

Active Directory Home Lab with PowerShell

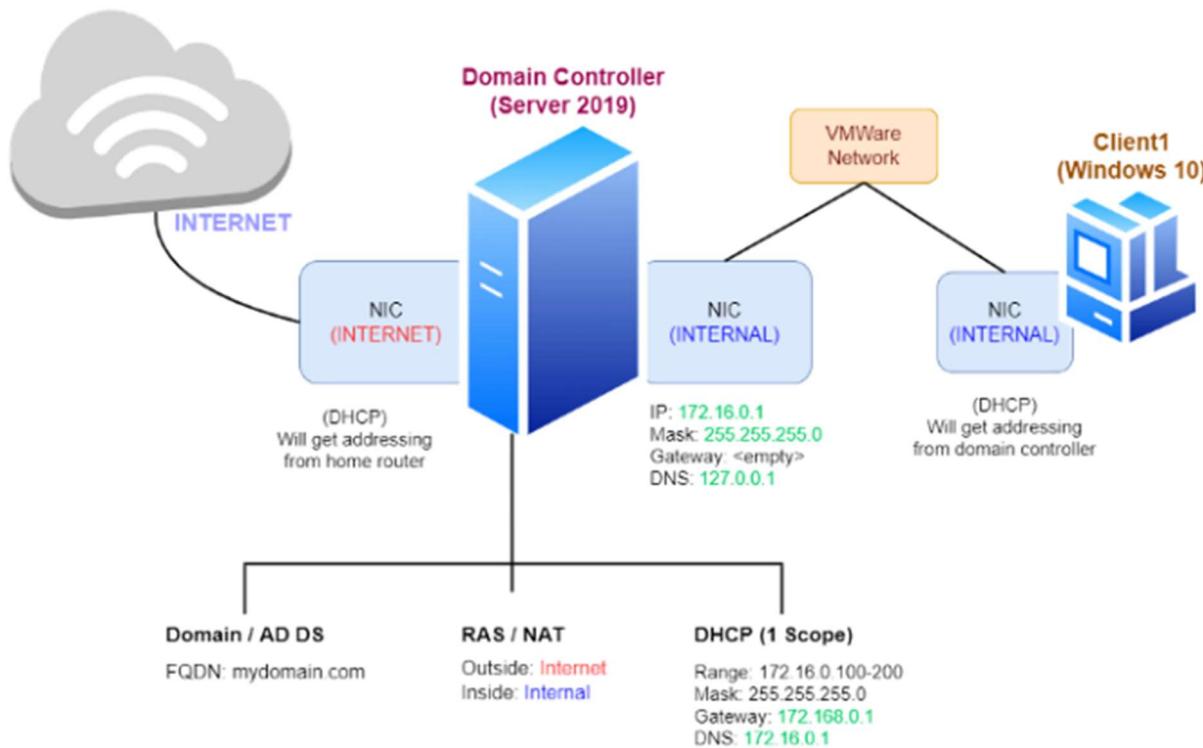


I created an Active directory home lab environment in Oracle VM VirtualBox by installing windows 2019 Server and Windows 10 Operating System. I installed Active Directory Domain Services, Remote Access Service / Network Address Translation (RAS/NAT) and DHCP services in 2019 Server. Along with that I have created 1000 users in Active Directory by using PowerShell scripts. '

I also connected the installed virtual windows 10 machine to the domain which can be seen in Active Directory.

This is an example of a mini-corporate environment in which all created users can log in from their machine to the corporate domain and get connected to the network. This is how we are given unique email addresses by our university and company.

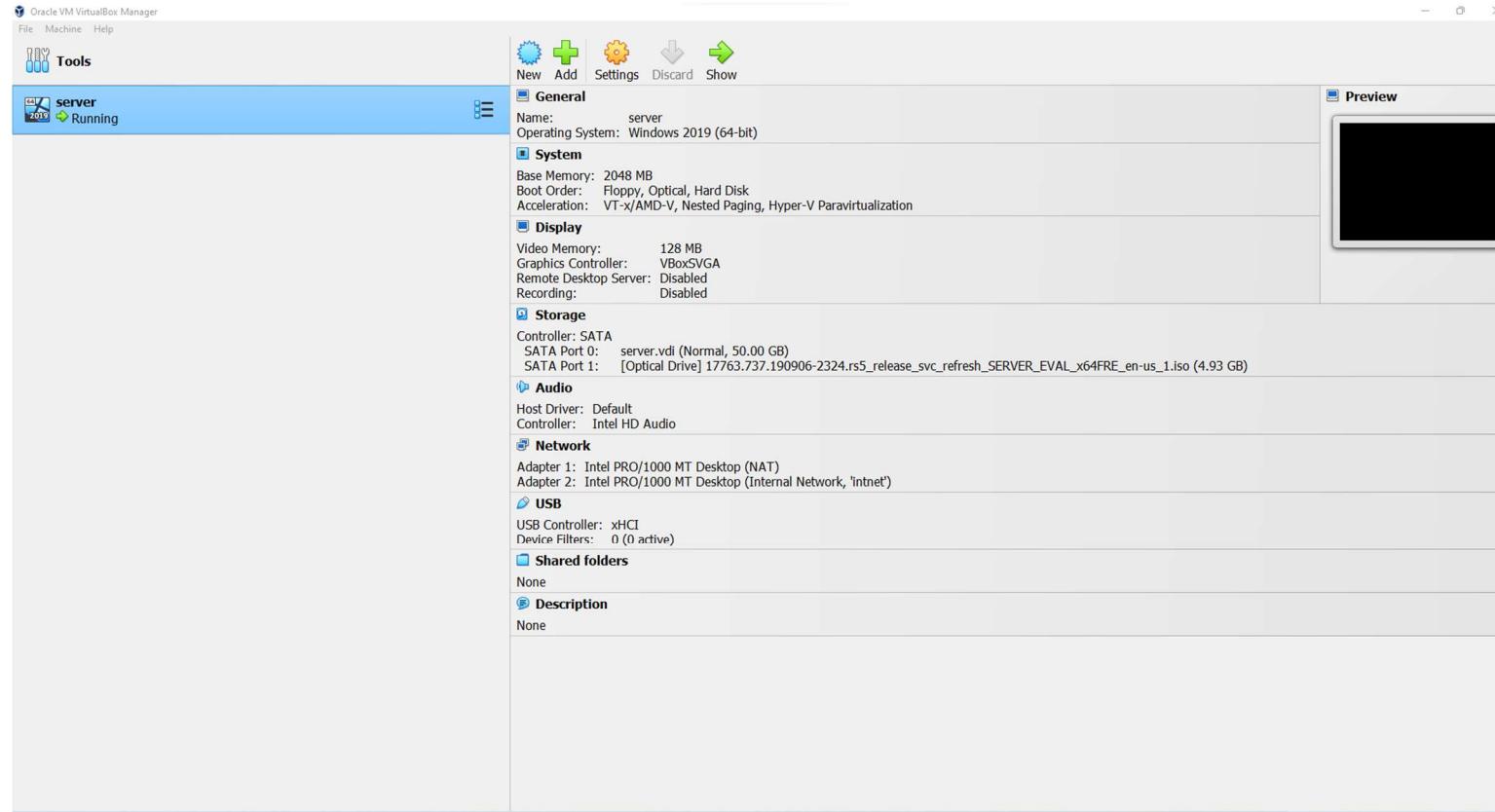
Network Diagram:



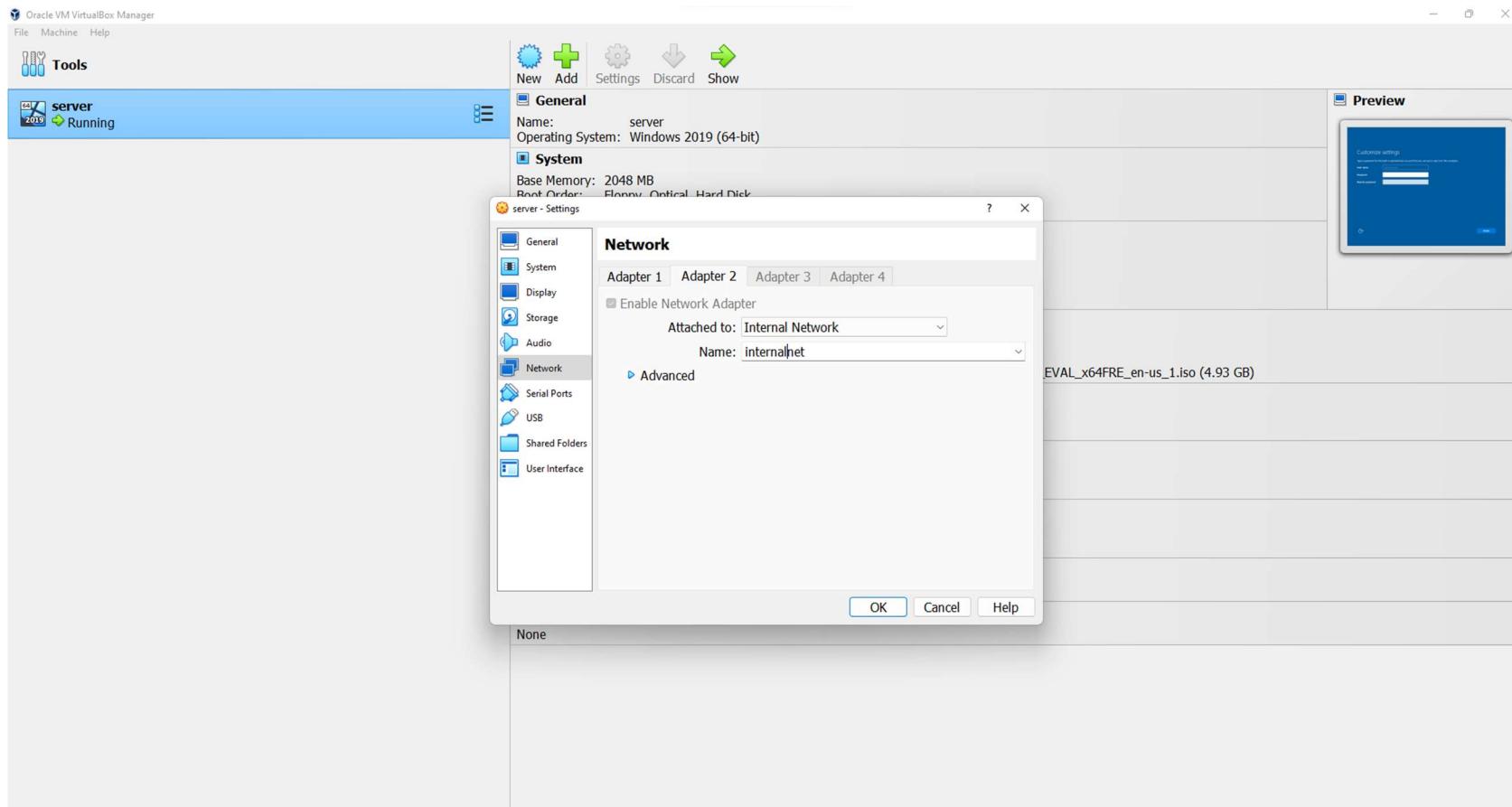
Requirements to do the project:

1. Oracle VirtualBox
2. Server 2019 ISO
3. Windows 10 ISO

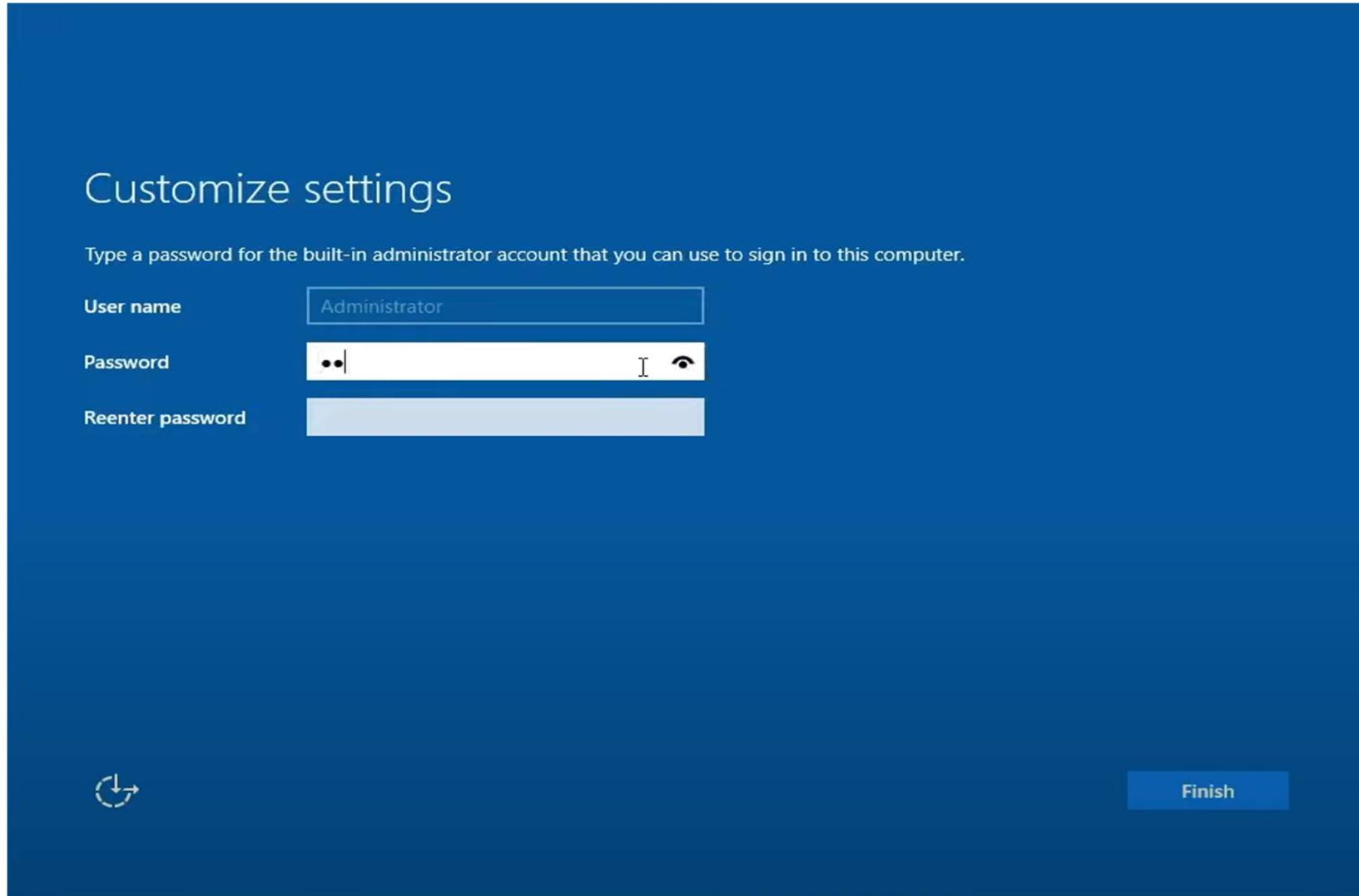
Install Windows server 2019 virtual machine which will be our domain controller



Add another Network Adapter to the machine



Create an administrator account and type a strong password



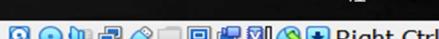
 server [Running] - Oracle VM VirtualBox

File Machine View Input Devices Help

Press Ctrl+Alt+Delete to unlock.

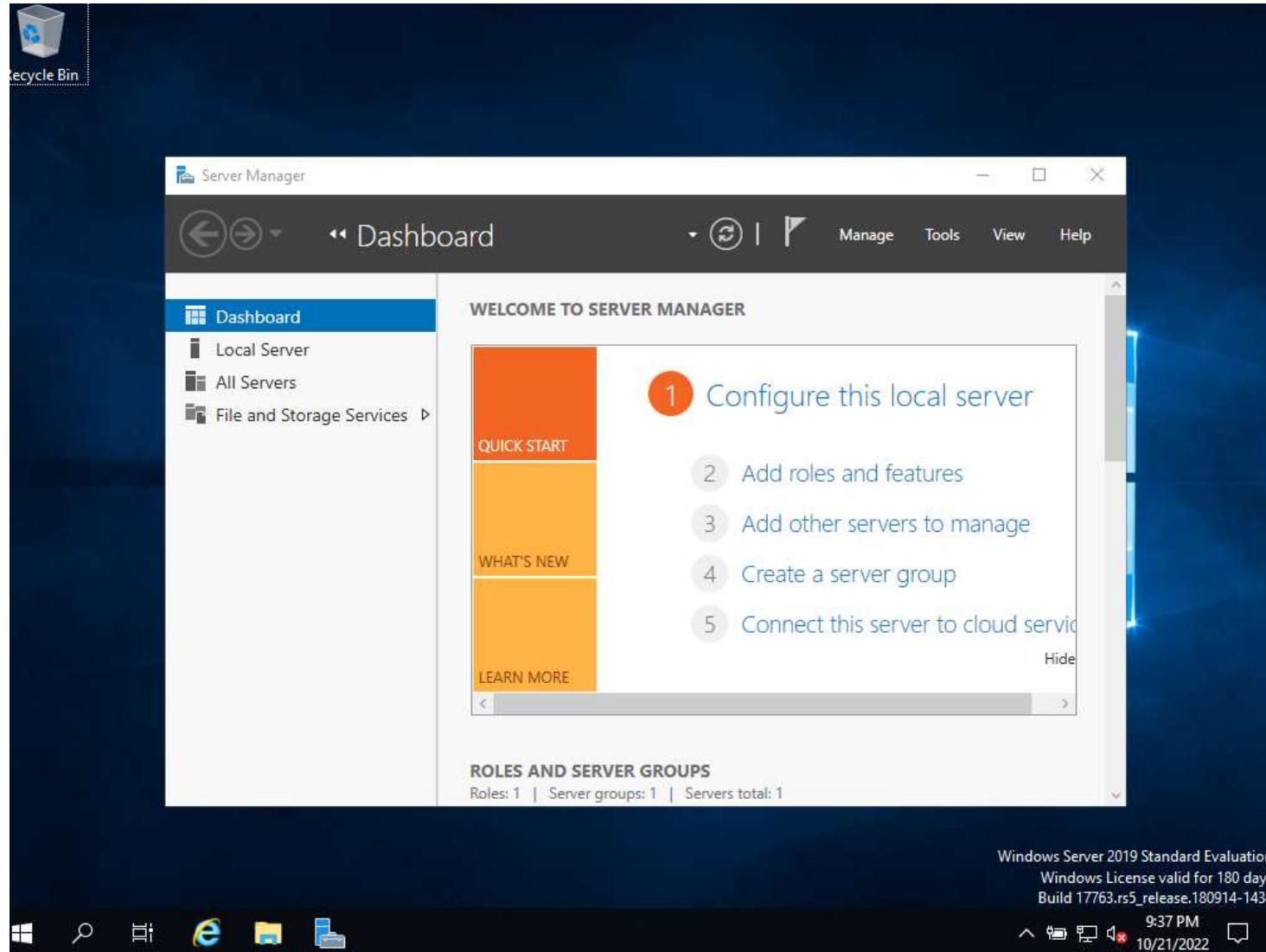
9:30

Friday, October 21

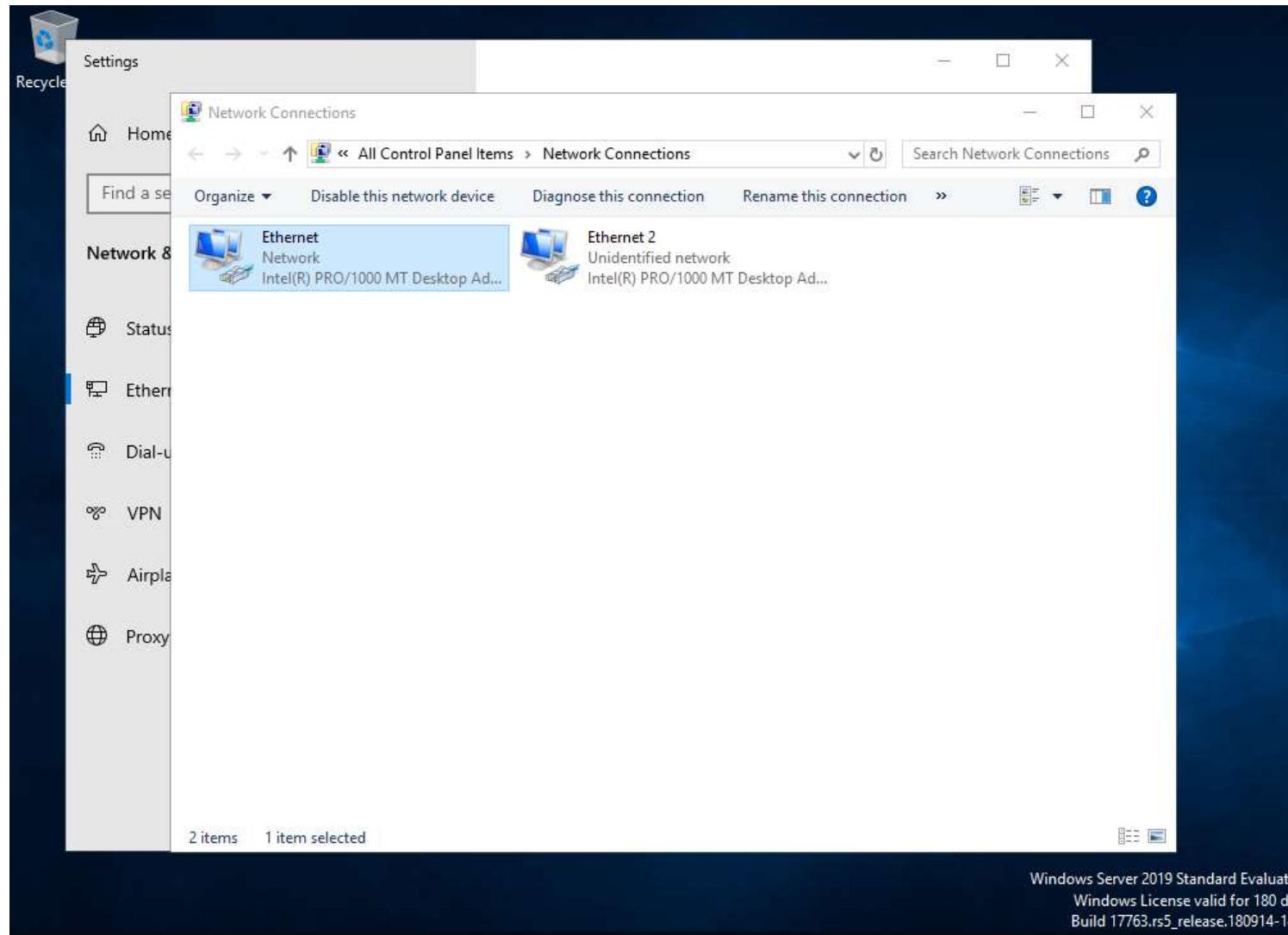


Right Ctrl

The installed 2019 Server looks like this

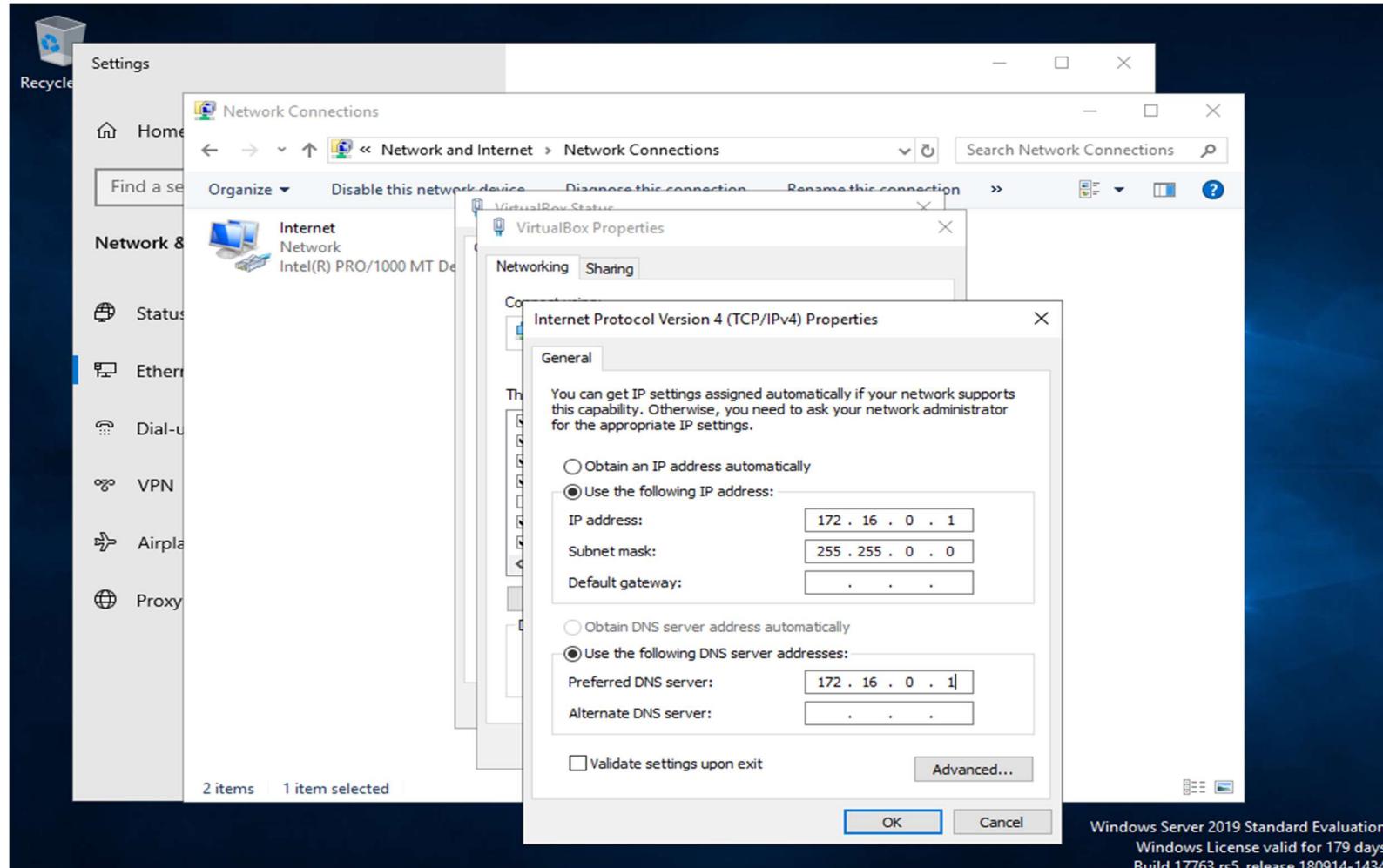


Give two different names for the Network Adapters



Assign the Ip address that we have in our diagram to Ethernet2 by going into the settings.

This is actually the gateway used by the virtual windows 10 to get connected to the domain



Install the Active Directory Domain service in the Server

 Add Roles and Features Wizard

— □ ×

Before you begin

DESTINATION SERVER
DomainController

Before You Begin

- Installation Type
- Server Selection
- Server Roles
- Features
- Confirmation
- Results

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

< Previous **Next >** Install Cancel

DESTINATION SERVER
DomainController

Select destination server

[Before You Begin](#)[Installation Type](#)[Server Selection](#)[Server Roles](#)[Features](#)[Confirmation](#)[Results](#)

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
DomainController	10.0.2.15,169.2...	Microsoft Windows Server 2019 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.

< Previous

Next >

Install

Cancel

Add Roles and Features Wizard

DESTINATION SERVER
DomainController

Select server roles

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

Select one or more roles to install on the selected destination 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

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)

Add Features Cancel

DESTINATION SERVER
DomainController

Installation progress

Before You Begin
Installation Type
Server Selection
Server Roles
Features
AD DS
Confirmation
Results

View installation progress

 Starting installation

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

 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 >

Install

Cancel

ADDS is installed in the server

The screenshot shows the Windows Server Manager interface. The left sidebar has a blue header "Dashboard" and includes links for Local Server, All Servers, AD DS, and File and Storage Services. The main content area is titled "WELCOME TO SERVER MANAGER". It features a "QUICK START" section with five numbered steps: 1. Configure this local server, 2. Add roles and features, 3. Add other servers to manage, 4. Create a server group, and 5. Connect this server to cloud services. Below this is a "WHAT'S NEW" section and a "LEARN MORE" button. A "Hide" link is located in the bottom right corner of the quick start box. At the bottom, there's a "ROLES AND SERVER GROUPS" section showing two roles: AD DS (1 instance) and File and Storage Services (1 instance). Both roles have "Manageability", "Events", "Services", "Performance", and "BPA results" listed under them. The taskbar at the bottom shows icons for Start, Search, Task View, Internet Explorer, File Explorer, and File History, along with the date and time (4:52 PM, 10/22/2022).

Server Manager

Server Manager • Dashboard

Manage Tools View Help

Dashboard

Local Server

All Servers

AD DS

File and Storage Services

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

QUICK START

WHAT'S NEW

LEARN MORE

Hide

ROLES AND SERVER GROUPS

Roles: 2 | Server groups: 1 | Servers total: 1

Role	Count
AD DS	1
File and Storage Services	1

AD DS

Manageability

Events

Services

Performance

BPA results

File and Storage Services

Manageability

Events

Performance

BPA results

4:52 PM 10/22/2022

Provide customized domain name

Active Directory Domain Services Configuration Wizard

- X

Deployment Configuration

TARGET SERVER
DomainController

Deployment Configuration

- Domain Controller Options
- Additional Options
- Paths
- Review Options
- Prerequisites Check
- Installation
- Results

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:

More about deployment configurations

< Previous **Next >** Install Cancel

Create a strong password

Active Directory Domain Services Configuration Wizard

Domain Controller Options

TARGET SERVER
DomainController

Deployment Configuration

Domain Controller Options

DNS Options

Additional Options

Paths

Review Options

Prerequisites Check

Installation

Results

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

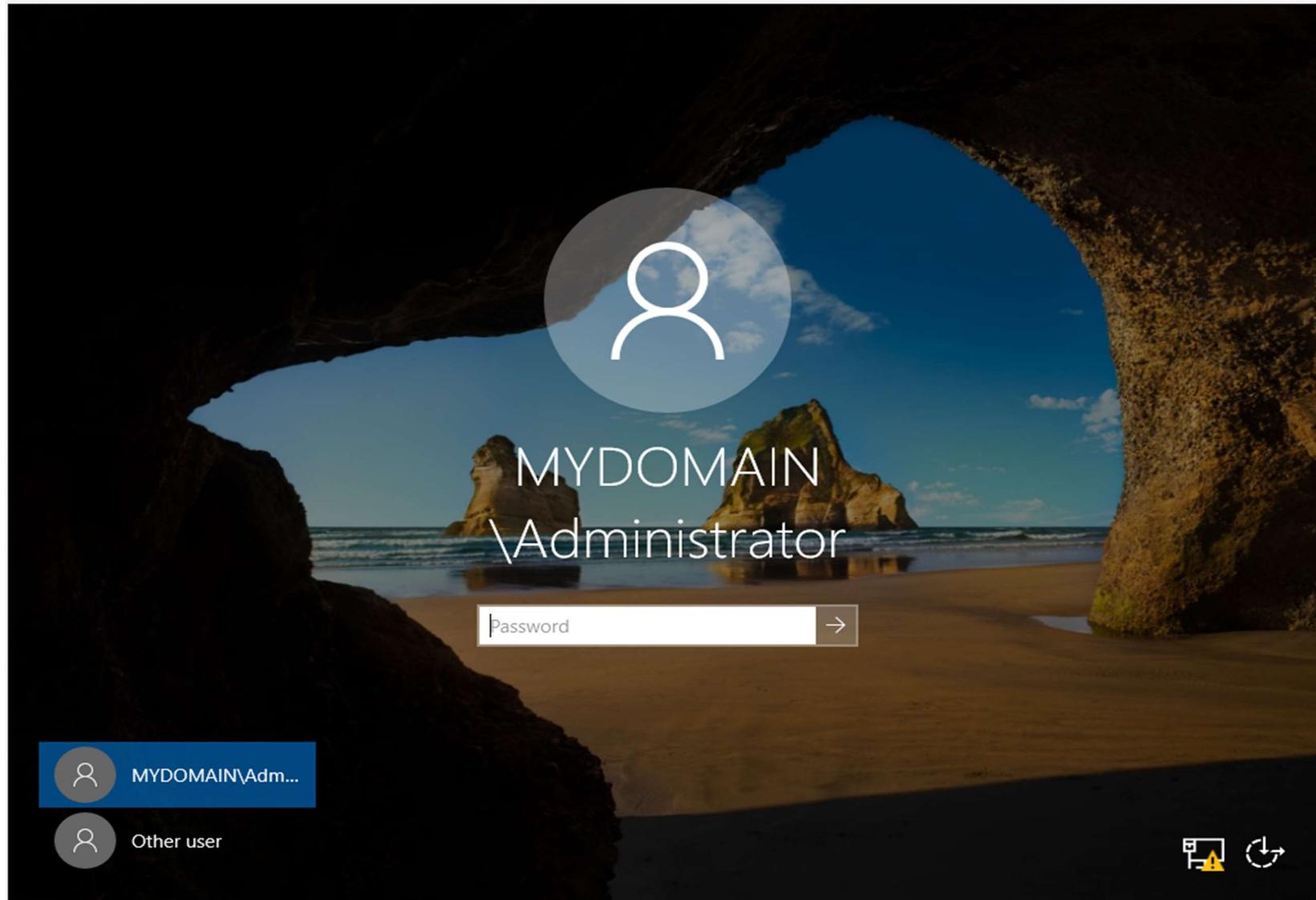
Password: ······

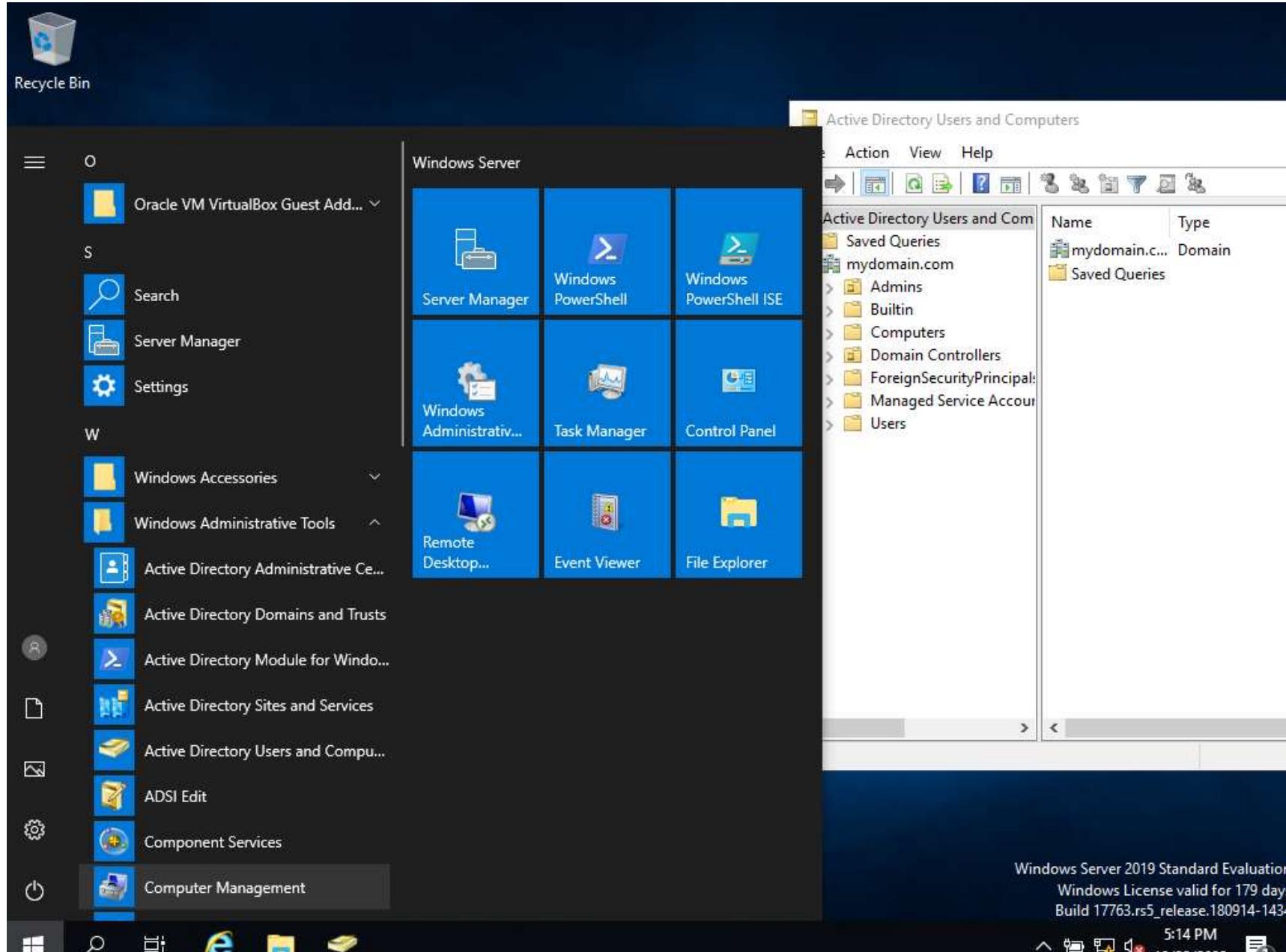
Confirm password: ······|

More about domain controller options

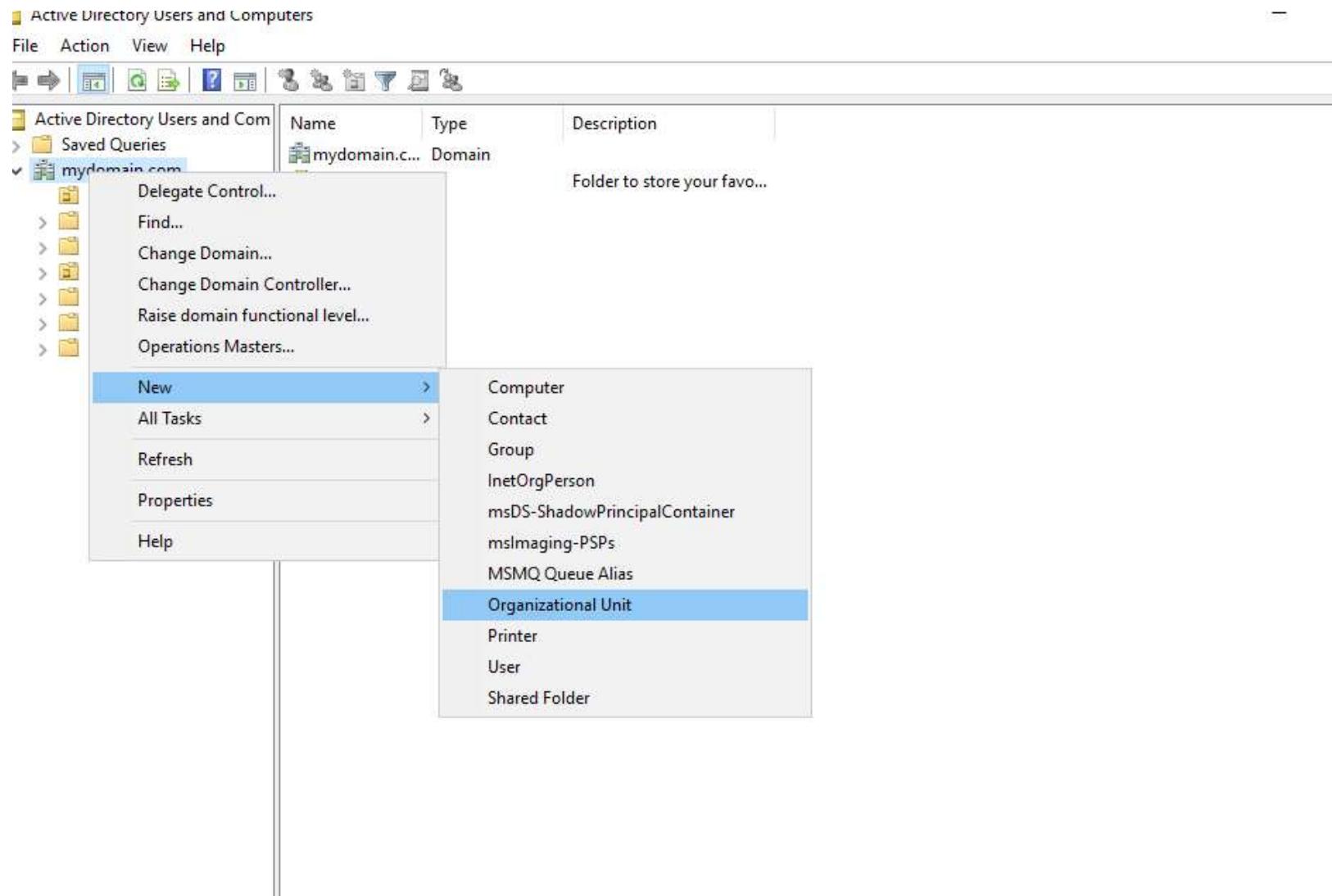
< Previous Next > Install Cancel

Login with built-in admin account and create another dedicated domain admin account

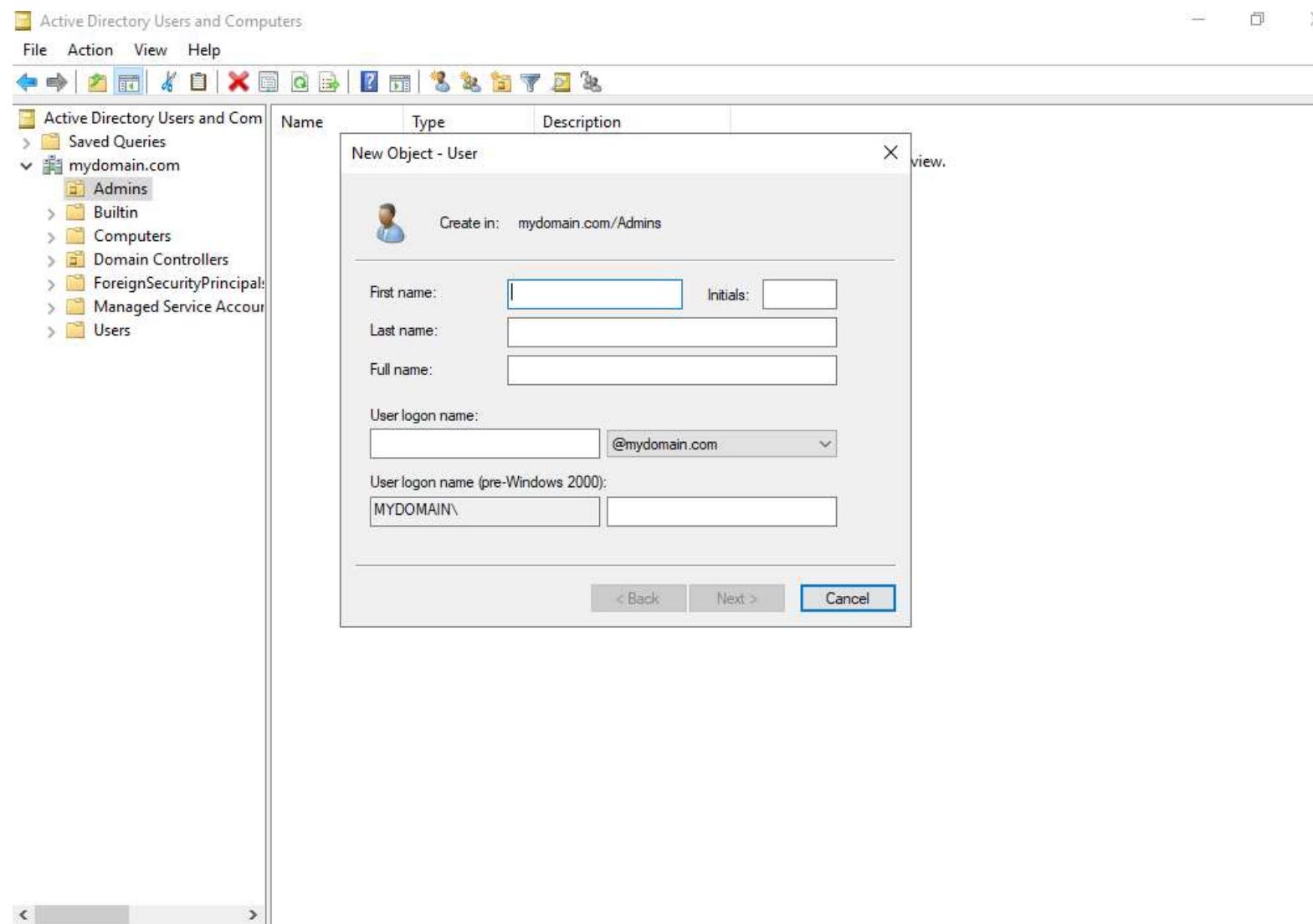




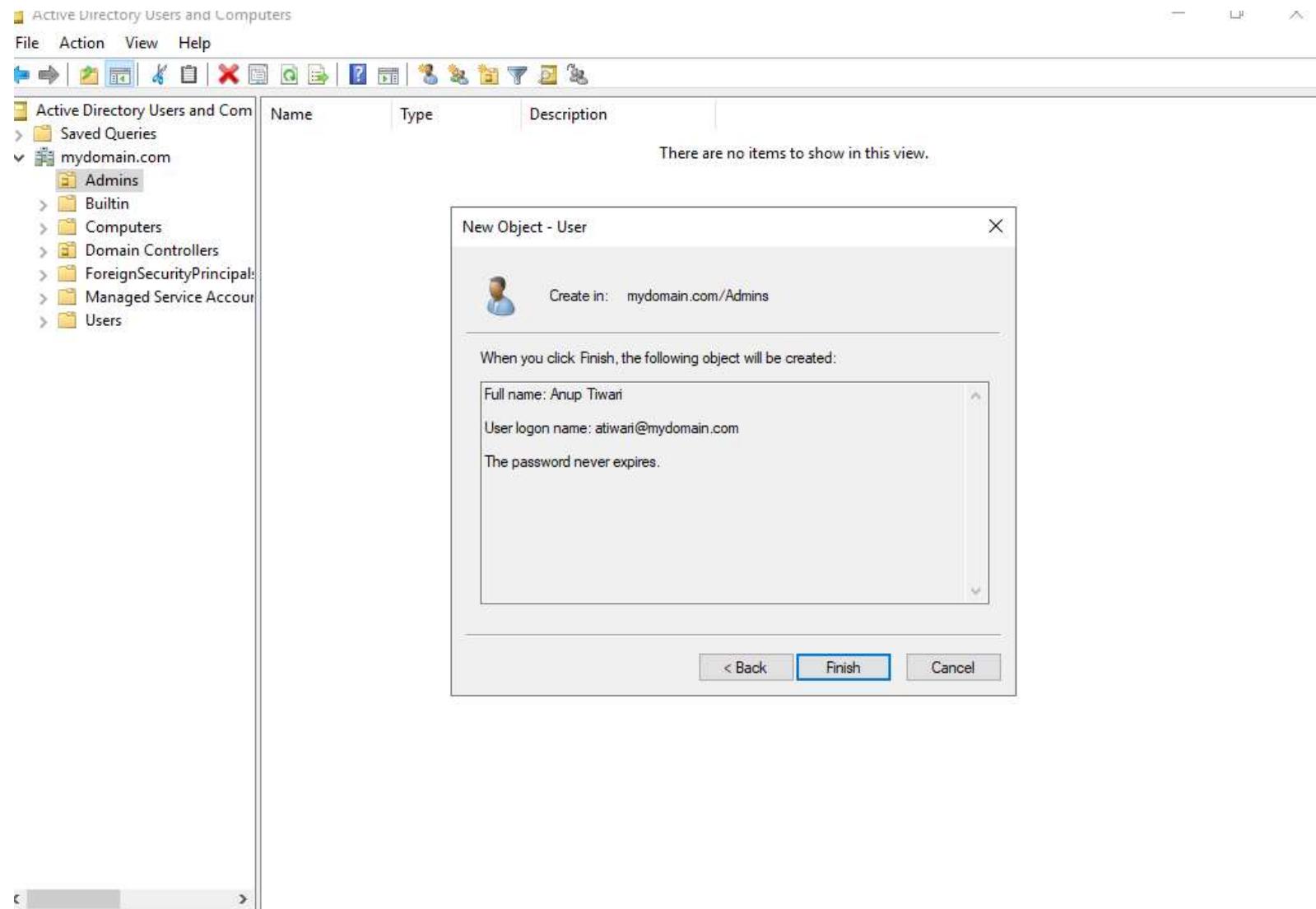
Create a new Organizational Unit (Admins)



Create a new user account



A new user is created with my own name



Active Directory Users and Computers

File Action View Help



Active Directory Users and Computers

Saved Queries

mydomain.com

Admins

Builtin

Computers

Domain Controllers

ForeignSecurityPrincipal

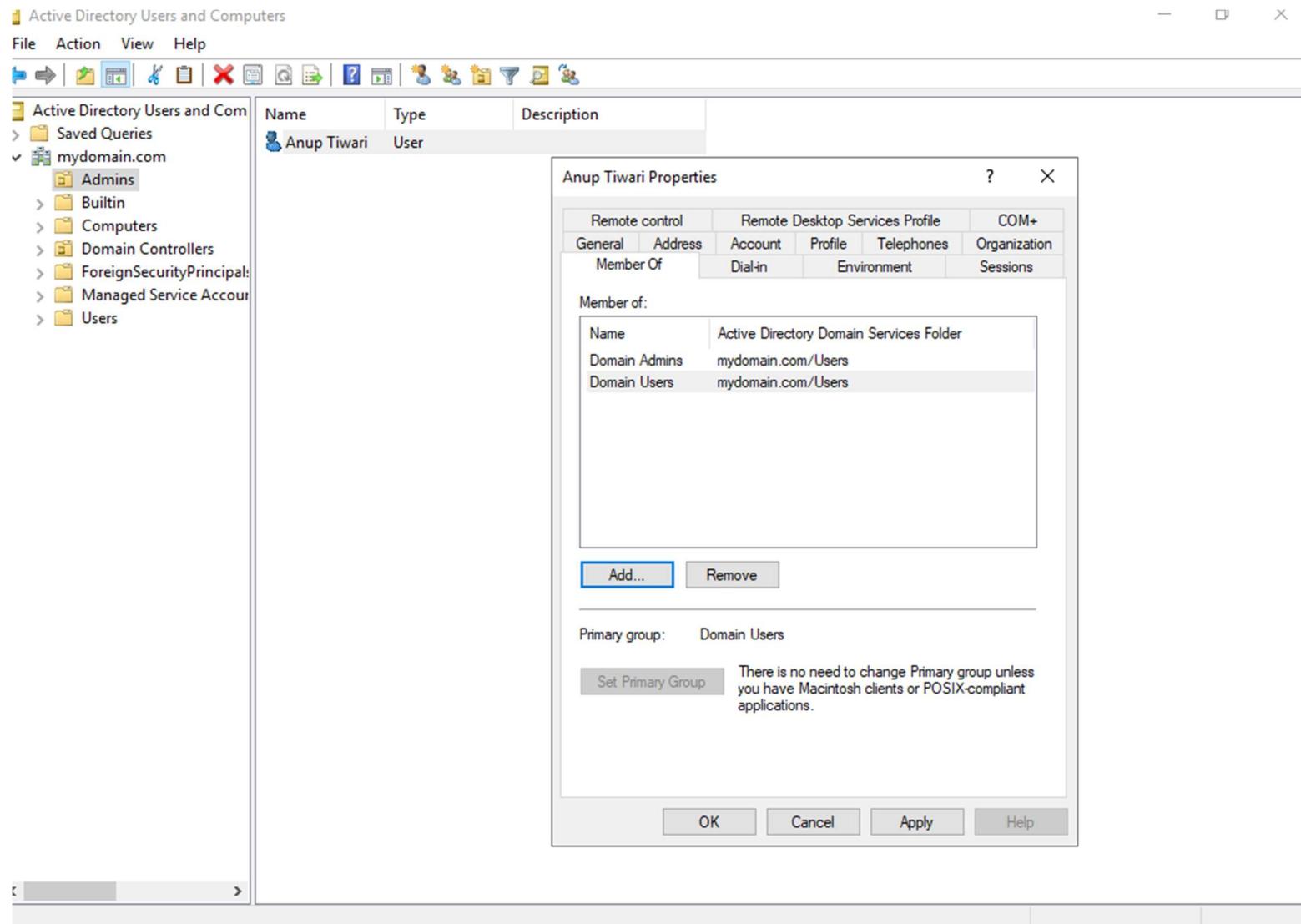
Managed Service Account

Users

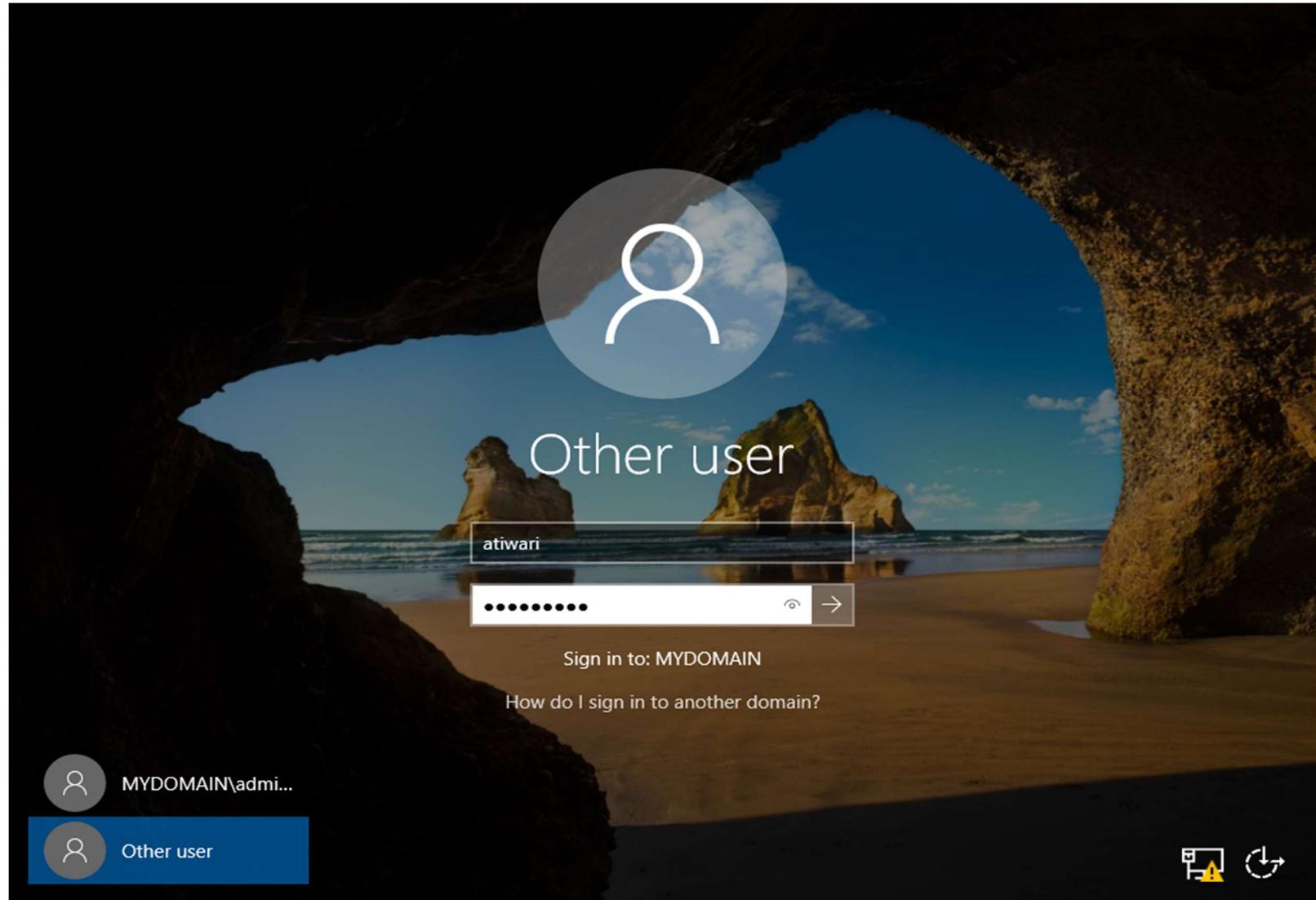
Name	Type	Description
------	------	-------------

Anup Tiwari	User	
-------------	------	--

Make it domain admin



Login with new admin account



Install and configure RAS/NAT

The screenshot shows the Windows Server Manager interface. The left sidebar has a blue header 'Dashboard' and items: Local Server, All Servers, AD DS, DNS, File and Storage Services. The main area has a 'QUICK START' section with numbered steps: 1. Configure this local server, 2. Add roles and features, 3. Add other servers to manage, 4. Create a server group. A modal window titled 'Add Roles and Features Wizard' is open. It has a 'Before you begin' sidebar with links: Before You Begin (selected), Installation Type, Server Selection, Server Roles, Features, Confirmation, Results. The main content area says: '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.' It also lists prerequisites: 'The Administrator account has a strong password', 'Network settings, such as static IP addresses, are configured', and 'The most current security updates from Windows Update are installed'. At the bottom, it says: '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.' A note at the bottom right says: 'DESTINATION SERVER DomainController.mydomain.com'.

Server Manager | Dashboard

Manage Tools View Help

Dashboard Local Server All Servers AD DS DNS File and Storage Services

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

Add Roles and Features Wizard

Before you begin

Before You Begin

- Installation Type
- Server Selection
- Server Roles
- Features
- Confirmation
- Results

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.

DESTINATION SERVER
DomainController.mydomain.com

Install Routing Services

Add Roles and Features Wizard

Select role services

DESTINATION SERVER
DomainController.mydomain.com

Before You Begin

Installation Type

Server Selection

Server Roles

Features

Remote Access

Role Services

Web Server Role (IIS)

Role Services

Confirmation

Results

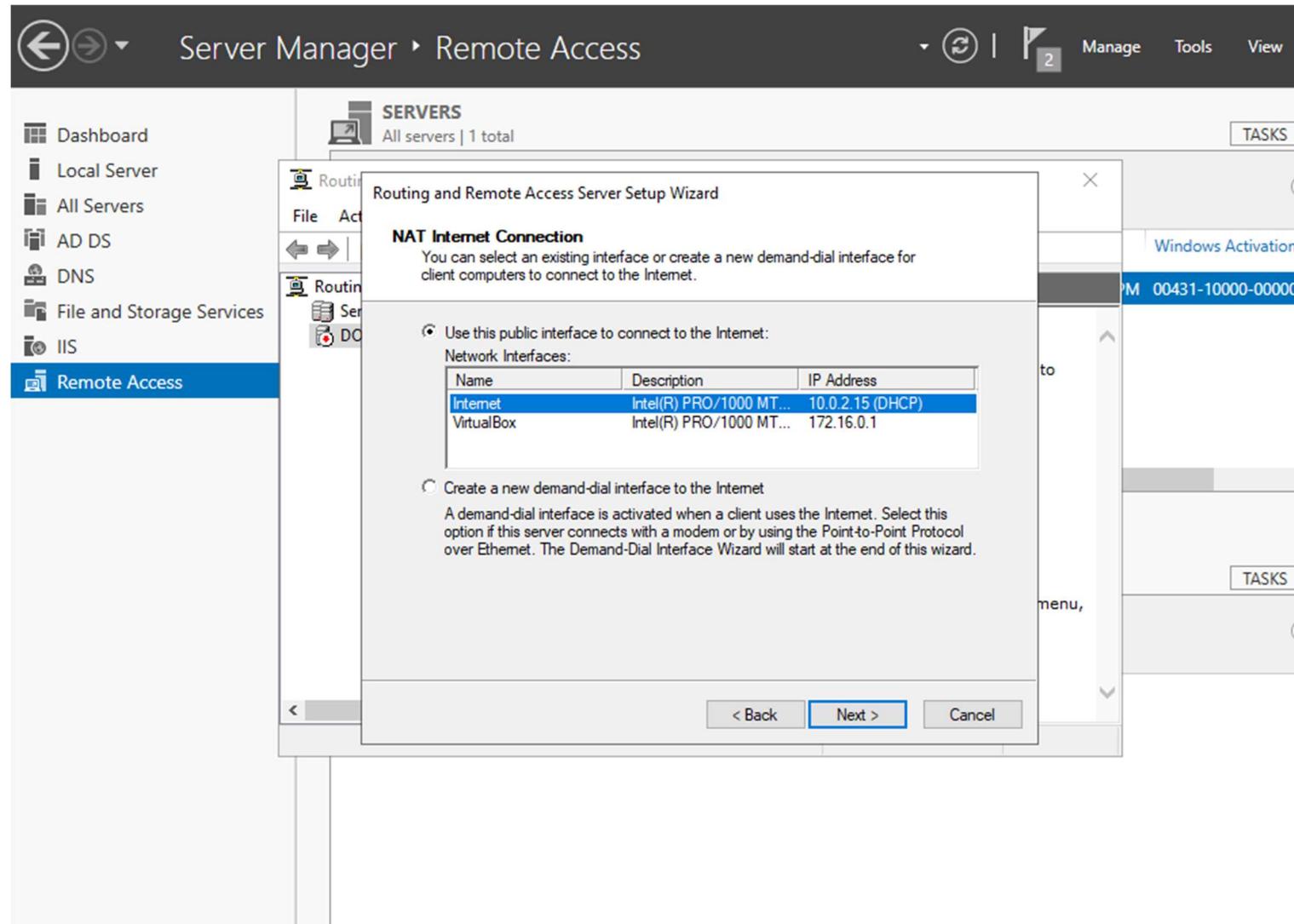
Select the role services to install for Remote Access

Role services

<input checked="" type="checkbox"/> DirectAccess and VPN (RAS)	Description
<input checked="" type="checkbox"/> Routing	Routing provides support for NAT Routers, LAN Routers running BGP, RIP, and multicast capable routers (IGMP Proxy).
<input type="checkbox"/> Web Application Proxy	

< Previous Next > Install Cancel

Configure the Ras/Nat by right clicking the Domain Controller and clicking "Configure and Enable Routing Services"



Install and configure DHCP Server in Domain Controller

Add Roles and Features Wizard

Select server roles

DESTINATION SERVER
DomainController.mydomain.com

Before You Begin

Installation Type

Server Selection

Server Roles

Features

DHCP Select server roles

Confirmation

Results

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

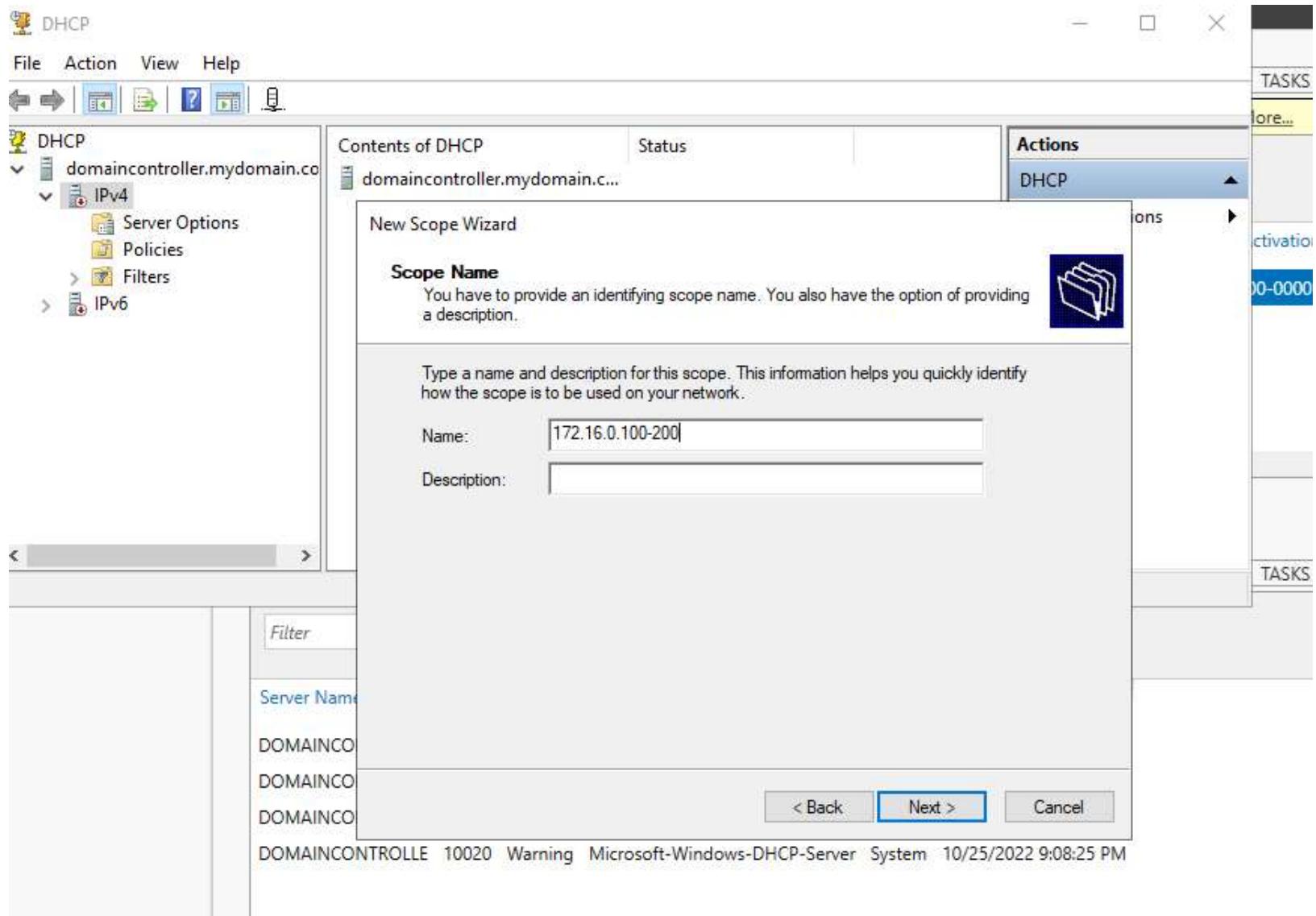
Roles

- Active Directory Certificate Services
- Active Directory Domain Services (Installed)
- Active Directory Federation Services
- Active Directory Lightweight Directory Services
- Active Directory Rights Management Services
- Device Health Attestation
- DHCP Server
- DNS Server (Installed)
- Fax Server
- File and Storage Services (2 of 12 installed)
 - Host Guardian Service
 - Hyper-V
 - Network Policy and Access Services
 - Print and Document Services
- Remote Access (2 of 3 installed)
 - Remote Desktop Services
 - Volume Activation Services
- Web Server (IIS) (10 of 43 installed)
 - Windows Deployment Services
 - Windows Server Update Services

Description

Dynamic Host Configuration Protocol (DHCP) Server enables you to centrally configure, manage, and provide temporary IP addresses and related information for client computers.

< Previous Next > Install Cancel



Provide the ranges for Ip address and subnet mask

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:

End IP address:

Configuration settings that propagate to DHCP Client

Length:

Subnet mask:

< Back Cancel

Provide the default gateway Ip address

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:

172 . 16 . 0 . 1 |

Add

Remove

Up

Down

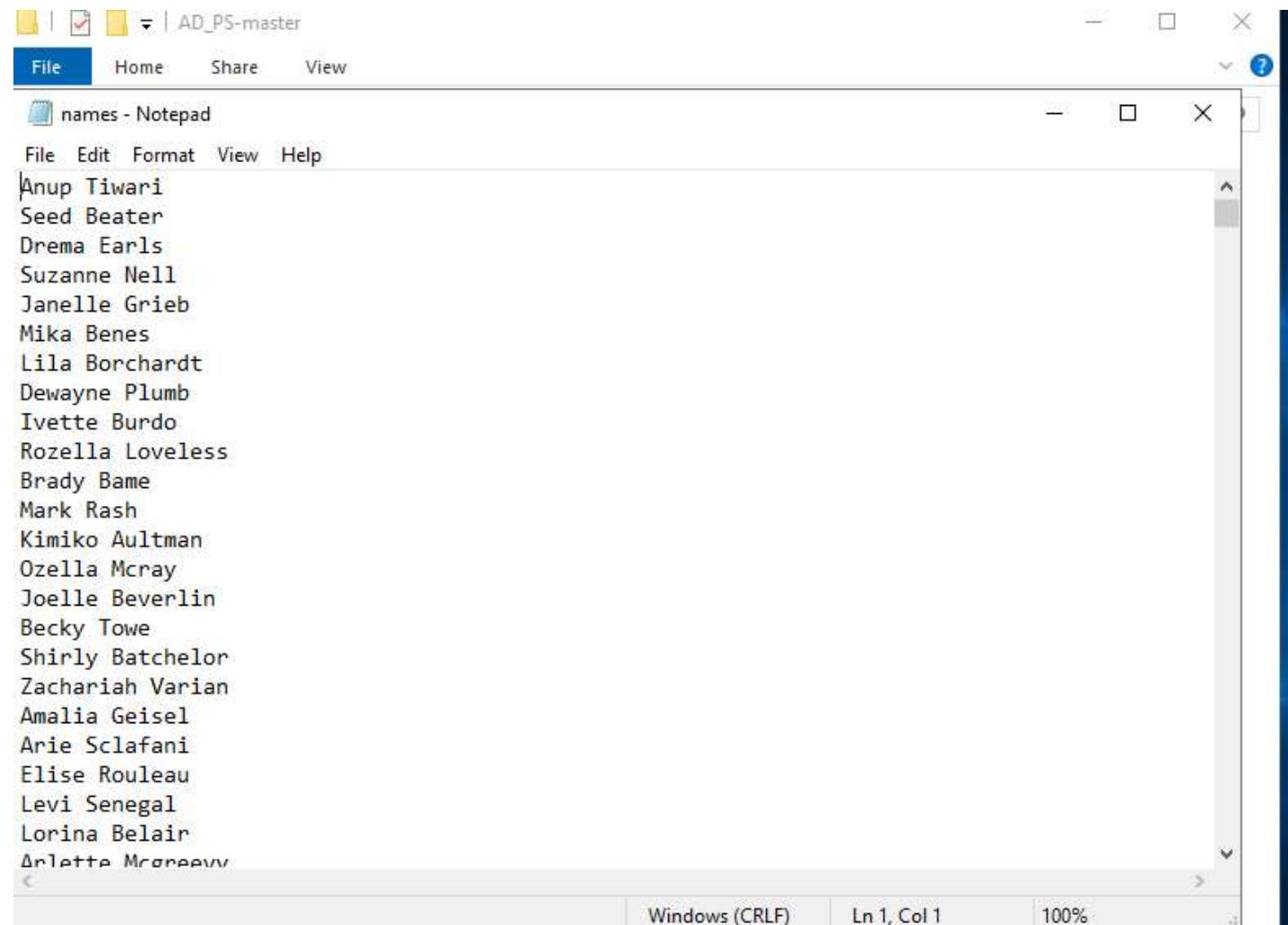
< Back

Next >

Cancel



Create a file name with random 1000 names. I downloaded it online.



Open the PowerShell ISE as an administrator and type the following scripts

```
$PASSWORD_FOR_USERS = "Password1"
$USER_FIRST_LAST_LIST = Get-Content .\names.txt
# ----- #

$password = ConvertTo-SecureString $PASSWORD_FOR_USERS -AsPlainText
-Force

New-ADOrganizationalUnit -Name _USERS -ProtectedFromAccidentalDeletion
\$false

foreach ($n in $USER_FIRST_LAST_LIST) {
    $first = $n.Split(" ")[0].ToLower()
    $last = $n.Split(" ")[1].ToLower()
    $username = "$($first.Substring(0,1))$($last)".ToLower()
    Write-Host "Creating user: $($username)" -BackgroundColor Black -
    ForegroundColor Cyan

    New-AdUser -AccountPassword $password `

        -GivenName $first `

        -Surname $last `

        -DisplayName $username `

        -Name $username `

        -EmployeeID $username `

        -PasswordNeverExpires $true `

        -Path "ou= _USERS,$([ADSIS]`""").distinguishedName" `

        -Enabled $true
```

Administrator: Windows PowerShell ISE

File Edit View Tools Debug Add-ons Help

1_CREATE_USERS.ps1 X

```
1 # ----- Edit these Variables for your own Use Case ----- #
2 $PASSWORD_FOR_USERS = "Password1"
3 $USER_FIRST_LAST_LIST = Get-Content .\names.txt
4 #
5
6 $password = ConvertTo-SecureString $PASSWORD_FOR_USERS -AsPlainText -Force
7 New-ADOrganizationalUnit -Name _USERS -ProtectedFromAccidentalDeletion $false
8
9 foreach ($n in $USER_FIRST_LAST_LIST) {
10     $first = $n.Split(" ")[0].ToLower()
11     $last = $n.Split(" ")[1].ToLower()
12     $username = "$($first.Substring(0,1))$($last)".ToLower()
13     Write-Host "Creating user: $($username)" -BackgroundColor Black -ForegroundColor White
14
15     New-AdUser -AccountPassword $password
16         -GivenName $first
17         -Surname $last
18         -DisplayName $username }
```

PS C:\Windows\system32>

Commands X

Modules: All Refresh

Name:

A:

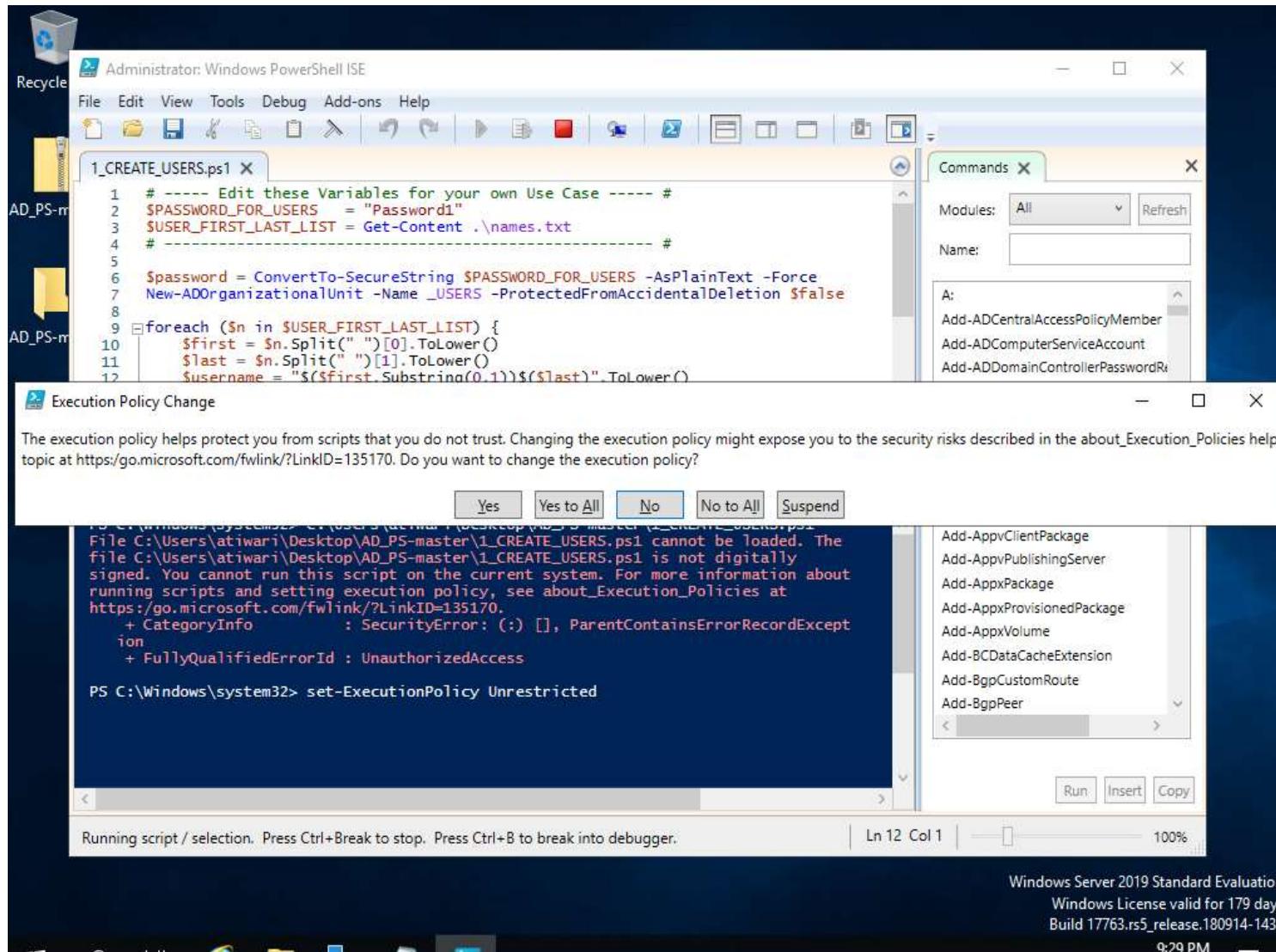
- Add-ADCentralAccessPolicyMember
- Add-ADComputerServiceAccount
- Add-ADDomainControllerPasswordRecovery
- Add-ADDSReadOnlyDomainController
- Add-ADFineGrainedPasswordPolicySetting
- Add-ADGroupMember
- Add-ADPrincipalGroupMembership
- Add-ADResourcePropertyListMember
- Add-AppClientConnectionGroup
- Add-AppClientPackage
- Add-AppPublishingServer
- Add-AppxPackage
- Add-AppxProvisionedPackage
- Add-AppxVolume
- Add-BCDataCacheExtension
- Add-BgpCustomRoute
- Add-BgpPeer

Run Insert Copy

Ln 1 Col 1 | 100%

Windows Server 2019 Standard Evaluation
Windows License valid for 179 days
Build 17763.rs5_release.180914-1434

Set Execution policy to unrestricted



1000 users get created after running the PowerShell script

The screenshot shows the Windows PowerShell ISE (x86) interface. The title bar reads "Administrator: Windows PowerShell ISE (x86)". The menu bar includes File, Edit, View, Tools, Debug, Add-ons, and Help. Below the menu is a toolbar with various icons. The main window displays a PowerShell script named "1_CREATE_USERS.ps1". The script creates a new organizational unit named "_USERS" and then iterates through a list of names to create 1000 users. The output window shows the progress of user creation, listing 1000 users from "mchestnut" to "arettig". The bottom status bar indicates the command was completed.

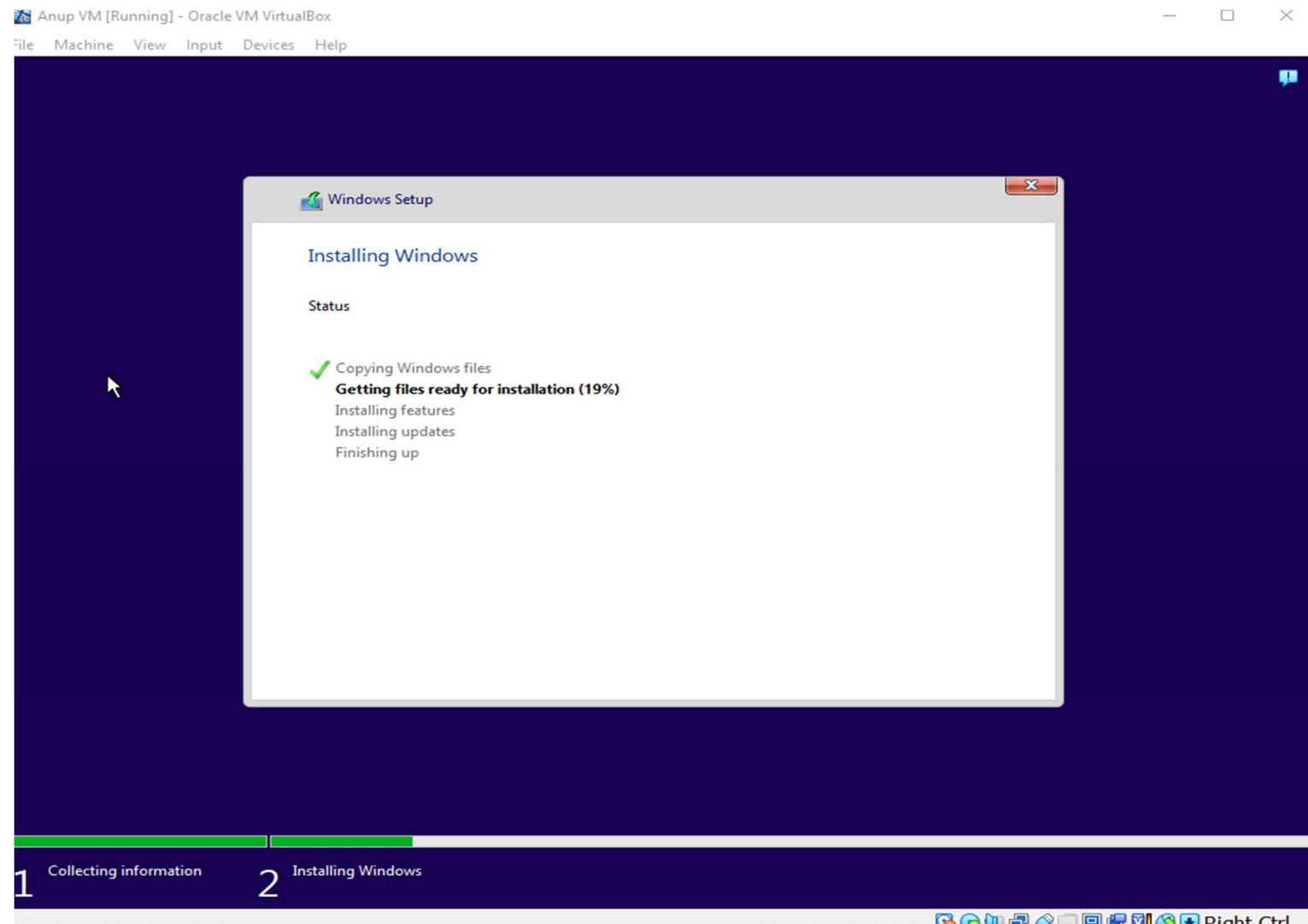
```
1 # ----- Edit these Variables for your own Use Case ----- #
2 $PASSWORD_FOR_USERS = "Password1"
3 $USER_FIRST_LAST_LIST = Get-Content .\names.txt
4 # -----
5
6 $password = ConvertTo-SecureString $PASSWORD_FOR_USERS -AsPlainText -Force
7 New-ADOrganizationalUnit -Name _USERS -ProtectedFromAccidentalDeletion $false
8
9 foreach ($n in $USER_FIRST_LAST_LIST) {
10     $first = $n.Split(" ")[0].ToLower()
11     $last = $n.Split(" ")[1].ToLower()
12     $username = $($first.Substring(0,1))$($last).ToLower()
13     Write-Host "Creating user: $($username)" -BackgroundColor Black -ForegroundColor Cyan
14
15     New-AdUser -AccountPassword $password
16         -GivenName $first
17         -Surname $last
18         -DisplayName $username
19         -Name $username
20         -EmployeeID $username
21         -PasswordNeverExpires $true
22         -Path "ou=_USERS,$([ADSI]'').distinguishedName"
23         Enabled $true
}
Creating user: mchestnut
Creating user: nlefevre
Creating user: cwestover
Creating user: vezzell
Creating user: dannunziata
Creating user: smitschke
Creating user: kmarden
Creating user: mraper
Creating user: dwillmore
Creating user: tbasilio
Creating user: bgilmer
Creating user: cconboy
Creating user: mhakes
Creating user: arettig
PS C:\Users\atiwari\Desktop\AD_PS-master> cd C:\Users\atiwari\Desktop\AD_PS-master
```

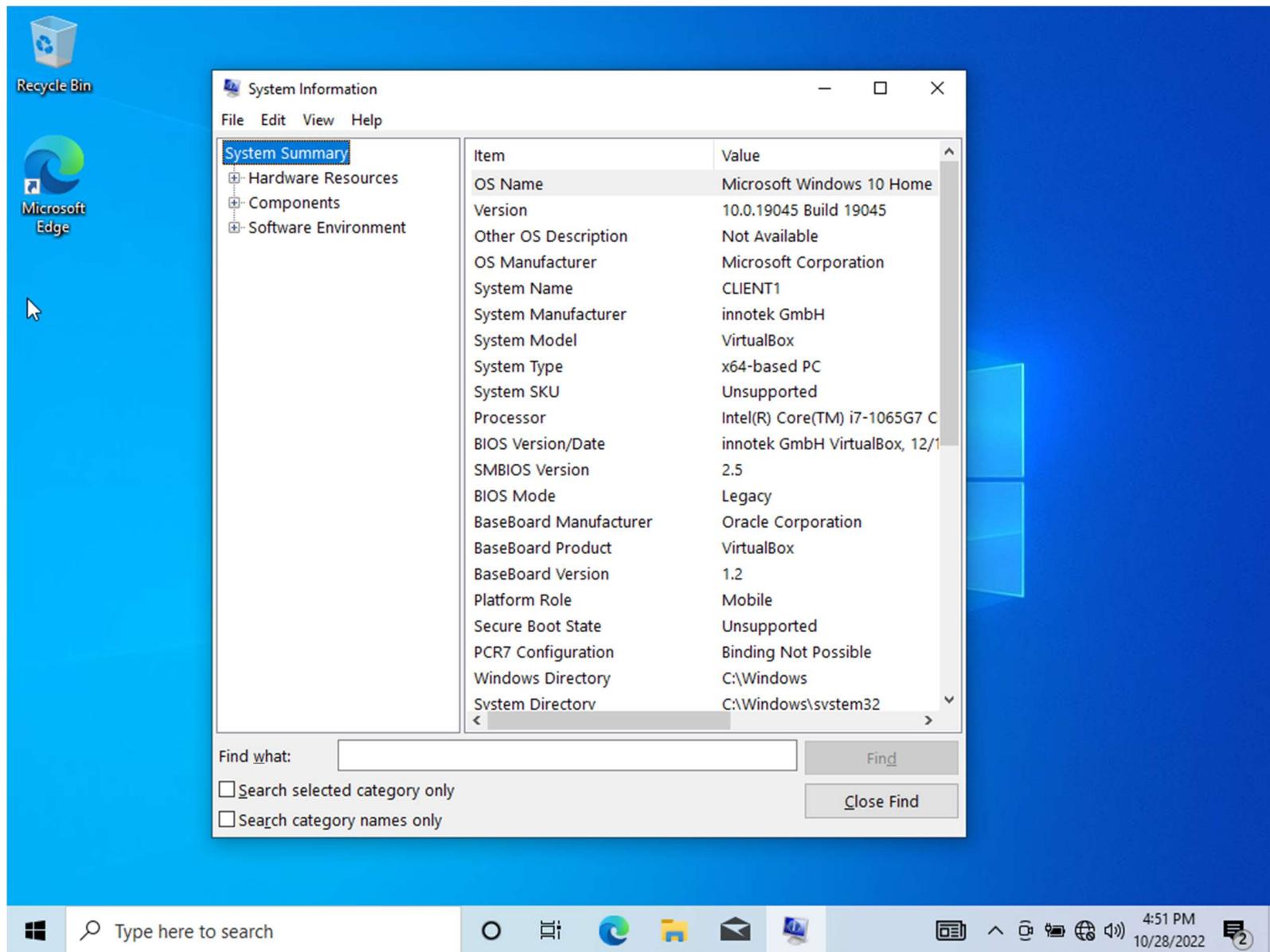
Check in the Active Directory users and computers. There will be all the users created in PowerShell.

The screenshot shows the Windows Active Directory Users and Computers (ADUC) management console. The left pane displays a tree view of the directory structure under 'mydomain.com'. The 'mydomain.com' node is expanded, showing its subcontainers: _USERS, Admins, Builtin, Computers, Domain Controllers, ForeignSecurityPrincipals, Managed Service Accounts, and Users. The '_USERS' container is also expanded, revealing its subcontainers: Admins, Builtin, Computers, Domain Controllers, ForeignSecurityPrincipals, Managed Service Accounts, and Users. The right pane is a grid-based list of users, with columns for Name, Type, and Description. The list contains 25 entries, each represented by a small user icon, the name, and the word 'User' indicating their type. The names listed are: afreitag, agaliano, agannon, agardner, ageisel, agoltz, aguo, ahamamoto, ahayne, ahinkle, ahitch, aholcombe, akime, akitzman, alegere, alingle, alott, alove, alowenthal, aloy, and amaharaj.

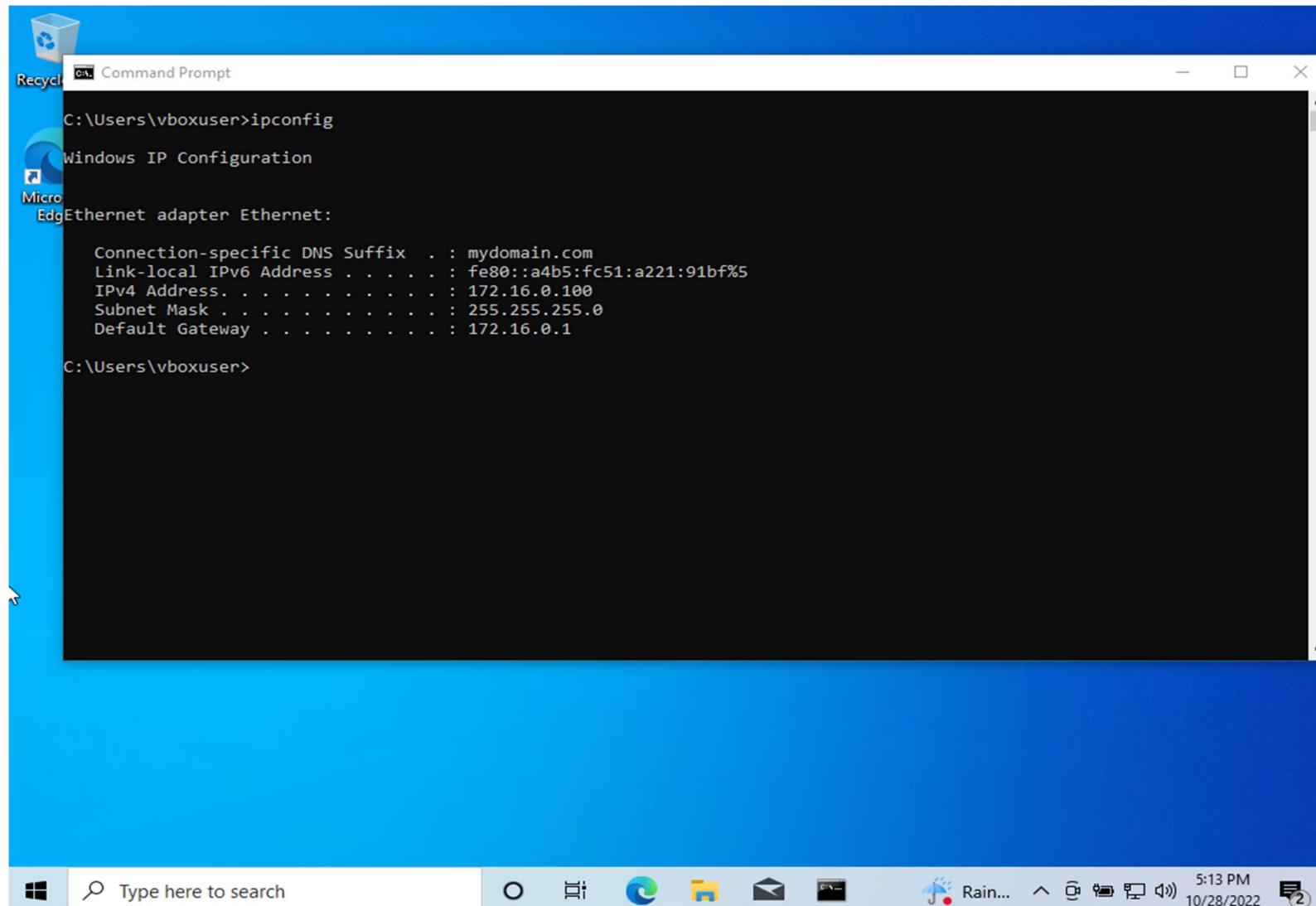
Name	Type	Description
afreitag	User	
agaliano	User	
agannon	User	
agardner	User	
ageisel	User	
agoltz	User	
aguo	User	
ahamamoto	User	
ahayne	User	
ahinkle	User	
ahitch	User	
aholcombe	User	
akime	User	
akitzman	User	
alegere	User	
alingle	User	
alott	User	
alove	User	
alowenthal	User	
aloy	User	
amaharaj	User	

Install windows 10 pro in the virtual box





Use ipconfig to see if the default gateway matches with the domain controller



Ping googles to see if it responds or not

A screenshot of a Windows 10 desktop environment. In the center is a Command Prompt window titled "Command Prompt". The window displays the output of the "ipconfig" command, which shows network configuration details for an "EdgEthernet adapter Ethernet". It includes information like Connection-specific DNS Suffix, Link-local IPv6 Address, IPv4 Address, Subnet Mask, and Default Gateway. Below this, the "ping google.com" command is run, showing four successful replies from the target IP address 142.250.113.101. The ping statistics show 4 packets sent, 4 received, 0% loss, and round-trip times ranging from 6ms to 11ms with an average of 8ms. The desktop background is blue, and the taskbar at the bottom shows various pinned icons and the system tray with the date and time (5:21 PM, 10/28/2022).

```
C:\Users\vboxuser>ipconfig

Windows IP Configuration

EdgEthernet adapter Ethernet:

  Connection-specific DNS Suffix . . . : mydomain.com
  Link-local IPv6 Address . . . . . : fe80::a4b5:fc51:a221:91bf%5
  IPv4 Address . . . . . : 172.16.0.100
  Subnet Mask . . . . . : 255.255.255.0
  Default Gateway . . . . . : 172.16.0.1

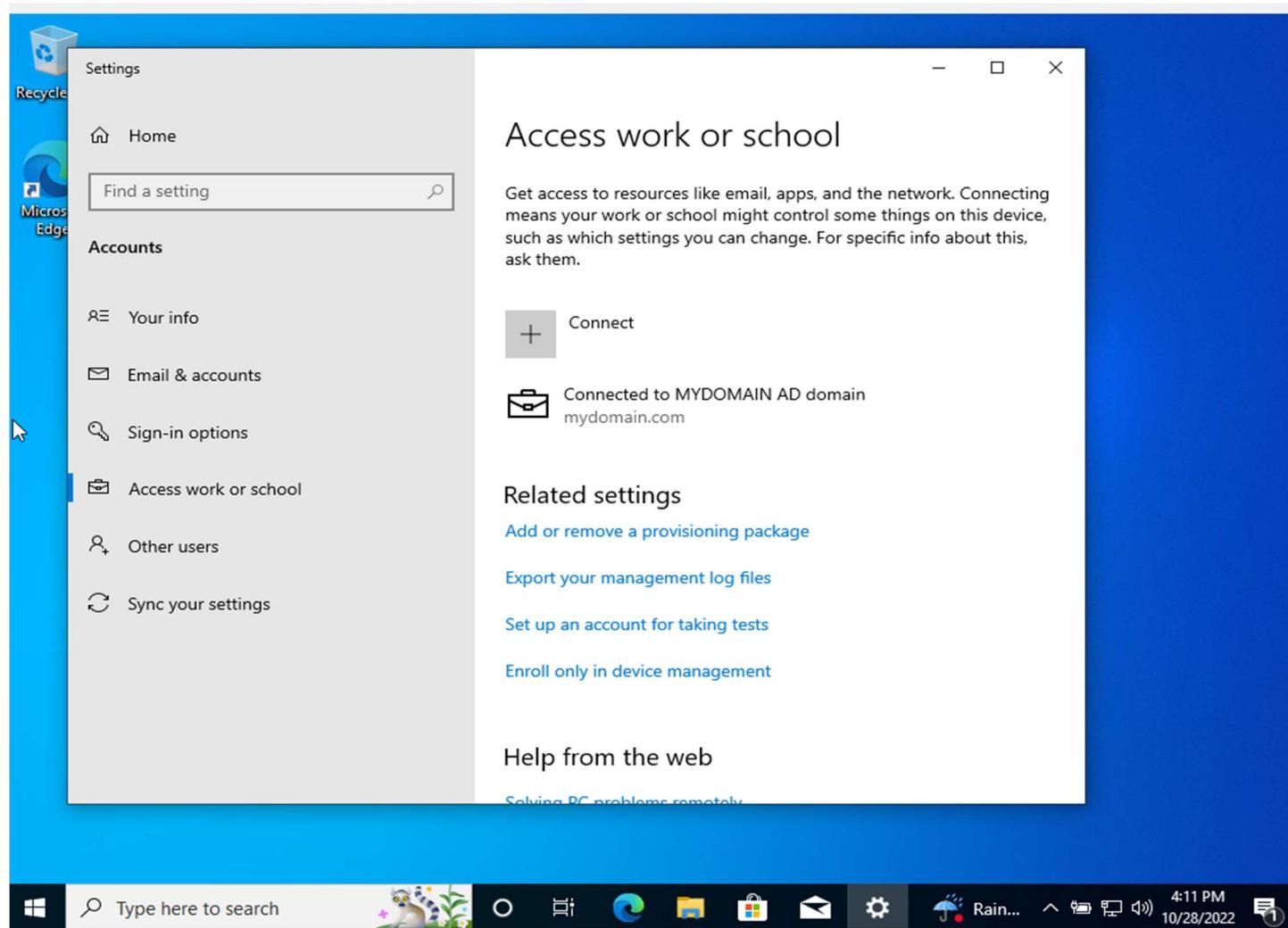
C:\Users\vboxuser>ping google.com

Pinging google.com [142.250.113.101] with 32 bytes of data:
Reply from 142.250.113.101: bytes=32 time=7ms TTL=102
Reply from 142.250.113.101: bytes=32 time=11ms TTL=102
Reply from 142.250.113.101: bytes=32 time=9ms TTL=102
Reply from 142.250.113.101: bytes=32 time=6ms TTL=102

Ping statistics for 142.250.113.101:
  Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
  Approximate round trip times in milli-seconds:
    Minimum = 6ms, Maximum = 11ms, Average = 8ms

C:\Users\vboxuser>
```

Connect the Virtual Windows to the domain: mydomain.com by going into the settings



New device is created in Active Directory

The screenshot shows the Windows Server Manager interface. The left sidebar navigation bar includes links for Dashboard, Local Server, All Servers, AD DS, DHCP (which is selected), DNS, File and Storage Services, IIS, and Remote Access. The main content area has three tabs: SERVERS, EVENTS, and SERVICES.

Servers Tab:

- Sub-tab: Active Directory Users and Computers
- Content pane: Shows the structure of the Active Directory. A tree view on the left lists "Active Directory Users and Computers", "mydomain.com", and several sub-containers like "_USERS", "Admins", "Builtin", "Computers", "Domain Controllers", "ForeignSecurityPrincipals", and "Users".
- Table view on the right lists objects by Name, Type, and Description. One entry is visible: ANUPVIRTU... (Computer).

Events Tab:

- Sub-tab: All events | 7 to
- Content pane: Shows event logs. The log table has columns for Server Name, Log, Type, Source, Message, and Date.
- Log entries:

 - DOMAINCONTROLE 10020 Warning Microsoft-Windows-DHCP-Server System 10/28/2022 11:47:31 AM
 - DOMAINCONTROLE 1036 Error Microsoft-Windows-DHCP-Server System 10/28/2022 11:47:14 AM
 - DOMAINCONTROLE 1035 Error Microsoft-Windows-DHCP-Server System 10/28/2022 11:47:14 AM

Services Tab:

- Sub-tab: All services | 1 total
- Content pane: Shows the status of the DHCP service. The table has columns for Server Name, Display Name, Service Name, Status, and Start Type.
- Service entry: DOMAINCONTROLE (DHCP Server) is listed as running with an automatic start type.

The network is completed, and a mini-corporate environment is created.