

VIRTUALIZATION ESSENTIALS (CSD5002)

Lab Record

Fall Semester 2023-24

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Experiment-1

Installing Operating System in VMware Workstation Pro17

***For this we will be installing OS as Ubuntu (link)**

Step 1: Download the VMware Workstation Pro 17 from these links

For Windows: <https://www.vmware.com/go/getworkstation-win>

For Linux: <https://www.vmware.com/go/getworkstation-linux>



Step 2: Download the iso image of Ubuntu from the official website.

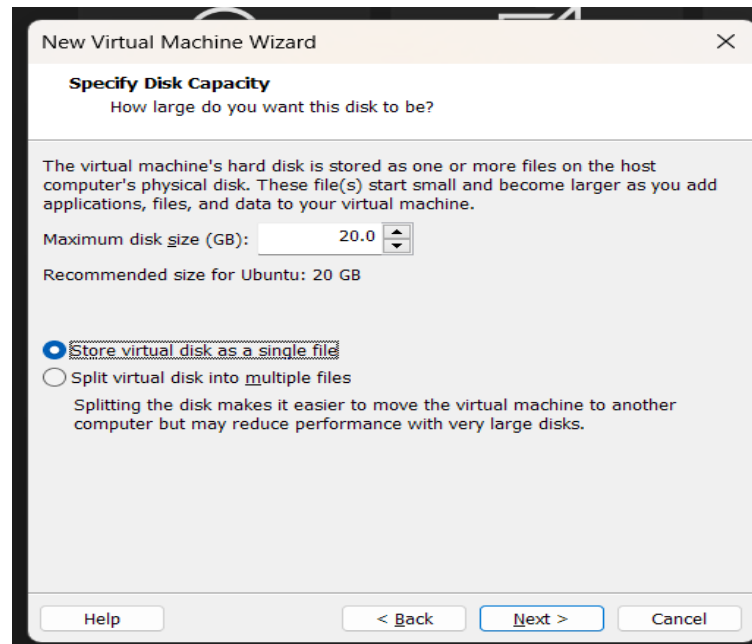
Step 3: Click on the “Create a New Virtual Machine” as shown in and choose the recommended settings.



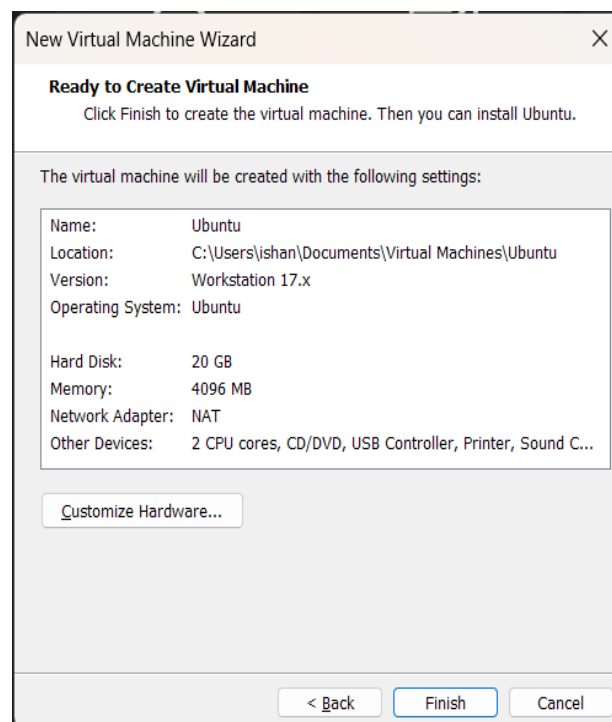
Step 4: Browse the disc image and select the image from the respective location.



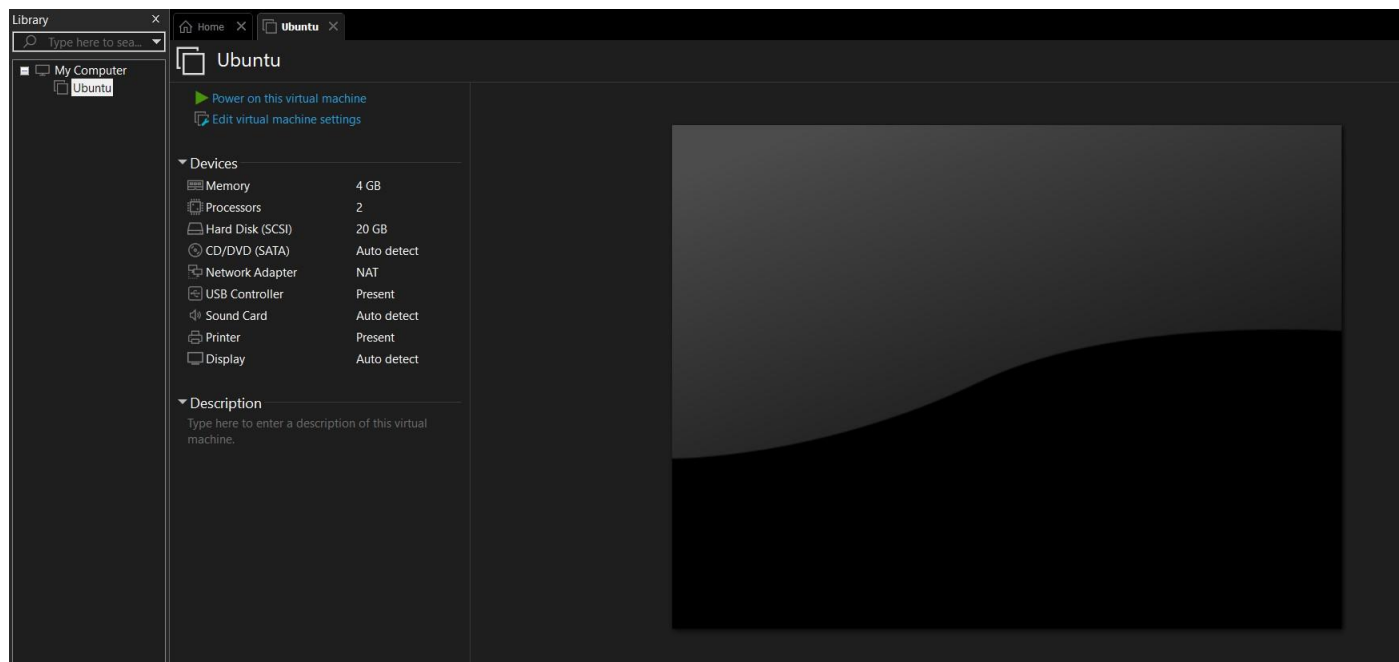
Step 5: Set the configuration. Choose the disk size, and other memory configurations.



After setting up the configurations, check once and select finish.



The ubuntu environment is ready and we can start the machine.



Experiment-2

Installing Operating System (OS) in Hyper-V Operating System Install In Hyper-V

For this we will be installing OS as Ubuntu (link)

Step 1: Enable Hyper V from windows feature as highlighted in *Figure 1*

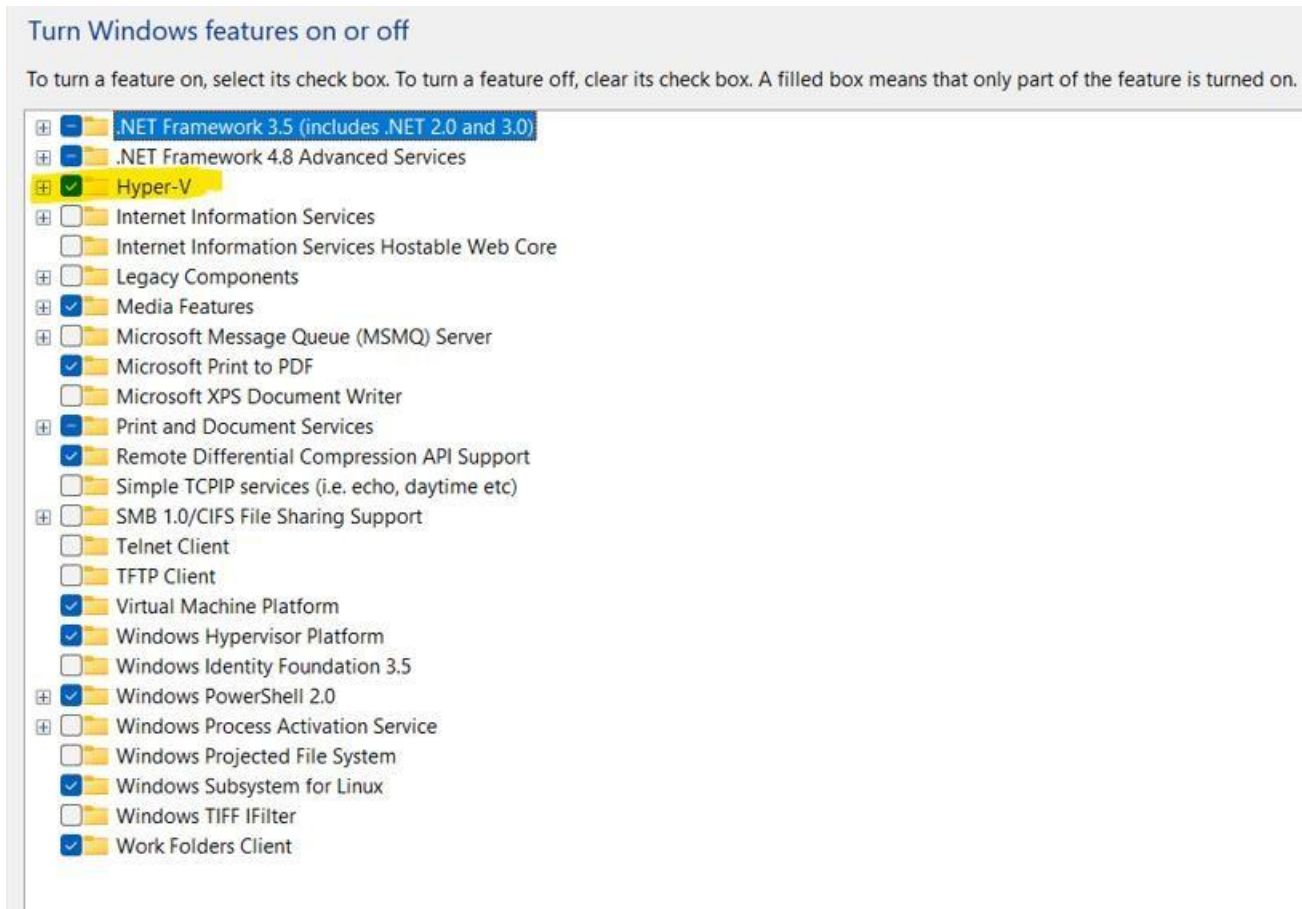


Figure 1: Windows Feature

Step 2: Click on Quick create and choose the location of the iso file to install the OS shown in *Figure 2*

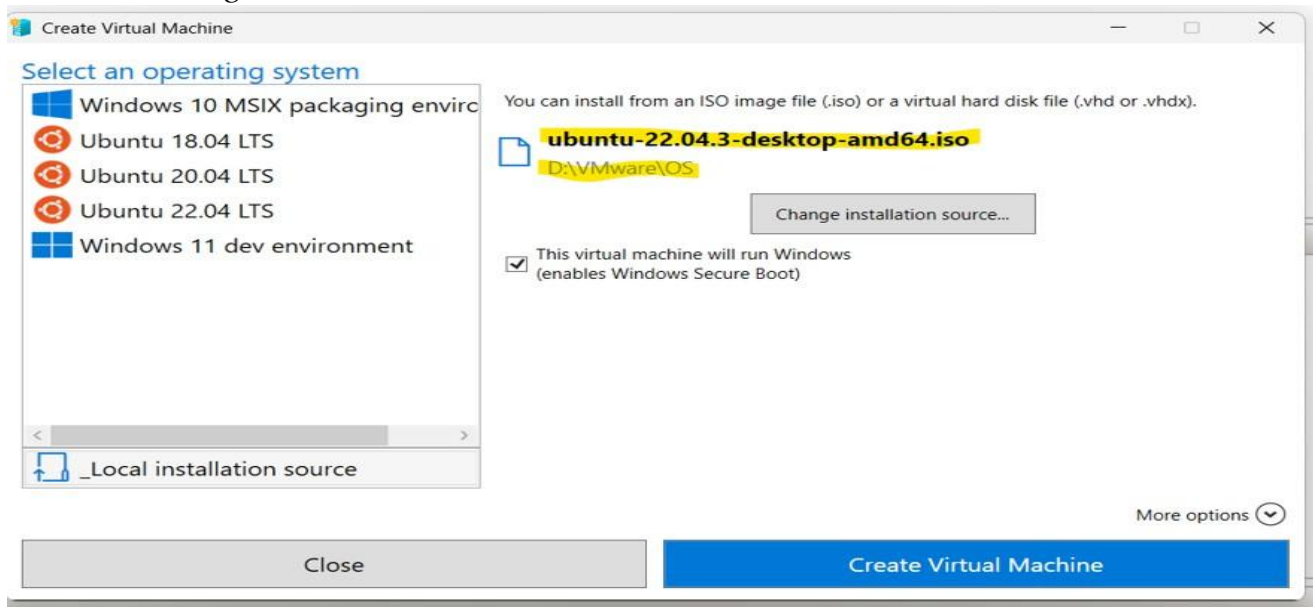


Figure 2: Selecting the iso file

Step 3: It will take its own time to do the boot up sequence while starting up it looks like shown in Figure 3

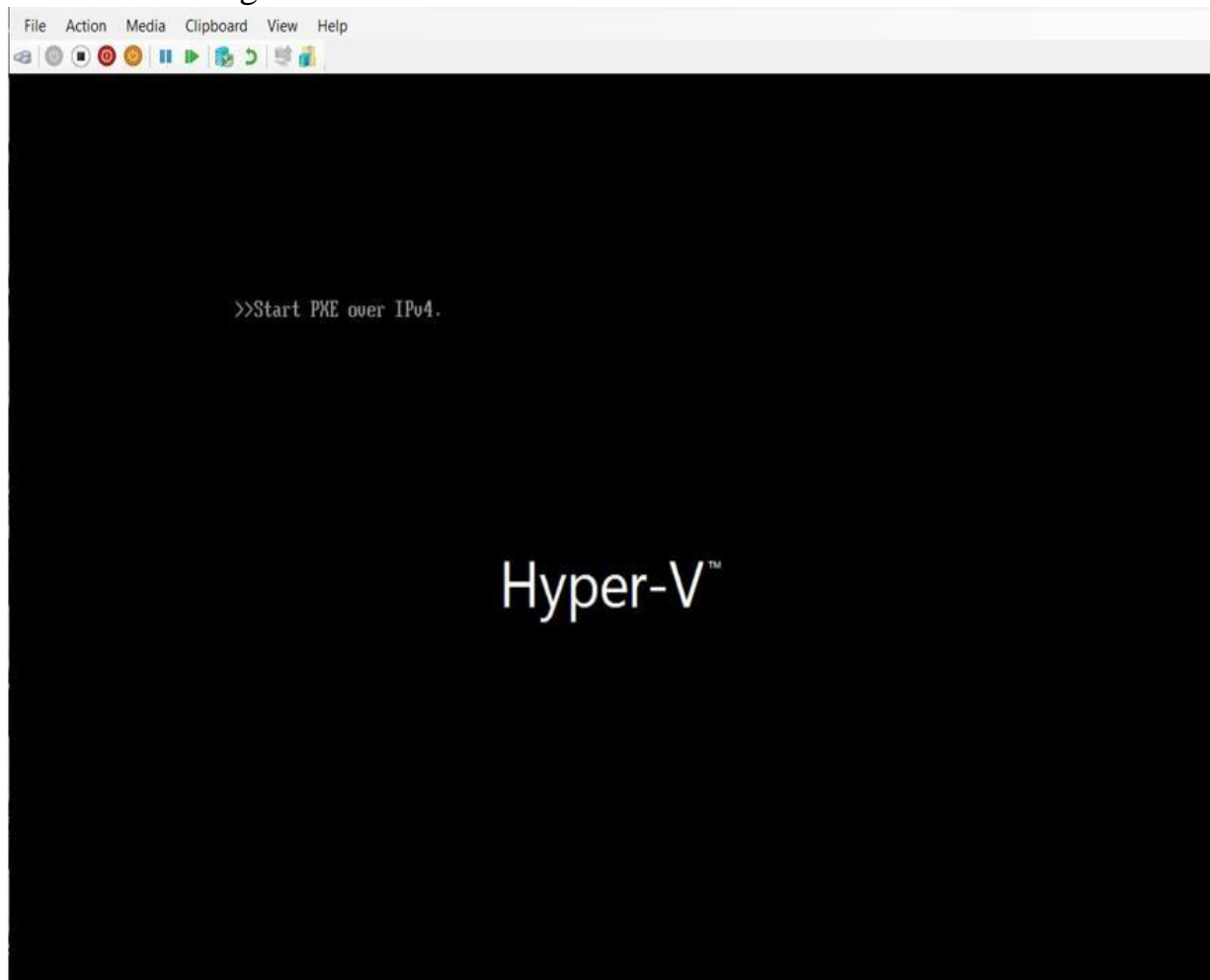


Figure 3: Initial boot up of the Ubuntu in Hyper-V

Step 4: Click on the Install Ubuntu as shown in

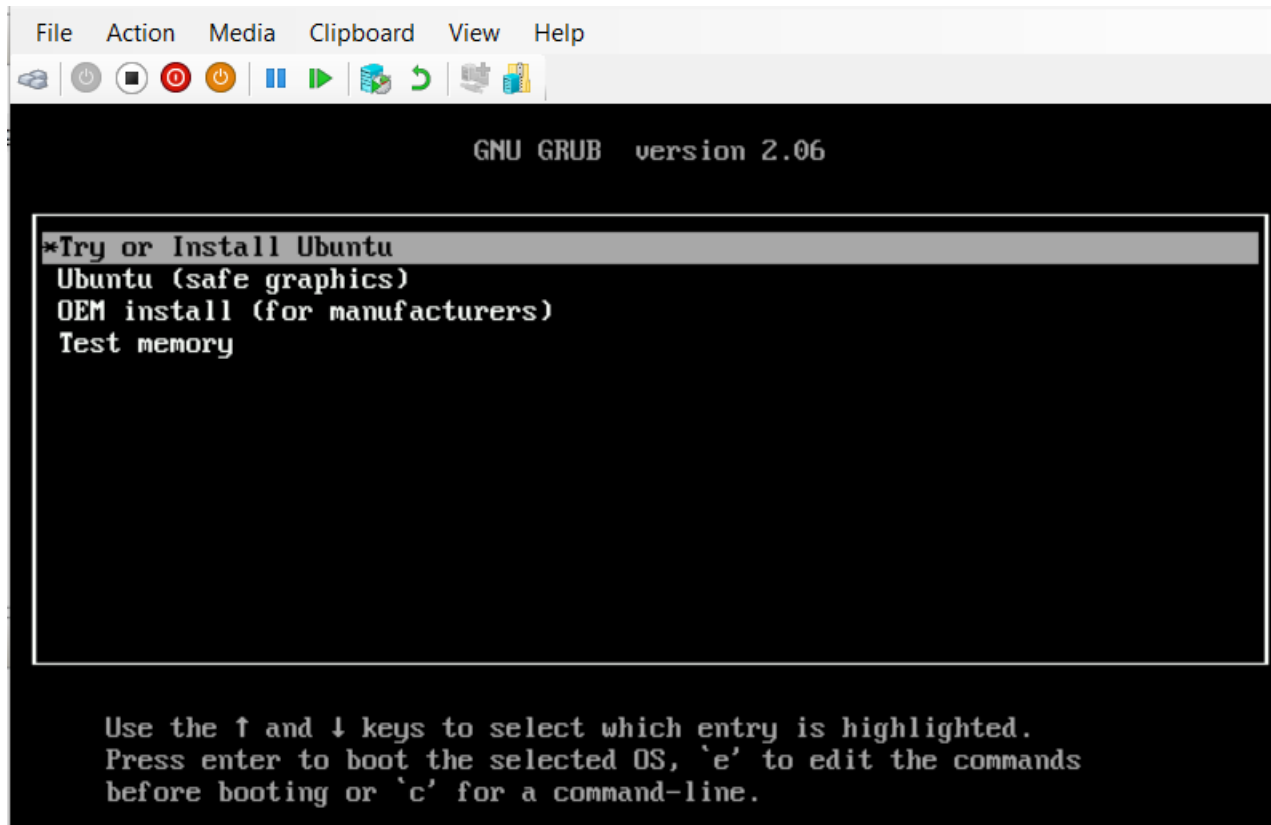


Figure 4: Install ubuntu

Step 5: Select the Keyboard Layout according to your choice as shown in **Figure 5**

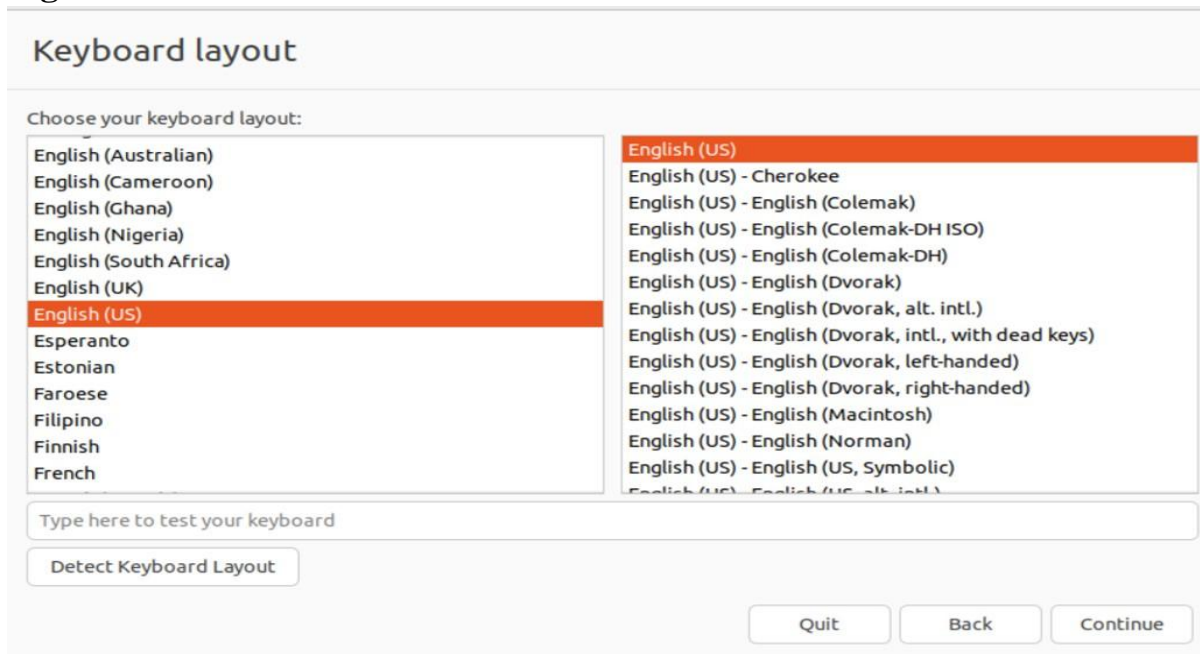
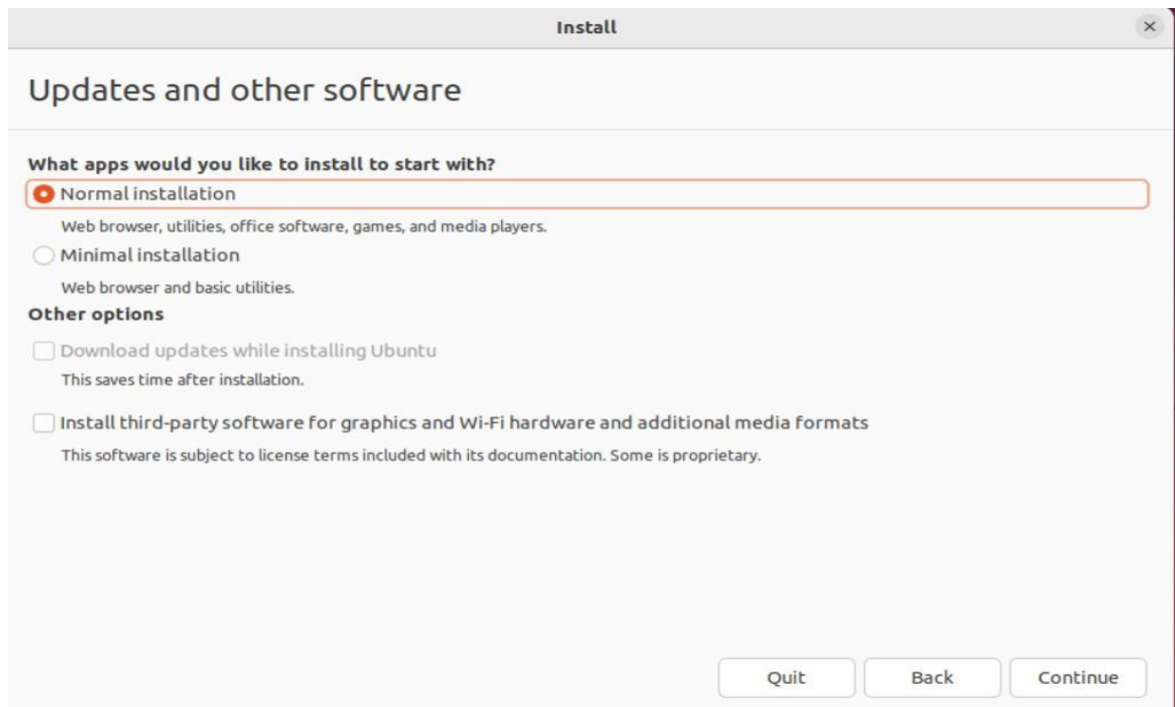


Figure 5: Keyboard Layout

Step 6: Click on normal boot option



Step 7: Selecting the time zone



Figure 7: Selecting Time Zone

Step 8: Setup your user and password, your computer name in the prompt.

Step 9: Wait until the installation is complete.

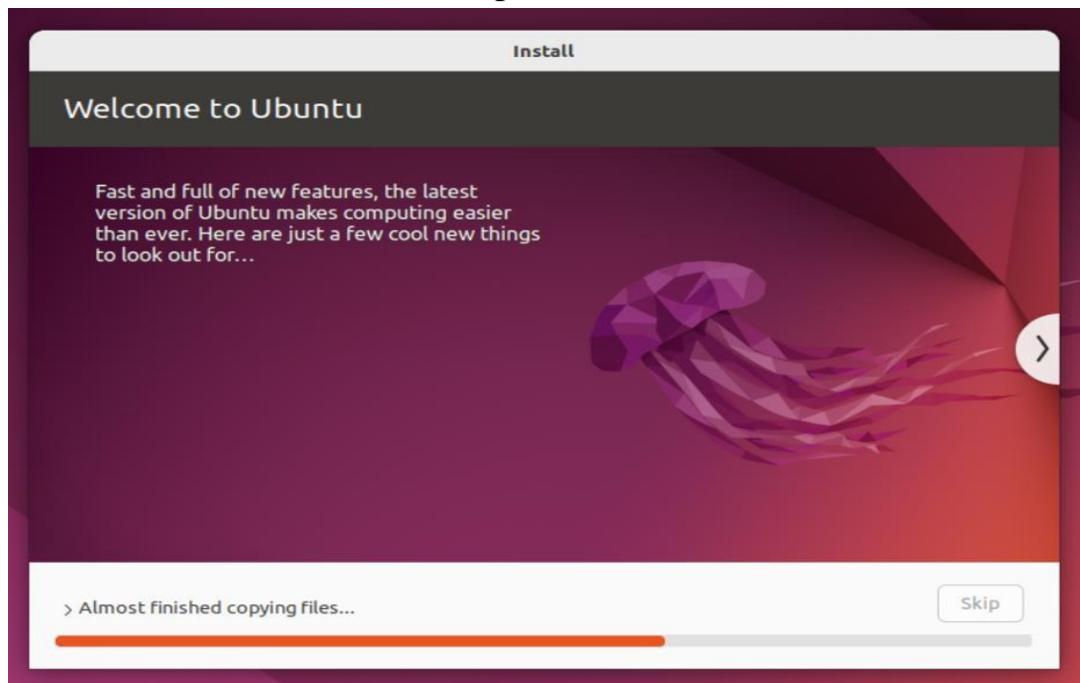


Figure 9: Completing Installation

Step 10: Restart after the installation as prompt in Figure 10

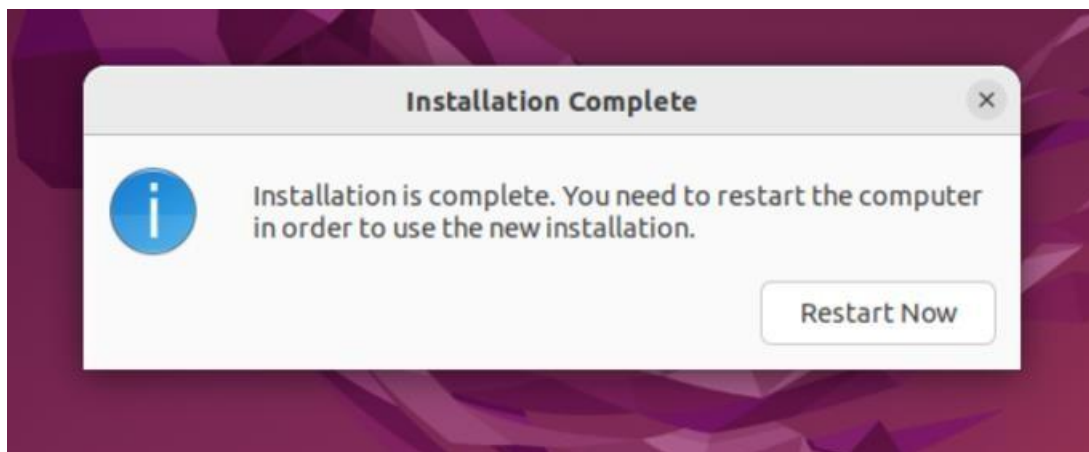


Figure 10: Restart prompt on screen

Step 11: Installation is complete and your screen will look like as shown in Figure 11

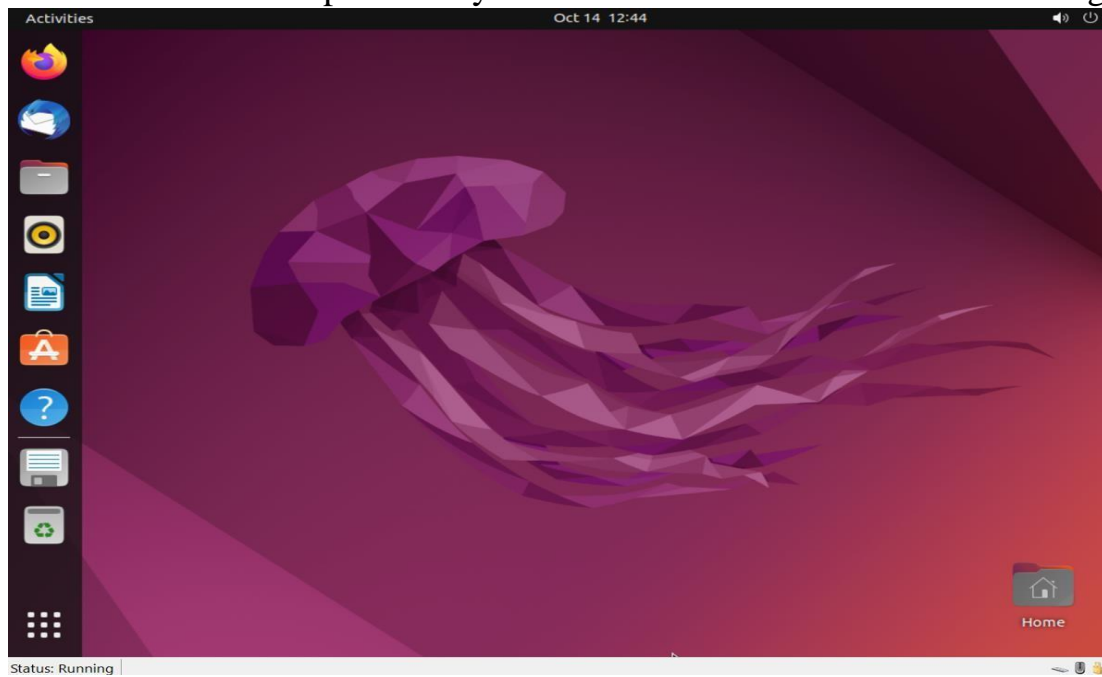


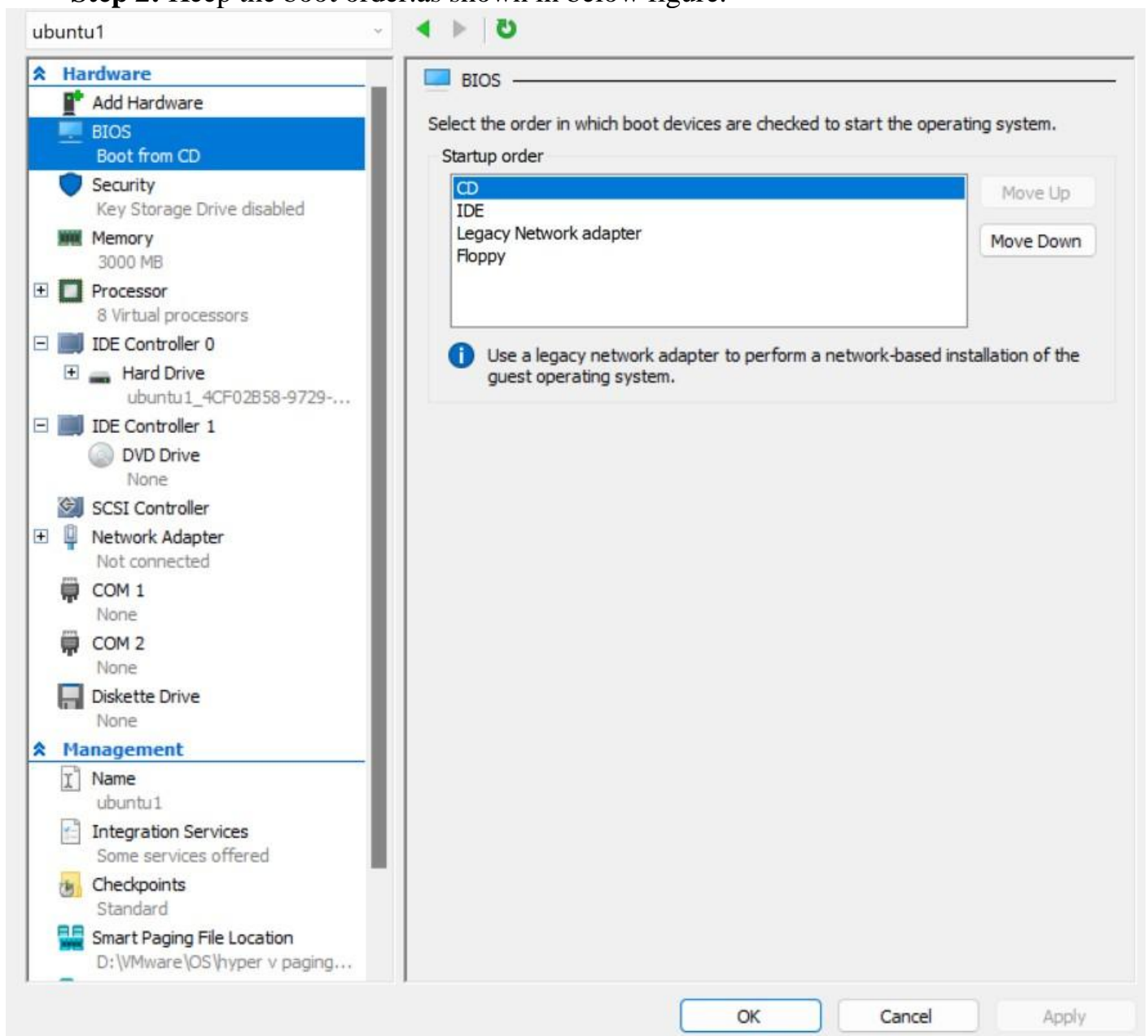
Figure 11: Installation Complete

Experiment-3

Configuration of the Virtual Machine in Hyper-V

Step 1: Click on the virtual machine to configure it correctly and then on “Setting” option from right panel

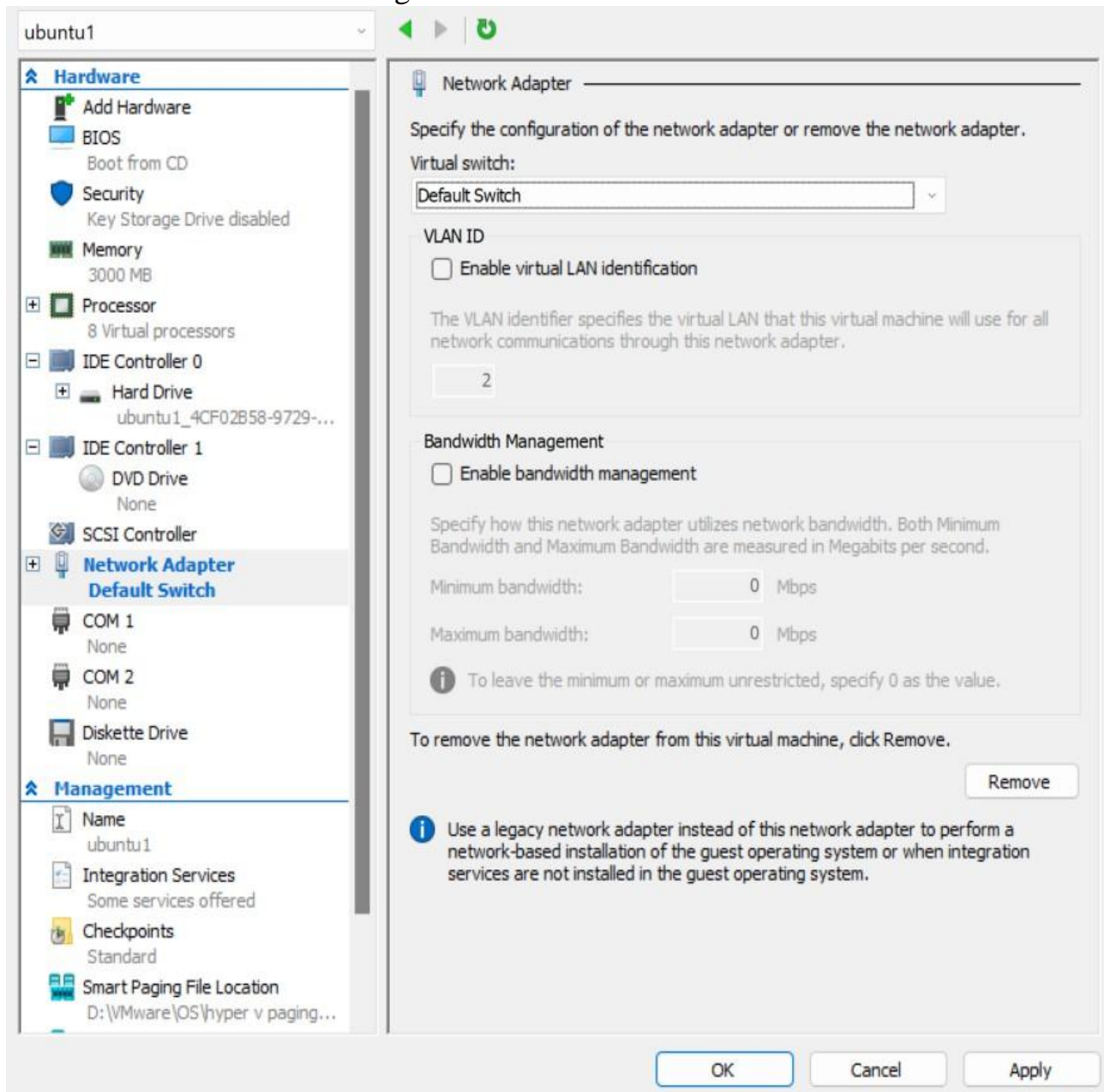
Step 2: Keep the boot order.as shown in below figure.



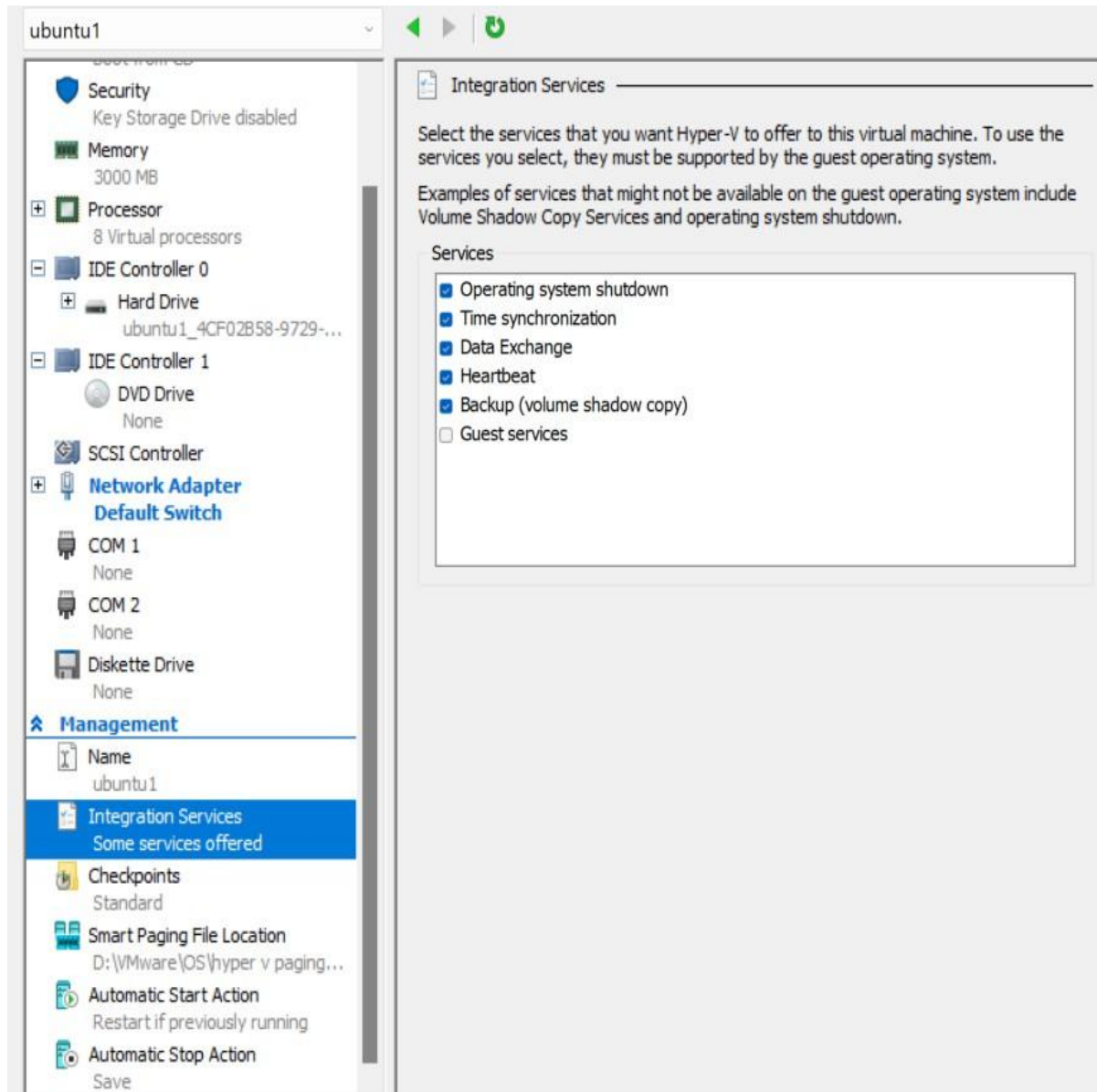
Step 3: Set the number of virtual Processor based on your need 4 (recommend).

The screenshot displays the VMware Workstation interface for a virtual machine named 'ubuntu1'. The left sidebar shows the 'Hardware' tab with a tree view containing: Add Hardware, BIOS (Boot from CD), Security (Key Storage Drive disabled), Memory (3000 MB), Processor (8 Virtual processors), IDE Controller 0 (Hard Drive: ubuntu1_4CF02B58-9729-...), IDE Controller 1 (DVD Drive: None), SCSI Controller, Network Adapter (Not connected), COM 1 (None), COM 2 (None), and Diskette Drive (None). Below this is the 'Management' section with: Name (ubuntu1), Integration Services (Some services offered), Checkpoints (Standard), and Smart Paging File Location (D:\VMware\OS\hyper v paging...). The main pane on the right is titled 'Processor' and contains the following text: 'You can modify the number of virtual processors based on the number of processors on the physical computer. You can also modify other resource control settings.' Below this is a slider for 'Number of virtual processors' set to 8. A 'Resource control' section follows, with the text: 'You can use resource controls to balance resources among virtual machines.' It includes four settings: 'Virtual machine reserve (percentage): 0', 'Percent of total system resources: 0', 'Virtual machine limit (percentage): 100', and 'Percent of total system resources: 50'. At the bottom, a warning icon states: 'Hyper-V is not configured to enable processor resource controls.' with a link: '[Learn more about Hyper-V processor configuration options.](#)'

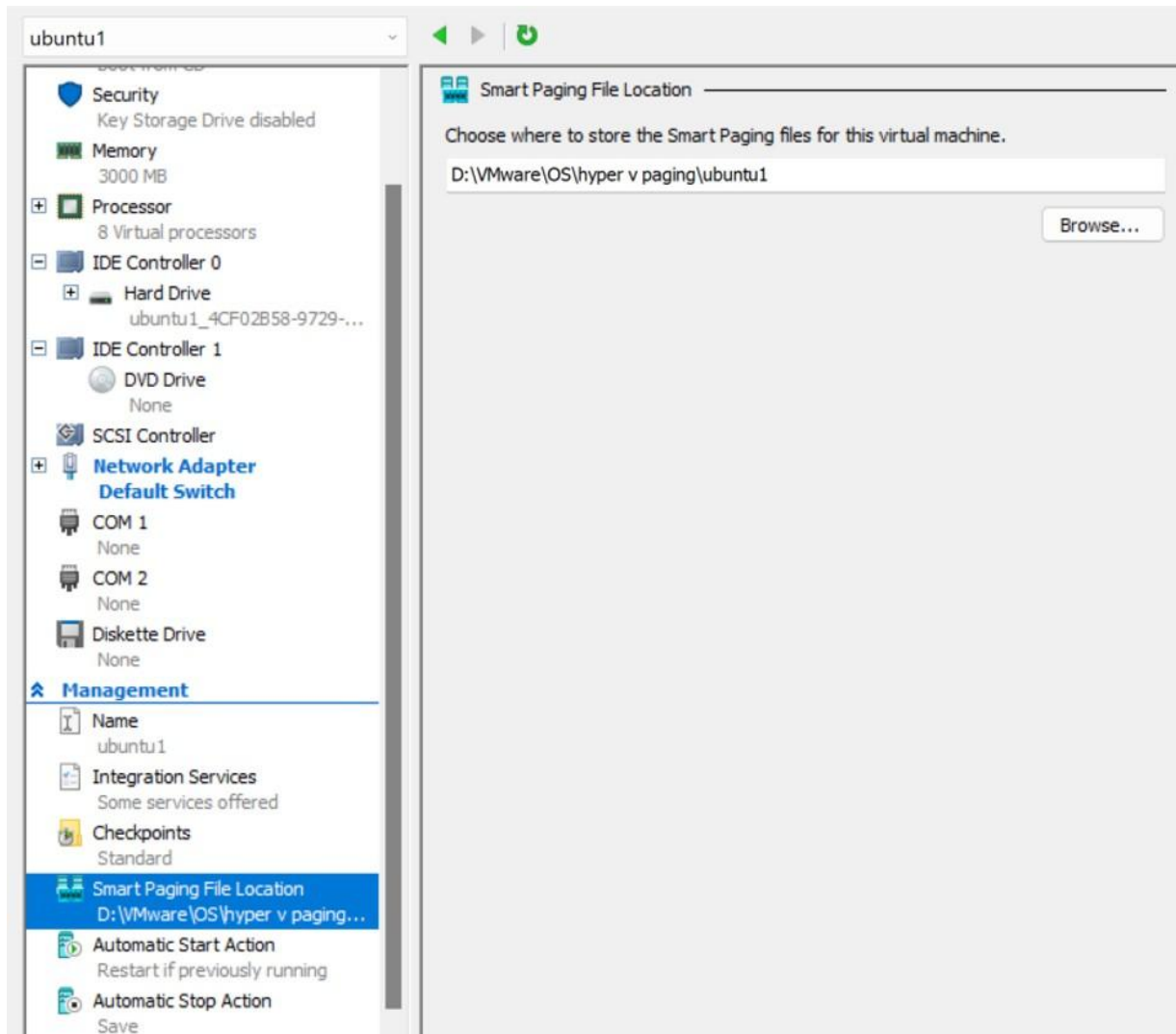
Step 4: Change “**Virtual Switch**” setting to the “**Default Switch**” by using the drop-down button as shown in below figure.



Step 5: Select the “**Integrated Services**”.as shown in below figure.



Step 6: Choose where to store the Smart Paging files for selected virtual machine



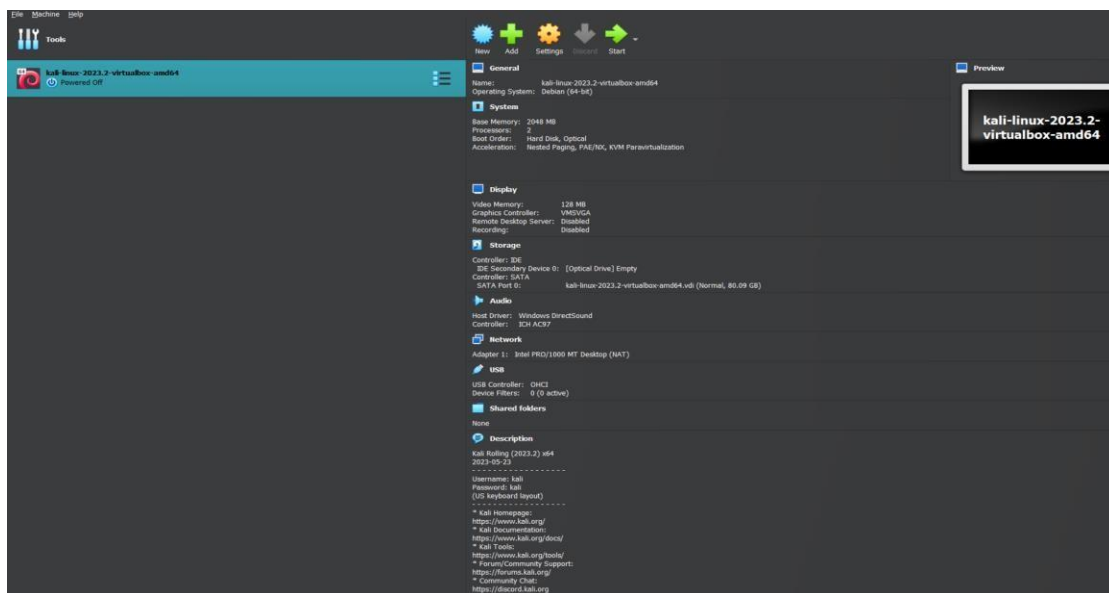
Experiment-4

Installing Operating System in Virtual Box

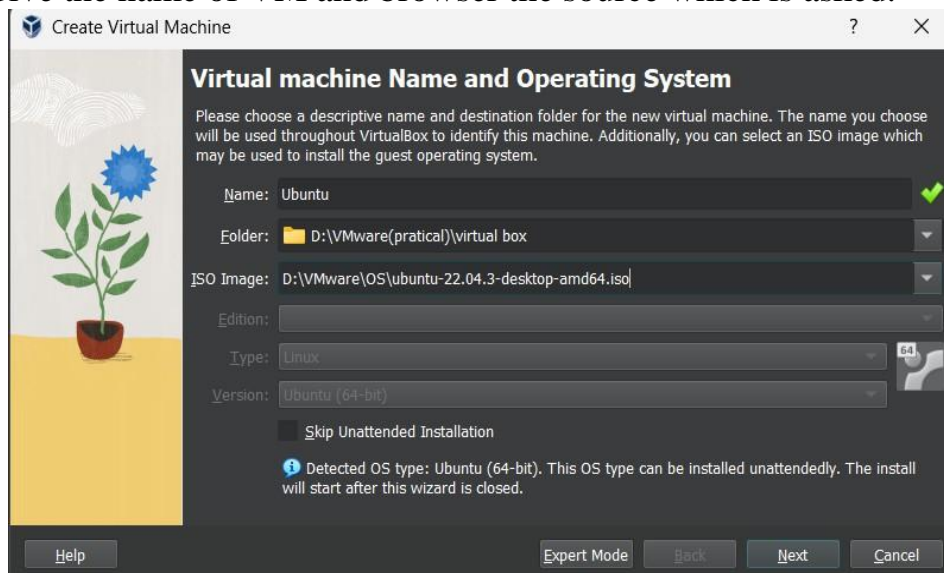
***For this we will be installing OS as Ubuntu (link)**

Step 1: Download the Virtual Box (LINK)

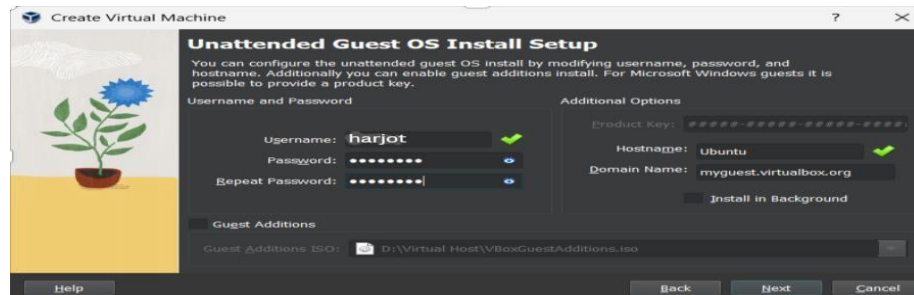
Step 2: Click on New



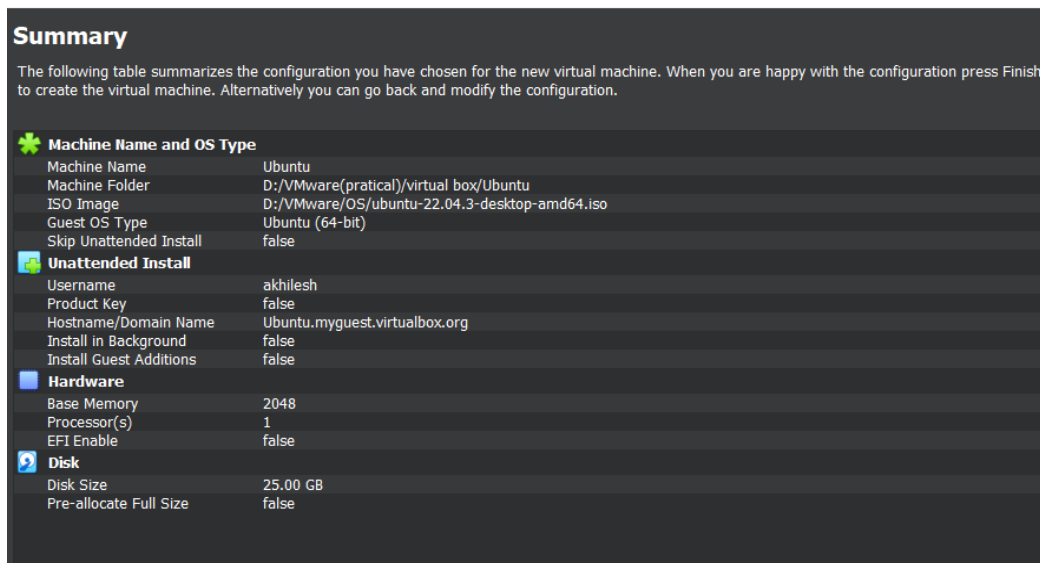
Step 3: Give the name of VM and browser the source which is asked.



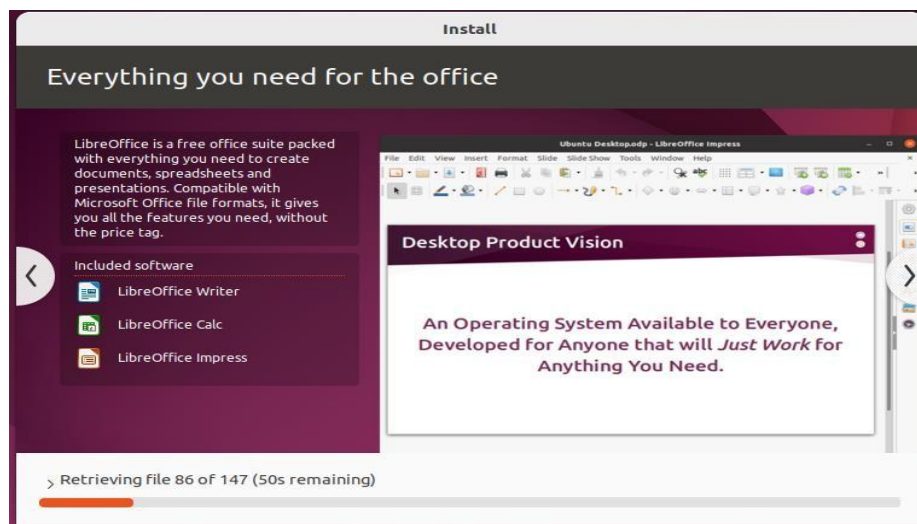
Step 4: Setup the username and password



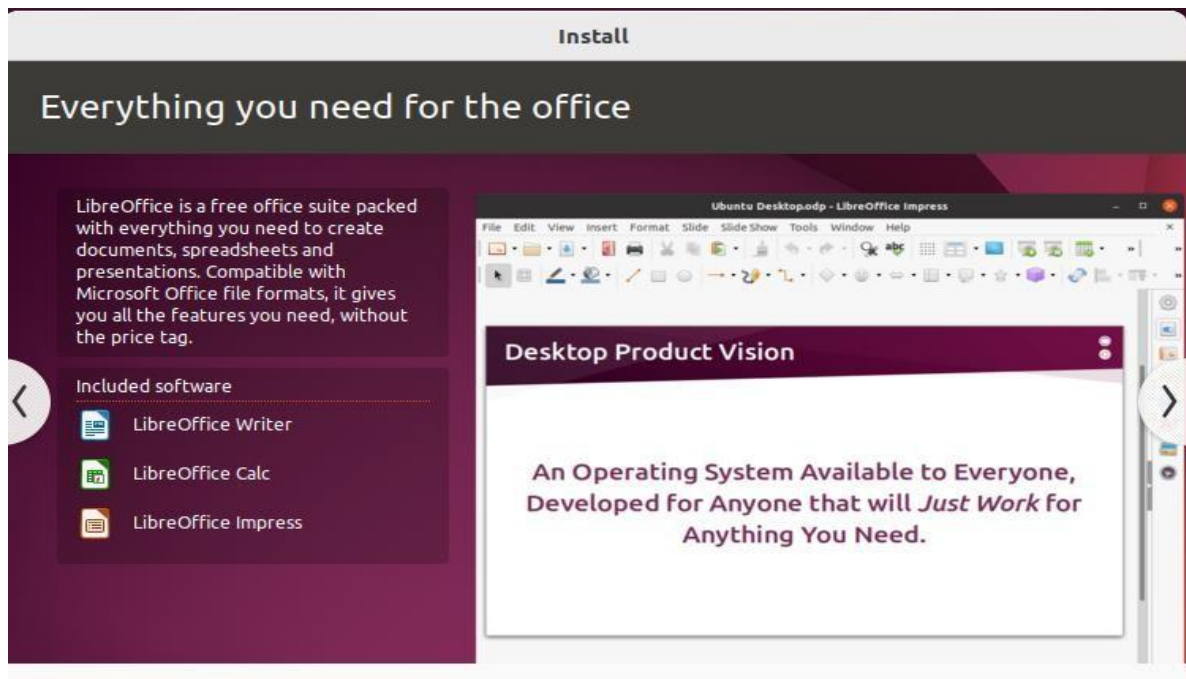
Step 5: Configure all the necessary thing which is asked and finally the summary page should look like this and then click on finish.



Step 6: Wait till the installation is finished usually it take 4 to 5 minute to finish.



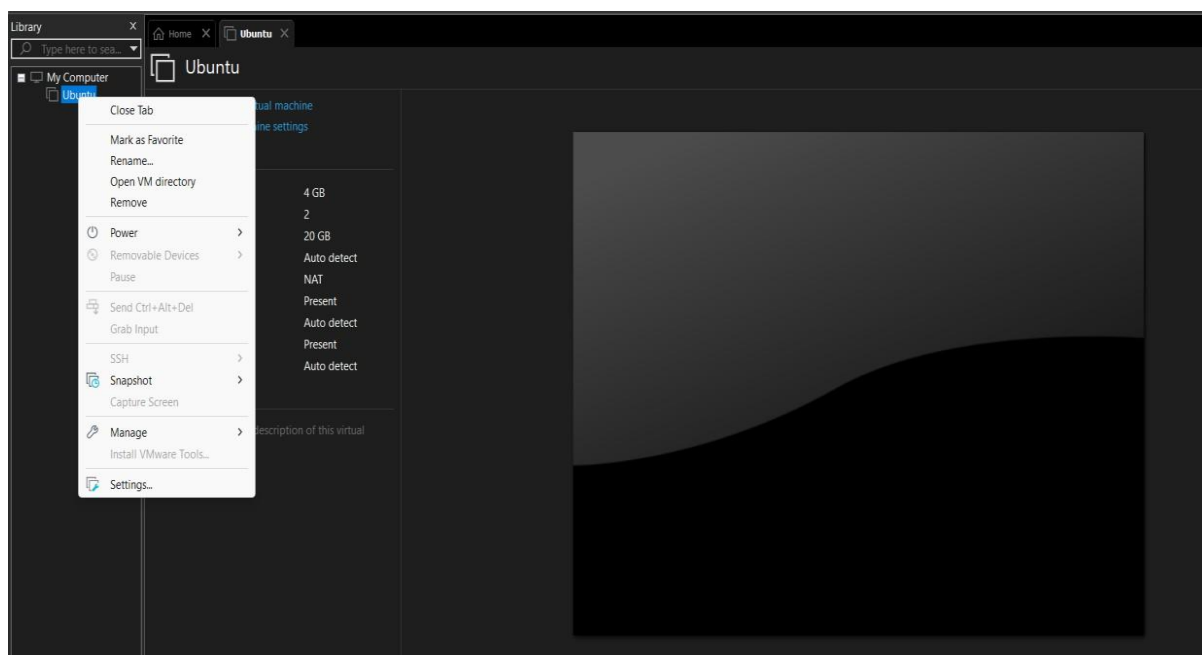
Step 7: Installation completed.



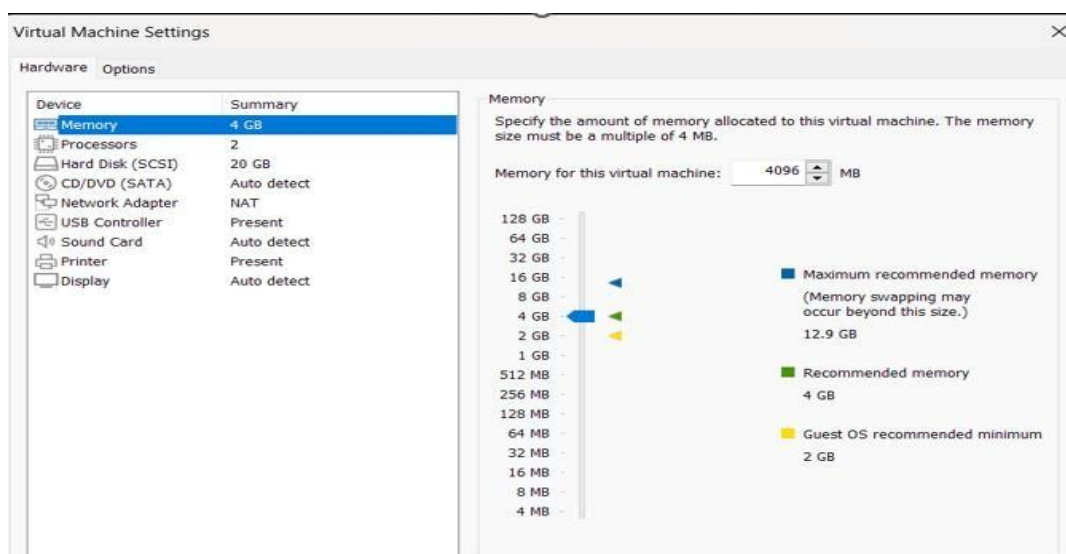
Experiment-5

Managing the Virtual Machine in VMware Workstation 17 Pro

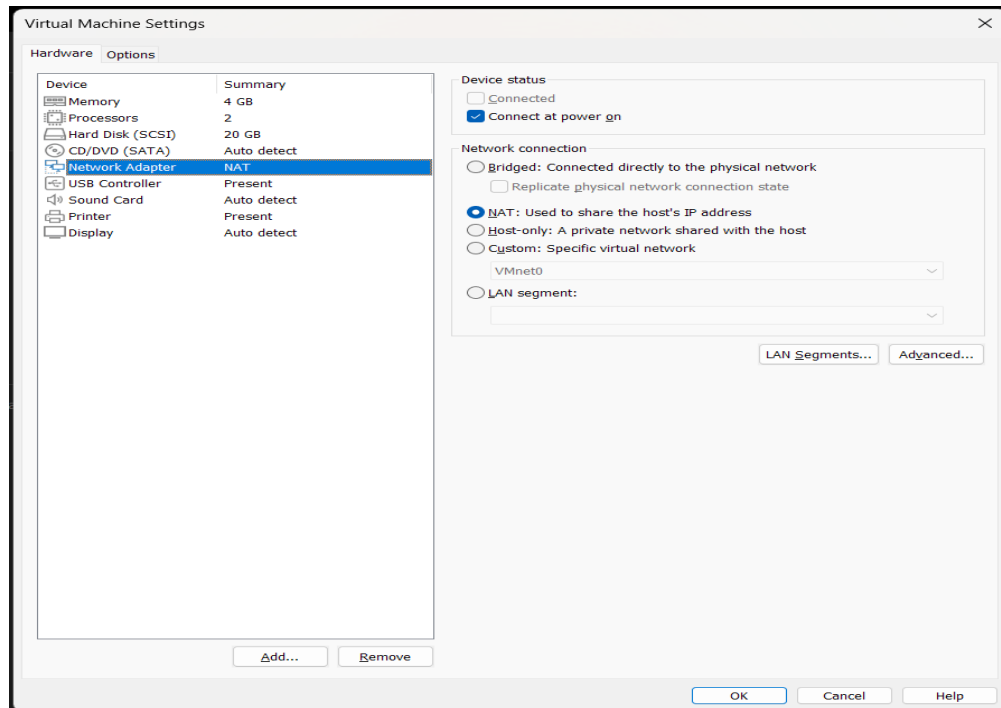
Step 1: Click on the virtual machine to configure it correctly and then on “Setting” option from right panel



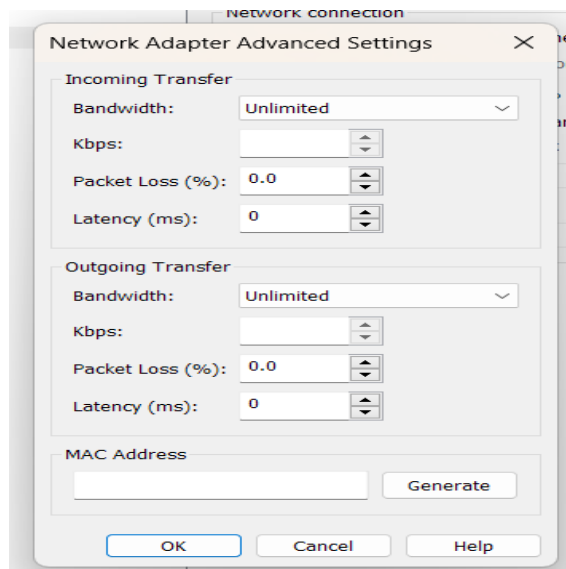
Step 2: Now you can see the various hardware configuration settings. You can configure the memory, processor and choose the hard disk, SATA and other configurations.



Step 3: Select the Network adapter and select the appropriate network configuration as per need. You can choose Bridge network to connect directly to the physical network, NAT to share the host's IP address, HOST-only for a private network or you can also set up a virtual network.

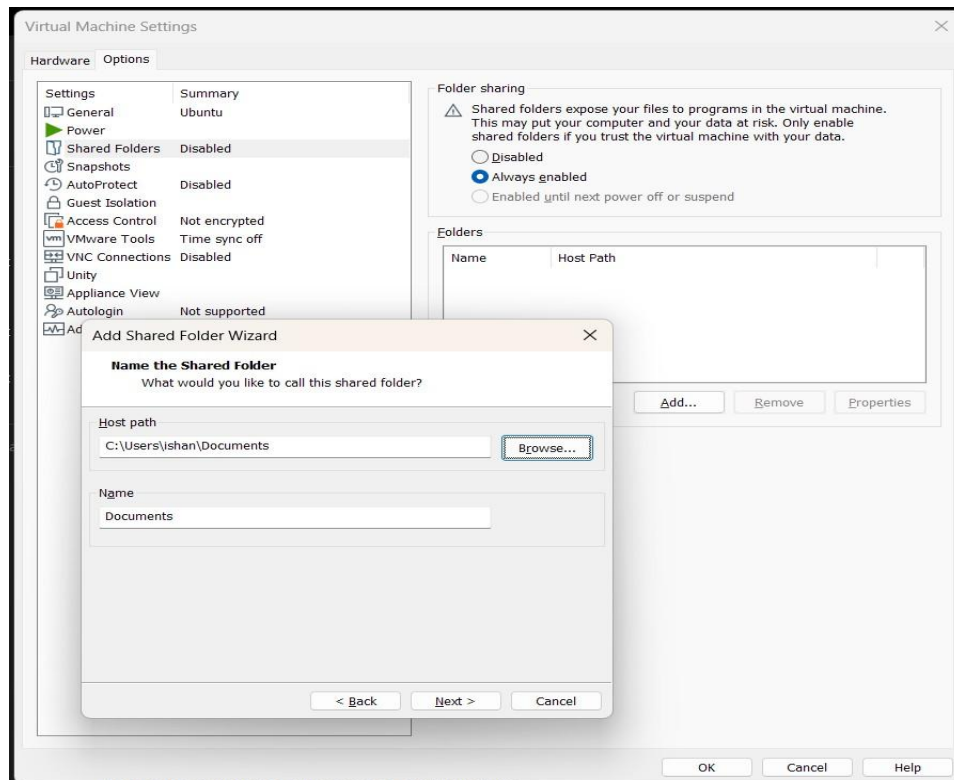


Further, in the advanced network settings you can manage the Bandwidth, packet loss, latency for incoming and outgoing traffic and other parameters.

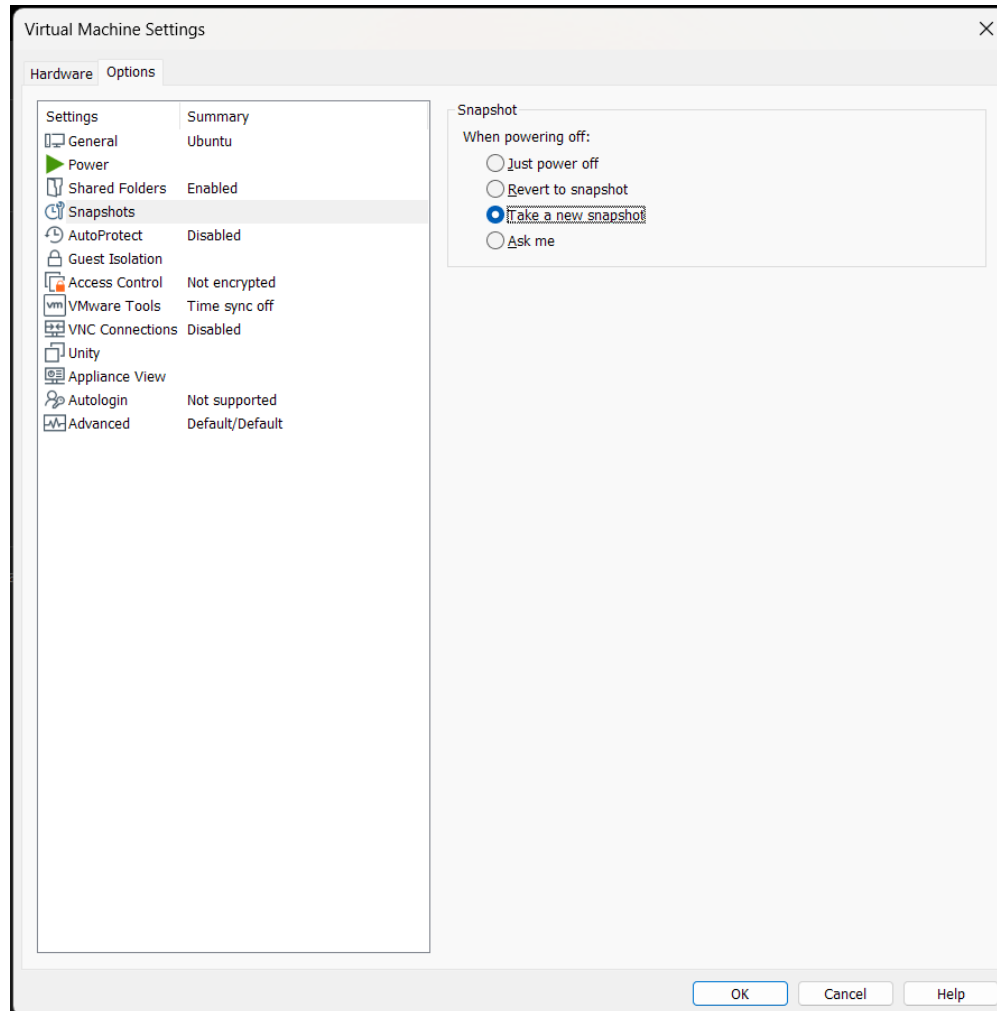


Step 4: Now, move to the options field on the left-hand side of the header. There you can explore many more settings to manage your virtual machine. Go to the shared folders if you want to share folders between the host machine and the virtual machine.

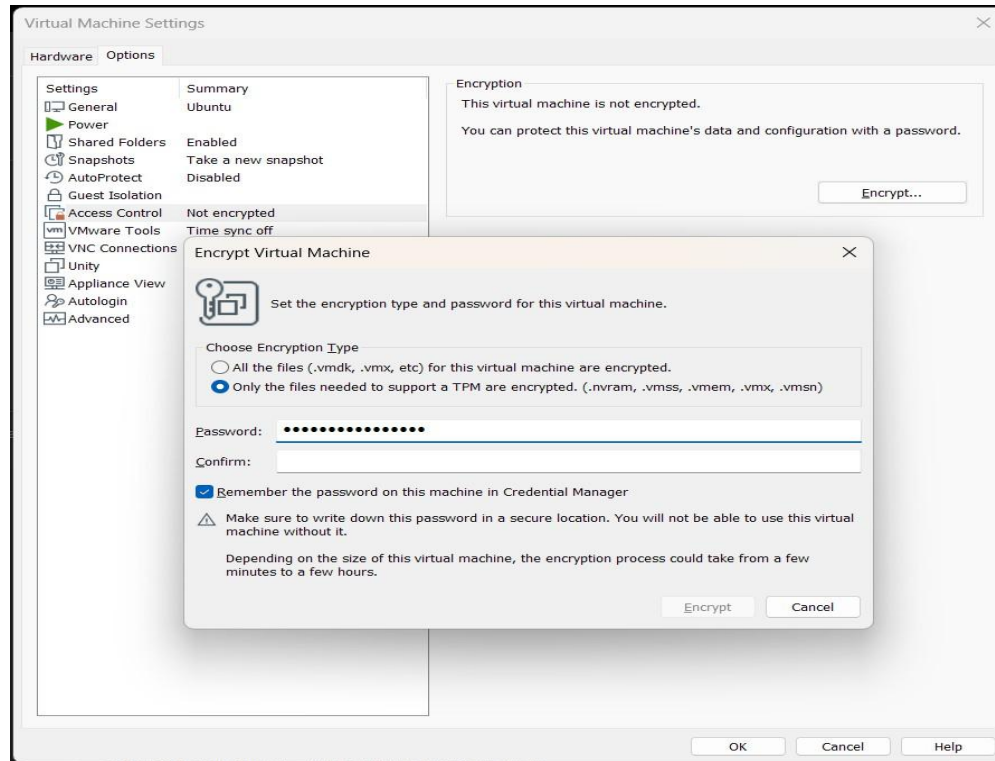
Choose the folder/file you want to share and add the respective path.



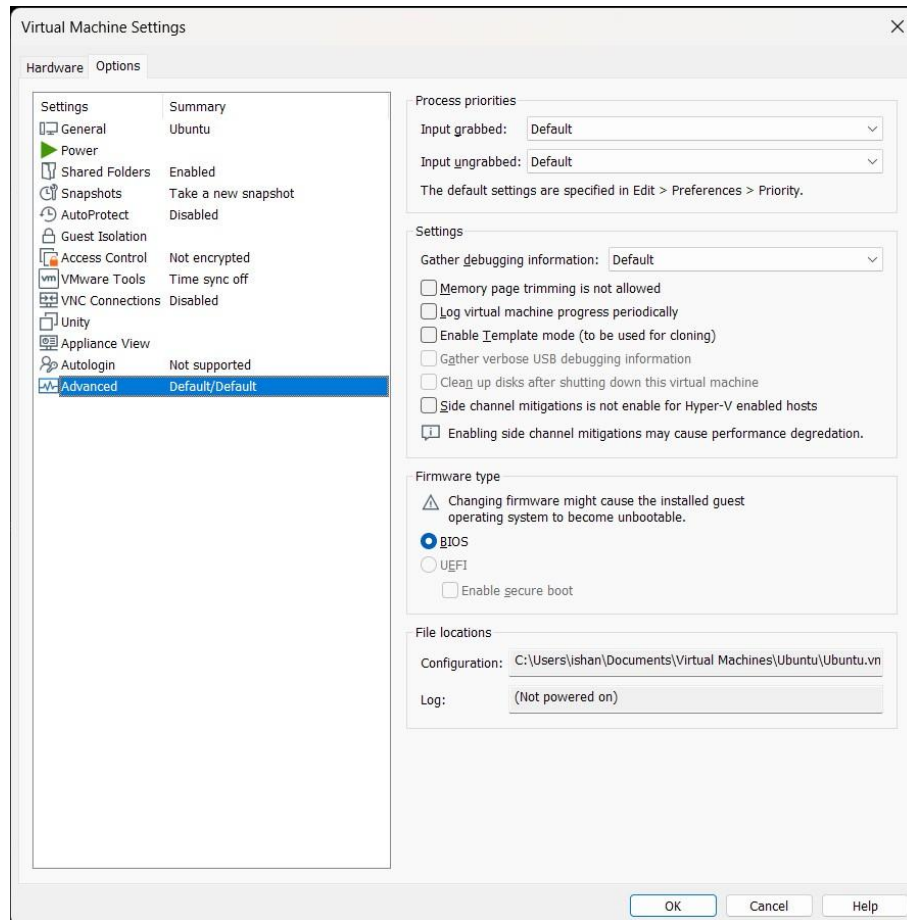
Step 5: To save the current environment of the machine we can take snapshots. While powering off the machine we can select the machine to take snapshot and revert back to the current state when powering on the next time.



Step 6: Further, we can protect our virtual machine by managing access control and permissions. This option also lets us encrypt the files and folders that we want to be accessed by restricted people only.



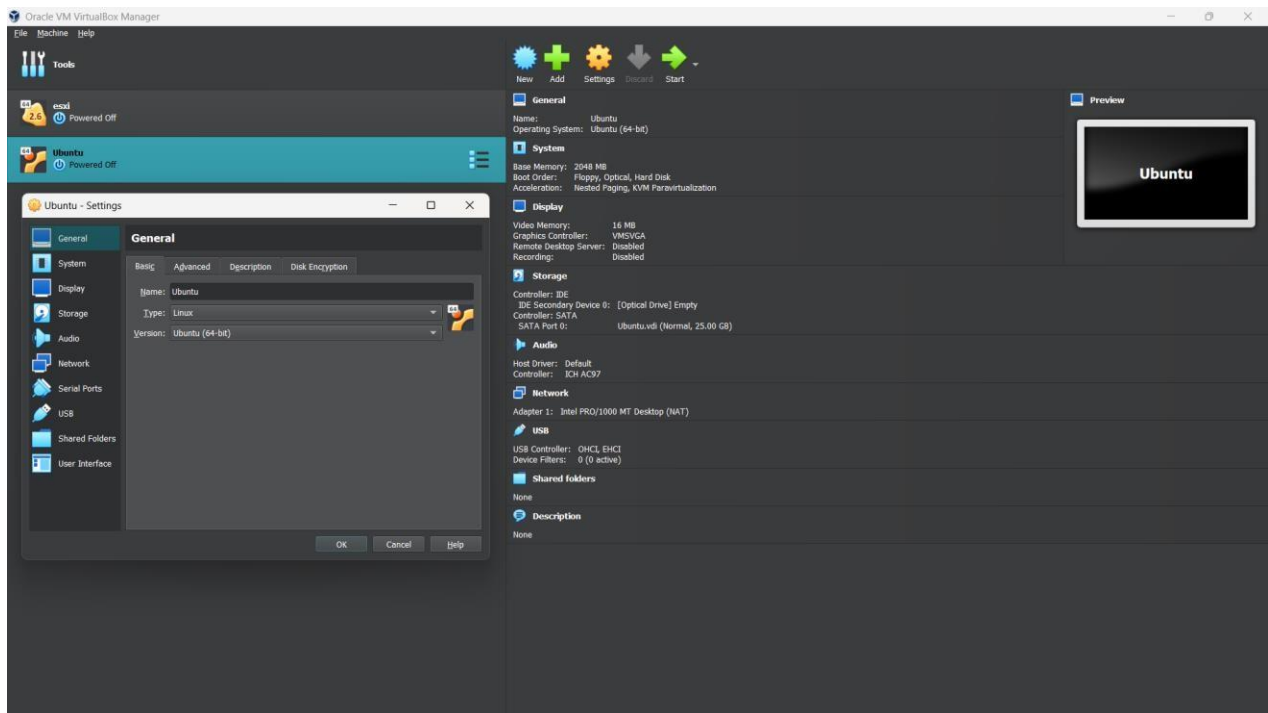
Step 7: Go to the advanced option to select the Firmware type. In this case, we opted for BIOS option. You can also configure other settings like allowing to gather debugging information, log information, cleaning up state and data etc.



Experiment-6

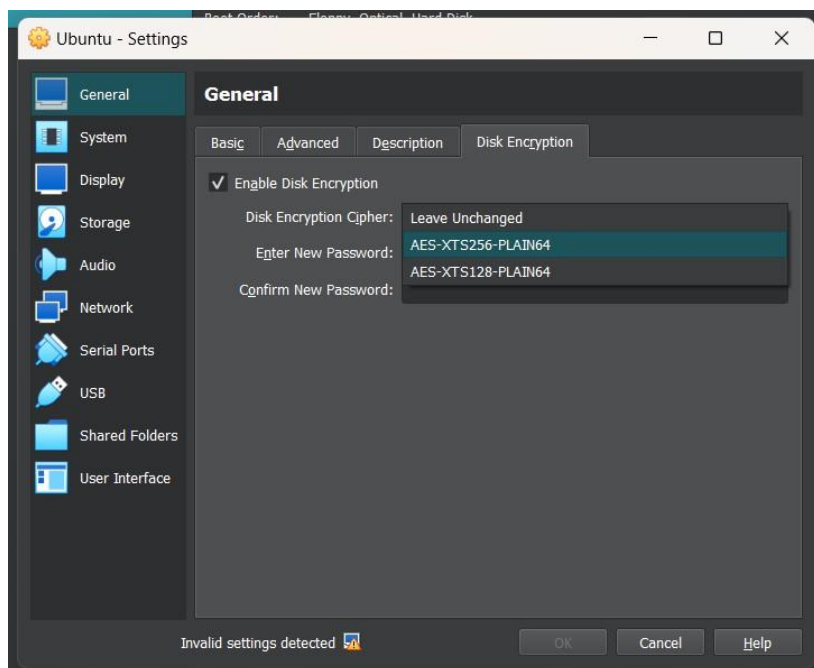
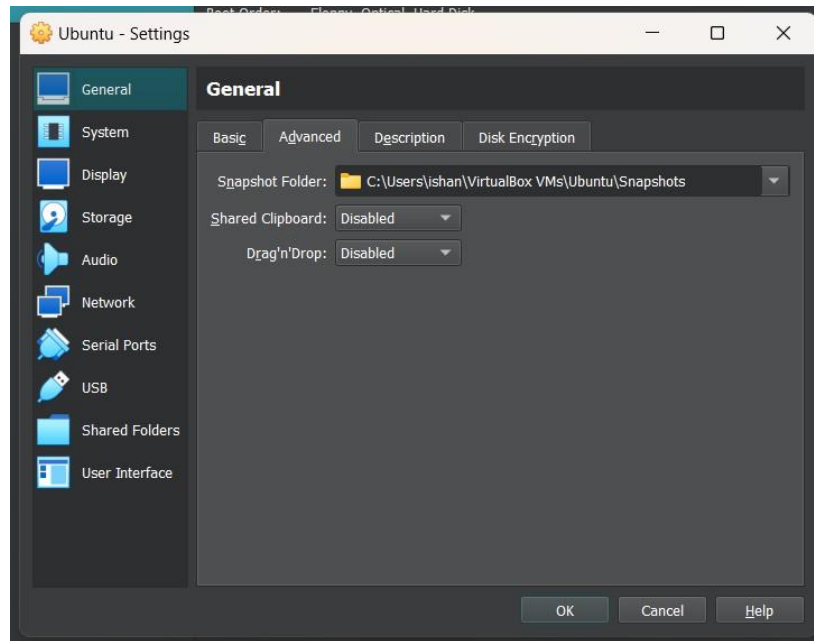
Managing the Virtual Machine in Virtual Box

Step 1: To manage the virtual machine, right click on the machine. Click the settings icon from the right-side panel and you will see the different configuration and management settings.

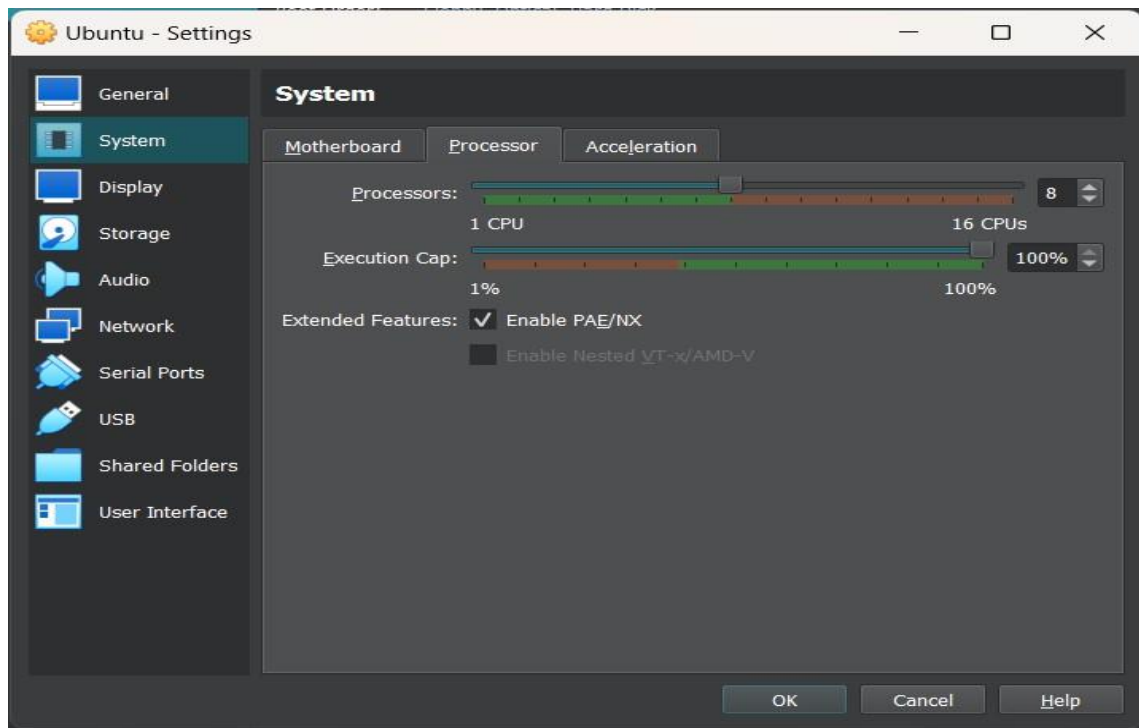


Step 2: Click the general settings and move to the advanced settings. There you can allow shared clipboard between the host and the virtual machine. It can be bidirectional and unidirectional from host to virtual machine or vice-versa.

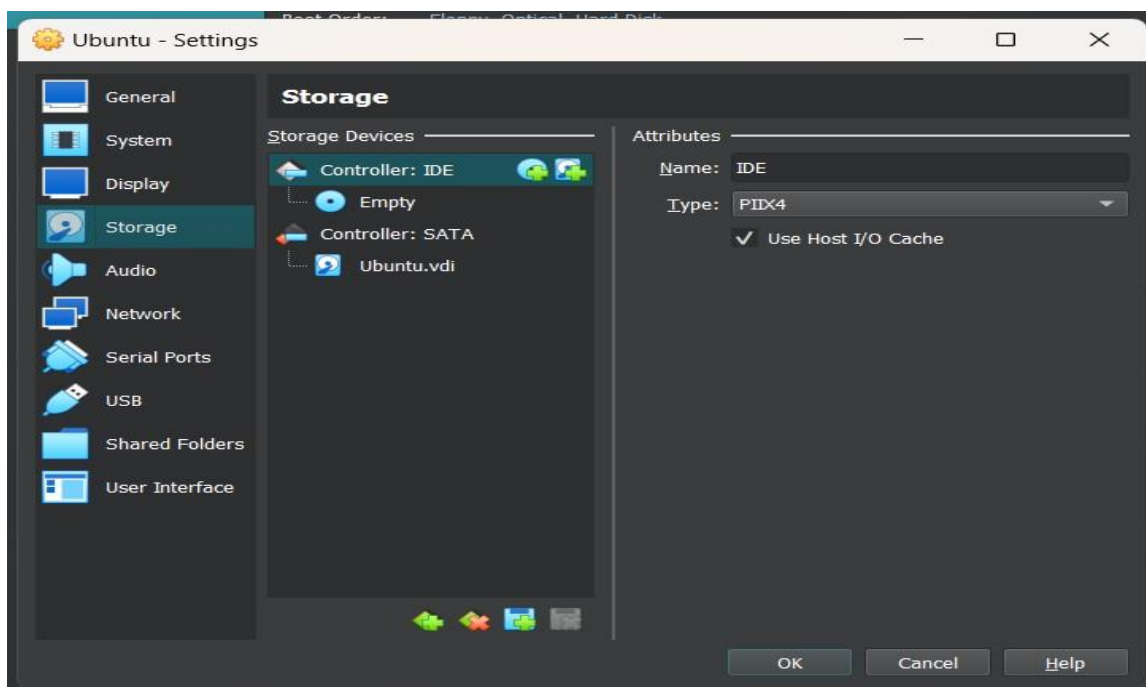
You can also enable disk encryption. You can choose among the encryption algorithm options. Here AES-versions are provided.



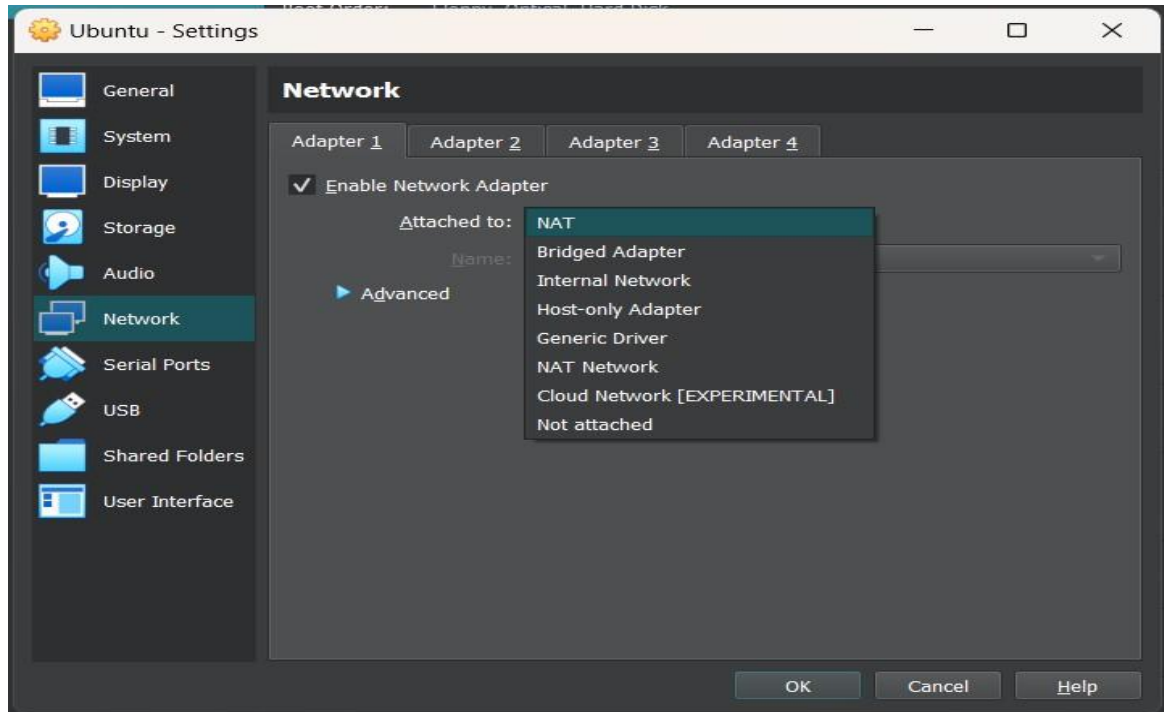
Step 3: Navigate to the System settings. There you can manage system settings for the motherboard, processors etc.



Step 4: Next, you can manage the storage settings, the IDE and the SATA configurations. You can select what needs to be stored or saved and where.

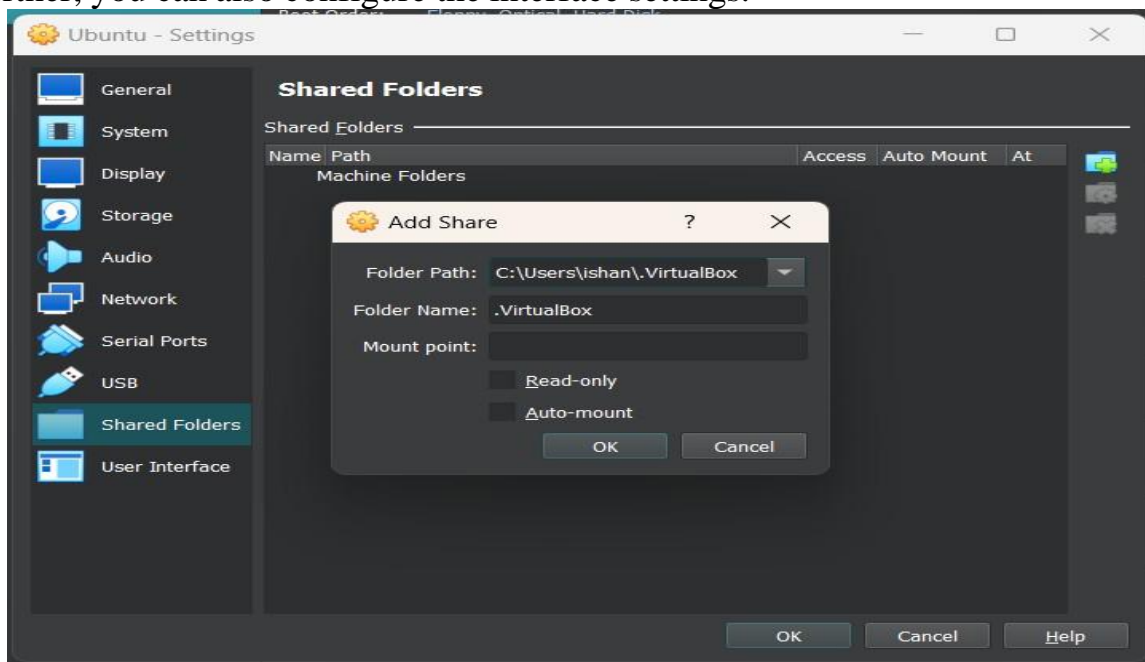


Step 5: Move to the Network settings. There you can select the network you need to configure for the virtual machine. You can select among the various options like NAT, Bridged, Host, Cloud network etc.



Step 6: You can also set shared folders between the host machine and the virtual machine. Select the required folder/file and add its path.

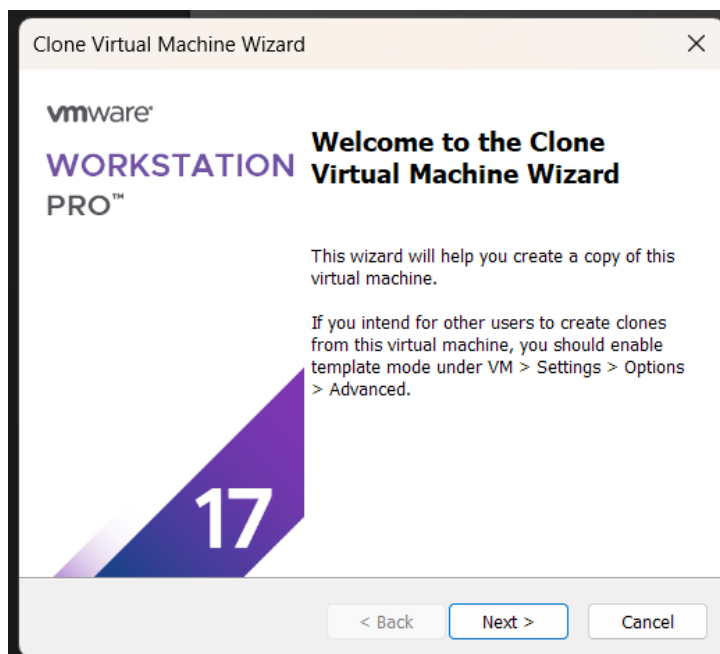
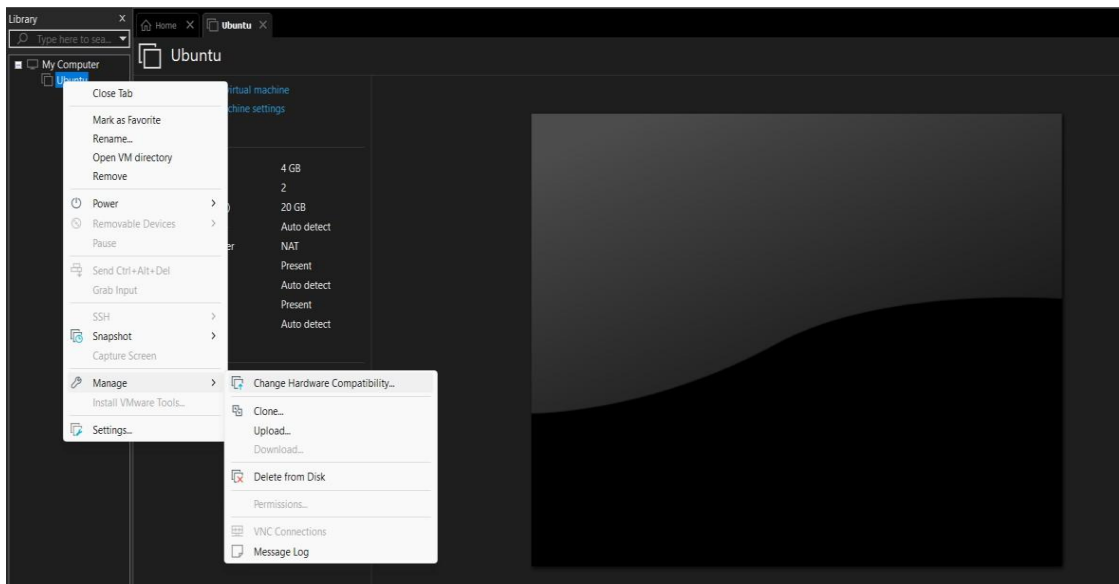
Further, you can also configure the interface settings.



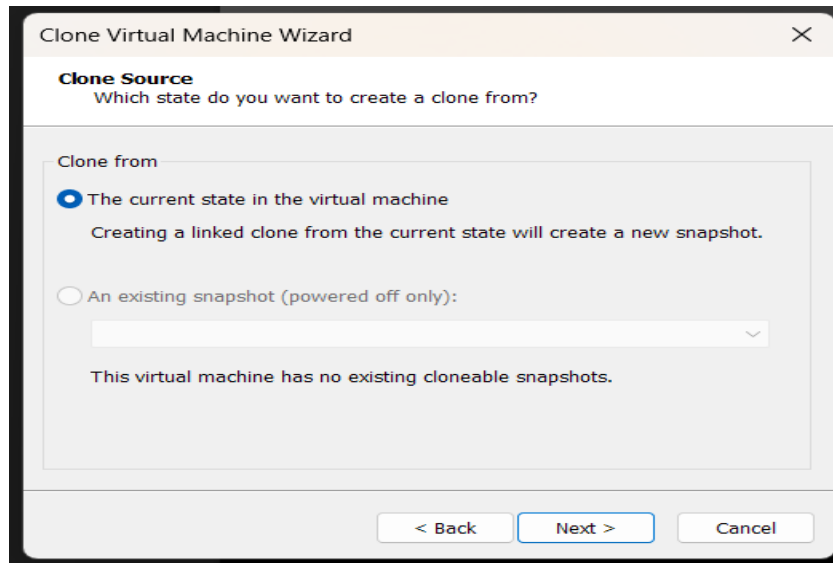
Experiment 7

Cloning Virtual Machine in VMware Workstation 17 Pro

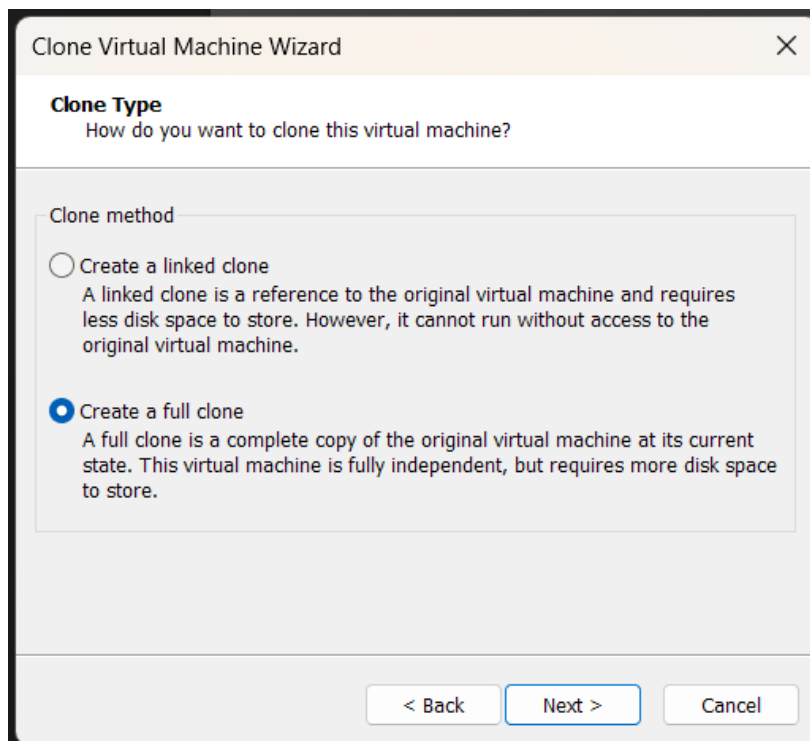
Step 1: Click on the virtual machine which is wanting to be clone and select the option **EXPORT** and give location to save the file.as shown in below figure



Step 2: Select the state of the machine you want to clone from. You can also choose the existing snapshot to clone.



Step 3: Select the clone type. You can choose between the linked clone or the full clone. Here, we go with the full clone mode.



Step 4: for the last step, name the clone machine and select the location from where you want to access it. Select Finish.

Once done, your clone is ready, and you can access it from the location you have specified and run it as the original machine.

Clone Virtual Machine Wizard

Name of the New Virtual Machine
What name would you like to use for this virtual machine?

Virtual machine name
Clone of Ubuntu

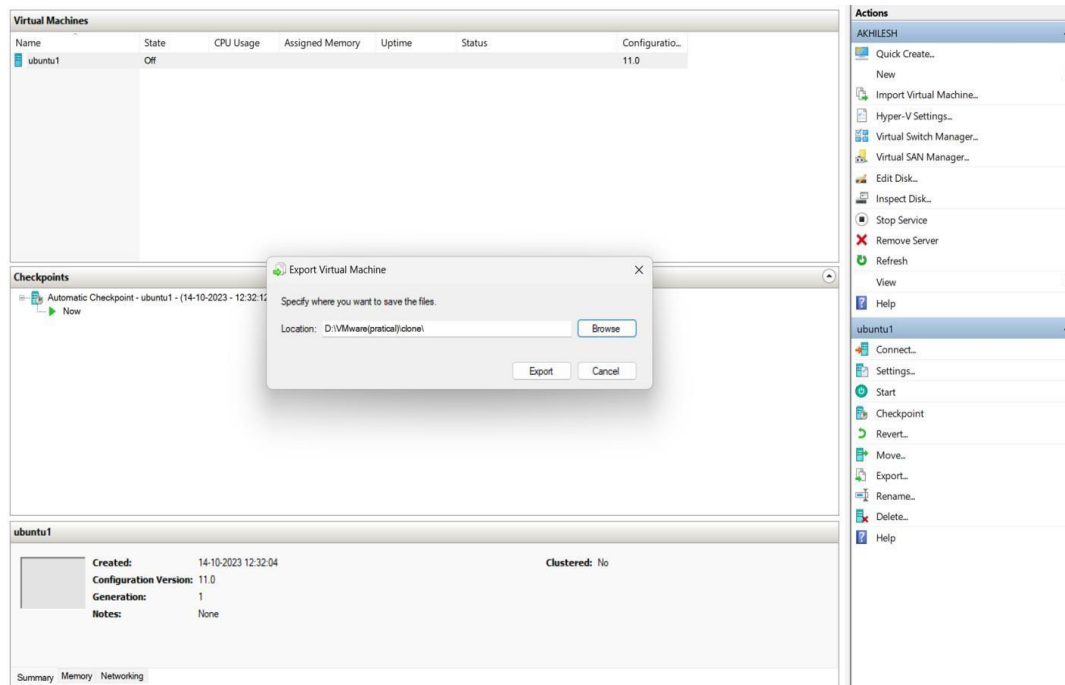
Location
C:\Users\ishan\Documents\Virtual Machines\Clone of Ubuntu Browse...

< Back Finish Cancel

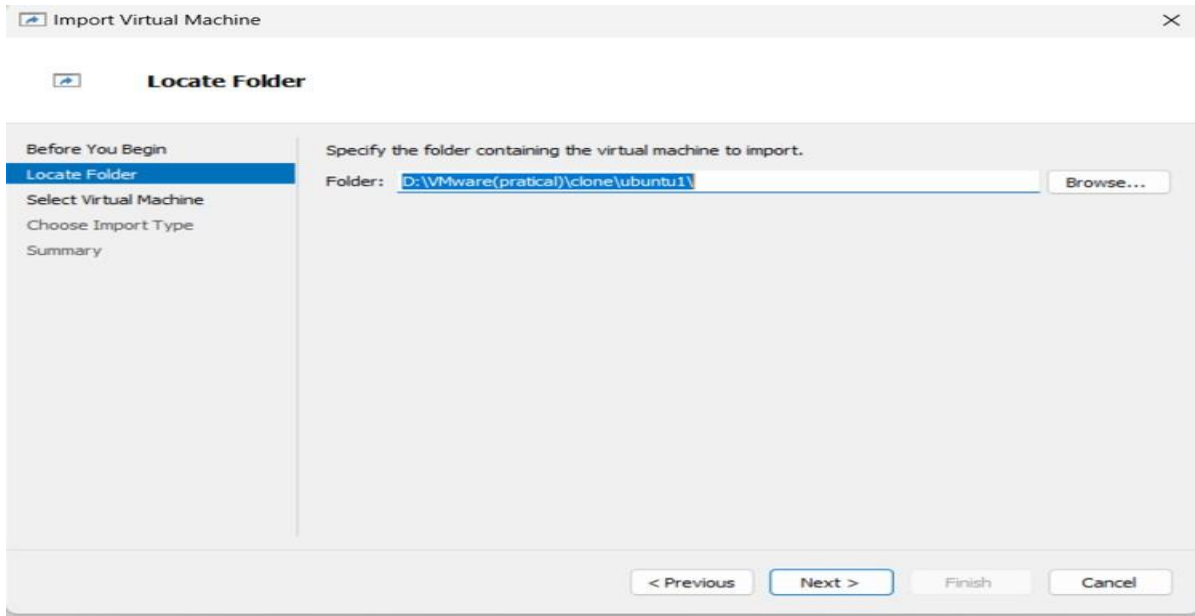
Experiment-8

Cloning Virtual Machine in Hyper V

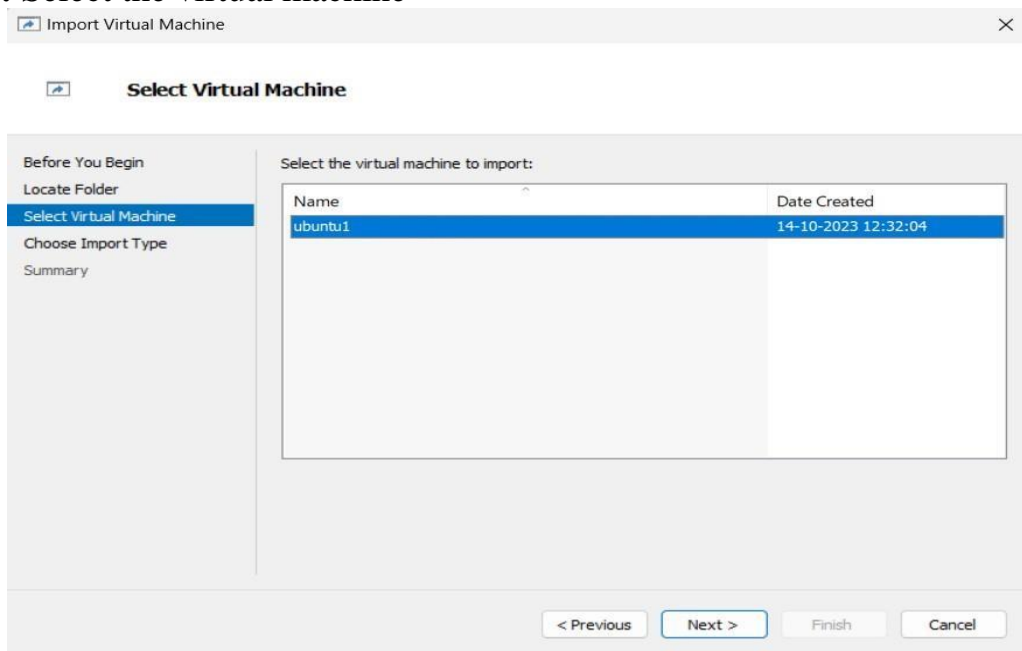
Step 1: Click on the virtual machine to clone and select the option **EXPORT** and give location to save the file.as shown in below figure.



Step 2: Locate the folder



Step 3: Select the virtual machine



Step 4: Choose import type as **Copy the Virtual Machine**

The screenshot shows the 'Import Virtual Machine' wizard at the 'Choose Import Type' step. The left sidebar contains a list of steps: 'Before You Begin', 'Locate Folder', 'Select Virtual Machine', 'Choose Import Type' (which is highlighted in blue), and 'Summary'. The main area is titled 'Choose Import Type' and contains the instruction 'Choose the type of import to perform:'. There are three radio button options: 'Register the virtual machine in-place (use the existing unique ID)', 'Restore the virtual machine (use the existing unique ID)', and 'Copy the virtual machine (create a new unique ID)'. The third option is selected with a blue dot.

Import Virtual Machine

Choose Import Type

Before You Begin
Locate Folder
Select Virtual Machine
Choose Import Type
Summary

Choose the type of import to perform:

- ☐ Register the virtual machine in-place (use the existing unique ID)
- ☐ Restore the virtual machine (use the existing unique ID)
- ☒ Copy the virtual machine (create a new unique ID)

Step 5: Choose Storage Folders

The screenshot shows the 'Import Virtual Machine' wizard at the 'Choose Folders to Store Virtual Hard Disks' step. The left sidebar contains a list of steps: 'Before You Begin', 'Locate Folder', 'Select Virtual Machine', 'Choose Import Type', 'Choose Destination', 'Choose Storage Folders' (which is highlighted in blue), and 'Summary'. The main area is titled 'Choose Folders to Store Virtual Hard Disks' and contains the question 'Where do you want to store the imported virtual hard disks for this virtual machine?'. Below this is a text field labeled 'Location:' with the path 'D:\VMware(pratical)\clone\HpyerVLOC' entered. To the right of the text field is a 'Browse...' button. The window title bar shows 'Import Virtual Machine' and a close button (X).

Import Virtual Machine

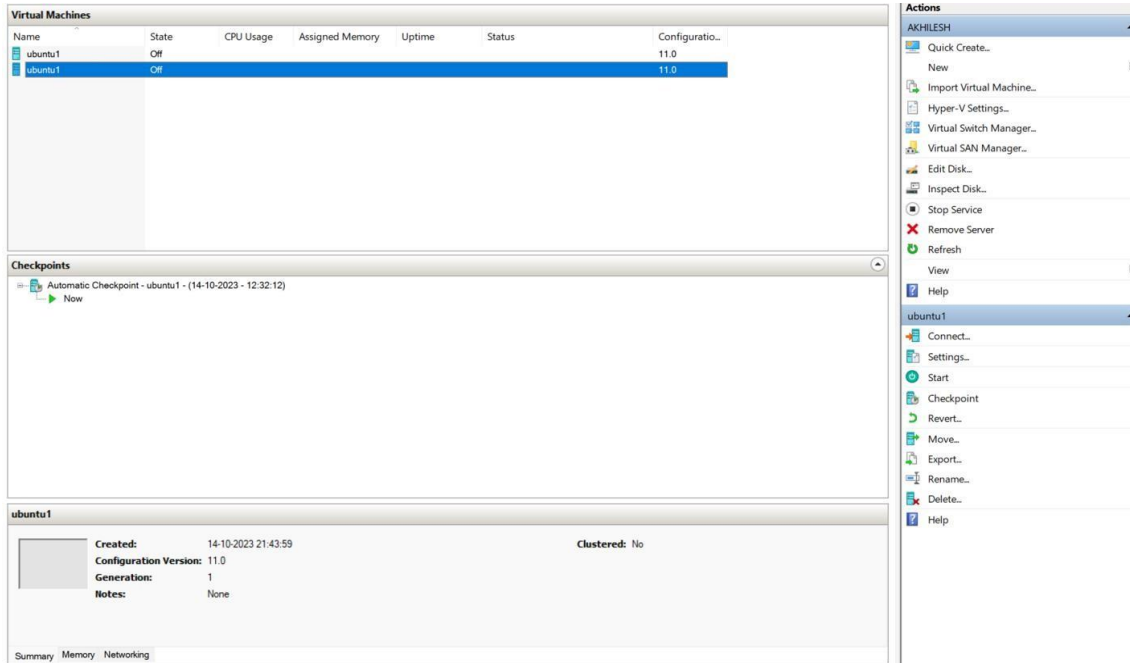
Choose Folders to Store Virtual Hard Disks

Before You Begin
Locate Folder
Select Virtual Machine
Choose Import Type
Choose Destination
Choose Storage Folders
Summary

Where do you want to store the imported virtual hard disks for this virtual machine?

Location:

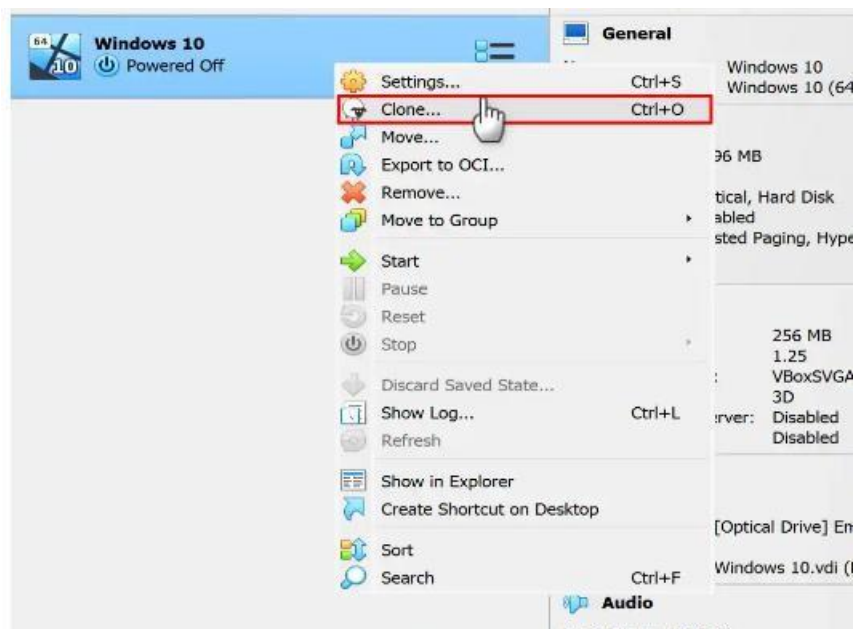
Step 6: After finishing the task click on import virtual Machine and then browse the location and then click on import, then we can see the clone of the our virtual machine as highlighted in below image



Experiment-9

Cloning Virtual Machine in Virtual box

Step 1: To clone an operating system in the VirtualBox virtualization program, right-click on the desired operating system located in the left panel, also known as the virtual machine library. From there, choose the “Clone” option among the available selections that appear.



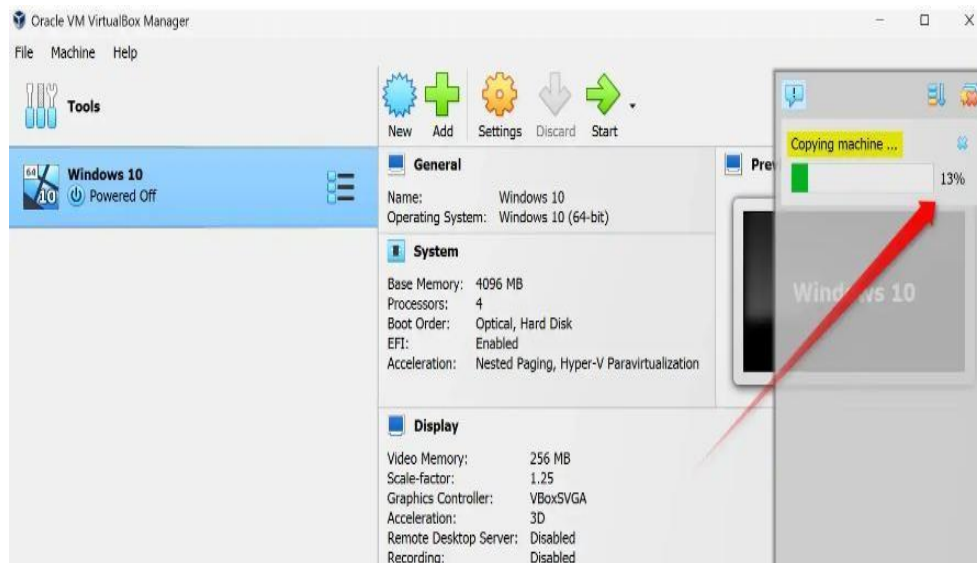
Step 2 After opening the New Machine Name and Path window, type a suitable name according to your preference in the Name field. In the MAC Address Policy section, select Generate new MAC addresses for all network adapters to prevent IP conflicts of the VMs you will connect to the network.

Step 3 After setting the MAC address, decide whether you want to keep the host's disk names and hardware IDs, the same values for the cloned VM, and make the relevant setting in the Additional Options section.



Step 4 For a healthier VM cloning process, you must choose one of the methods we specified in the Clone Type window after continuing without ticking additional options. Check Full Clone and click Finish for a complete standalone VM replication.

Step 5 Wait while VirtualBox copies your Windows 10 or another virtual system for a complete clone.



Step 6

When you complete the virtual machine copying process, open the host and VM network settings, and compare the MAC addresses, you can see that the VirtualBox software assigns a new address according to the settings you selected in the MAC policy section.

Adapter Type:	Intel PRO/1000 MT Desktop (82540EM)
Promiscuous Mode:	Deny
MAC Address:	0800277267F
<input checked="" type="checkbox"/> Cable Connected	
Port Forwarding	

Network

Adapter 1 Adapter 2 Adapter 3 Adapter 4

☒ Enable Network Adapter

Attached to: NAT

Name:

☐ Advanced

Adapter Type: Intel PRO/1000 MT Desktop (82540EM)

Promiscuous Mode: Deny

MAC Address: 0800273E3862

☒ Cable Connected

[Port Forwarding](#)

OK Cancel Help

Step 7 Click Start from the tool menu to run your copied virtual computer.



Step 8 Upon reviewing the provided screenshot, it becomes evident that the cloned virtual system functions seamlessly.

