

## Active Directory Home Lab

Zachary Koopman

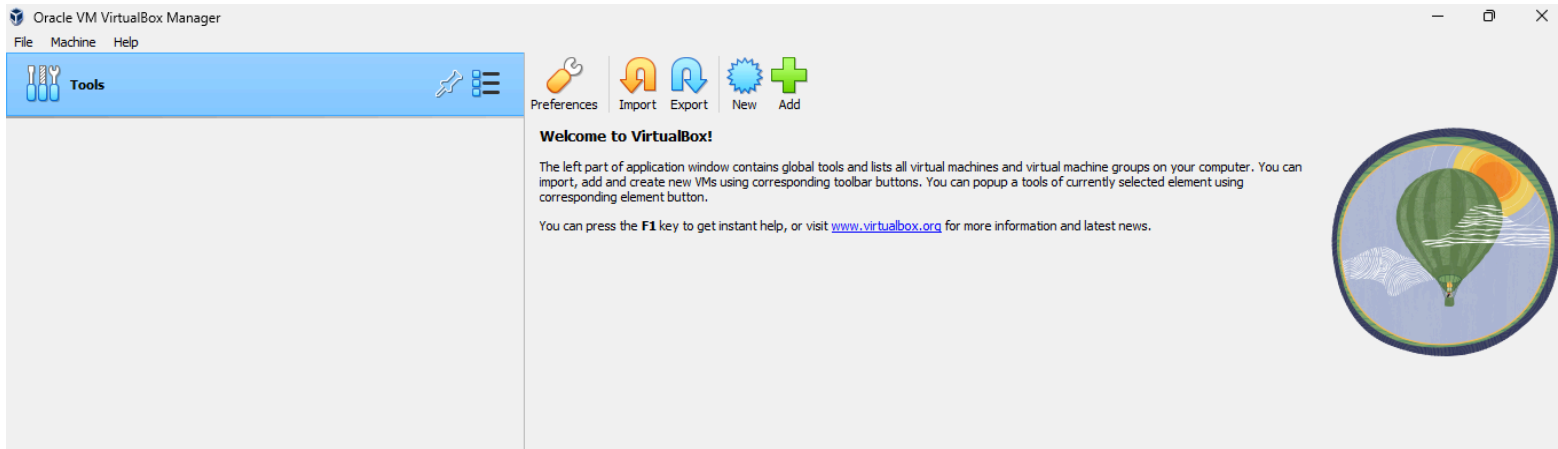
Purpose of Lab: In this lab, multiple Windows virtual machines and a Windows Server 2022 will be utilized to create an Active Directory lab environment. The domain controller in this environment will be the Windows Server 2022 which will allow for both the authentication and authorization of new users. Active Directory serves as a cornerstone in Windows domain enterprises allowing for easy centralized management, scalability, and integration with other applications which really reduces administrative overhead. Thus, it is essential for an IT career to understand how Active Directory works so this document will serve as a basic guide showcasing my experience configuring Active Directory.

Hypervisor: For this lab, the hypervisor that I will be using for my virtual machines is VirtualBox. A download for VirtualBox can be found [here](#). Any other hypervisor should work for this lab and the only difference should be where certain options/buttons are but there should be plenty of resources online to assist.

**Make sure that virtualization is enabled in your BIOS as well!**

## Configure the Hypervisor

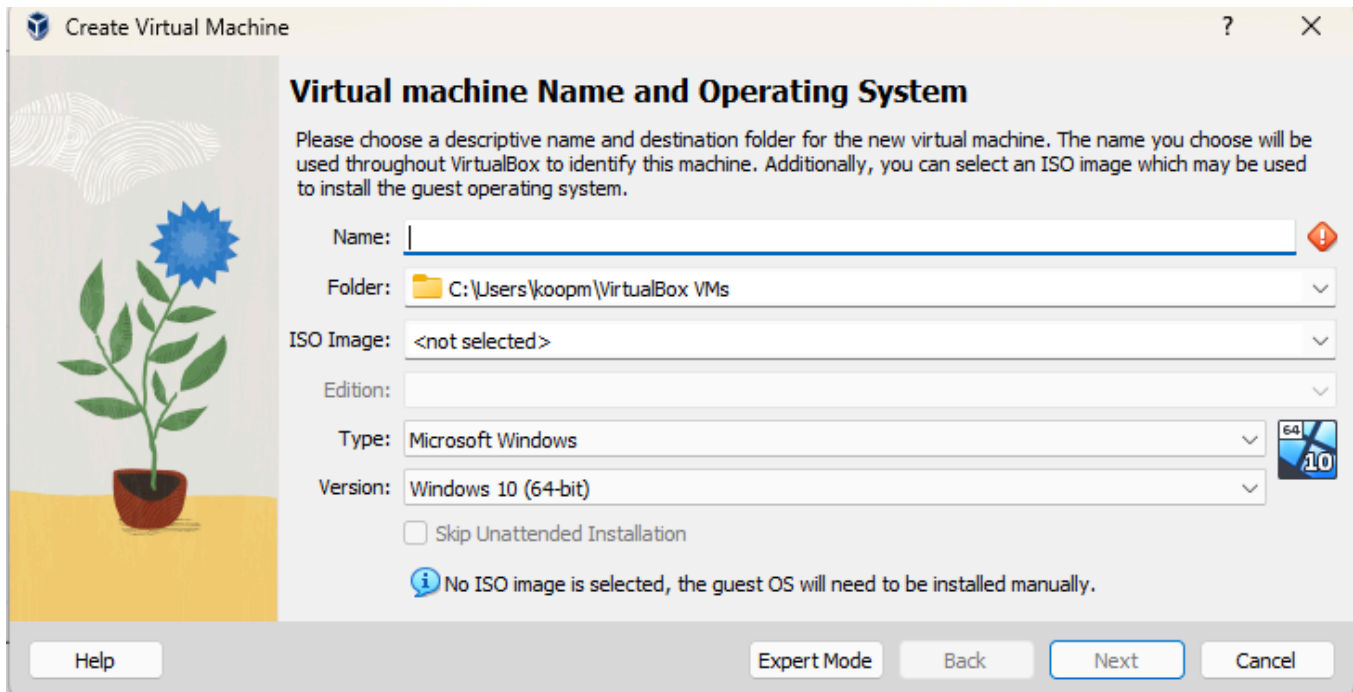
- Once you have installed the hypervisor of your choice, run it and get to the home screen. Here is what it looks like for VirtualBox:



- Next, you will need to install [Windows 10 Enterprise](#). Choose the 64-bit version.

English (United States)	<b>ISO – Enterprise downloads</b> <a href="#">32-bit edition &gt;</a> <a href="#">64-bit edition &gt;</a>	<b>ISO – Enterprise LTSC downloads</b> <a href="#">32-bit edition &gt;</a> <a href="#">64-bit edition &gt;</a>
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- Once the installation has completed, create a new virtual machine (for VirtualBox, click the “new” button). You can choose any name you want but make sure to not include the ISO image yet. Your settings (except for the name) should look as follows:



**Create Virtual Machine**

**Virtual machine Name and Operating System**

Please choose a descriptive name and destination folder for the new virtual machine. The name you choose will be used throughout VirtualBox to identify this machine. Additionally, you can select an ISO image which may be used to install the guest operating system.

Name:

Folder:


ISO Image:

Edition:

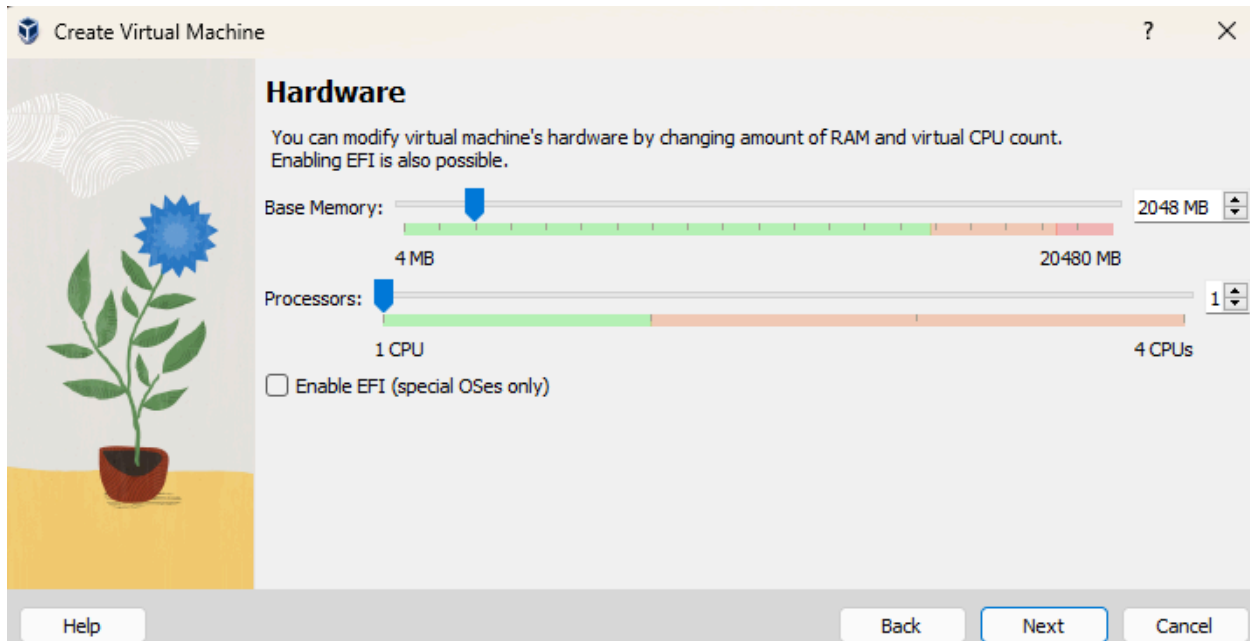
Type:

Version:

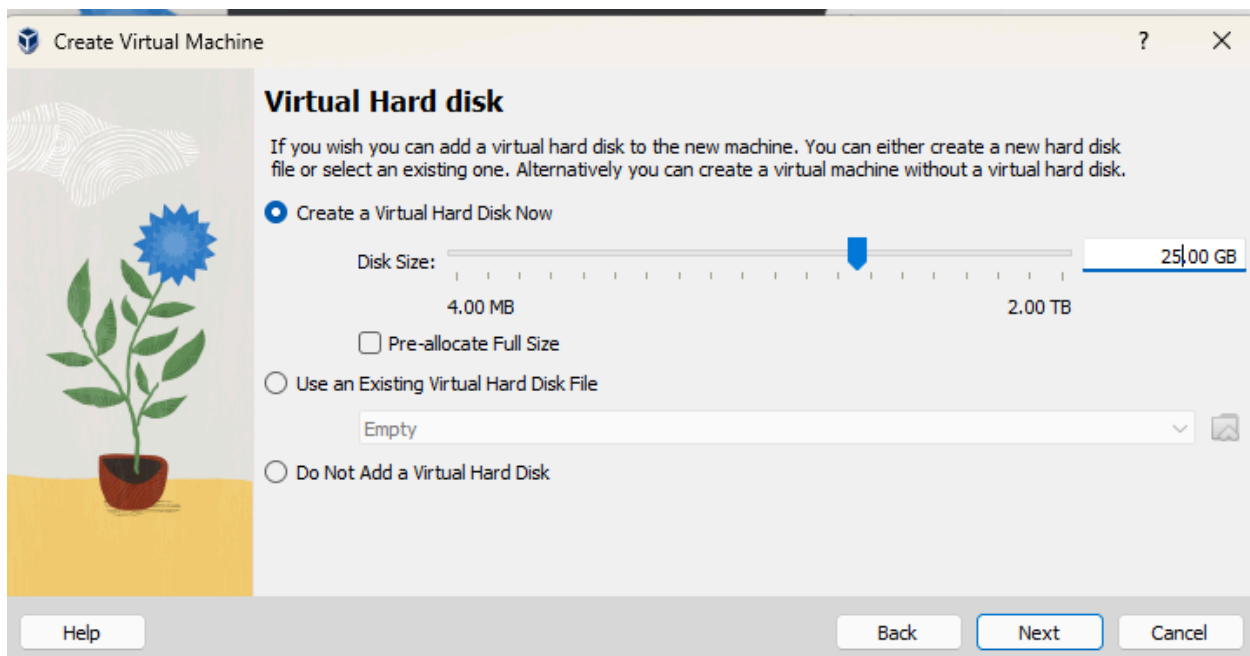
☐ Skip Unattended Installation

 No ISO image is selected, the guest OS will need to be installed manually.

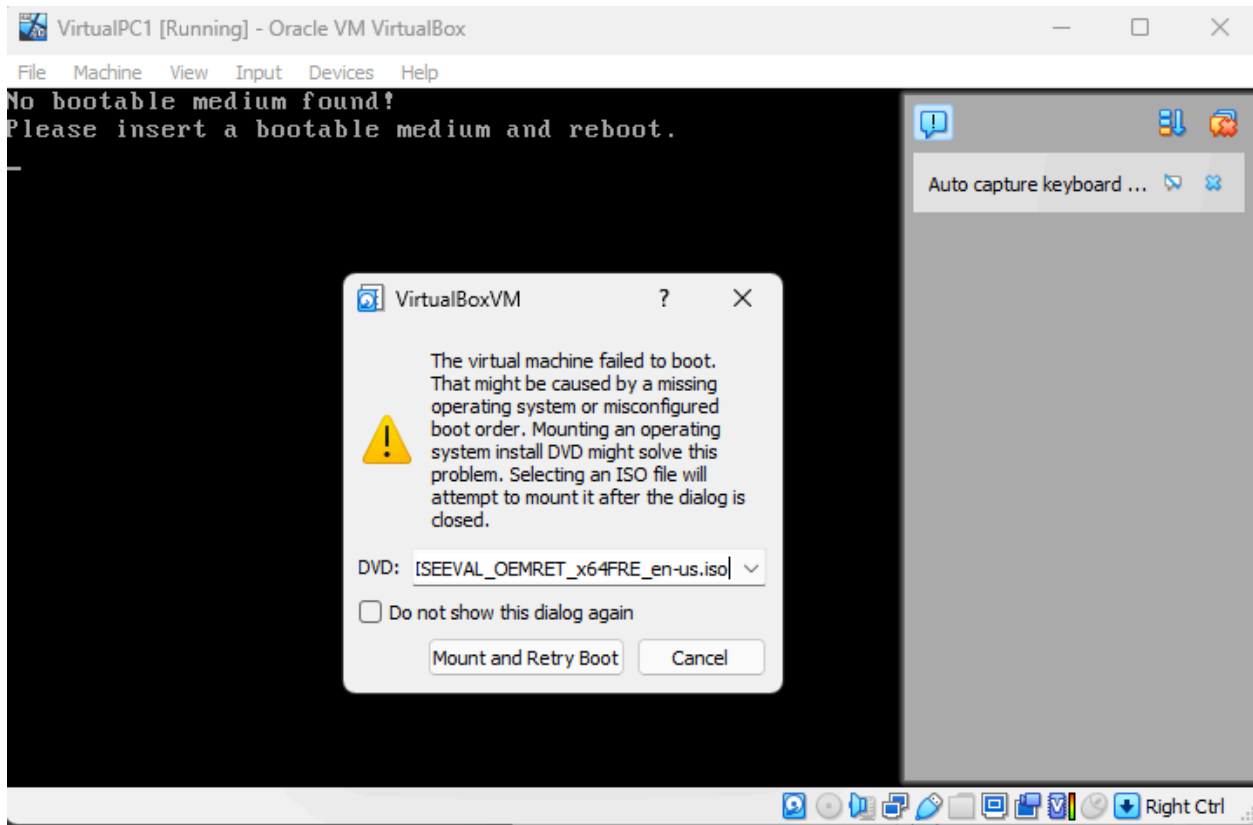
- Once you have entered the settings, allocate the RAM and processors for the virtual machine. In this case, I will be allocating 2 GBs of RAM and 1 processor (\*\*Note: I do not recommend going below 2 GBs of RAM for your setup)



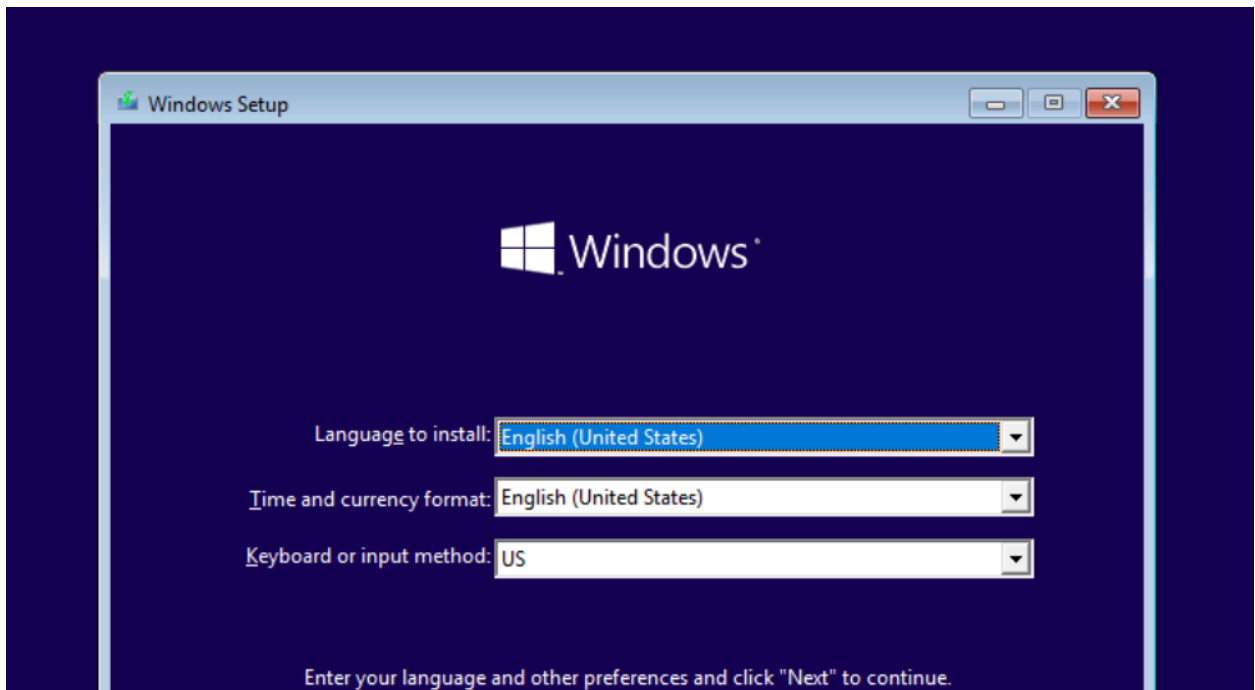
- Next, set up the virtual hard disk. I chose 25 GBs for the virtual disk space and you do whatever you like (minimum for Windows 10 is 16 GB).



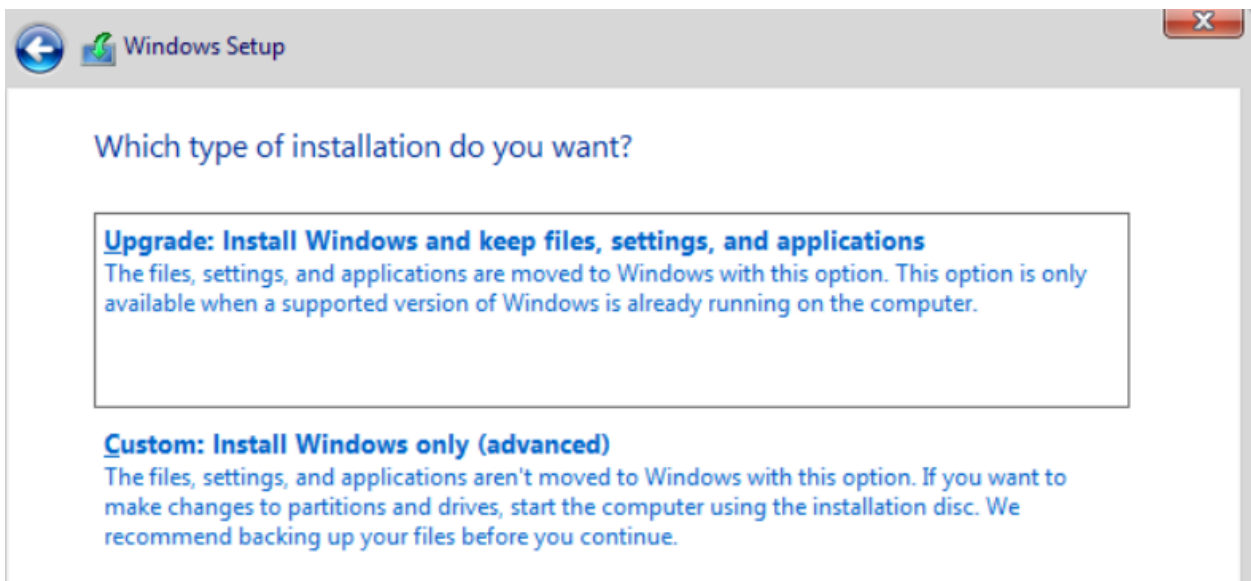
- Now that you have allocated everything properly, the initial VM setup is complete. Now, in VirtualBox or whatever hypervisor you're using, the new VM should appear. Click to run it and you will see this below. Here, add into the DVD your Windows Enterprise that you downloaded earlier (Page 2) then click “mount and retry boot.”



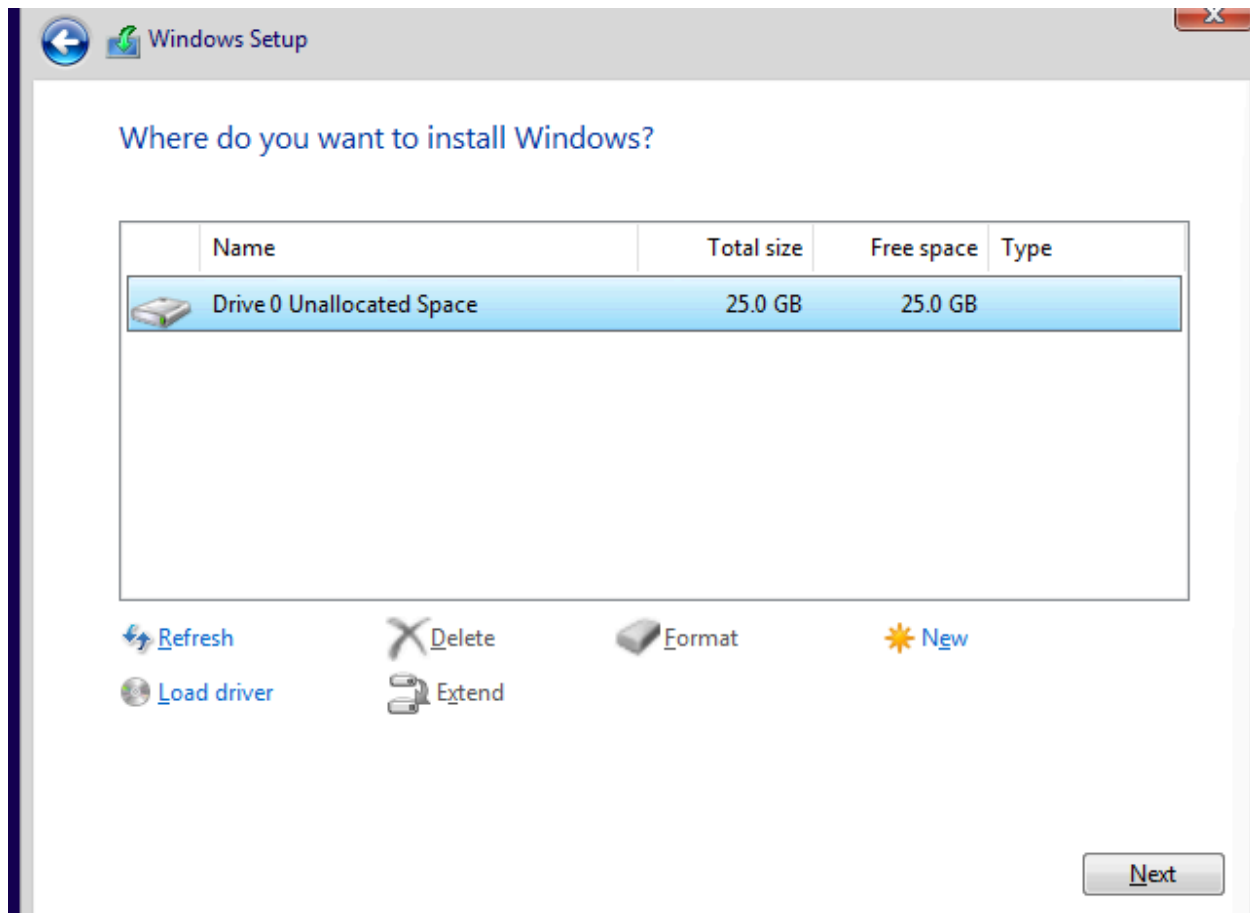
- Afterwards, you should now be able to see the Windows boot up screen as shown below.



- Click next in the bottom right and select install. It will ask you to agree to the terms and conditions then make sure you click **Custom: Install Windows Only**.



- Download the OS using the virtual drive created in the previous steps



## Installing Windows Server 2022

- After you have begun the installation process as seen on the last page, we can now download Windows Server 2022 in the meantime [here](#). Download the ISO is the option you will select.

### Get started for free

Please select your evaluation experience:

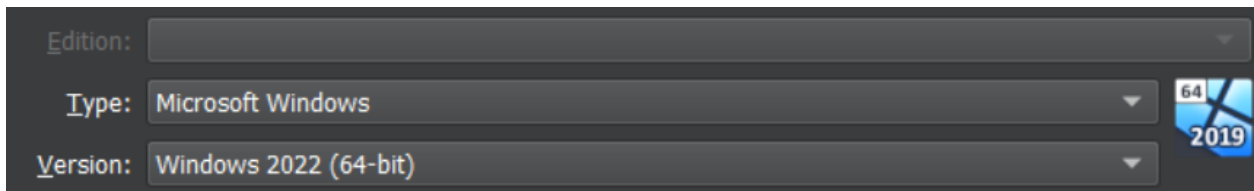
[Try Windows Server on Azure >](#)

[Create a Virtual Machine in Azure >](#)

[Download the ISO >](#)

[Download the VHD >](#)

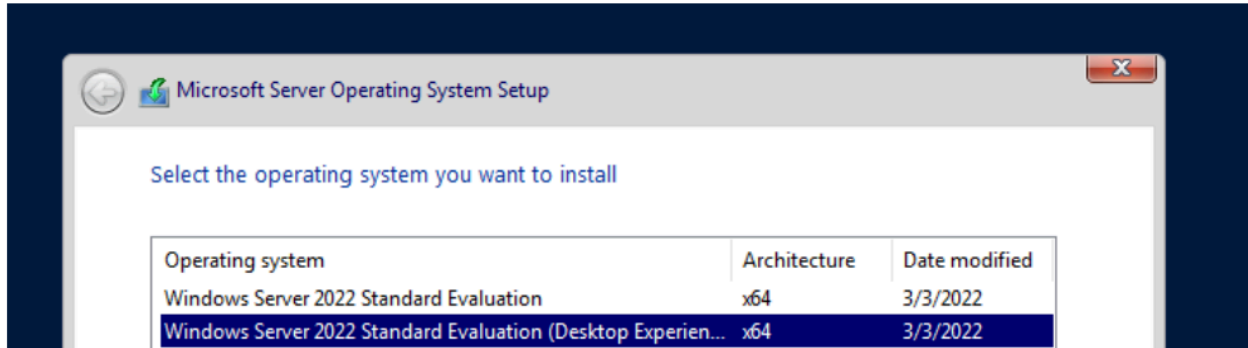
- You will now create another virtual machine following the exact same steps you used to install the previous one. The only difference is that you will now use Windows 2022 (64-bit) as the version. You will still not include the ISO file just yet.



The screenshot shows a dark-themed interface for selecting a Windows edition. It features three dropdown menus: 'Edition:' (empty), 'Type:' (set to 'Microsoft Windows'), and 'Version:' (set to 'Windows 2022 (64-bit)'). To the right of these menus is a blue square icon with a white 'X' and the text '64' and '2019'.



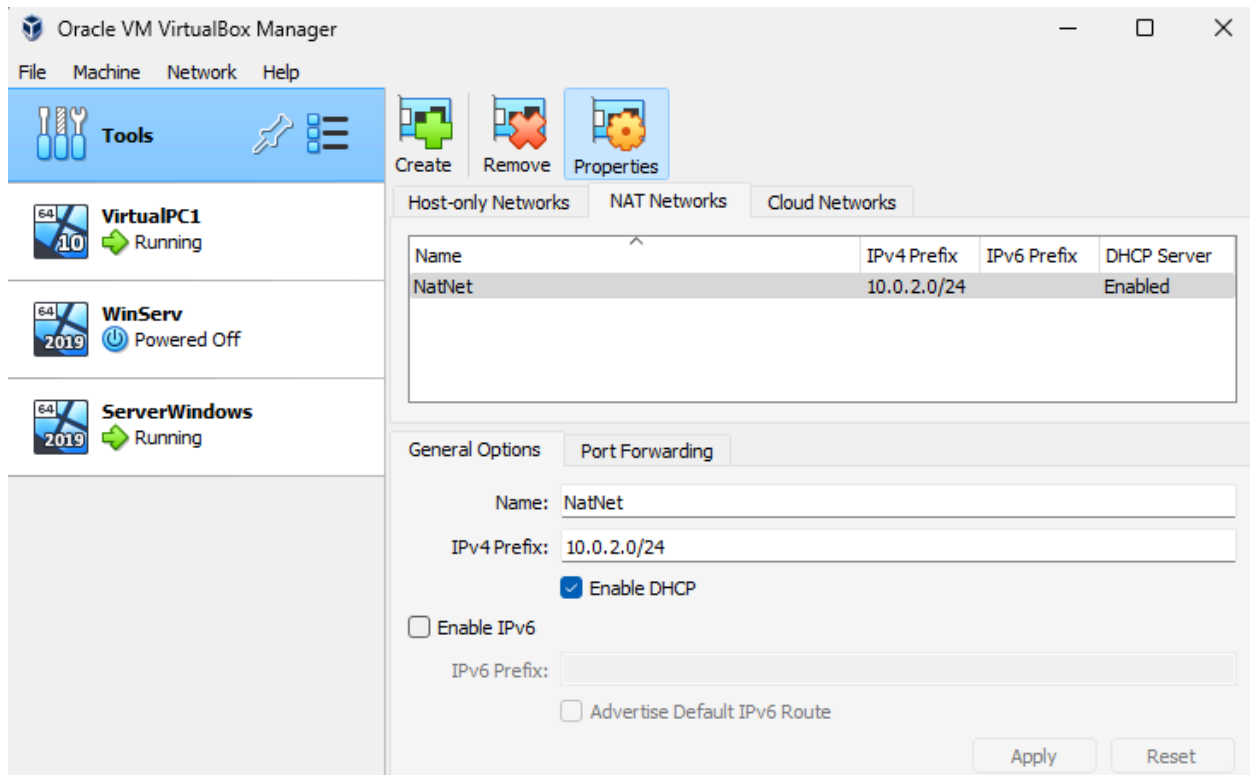
- After you have continued the installation process as usual, you will eventually come to this page:



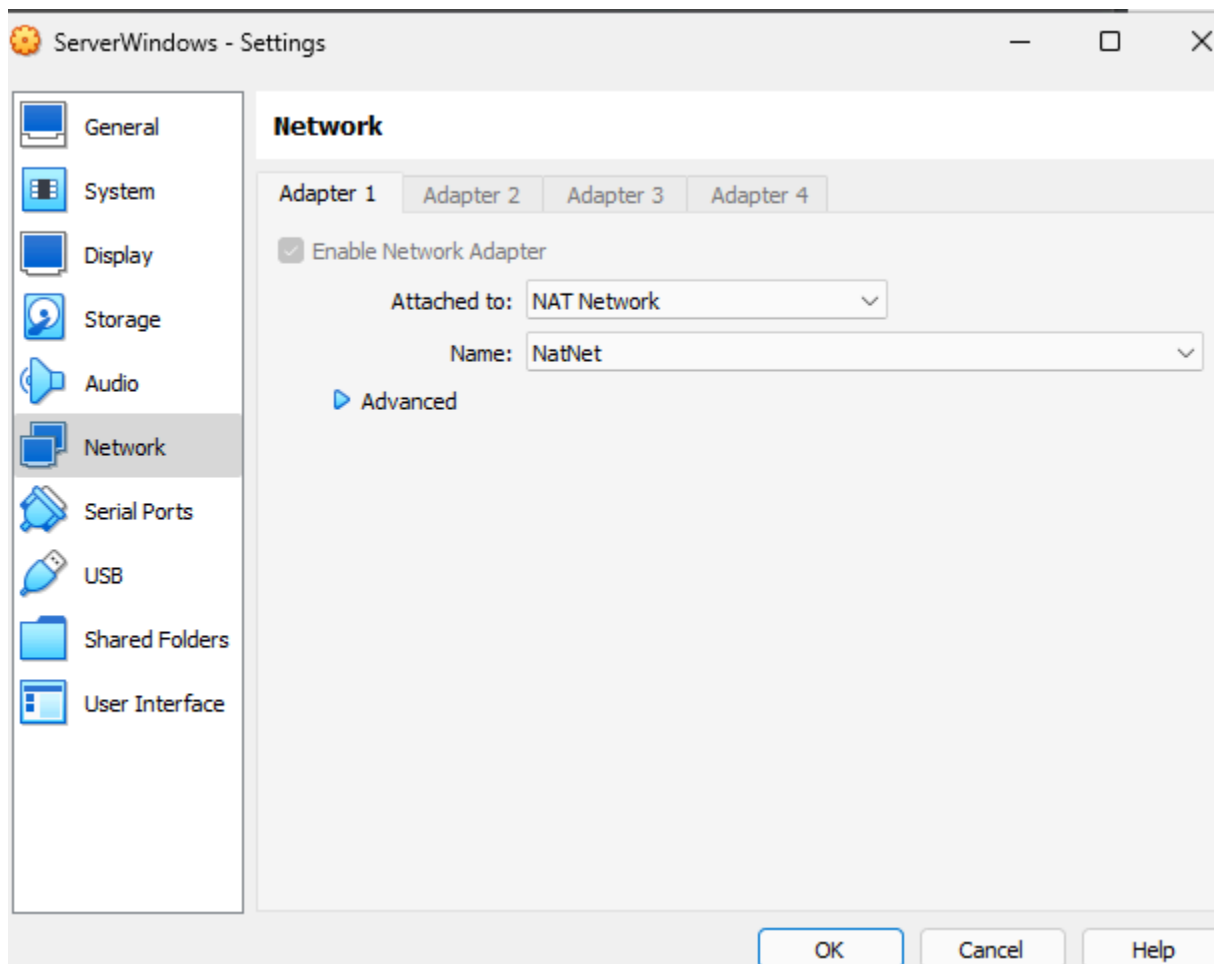
- Make sure you select **Windows Server 2022 Standard Evaluation (Desktop Experience)**.

## Virtual Network Setup

- The VMs that were created in the last step now need to be put onto their own isolated network. To configure this network, go to file->tools->network manager (these are the steps for VirtualBox and may be a bit different on other hypervisors). Then, highlight NAT Networks as seen below. Make sure your settings are similar and DHCP is enabled.

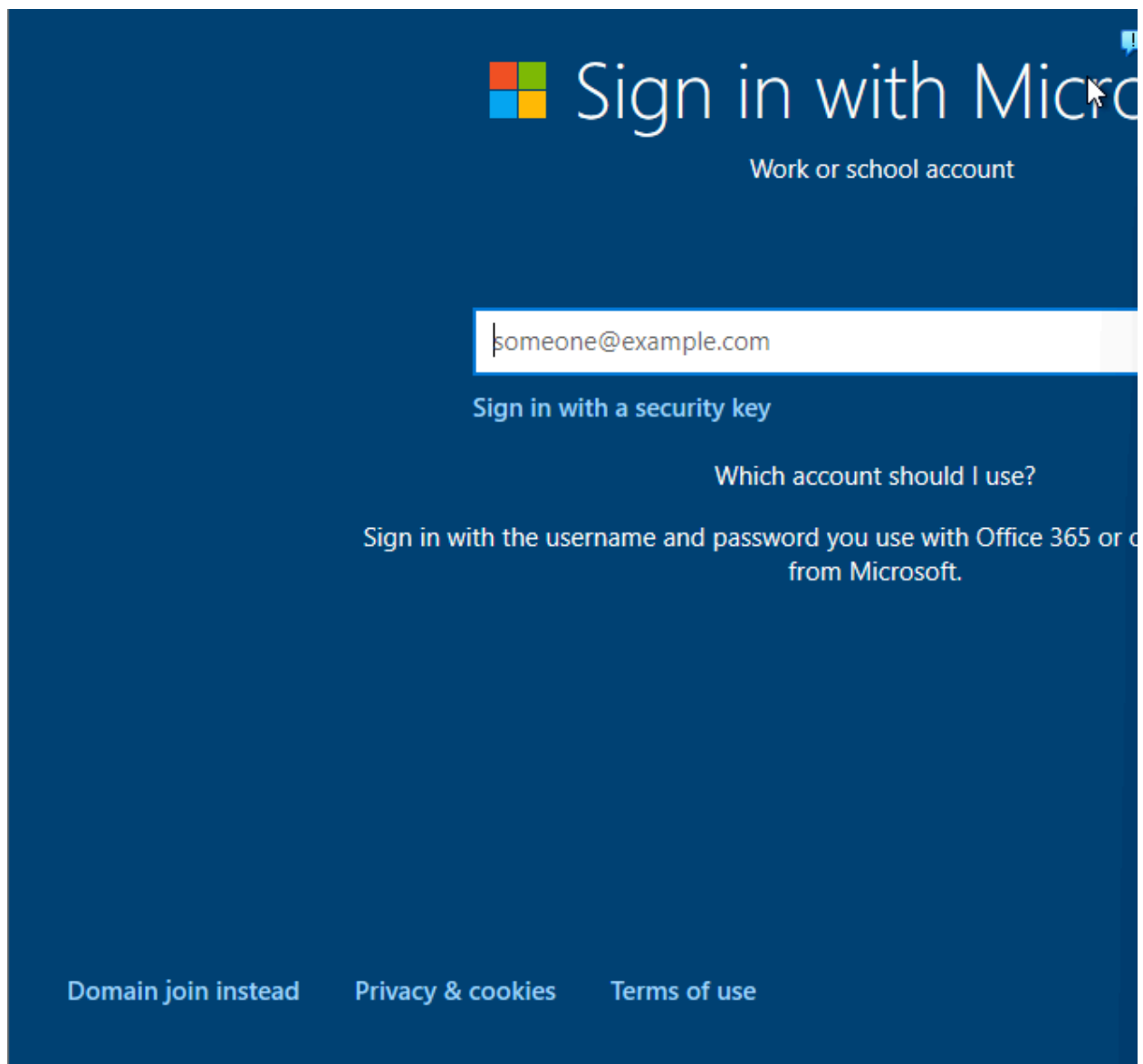


- Once the NAT Network is set up, we need to add the VMs to it. Right click your VMs, go to settings, select Network and make sure your settings look as follows (Attached to: NAT Network with the name being the NAT Network you just created)



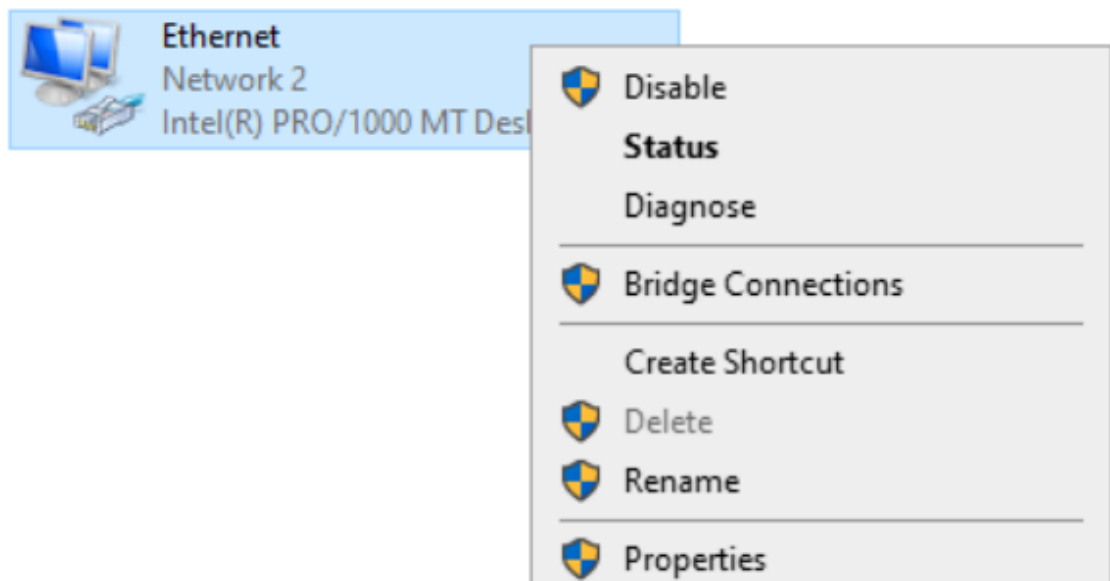
## Creating Accounts on the VM

- Use the domain join option in the bottom left inside of the Windows 10 host VM. You can choose a name, password, and complete the security questions with anything of your choosing.
- You can also sign into your administrator account on the Windows Network VM and all you need to do is create a password to get in.

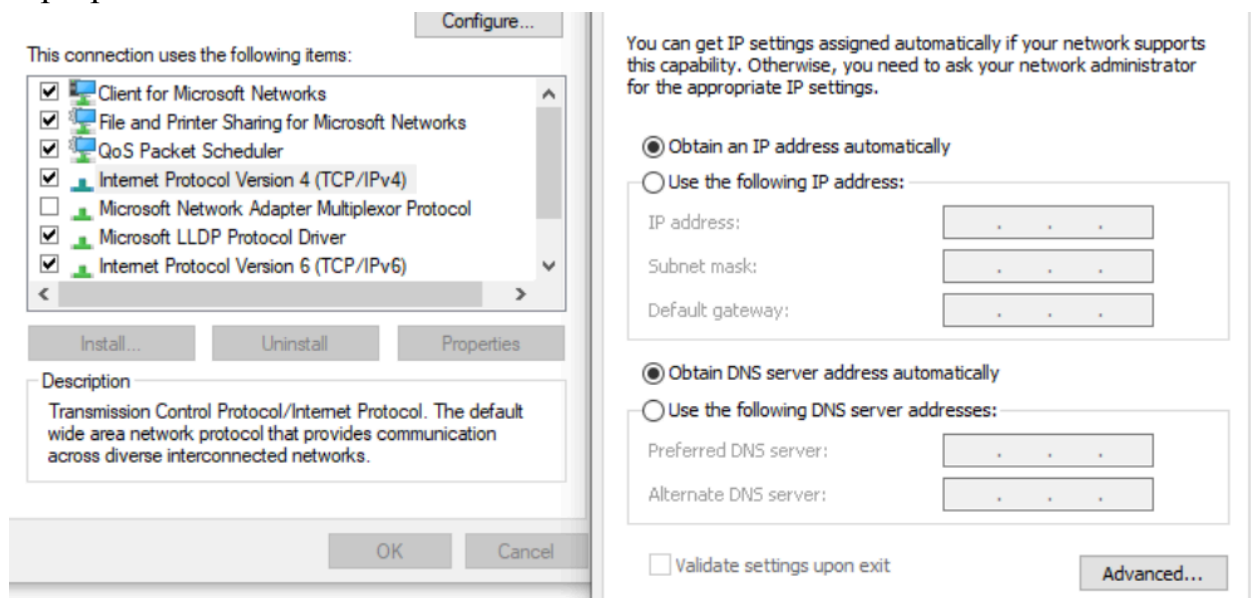


## Host Setup

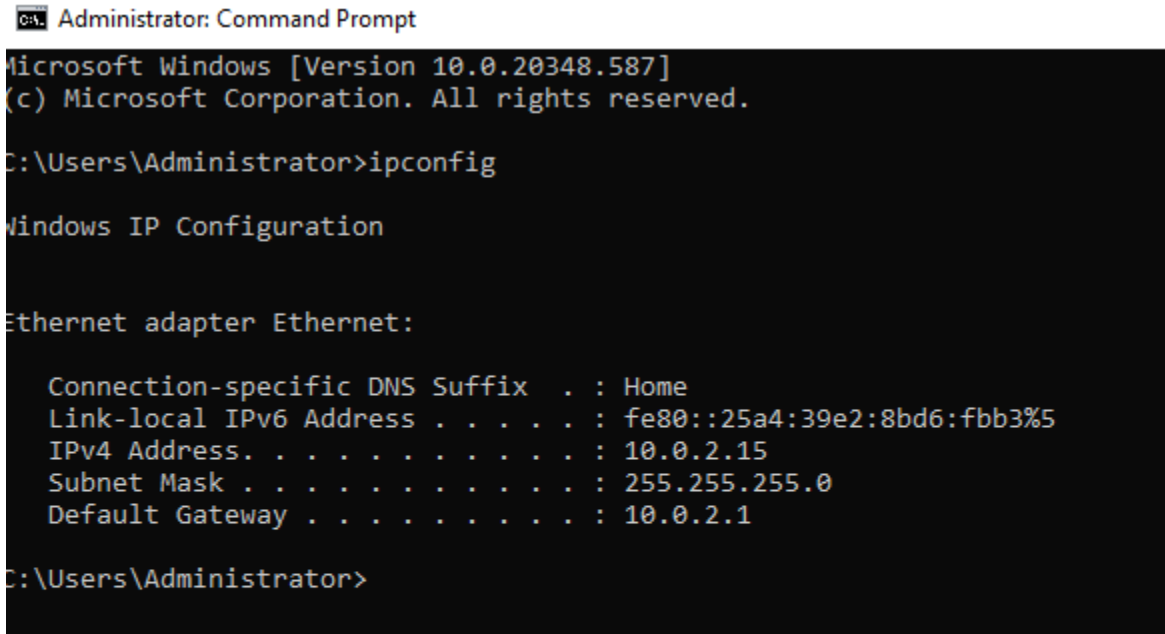
- We are now very close to actually setting up the Active Directory. Now, all we need to do is join the Windows host to the domain.
- To do this, you will first go to settings inside the VM desktop then access Network and Internet -> change adapter options -> right click on the adapter and choose properties.



- Under properties, click “Internet Protocol Version 4 (TCP/IPv4)” and choose properties



- We will want to edit the DNS server addresses at the bottom so choose “Use the following DNS server addresses:”
- To find this address, go into your Windows Server 2022 VM and once you're at the home screen, go to the command prompt. Use the command “ipconfig” in the command prompt which will bring up this information.
- You will be looking for the IPv4 address in particular.

A screenshot of a Windows Command Prompt window titled "Administrator: Command Prompt". The window shows the output of the 'ipconfig' command. The text is as follows:  
Microsoft Windows [Version 10.0.20348.587]  
(c) Microsoft Corporation. All rights reserved.  
  
C:\Users\Administrator>ipconfig  
  
Windows IP Configuration  
  
Ethernet adapter Ethernet:  
  
    Connection-specific DNS Suffix . : Home  
    Link-local IPv6 Address . . . . . : fe80::25a4:39e2:8bd6:fb3%5  
    IPv4 Address. . . . . : 10.0.2.15  
    Subnet Mask . . . . . : 255.255.255.0  
    Default Gateway . . . . . : 10.0.2.1  
  
C:\Users\Administrator>

Internet Protocol Version 4 (TCP/IPv4) Properties

General Alternate Configuration

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

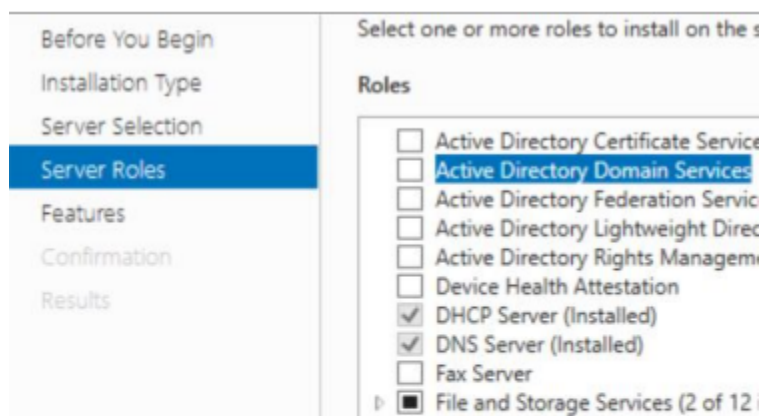
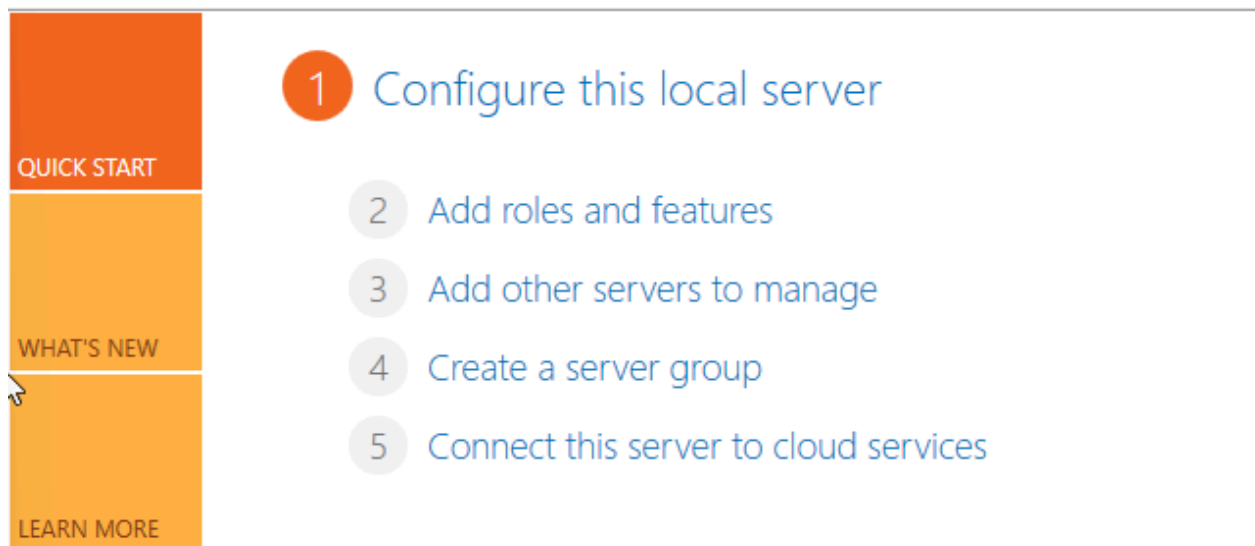
Advanced...

OK Cancel

- Copy the IPv4 address into the DNS server address as shown above. You can do this for each host that you have.

## Active Directory

- Finally, we can set up the Active Directory. To begin this, go into the Windows 2022 Server VM and go to the server manager. There will be an option that says “Add roles and features.” After you click this, select “Active Directory Domain Services.”



- Once you check this box, press “add features” then leave everything else default. Click next until you get to the last confirmation page and let it install.



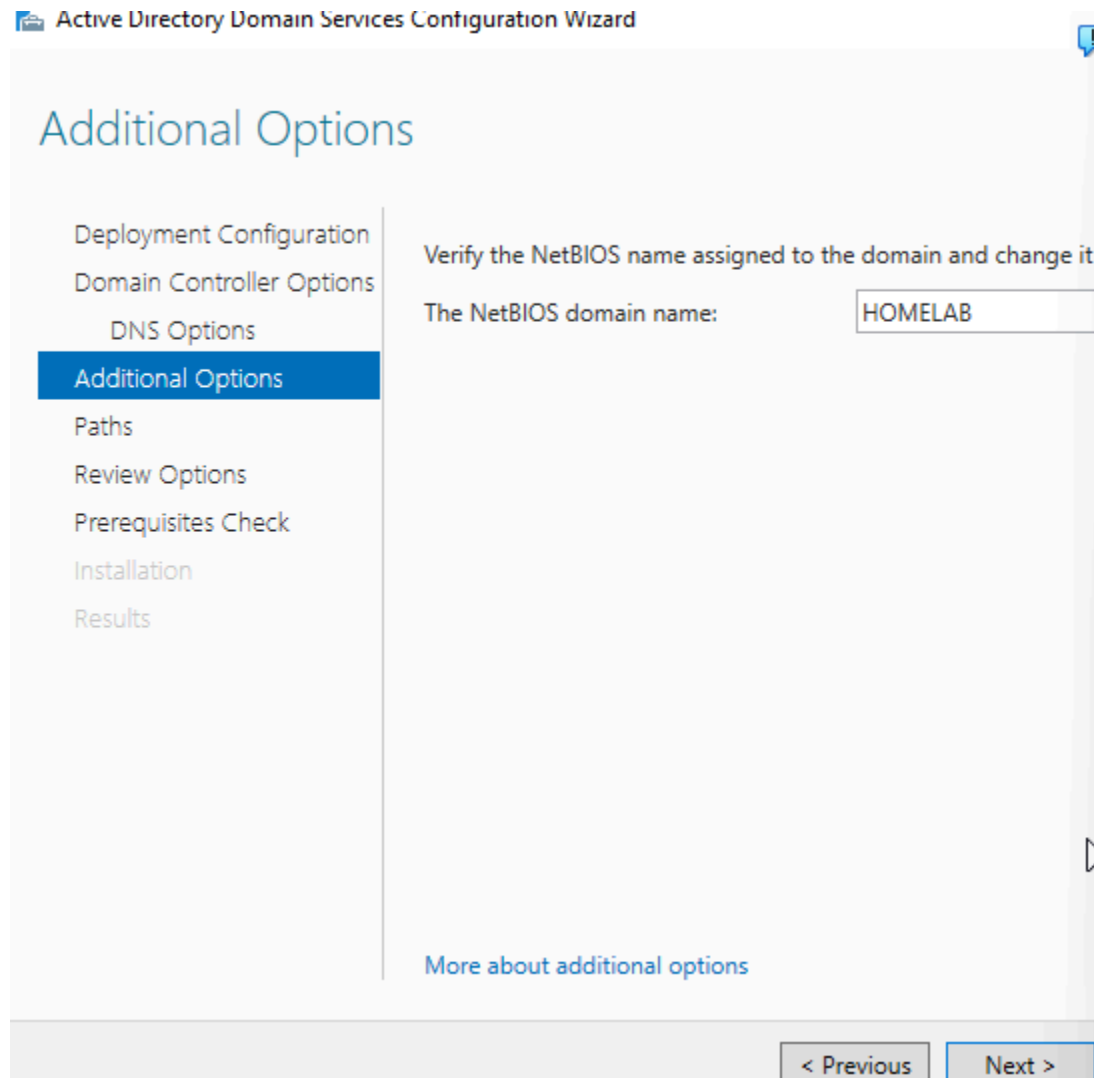
- After the installation has finished, you will notice a yellow triangle in the top right of the server manager. Click the flag and there will be an option that says “Promote this server to a domain controller.”



- A new pop up will appear after promoting the server and on this new screen, click “Add a new forest.” You can add any name you want but make sure to **add .local** at the end of the name.

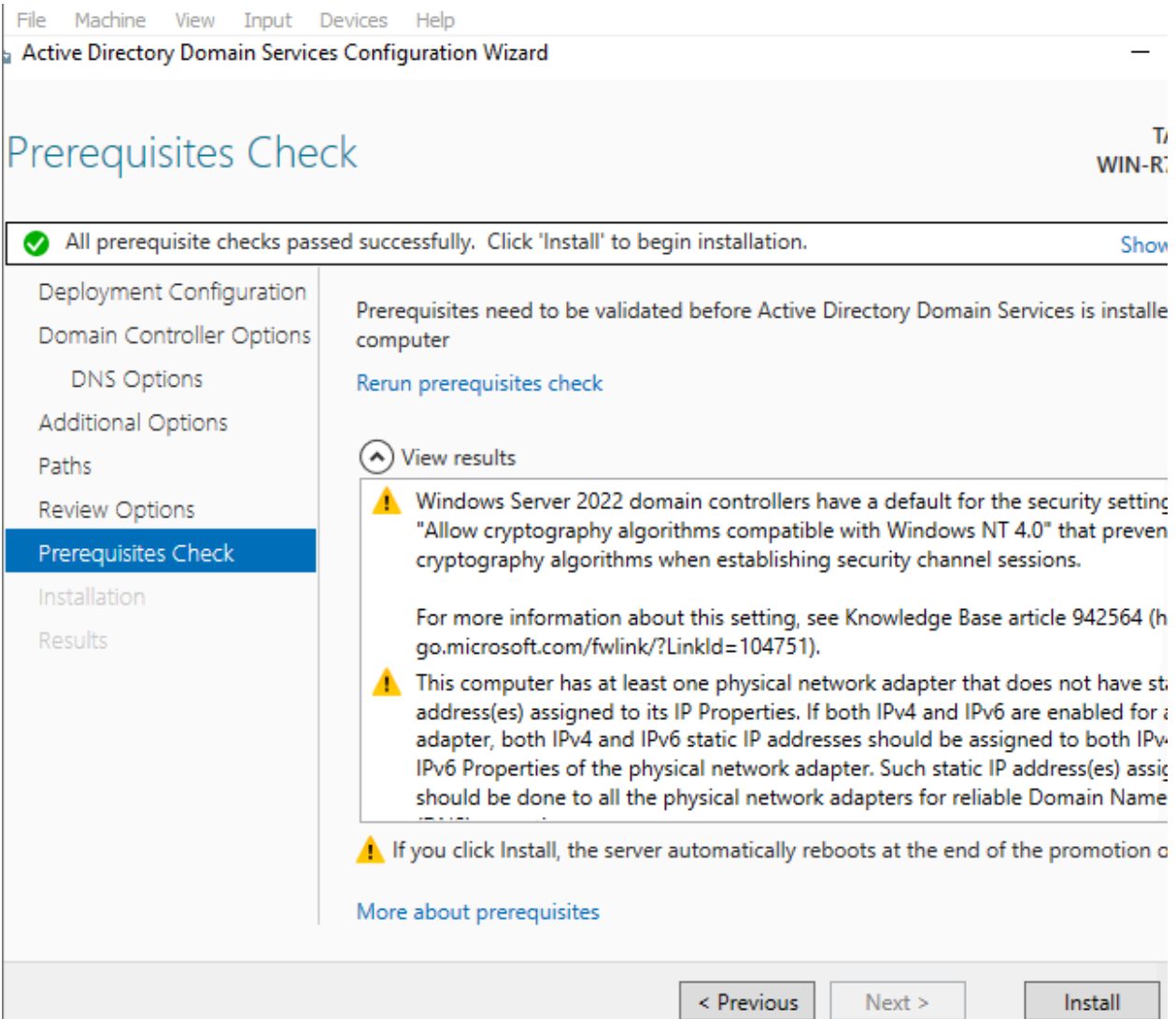
A screenshot of the 'Active Directory Domain Services Configuration Wizard' window. The title bar says 'Active Directory Domain Services Configuration Wizard'. The main heading is 'Deployment Configuration'. On the left, there is a sidebar with a list of steps: 'Deployment Configuration' (highlighted in blue), 'Domain Controller Options', 'Additional Options', 'Paths', 'Review Options', 'Prerequisites Check', 'Installation', and 'Results'. The main area on the right contains the following text: 'Select the deployment operation'. Below this are three radio button options: 'Add a domain controller to an existing domain', 'Add a new domain to an existing forest', and 'Add a new forest' (which is selected with a black dot). Below these options is the text 'Specify the domain information for this operation'. At the bottom, there is a label 'Root domain name:' followed by a text input field containing the text 'homelab.local'.

- Click next after specifying the name and you will eventually be prompted to create a DRSM password. Leave everything else default. After pressing next multiple times, you should get to the additional options page where you will see a NETBIOS name. This should be the name you specified earlier.



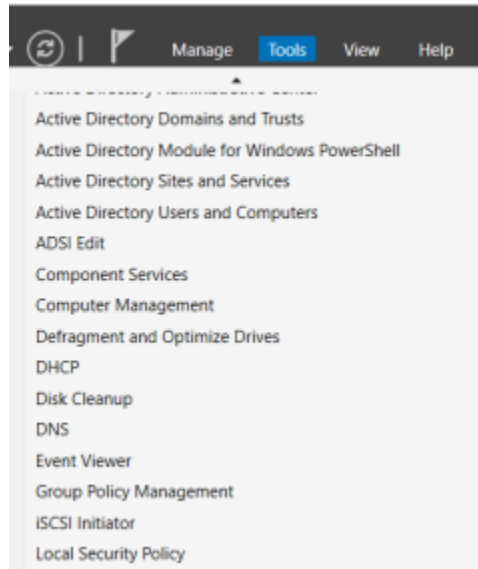
The screenshot shows the 'Active Directory Domain Services Configuration Wizard' window. The title bar reads 'Active Directory Domain Services Configuration Wizard'. The main heading is 'Additional Options'. On the left, a vertical list of options is shown: 'Deployment Configuration', 'Domain Controller Options', 'DNS Options', 'Additional Options' (highlighted with a blue background), 'Paths', 'Review Options', 'Prerequisites Check', 'Installation', and 'Results'. The main content area on the right has the heading 'Verify the NetBIOS name assigned to the domain and change it'. Below this, it says 'The NetBIOS domain name:' followed by a text box containing 'HOMELAB'. At the bottom right of the main content area, there is a link that says 'More about additional options'. At the very bottom of the window, there are two buttons: '< Previous' and 'Next >'. The 'Next >' button is highlighted with a blue border.

- Keep clicking next until you get to the “Prerequisites Check” page. It will check that your system can properly install the Active Directory. You may need to reboot the server after this installation.

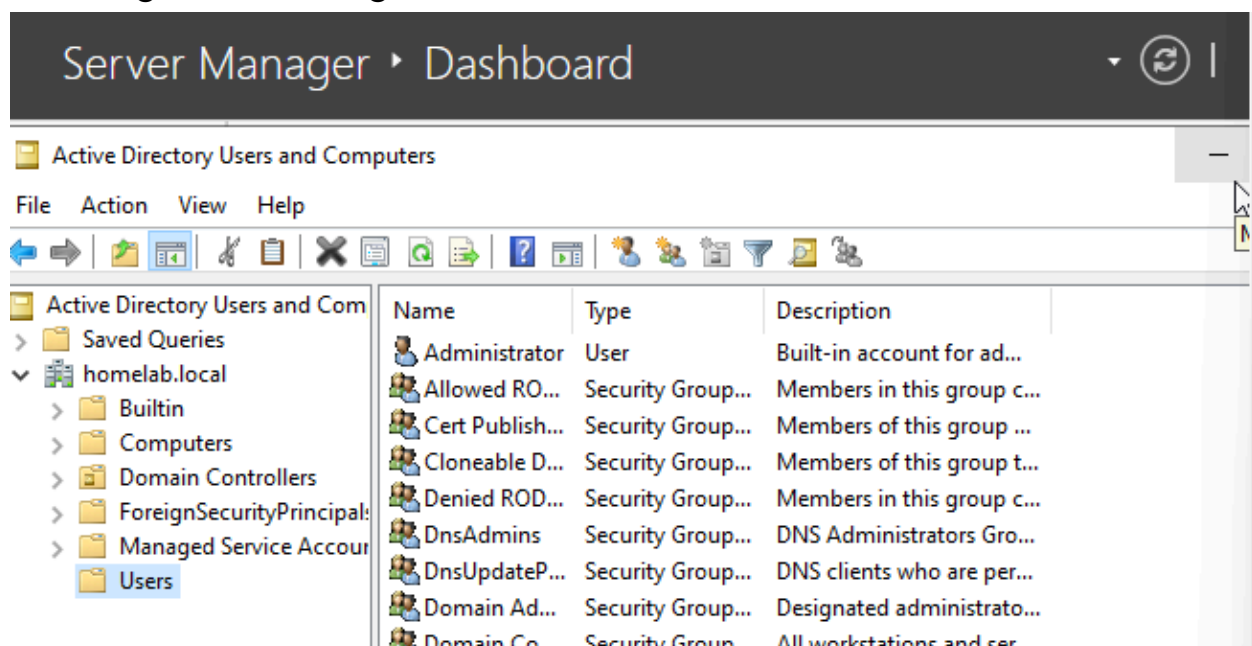


## Adding Users

- The installation of the Active Directory is now complete. Now, we can begin to add users. In the server manager, there is an option in the top right next to the flag called tools. Navigate here and look for “Active Directory Users and Computers.”




- This will open up a new screen where you will need to look for your domain name on the left (name.local) and click the small arrow next to it. Once you press the arrow, it will show folders and one of the names will be Users. Right click it and go to New -> User.



- This will bring up a page to create a new user. You can choose any name and login information for this brand new account. To make things easier for this lab, you can choose the “Password never expires” option and uncheck the “User must change password at next login” option.  
\*\*This is safe because this Active Directory is being used in an isolated home environment but in an enterprise environment, these settings would not be ideal for the security of the organization.

New Object - User ×

 Create in: homelab.local/Users

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First name:  Initials:

Last name:

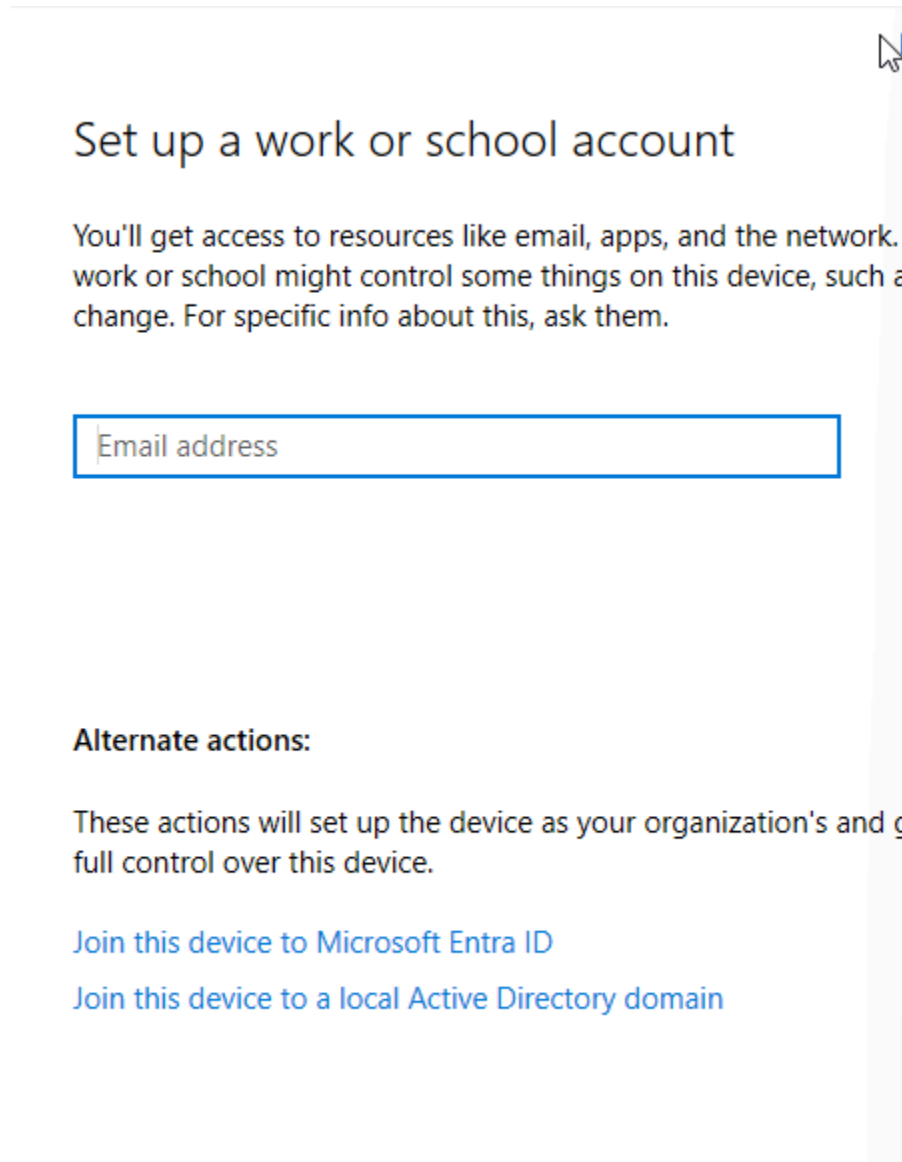
Full name:

User logon name:

User logon name (pre-Windows 2000):

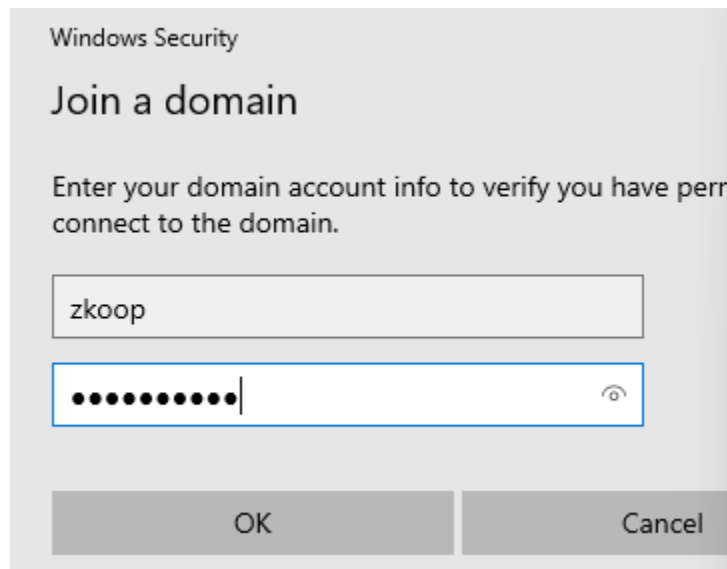
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- You have now created a new user. We will now join this user to our domain. Go to your Windows 10 Host and with the search bar, look for “access work or school.”

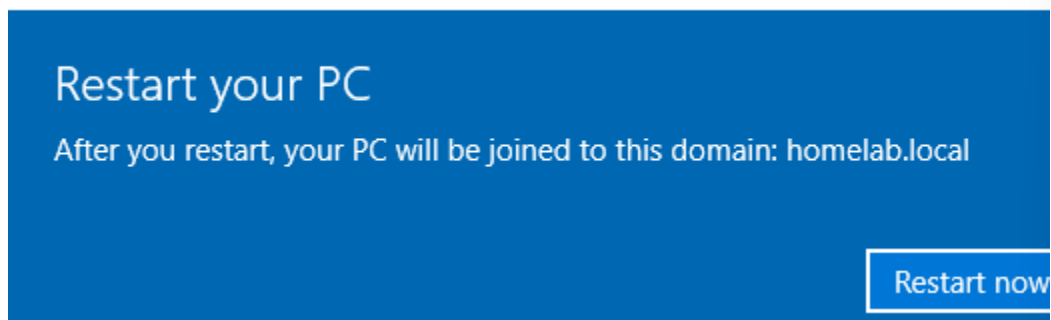


- Instead of typing an email address, at the bottom, there should be an option that will say “Join this device to a local Active Directory domain.” To join the domain, type in the original .local domain name you created earlier.

- Finally, join this domain with the user account you created earlier in the server manager. After this, the VM will need to be restarted then the user account will be added to the domain.



Restart your PC



A functioning Active Directory home lab has now been finalized. This was a basic entry lab into getting used to how VMs work and how to initialize an Active Directory with users accounts joining a domain. There are still many new settings and configurations to play with though and I recommend trying new things to gain even more experience in your home lab environment.