

SETTING UP A VIRTUAL LAB PROJECT

In this project i was able to build a Free Virtual Home Lab from the beginning to the end without having to brake the bank. To grow you cybersecurity skills you need real life experience and it can be cost a lot of money or space to get the stack of hardware. So I decided to create a virtual home lab using free tools and open-source software right from my computer.

The best part? It's flexible ,free, and a great way to get hands on experience without breaking the bank. And here's how I did it and how you can too.

WHAT IS REQUIRED

- A Virtualization Machine (Oracle Virtual Box)
- Creating a Virtual network
- Spinning up your first virtual machine
- Installing an operating system OS
- Wrapping up the project

So, What is Virtualization? 😊

In simple terms, virtualization means creating a virtual version of something—like a computer, storage, or network—using software instead of extra hardware.

Instead of needing multiple physical machines, you can run several virtual machines (VMs) on just one physical computer. Each VM behaves like its own independent computer, with its own operating system, apps, and settings.

Think of your main computer as the host. It's the “parent” that does all the heavy lifting. The virtual machines are the guests—they live inside the host but act like real, separate computers.

Why This Matters

With this setup, you can:

- Experiment and break things safely (without harming your real computer)
- Learn how networks, servers, and operating systems work
- Practice cybersecurity techniques in a safe environment
- Building this lab gave me a risk-free way to learn, and it's something anyone curious about IT can try at home.

Some Links have been provided below for an easy access to download all the required tools

<https://cdimage.kali.org/kali-2025.2/kali-linux-2025.2-virtualbox-amd64.7z>

<https://download.virtualbox.org/virtualbox/7.1.10/VirtualBox-7.1.10-169112-Win.exe>

<https://download.vulnhub.com/metasploitable/metasploitable-linux-2.0.0.zip>

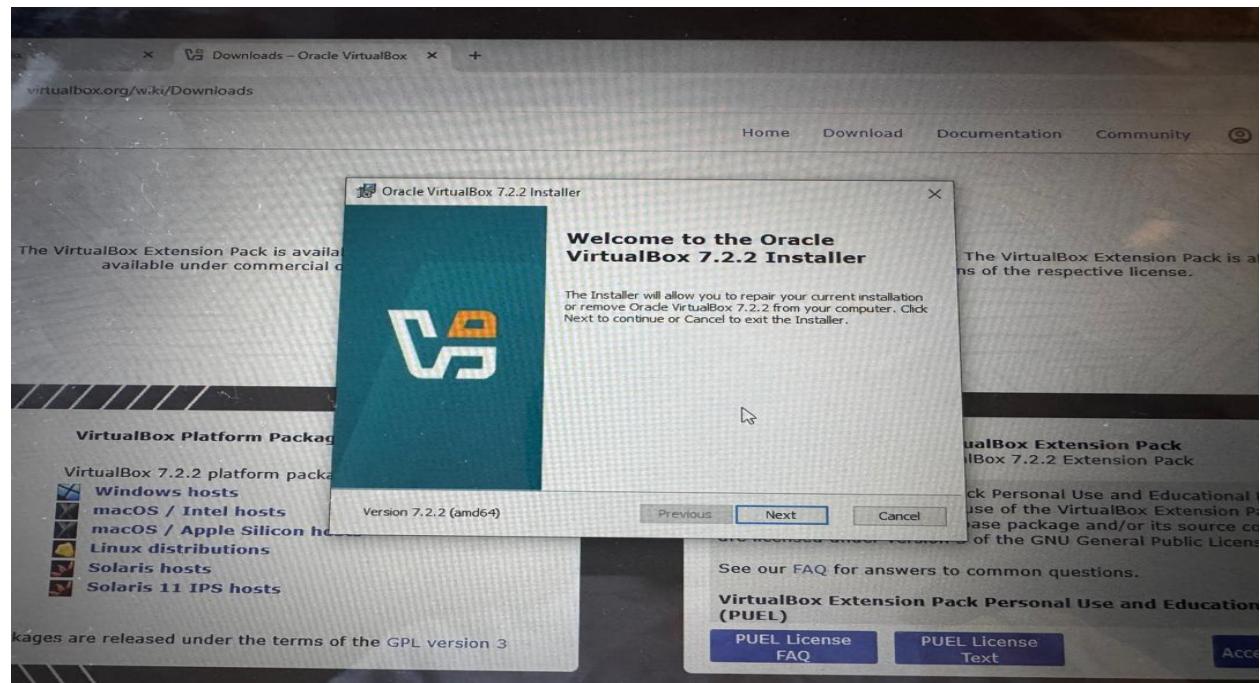
<https://archive.org/compress/win-8.1-english-x-64-x-86/format=ISO%20IMAGE&file=/win-8.1-english-x-64-x-86.zip>

<https://go.microsoft.com/fwlink/p/LinkID=2195280&clcid=0x409&culture=en-us&country=US>

VIRTUALIZATION SOFTWARE

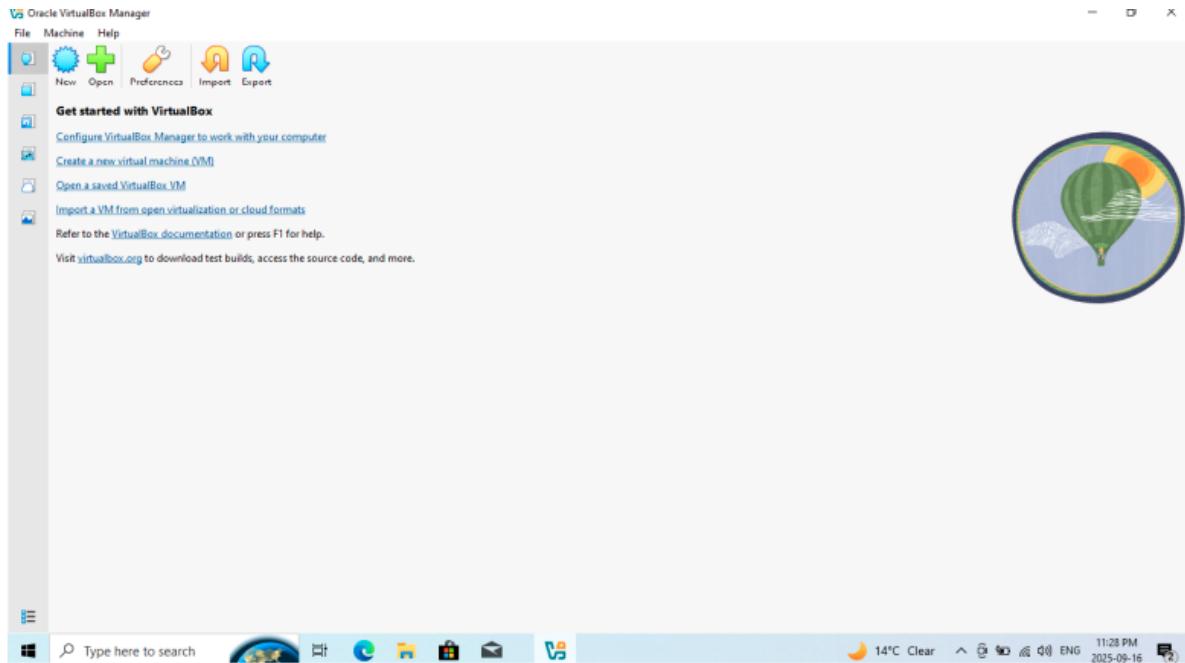
Download and Install Virtual Box

The First thing needed to be done is to download and install a virtual machine and there are many virtual machines but one of the most popular one is the VirtualBox which we are going to be using.



Note: Once the download was Complete I lunched the VM (VirtualBox) and the I click **NEXT**

I went through the process of the installation and then Clicked on **Finish** after the VirtualBox has been completely installed . and then my VirtualBox was ready to be lunched as seen in the image below



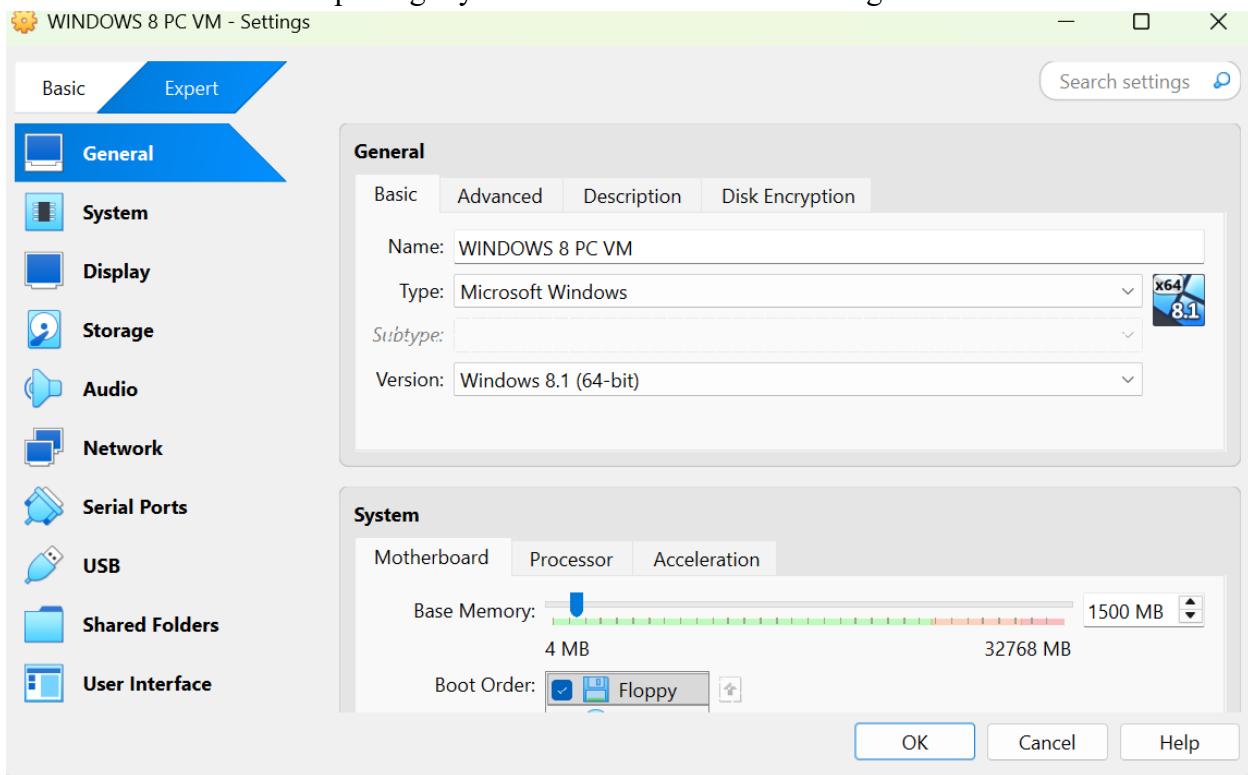
A NEW LUNCHED VIRTUALBOX DASHBOARD

Next Step: I Want to create my Virtual Machine

To Create my Virtual Machine After downloading other tools needed in building my home lab (VM) on the VirtualBox I click on **NEW** (As you can see it the top left of the screenshot of my virtualBox dashboard.

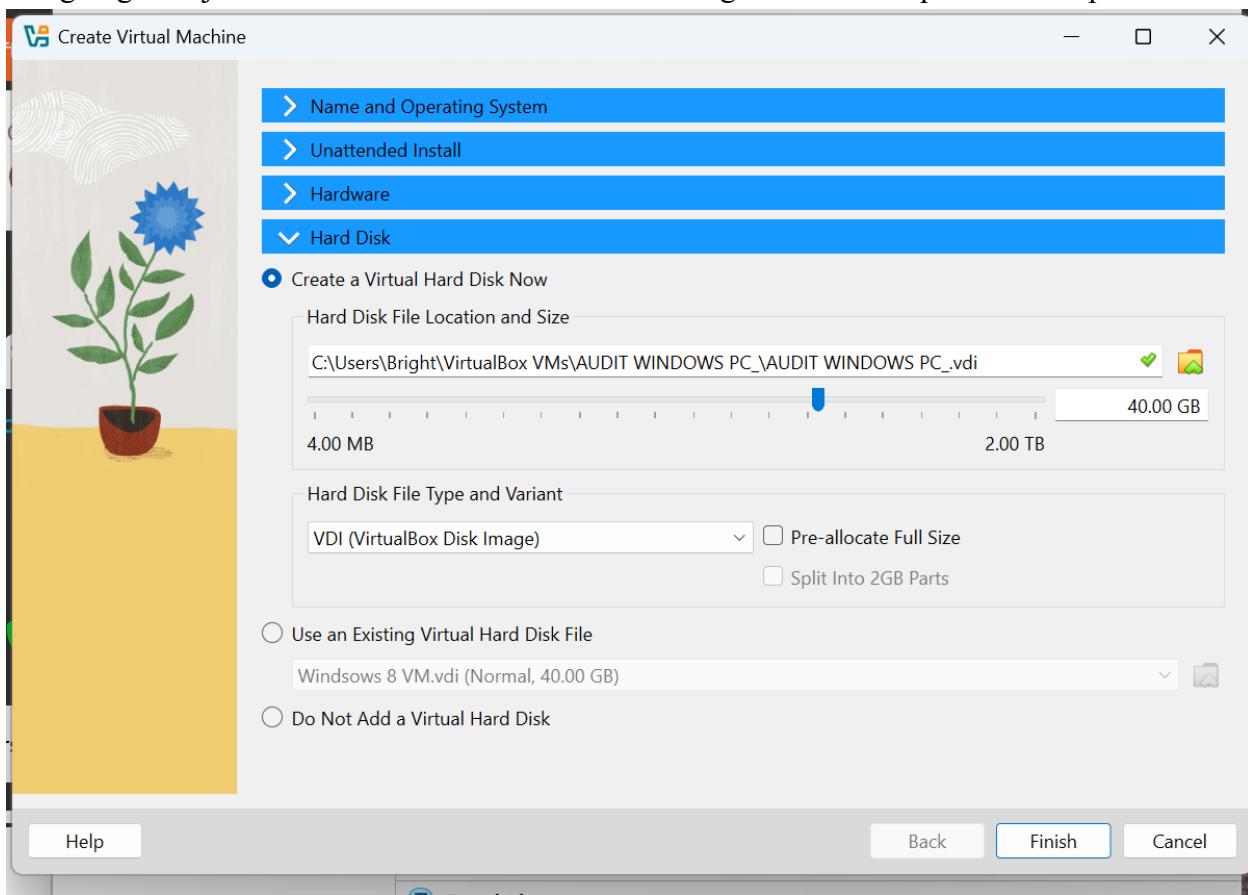
- The next thing I did was to make sure that i select the expert mode on the virtualbox this isn't to make the whole process more complicated though but the make easy in setup

Note: At this time I am inputting my Windows 8 as soon in the image below



WINDOWS 8 PC Here I decide to allocate 1500MB of RAM to it for a better performance . And once that is done I click okay to proceed .

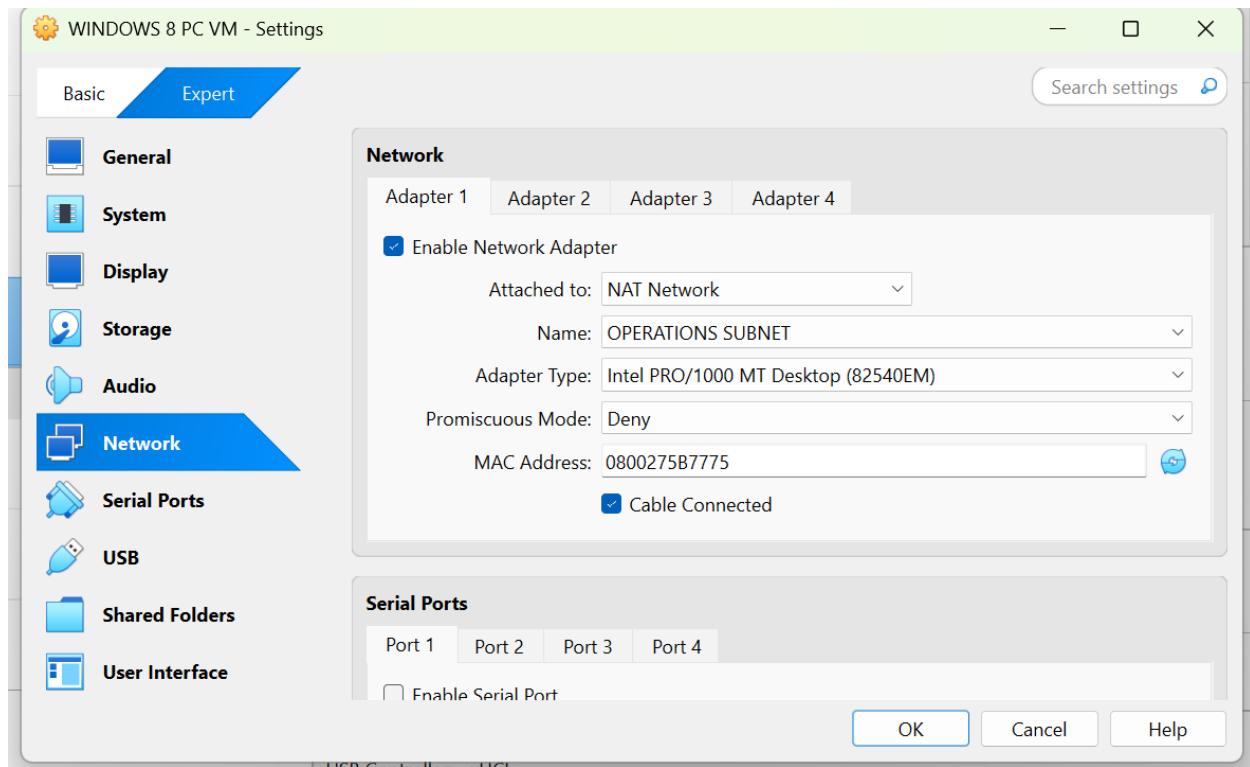
This opens a new window to create the Virtual Hard Disk. The default settings work well, but I'm going to adjust the File Size to 40GB before clicking Finish to complete the setup.



We can see this hard disk drive (HDD) is set to dynamically allocate (as shown in the screenshot Above), it will only use as much space as the data stored on it—up to the 40GB limit that I did set. Then the Windows 8 PC will be listed on the VirtualBox dashboard. Before starting the virtual machine, you can go through its settings if needed. Common adjustments include: Assigning more processors Changing the network adapter Mounting an ISO image.

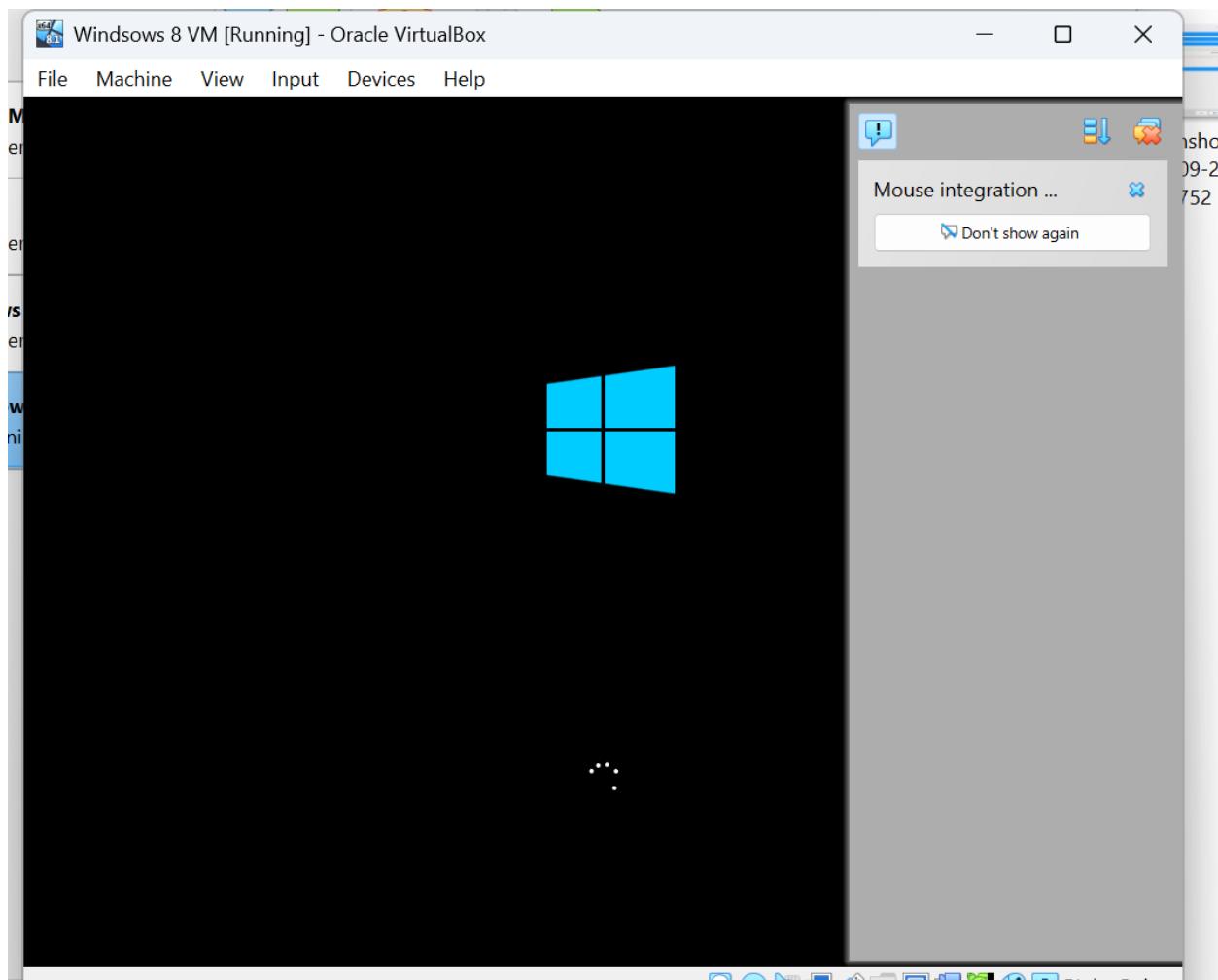
With this I have successfully created my virtual machine VM but I can't Run it yet because I need to install an operating system (ISO) to it . but before then lets set up a network for the virtual machine.

Creating a Virtual Network in VirtualBox I set up a virtual network that allows my VM (Windows 8 PC) to connect with other VMs, my host machine, or the internet, depending on the configuration. VirtualBox offers several types of network setups, and the one you choose depends on your needs. For my setup, I went with a NAT Network.

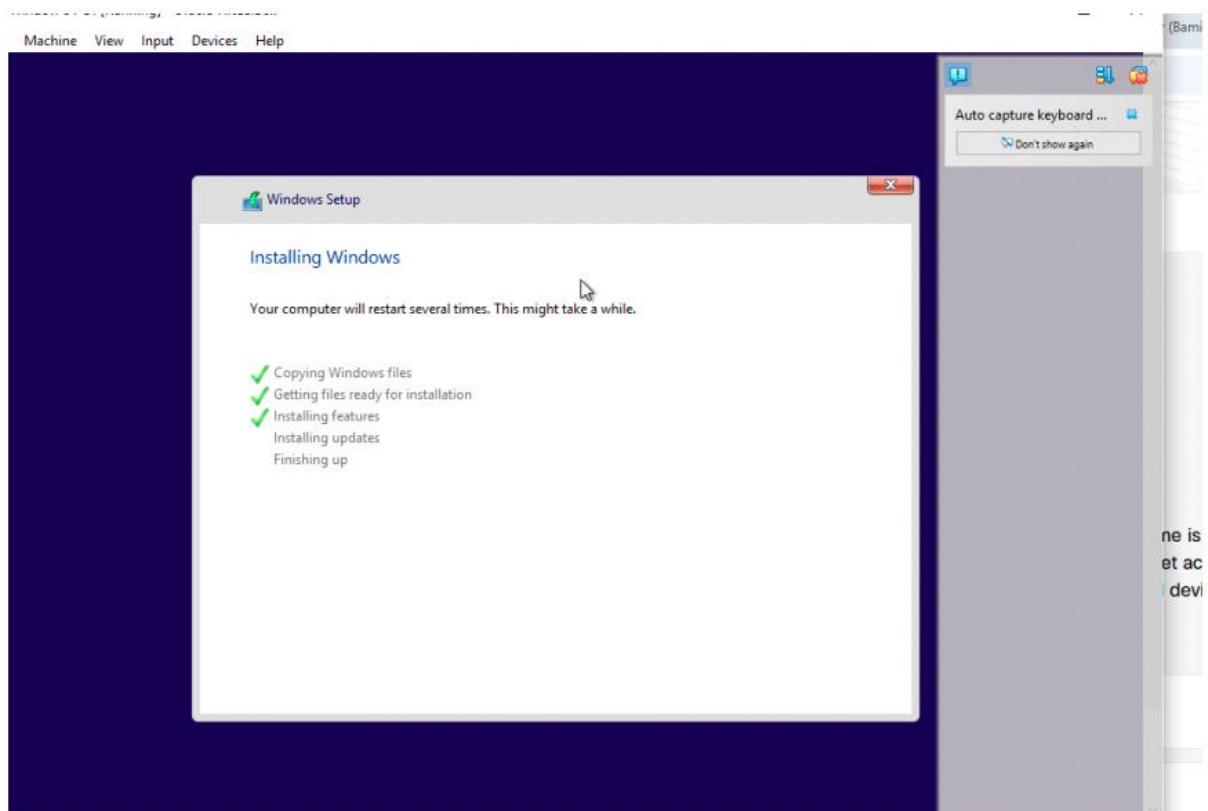


Then I Click "OK" to complete the set up I think it is important and necessary to let you know that we have different Network Types in VirtualBox such as NAT, Bridge adapter, NAT Network and Host Only Adapter but for this Project I am going to stick to NAT network only because it aligns with the objective of this project.

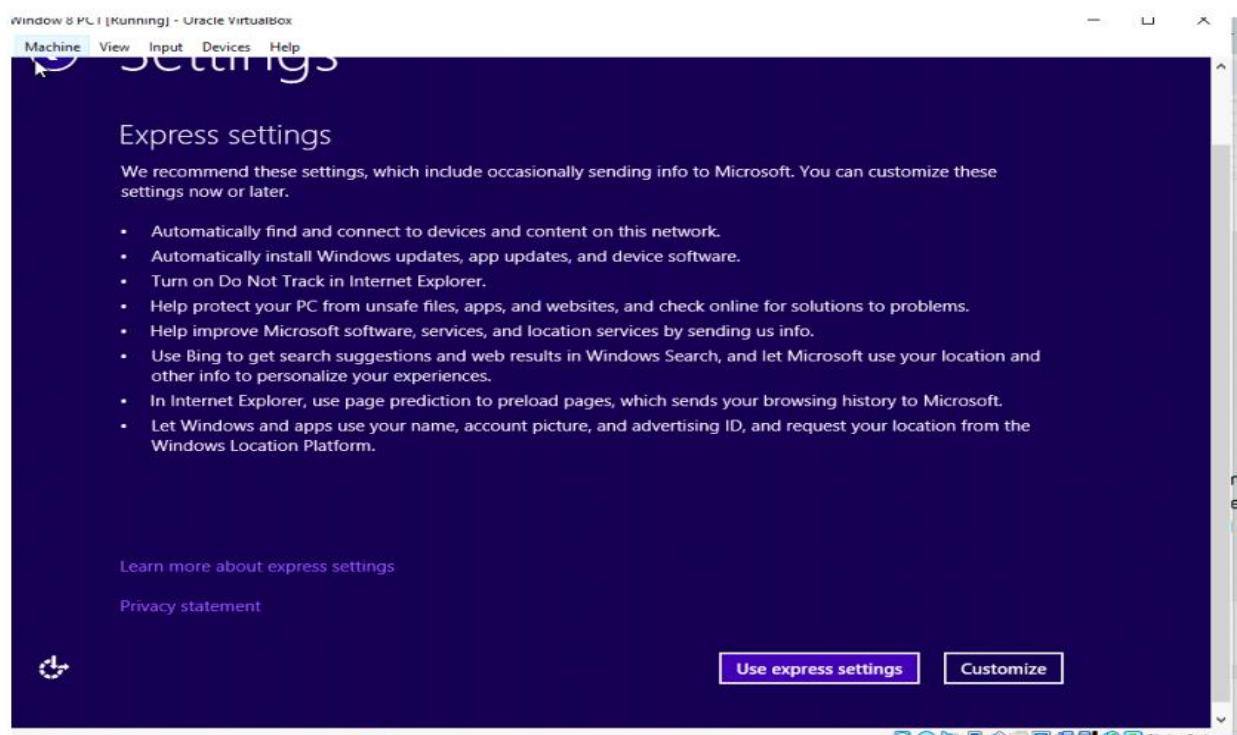
- NAT Network This allows VMs connected to the same NAT Network to communicate with each other, while still maintaining internet access. You can use this if virtual lab setup includes multiple VMs that need to talk to each other and access the internet. Let me show you how I create my NAT Network.
- Go to File > Preferences
- Select the Network tab
- Click the plus (+) button to create a new NAT Network
- Then, in your VM's settings, attach it to the NAT Network you just created After clicking "OK" then I start my Virtual Machine (see picture below)



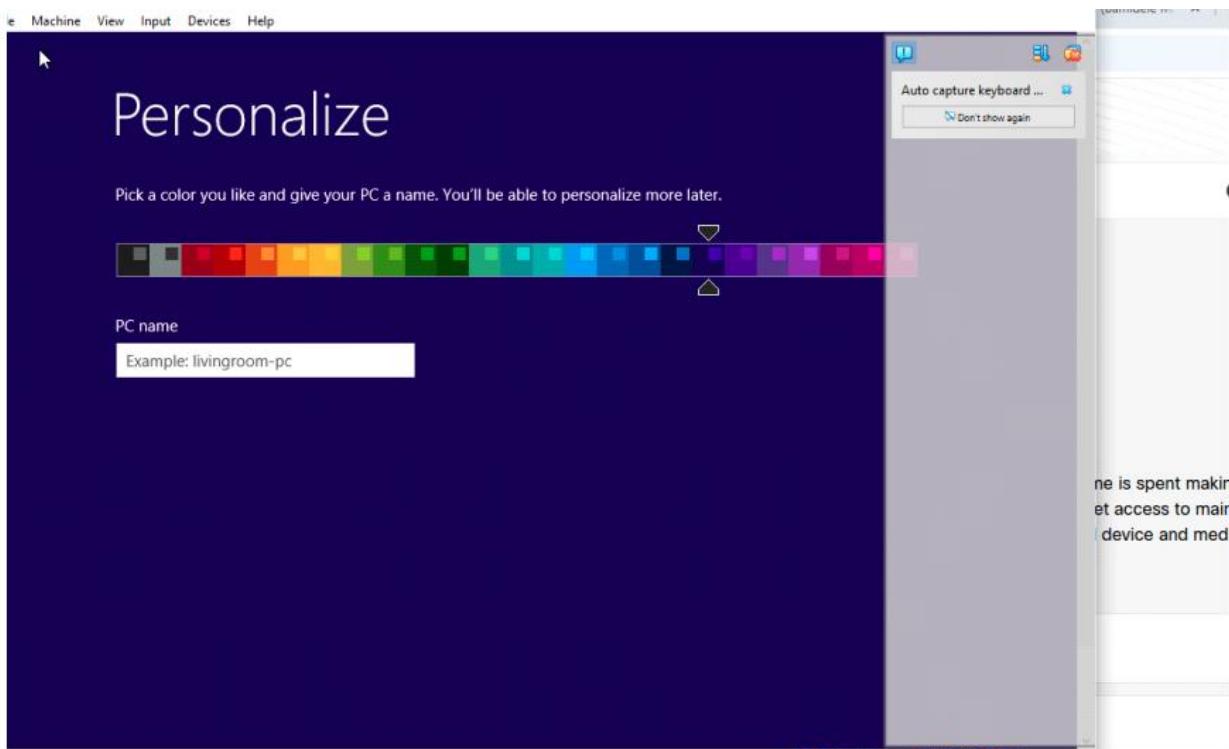
At this point my VM Windows 8 has start to install



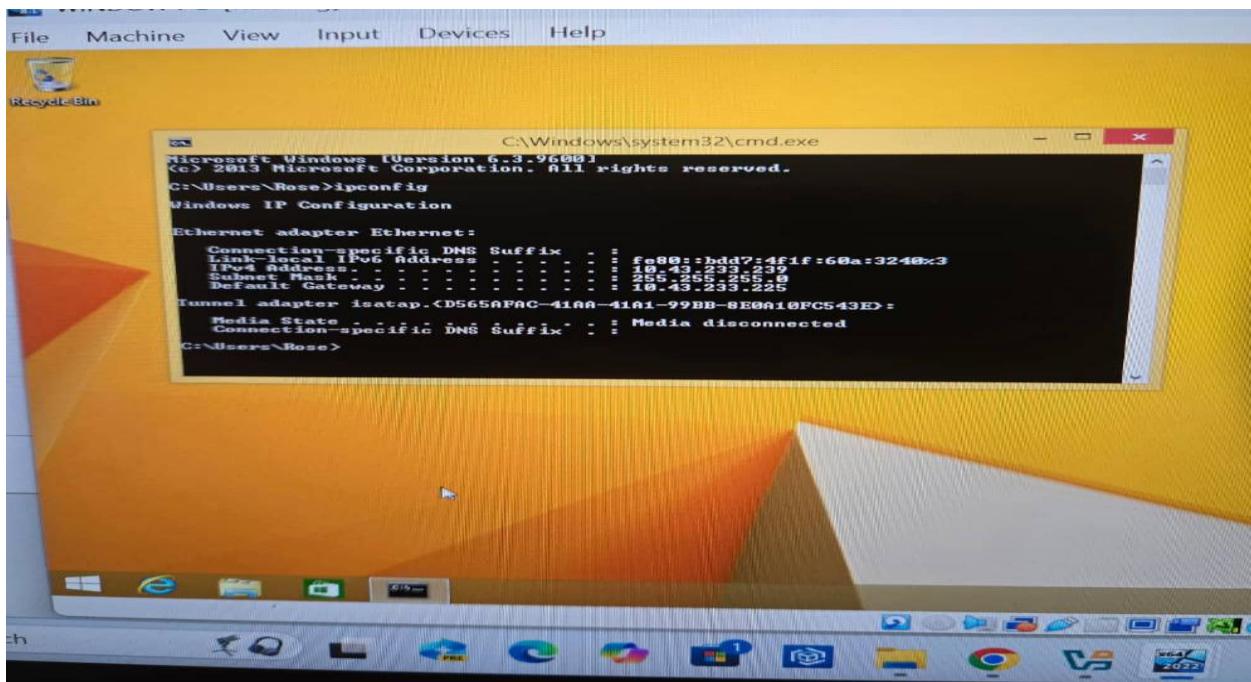
After the installation in start the set up of My PC



Still in the process of setup



When I finished with the set up, I click window button + R and run command "cmd" to get the IP



At this Point my VM (Windows 8 is ready) and completely installed.

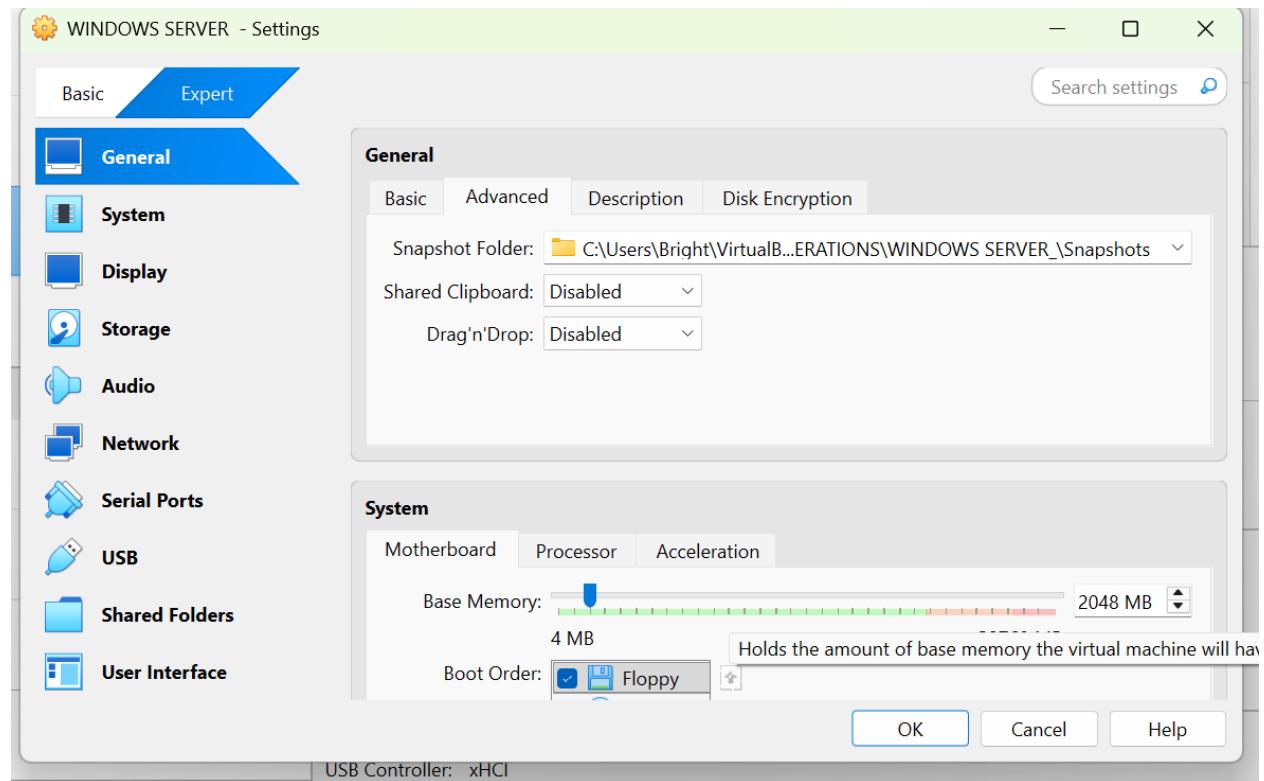
The next thing to do is to Download And Install my Operating System.

Lets go through it together ,

Hopefully by now with the link provided anyone should be able to have downloaded the ISO .

Download Operating System (ISO)

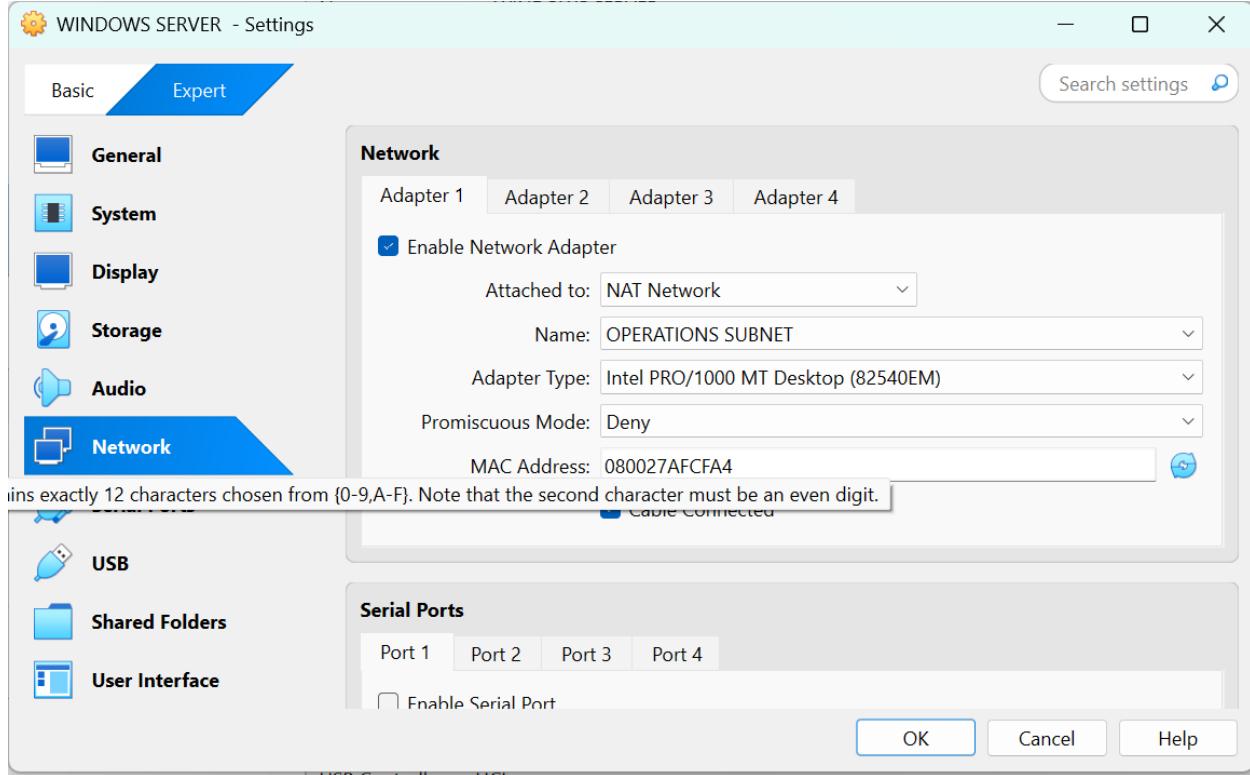
After download and installing Windows Server ISO using the link provided , the next step is to mount it to my virtual machine in VirtualBox. Think of mounting as the virtual equivalent of inserting a DVD into a computer's drive. Here's how I did it: I right-clicked on my VM and selected Settings. From there, I opened the Storage tab, clicked the Empty disc icon, and then selected the small disc icon under Attributes on the right-hand side. Finally, I chose "Virtual Optical Disk File...", browsed to my downloaded ISO, and loaded it into the VM.



Here have been able to mount my operating system ISO but then I have set up a network for it .

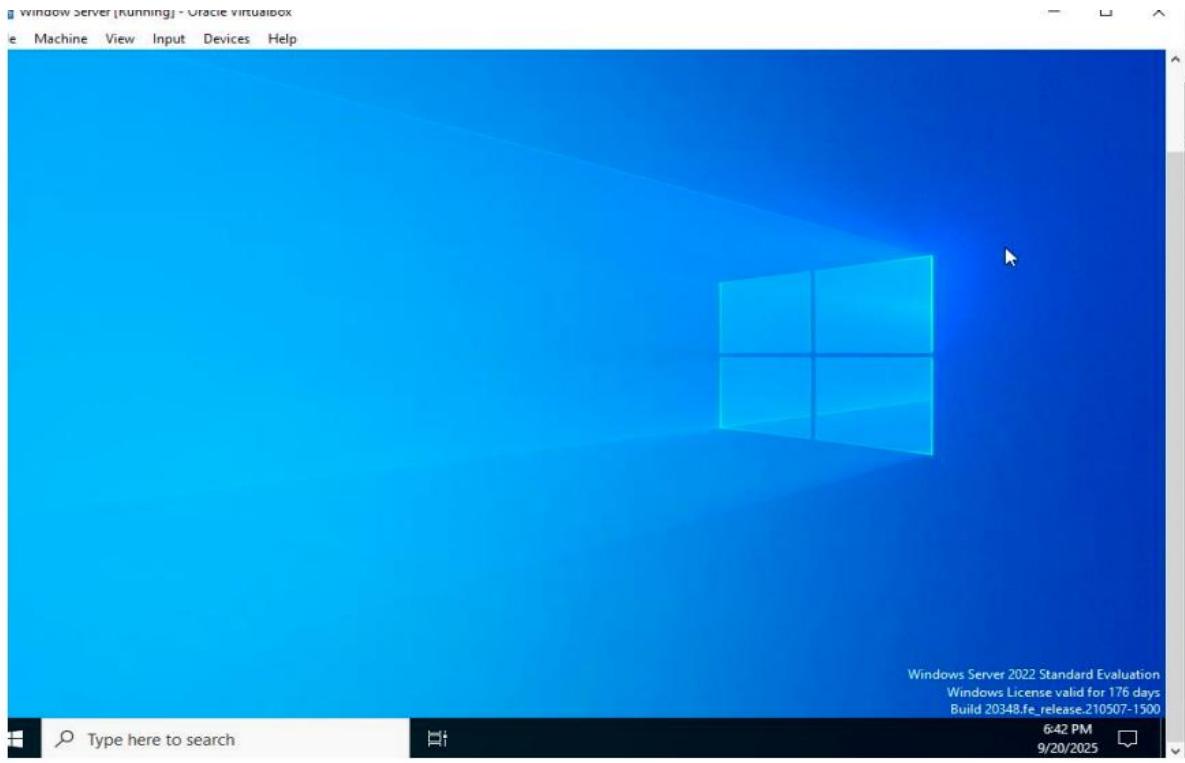
Lets set up a network for our Operating System (ISO) .

After loading my ISO into the VM , I setup a network for it so as to allow my windows server to connect with the other virtual machines (VMS) my host machine, or the internet, depending on the configuration. VirtualBox offers several types of network setups, and the one you choose depends on your needs. For my setup, I went with a NAT Network.

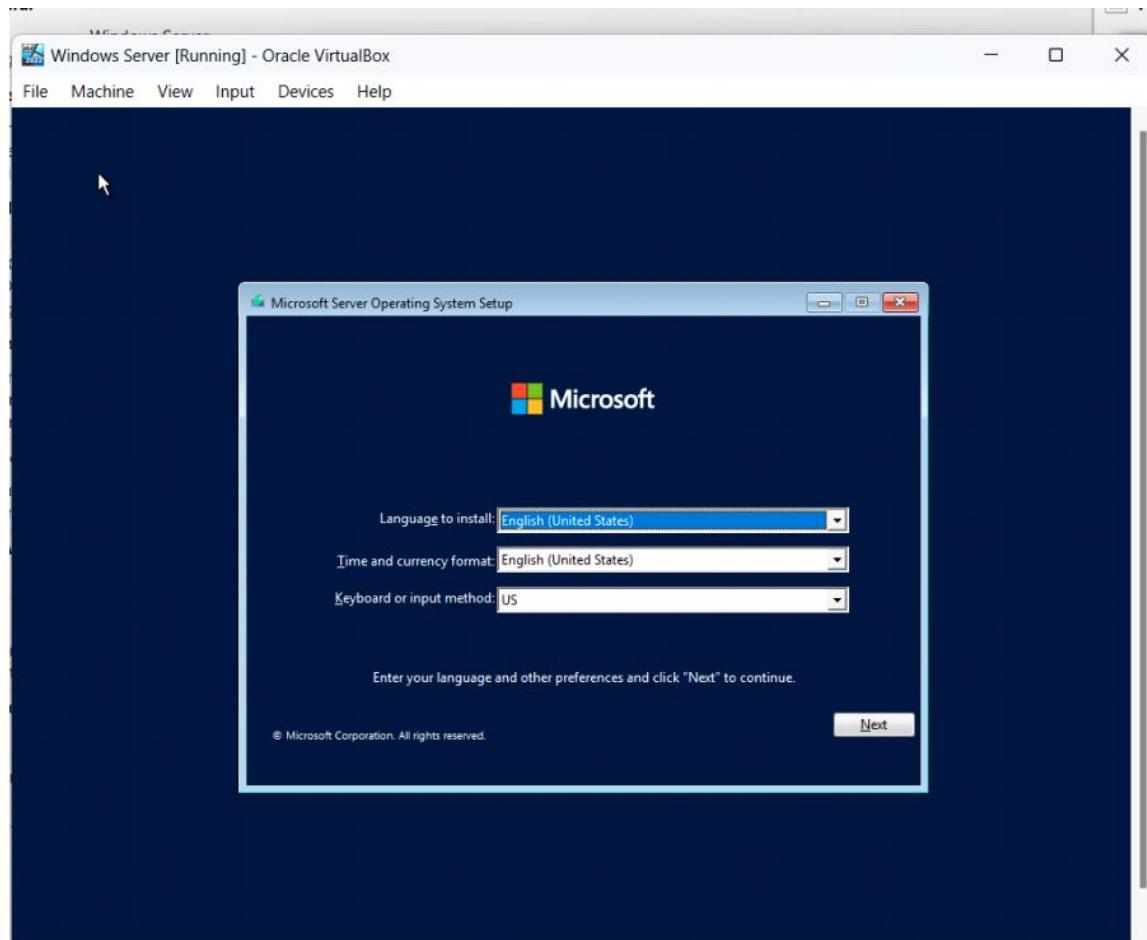


I click on **OK** to complete the process or set up.

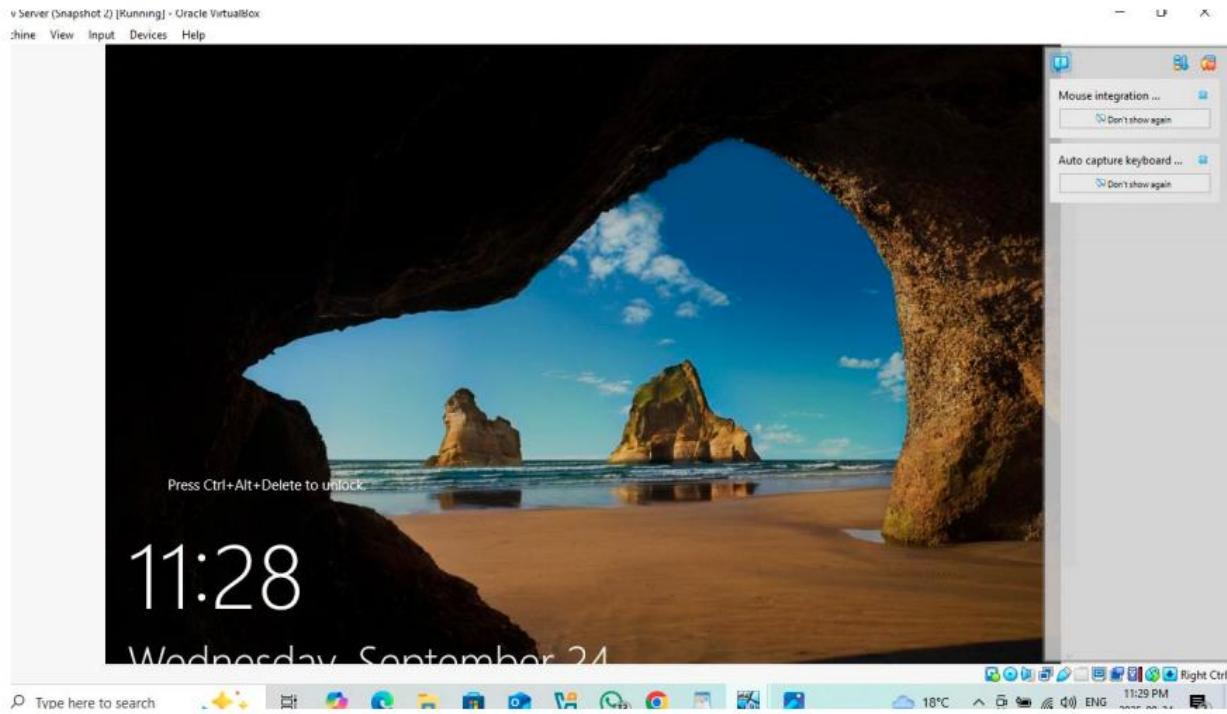
Then after clicking **OK**, the VM is ready to launch and begin the OS installation. In my case, I mounted a Windows Server ISO, so when I start the VM, the installation screen for Windows Server appears, allowing me to proceed with the setup.



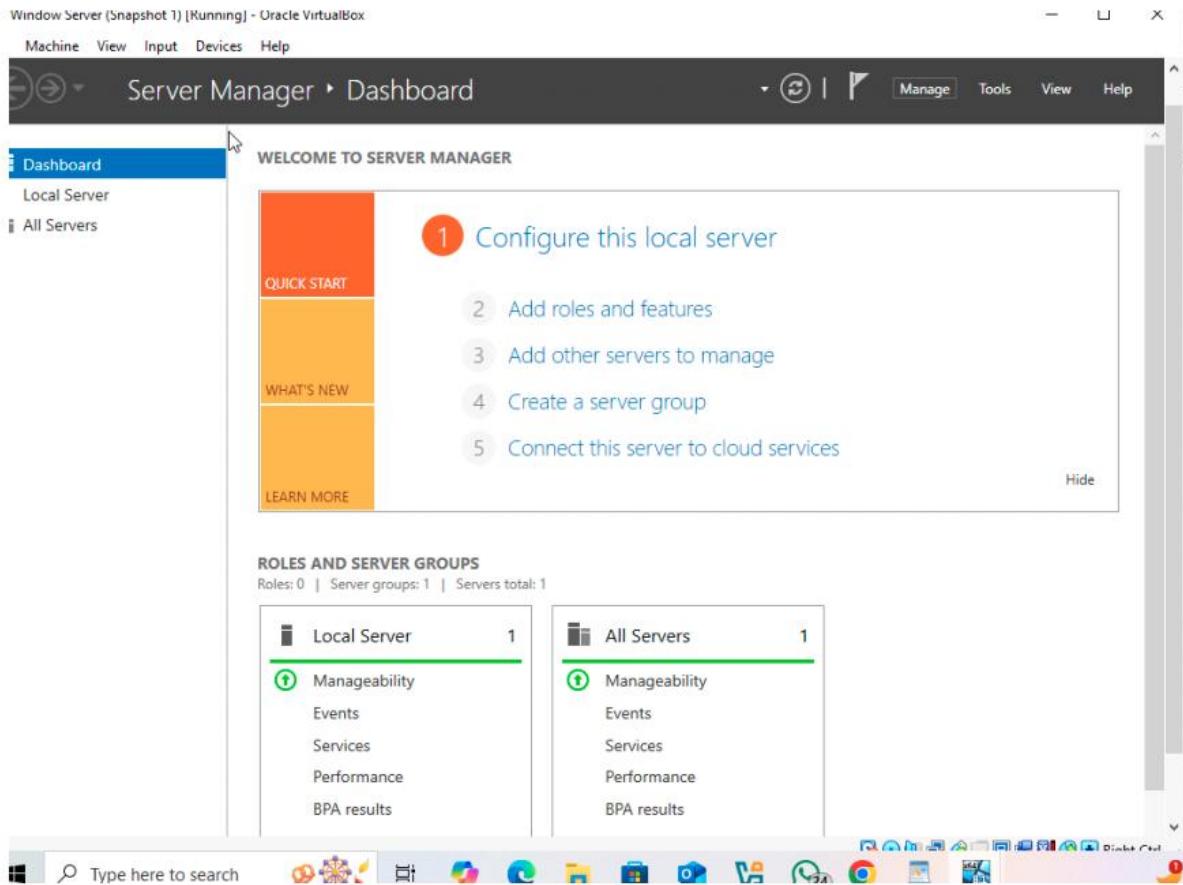
AT this point I have to start the setting up of my sever



After Installation of my window server, I login to my Window server with password I created during Installation process



At this point my server is ready and running .



Here the server is running and this is an image showering the server looks like

Now I have a virtual machine, a virtual network, and the OS ISO to bring up an actual hands-on lab – from my desk.

Here's what I accomplished:

- Created and configured several virtual machines.
- Create a virtual network to communicate and connect.
- I have downloaded and mounted a Windows Server ISO.
- Got everything ready for the OS install.