

Setting Up A Virtual Lab Environment

In This Project I Built a Virtual Lab environment featuring windows server with two windows 8 client.

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What is Virtualization?

Virtualization involves abstracting physical hardware resources to creating multiple virtual instances (virtual machines or VMs) that operate independently on a single physical host machine. Each VM behaves like a separate computer with its own virtual CPU, memory, storage, and network interfaces, running its own operating system and applications. Virtualization is a foundational technology in modern computing that enables the creation of virtual representations of physical computing resources like servers, storage, networks, and operating systems.

Key Aspects of Virtualization

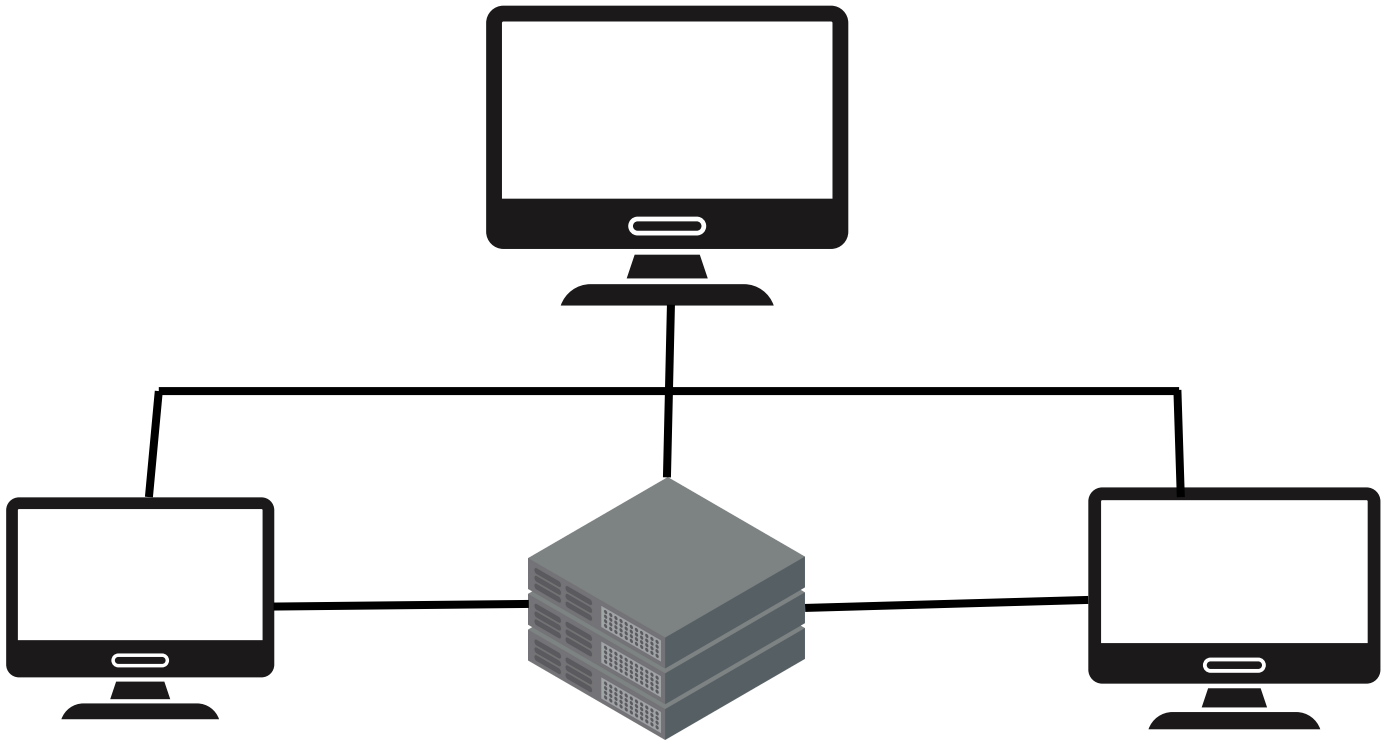
1. Resource Optimization: Better utilization of physical hardware resources by hosting multiple VMs
2. Isolation: VMs are isolated from each other and the host, enhancing security and stability.
3. Flexibility & Agility: Easy creation, cloning, migration of VMs for testing, deployment.
4. Cost Efficiency: Reduced hardware footprint can lower costs (space, power, hardware).
5. Disaster Recovery: Snapshots and backups of VMs aid recovery strategies.
6. Testing & Development: Ideal for dev/test environments without impacting production

Virtualization Technologies & Tools

- Hypervisors: Software managing VMs (Type 1: bare-metal like VMware ESXi, Type 2: hosted like VirtualBox, VMware Workstation).
- Type 1 Hypervisor: Bare-metal (VMware ESXi, Microsoft Hyper-V).
- Type 2 Hypervisors: Hosted (Oracle VirtualBox, VMware Workstation).
- Containers: Lightweight virtualization (Docker, LXC).

Tools & Platform

- Oracle VirtualBox: The core virtualization software enabling creation and management of VMs.
- Host System: Windows server 2022 serving as the base for VirtualBox operations.
- Guest Operating Systems: Windows 8, Windows Server versions deployed as VMs.



Virtual Machines--Computers Within your own 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.

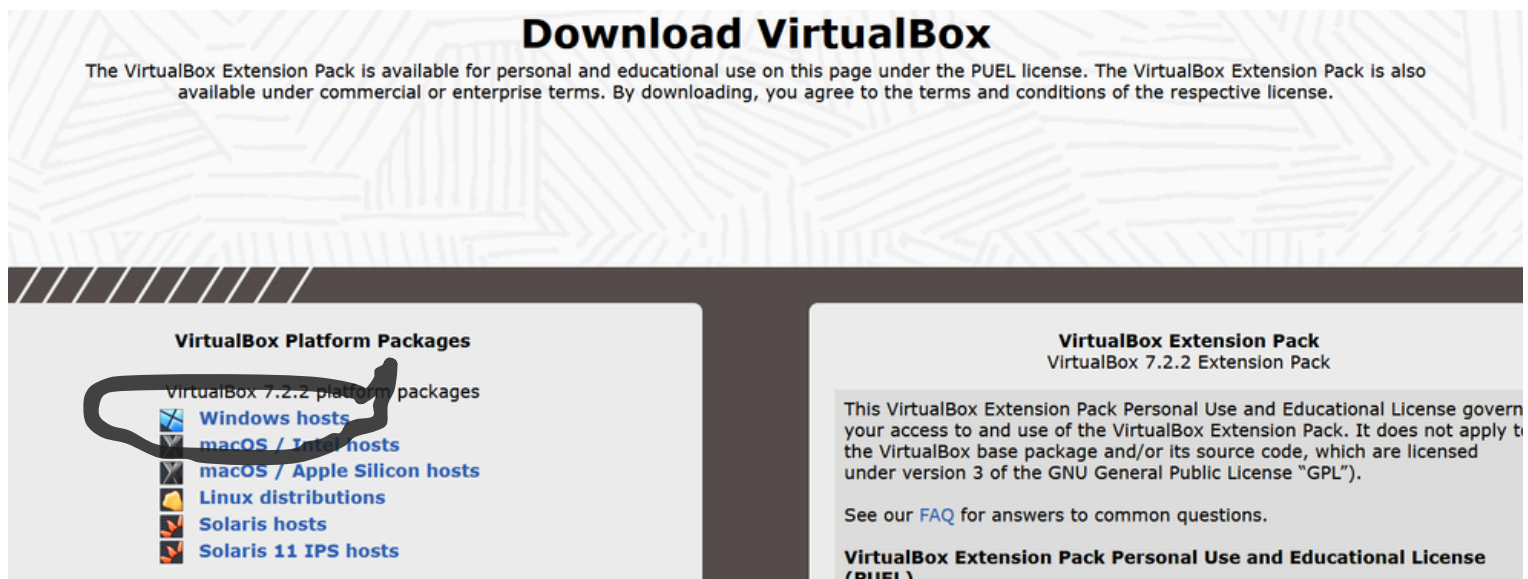
Because of this flexibility, virtual machines are ideal for creating your own IT lab, giving you a safe space to test, learn, and build without needing extra hardware.

Virtualization Software

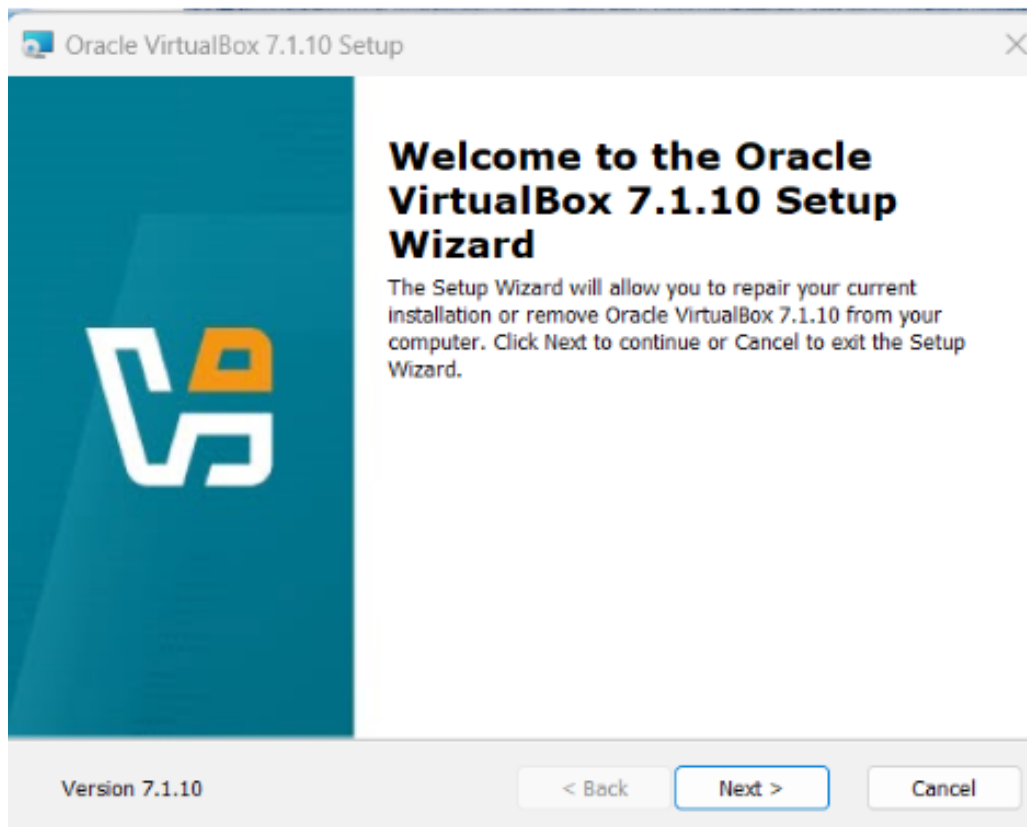
For this project, I'm using Oracle VM VirtualBox, mainly because it works seamlessly on both Windows and Linux systems. However there are other virtualisation tool you can also use apart from oracle VM virtual box prefer most of the setup steps will be very similar across platforms.

Downloading and Installing VirtualBox

Download Oracle VM VirtualBox. Once the download is completed, i install then launch



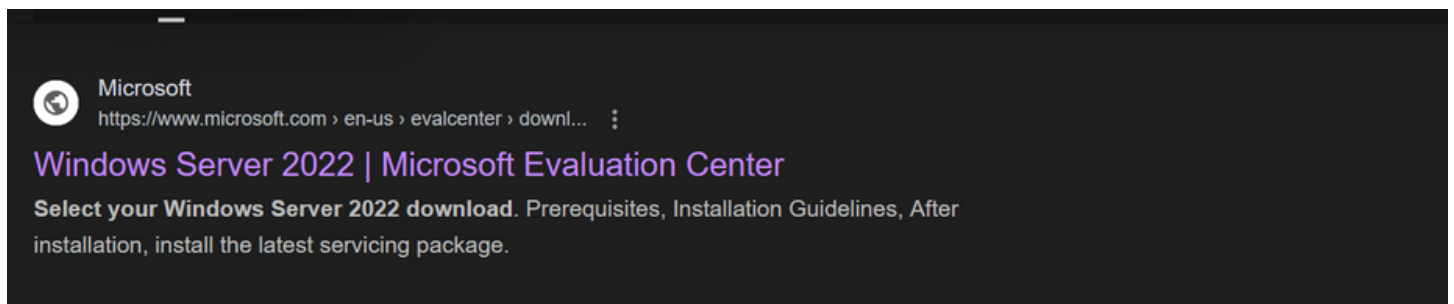
This was the file i download which is the windows host after downloading then i did installation



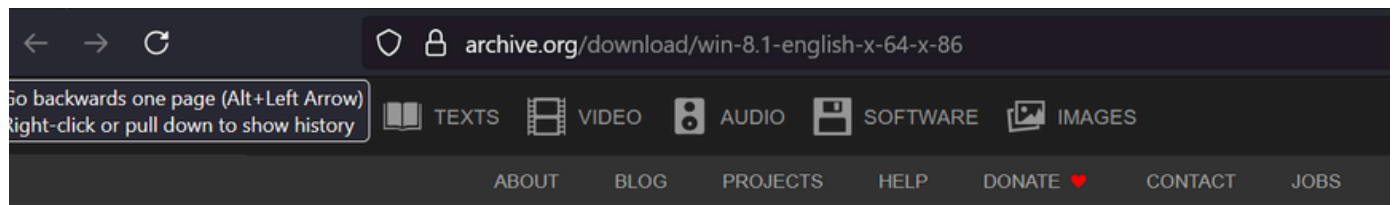
installation

I went through the installation using the default options. Whenever am prompted with a yes/no question, simply read and accept to continue then click finish to launch .

After the successful installation of my virtualbox i downloaded other machines like windows 8 and windows server.



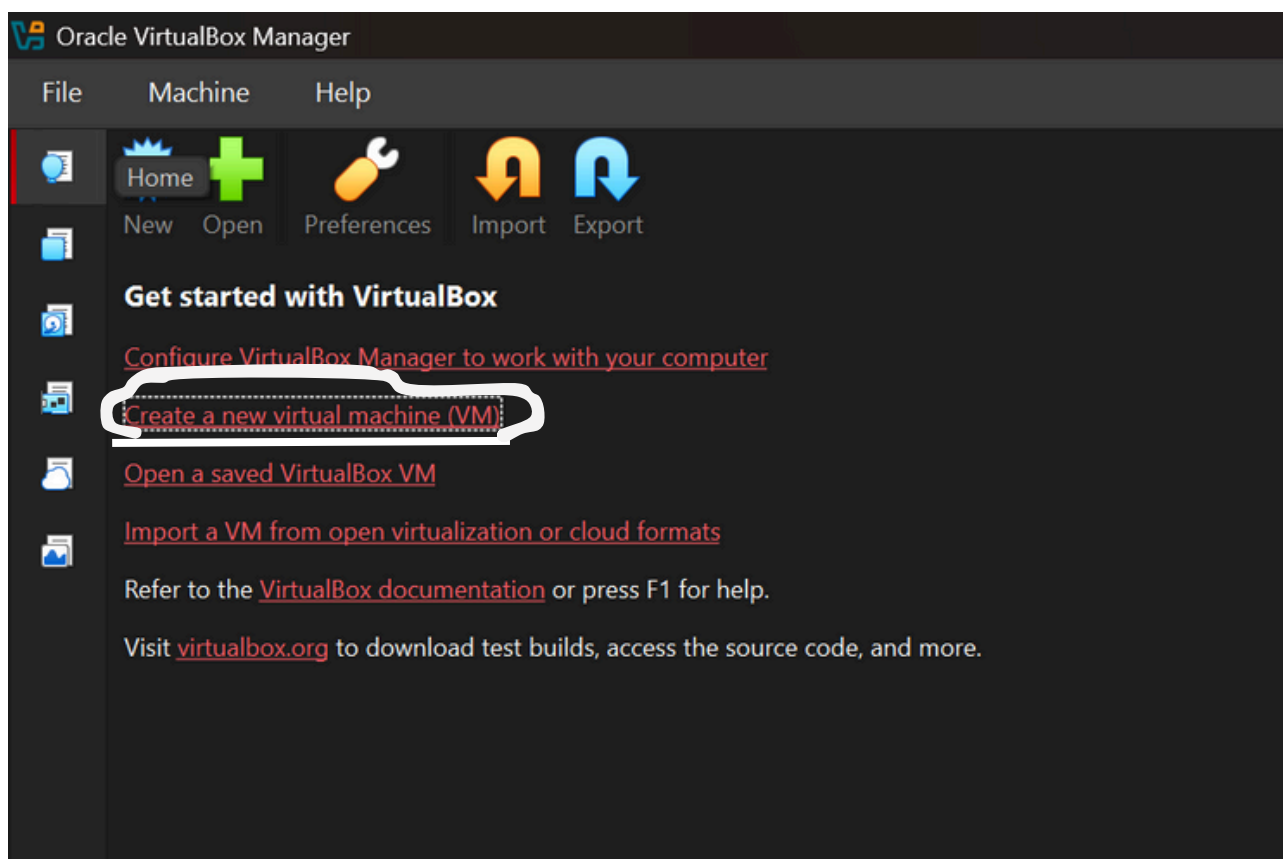
Downloaded a windows server 2022 from microsoft



Files for win-8.1-english-x-64-x-86

Name	Last modified	Size
Go to parent directory		
Win8.1_English_x32.iso (View Contents)	16-Jun-2024 18:26	3.0G
Win8.1_English_x64.iso (View Contents)	16-Jun-2024 17:06	4.0G
win-8.1-english-x-64-x-86_archive.torrent	16-Jun-2024 18:28	37.3K
win-8.1-english-x-64-x-86_files.xml	15-Sep-2025 05:43	2.1K
win-8.1-english-x-64-x-86_meta.sqlite	16-Jun-2024 18:27	28.0K
win-8.1-english-x-64-x-86_meta.xml	16-Jun-2024 17:43	1.2K
win-8.1-english-x-64-x-86_reviews.xml	15-Sep-2025 05:43	18.9K

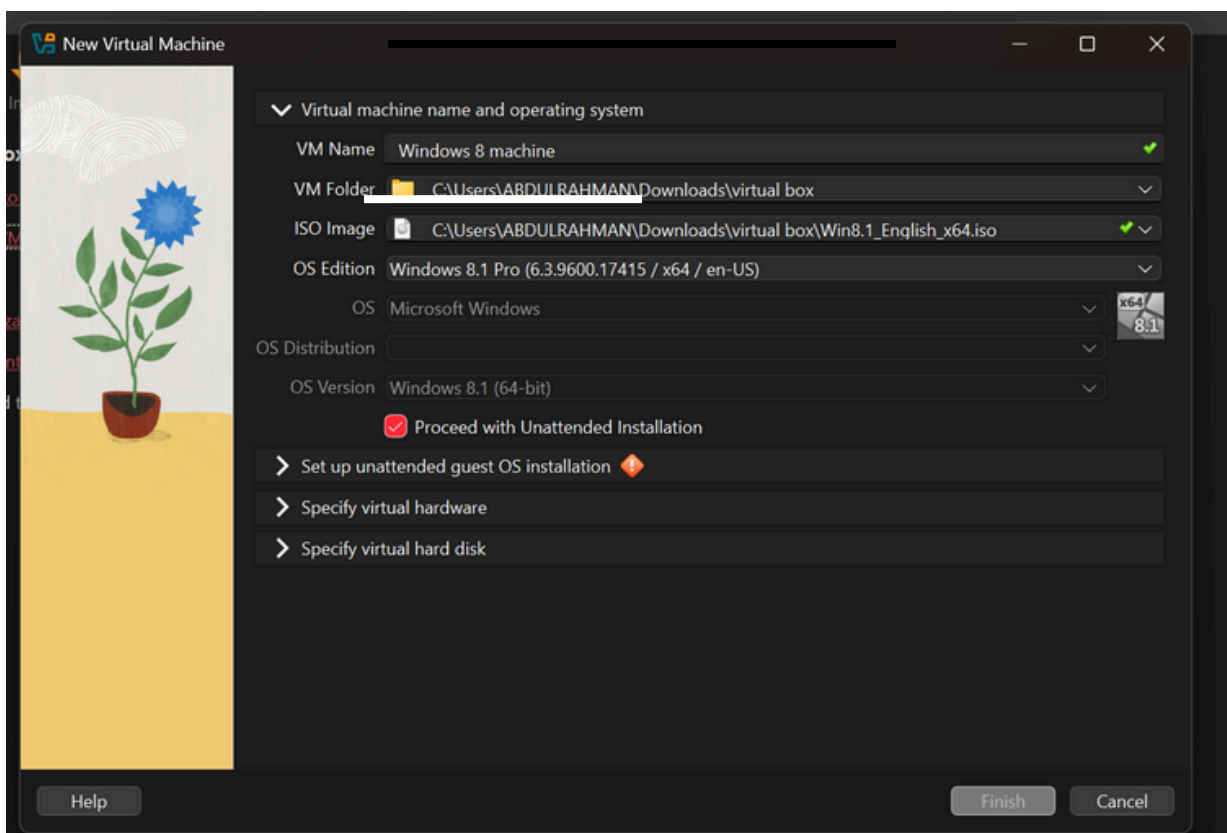
Also downloaded windows 8 64 bit iso file you might choose to download windows 10,11 and so on just get the one suitable for the task you want to carry out



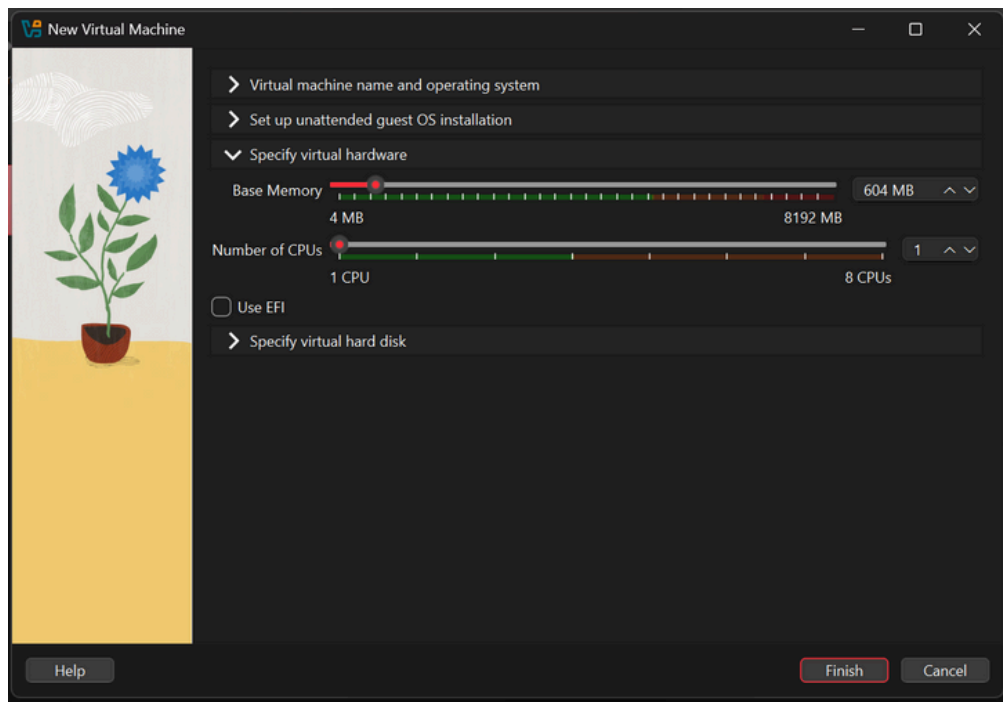
Creating a Virtual Machine

Now that have decided on the type of virtual manager to use, it's time to create a Virtual Machine (VM). You can do this by clicking the "create a a new virtual machine" button in the VirtualBox Manager.

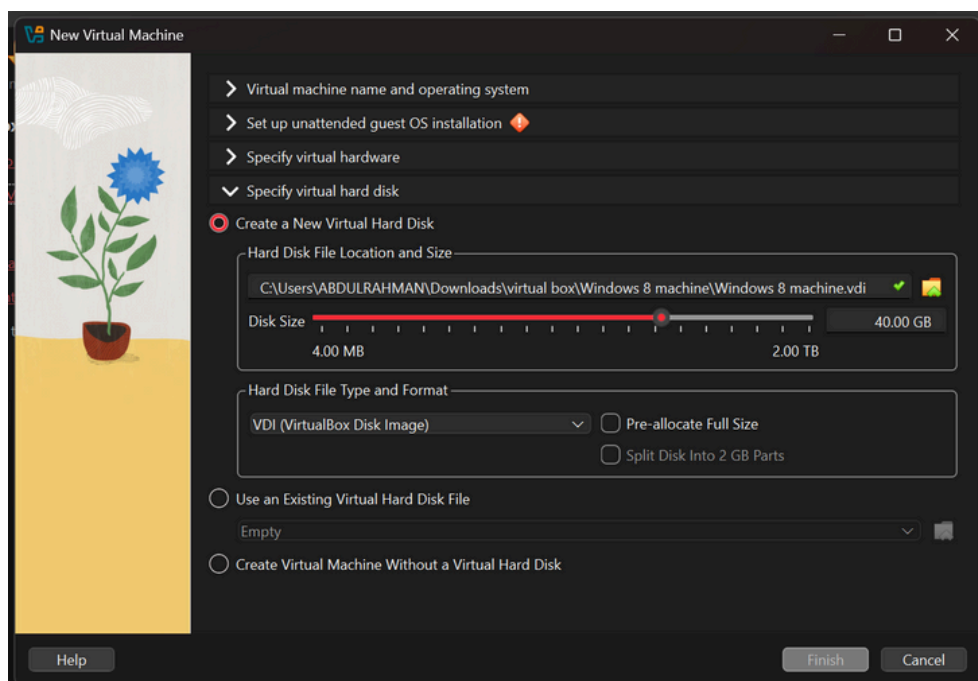
This will launch the new VM window. Click the Expert Mode button to proceed. Don't worry, it doesn't make the process harder. It simply streamlines the setup by reducing the number of steps.



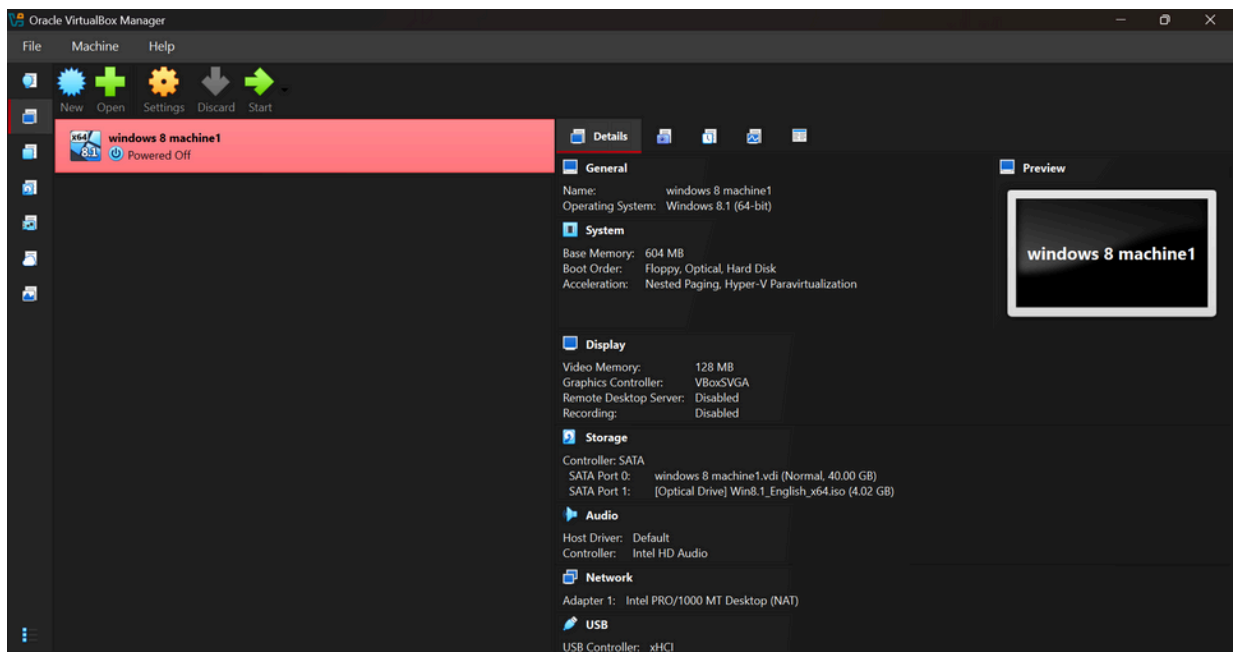
Setting up a new machine which is windows 8 and also naming it



Assigning RAM and processor for the machine making sure am not assigning too much for each machine am bringing into the virtual manger in other not to make the host machine lag

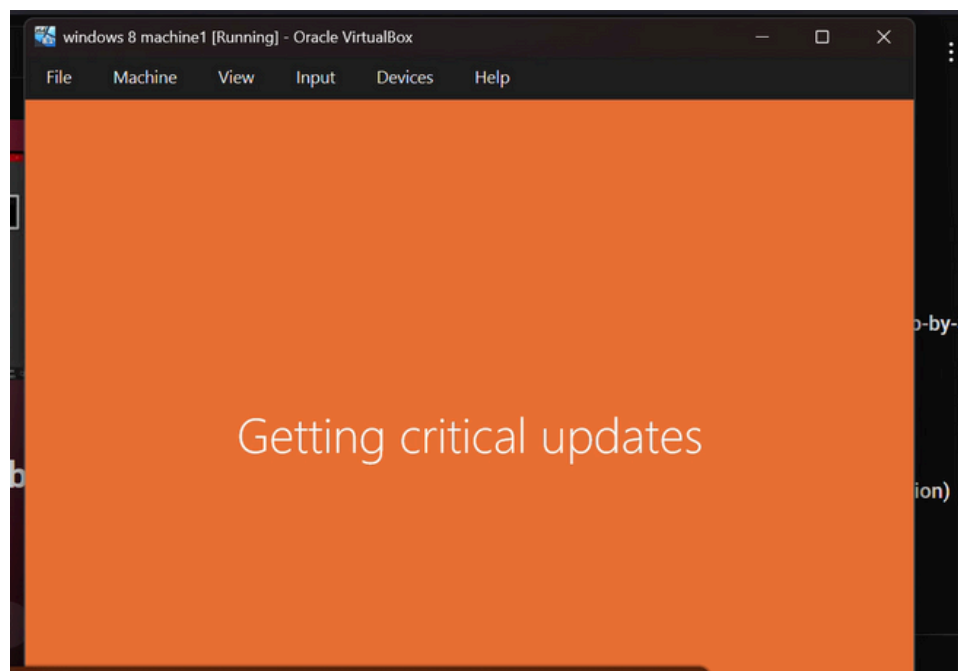


Also assigning virtual hard disk drive giving it 40gb from 2tb is not you can assign more depending on the task the VM want to carry out then click on the finish to mount the machine you can reciprocate depending on how many windows machine you need virtually

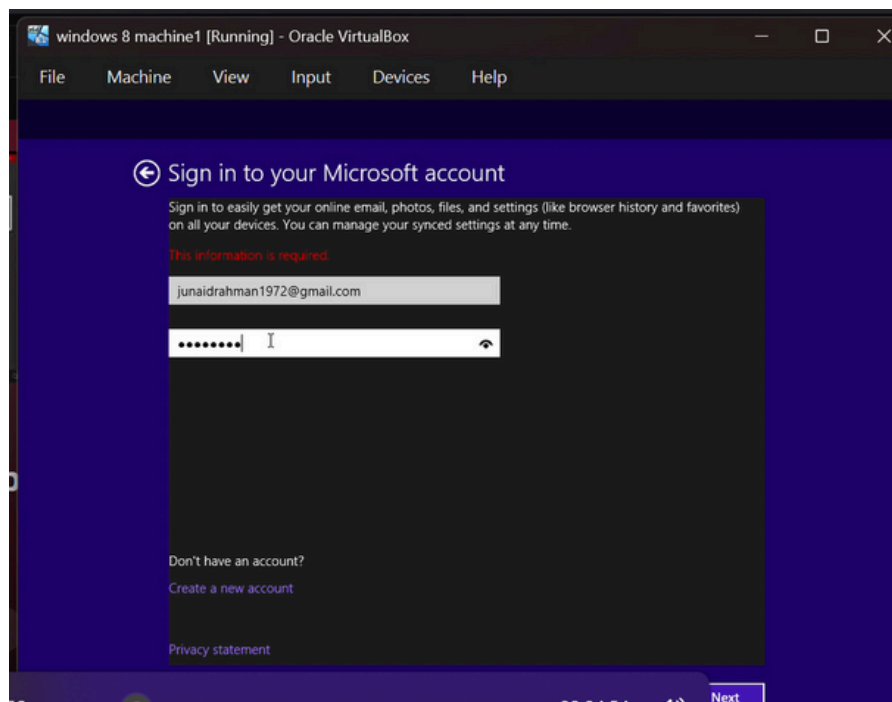


Configuration

As you can see the machine is mounted ready for configuration i have to configure and install to make it run virtually the next step now is the configuration

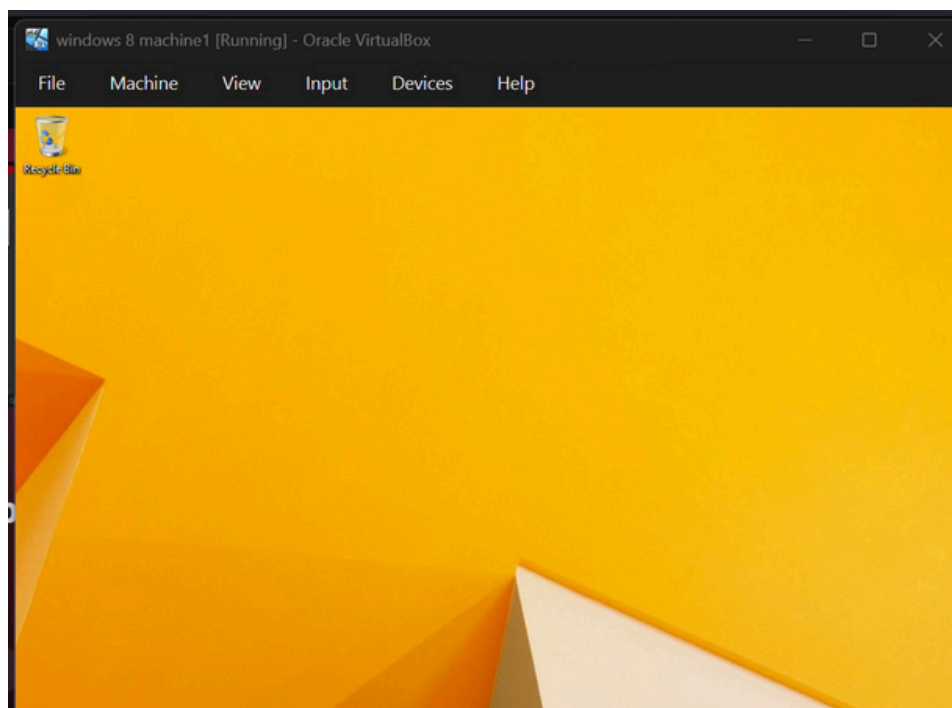


Preparing the machine configuration



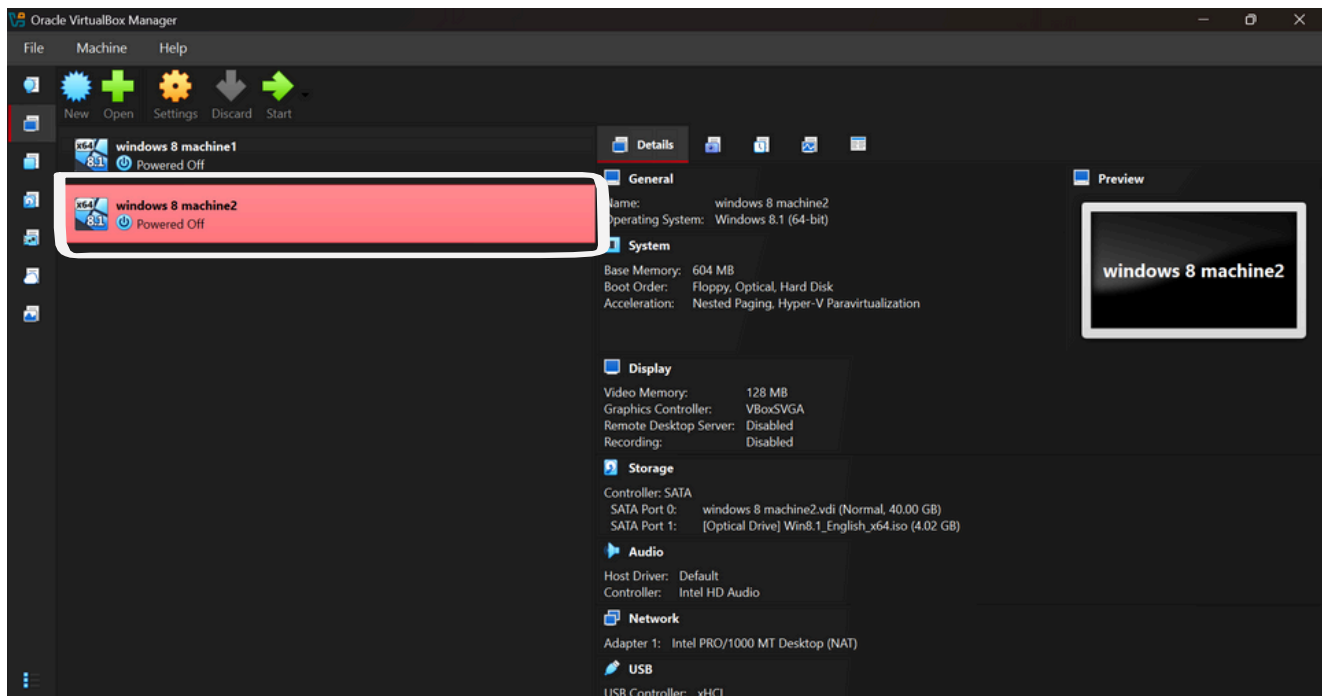
Signing in my gmail account and also going through the installation using all the default options.

Then click finish to make it run successfully.

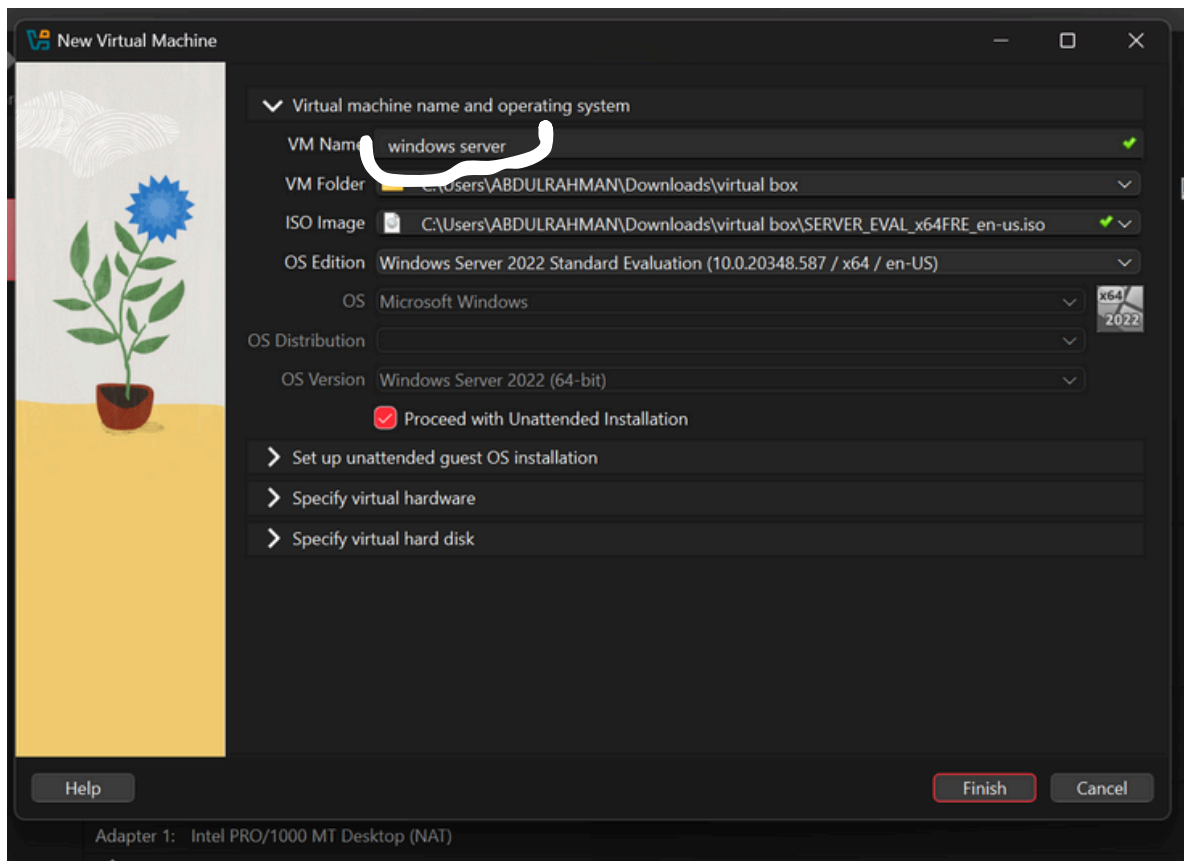
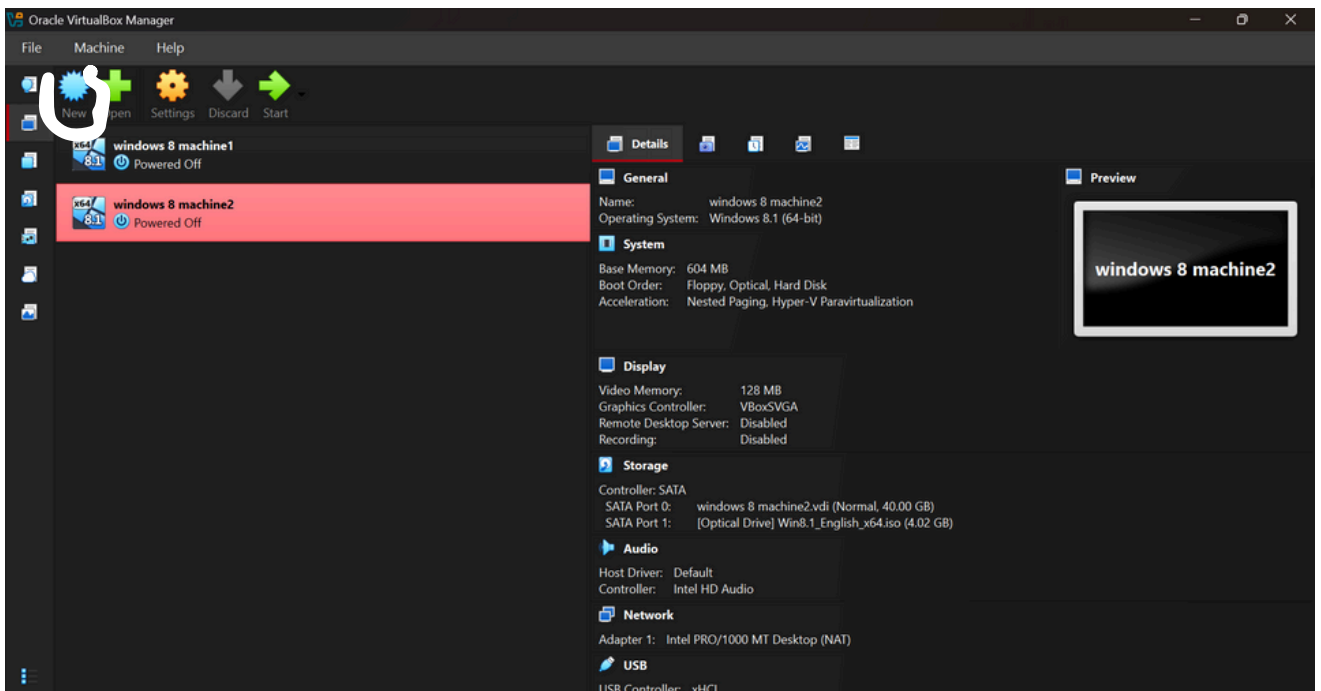


Now the windows 8 machine is successfully running virtually

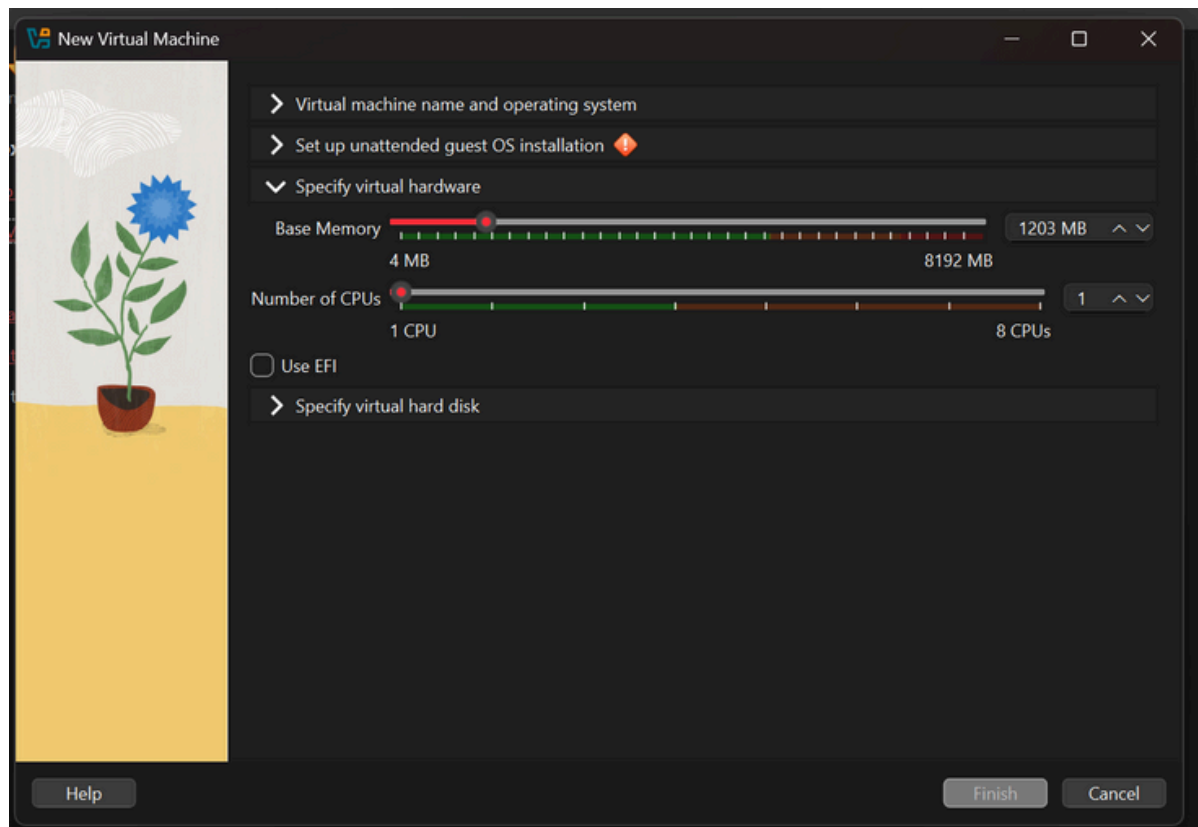
I reciprocate same steps i took earlier to create another windows 8 machine which gives me what i have below



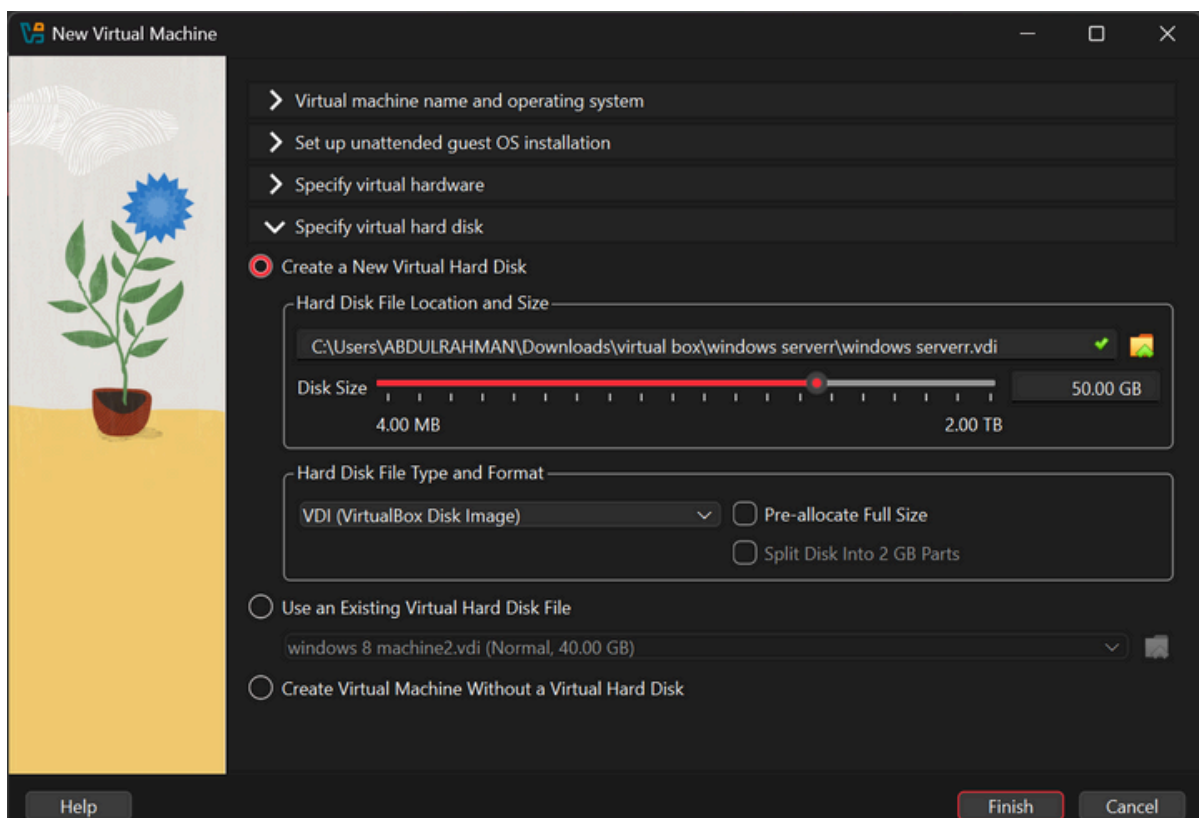
After this the next machine to mount now is the windows server which is the windows server 2022 and did this by clicking on new from the virtualbox interface to create a new machine



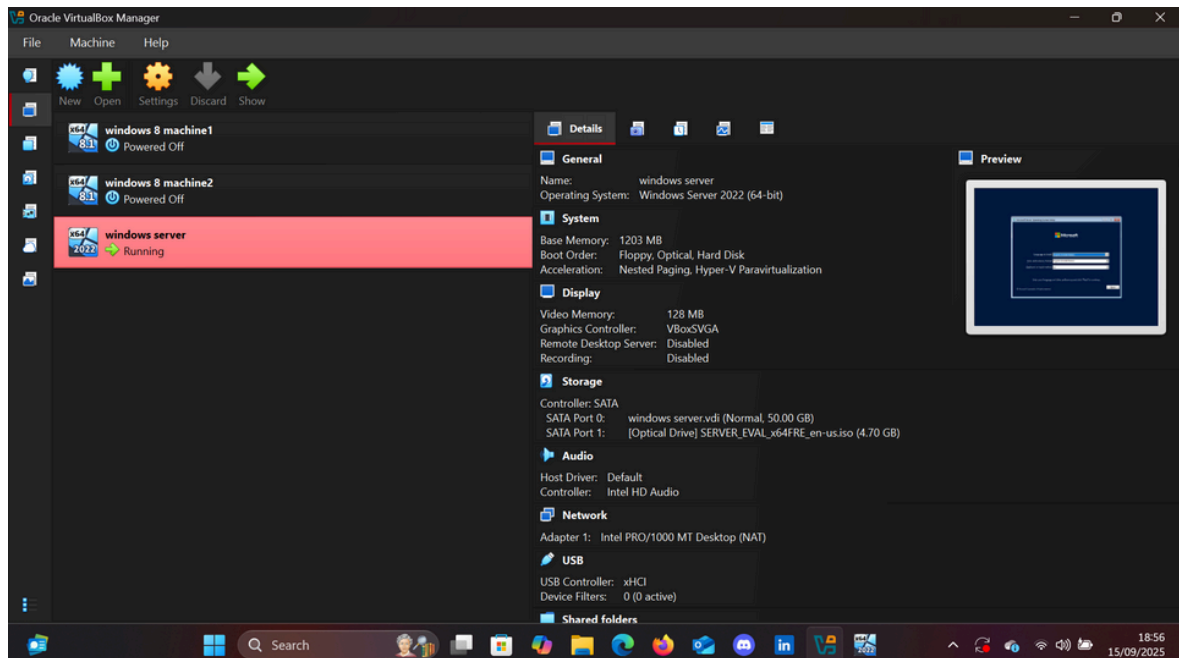
setting up the new machine i want to mount which
is the windows server naming it windows server
also



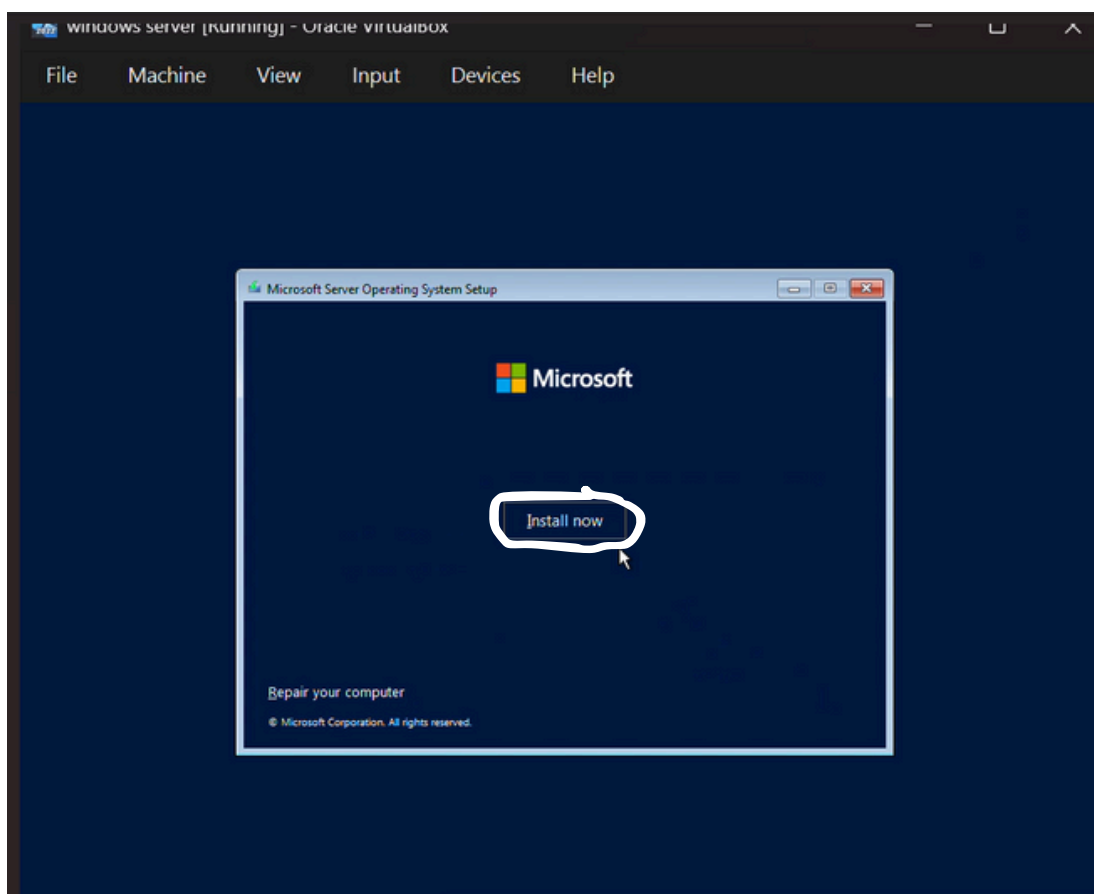
setting a base memory for machine and
also assigning a processor which is the
CPU



The next thing is to assign virtual hard disk for the machine assigning 50gb from 2tb is not a bad idea after this i click on finish to mount the machine which is the windows server

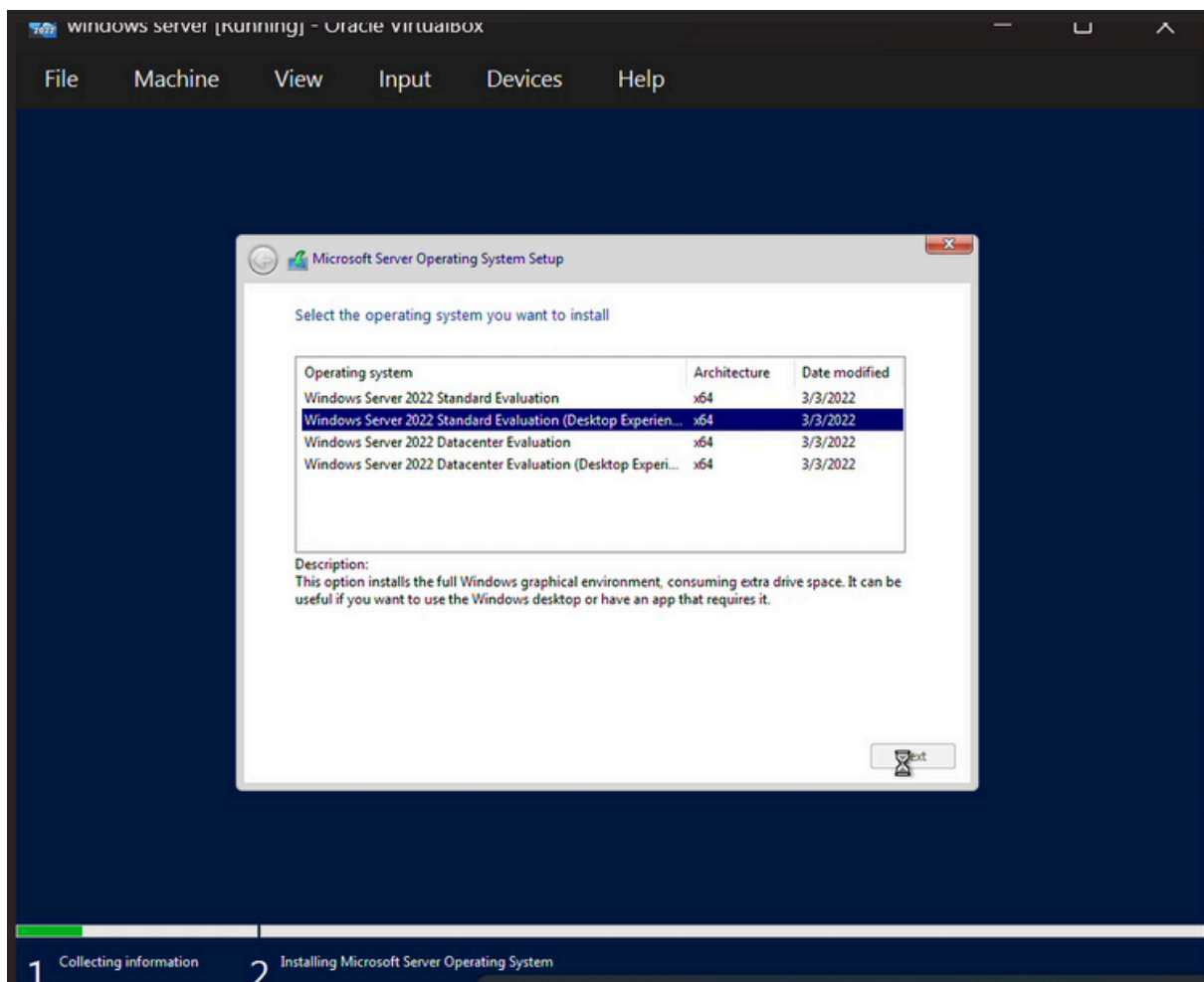


Now the windows server machine is successfully mounted the next thing is the configuration

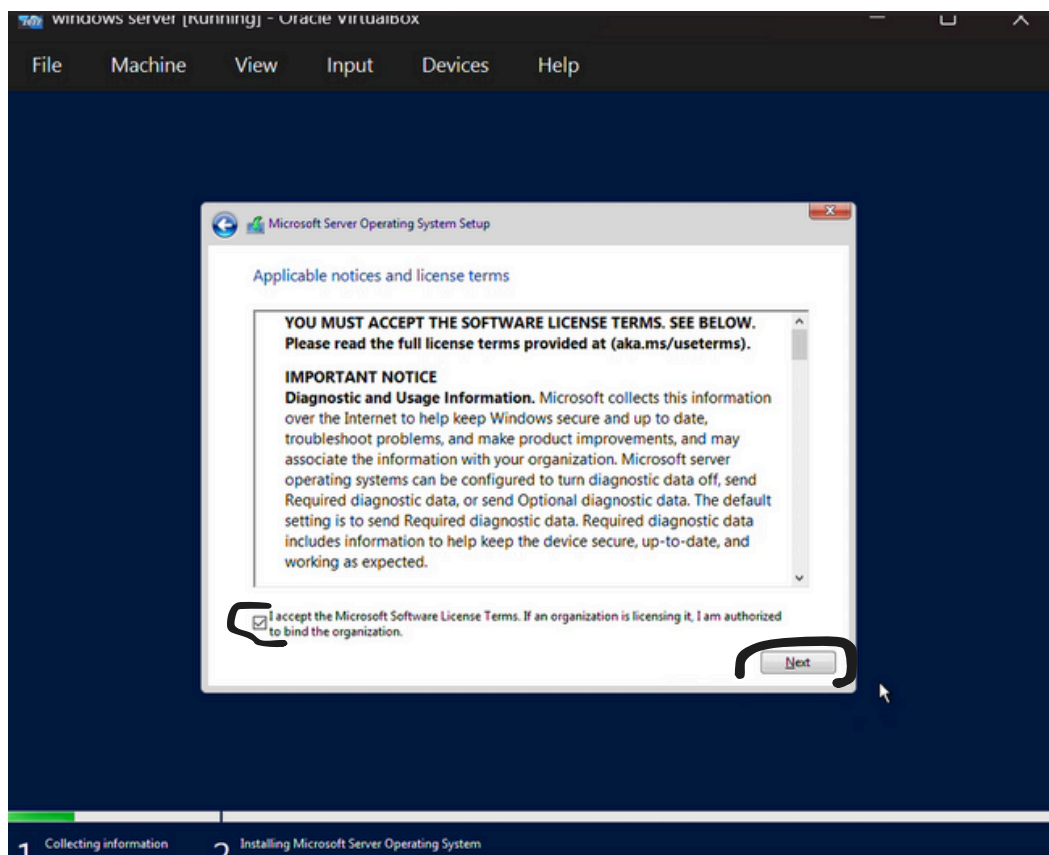


This is the first step for configuration i clicked on install now

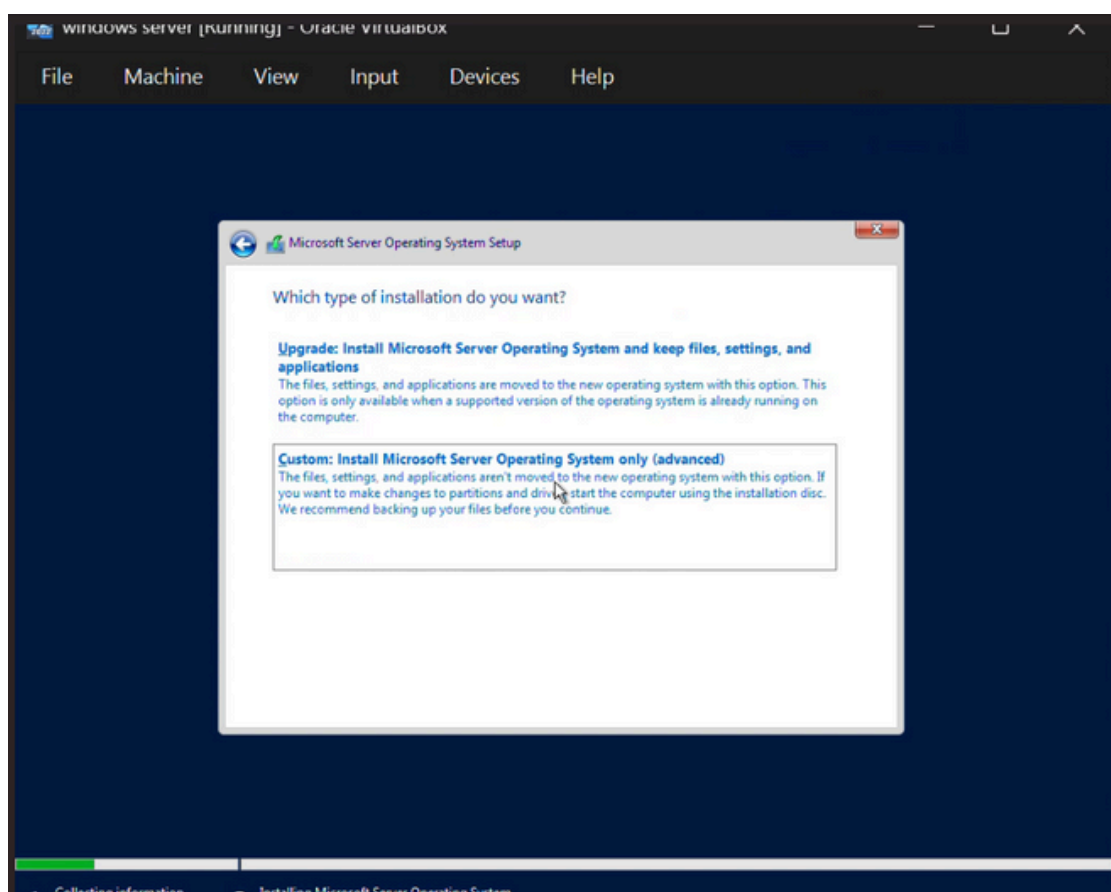
After clicking on install now i would move to next step below



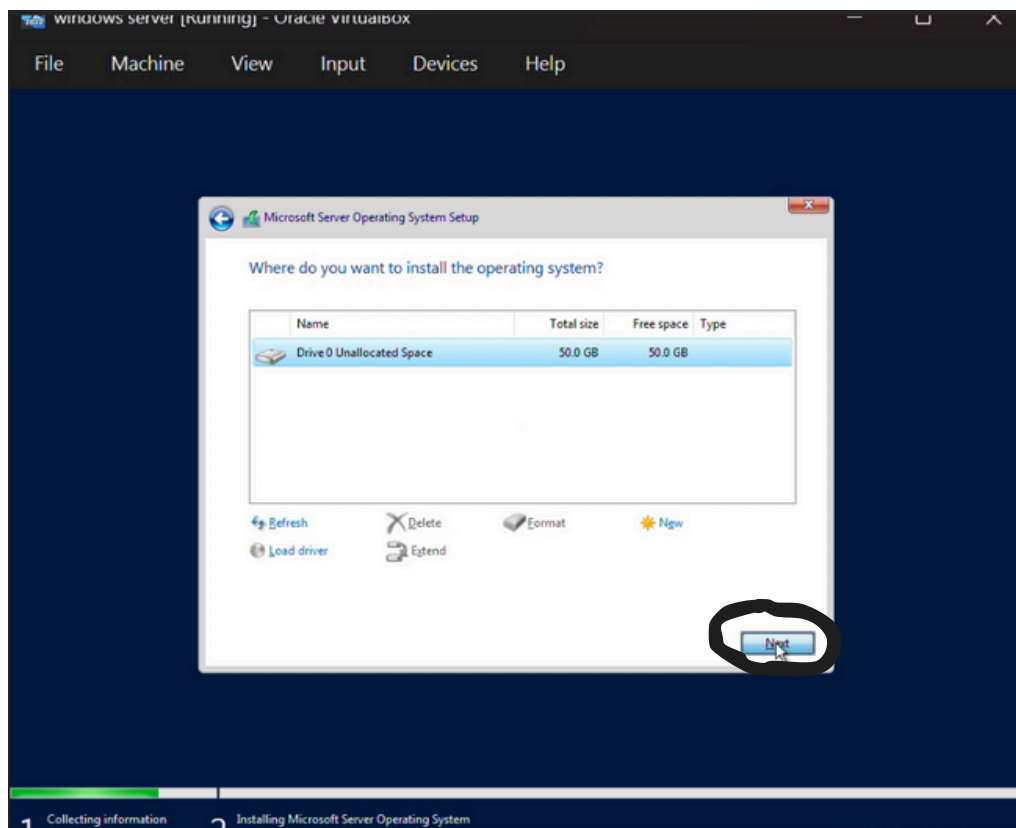
Here i clicked on windows server 2022 standard evaluation[desktop experience] x64 then move to the next step below



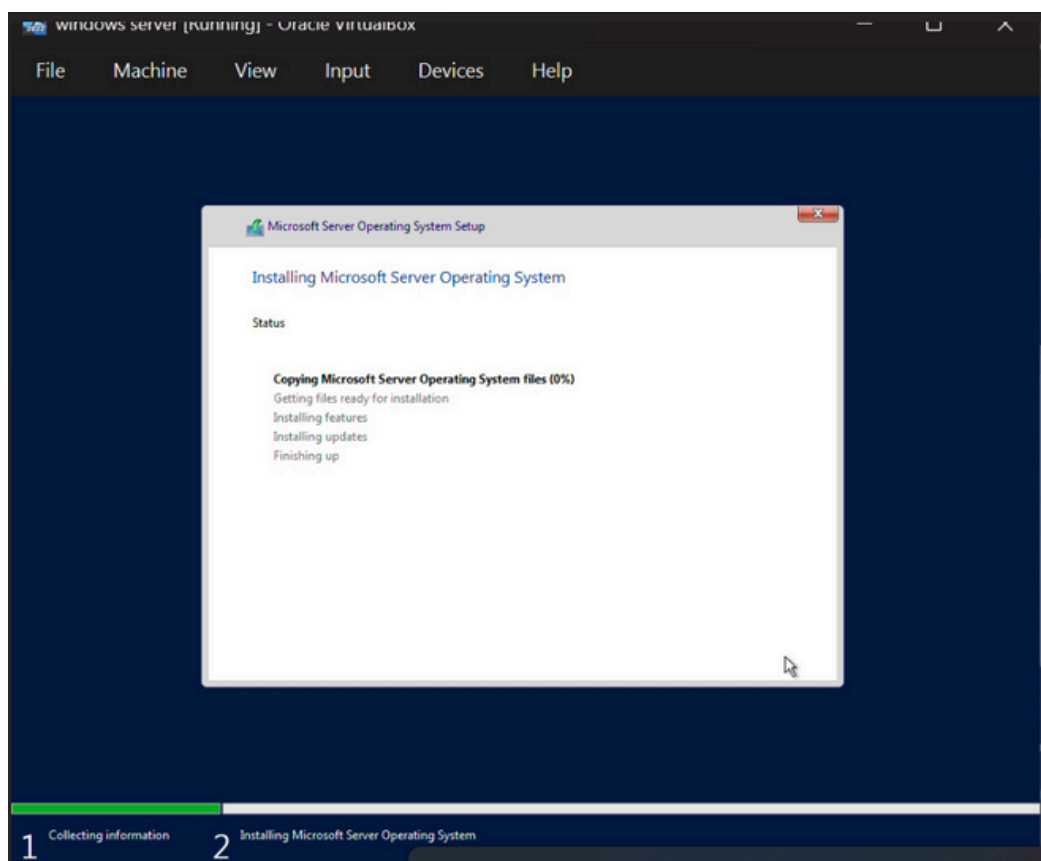
Read and accept the terms and conditions here
then click on next to move to the next step of
configuration



choose custom installation here then move to the next step



click on next here then move to the final step



Now that the final stage to make my windows server machine running successfully the installation took few minute after the complete installation the windows server vurtual machine start running successfully



Now the windows server virtual machine is fully functioning

In conclusion

This project successfully demonstrated the setup and configuration of a virtual home lab using Oracle VirtualBox, featuring two Windows 8 client machines and one Windows Server. Through this lab, we explored key concepts in virtualization

The virtual home lab project was a resounding success, providing hands-on experience with virtualization and system management. The use of Oracle VirtualBox proved to be an effective solution for creating a flexible and isolated environment for testing and learning.

This project highlighted the importance of virtualization in modern IT infrastructure and demonstrated the potential for virtual labs to support education and professional development. The insights gained from this project will be useful for future projects and career opportunities in IT and cybersecurity.