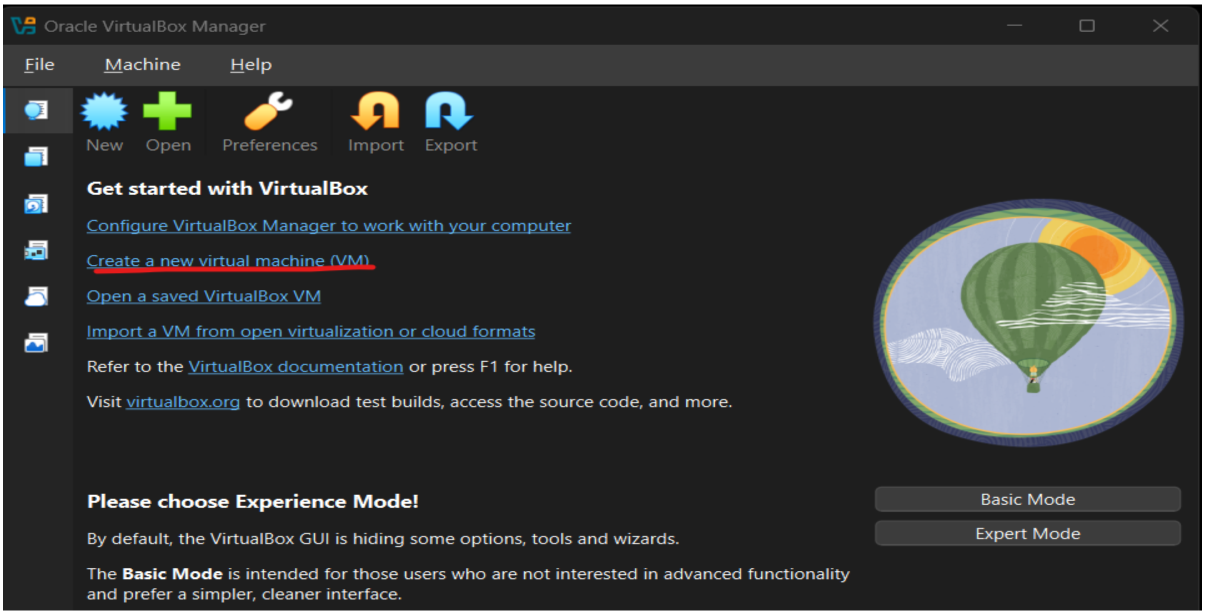
□ Enable IPv6

IPv6 Prefix:

□ Advertise Default IPv6 Route

📌 Part 2: The Domain Controller (DC)

Step 1: To set up the **Domain Controller** using Windows Server, I created a new virtual machine by clicking **New VM** in VirtualBox. This VM will host the server operating system and Active Directory services for the lab environment



Get started with VirtualBox

Configure VirtualBox Manager to work with your computer

Create a new virtual machine (VM)

Open a saved VirtualBox VM

Import a VM from open virtualization or cloud formats

Refer to the VirtualBox documentation or press F1 for help.

Visit virtualbox.org to download test builds, access the source code, and more.

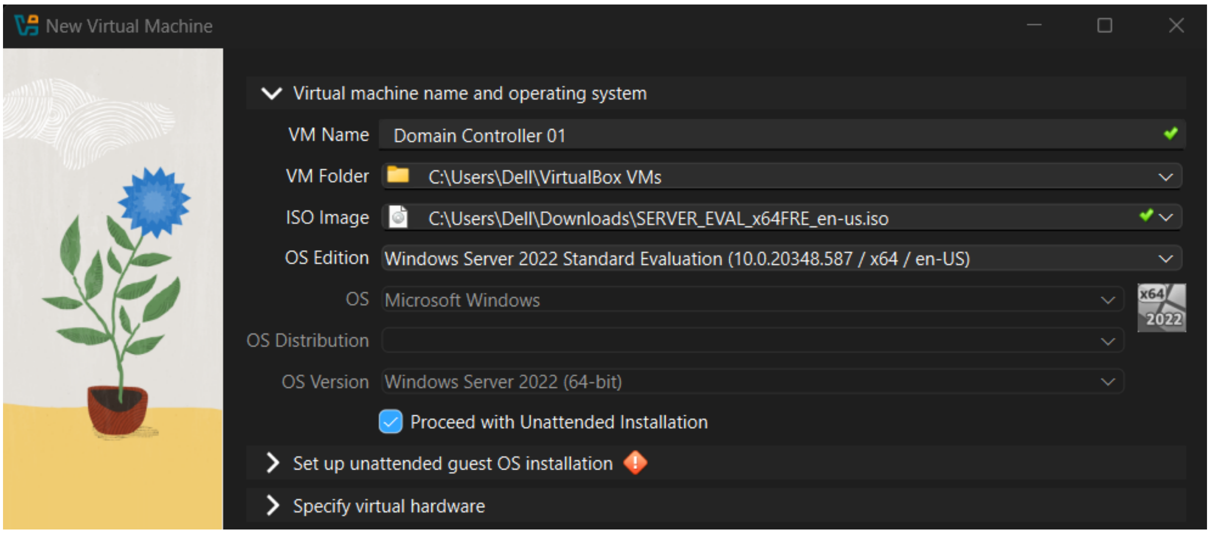
Please choose Experience Mode!

By default, the VirtualBox GUI is hiding some options, tools and wizards.

The **Basic Mode** is intended for those users who are not interested in advanced functionality and prefer a simpler, cleaner interface.

Step 2: Configure the VM for Windows Server

- I provided a **name** for the VM.
- Then selected the **Windows Server 2022 ISO image** previously downloaded.
- Choose the **Desktop Experience edition**.
- Left **“Proceed with Unattended Installation”** enabled to allow automatic installation.



Virtual machine name and operating system

VM Name: Domain Controller 01

VM Folder: C:\Users\Dell\VirtualBox VMs

ISO Image: C:\Users\Dell\Downloads\SERVER_EVAL_x64FRE_en-us.iso

OS Edition: Windows Server 2022 Standard Evaluation (10.0.20348.587 / x64 / en-US)

OS: Microsoft Windows

OS Distribution:

OS Version: Windows Server 2022 (64-bit)

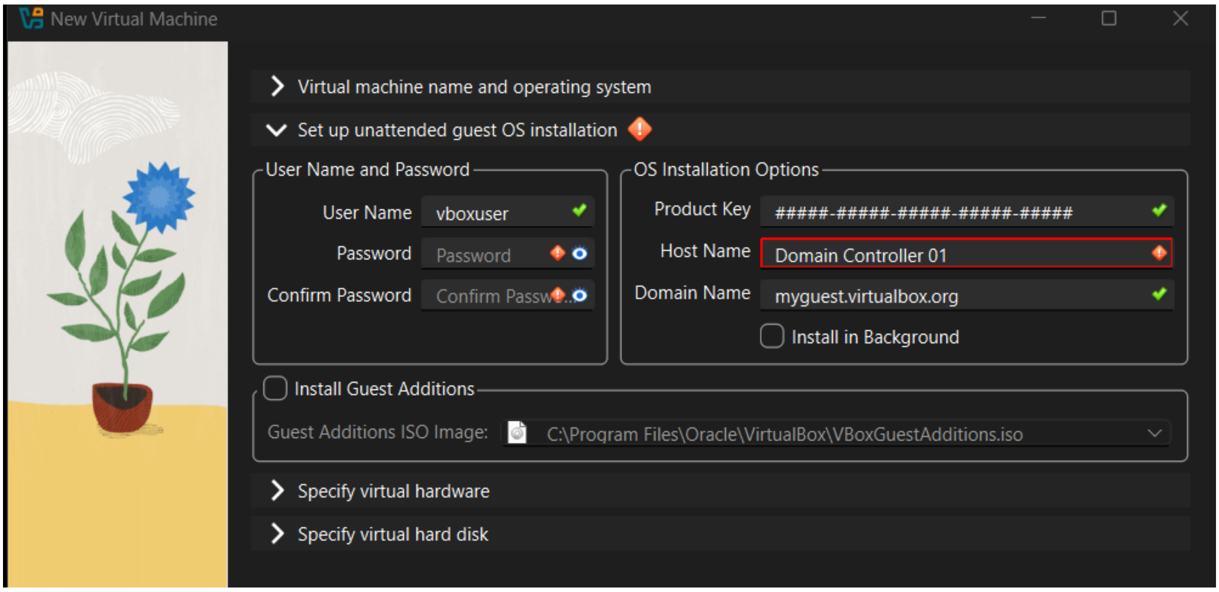
☑ Proceed with Unattended Installation

Set up unattended guest OS installation

Specify virtual hardware

Step 3: Set Hostname and Administrator Credentials

- I selected a **hostname** for the virtual machine.
- I provided a **username** and **password** for the administrator account.
- This ensured a smooth and automated installation process without interruptions.



Virtual machine name and operating system

Set up unattended guest OS installation

User Name and Password

User Name: vboxuser

Password: Password

Confirm Password: Confirm Passw...

OS Installation Options

Product Key: #####-#####-#####-#####-#####

Host Name: Domain Controller 01

Domain Name: myguest.virtualbox.org

☐ Install in Background

☐ Install Guest Additions

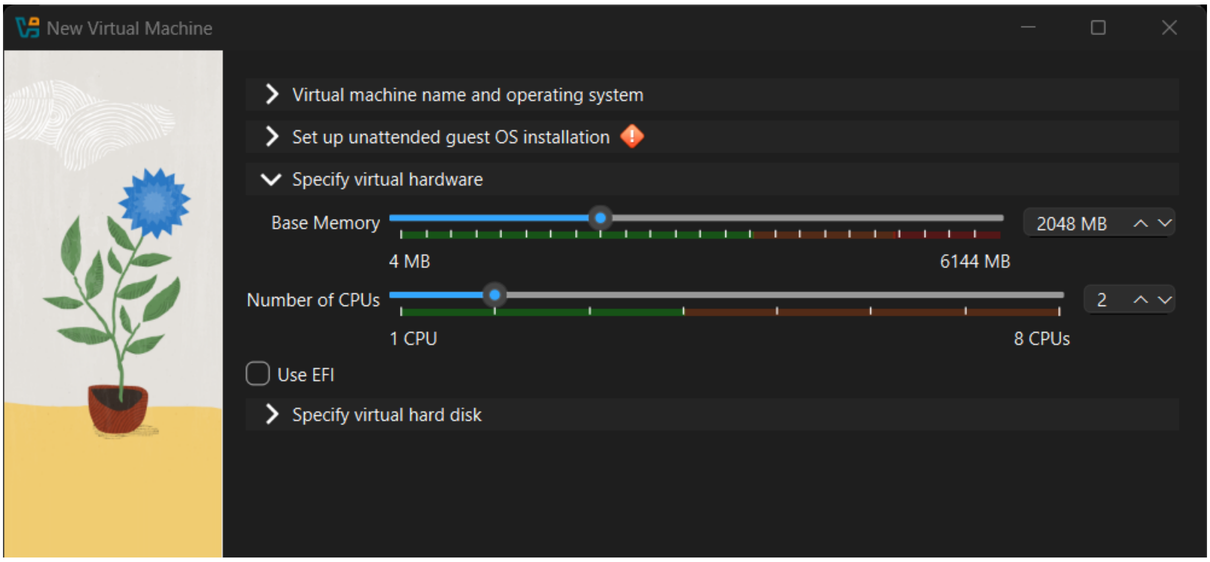
Guest Additions ISO Image: C:\Program Files\Oracle\VirtualBox\VBoxGuestAdditions.iso

Specify virtual hardware

Specify virtual hard disk

Step 4: Allocate Hardware Resources

- I specified the **hardware configuration** for the virtual machine.
- Assigned **2 GB of RAM** and **2 CPU cores** to ensure optimal performance during the installation and operation of the server.


New Virtual Machine
Virtual machine name and operating system
Set up unattended guest OS installation
Specify virtual hardware
4 MB
6144 MB
1 CPU
8 CPUs
Specify virtual hard disk

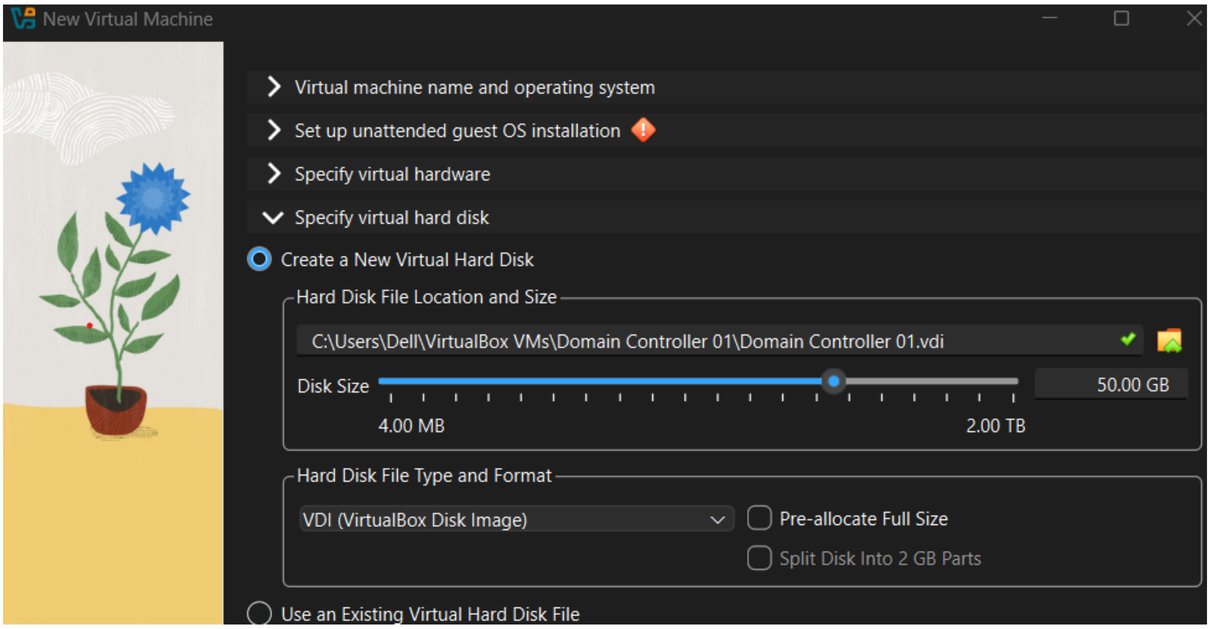
Base Memory: 2048 MB

Number of CPUs: 2

□ Use EFI

Step 5: Configure Storage for the VM

- I specified a **virtual hard drive** of **50 GB** for the virtual machine to store the operating system and lab data.


New Virtual Machine
Virtual machine name and operating system
Set up unattended guest OS installation
Specify virtual hardware
Specify virtual hard disk
Hard Disk File Location and Size
4.00 MB
2.00 TB
Hard Disk File Type and Format

● Create a New Virtual Hard Disk

C:\Users\Dell\VirtualBox VMs\Domain Controller 01\Domain Controller 01.vdi

Disk Size: 50.00 GB

VDI (VirtualBox Disk Image)

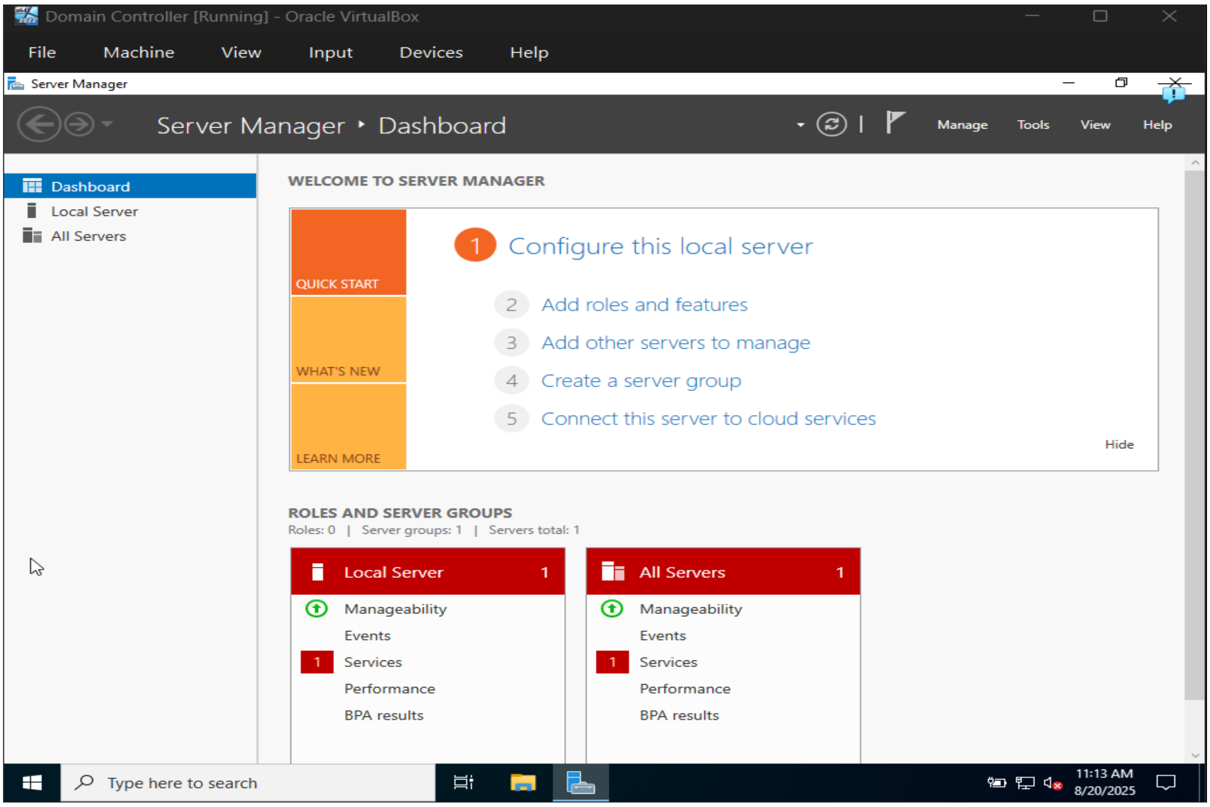
□ Pre-allocate Full Size

□ Split Disk Into 2 GB Parts

○ Use an Existing Virtual Hard Disk File

Step 6: Complete VM Configuration and Install Windows Server 2022

- After entering all the required details, I finished the **Virtual Machine configuration wizard**.
- At the end of the process, I had successfully **installed Windows Server 2022** on my local machine.



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 to manage

4 Create a server group

5 Connect this server to cloud services

Hide

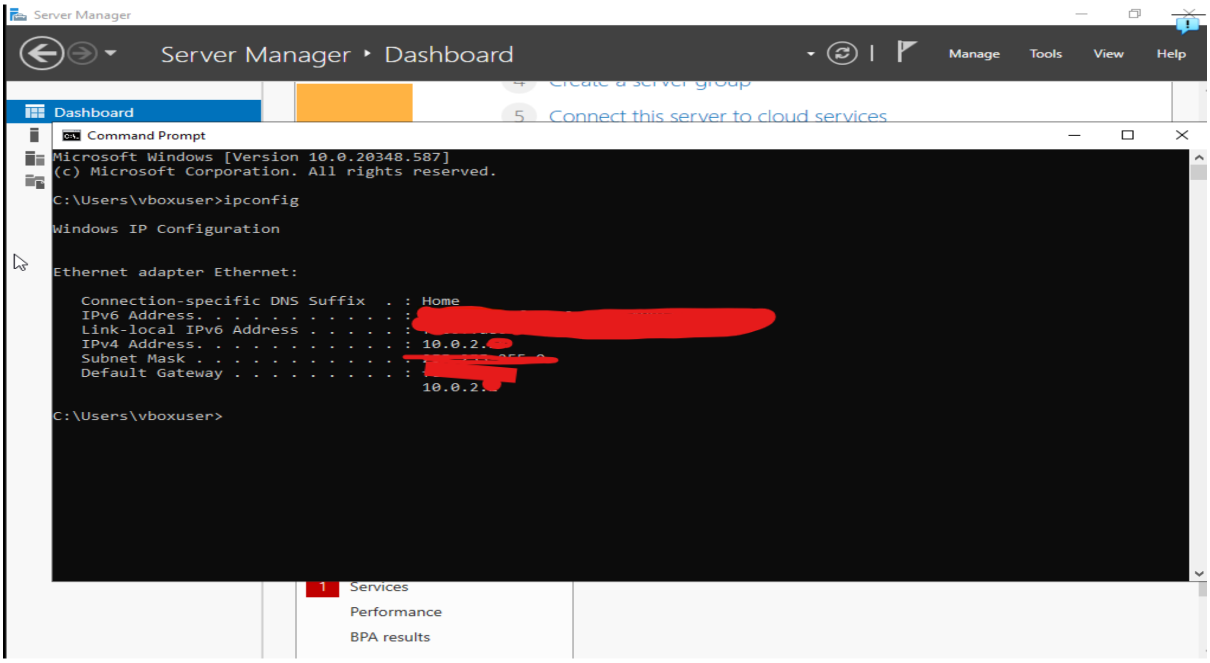
ROLES AND SERVER GROUPS

Roles: 0 | Server groups: 1 | Servers total: 1

Local Server 1	All Servers 1
Manageability	Manageability
Events	Events
1 Services	1 Services
Performance	Performance
BPA results	BPA results

Step 7: Configure Networking for the Domain Controller

- I selected the **Domain Controller 01 VM** and clicked **Settings** → **Network**.
- Then changed **“Attached to”** to **NAT Network**.
- Ensured the **“Name”** dropdown displayed **AD-Lab-Network**.
- Clicked **OK** to apply the network settings.

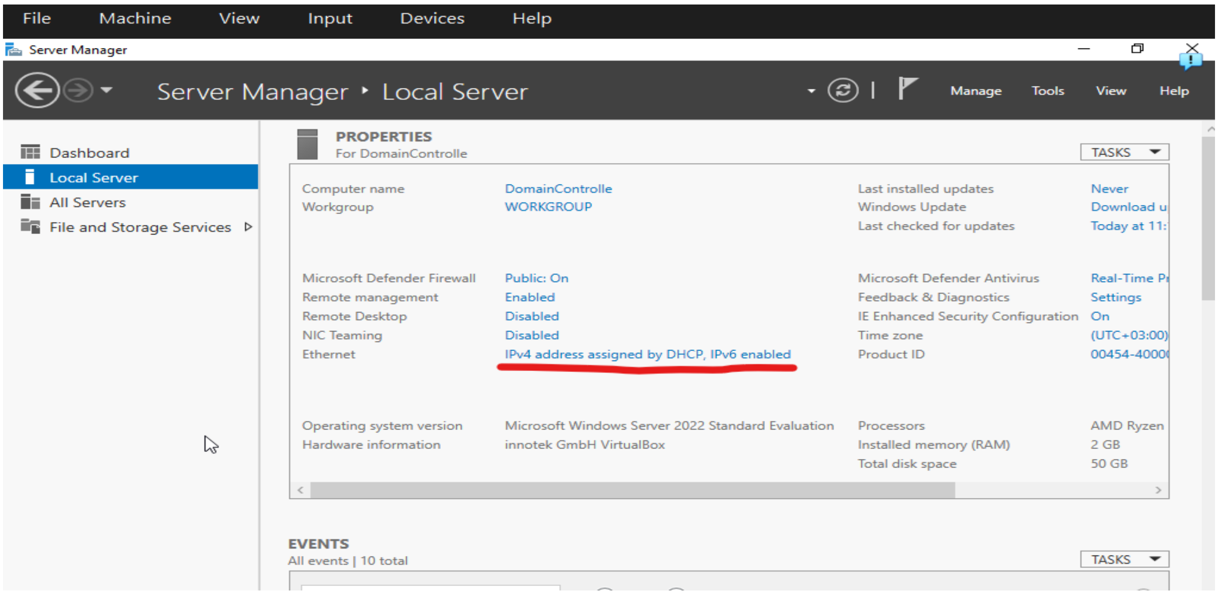


```
Microsoft Windows [Version 10.0.20348.587]
(c) Microsoft Corporation. All rights reserved.

C:\Users\vboxuser>ipconfig

Windows IP Configuration


Ethernet adapter Ethernet:

   Connection-specific DNS Suffix  . : Home
   IPv6 Address. . . . . . . . . . . : [redacted]
   Link-local IPv6 Address . . . . . :
   IPv4 Address. . . . . . . . . . . : 10.0.2.[redacted]
   Subnet Mask . . . . . . . . . . . : [redacted]
   Default Gateway . . . . . . . . . : [redacted]
                                       10.0.2.[redacted]

C:\Users\vboxuser>
```

Step 8: Set the Static IP on Server

• Configured the server’s network adapter to use a **static IP address**, ensuring consistent network identification for the Domain Controller.

• This step is crucial for proper **Active Directory and DNS functionality**.

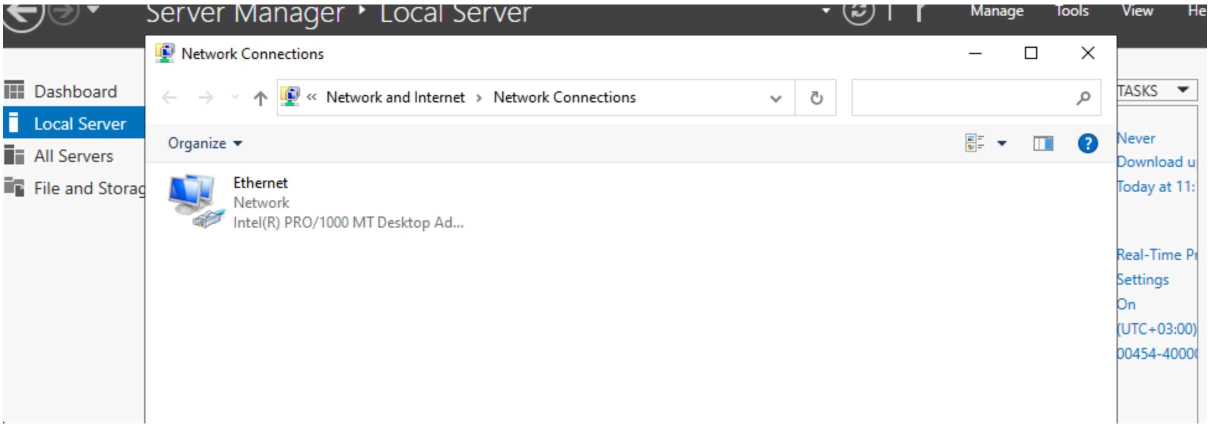


PROPERTIES
For DomainControlle

Computer name	DomainControlle	Last installed updates	Never
Workgroup	WORKGROUP	Windows Update	Download u
		Last checked for updates	Today at 11:
Microsoft Defender Firewall	Public: On	Microsoft Defender Antivirus	Real-Time P
Remote management	Enabled	Feedback & Diagnostics	Settings
Remote Desktop	Disabled	IE Enhanced Security Configuration	On
NIC Teaming	Disabled	Time zone	(UTC+03:00)
Ethernet	IPv4 address assigned by DHCP, IPv6 enabled	Product ID	00454-4000
Operating system version	Microsoft Windows Server 2022 Standard Evaluation	Processors	AMD Ryzen
Hardware information	innotek GmbH VirtualBox	Installed memory (RAM)	2 GB
		Total disk space	50 GB

Step 8: Access Network Settings in Server Manager

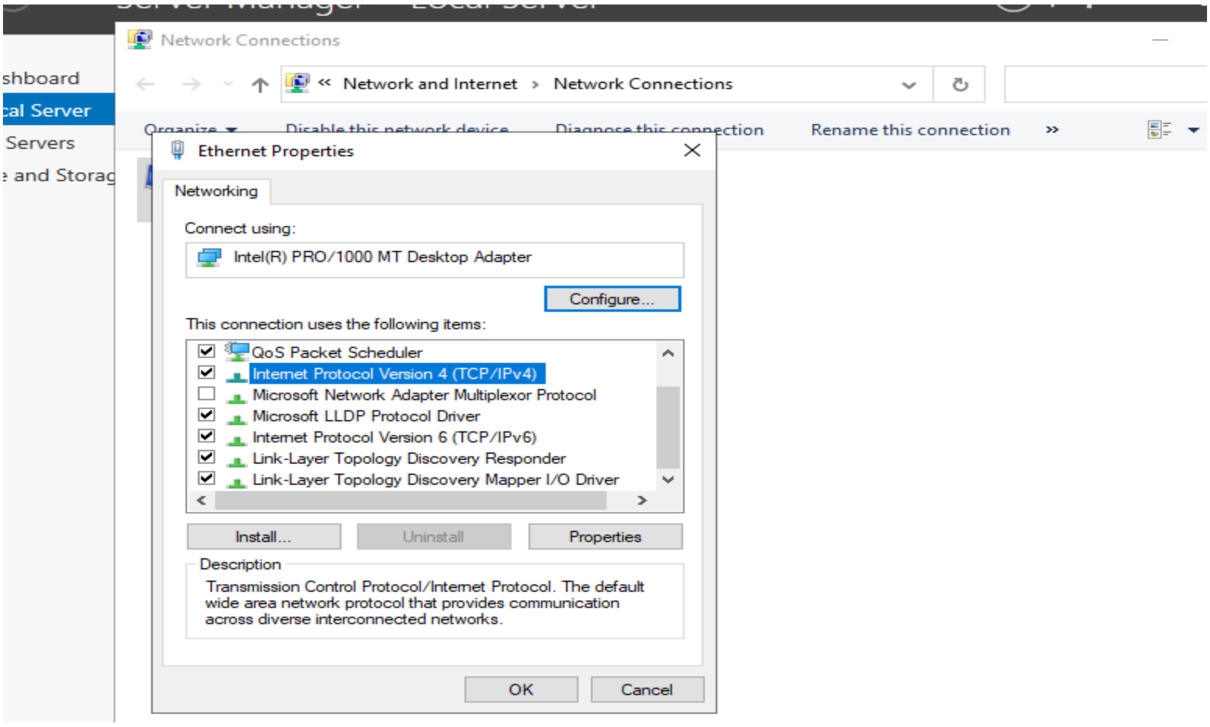
- Opened **Server Manager** and clicked **Local Server**.
- Clicked the link next to **Ethernet** (which initially displays as **“IP address assigned by DHCP”**) to access the network adapter settings for further configuration.



Ethernet
Network
Intel(R) PRO/1000 MT Desktop Ad...

Step 9: Open IPv4 Properties

- Opened the **Properties** of the Ethernet adapter.
- Selected **Internet Protocol Version 4 (TCP/IPv4)** to configure the IP settings for the server.



Connect using:

Intel(R) PRO/1000 MT Desktop Adapter

This connection uses the following items:

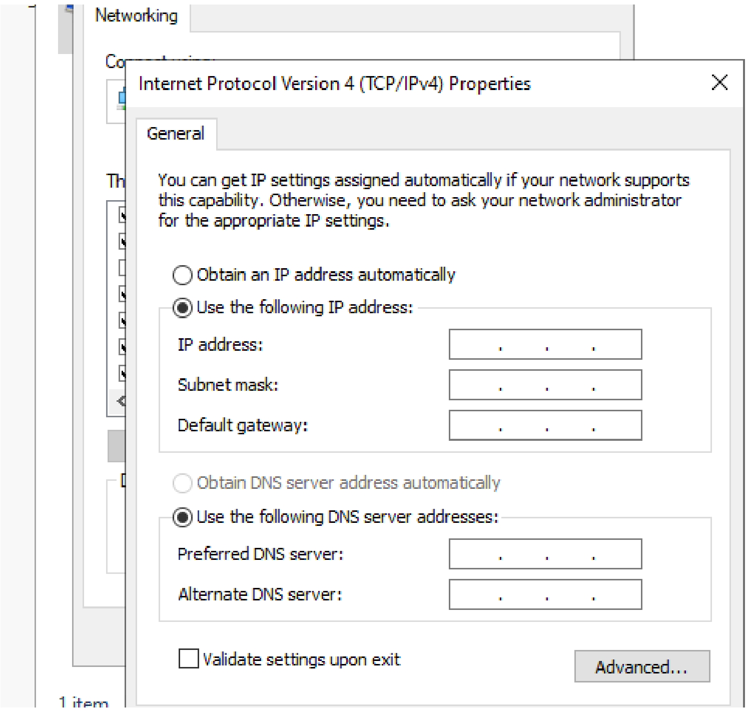
- ☑ QoS Packet Scheduler
- ☑ Internet Protocol Version 4 (TCP/IPv4)
- ☐ Microsoft Network Adapter Multiplexor Protocol
- ☑ Microsoft LLDP Protocol Driver
- ☑ Internet Protocol Version 6 (TCP/IPv6)
- ☑ Link-Layer Topology Discovery Responder
- ☑ Link-Layer Topology Discovery Mapper I/O Driver

Description

Transmission Control Protocol/Internet Protocol. The default wide area network protocol that provides communication across diverse interconnected networks.

Step 10: Configure Static IP for the Domain Controller

- Configured the following settings:
  - **IP Address:** 10.0.2.10
  - **Subnet Mask:** 255.255.255.0
  - **Default Gateway:** 10.0.2.1
  - **Preferred DNS Server:** 127.0.0.1 (so the server queries itself for DNS, which is essential once Active Directory is installed)
- Clicked **OK** and **Close**.
- Noted that the server may briefly lose network connectivity, which is normal during the change.



Internet Protocol Version 4 (TCP/IPv4) Properties

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: . . .

Subnet mask: . . .

Default gateway: . . .

○ Obtain DNS server address automatically

● Use the following DNS server addresses:

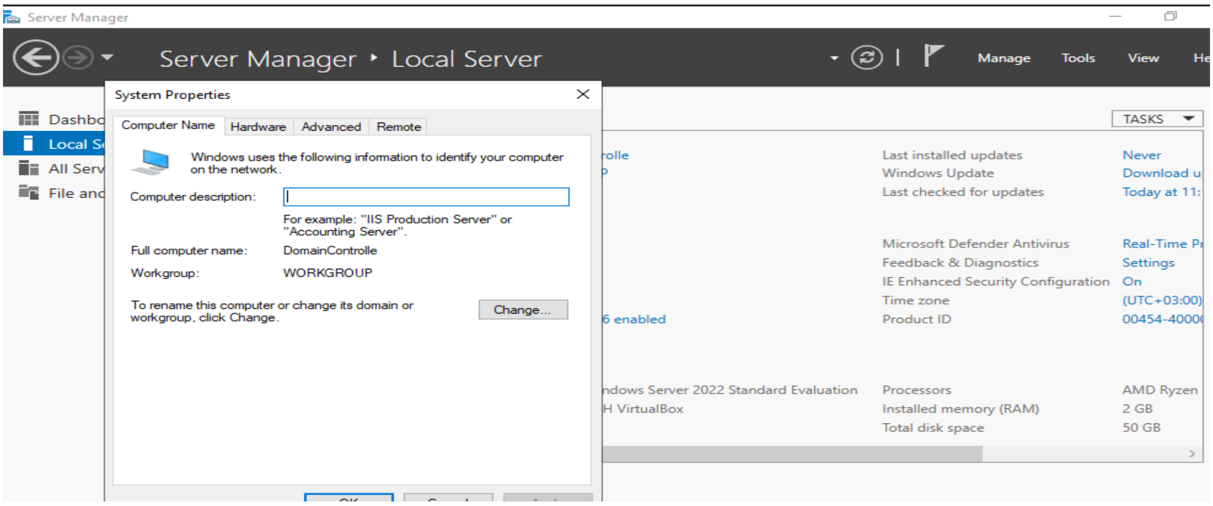
Preferred DNS server: . . .

Alternate DNS server: . . .

□ Validate settings upon exit

Step 11: Rename the Server Computer

- In **Server Manager → Local Server**, clicked the existing computer name.
- Renamed the computer to **DC01** to reflect its role as the Domain Controller.
- Restarted the server to apply the new name.



System Properties

Windows uses the following information to identify your computer on the network.

Computer description:

For example: "IIS Production Server" or "Accounting Server".

Full computer name: DomainControlle

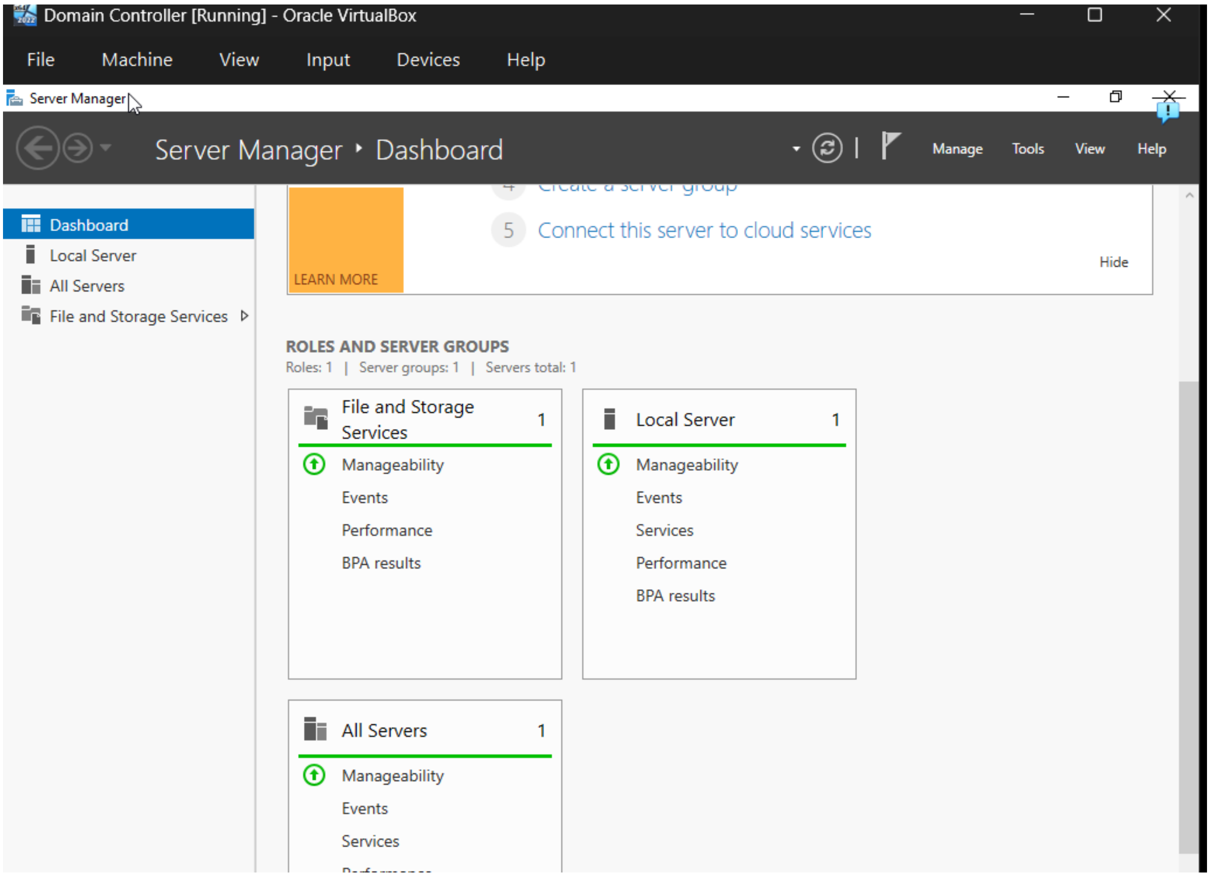
Workgroup: WORKGROUP

To rename this computer or change its domain or workgroup, click Change.

Last installed updates	Never
Windows Update	Download u
Last checked for updates	Today at 11:
Microsoft Defender Antivirus	Real-Time Pr
Feedback & Diagnostics	Settings
IE Enhanced Security Configuration	On
Time zone	(UTC+03:00)
Product ID	00454-4000
Processors	AMD Ryzen
Installed memory (RAM)	2 GB
Total disk space	50 GB

rolle
6 enabled
ndows Server 2022 Standard Evaluation
H VirtualBox

- After restarting the server this is what it looked like.



Domain Controller [Running] - Oracle VirtualBox
File
Machine
View
Input
Devices
Help
Server Manager
Server Manager ‣ Dashboard
Manage
Tools
View
Help
Dashboard
Local Server
All Servers
File and Storage Services
4 Create a server group
5 Connect this server to cloud services
LEARN MORE
Hide

ROLES AND SERVER GROUPS
Roles: 1 | Server groups: 1 | Servers total: 1

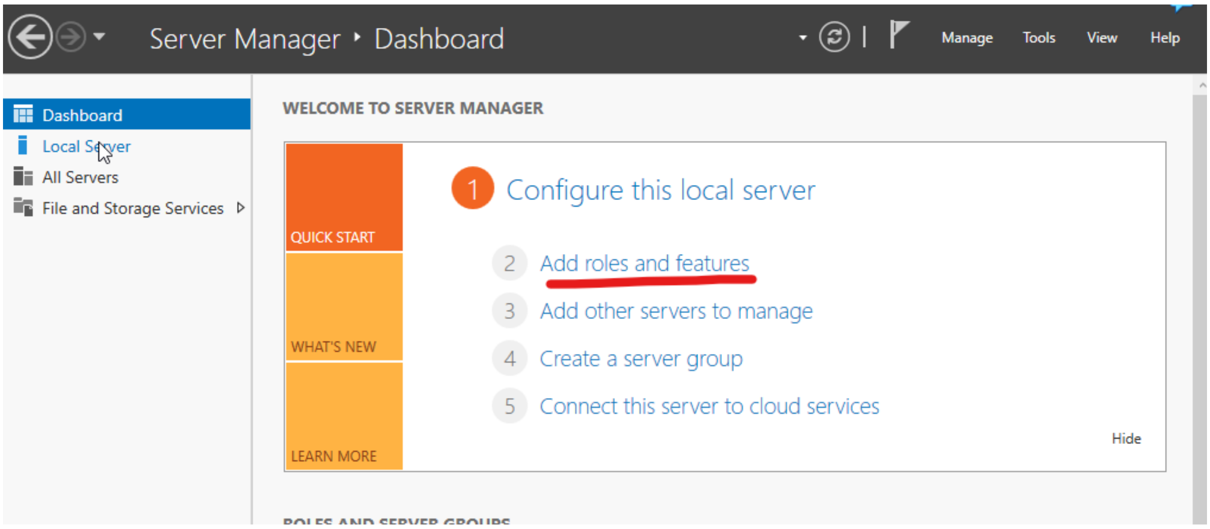
File and Storage Services 1
Manageability
Events
Performance
BPA results

Local Server 1
Manageability
Events
Services
Performance
BPA results

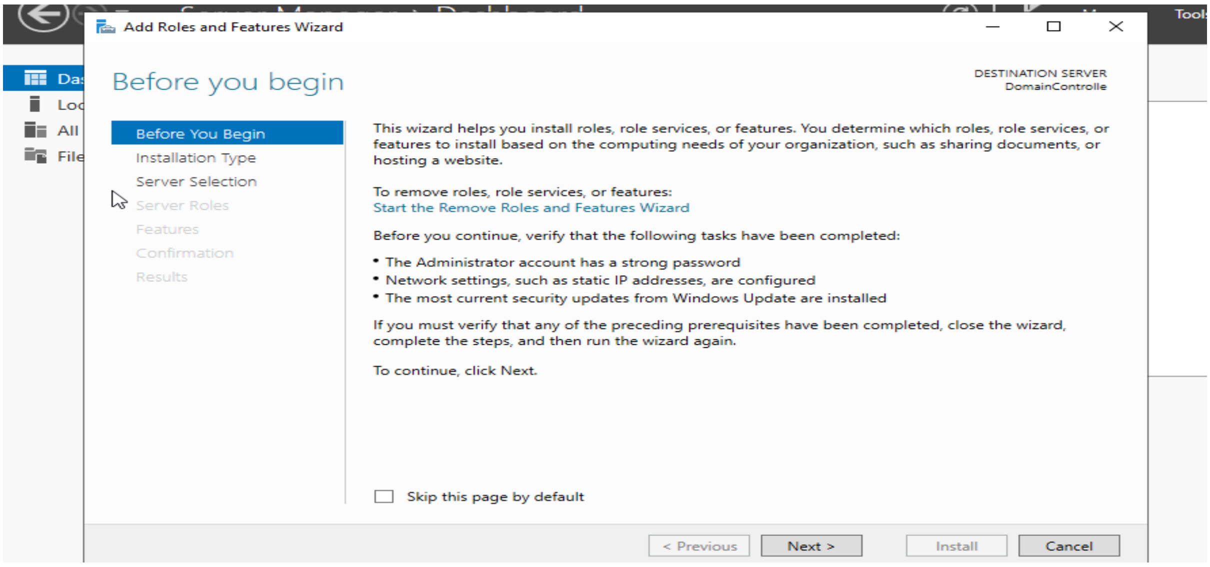
All Servers 1
Manageability
Events
Services
Performance

Step 12: Install and Promote Active Directory

1. After restarting the server, opened **Server Manager**.
2. Clicked **Manage → Add Roles and Features**.


Server Manager ‣ Dashboard
Manage
Tools
View
Help
Dashboard
Local Server
All Servers
File and Storage Services
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 to manage
4 Create a server group
5 Connect this server to cloud services
Hide
ROLES AND SERVER GROUPS

3. Proceeded through the wizard by clicking **next** until reaching **Server Roles**.



This wizard helps you install roles, role services, or features. You determine which roles, role services, or features to install based on the computing needs of your organization, such as sharing documents, or hosting a website.

To remove roles, role services, or features:
Start the Remove Roles and Features Wizard

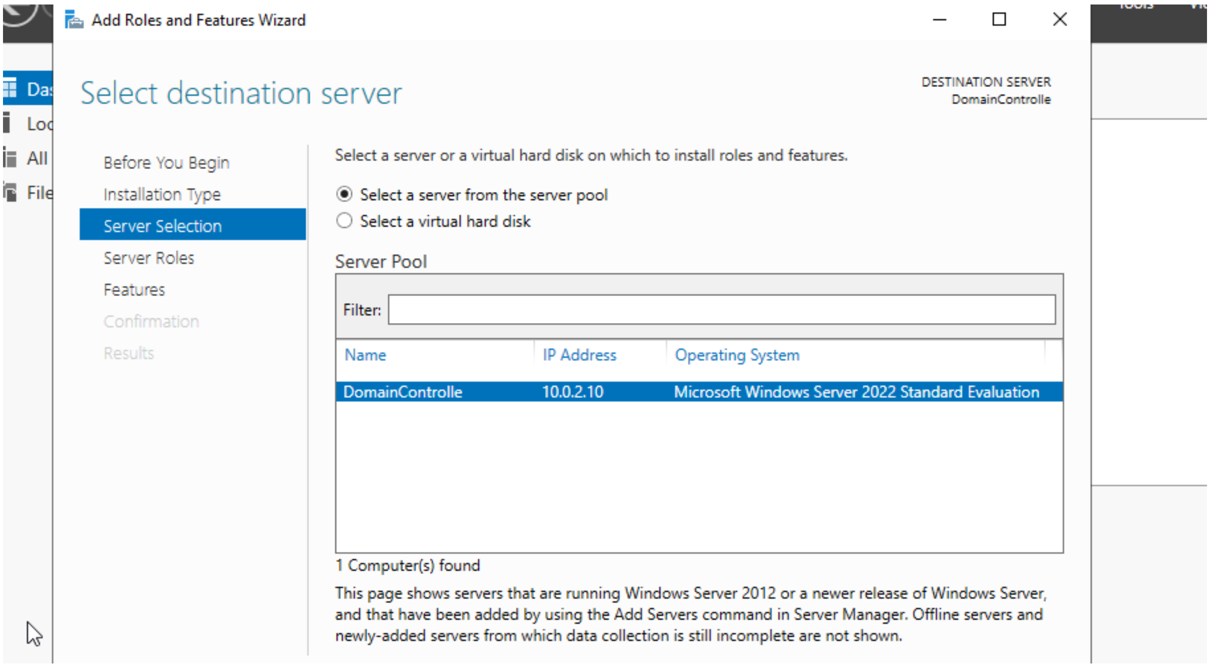
Before you continue, verify that the following tasks have been completed:

- The Administrator account has a strong password
- Network settings, such as static IP addresses, are configured
- The most current security updates from Windows Update are installed

If you must verify that any of the preceding prerequisites have been completed, close the wizard, complete the steps, and then run the wizard again.

To continue, click Next.

□ Skip this page by default



Select destination server

Select a server or a virtual hard disk on which to install roles and features.

● Select a server from the server pool
○ Select a virtual hard disk

Server Pool

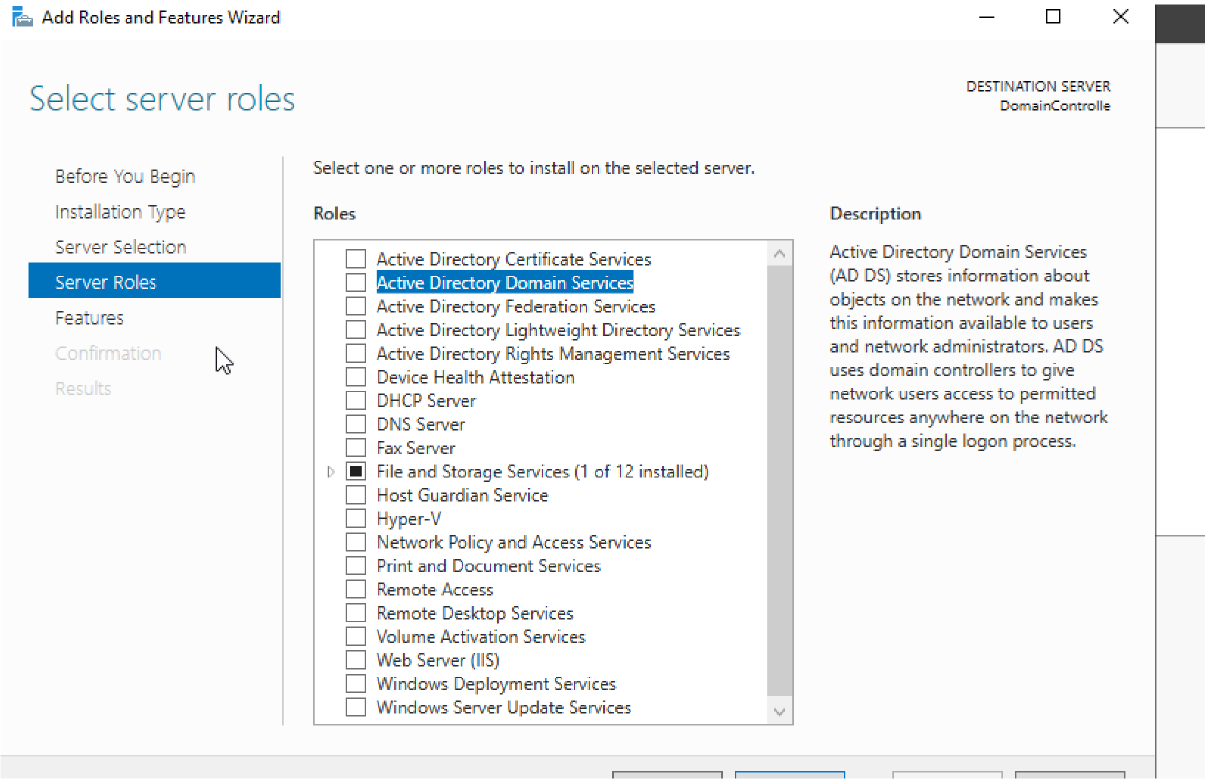
Filter:

Name	IP Address	Operating System
DomainControlle	10.0.2.10	Microsoft Windows Server 2022 Standard Evaluation

1 Computer(s) found

This page shows servers that are running Windows Server 2012 or a newer release of Windows Server, and that have been added by using the Add Servers command in Server Manager. Offline servers and newly-added servers from which data collection is still incomplete are not shown.

4. Checked **Active Directory Domain Services (AD DS)** and accepted the prompt to add the required features.



Select server roles

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

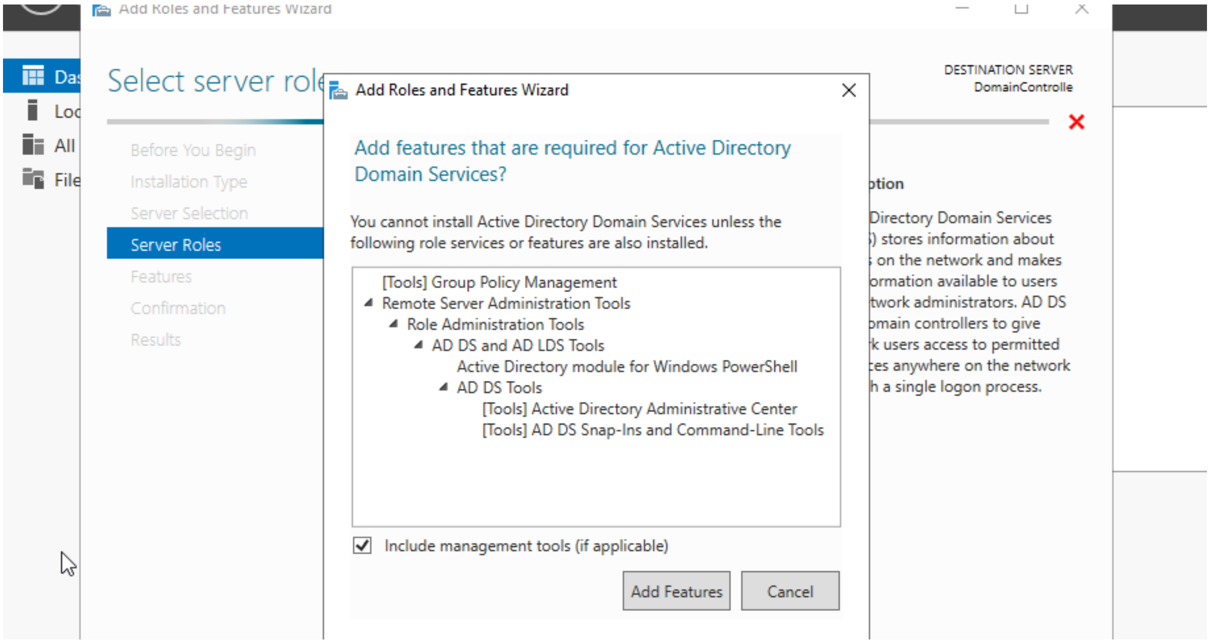
Roles

□ Active Directory Certificate Services
□ Active Directory Domain Services
□ Active Directory Federation Services
□ Active Directory Lightweight Directory Services
□ Active Directory Rights Management Services
□ Device Health Attestation
□ DHCP Server
□ DNS Server
□ Fax Server
■ File and Storage Services (1 of 12 installed)
□ Host Guardian Service
□ Hyper-V
□ Network Policy and Access Services
□ Print and Document Services
□ Remote Access
□ Remote Desktop Services
□ Volume Activation Services
□ Web Server (IIS)
□ Windows Deployment Services
□ Windows Server Update Services

Description

Active Directory Domain Services (AD DS) stores information about objects on the network and makes this information available to users and network administrators. AD DS uses domain controllers to give network users access to permitted resources anywhere on the network through a single logon process.

5. Continued clicking **Next** and finally clicked **Install** to install the role.



Add features that are required for Active Directory Domain Services?

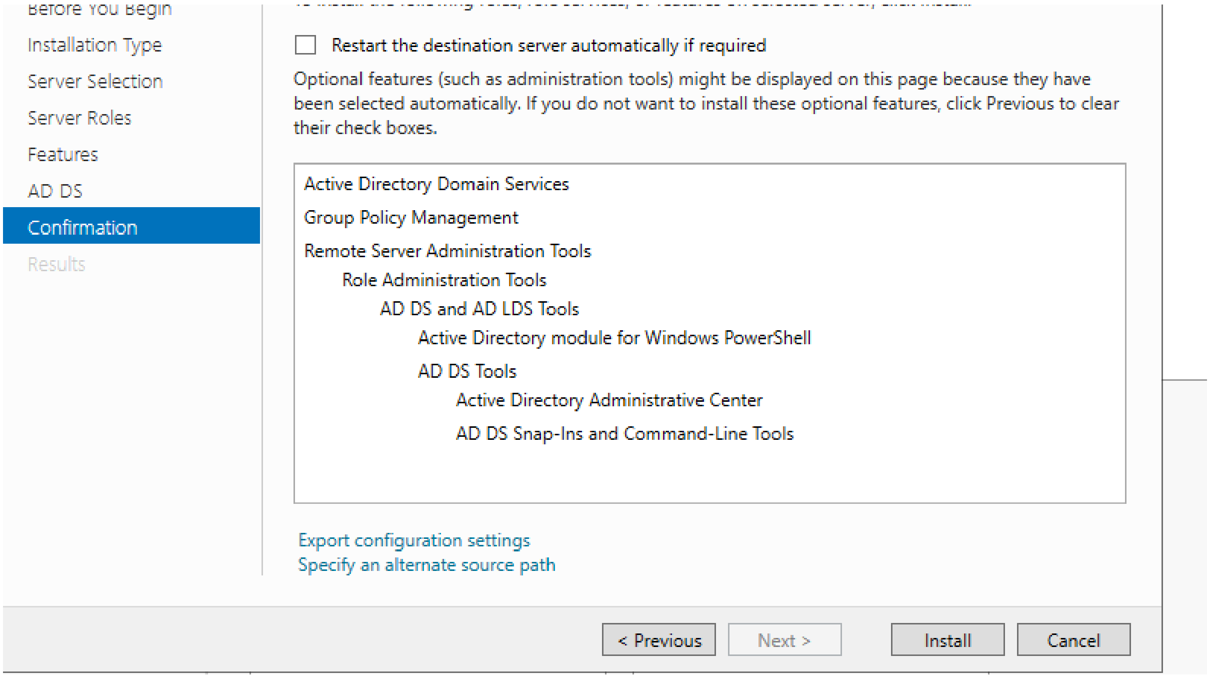
You cannot install Active Directory Domain Services unless the following role services or features are also installed.

[Tools] Group Policy Management
- Remote Server Administration Tools
  - Role Administration Tools
    - AD DS and AD LDS Tools
      - Active Directory module for Windows PowerShell
      - AD DS Tools
        - [Tools] Active Directory Administrative Center
        - [Tools] AD DS Snap-Ins and Command-Line Tools

☑ Include management tools (if applicable)

ption

Directory Domain Services) stores information about on the network and makes ormation available to users twork administrators. AD DS omain controllers to give k users access to permitted ces anywhere on the network h a single logon process.



□ Restart the destination server automatically if required

Optional features (such as administration tools) might be displayed on this page because they have been selected automatically. If you do not want to install these optional features, click Previous to clear their check boxes.

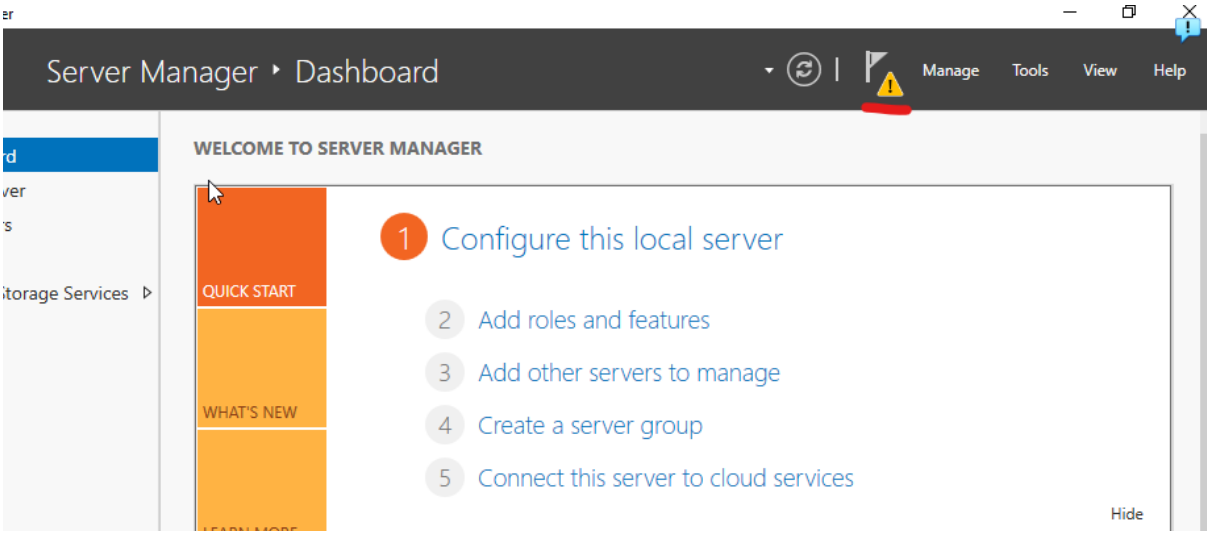
Active Directory Domain Services

Group Policy Management

Remote Server Administration Tools
- Role Administration Tools
  - AD DS and AD LDS Tools
    - Active Directory module for Windows PowerShell
    - AD DS Tools
      - Active Directory Administrative Center
      - AD DS Snap-Ins and Command-Line Tools

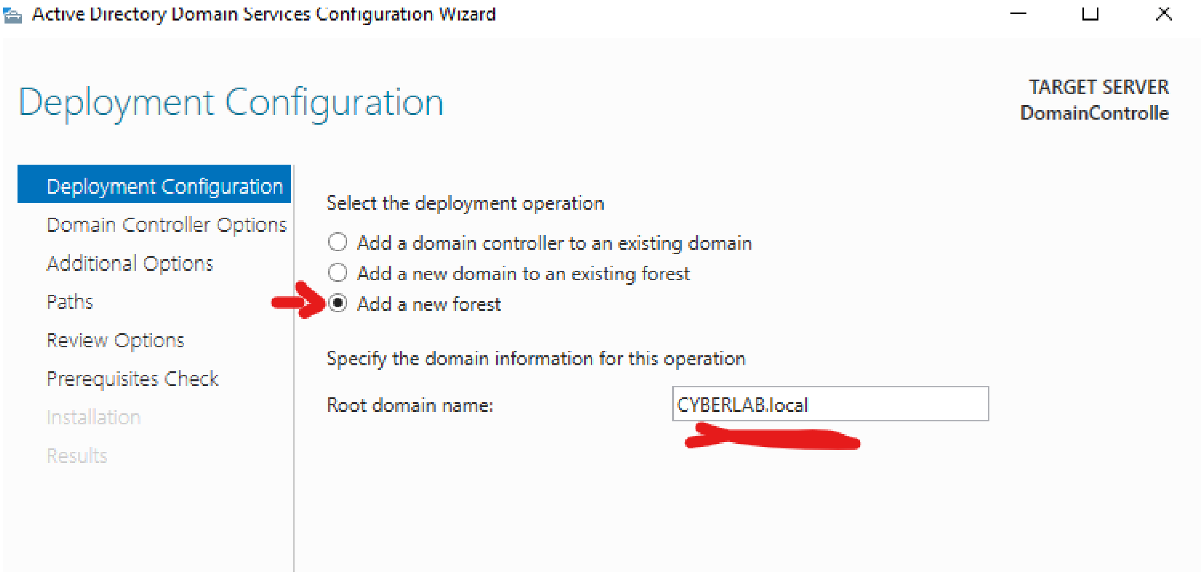
Export configuration settings
Specify an alternate source path

6. After the installation completed, a **notification flag** appeared at the top of Server Manager.
7. Clicked the flag and selected **“Promote this server to a domain controller”** to begin the domain configuration.


Server Manager • Dashboard
Manage
Tools
View
Help
WELCOME TO SERVER MANAGER
QUICK START
WHAT'S NEW
1 Configure this local server
2 Add roles and features
3 Add other servers to manage
4 Create a server group
5 Connect this server to cloud services
Hide
Storage Services

Step 13: Configure Active Directory and Promote to Domain Controller

- In the **Active Directory Domain Services Configuration Wizard**, I selected **“Add a new forest”**.
- Entered a **root domain name**, choosing a fictional domain to avoid conflicts with real internet domains. I used **CYBERLAB.local**.


Active Directory Domain Services Configuration Wizard

Deployment Configuration

TARGET SERVER
DomainControlle

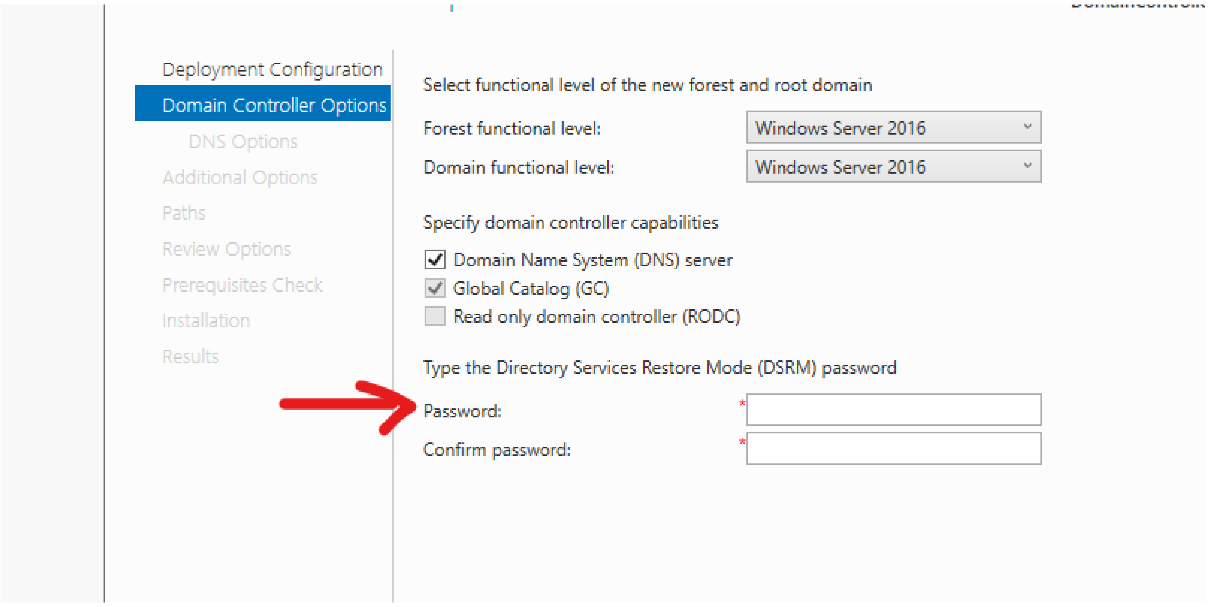
Select the deployment operation

○ Add a domain controller to an existing domain
○ Add a new domain to an existing forest
● Add a new forest

Specify the domain information for this operation

Root domain name: CYBERLAB.local

- On the next screen, I set a **DSRM (Directory Services Restore Mode) password** and noted it down securely.
- Clicked **Next** through the remaining screens, accepting the default options.
- Clicked **Install**, allowing the server to install Active Directory and restart automatically.



Select functional level of the new forest and root domain

Forest functional level: Windows Server 2016

Domain functional level: Windows Server 2016

Specify domain controller capabilities

☑ Domain Name System (DNS) server

☑ Global Catalog (GC)

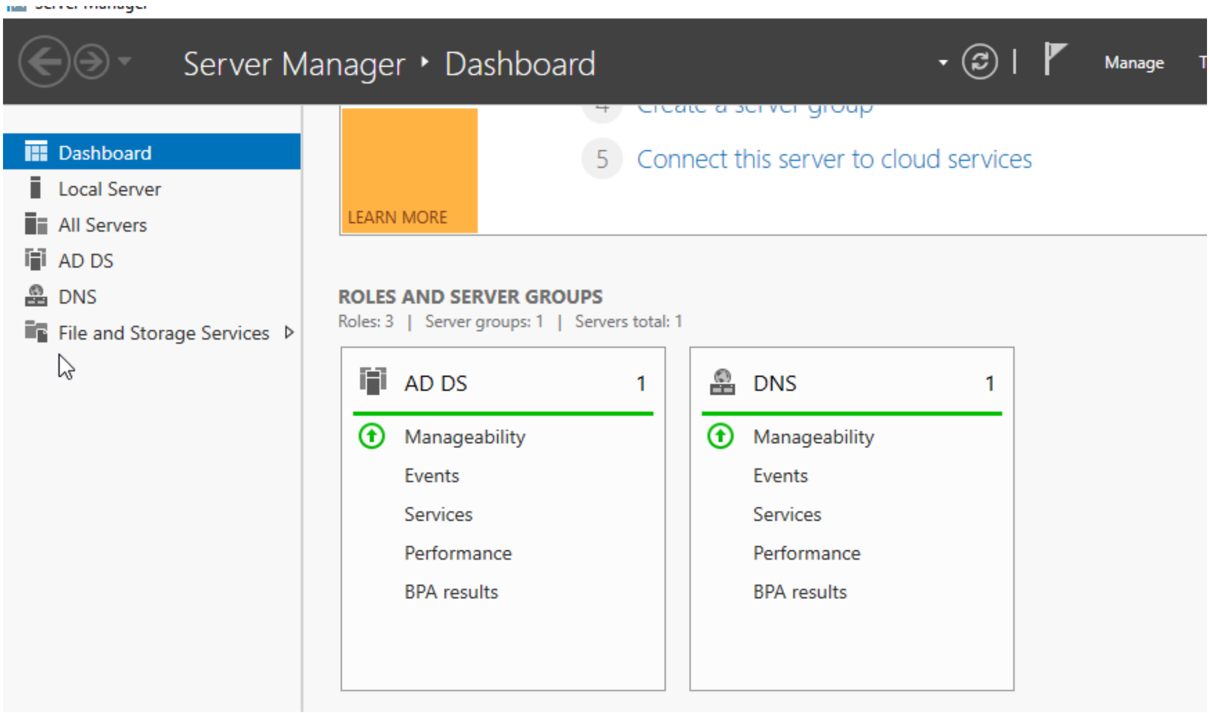
□ Read only domain controller (RODC)

Type the Directory Services Restore Mode (DSRM) password

Password: *

Confirm password: *

At the end of this process, **DC01** was successfully promoted to a **Domain Controller** for the **CYBERLAB.LOCAL** domain.


Server Manager ‣ Dashboard
Manage
Dashboard
Local Server
All Servers
AD DS
DNS
File and Storage Services ▷
5 Connect this server to cloud services
LEARN MORE

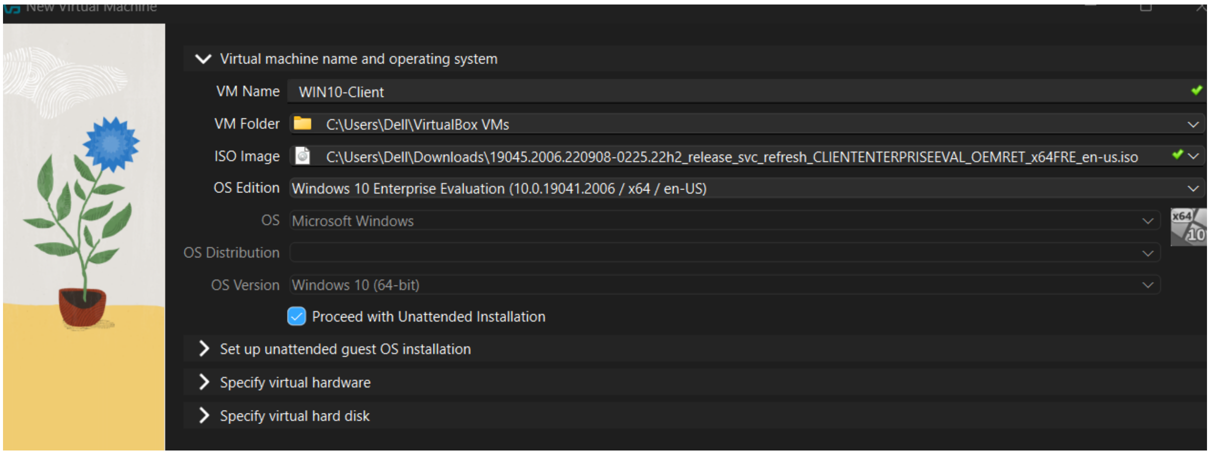
ROLES AND SERVER GROUPS

Roles: 3 | Server groups: 1 | Servers total: 1

Part 3: The Client Workstation

Step 1: Create the Windows 10 Client VM

- I created a new virtual machine following the same procedure used for the server VM and named it **WIN10-Client**.
- Allocated **4 GB of RAM**, **2 CPU cores**, and a **40 GB virtual hard disk** to ensure smooth performance for the client operating system.



New Virtual Machine

Virtual machine name and operating system

VM Name: WIN10-Client

VM Folder: C:\Users\Dell\VirtualBox VMs

ISO Image: C:\Users\Dell\Downloads\19045.2006.220908-0225.22h2_release_svc_refresh_CLIENTENTERPRISEEVAL_OEMRET_x64FRE_en-us.iso

OS Edition: Windows 10 Enterprise Evaluation (10.0.19041.2006 / x64 / en-US)

OS: Microsoft Windows

OS Distribution:

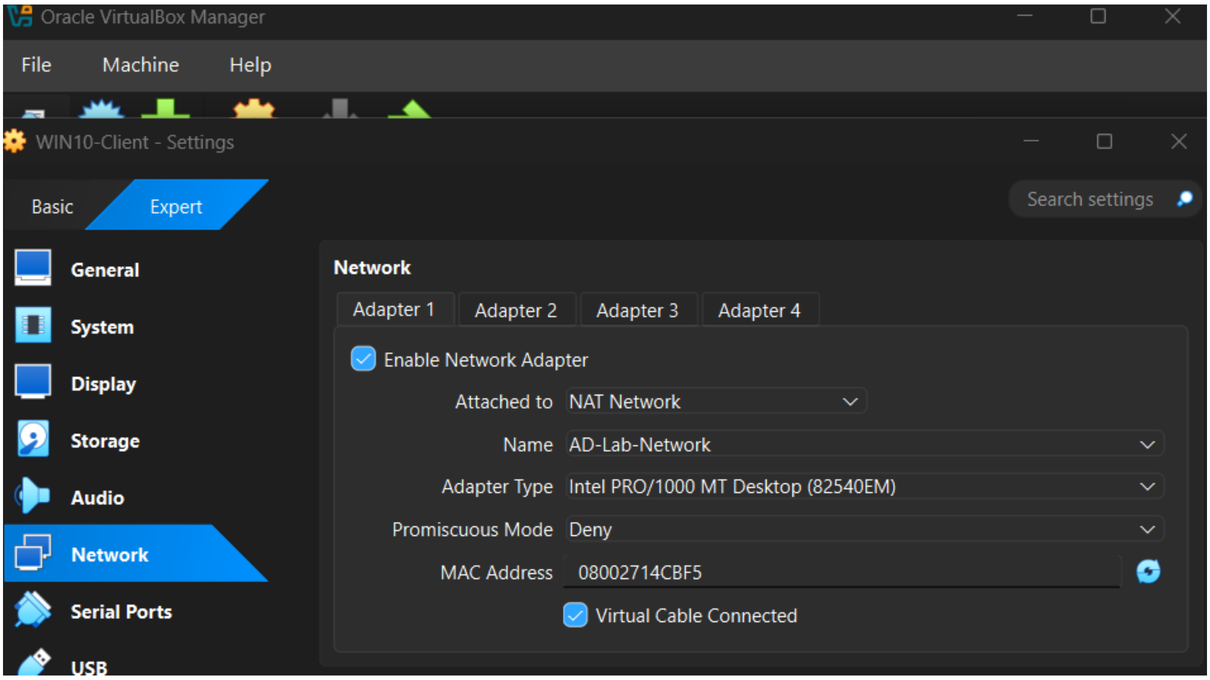
OS Version: Windows 10 (64-bit)

☑ Proceed with Unattended Installation

Set up unattended guest OS installation
Specify virtual hardware
Specify virtual hard disk

Step 2: Configure Networking and Install Windows 10 Client

- In **WIN10-Client VM → Settings → Network**, I attached the virtual machine to the same **NAT Network (AD-Lab-Network)** used by the Domain Controller.
- Started the VM and completed the **Windows 10 operating system installation** to set up the client machine within the virtual lab environment.



Network

Adapter 1 | Adapter 2 | Adapter 3 | Adapter 4

☑ Enable Network Adapter

Attached to: NAT Network

Name: AD-Lab-Network

Adapter Type: Intel PRO/1000 MT Desktop (82540EM)

Promiscuous Mode: Deny

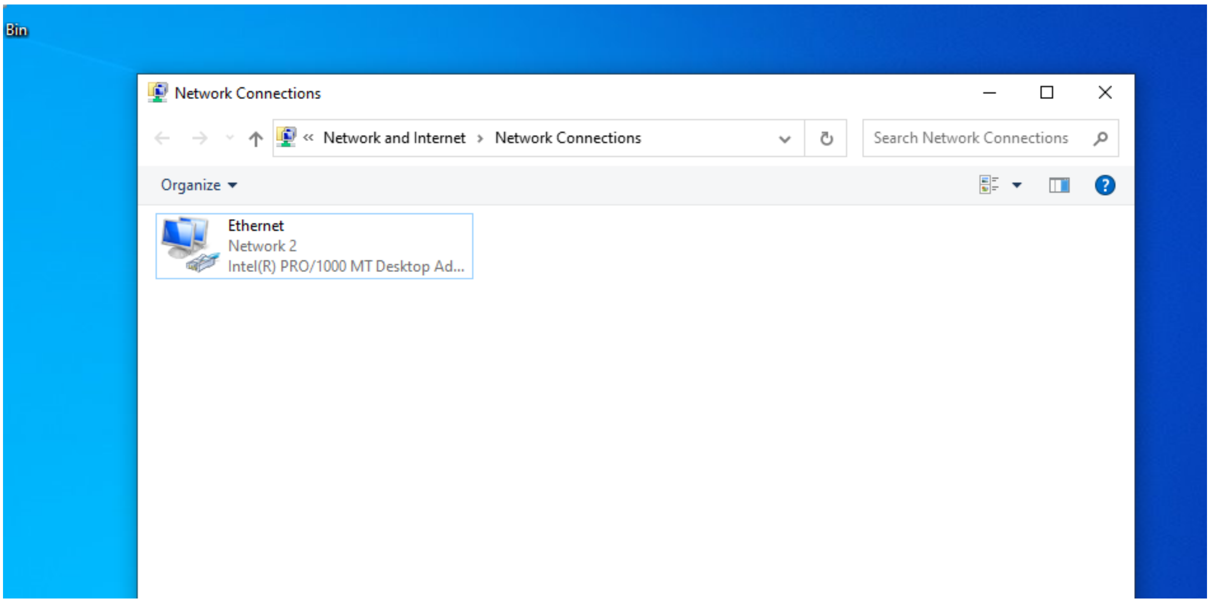
MAC Address: 08002714CBF5

☑ Virtual Cable Connected

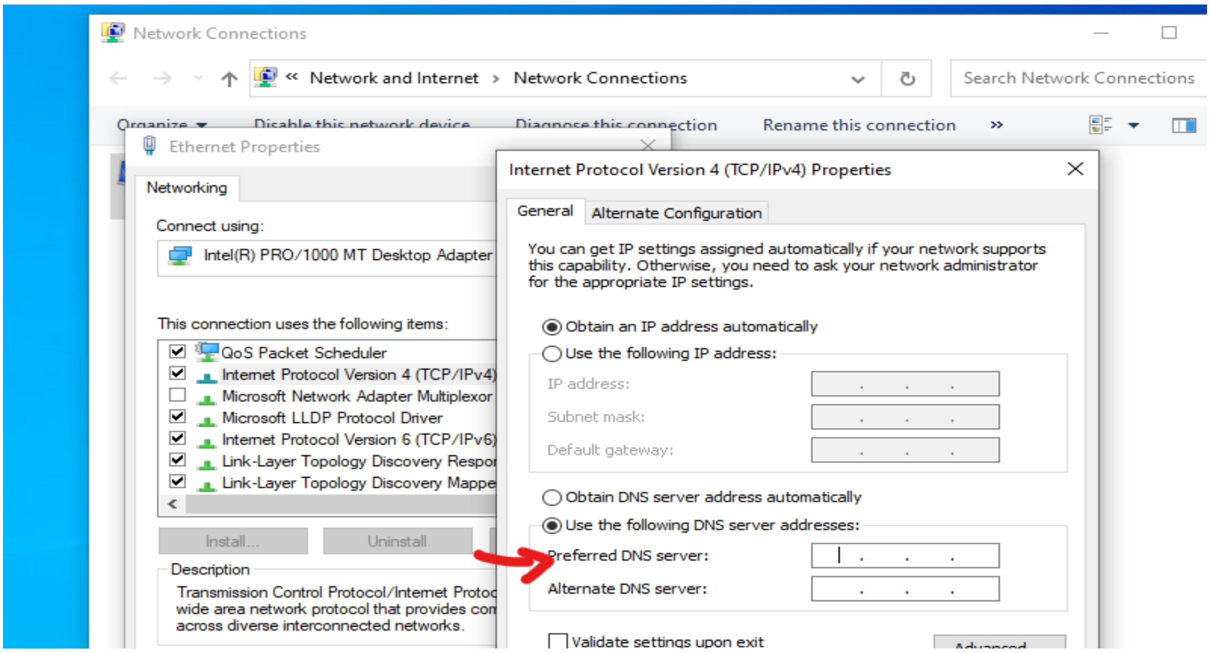
Step 3: Configure Client Networking

- After completing the Windows 10 installation, I configured the network settings to ensure the client uses the Domain Controller for DNS.
- Opened the **network adapter properties**, similar to the configuration done on the server.
- Set the **IP address configuration** to **“Obtain an IP address automatically”**.
- Set the **Preferred DNS server** to the Domain Controller’s IP address: **10.0.2.10**.

This configuration ensures the client can properly communicate with the domain and access Active Directory services.


Bin
Network Connections
« Network and Internet › Network Connections
Search Network Connections
Organize ▾
Ethernet
Network 2
Intel(R) PRO/1000 MT Desktop Ad...

- Set the **Preferred DNS server** to the Domain Controller’s IP address: **10.0.2.10**.



Connect using:

Intel(R) PRO/1000 MT Desktop Adapter

This connection uses the following items:

- ☑ QoS Packet Scheduler
- ☑ Internet Protocol Version 4 (TCP/IPv4)
- □ Microsoft Network Adapter Multiplexor
- ☑ Microsoft LLDP Protocol Driver
- ☑ Internet Protocol Version 6 (TCP/IPv6)
- ☑ Link-Layer Topology Discovery Respor
- ☑ Link-Layer Topology Discovery Mappe

Description

Transmission Control Protocol/Internet Protoc wide area network protocol that provides cor across diverse interconnected networks.

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: . . .
Subnet mask: . . .
Default gateway: . . .

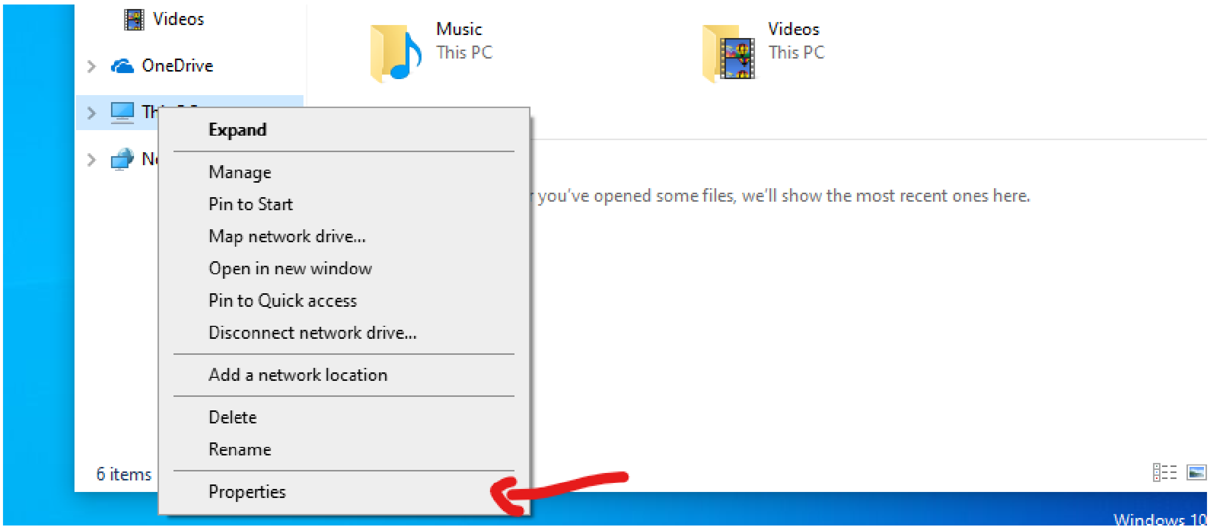
○ Obtain DNS server address automatically
● Use the following DNS server addresses:

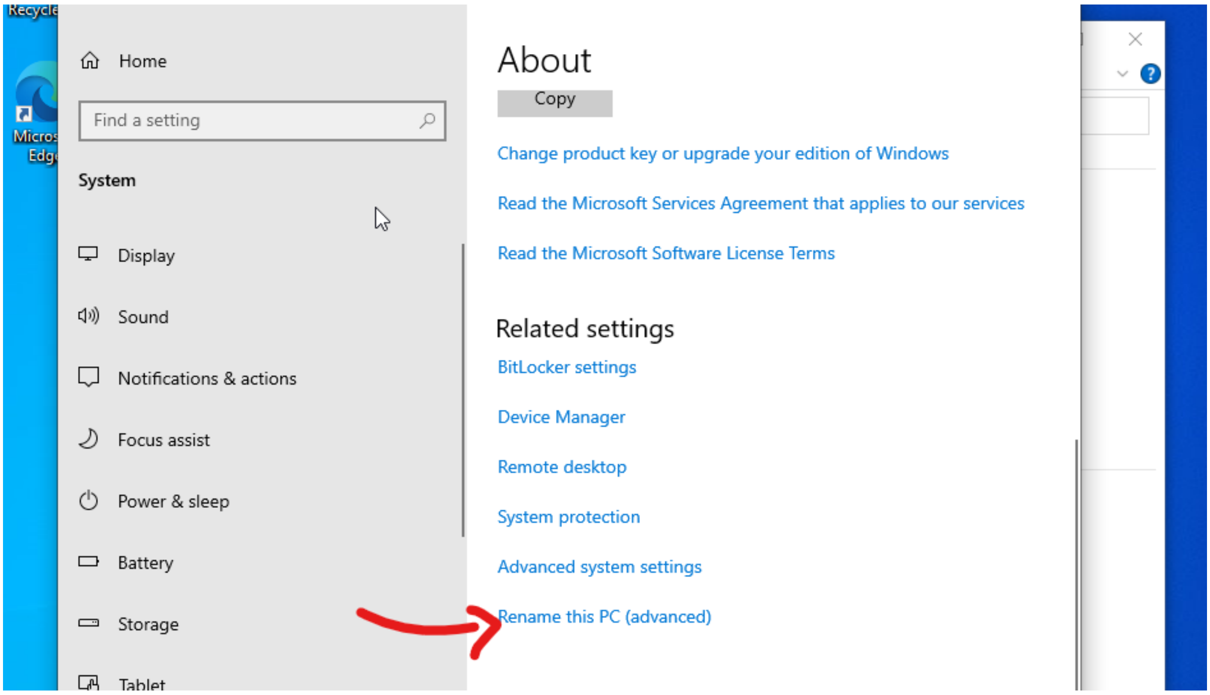
Preferred DNS server: . . .
Alternate DNS server: . . .

□ Validate settings upon exit

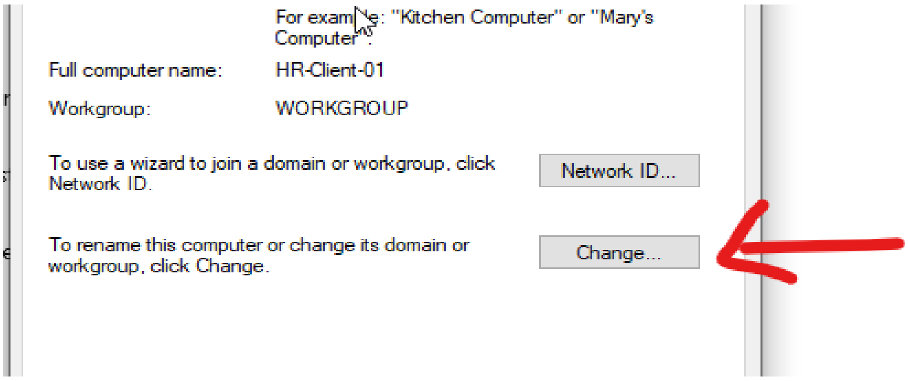
Step 4: Join the Client to the Domain

- I opened **System Properties** by right-clicking **This PC → Properties → Rename this PC (advanced)**.





- Clicked the **“Change…”** button.



For example: "Kitchen Computer" or "Mary's Computer".

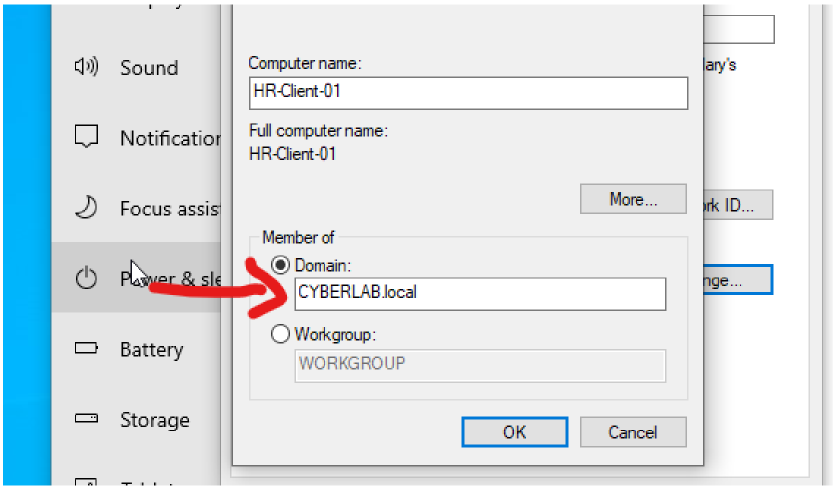
Full computer name: HR-Client-01

Workgroup: WORKGROUP

To use a wizard to join a domain or workgroup, click Network ID.

To rename this computer or change its domain or workgroup, click Change.

- Under **“Member of”**, selected **Domain** and entered the domain name: **CYBERLAB.local**.



Computer name: HR-Client-01

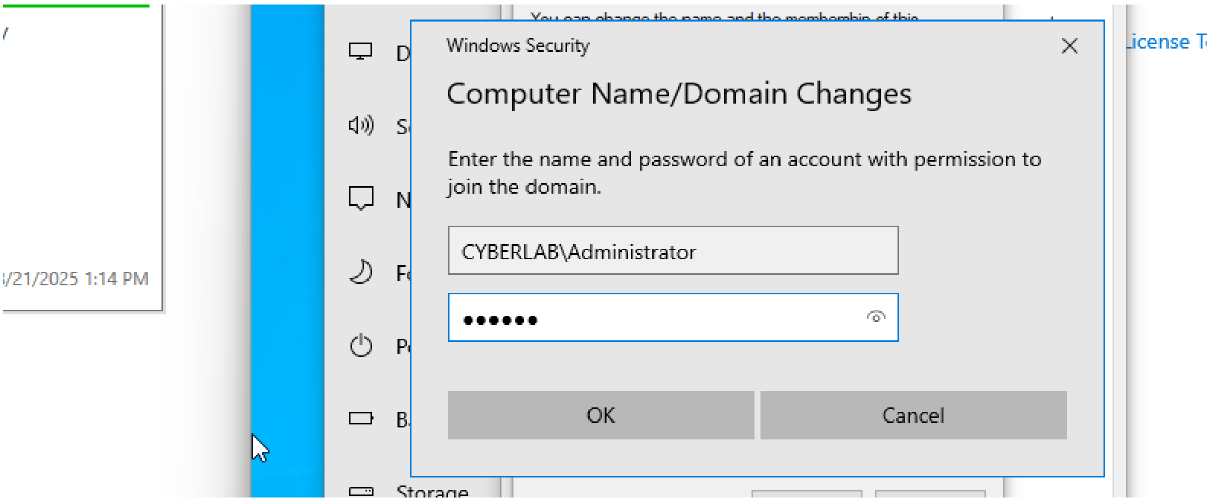
Full computer name: HR-Client-01

Member of

● Domain: CYBERLAB.local

○ Workgroup: WORKGROUP

- Entered the **administrator credentials** for the domain (**CYBERLAB\Administrator**) along with the password set during the Windows Server setup.



Windows Security

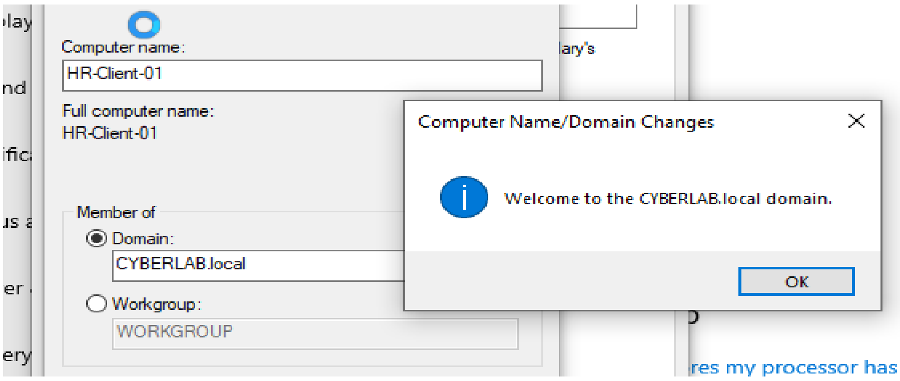
Computer Name/Domain Changes

Enter the name and password of an account with permission to join the domain.

CYBERLAB\Administrator

••••••

- Received the **"Welcome to the CYBERLAB.LOCAL domain"** message and restarted the client machine to complete the domain join process.


Computer name: HR-Client-01

Full computer name: HR-Client-01

Member of

● Domain: CYBERLAB.local

○ Workgroup: WORKGROUP

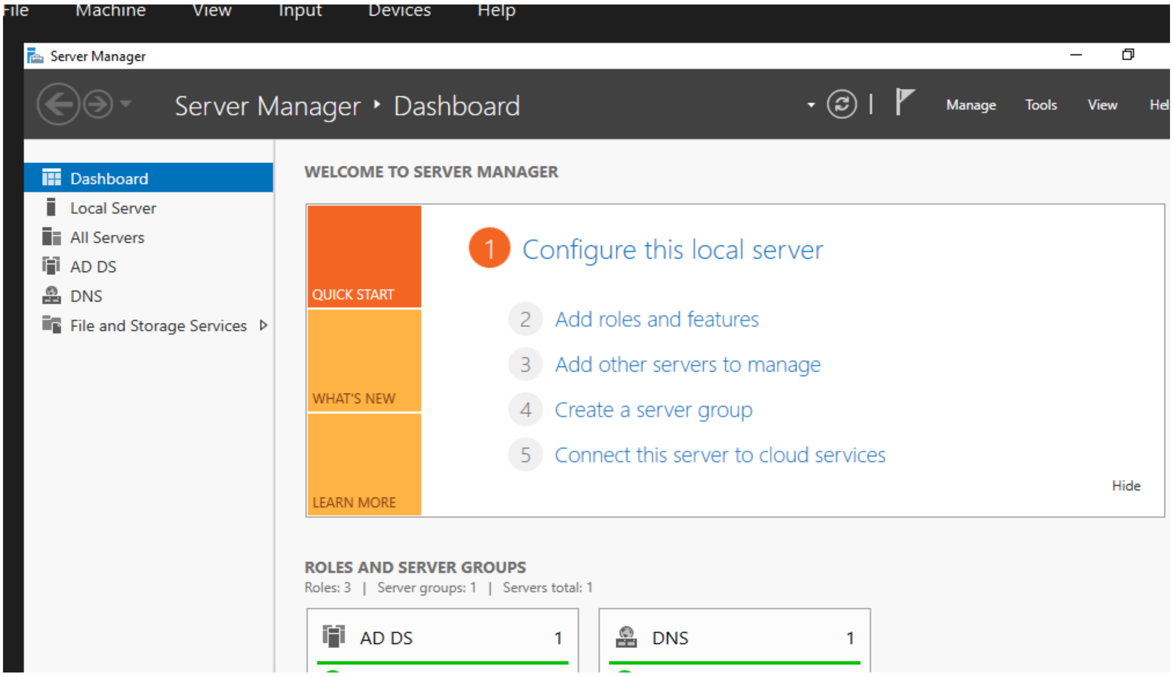
Computer Name/Domain Changes

Welcome to the CYBERLAB.local domain.

Part 4: Active Directory Tasks

Step 1: Creating Organization Unit (OU)

- Went back to the **DC01 server**. In **Server Manager**, navigated to **Tools → Active Directory Users and Computers**.



WELCOME TO SERVER MANAGER

1 Configure this local server

2 Add roles and features

3 Add other servers to manage

4 Create a server group

5 Connect this server to cloud services

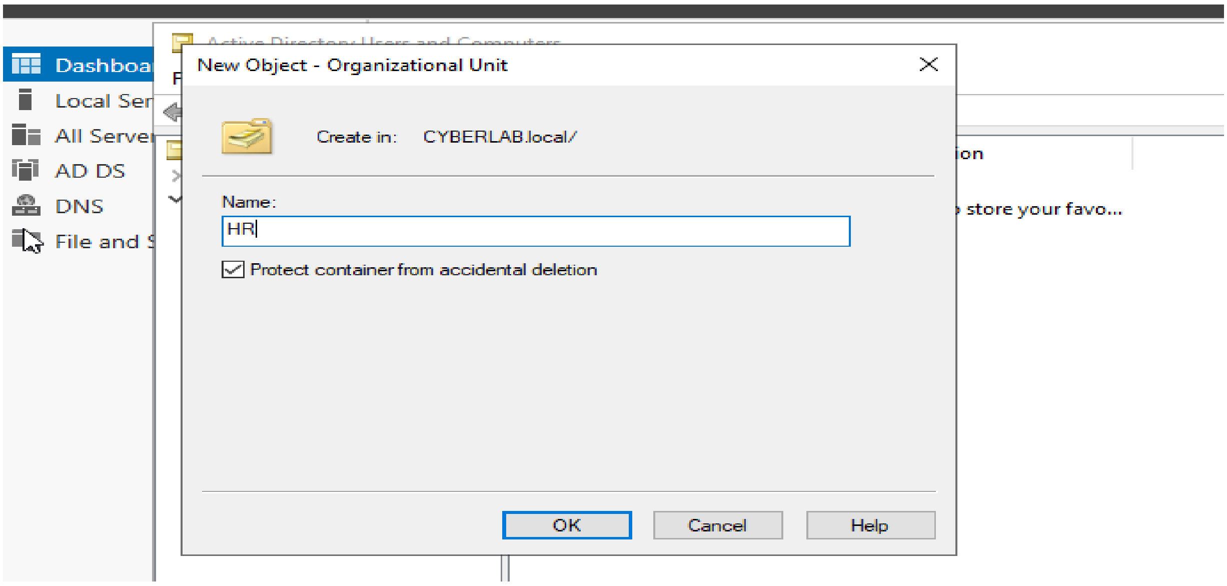
ROLES AND SERVER GROUPS

Roles: 3 | Server groups: 1 | Servers total: 1

AD DS 1

DNS 1

- Right-clicked the domain (**CYBERLAB.LOCAL**) and selected **New** → **Organizational Unit**.
- Named the OU **HR**.



New Object - Organizational Unit

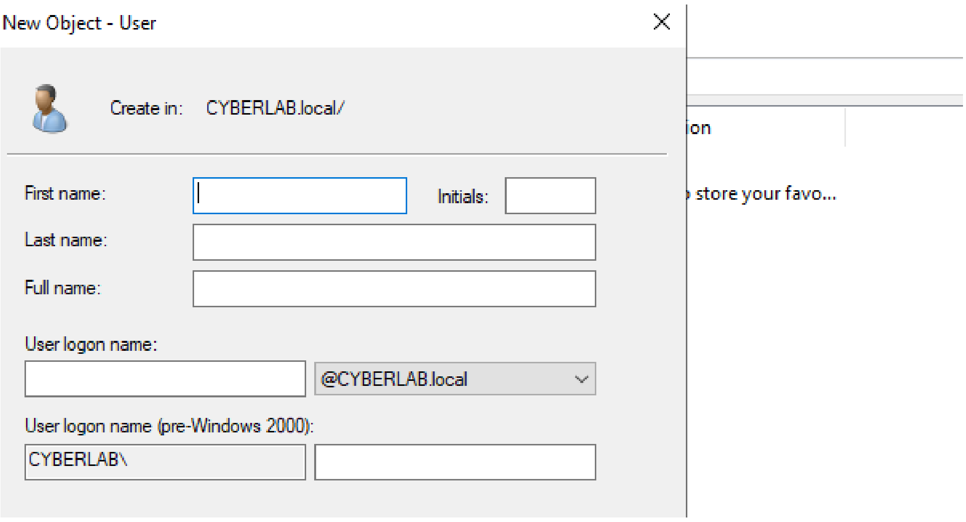
Create in: CYBERLAB.local/

Name: HR

☑ Protect container from accidental deletion

Step 2: Create a User:

- Right-clicked the **HR OU** and selected **New** → **User**.
- Filled in the details to create a user named **Haroon Zaman.**



New Object - User

Create in: CYBERLAB.local/

First name:

Initials:

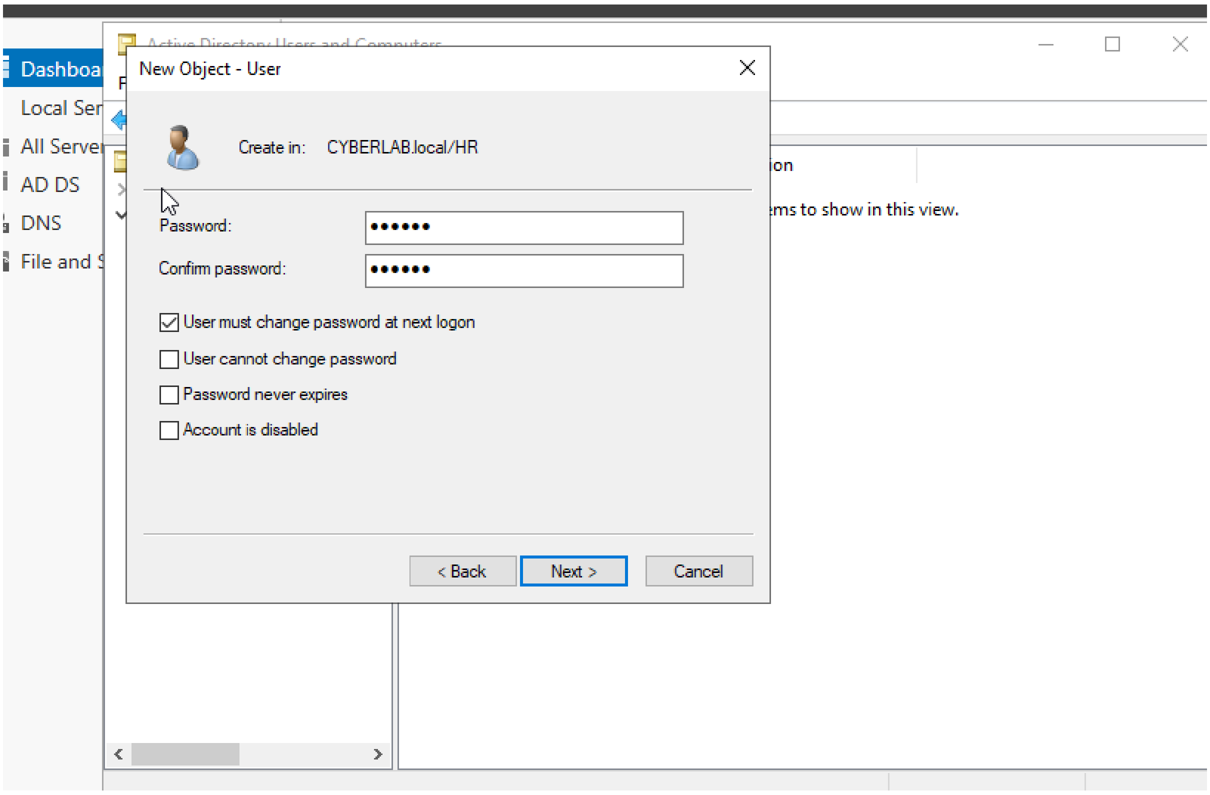
Last name:

Full name:

User logon name: @CYBERLAB.local

User logon name (pre-Windows 2000): CYBERLAB\

- Set a **password** for the user and **checked** the option **“User must change password at next logon”**.



New Object - User

Create in: CYBERLAB.local/HR

Password: ••••••

Confirm password: ••••••

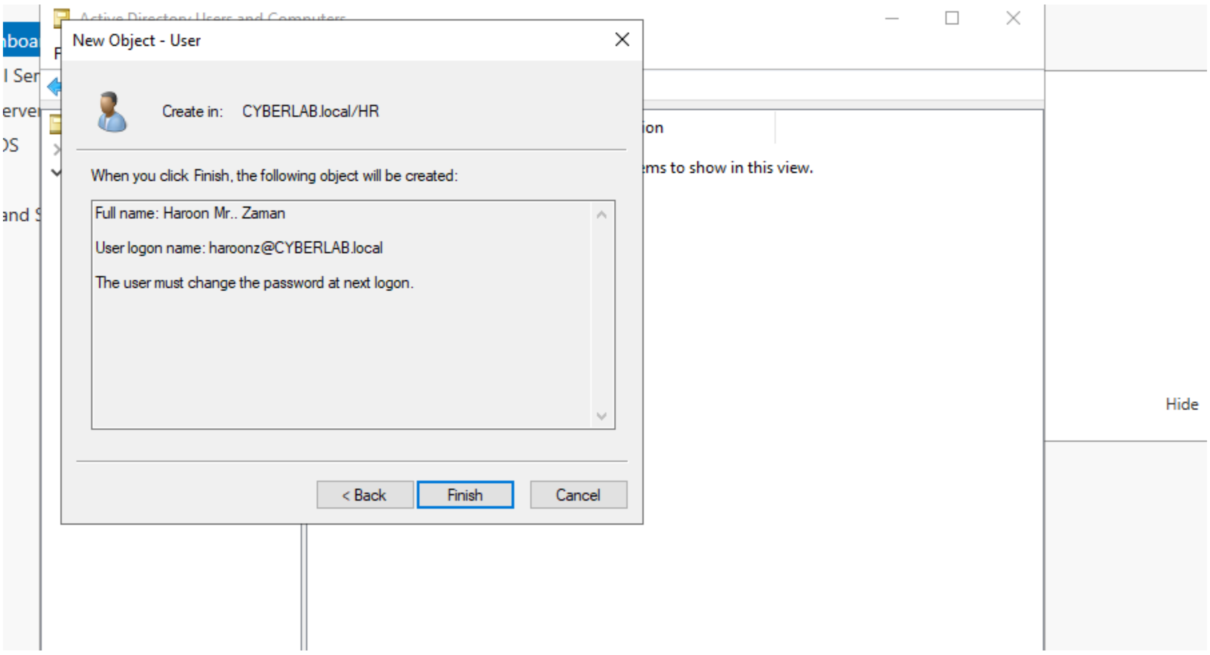
☑ User must change password at next logon

☐ User cannot change password

☐ Password never expires

☐ Account is disabled

- Gave a final check before clicking finish.



New Object - User

Create in: CYBERLAB.local/HR

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

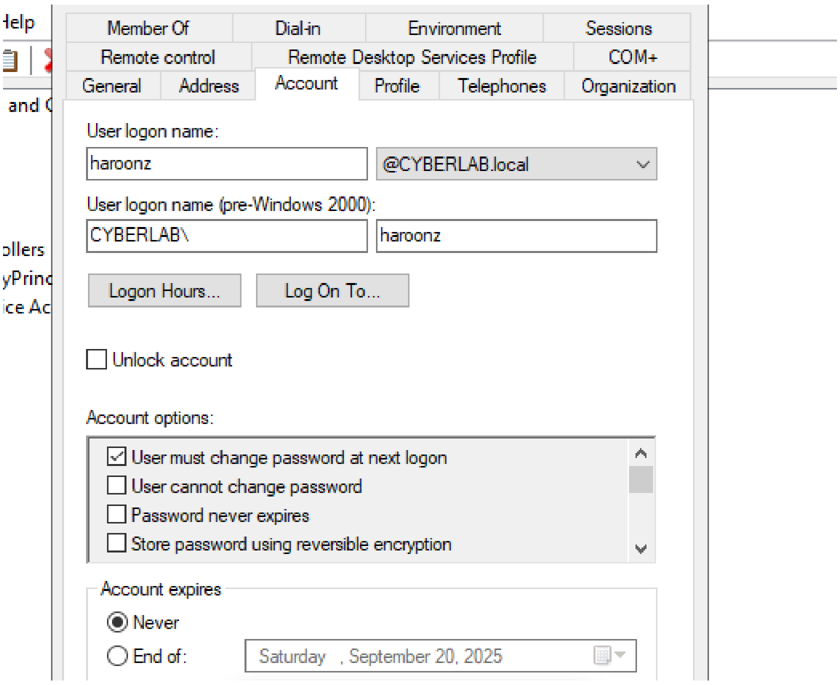
Full name: Haroon Mr.. Zaman

User logon name: haroonz@CYBERLAB.local

The user must change the password at next logon.

From the **HR OU**, I was able to **edit all aspects of the user account**, including:

- Changing the **password**
- Modifying the **logon name**
- Unlocking the account
- Configuring any other settings related to the account or password



User logon name:

haroonz @CYBERLAB.local

User logon name (pre-Windows 2000):

CYBERLAB\ haroonz

□ Unlock account

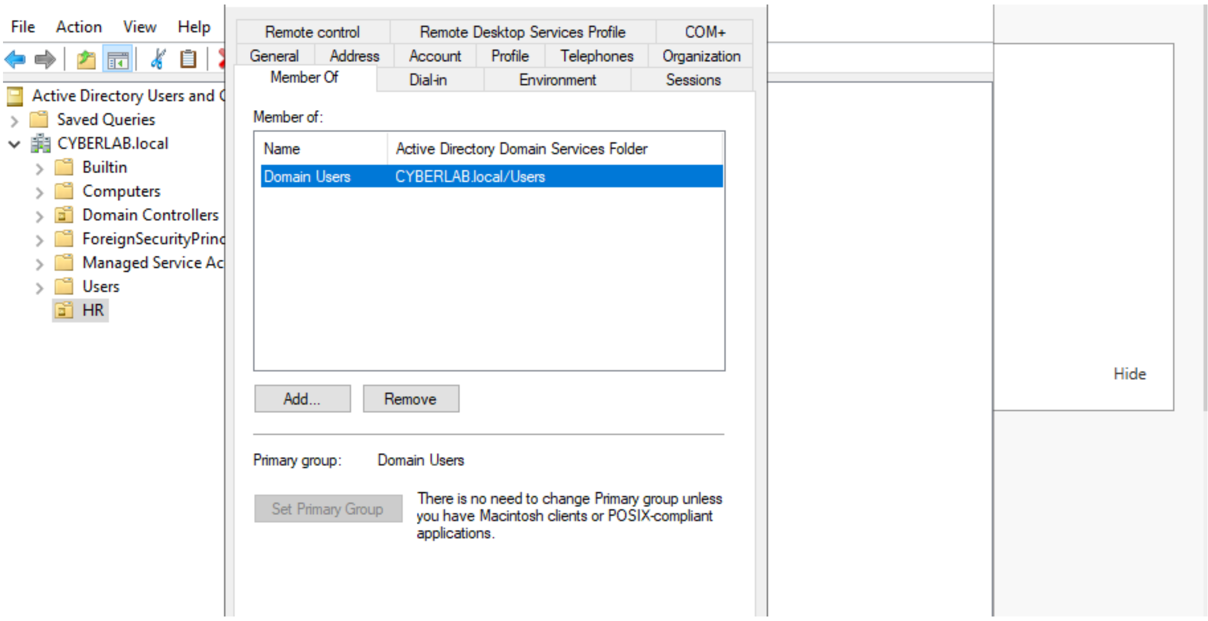
Account options:

☑ User must change password at next logon
□ User cannot change password
□ Password never expires
□ Store password using reversible encryption

Account expires

● Never
○ End of: Saturday , September 20, 2025

- I can make this user to a specific group member or remove it also.



Member of:

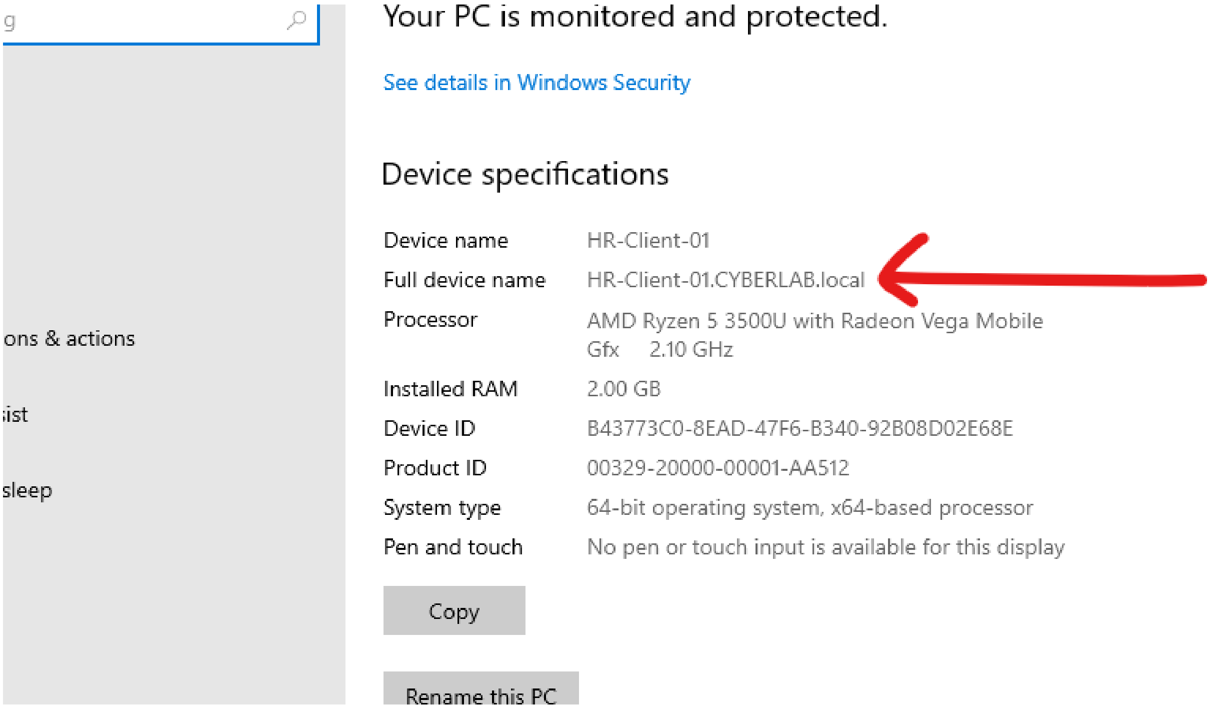
Name	Active Directory Domain Services Folder
Domain Users	CYBERLAB.local/Users

Primary group: Domain Users

There is no need to change Primary group unless you have Macintosh clients or POSIX-compliant applications.

Step 3: Log In as the New User

- Went to the **WIN10-Client VM**. At the login screen, clicked **Other user**.
- Signed in using the new domain account:
  - **Username:** CYBERLAB\haroonz
  - **Password:** The password set during user creation
- Successfully logged into the **domain-joined machine** with the domain user account.



Your PC is monitored and protected.

See details in Windows Security

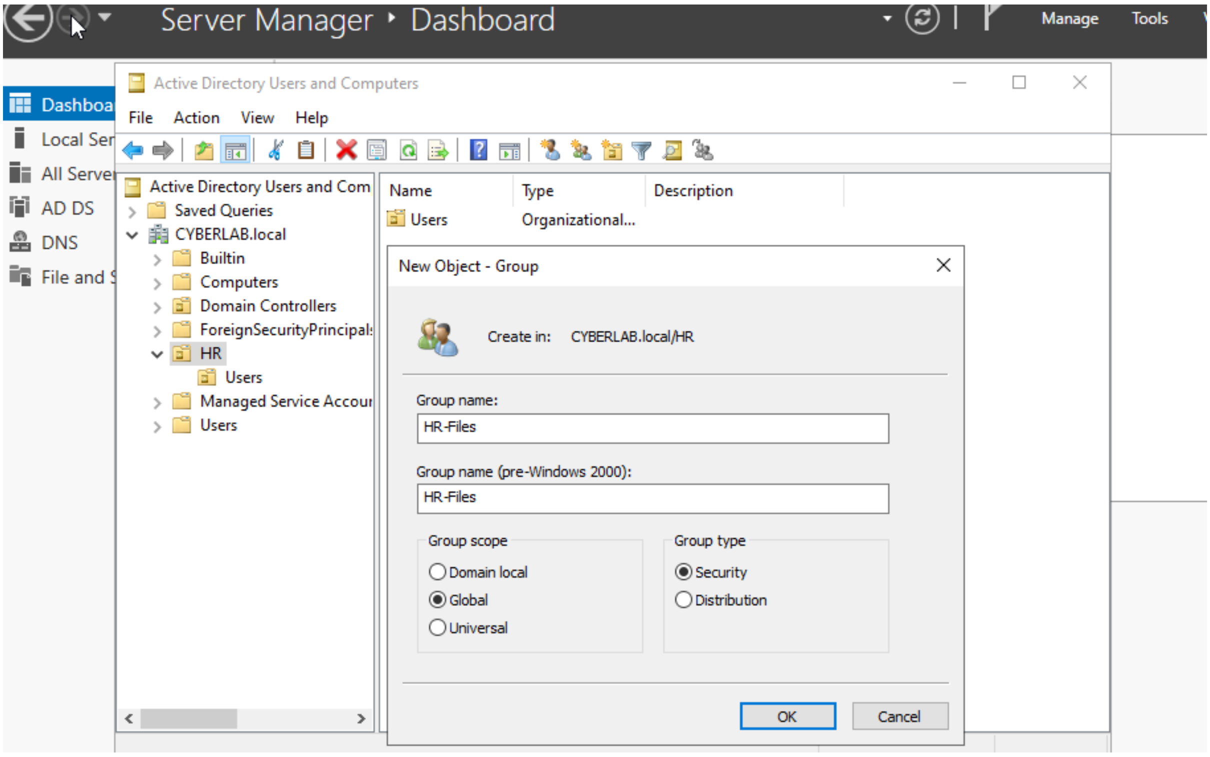
Device specifications

Device name	HR-Client-01
Full device name	HR-Client-01.CYBERLAB.local
Processor	AMD Ryzen 5 3500U with Radeon Vega Mobile Gfx 2.10 GHz
Installed RAM	2.00 GB
Device ID	B43773C0-8EAD-47F6-B340-92B08D02E68E
Product ID	00329-20000-00001-AA512
System type	64-bit operating system, x64-based processor
Pen and touch	No pen or touch input is available for this display

Part 5: Applying a User Policy

Step 1: Create a Security Group and Add Members

- Created a new **security group** named **HR-Files** in **Active Directory Users and Computers**.



New Object - Group

Create in: CYBERLAB.local/HR

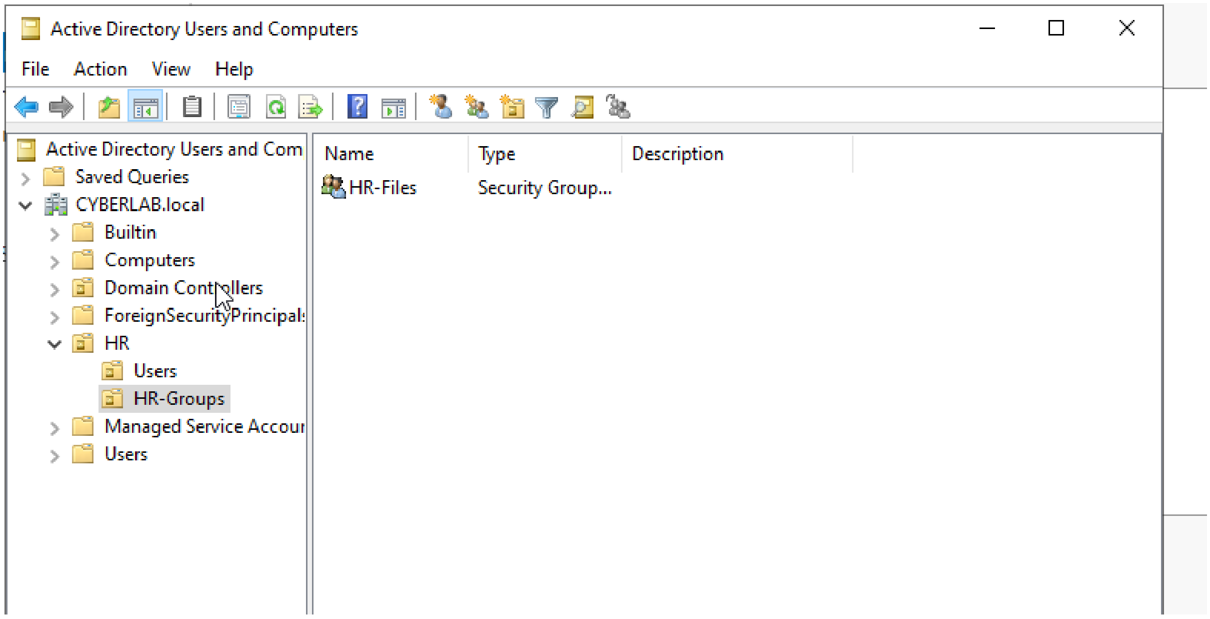
Group name: HR-Files

Group name (pre-Windows 2000): HR-Files

Group scope: ○ Domain local ● Global ○ Universal

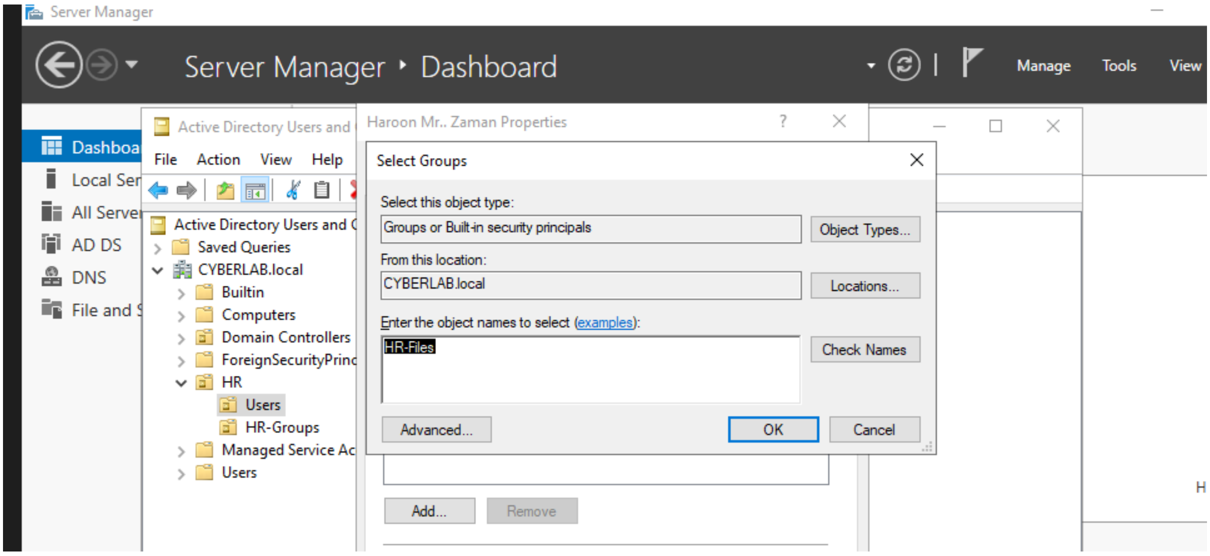
Group type: ● Security ○ Distribution

- This is security group created.



Name	Type	Description
HR-Files	Security Group...	

- Added **Haroon** as a member of the **HR-Files** group.



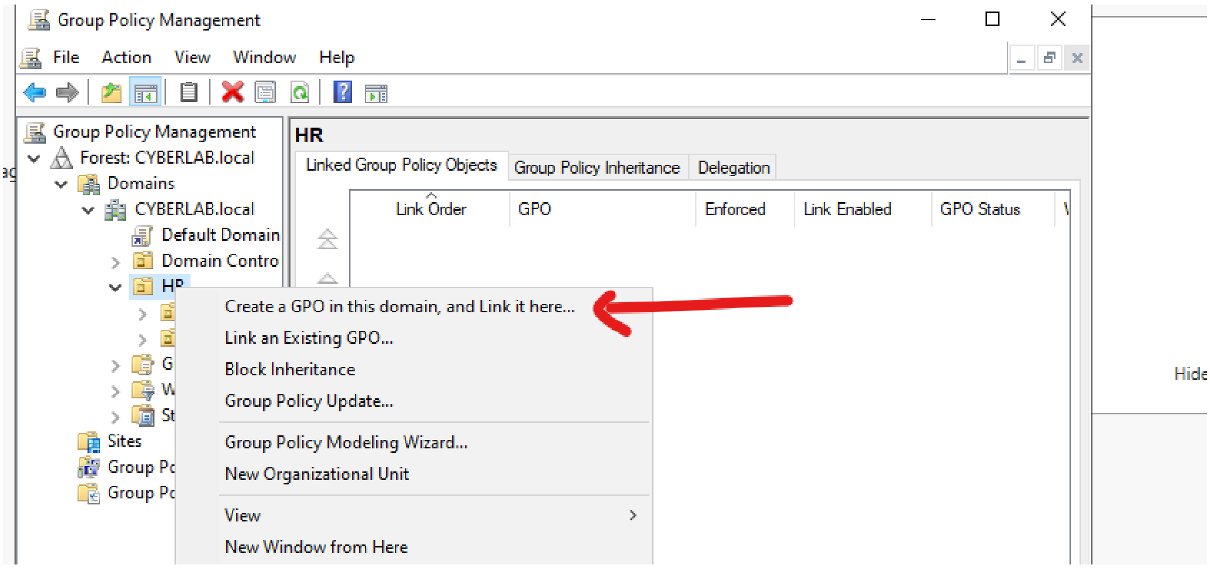
Select this object type:
Groups or Built-in security principals

From this location:
CYBERLAB.local

Enter the object names to select (examples):
HR-Files

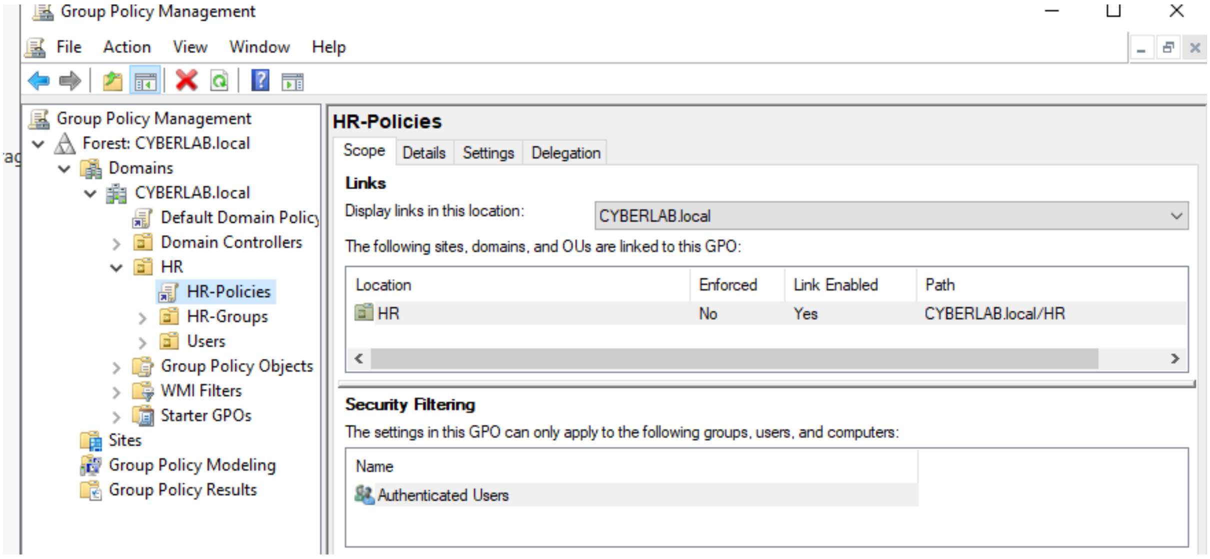
Step 2: **Create a Group Policy Object (GPO) for HR**

- Opened **Group Policy Management** from **Tools** in **Server Manager**.
- Expanded the domain **CYBERLAB.LOCAL → HR**.
- Right-clicked the **HR OU** and selected **"Create a GPO in this domain, and Link it here…"** to create a new Group Policy Object for the HR group.



Step 3: Configure Security Filtering for the GPO

- After creating the GPO for the **HR** OU, I proceeded to configure **Security Filtering**.
- This step ensures that the policy applies **only to the intended users or groups**, in this case, members of the **HR** group.



HR-Policies

Links

Display links in this location: CYBERLAB.local

The following sites, domains, and OUs are linked to this GPO:

Location	Enforced	Link Enabled	Path
HR	No	Yes	CYBERLAB.local/HR

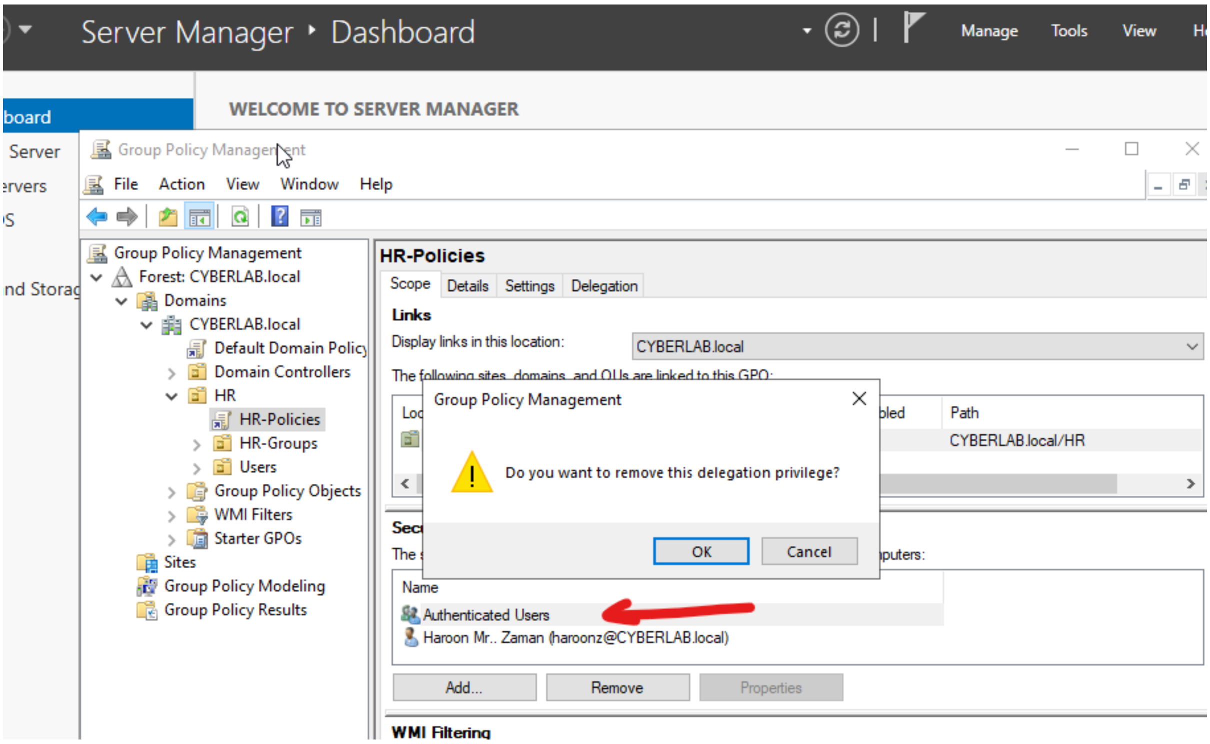
Security Filtering

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

Name
Authenticated Users

Step 4: Remove Authenticated Users from Security Filtering

- Removed **Authenticated Users** from the **Security Filtering** section of the GPO.
- This ensures the policy **applies only to the specified HR group members** and not to all users in the domain.



HR-Policies

Links

Display links in this location: CYBERLAB.local

The following sites, domains, and OUs are linked to this GPO:

Loc	bled	Path
		CYBERLAB.local/HR

Group Policy Management

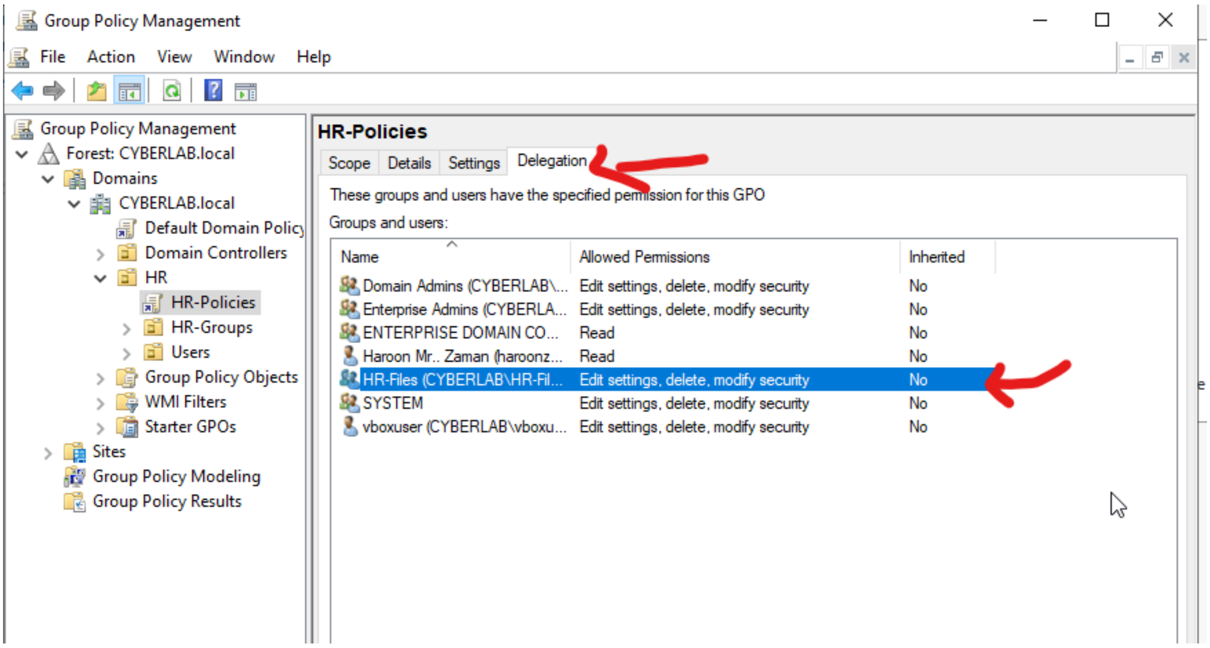
Do you want to remove this delegation privilege?

OK Cancel

Name
Authenticated Users
Haroon Mr.. Zaman (haroonz@CYBERLAB.local)

Step 5: Configure Delegation for Granular Control

- Accessed the **Delegation** tab in the GPO settings.
- Added or removed users/groups to control **who can modify or apply the GPO**, providing **more granular control over policy filtering**.

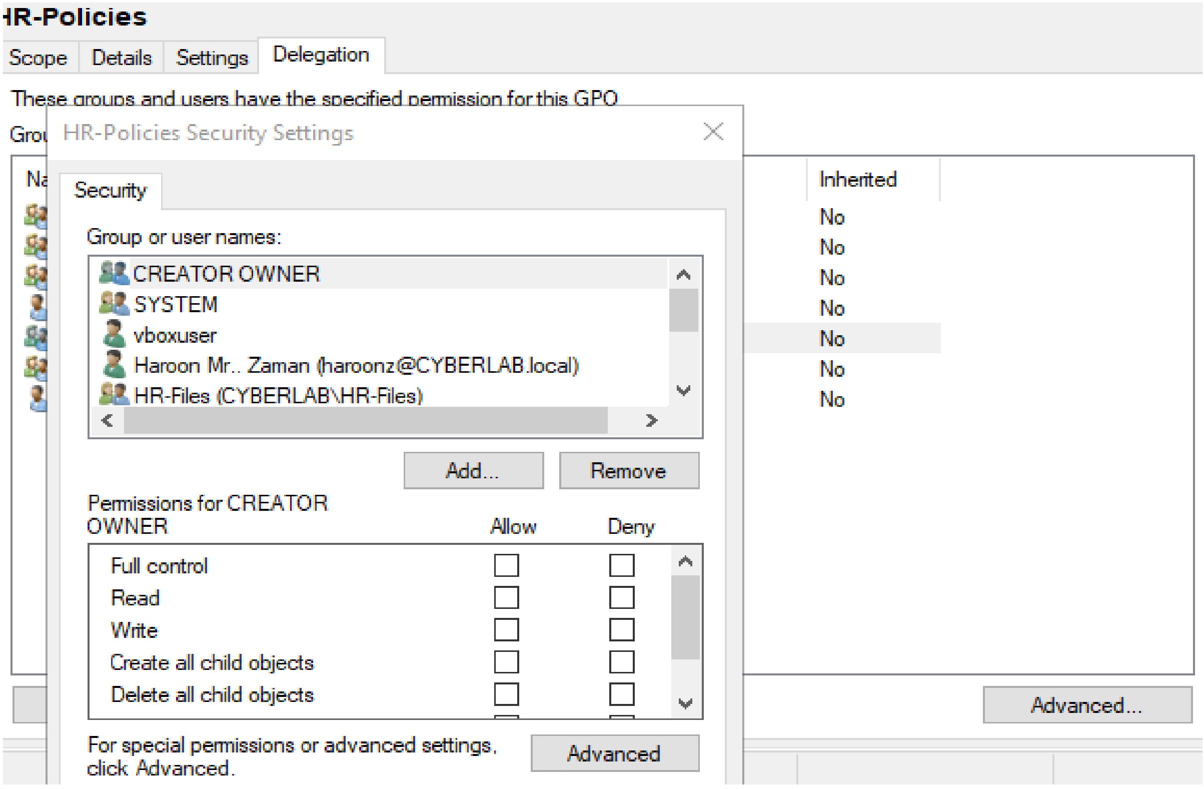


HR-Policies

These groups and users have the specified permission for this GPO

Groups and users:

Name	Allowed Permissions	Inherited
Domain Admins (CYBERLAB\...	Edit settings, delete, modify security	No
Enterprise Admins (CYBERLA...	Edit settings, delete, modify security	No
ENTERPRISE DOMAIN CO...	Read	No
Haroon Mr.. Zaman (haroonz...	Read	No
HR-Files (CYBERLAB\HR-Fil...	Edit settings, delete, modify security	No
SYSTEM	Edit settings, delete, modify security	No
vboxuser (CYBERLAB\vboxu...	Edit settings, delete, modify security	No



HR-Policies Security Settings

Group or user names:

- CREATOR OWNER
- SYSTEM
- vboxuser
- Haroon Mr.. Zaman (haroonz@CYBERLAB.local)
- HR-Files (CYBERLAB\HR-Files)

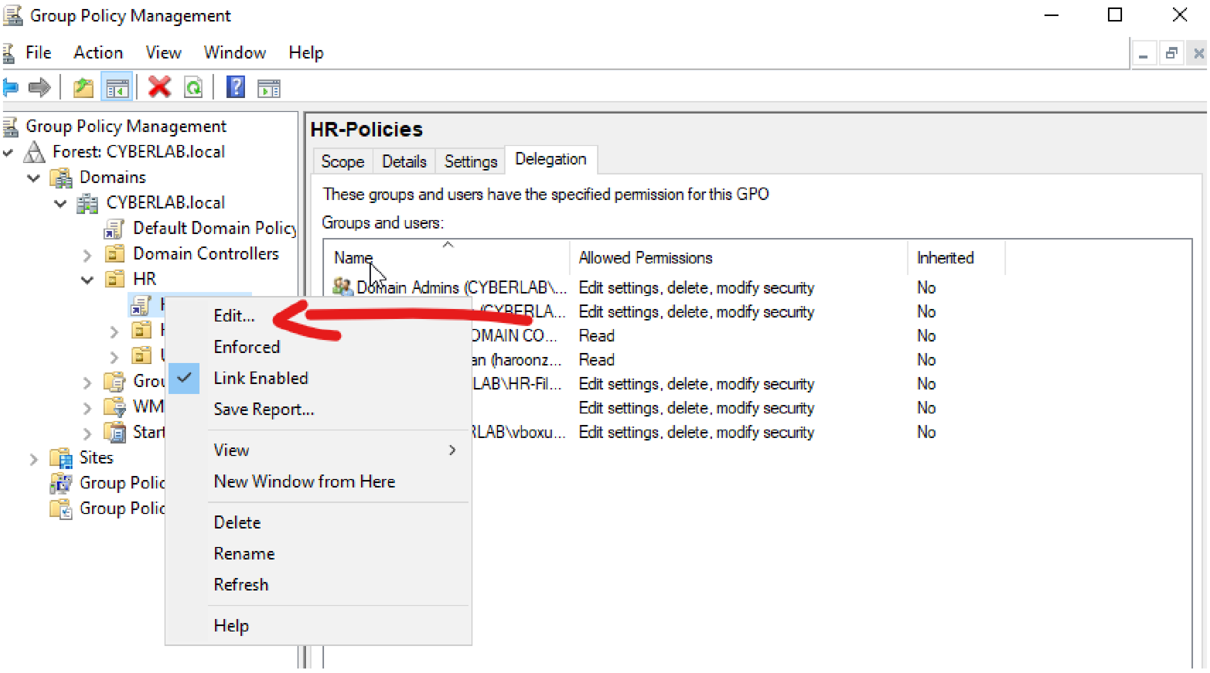
Permissions for CREATOR OWNER	Allow	Deny
Full control	□	□
Read	□	□
Write	□	□
Create all child objects	□	□
Delete all child objects	□	□

For special permissions or advanced settings, click Advanced.

Step 6: Edit the HR GPO to Configure Policies

- Navigated to the **HR OU** in **Group Policy Management**.

- Right-clicked on **HR-Policies** and selected **Edit**.



HR-Policies

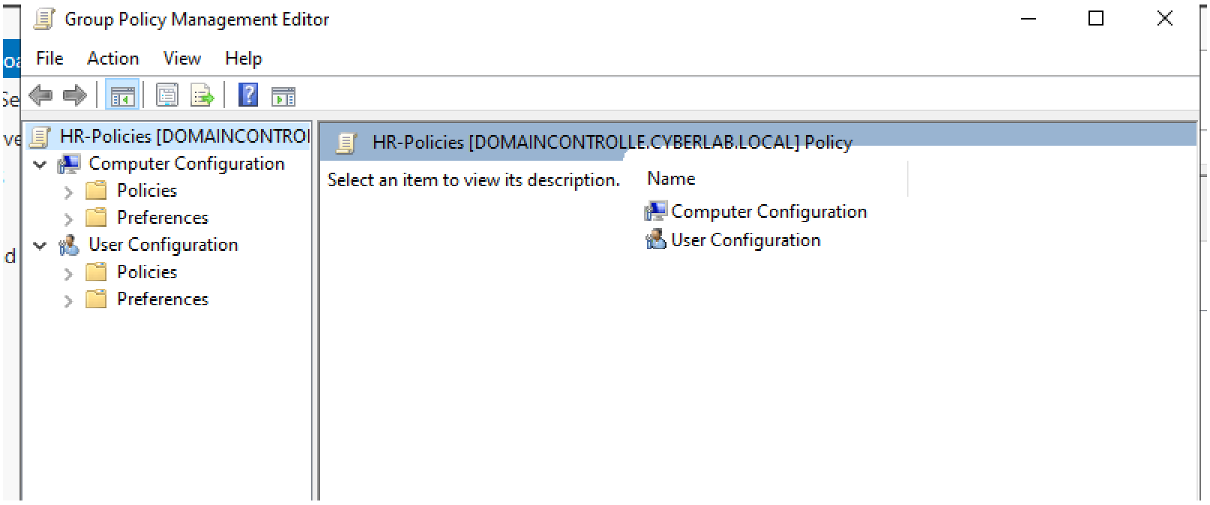
Scope | Details | Settings | Delegation

These groups and users have the specified permission for this GPO

Groups and users:

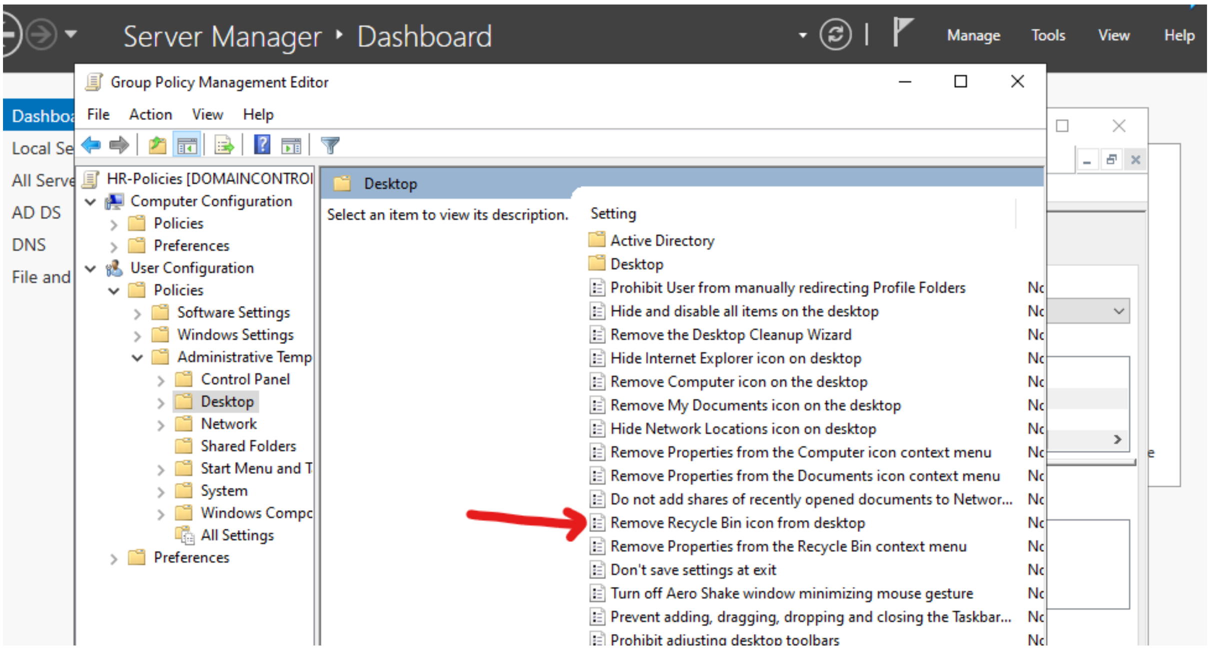
Name	Allowed Permissions	Inherited
Domain Admins (CYBERLAB\...	Edit settings, delete, modify security	No
(CYBERLA...	Edit settings, delete, modify security	No
OMAIN CO...	Read	No
an (haroonz...	Read	No
LAB\HR-Fil...	Edit settings, delete, modify security	No
	Edit settings, delete, modify security	No
RLAB\vboxu...	Edit settings, delete, modify security	No

- This opened the **Group Policy Management Editor**, where I could **set and configure specific policies** for the HR group.


Group Policy Management Editor
File Action View Help
HR-Policies [DOMAINCONTROI
Computer Configuration
Policies
Preferences
User Configuration
Policies
Preferences
HR-Policies [DOMAINCONTROLLE.CYBERLAB.LOCAL] Policy
Select an item to view its description.
Name
Computer Configuration
User Configuration

Step 7: Configure Policy to Remove Recycle Bin on Client

- Navigated to **User Configuration** in the **Group Policy Management Editor**, since the policy is applied to users.
- Went to **Policies → Administrative Templates → Desktop**.
- Double-clicked **Desktop** to open the available options on the right-hand pane for configuring user desktop settings.

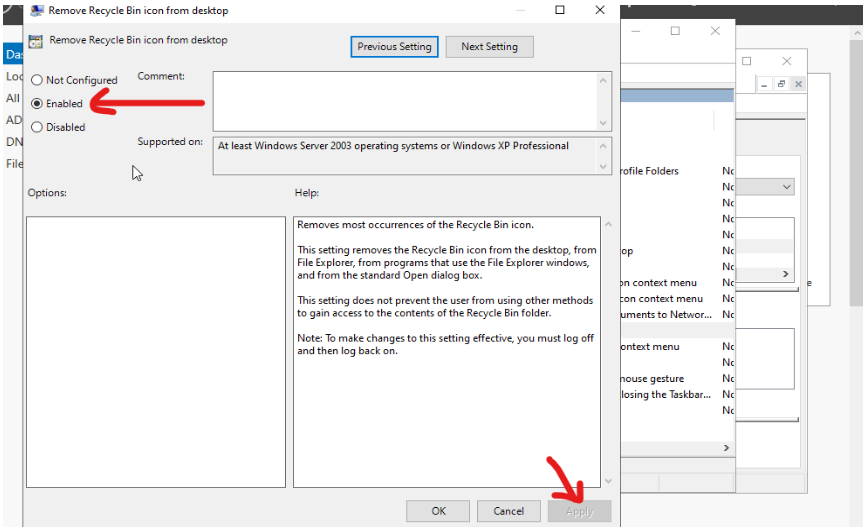


Select an item to view its description.

Setting
- Active Directory
- Desktop
- Prohibit User from manually redirecting Profile Folders
- Hide and disable all items on the desktop
- Remove the Desktop Cleanup Wizard
- Hide Internet Explorer icon on desktop
- Remove Computer icon on the desktop
- Remove My Documents icon on the desktop
- Hide Network Locations icon on desktop
- Remove Properties from the Computer icon context menu
- Remove Properties from the Documents icon context menu
- Do not add shares of recently opened documents to Networ...
- Remove Recycle Bin icon from desktop
- Remove Properties from the Recycle Bin context menu
- Don't save settings at exit
- Turn off Aero Shake window minimizing mouse gesture
- Prevent adding, dragging, dropping and closing the Taskbar...
- Prohibit adjusting desktop toolbars

Step 8: Enable the "Remove Recycle Bin from Desktop" Policy

- Clicked on the **"Remove Recycle Bin from Desktop"** setting.
- In the window that opened, selected **Enabled**.
- Clicked **Apply** to enforce the policy for users in the HR group.



Remove Recycle Bin icon from desktop

○ Not Configured
● Enabled
○ Disabled

Comment:

Supported on: At least Windows Server 2003 operating systems or Windows XP Professional

Help:

Removes most occurrences of the Recycle Bin icon.

This setting removes the Recycle Bin icon from the desktop, from File Explorer, from programs that use the File Explorer windows, and from the standard Open dialog box.

This setting does not prevent the user from using other methods to gain access to the contents of the Recycle Bin folder.

Note: To make changes to this setting effective, you must log off and then log back on.

Step 10: Troubleshooting GPO Issues on a Client Machine

1. Verify GPO Linking

- Ensure the **GPO is linked** to the correct **OU**, domain, or site where the client machine resides.
- Check that the **user or computer object** is in the OU where the GPO is linked.

2. Check Security Filtering

- Go to the GPO **Security Filtering** tab.
- Make sure the **user or computer group** you want the policy applied to is listed.
- Remove **Authenticated Users** if you only want the policy applied to specific groups.
- Verify the account has **Read** and **Apply Group Policy** permissions.

3. Check WMI Filtering

- If a **WMI filter** is applied to the GPO, verify that the client **matches the filter conditions**.
- Misconfigured WMI filters can prevent the GPO from applying.

4. Confirm the Client's Network Connection

- Ensure the client can **communicate with the Domain Controller**.
- Test by running `ping <DC-IP>` or checking DNS resolution of the domain (`nslookup <domain>`).

5. Force a Group Policy Update

- On the client, run:
- `gpupdate /force`
- Then check if the policy applied.
- For user policies, log off and log back in; some policies require a **reboot**.

6. Check Applied Policies

- Run the following command on the client to see which GPOs are applied:
- `gpresult /r`
- Review both **User and Computer settings** to ensure the intended GPO is listed.
- If it shows **N/A** or the GPO is missing, it indicates **filtering, permissions, or network issues**.

7. Review Event Logs

- Open **Event Viewer → Applications and Services Logs → Microsoft → Windows → GroupPolicy → Operational**
- Look for **errors or warnings** related to GPO application.

8. Check Policy Type

- Confirm you are editing the **correct section**:
    - **User Configuration** policies apply to users.
    - **Computer Configuration** policies apply to computers.
- Applying a user policy to a computer object will not work and vice versa.

9. Check Replication

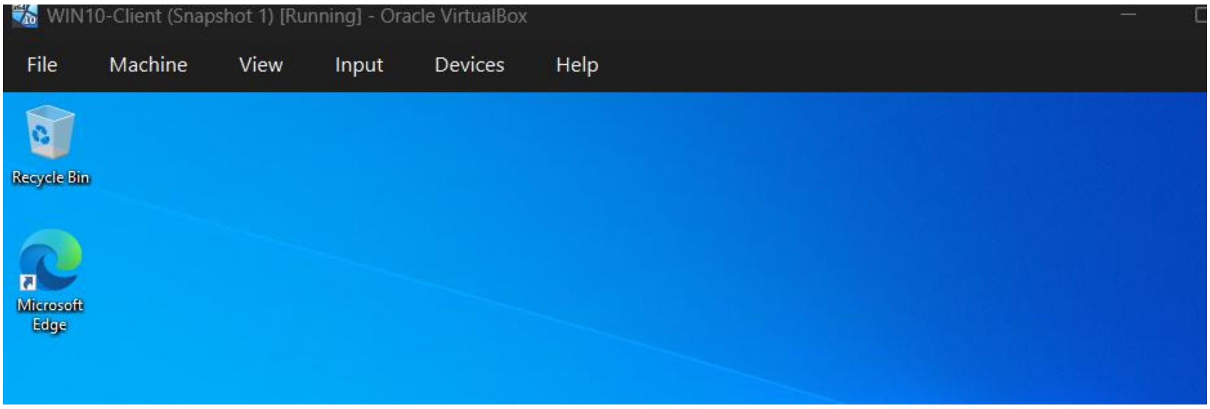
- In multi-DC environments, verify that **GPO replication** is complete and consistent across all Domain Controllers.

10. Other Considerations

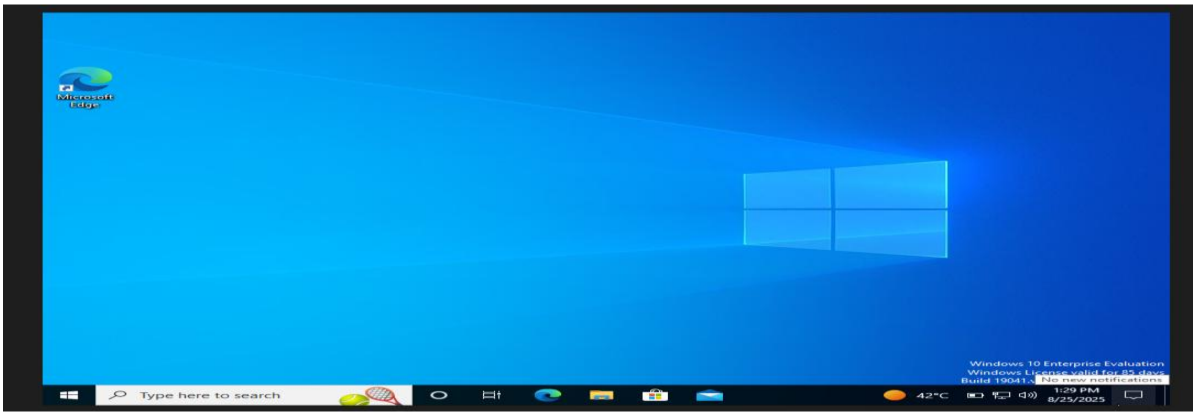
- Some policies require **specific Windows editions** (e.g., Enterprise vs. Home).
- Check for **local policies or conflicting GPOs** that may override the settings.

✅ **Tip:** Always start with `gpresult /r` or the **RSOP (Resultant Set of Policy)** tool to quickly see what policies are applied and troubleshoot why a policy isn't taking effect.

- **Before applying the Policy**

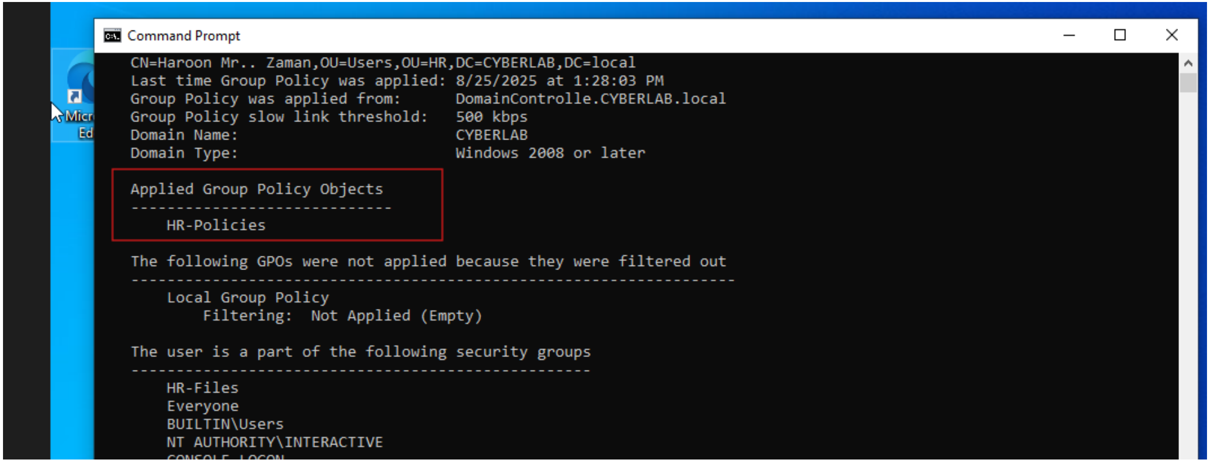


- After applying the Policy, The **Recycle Bin** is removed from the **Desktop**



Check if Policy is Applied

1. On the **Client VM**, open **Command Prompt**.
2. Type:
3. `gpresult /r`



```
    CN=Haroon Mr.. Zaman,OU=Users,OU=HR,DC=CYBERLAB,DC=local
    Last time Group Policy was applied: 8/25/2025 at 1:28:03 PM
    Group Policy was applied from:      DomainControlle.CYBERLAB.local
    Group Policy slow link threshold:   500 kbps
    Domain Name:                        CYBERLAB
    Domain Type:                        Windows 2008 or later

    Applied Group Policy Objects
    -----------------------------
        HR-Policies

    The following GPOs were not applied because they were filtered out
    -------------------------------------------------------------------
        Local Group Policy
            Filtering:  Not Applied (Empty)

    The user is a part of the following security groups
    ---------------------------------------------------
        HR-Files
        Everyone
        BUILTIN\Users
        NT AUTHORITY\INTERACTIVE
        CONSOLE LOGON
```

Step 9: Link the GPO and Verify on Client

- Linked the **HR-Policies GPO** to the **HR OU** in **Group Policy Management**.
- On the **client machine**, logged in as a user in the HR group.
- Verified that the **Recycle Bin was successfully removed from the desktop**, confirming the policy was applied correctly.

Conclusion

In this lab, I successfully built a **complete Active Directory environment** using Windows Server 2022 and a Windows 10 client machine in VirtualBox. I learned how to:

- **Install and configure Windows Server** as a Domain Controller.
- Set **static IP addresses** and DNS settings for proper network communication.
- **Create and manage Organizational Units (OUs), users, and groups** within Active Directory.
- **Join client machines to the domain** and verify user authentication.
- **Create and apply Group Policy Objects (GPOs)**, including user-specific policies like removing the Recycle Bin.
- Configure **security filtering and delegation** to control policy application at a granular level.

Through this project, I gained practical experience in **network planning, Active Directory management, and user policy enforcement**, which are crucial skills for IT and network administration roles.

Other learners can use this lab to understand the **core concepts of Active Directory**, how to **structure a domain environment**, and how **Group Policies can be used to manage user settings and security** effectively. By following similar steps, they can build a safe, controlled lab environment to practice Active Directory administration without impacting real-world networks.