Setting up a Virtual Home Lab Project

I Built a Free Virtual IT Home Lab at Home from the begining to the end. Here's How I go about it

With the power of open-source tools and virtualisation, anyone can build a fully functional IT lab right from the comfort of their home with own computer and that is exactly what I did here.

I built a **completely free virtual IT lab** from scratch on my home machine using open-source software. It’s fast, flexible, and a great way to gain hands-on IT and cybersecurity skills without needing a stack of hardware.

Let me walk you through how I did it and how you can, too.

Introduction & Overview

- Virtualization Overview
- Free Virtualization Software
- Downloading and Installing VirtualBox
- Creating a Virtual Network
- Creating a Virtual Machine
- Downloading Your operating systems ISO(s)
- Installing an OS on Your Lab VMs
- Conclusion

Virtualization Overview

First, Let's get to know what virtualization means?

In simple terms,Virtualization is the process of creating a virtual version of something - Like computer, storage, server, devices, or network - using software..Instead of needing multiple physical machines, you can run several virtual machines (VMs) on a single physical computer (called the host). Each VM behaves like a real, independent computer with its own operating system, applications, storage, and network settings.

In this project, my main computer is the **host**, the one doing all the work. As a host, I mount one or more **guest virtual machines**, and each acting like its own

separate computer with its own operating system and settings.

It is so amazing running a full computer *inside* my physical computer (Host), It is like opening up a new world on my desktop!

Virtual Machines — My Own Computers Within a Computer

Virtual machines (VMs) behave just like real computers, but they **run as software** inside your main system. That means you can **start, restart, shut down**, and even **install operating systems and applications**, just like you would on a physical machine and that is exactly what I am trying to show you in this project

“Thanks to their flexibility, virtual machines have become the backbone of my home IT lab. They give me a safe environment to test, learn, and build new skills — all without the need for extra hardware.”

Virtualisation Software

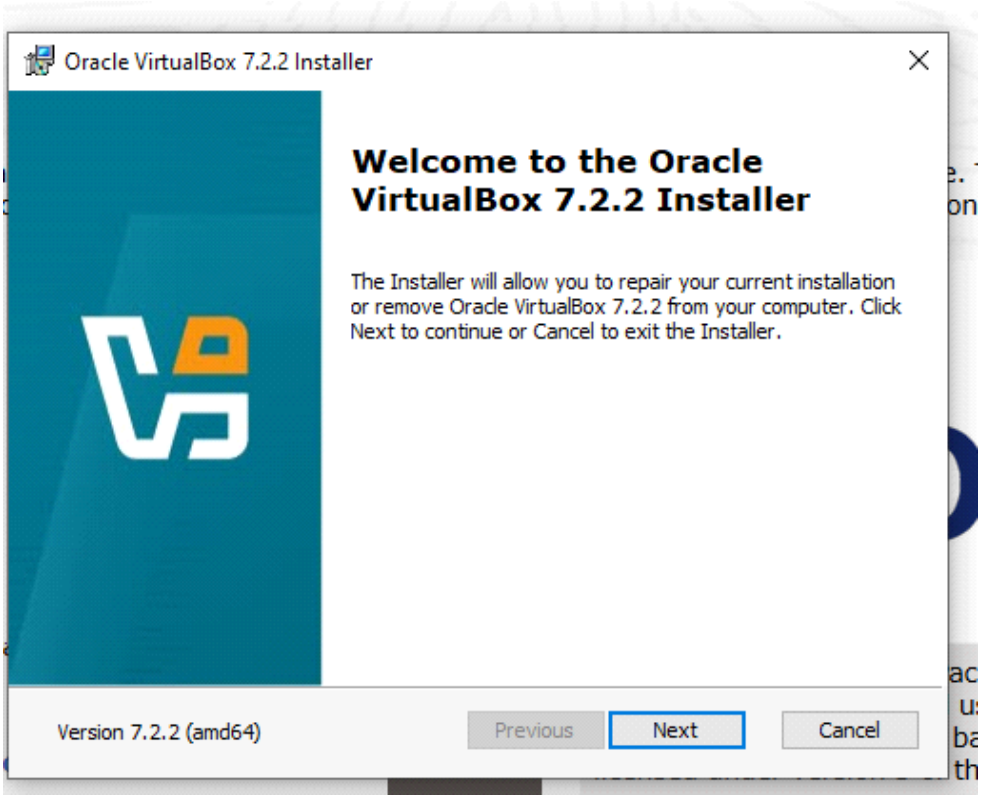
Virtualization software comes in many forms, and picking the “best” one can feel a bit overwhelming. The reality is, there isn’t a single solution that works for everyone—it really depends on your operating system and what you need it to do.

For my project, I’m using Oracle VM VirtualBox because it runs smoothly on both Windows and Linux, making it a versatile choice. That said, you can use whichever virtualization tool you’re most comfortable with—the setup process is

largely the same across different platforms.

Downloading and Installing VirtualBox

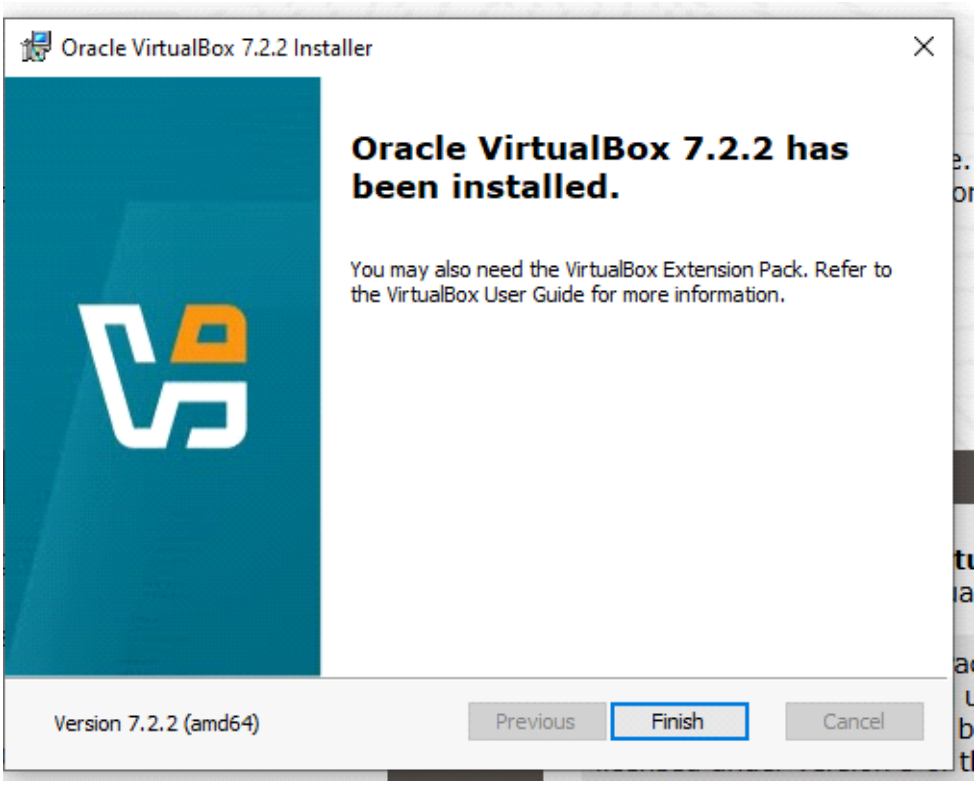
First thing I do is to Download Oracle VM VirtualBox through google, Once the download is completed, I launched the VM Virtualbox



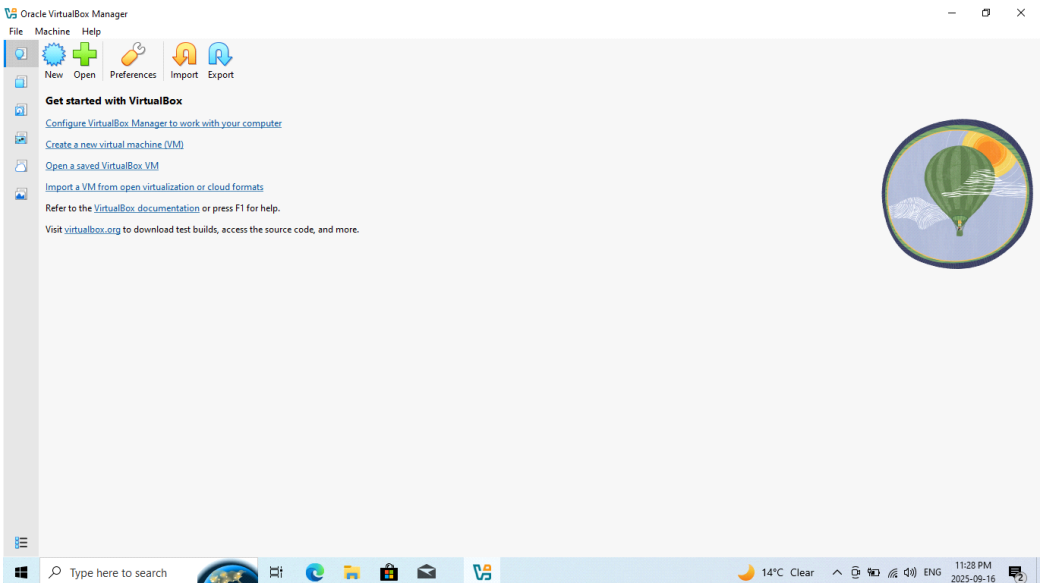
Then I click "Next"

This is how I Installed my Virtualbox

I went through the installation using **all the default options**.
Whenever I am prompted with a **yes/no question**, I simply choose **"Yes"** to continue.



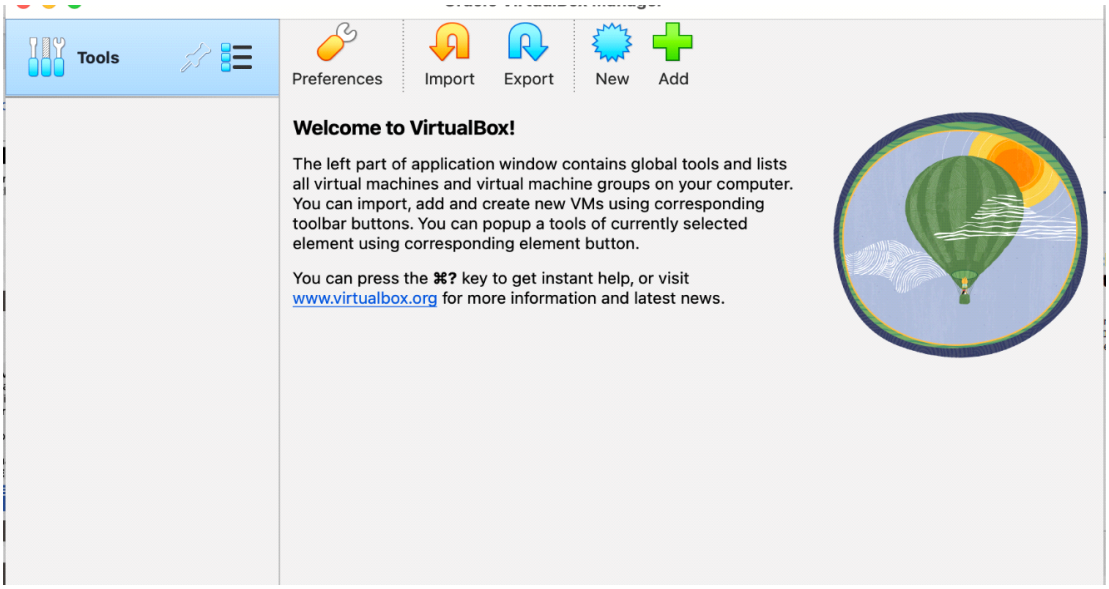
Here , My Oracle VM Virtual box has been sucessfully installed and It is time to launch it then I Click Finish and launch VirtualBox



The picture above shows a newly launch virtualbox dashboard that I just launched.

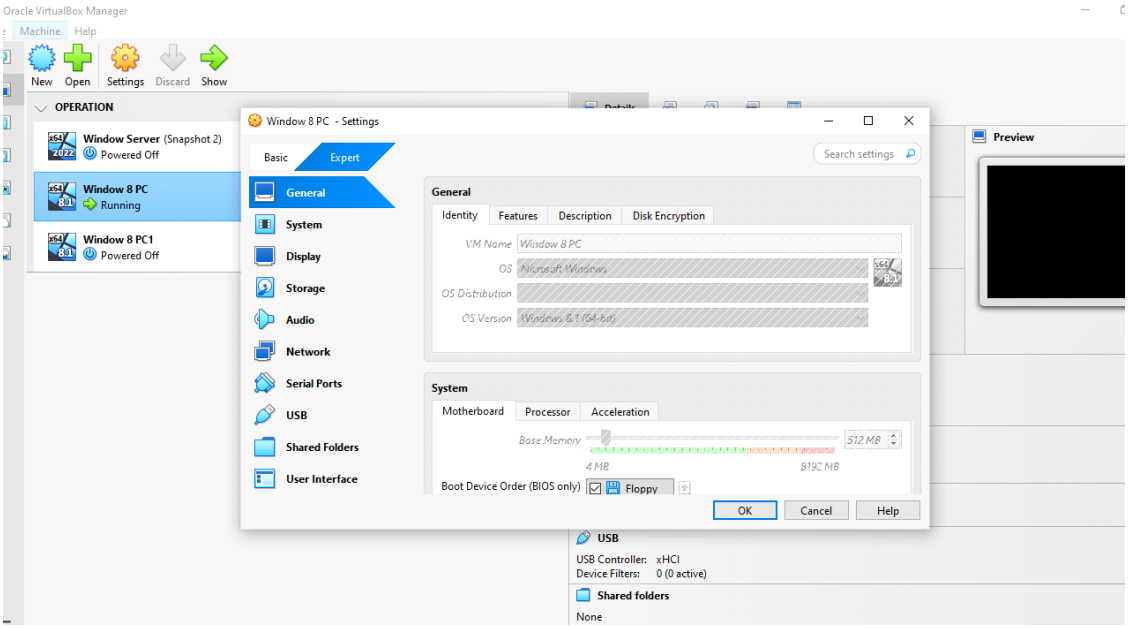
Now I want to Create my Virtual Machine

To **create a Virtual Machine (VM)**. I started by clicking the **"New"** button in the VirtualBox Manager.

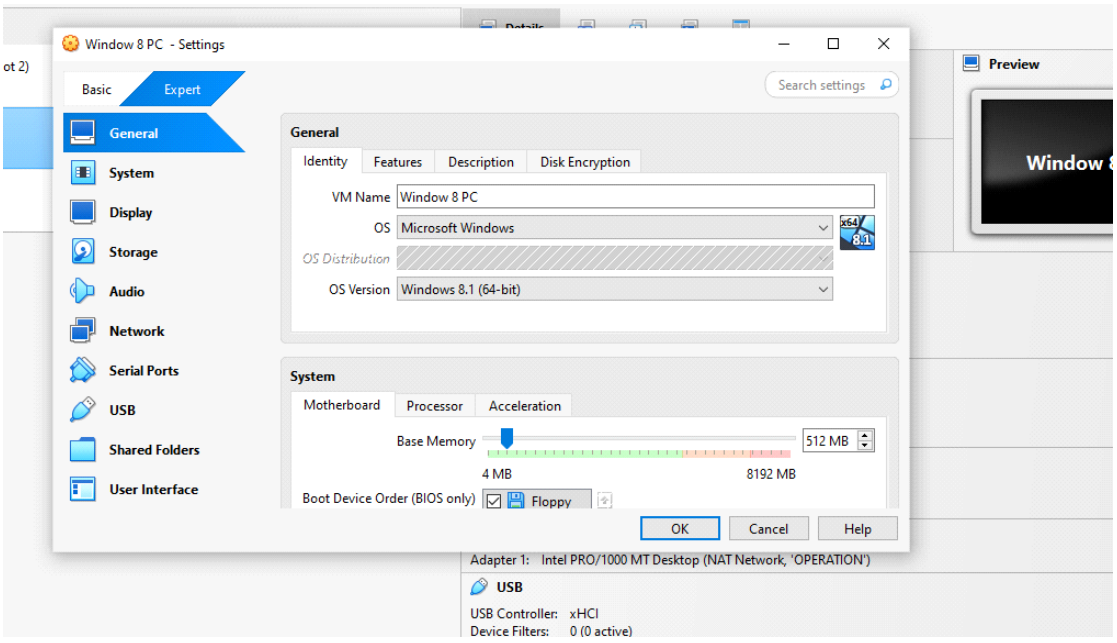


After clicking the “NEW” button, the New VM window opens. I then select Expert Mode to continue. Don’t worry—this doesn’t make things more complicated; it

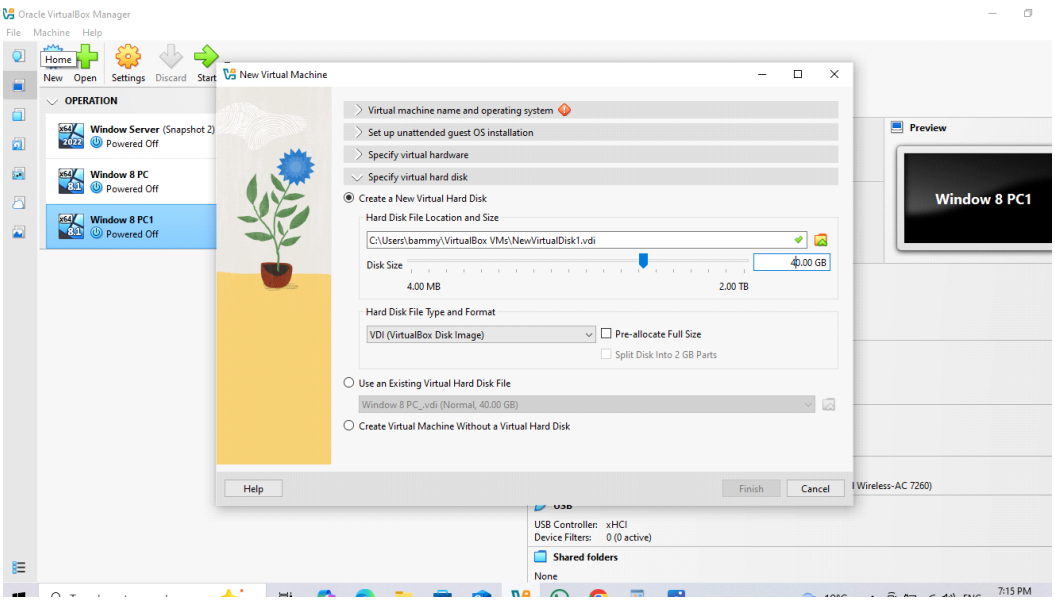
just streamlines the setup by cutting down the number of steps.



I'm naming this virtual machine "Windows 8 PC" and allocating 512 MB of RAM. Once that's set, I click Finish to complete the setup.



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.



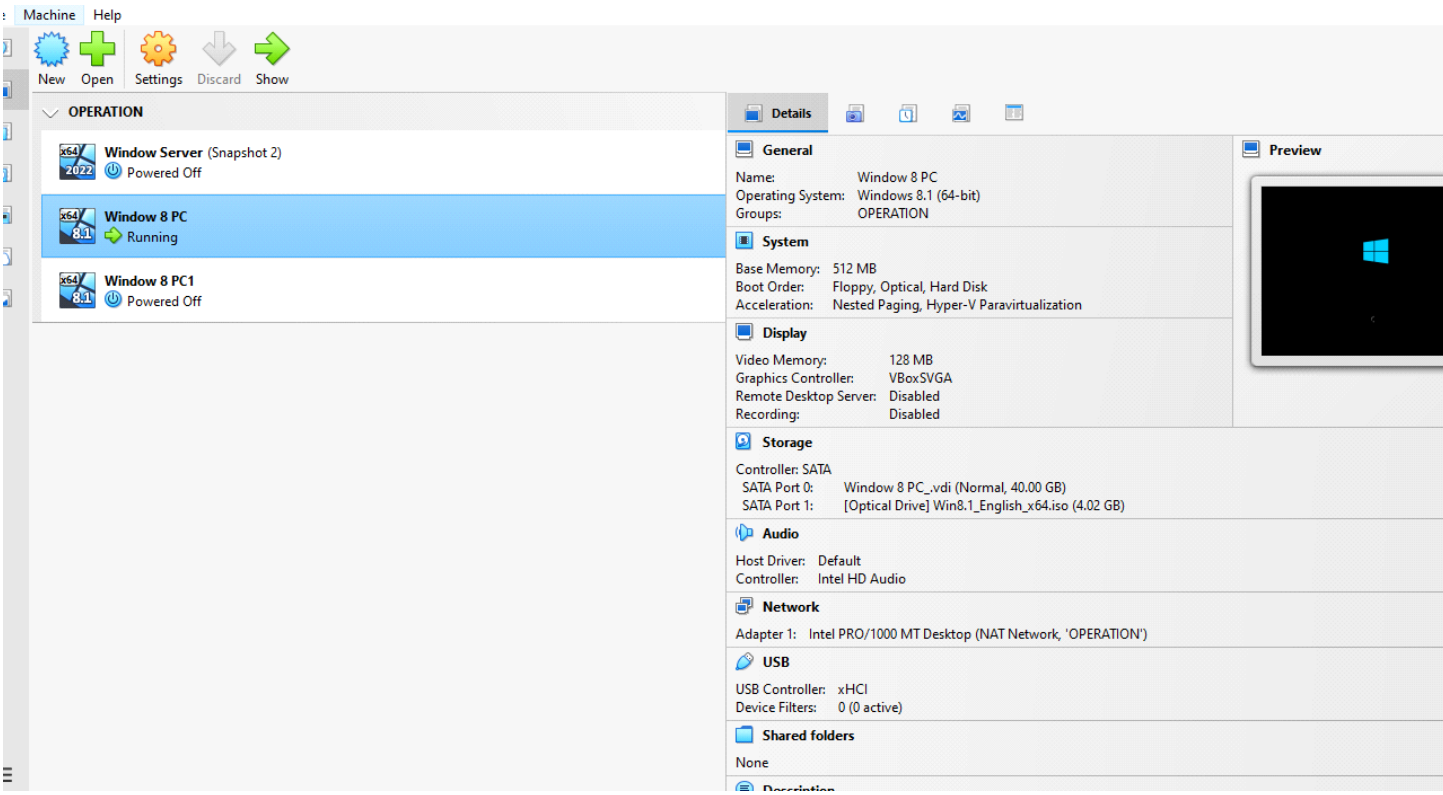
Since this hard disk drive (HDD) is set to dynamically allocate (as shown in the screenshot), it will only use as much space as the data stored on it—up to the 40GB limit I set.

Now, you'll see Windows 8 PC listed on the VirtualBox dashboard. Before starting the virtual machine, you can tweak its settings if needed. Common adjustments include:

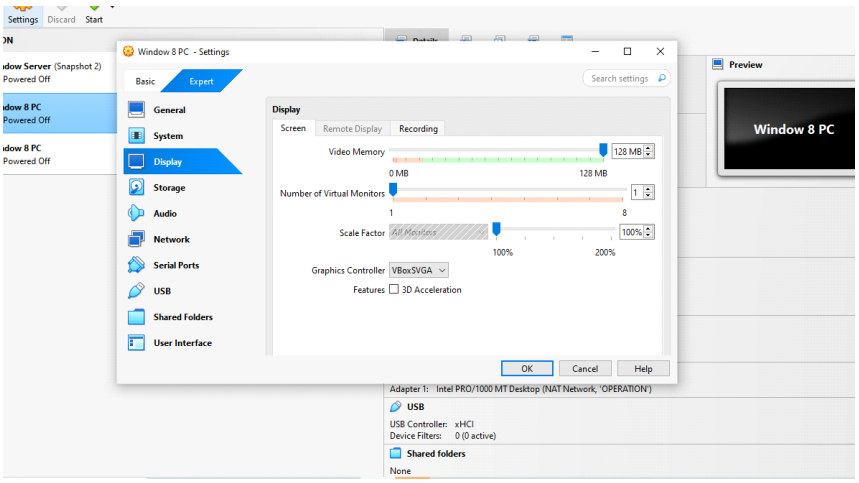
Assigning more processors

Changing the network adapter

Mounting an ISO image



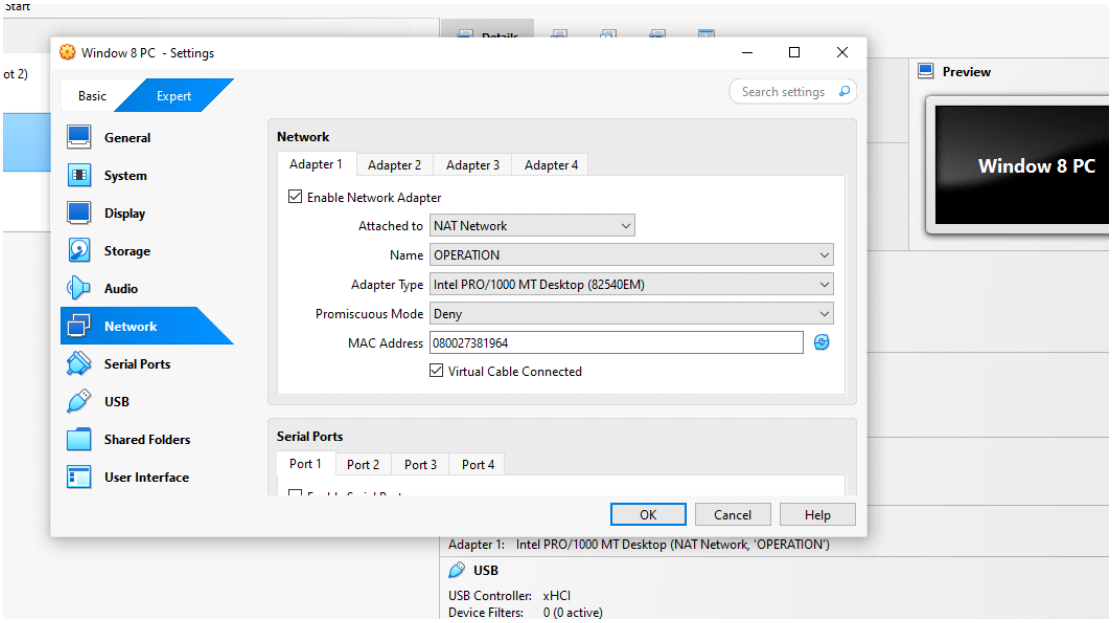
Increasing the number of CPU cores can noticeably improve your virtual machine's performance. If your system allows, it's a good idea to set it to 2 CPUs. For my setup, I'm keeping it at 1 CPU due to my computer's capacity.



I've successfully created the virtual machine (VM), but I can't start it just yet—I still need to download and attach an operating system ISO. Don't worry, I'll walk you through exactly how I do it.

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 necesarry 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 alligns with the objective of this project.

1. NAT Network

This allows VMs connected to the same NAT Network to communicate with each other, while still maintaining internet access.

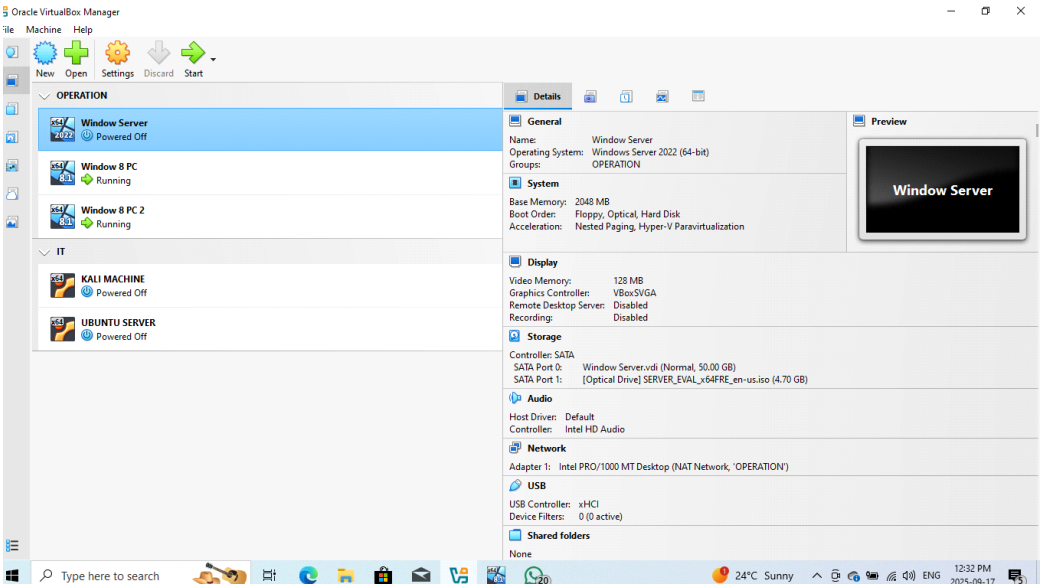
You can use this if virtual lab setup includes multiple VMs that need to talk to each other and access the internet.

Let me show you how I create my NAT Network.

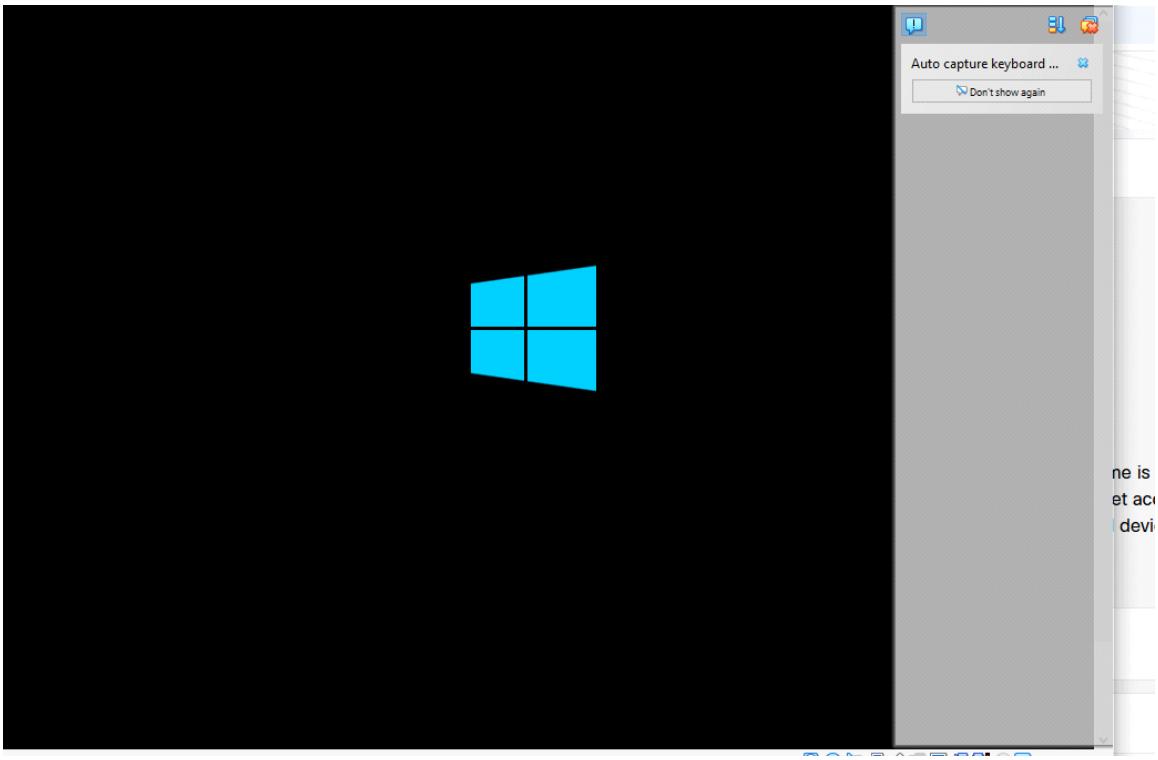
To create a NAT Network:

- Go to File > Preferences
- Select the Network tab

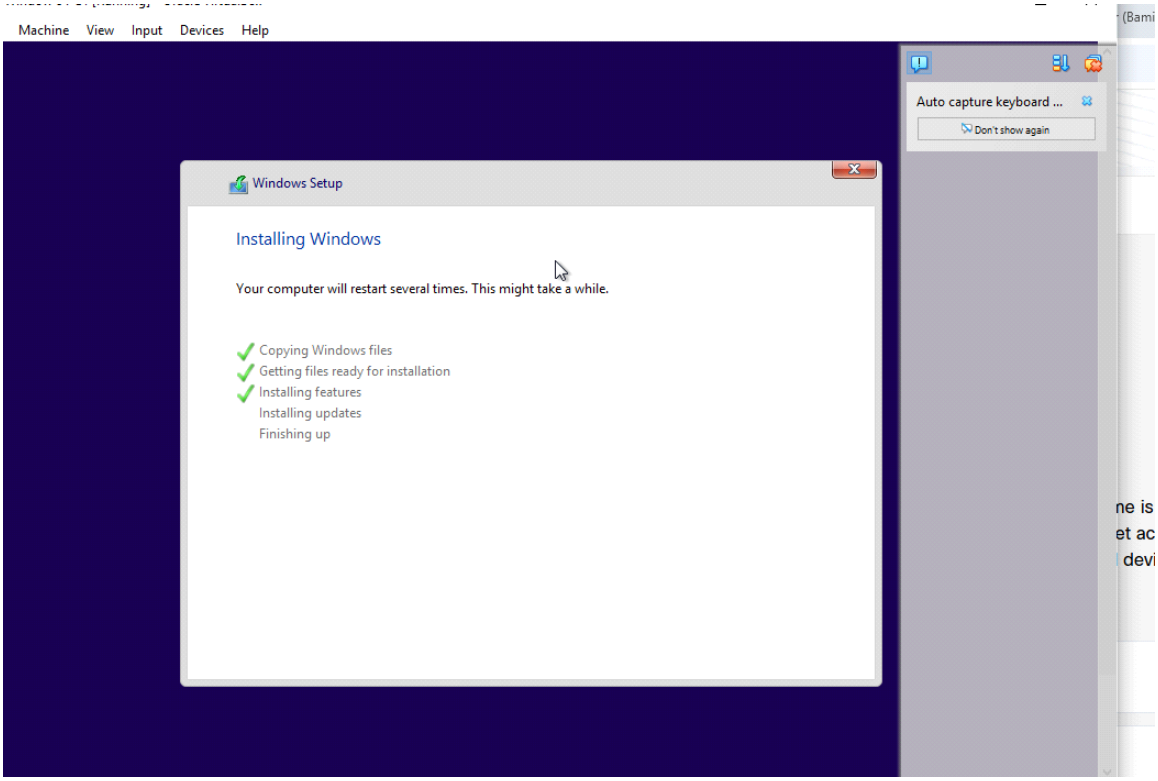
- Click the plus (+) button to create a new NAT Network
- Then, in your VM's settings, attach it to the NAT Network you just created
  After clicking "OK" then I start my Virtual Machine (see pictute below)



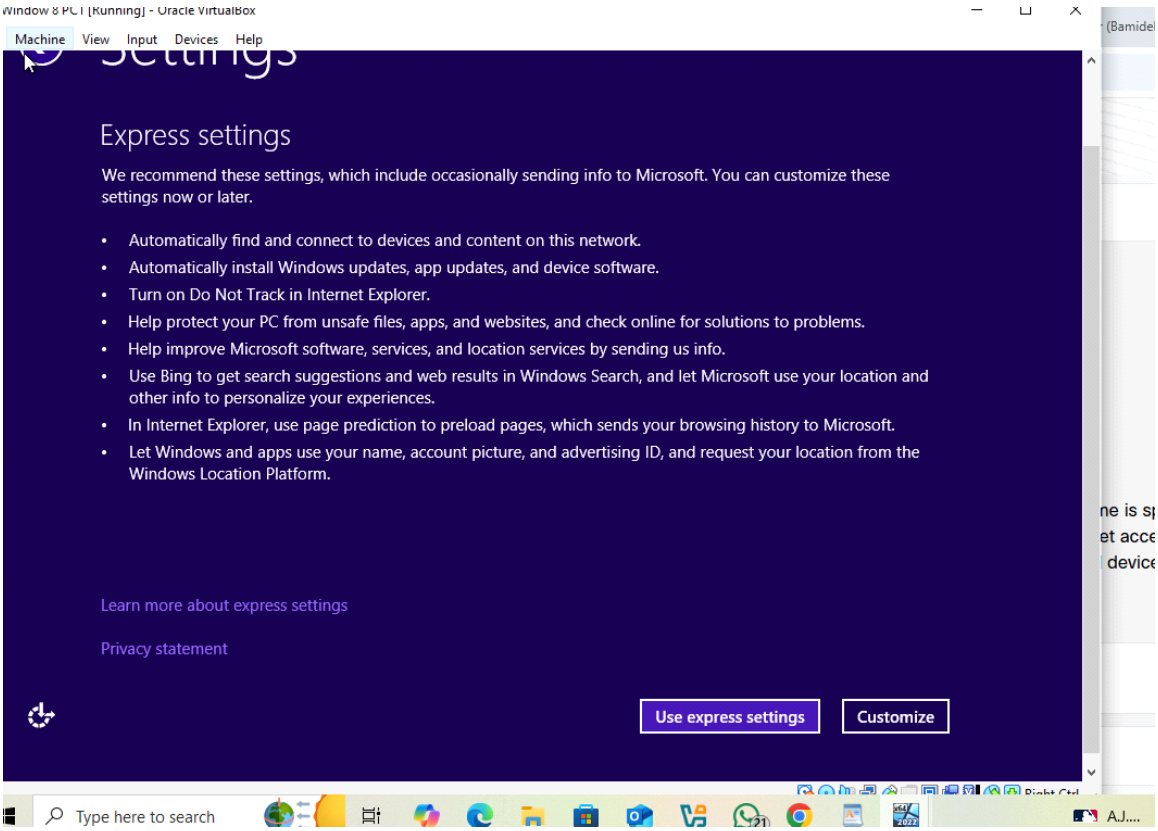
Here, My Window 8 PC is loading and I waited patiently for it to load



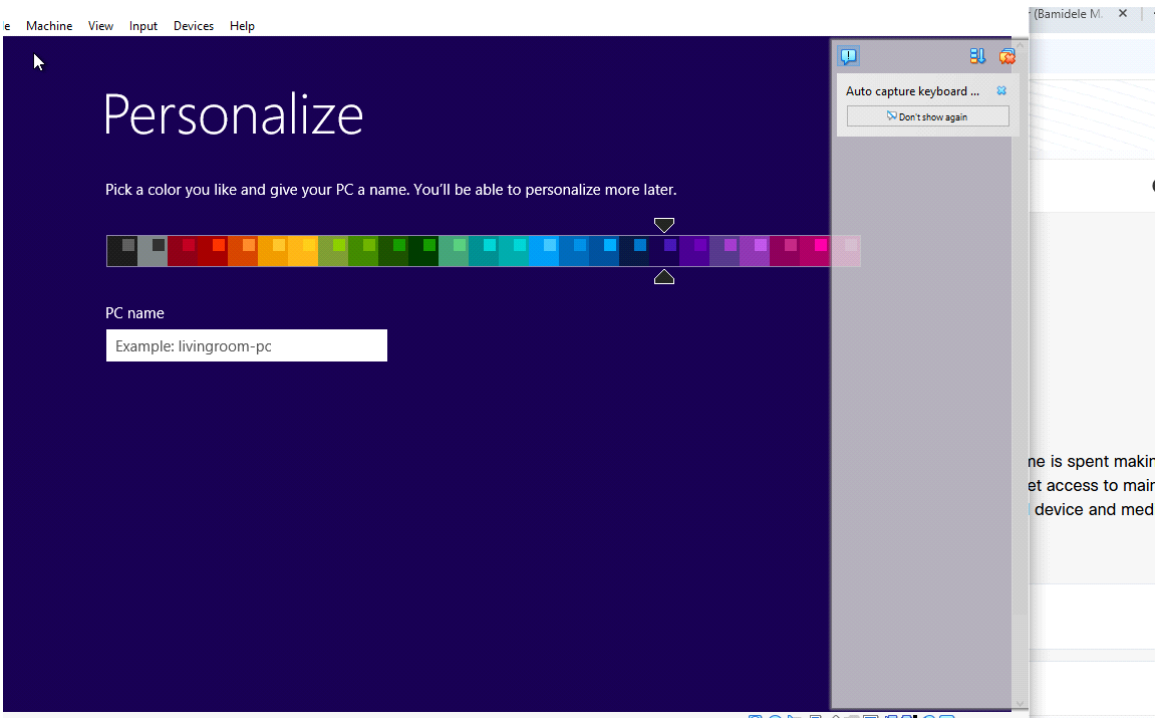
And Here, It started installing Window 8 PC on my VM



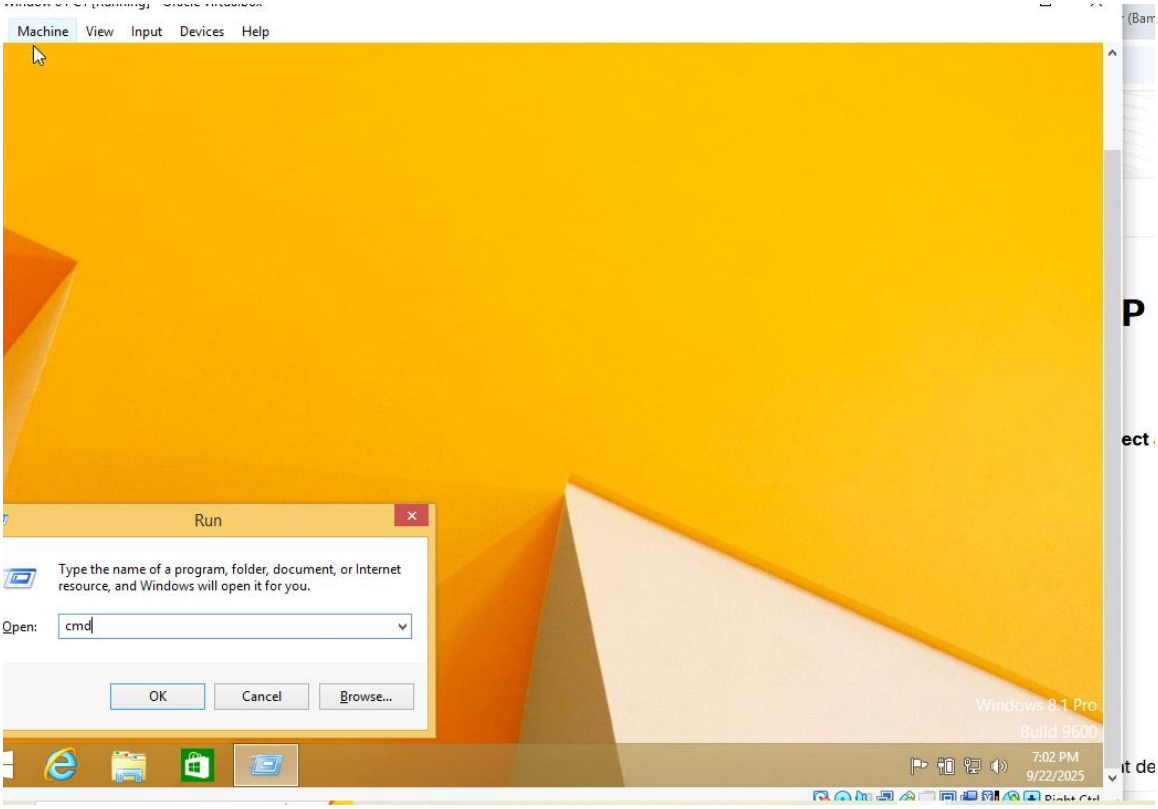
After the Installation, I started setting up Window 8 PC



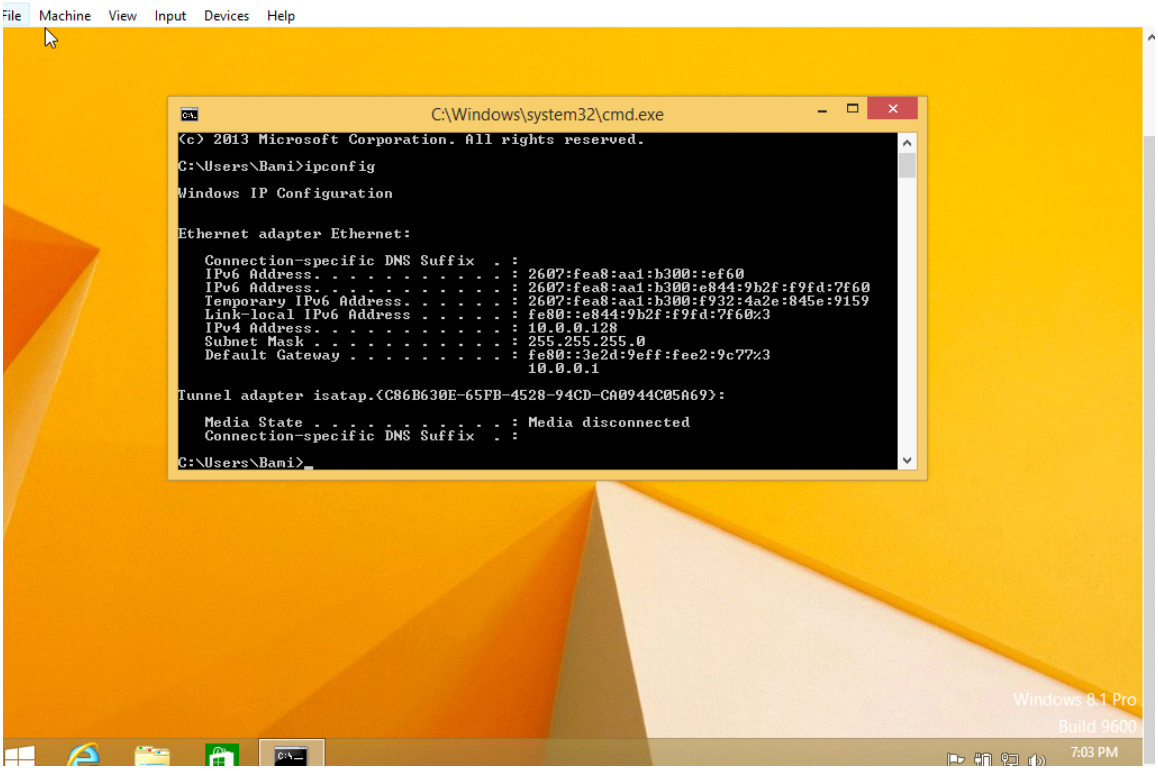
Setting up continues



After the set up, I click window button + R and run command "cmd"



Then when my Window Machine is open, I run command "ipconfig" to know my window IP configuration



Now, My Window VM is ready and complete

Also, The second Window 8 PC VM is also mount on VM Virtualbox and set up the same way I set up the first one. I followed the same process with details information above

Downloading Operating System ISO(s)

Now that my virtual network is ready, the next step in this project is to download an operating system (OS) to install on my virtual machines.

Although it's technically possible to install from a physical disc, the easiest and most common method is by using an ISO file—a digital version of the OS installation media.

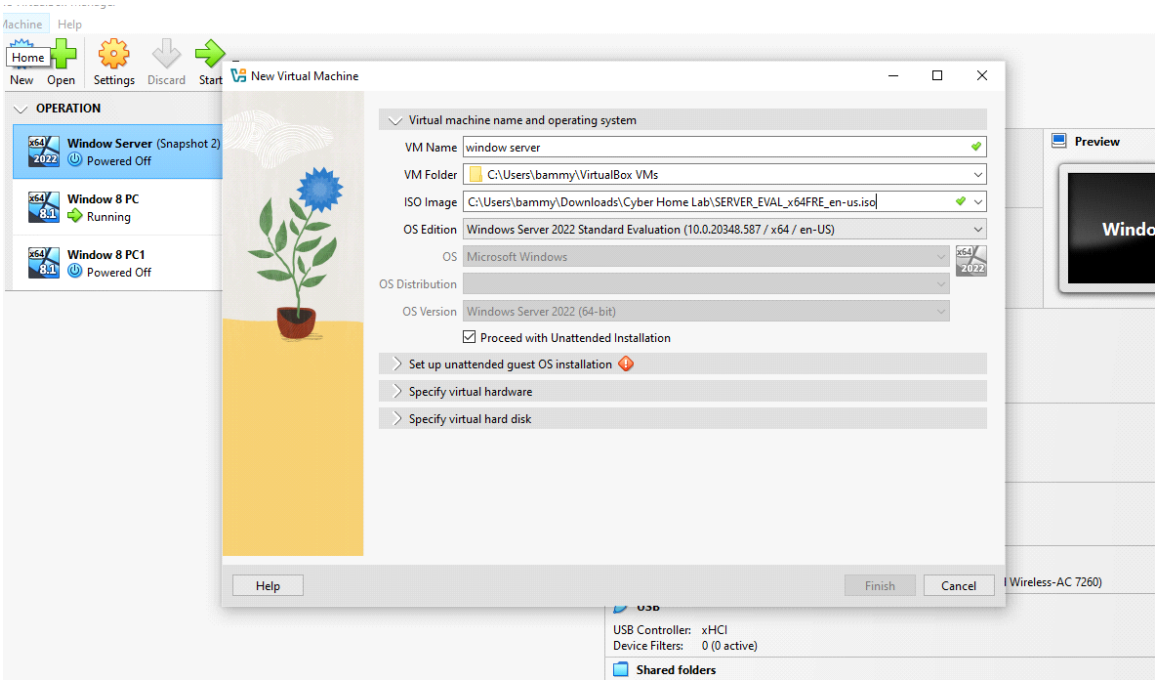
To get an ISO file, a simple online search does the trick. For example, when I needed to set up my Windows Server VM, I searched:

"Windows Server ISO Download

Installing an OS on My Lab VMs

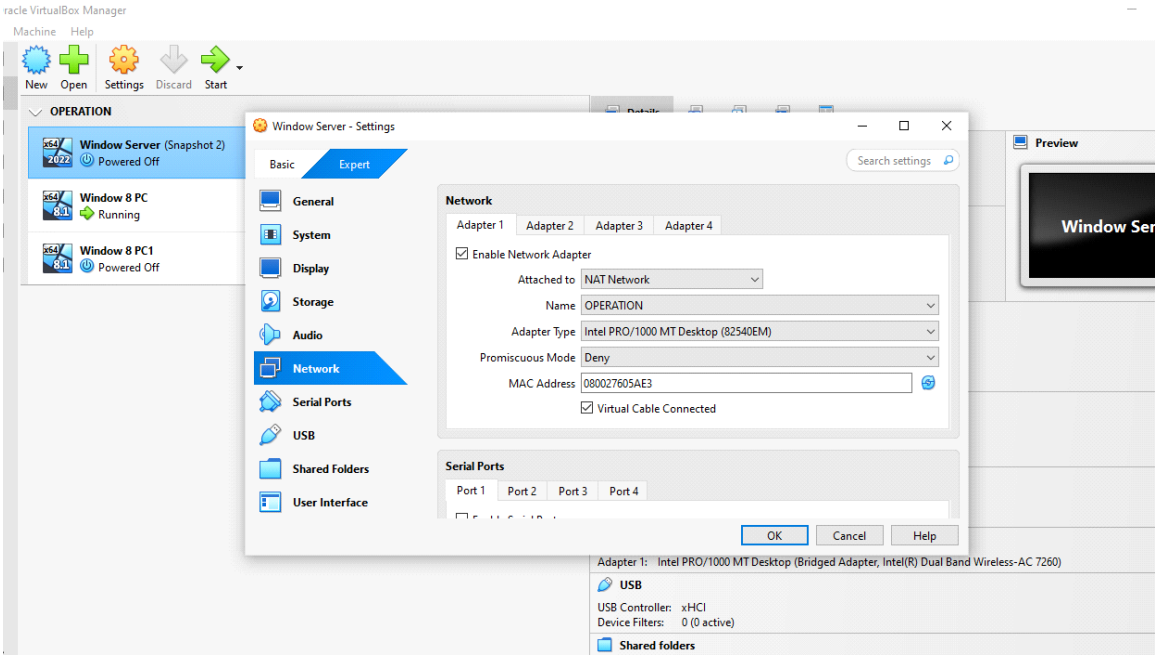
After downloading the ISO file, the next step is to mount it to my virtual machine in VirtualBox. Think of mounting as the virtual equivalent of inserting a DVD into a computer's drive.

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.

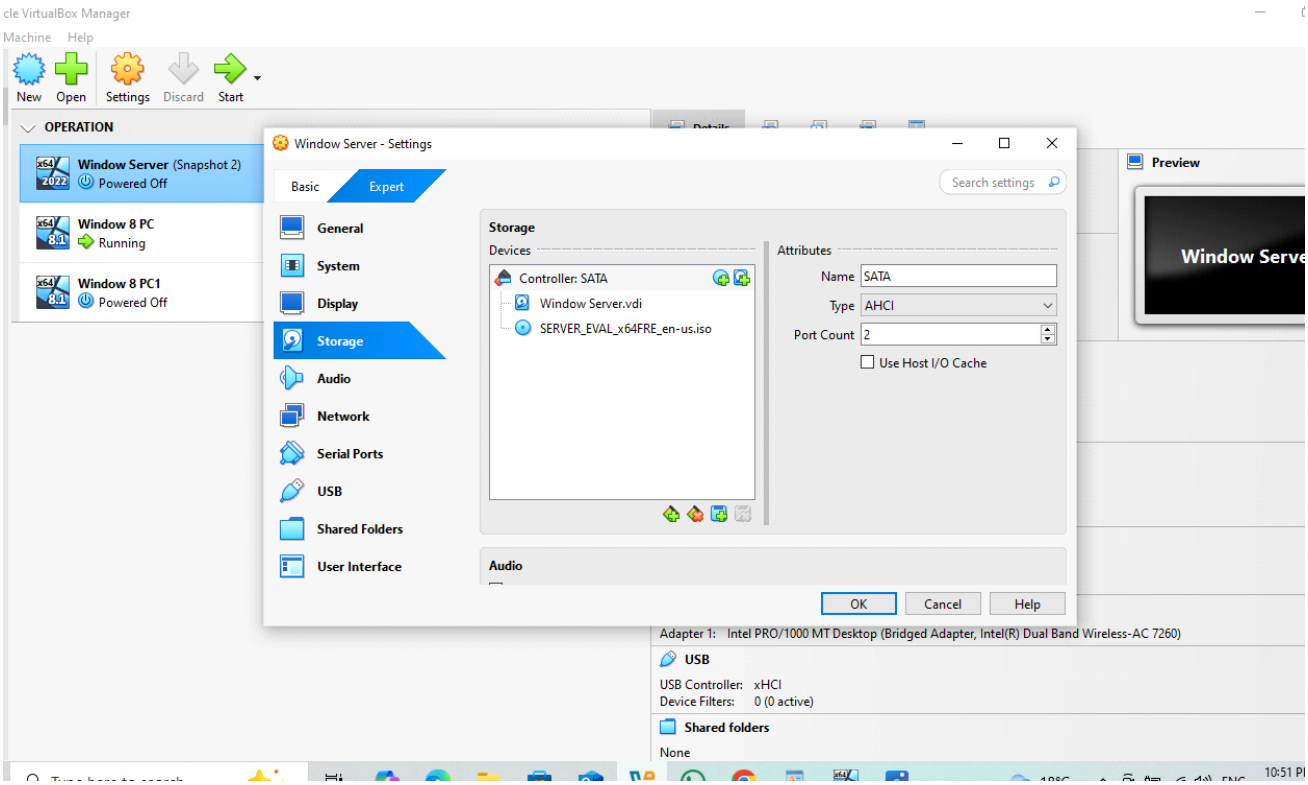


After loading ISO into the VM, I set up a virtual network that allows my VM

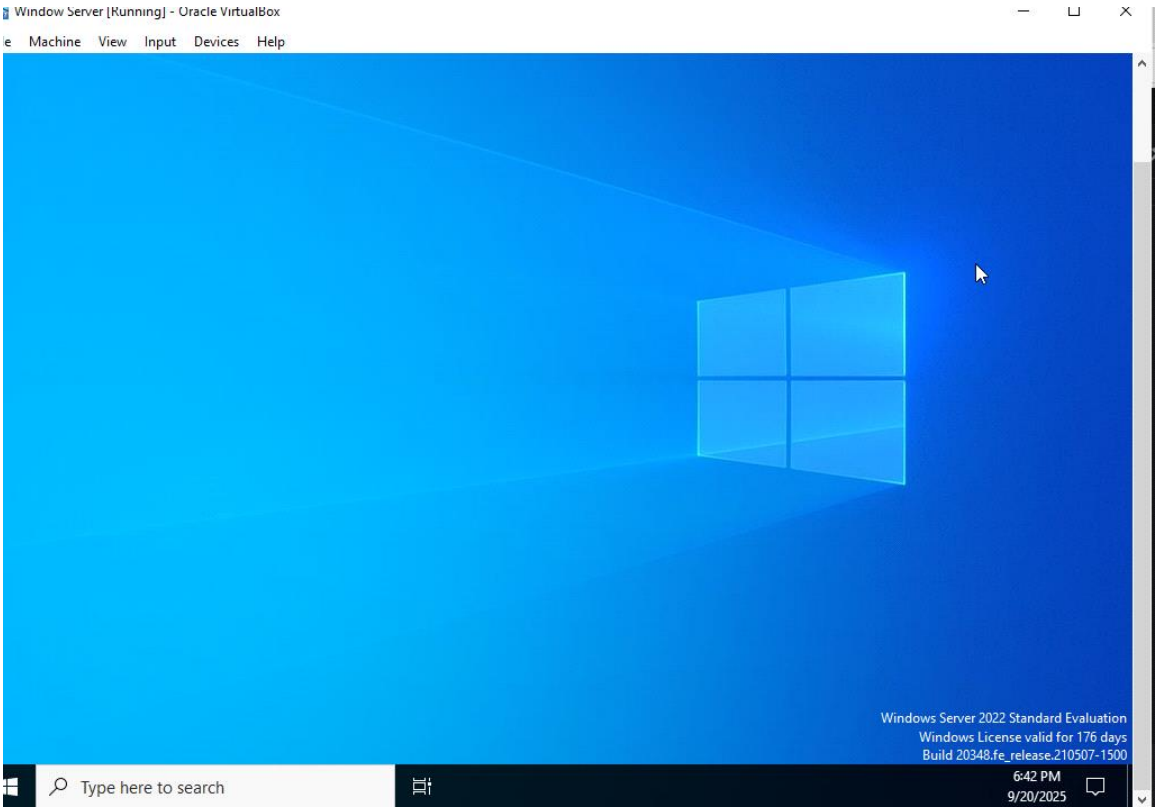
(Window Server) to connect with other VMs, my host machine, or the internet, depending on the configuration. VirtualBox offers several types of network setups, and the one you choose depends on your needs. For my setup, I went with a NAT Network.



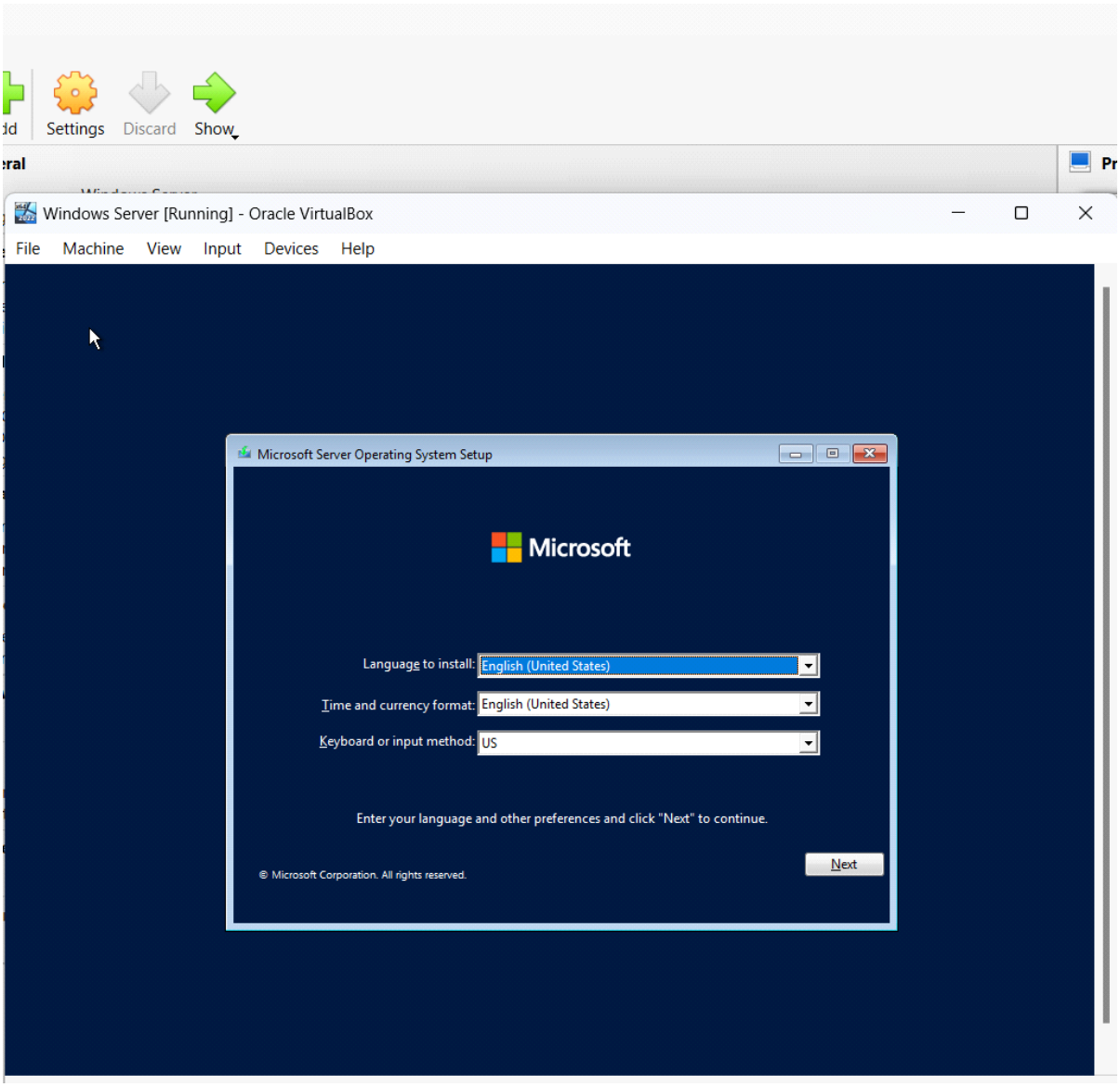
Then I click "OK" to complete the set up



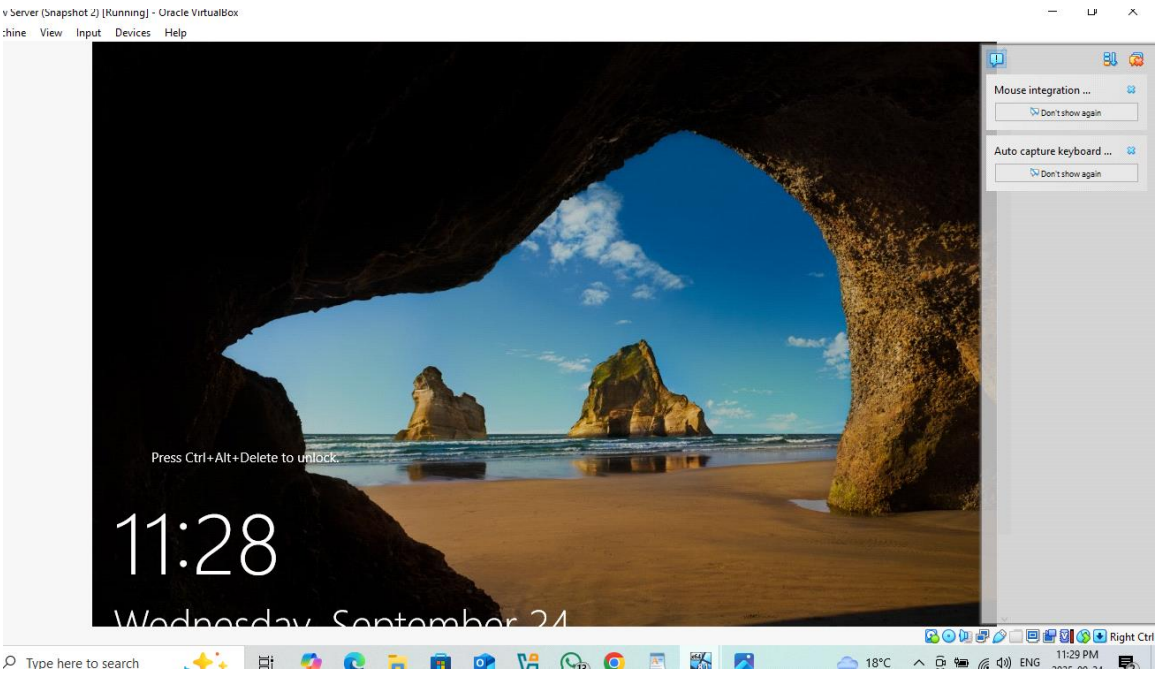
After clicking OK, the VM is ready to launch and begin the OS installation. In my case, I mounted a Windows Server ISO, so when I start the VM, the installation screen for Windows Server appears, allowing me to proceed with the setup.

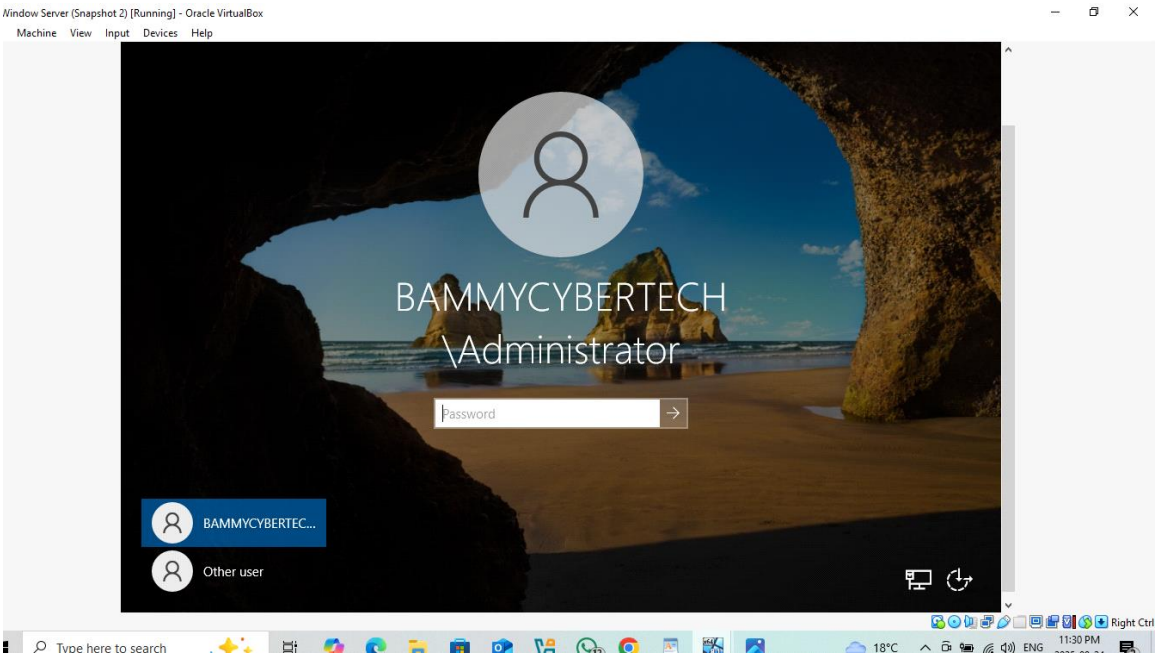


Setting up My Window Server continues

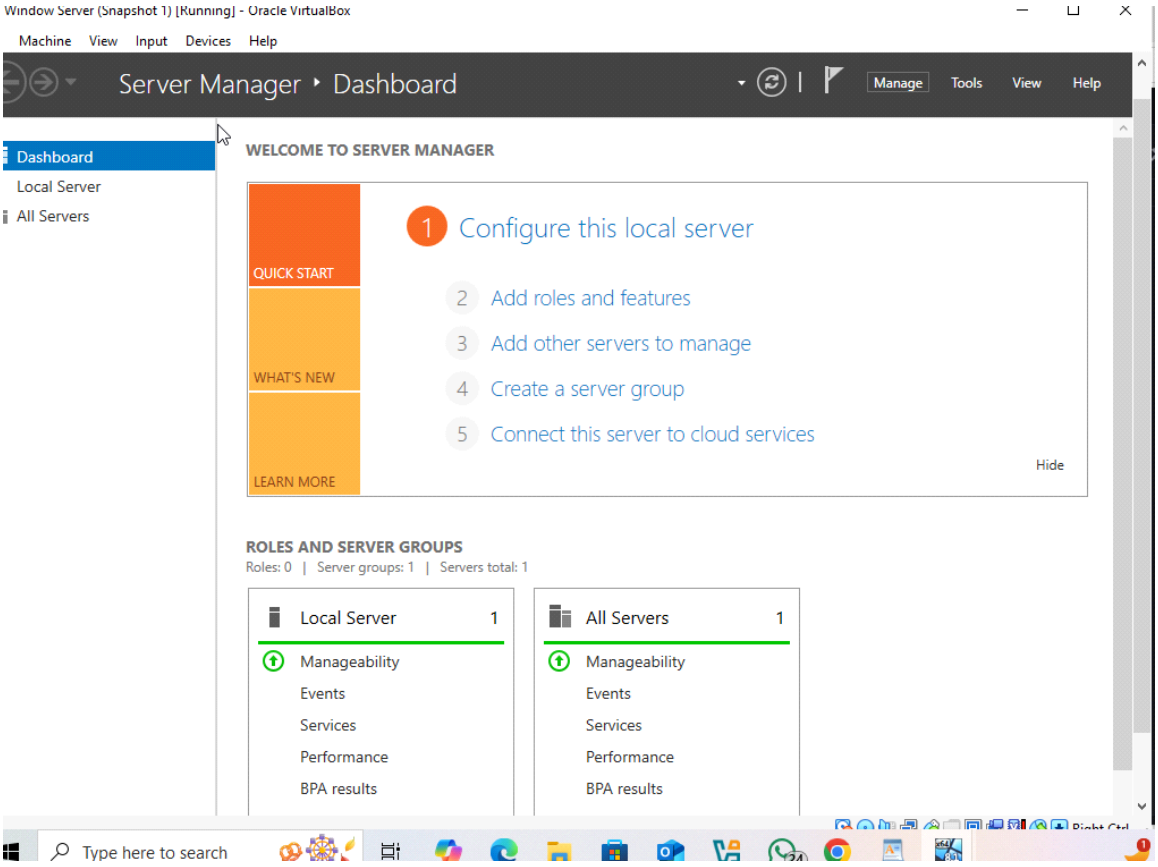


After Installation of my window server, I login to my Window server with password I created during Installation process





Here is how my Window Server Dashboard look like



With a virtual machine, a virtual network, and the operating system ISO all set up, I've created the foundation for a fully functional hands-on lab—right from my own computer.

Here's what I accomplished:

Built and configured multiple virtual machines

Set up a virtual network for communication and connectivity

Downloaded and mounted a Windows Server ISO

Prepared everything needed for the OS installation