

**EX. NO. 1 CREATION OF A TYPE 2 VIRTUALIZATION IN VMWARE. ALLOCATE
MEMORY AND STORAGE SPACE AS PER THE REQUIREMENTS.
INSTALL GUEST OS ON THE VMWARE**

DATE:

AIM:

PROCEDURE:

STEP 1: Download and Install VMware Workstation Player

STEP 2: Create a New Virtual Machine

- a. Open VMware Workstation Player
- b. Click on "Create a New Virtual Machine" or go to File -> New Virtual Machine

STEP 3: Virtual Machine Configuration Wizard

- a. The Virtual machine configuration Wizard will appear.
- b. Choose "Typical" configuration and click "Next".

STEP 4: Install Guest Operating System

- a. Choose the installation method for the guest OS. You can either install from a disc or image file (ISO) or choose to install later. If you have the ISO file for your guest OS, select it during this step
- b. Click "Next"

STEP 5: Enter Guest OS Details

- a. Enter the name of your virtual machine and choose the location where you want to save it.
- b. Select the appropriate guest operating system and version. For example, if you are installing Windows 10, choose "Windows" as the guest OS and "Windows 10 x64" as the version.
- c. Click "Next."

STEP 6: Configure Virtual Machine Hardware

- a. Allocate memory: Choose how much RAM you want to allocate to the virtual machine. Make sure to leave enough memory for your host OS to run smoothly as well.
- b. Allocate storage: Choose whether to store the virtual disk as a single file or split into multiple files. Specify the disk size, and you can also choose to allocate all disk space now or let it grow as needed.

- c. Click "Next."

STEP 7: Customize Hardware (Optional)

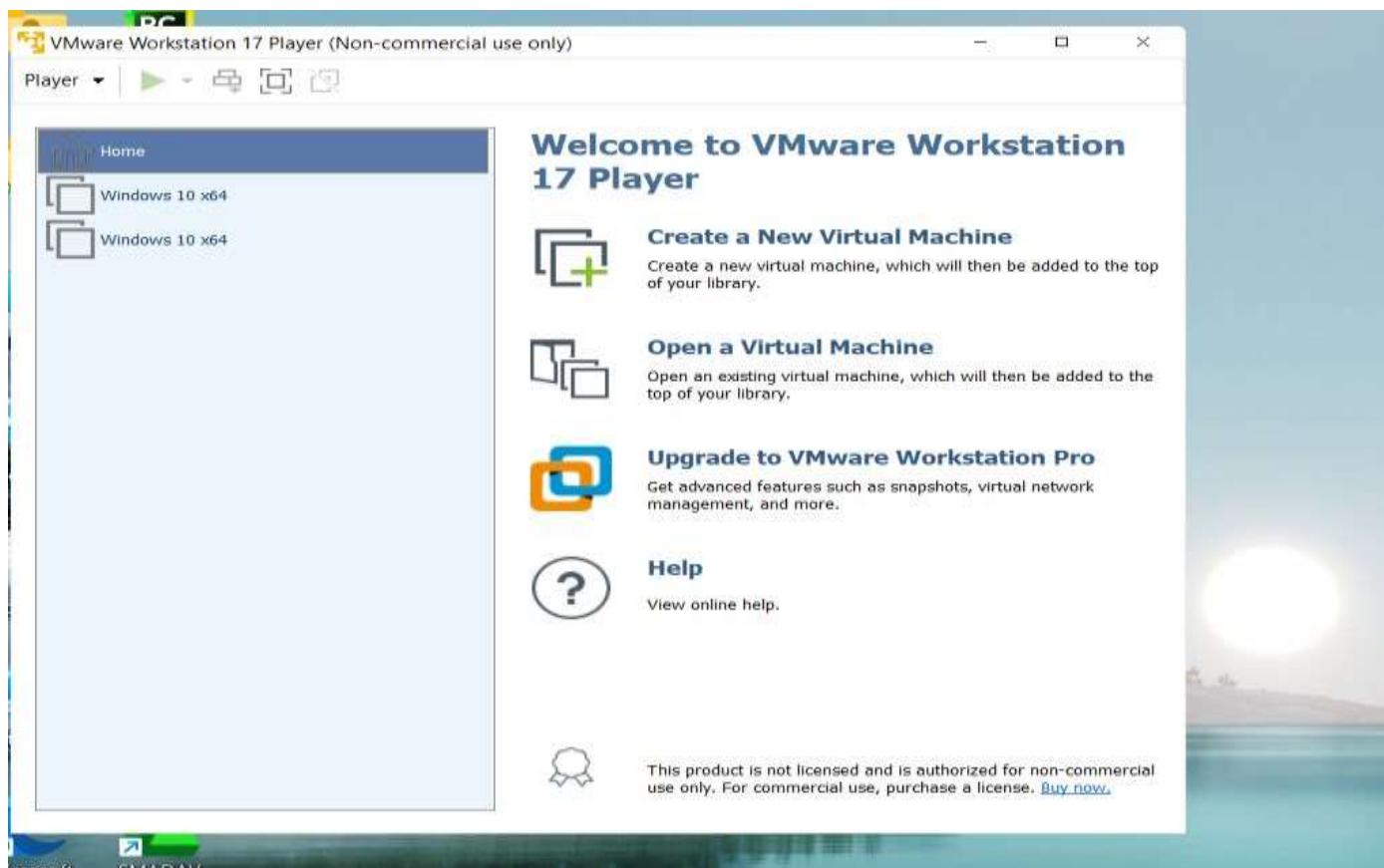
- a. If needed, you can customize the virtual machine's hardware settings like CPU cores, network adapters, graphics memory, etc. Otherwise, you can leave them as default.
- b. Click "Finish" once you are satisfied with the settings.

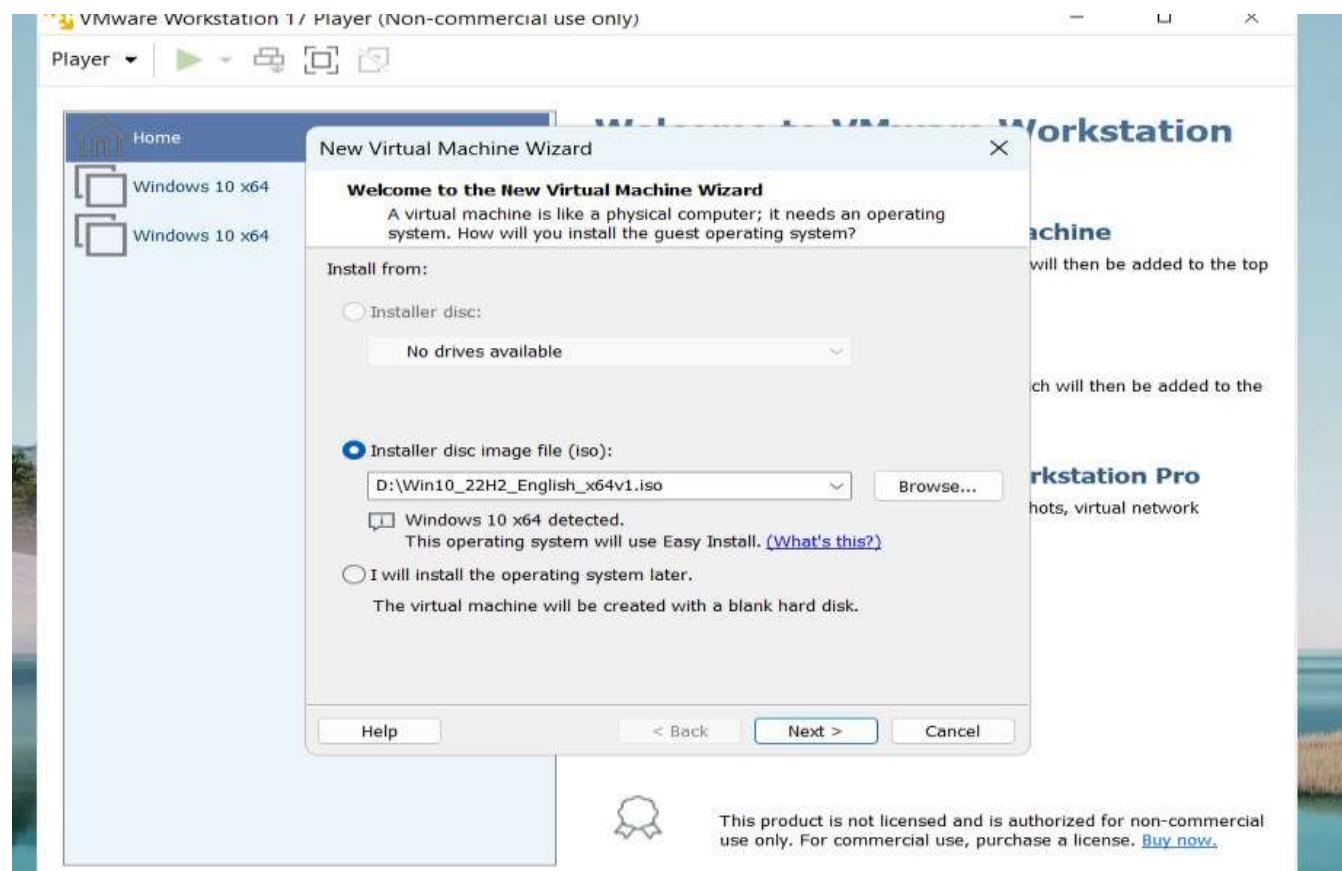
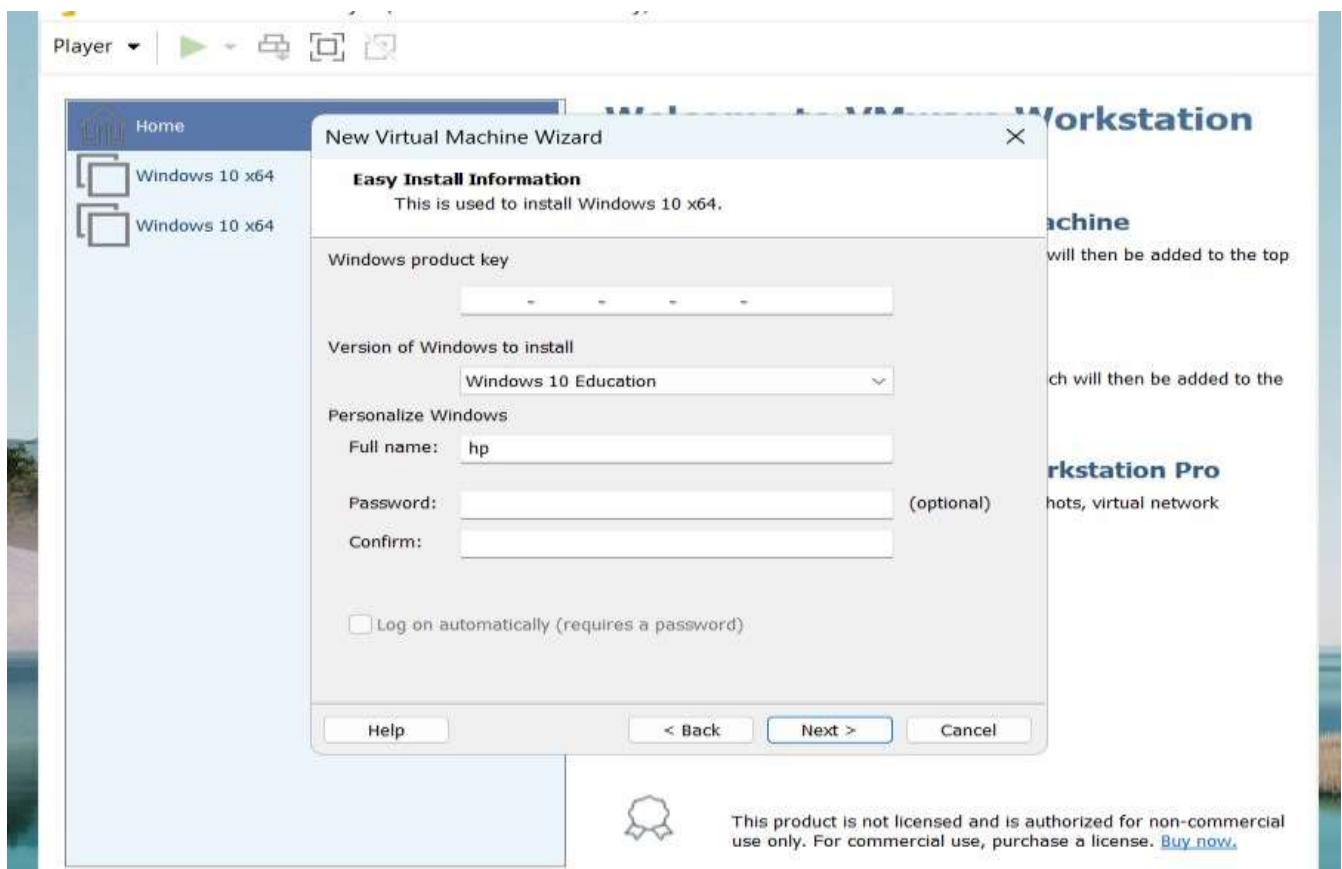
STEP 8: Install Guest OS

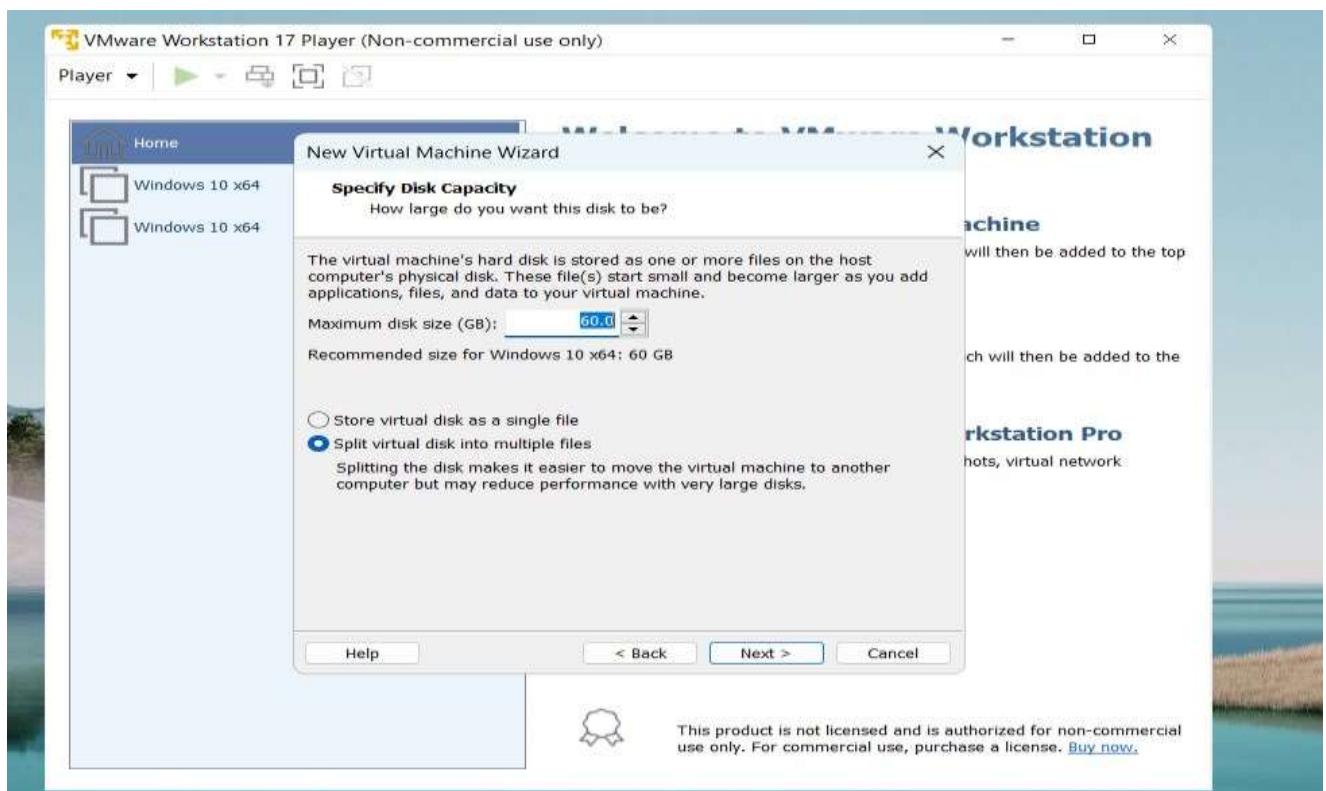
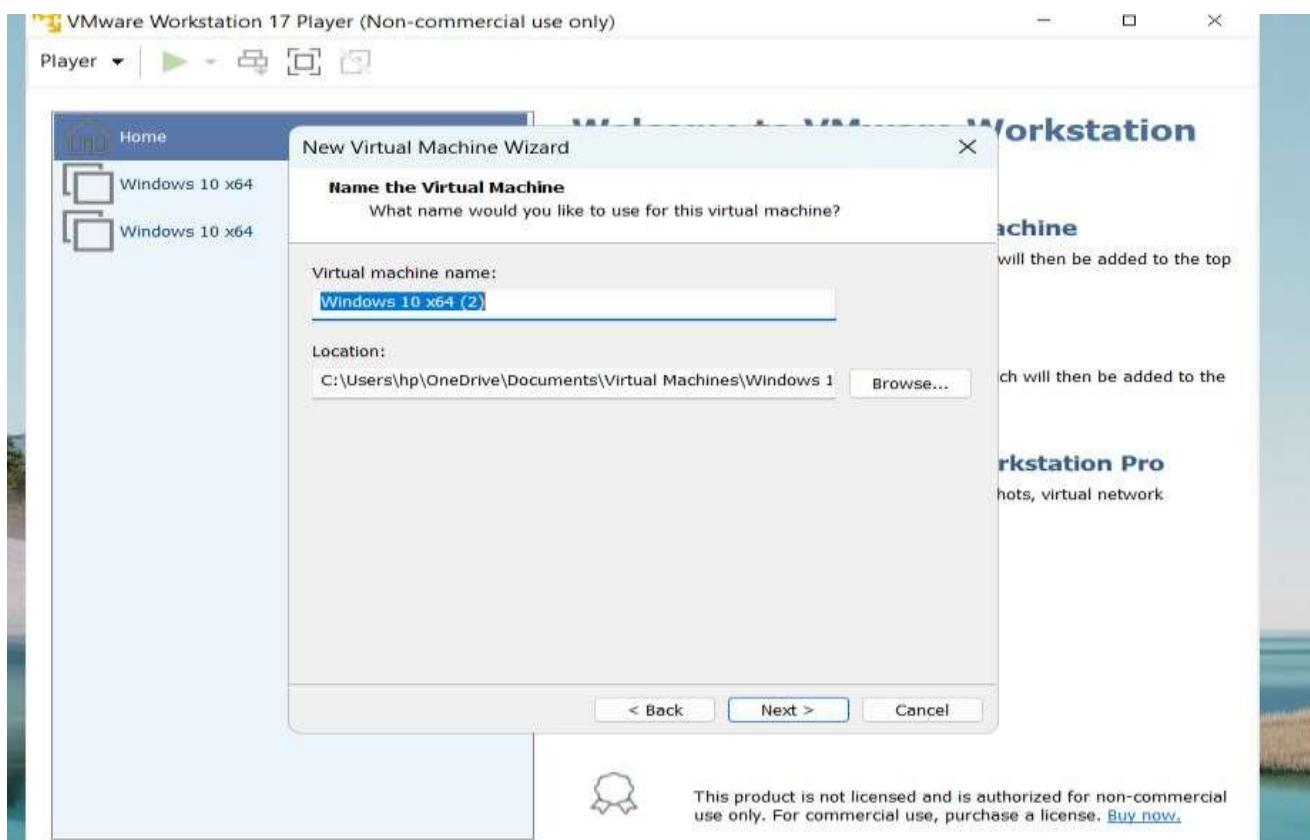
- a. Start the virtual machine you just created. The virtual machine will boot from the ISO or installation media you provided earlier.
- b. Follow the standard installation process for your guest OS.

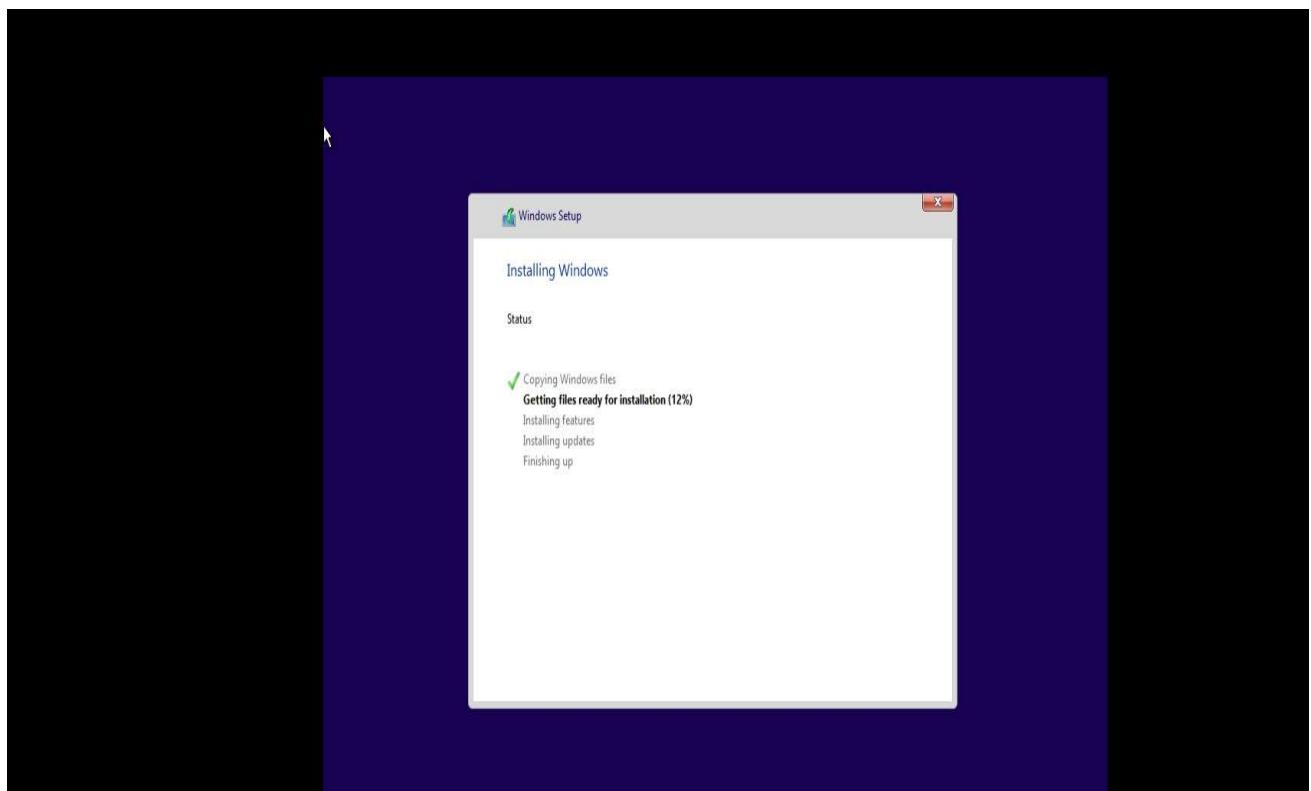
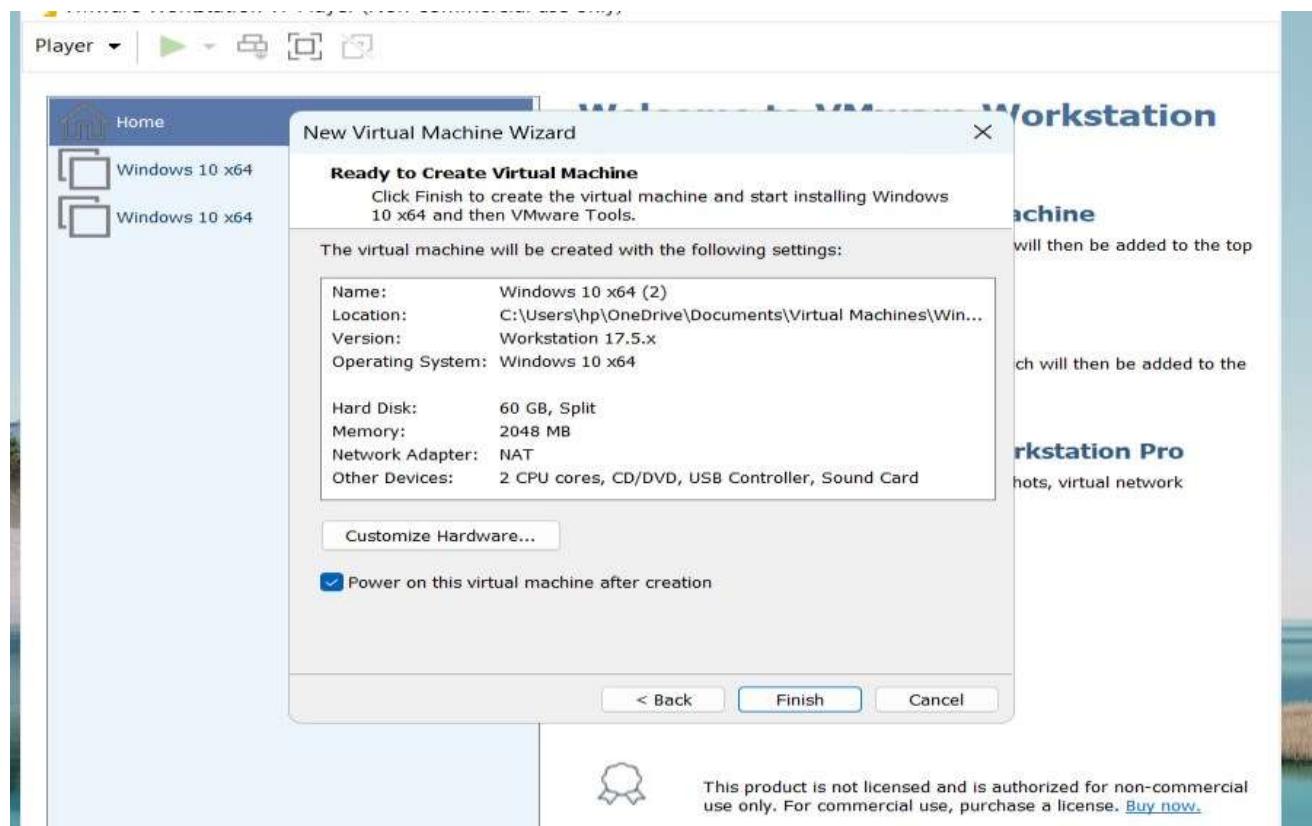
STEP 9: Install VMware Tools (Optional but Recommended)

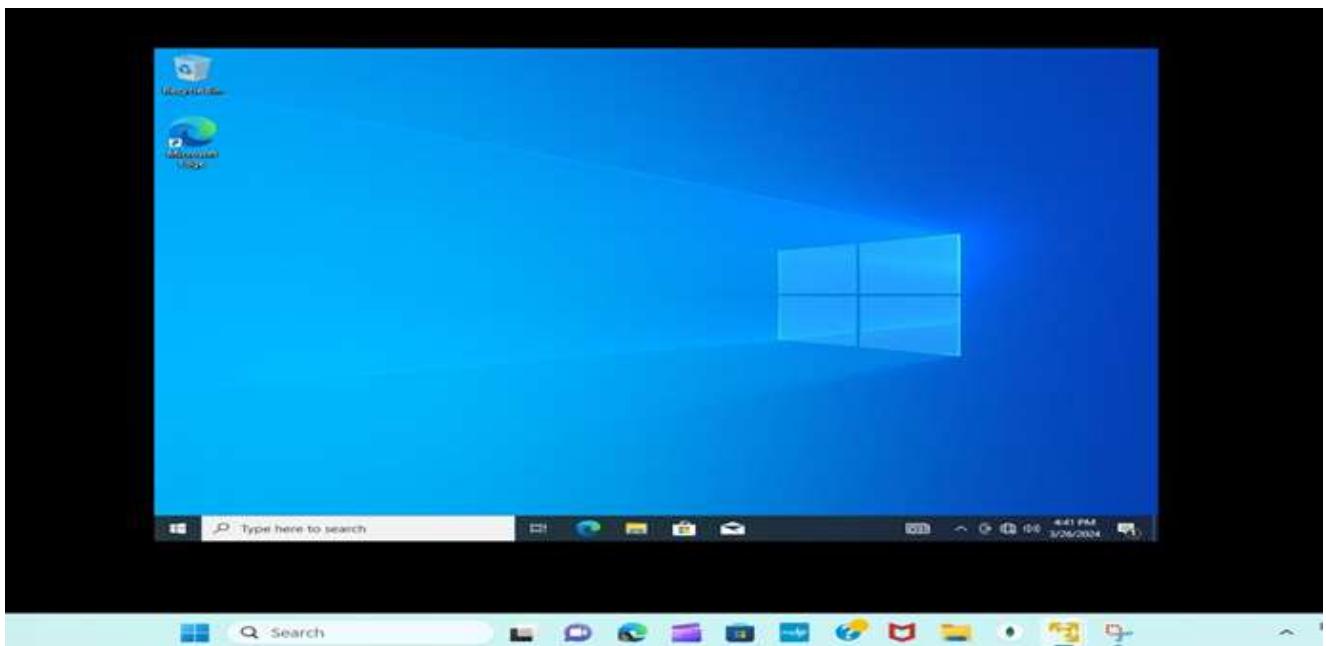
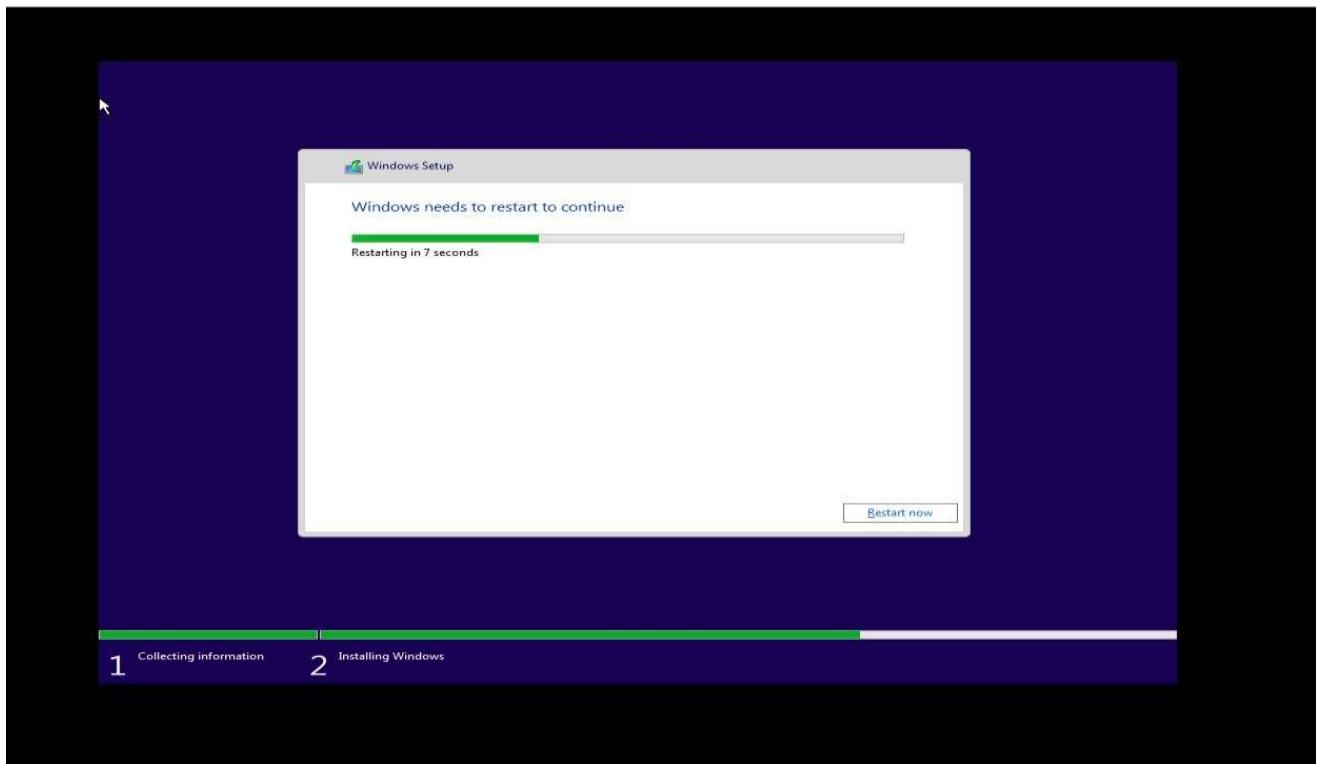
- a. After installing the guest OS, it is advisable to install VMware Tools within the guest OS. VMware Tools provides better integration between the host and guest OS, enabling features like shared folders, improved graphics, and more.
- b. In the same way, we can install windows OS also. The output screens for the virtual machines of different configurations.

OUTPUT:







**RESULT:**

EX. NO. 2(A)**STORAGE VIRTUALIZATION –
SHRINK AND EXTEND VIRTUAL DISK**

AIM:**PROCEDURE:****SHRINK A VIRTUAL DISK**

STEP 1: Inside the Virtual Machine, delete unnecessary files and empty the recycle bin/trash to free up space.

STEP 2: Defragment the Virtual Machine's disk to move all the data to the beginning of the disk.

STEP 3: Shutdown the Virtual Machine

STEP 4: On the host system, open the virtualization software

STEP 5: Navigate the Virtual Machine's settings or configuration

STEP 6: Select the Virtual disk you want to shrink.

STEP 7: Look for an option to shrink or compact the disk and follow the prompts

STEP 8: The process might take some time, and it's essential to back up your Virtual Machine before proceeding, as data loss can occur in some cases.

EXTEND VIRTUAL DISK

STEP 1: Shutdown the virtual machine.

STEP 2: On the host system, open the virtualization software

STEP 3: Navigate to the virtual machine's settings or configuration.

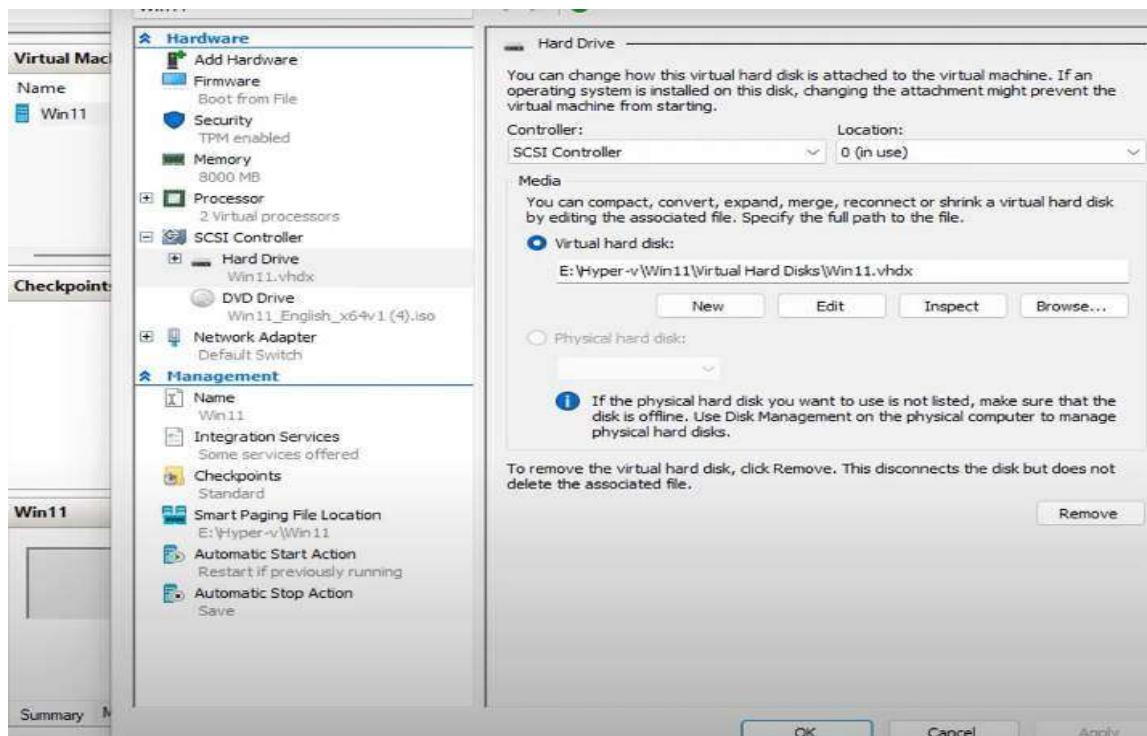
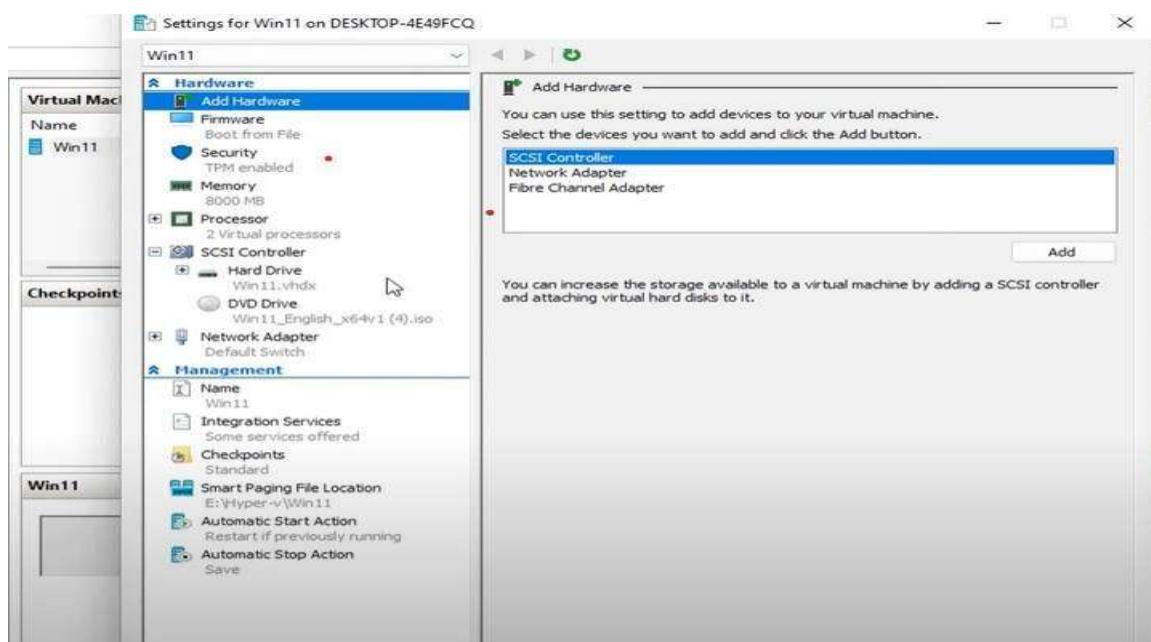
STEP 4: Select the virtual disk you want to extend.

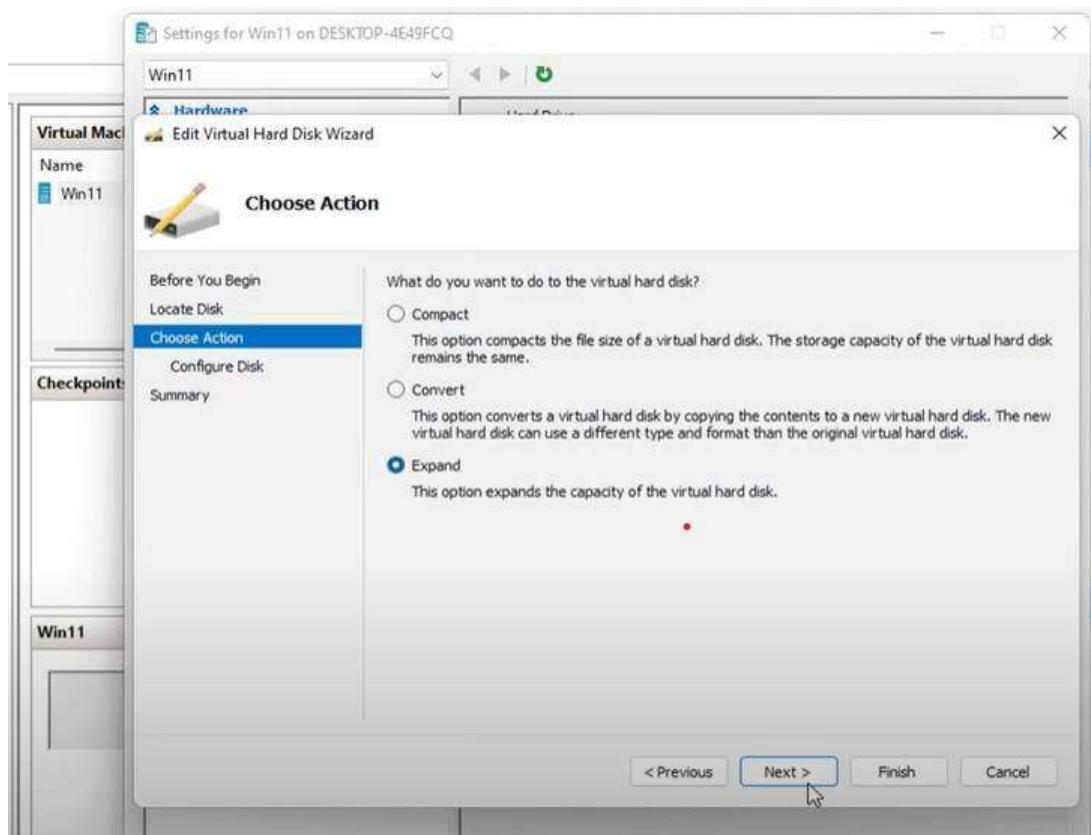
STEP 5: Look for an option to increase or extend the disk and follow the prompts.

STEP 6: Specify the new size for the virtual disk (make sure to allocate enough space for your needs).

STEP 7: The process might take some time, and it's crucial to back up your virtual machine before proceeding, as extending the disk involves modifying the underlying file system.

OUTPUT:





The screenshot shows the Hyper-V Manager interface. On the left, the 'Virtual Machines' list shows 'Win11' is off. Below it, the 'Checkpoints' section indicates no checkpoints are present. The main details pane for 'Win11' shows its creation date (07/08/2022), configuration version (10.0), generation (2), and notes (None). At the bottom, tabs for 'Summary', 'Memory', and 'Networking' are visible. On the right, the 'Actions' pane is open for 'Win11', listing actions such as 'Quick Create...', 'Import Virtual Machine...', 'Hyper-V Settings...', 'Virtual Switch Manager...', 'Virtual SAN Manager...', 'Edit Disk...', 'Inspect Disk...', 'Stop Service', 'Remove Server', 'Refresh', 'View', and 'Help'. A cursor is hovering over the 'Next >' button in the 'Edit Virtual Hard Disk Wizard' window.

RESULT:

EX. NO. 2(B)**STORAGE VIRTUALIZATION –****DATE: CREATE, MANAGE, CONFIGURE AND SCHEDULE SNAPSHOTS****AIM:****PROCEDURE:****STEP 1:** Creating a Snapshot: To create a snapshot, follow these steps:

Select the virtual machine in the management interface

- a. Right-click on the virtual machine and choose "Snapshot" or "Take Snapshot."
- b. Provide a name and description for the snapshot.
- c. Optionally, select the memory state to capture the virtual machine's running state (requires the virtual machine to be powered off).
- d. Click "OK" to create the snapshot.

STEP 2: Managing Snapshots: Managing snapshots involves tasks such as viewing, reverting, deleting, and consolidating snapshots.

- a. Viewing Snapshots: To see the list of snapshots for a virtual machine, navigate to the "Snapshots" tab in the virtual machine's details.
- b. Reverting to a Snapshot: To revert a virtual machine to a specific snapshot, right-click on the snapshot and choose "Revert to Snapshot." This action will roll back the virtual machine to the state captured in the selected snapshot.
- c. Deleting Snapshots: To delete a snapshot, right-click on the snapshot and choose "Delete Snapshot." You can choose to delete the snapshot only or delete the snapshot and consolidate its changes into the base virtual machine disk.
- d. Consolidating Snapshots: If you have multiple snapshots, you can perform a "Snapshot Consolidation" to merge all snapshots into the base disk. This helps to reduce storage requirements and improves performance.

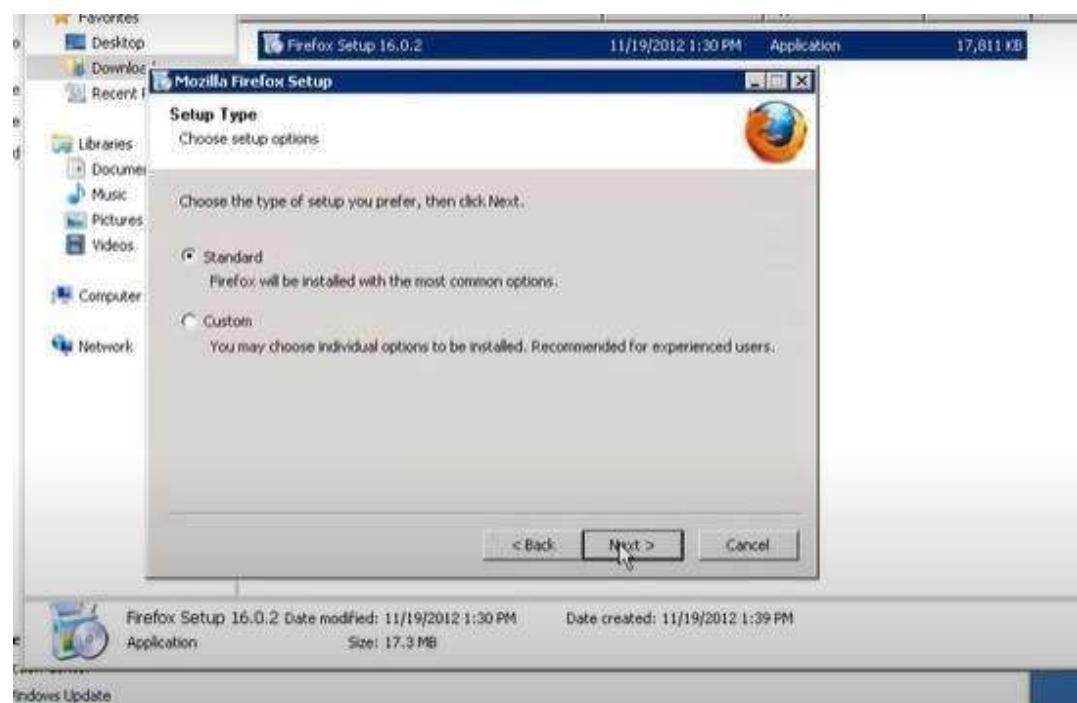
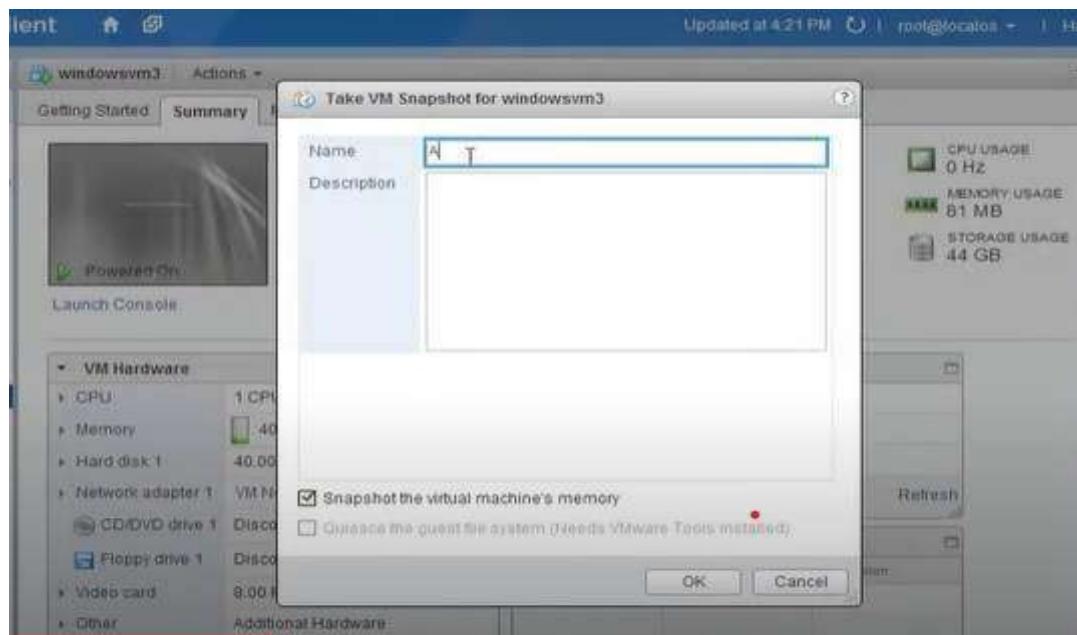
STEP 3: Configuring Snapshot Settings: The snapshot settings allow you to define how snapshots are managed and stored.

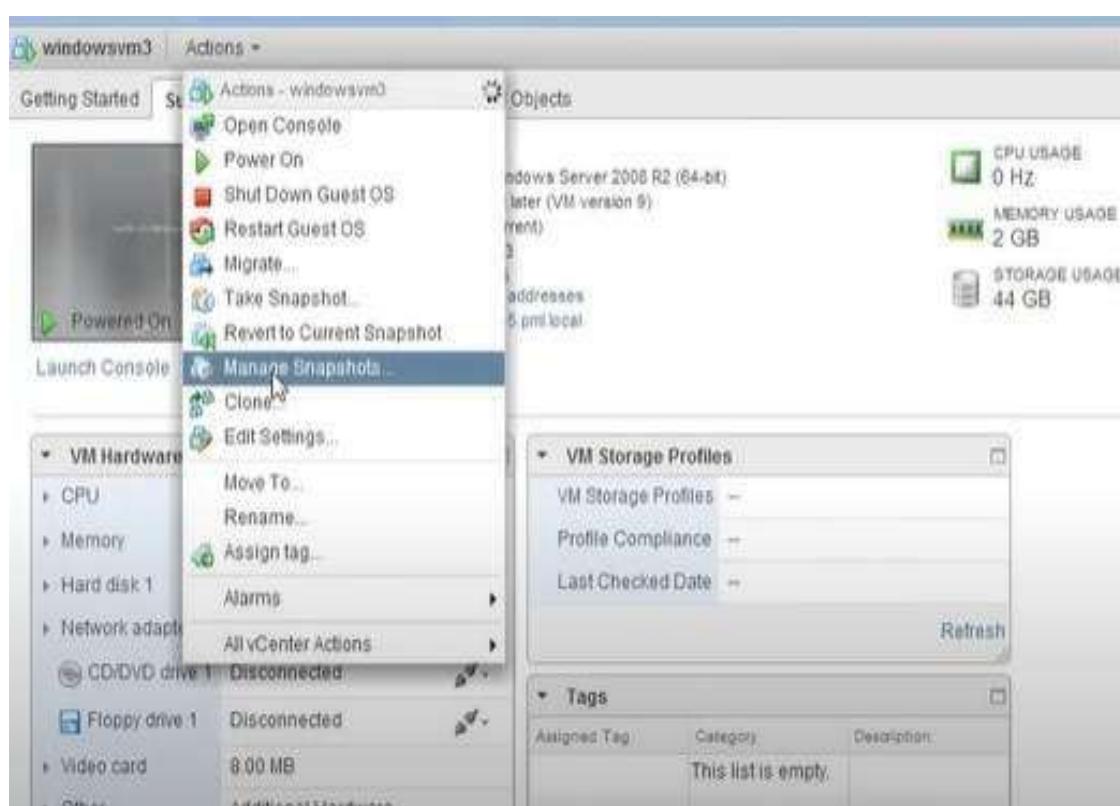
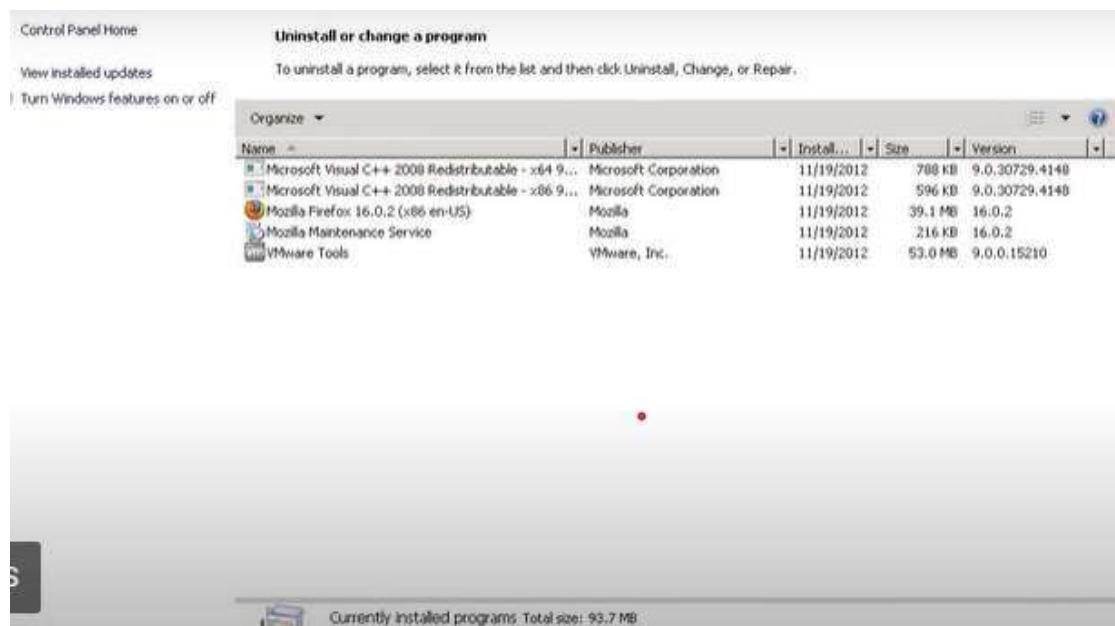
- a. Snapshot Location: Configure the location where snapshot files are stored, which can be on the same data store as the virtual machine or on a different storage location.
- b. Snapshot Quiescent: Enable or disable the use of VMware Tools to quiescence the file system inside the virtual machine before taking a snapshot. This helps ensure application consistency during the snapshot.

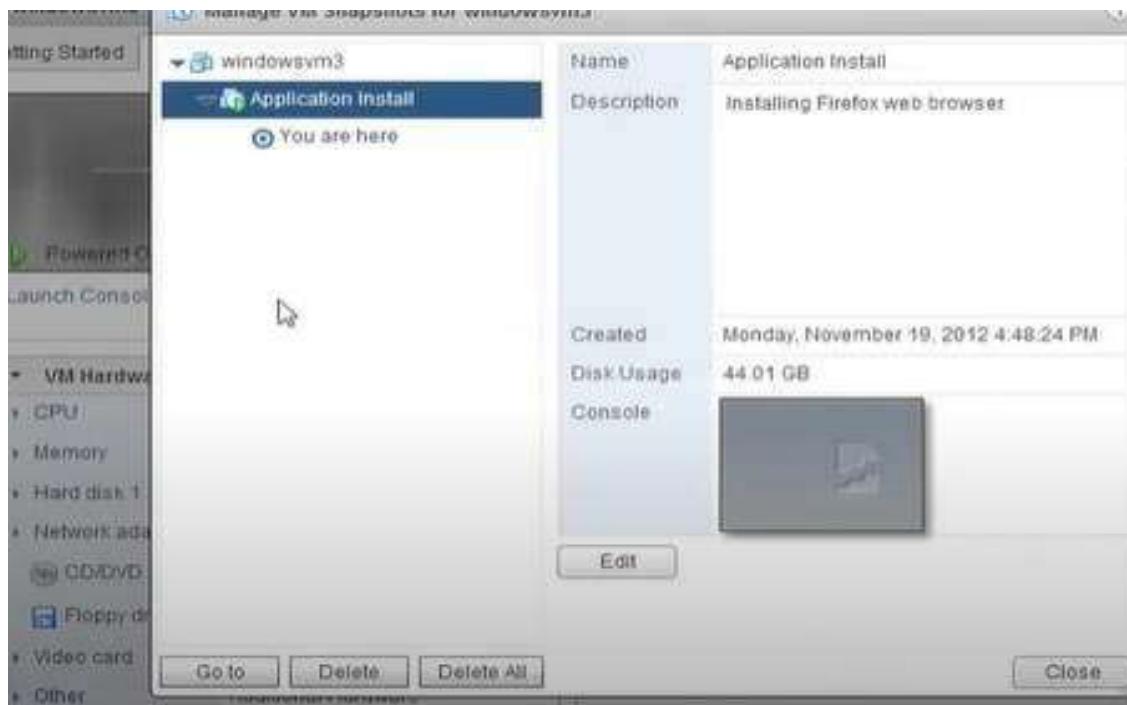
STEP 4: Scheduling Snapshots: Some virtualization platforms allow you to schedule snapshots to be taken automatically at specific intervals.

- Scheduled Snapshots: Navigate to the virtual machine's settings, find the "Snapshot Schedule" option, and configure the frequency and retention policy for automatic snapshots.

OUTPUT:







RESULT:

EX. NO. 3(A)**STORAGE VIRTUALIZATION –****DATE: CREATE, SPANNED, MIRRORED AND STRIPED VOULME****AIM:****PROCEDURE:****STEP 1:** How to create a spanned volume:

- a. Right-click on "This PC" or "My Computer" and select "Manage."
- b. In the Computer Management window, click on "Disk Management" under "Storage" in the left pane.
- c. Identify the disks you want to use in the spanned volume. They should be unallocated or have empty space available.
- d. Right-click on the first disk and choose "New Spanned Volume."
- e. Follow the on-screen instructions to select additional disks and allocate space for the spanned volume.
- f. Assign a drive letter or mount point to the new volume and format it with a file system.

STEP 2: How to create a mirrored volume:

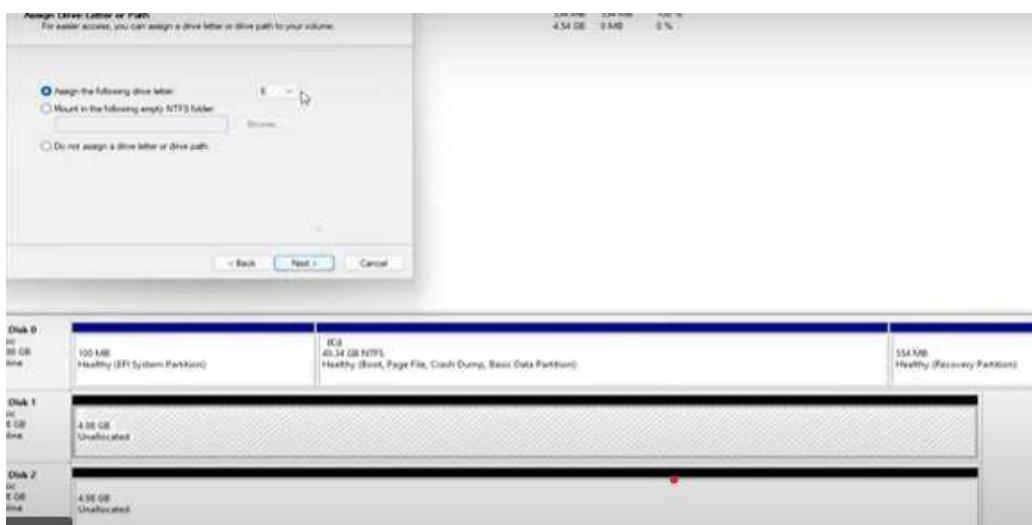
- a. Follow steps a to c from the spanned volume creation process to open Disk Management.
- b. Right-click on one of the disks you want to use in the mirror and choose "New Mirrored Volume."
- c. Select the additional disk(s) to mirror the first disk, and then allocate space for the mirrored volume.
- d. Assign a drive letter or mount point to the new volume and format it with a file system.
- e. Windows will start the synchronization process, where data is copied from the source disk to the mirror disk(s).

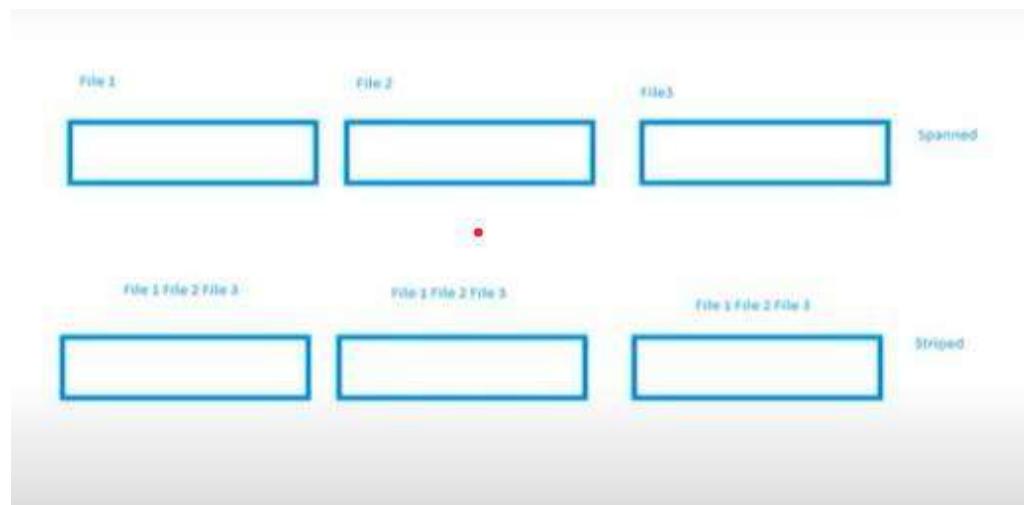
STEP 3: How to create a striped volume:

- a. Follow steps a to c from the spanned volume creation process to open Disk Management. Right-click on one of the disks you want to use in the stripe and choose "New Striped Volume."
- b. Select the additional disk(s) to include in the stripe, and then allocate space for the striped volume.

- c. Select the additional disk(s) to include in the stripe, and then allocate space for the striped volume.
- d. Assign a drive letter or mount point to the new volume and format it with a file system.

OUTPUT:



**RESULT:**

EX. NO. 3 (B)**STORAGE VIRTUALIZATION – CREATE RAID 5 VOLUME****DATE:****AIM:****PROCEDURE:**

STEP 1: Backup Data: Before creating the RAID 5 volume, back up all your critical data to ensure it is safe in case of any unforeseen issues.

STEP 2: Initialize and Convert Disks to Dynamic: If your disks are currently basic disks, you need to convert them to dynamic disks to create a RAID 5 volume. Follow these steps:

- a. Right-click on "This PC" or "My Computer" and select "Manage."
- b. In the Computer Management window, click on "Disk Management" under "Storage" in the left pane.
- c. Identify the disks you want to use in the RAID 5 array. They should be unallocated or have empty space available.
- d. Right-click on each disk and select "Convert to Dynamic Disk." Repeat this for all the disks you want to include in the RAID 5 array.

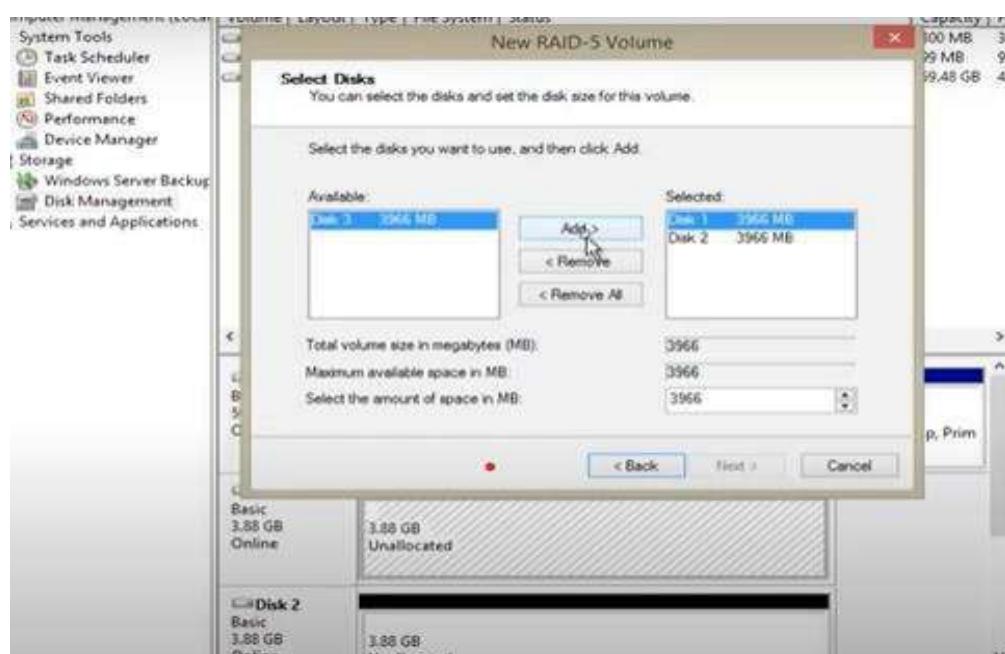
STEP 3: Create the RAID 5 Volume: Once you have converted the disks to dynamic, you can proceed to create the RAID 5 volume:

- a. Right-click on one of the disks you want to use in the RAID 5 array.
- b. Select "New Spanned Volume."
- c. Follow the on-screen instructions to select the other disks you want to include in the RAID 5 array. There should be at least three disks in total.
- d. Allocate the desired amount of space for the RAID 5 volume. RAID 5 requires a minimum of three disks, and the volume size will be the total capacity of all disks minus one disk's worth of space. For example, if you have three 1TB disks, the RAID 5 volume will have a total capacity of 2TB.
- e. Assign a drive letter or mount point to the new RAID 5 volume and format it with a file system.

STEP 4: Initialize and Format the RAID 5 Volume: After creating the RAID 5 volume, you need to initialize and format it:

- a. When prompted, initialize the disks using the default partition style
- b. Format the RAID 5 volume with your desired file system and assign a drive letter or mount point.

OUTPUT:



Volume	Layout	Type	File System	Status	Capacity	Fr
System Tools	Simple	Basic		Healthy (Recovery Partition)	300 MB	30
Task Scheduler	Simple	Basic		Healthy (EFI System Partition)	99 MB	95
Event Viewer	Simple	Basic	NTFS	Healthy (Boot, Page File, Crash Dump, Primary Partition)	59.48 GB	40
Shared Folders	Raid...	Dy...	NTFS	Resynching : (8%)	7.75 GB	7
Performance						
Device Manager						
Storage						
Windows Server Backup						
Disk Management						
Services and Applications						

Disk	Volume	Capacity	Status
Disk 0	(C)	59.48 GB NTFS	Healthy (Boot, Page File, Crash Dump, Primary Partition)
Disk 1	Raid5 (E)	3.87 GB NTFS	Resynching : (8%)
Disk 2	Raid5 (E)	3.87 GB NTFS	Resynching : (8%)

RESULT:

EX. NO. 4 (A)**DESKTOP VIRTUALIZATION – USING VNC SERVER****DATE:****AIM:****PROCEDURE:****STEP 1:** Install VNC Server.**STEP 2:** Configure VNC Server: After installing the VNC server, you'll need to configure it by setting a password or access control options to secure the remote access. Ensure that the VNC server is running and ready to accept incoming connections.**STEP 3:** Install VNC Viewer.**STEP 4:** Connect to the Remote Desktop: Launch the VNC viewer and enter the IP address or host name of the remote computer (the host) you want to connect to. If you have configured a password or access control options on the VNC server, you will be prompted to enter the credentials. Once authenticated, the VNC viewer establishes a connection to the remote desktop.**STEP 5:** Control the Remote Desktop: After the connection is established, you will see the remote desktop environment displayed in the VNC viewer. You can now interact with the remote desktop as if you were physically sitting in front of it. You can run applications, access files, and perform any tasks on the remote computer just as if you were using it directly.

OUTPUT:

```

=====
installing:
tigervnc-server.x86_64 1.3.1-9.el7 base
transaction Summary
=====
install 1 Package
=====
total download size: 283 K
installed size: 493 K
  is this ok [y/d/N]: y
downloading packages:
tigervnc-server-1.3.1-9.el7.x86_64.rpm
running transaction check
running transaction test
transaction test succeeded
running transaction
  Installing : tigervnc-server-1.3.1-9.el7.x86_64
  Verifying : tigervnc-server-1.3.1-9.el7.x86_64
=====
installed:
tigervnc-server.x86_64 0:1.3.1-9.el7
=====
complete!
root@ip-172-31-79-238 ~]# useradd roham
root@ip-172-31-79-238 ~]# cp /lib/systemd/system/vncserver@.service /etc/systemd/

```

Amazon AWS CloudWatch Log Stream

Instance: i-08eaf945801ee0418 (VNC) Public DNS: ec2-54-167-46-85.compute-1.amazonaws.com

Description Status Checks Monitoring Tags

Instance ID: i-08eaf945801ee0418 Public DNS (IPv4): ec2-54-167-46-85.compute-1.amazonaws.com

```

=====
total download size: 283 K
installed size: 493 K
  is this ok [y/d/N]: y
downloading packages:
tigervnc-server-1.3.1-9.el7.x86_64.rpm
running transaction check
running transaction test
transaction test succeeded
running transaction
  Installing : tigervnc-server-1.3.1-9.el7.x86_64
  Verifying : tigervnc-server-1.3.1-9.el7.x86_64
=====
installed:
tigervnc-server.x86_64 0:1.3.1-9.el7
=====
complete!
root@ip-172-31-79-238 ~]# useradd roham
root@ip-172-31-79-238 ~]# cp /lib/systemd/system/vncserver@.service /etc/systemd/system/vncserver@:1.service
root@ip-172-31-79-238 ~]# vi /etc/systemd/system/vncserver@:1.service
root@ip-172-31-79-238 ~]# passwd roham
changing password for user roham.
new password:
retype new password:
passwd: all authentication tokens updated successfully.
root@ip-172-31-79-238 ~]# firewall-cmd --permanent --zone=public --add-

```

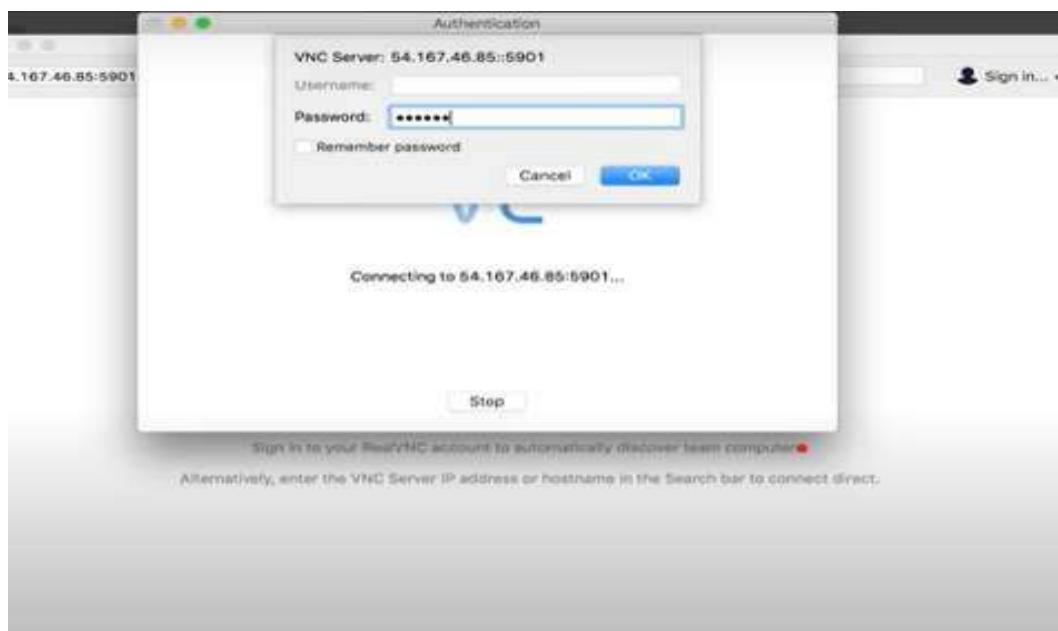
Amazon AWS CloudWatch Log Stream

Instance: i-08eaf945801ee0418 (VNC) Public DNS: ec2-54-167-46-85.compute-1.amazonaws.com

Description Status Checks Monitoring Tags

Instance ID: i-08eaf945801ee0418 Public DNS (IPv4): ec2-54-167-46-85.compute-1.amazonaws.com

Instance state: running IPv4 Public IP: 54.167.46.85

**RESULT:**

EX. NO. 4 (B) DESKTOP VIRTUALIZATION – CHROME REMOTE DESKTOP**DATE:****AIM:****PROCEDURE:**

STEP 1: Install Chrome Remote Desktop Extension: Make sure you have the Google Chrome web browser installed on both the computer you want to access remotely (the host) and the computer or device you want to use for remote access (the client). Install the "Chrome Remote Desktop" extension from the Chrome Web Store on both devices.

STEP 2: Set Up Host Computer (Computer to be Accessed):

- a. Open Google Chrome on the host computer.
- b. In the address bar, type "chrome://apps" and press Enter.
- c. Click on the "Chrome Remote Desktop" icon to open the application.
- d. Follow the on-screen instructions to grant necessary permissions and set up remote access for the host computer.
- e. Create a secure PIN to use for remote access authentication.

Step 3: Access Host Computer (Client Device):

- a. Open Google Chrome on the client device (the computer or device from which you want to access the host computer remotely).
- b. In the address bar, type "remotedesktop.google.com/access" and press Enter.
- c. Click on the "Access" button under the "Remote Access" section.
- d. Sign in with your Google Account (the same account used on the host computer).

STEP 4: Choose the Host Computer:

- a. After signing in, you should see a list of available computers set up for remote access. Choose the host computer you want to access.

STEP 5: Authenticate and Connect:

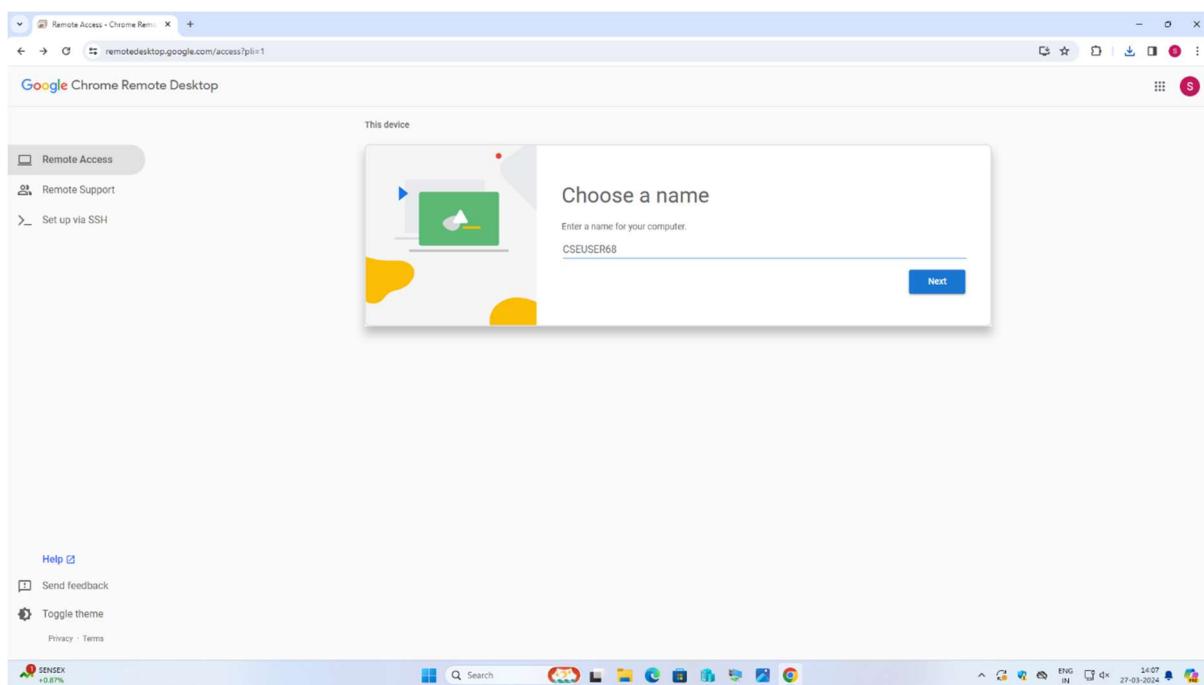
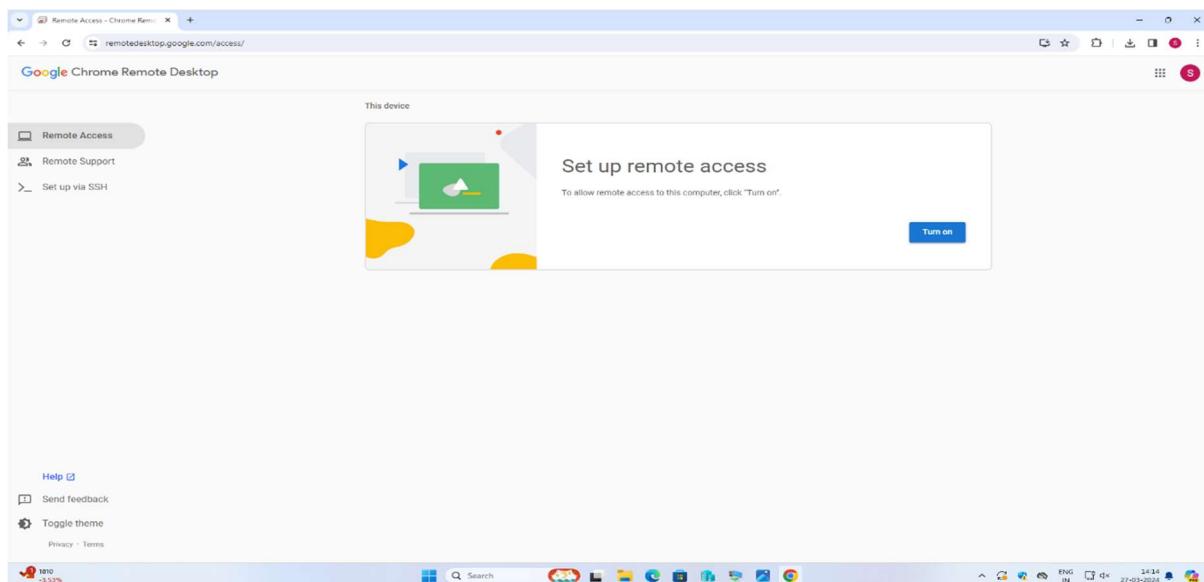
- a. If you have set up a PIN for the host computer, you will be prompted to enter it to authenticate the remote access.
- b. Once authenticated, the remote connection will be established, and you will see the host computer's desktop in the Chrome browser window.

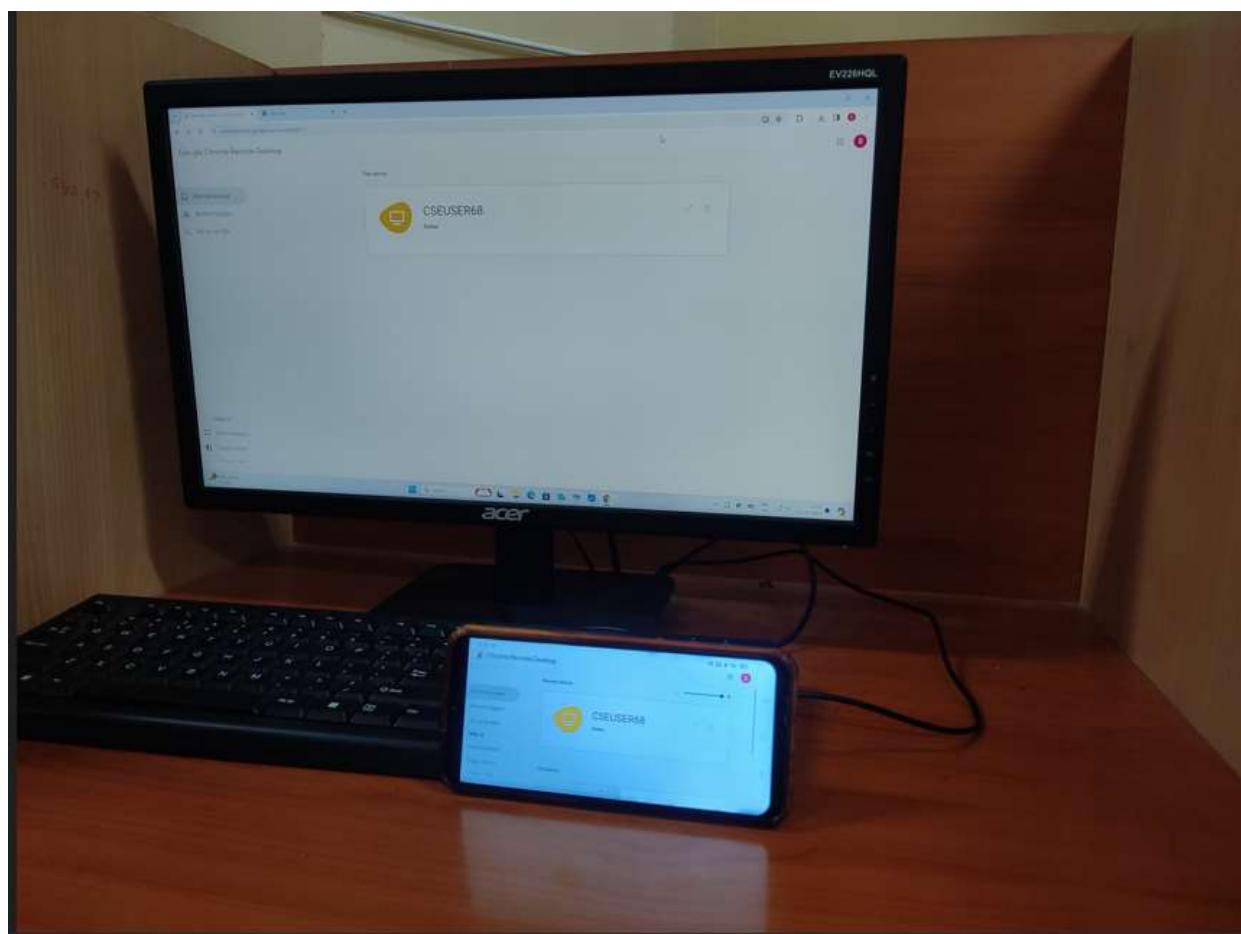
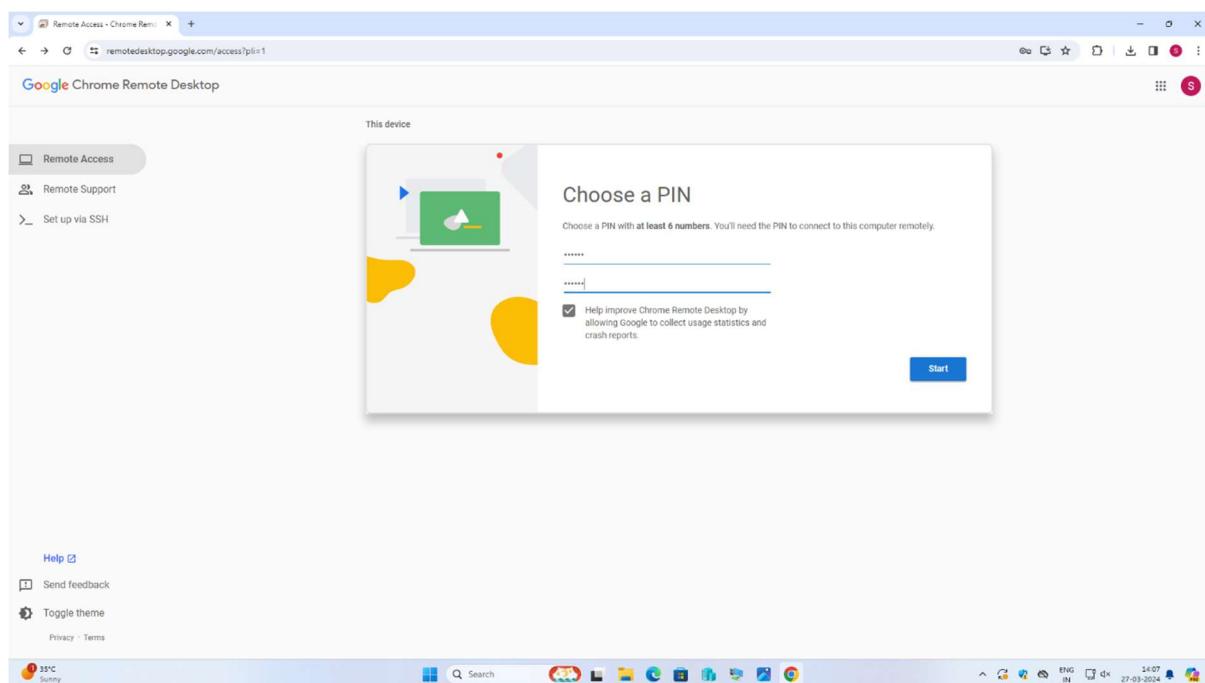
STEP 6: Control the Host Computer:

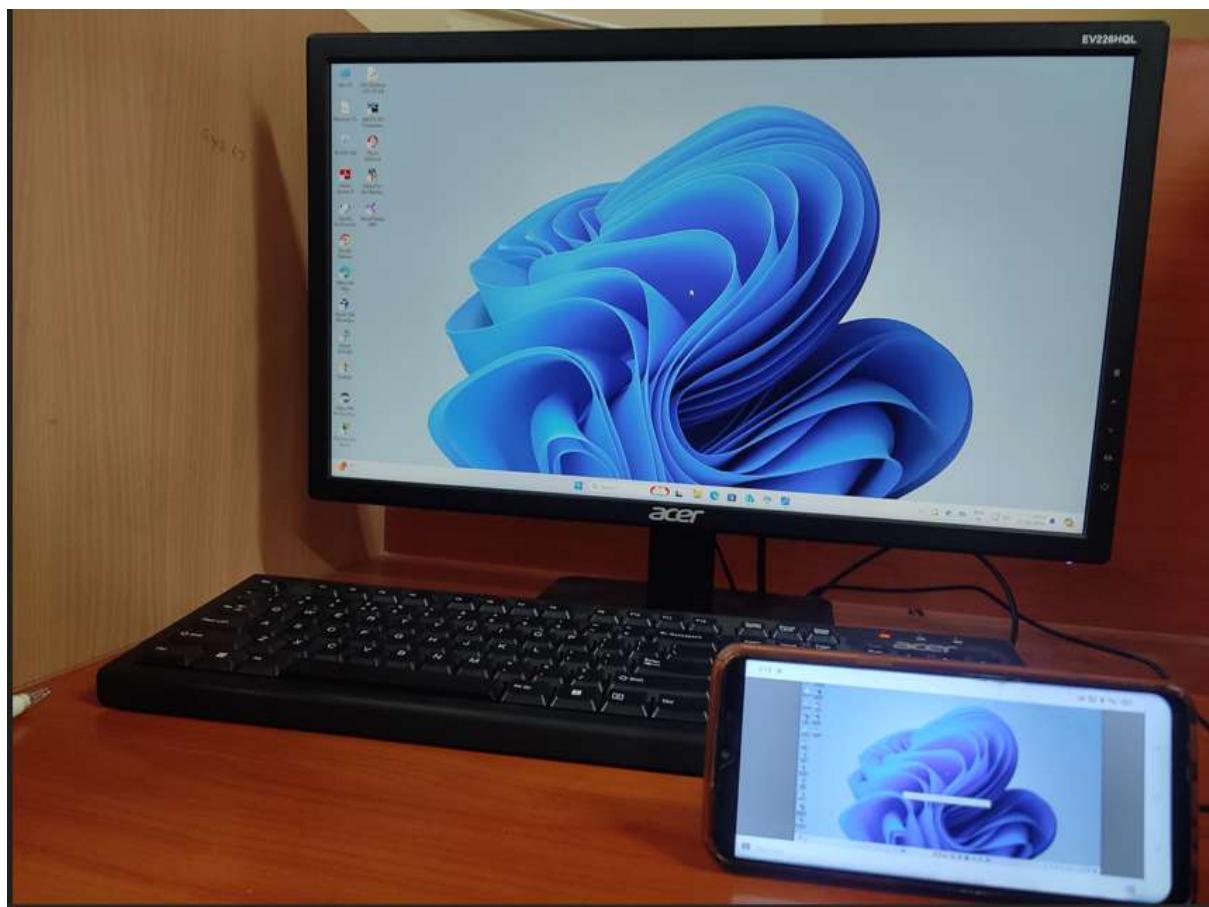
- You can now interact with the host computer's desktop through the Chrome browser on your client device. Use your mouse and keyboard to control the remote desktop.
- To switch between full-screen and windowed mode, click the "Toggle full screen" button on the top right corner of the remote desktop window.

STEP 7: End the Remote Session: To end the remote session, click the "Stop Sharing" button at the bottom of the remote desktop window.

OUTPUT:







RESULT:

EX. NO. 5**SERVER VIRTUALIZATION -
CREATE A TYPE 2 VIRTUALIZATION ON ESXI 6.5 SERVER**

AIM:**PROCEDURE:**

STEP 1: Install ESXi 6.5: First, you need to install VMware ESXi 6.5 on your server.

STEP 2: Access ESXi Web Client: Once ESXi is installed and running, access the ESXi Web Client through a web browser on a separate computer. Enter the IP address or hostname of your ESXi server to log in to the management interface.

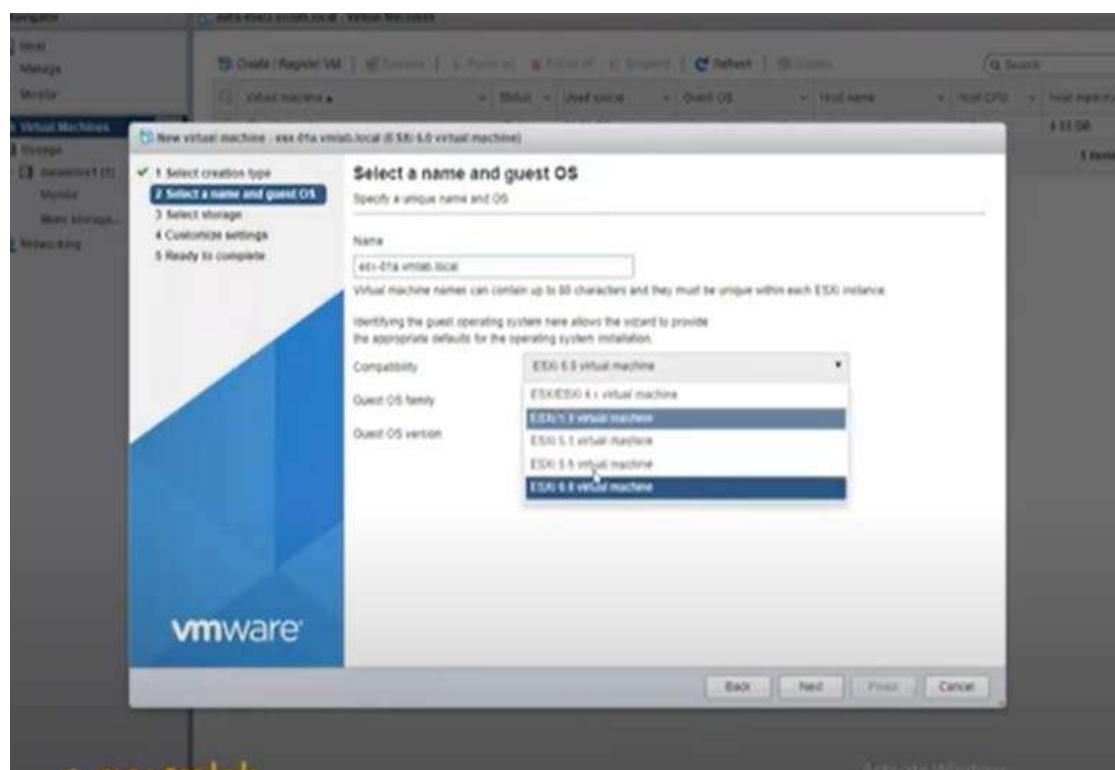
STEP 3: Create a Virtual Machine: To create a virtual machine within ESXi, follow these steps:

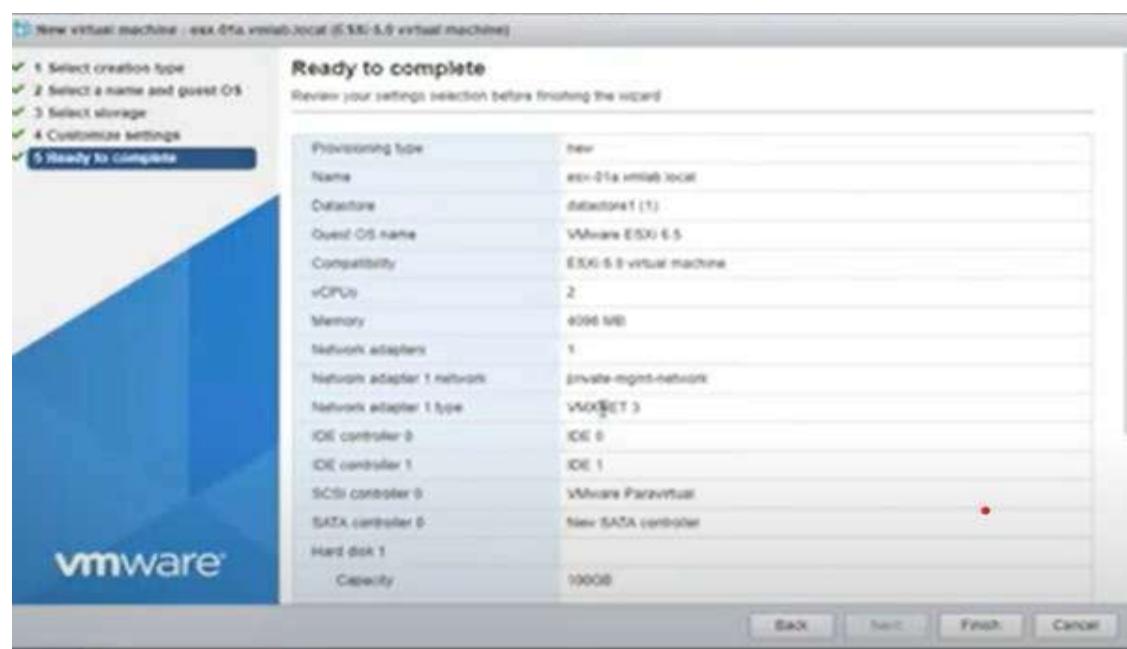
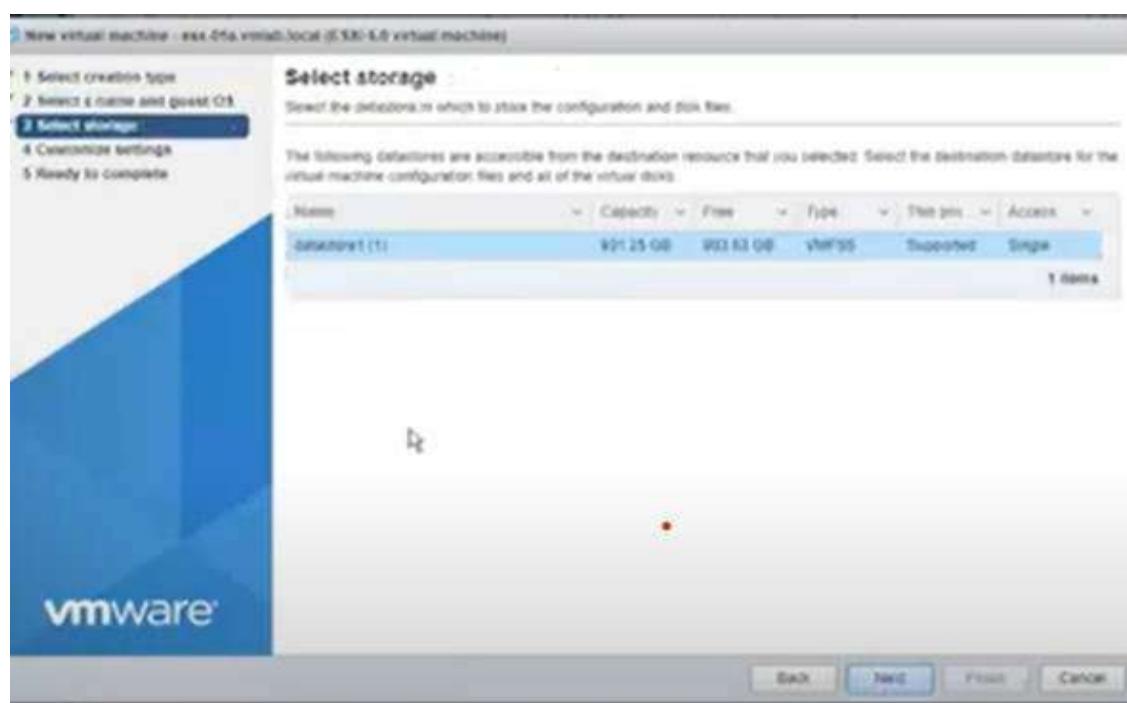
- a. In the ESXi Web Client, navigate to the "Hosts and Clusters" view.
- b. Select your ESXi server from the list of hosts.
- c. Click on the "Create/Register VM" button or right-click on the host and choose "New Virtual Machine."
- d. The "Create New Virtual Machine" wizard will appear. Follow the steps in the wizard to configure the virtual machine, including providing a name, selecting the guest operating system, setting the desired resources (CPU, memory, disk space, etc.), and selecting a storage location for the virtual machine files.
- e. Finish the wizard, and the virtual machine will be created.

STEP 4: Install Guest Operating System: Once the virtual machine is created, you can power it on and install the guest operating system of your choice (e.g., Windows, Linux, etc.) using an ISO image or CD/DVD.

STEP 5: Access and Manage the Virtual Machine: After the guest operating system is installed, you can access the virtual machine through the VMware Remote Console (VMRC) or use remote access tools like VNC or RDP to interact with the guest operating system.

OUTPUT:

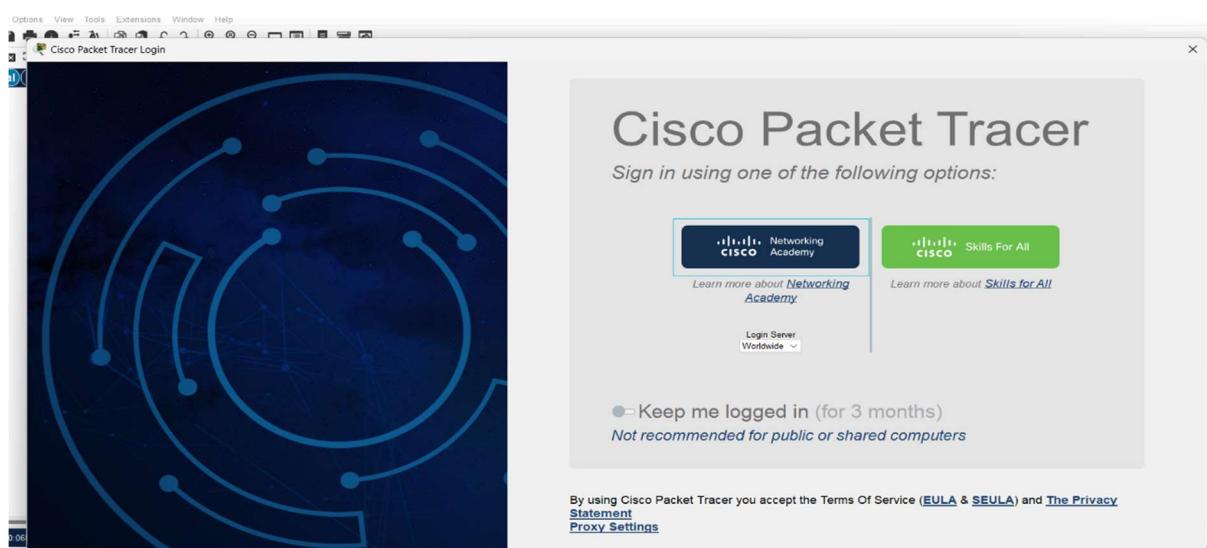
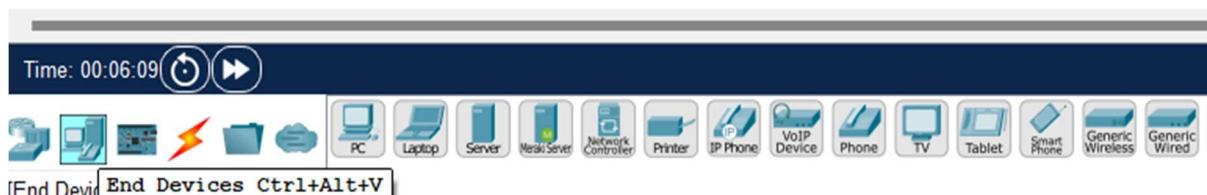


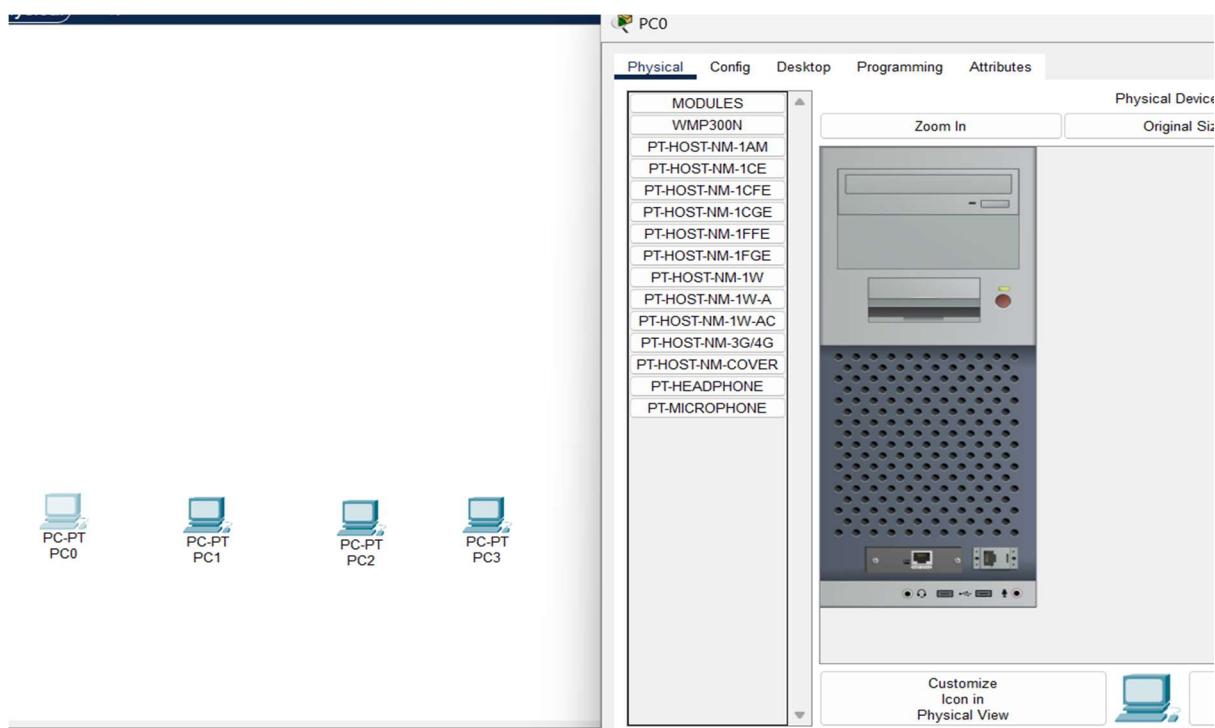


RESULT:

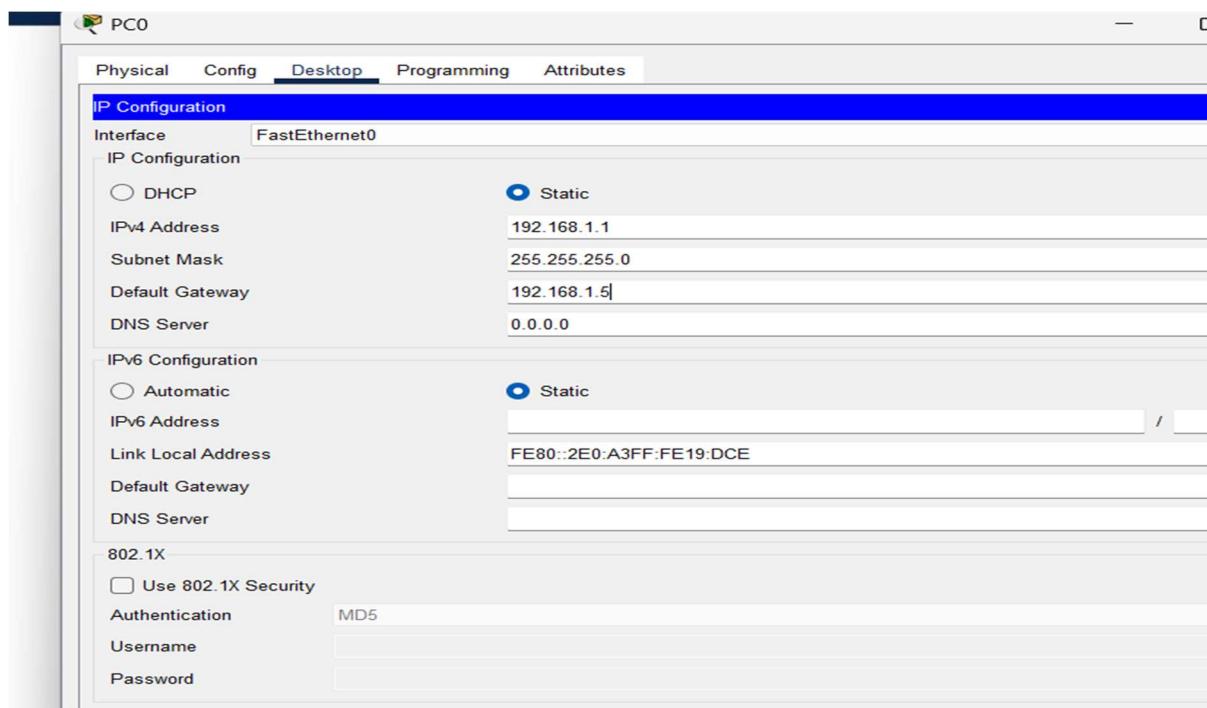
EX. NO. 6

NETWORK VIRTUALIZATION -
CREATE A VLAN IN CISCO PACKET TRACER

AIM:**PROCEDURE:****STEP 1:** Login with Cisco Packet Tracer**STEP 2:** Click on End Devices and drag the PC's and place it in the Workspace

STEP 3: Click the PC0

STEP 4: In PC0, Choose the desktop option then move on with IP configuration and set the IP Subnet Mask and the Default Gateway



STEP 5: Repeat the same steps as followed in PC0 for PC1, PC2, PC3

PC1: IP Address: 192.168.1.2

Subnet Mask: 255.255.255.0

Default Gateway: 192.168.1.5

PC2: IP Address: 192.168.10.1

Subnet Mask: 255.255.255.0

Default Gateway: 192.168.10.5

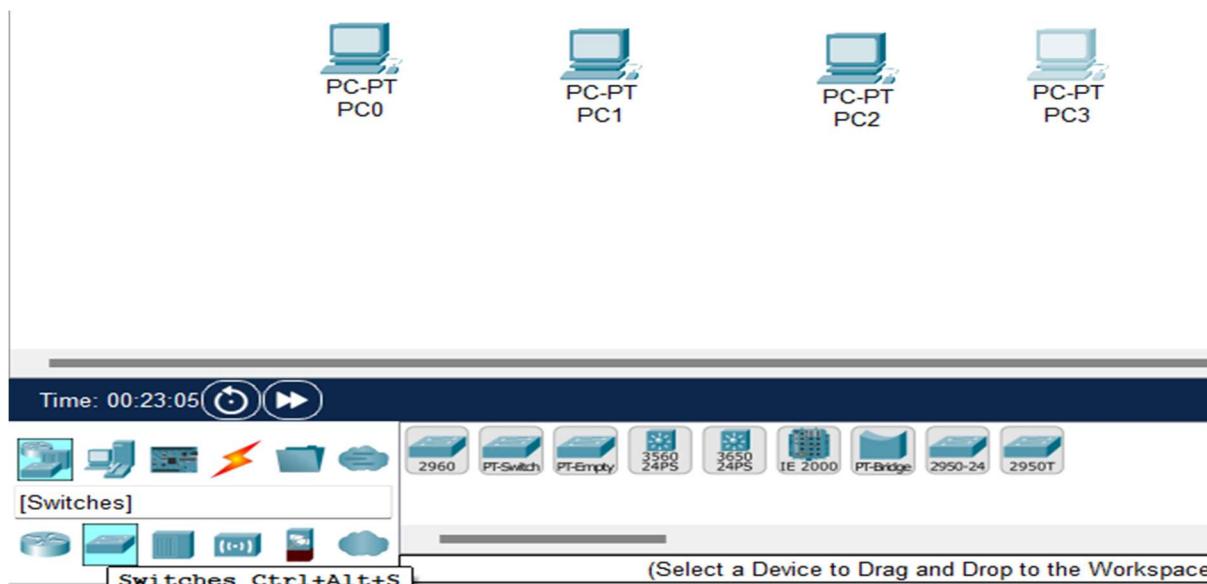
PC3: IP Address: 192.168.10.2

Subnet Mask: 255.255.255.0

Default Gateway: 192.168.10.5

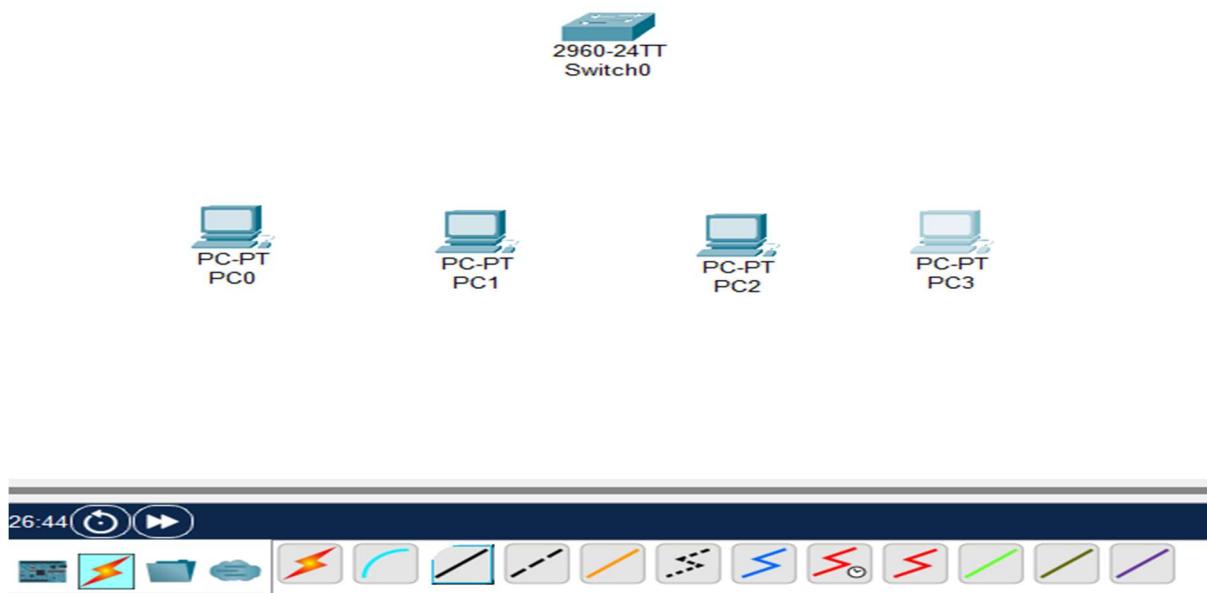
STEP 6: After completing the Step 5, do the following,

Network Devices -> Switches -> Switch2960



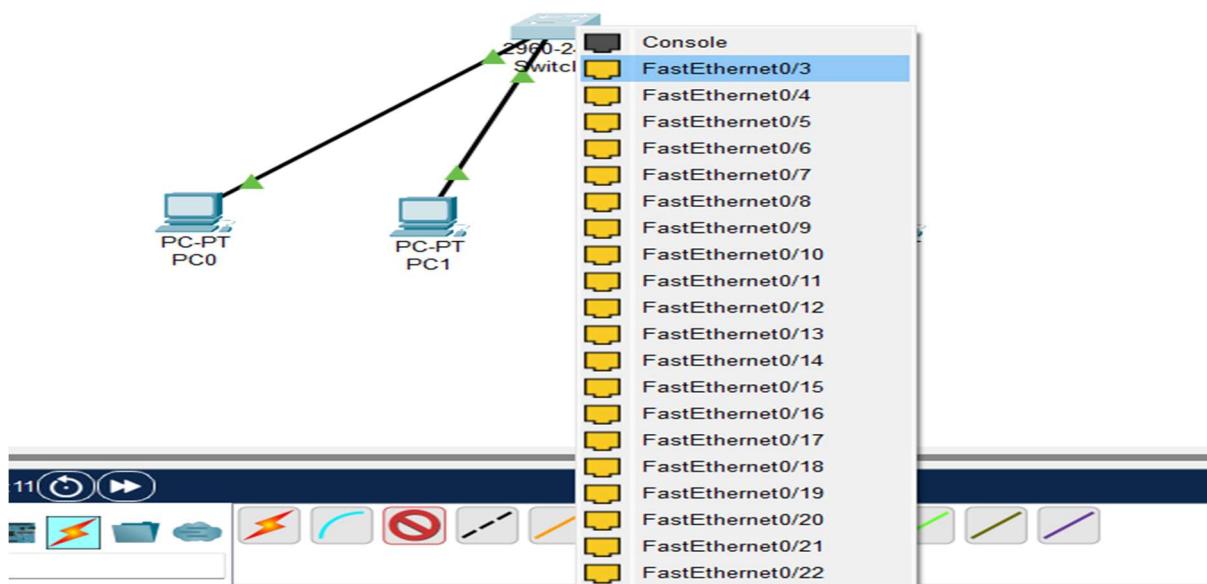
STEP 7: After placing the Switch on the Workspace, again do the following

Connections -> Choose Third Wire Connection

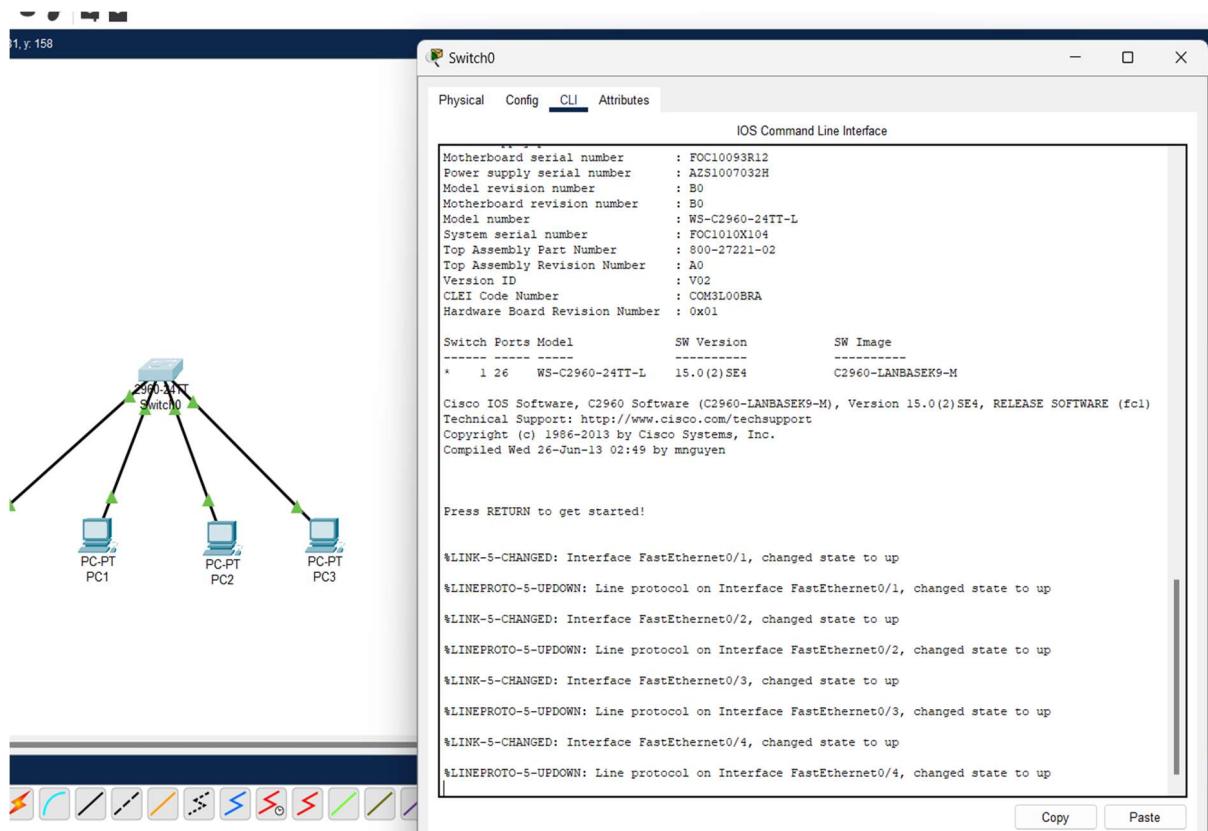


STEP 8: Now, make connection between PC0 and Switch2960. Make a FastEthernet connection and connect to the Switch2960 as FastEthernet 0/1

*** Like this connect PC1, PC2 and PC3 also to the Switch2960 as FastEthernet 0/2, 0/3, 0/4



STEP 9: Click on Switch2960 and Choose CLI to proceed commands for creating VLAN's.



STEP 10: Creation of VLAN's by the following steps

```
Press RETURN to get started!

%LINK-5-CHANGED: Interface FastEthernet0/1, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/1, changed state to up
%LINK-5-CHANGED: Interface FastEthernet0/2, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/2, changed state to up
%LINK-5-CHANGED: Interface FastEthernet0/3, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/3, changed state to up
%LINK-5-CHANGED: Interface FastEthernet0/4, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/4, changed state to up

Switch>en
Switch#config t
Enter configuration commands, one per line. End with CNTL/Z.
Switch(config)#vlan 10
Switch(config-vlan)#vlan 20
Switch(config-vlan)#

Copy Paste
```

STEP 11: Give access to VLAN's

```

% Incomplete command.
Switch(config)#exit
Switch#
%SYS-5-CONFIG_I: Configured from console by console

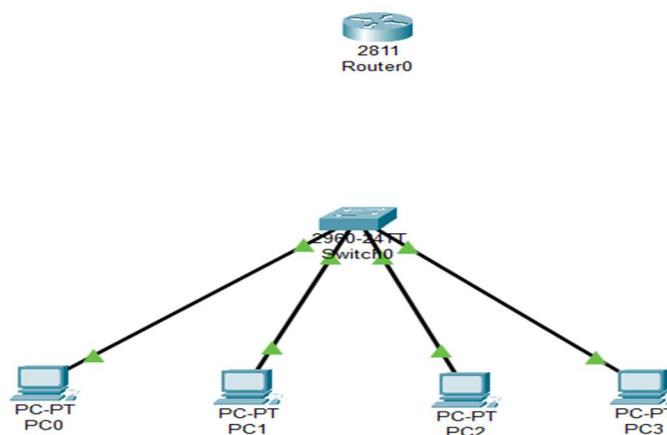
Switch#config t
Enter configuration commands, one per line. End with CNTL/Z.
Switch(config)#inter
% Incomplete command.
Switch(config)#interface fastEthernet 0/1
Switch(config-if)#switchport access vlan 10
Switch(config-if)#interface fastEthernet 0/2
Switch(config-if)#switchport access vlan 10
Switch(config-if)#exit
Switch(config)#interface fastEthernet 0/4
Switch(config-if)#switchport access vlan 20
Switch(config-if)#interface fastEthernet 0/3
Switch(config-if)#switchport access vlan 20
Switch(config-if)#^Z
Switch#
%SYS-5-CONFIG_I: Configured from console by console

Switch#show vlan

VLAN Name          Status      Ports
-----  -----
1    default        active     Fa0/5, Fa0/6, Fa0/7, Fa0/8
                           Fa0/9, Fa0/10, Fa0/11, Fa0/12
                           Fa0/13, Fa0/14, Fa0/15, Fa0/16
                           Fa0/17, Fa0/18, Fa0/19, Fa0/20
                           Fa0/21, Fa0/22, Fa0/23, Fa0/24
                           Gig0/1, Gig0/2
10   VLAN0010       active     Fa0/1, Fa0/2
20   VLAN0020       active     Fa0/3, Fa0/4
1002 fddi-default   active
1003 token-ring-default   active
1004 fddinet-default   active
1005 trnet-default    active

```

STEP 12: Place the Router0 2811 in the Workspace



STEP 13: Establish a connection from Switch2960 to Router through FastEthernet 0/8 and then give trunk mode to Router by click on the Switch by using the following commands.

```
Switch#config t
Enter configuration commands, one per line. End with CNTL/Z.
Switch(config)#interface fastEthernet 0/8
Switch(config-if)#switchport mode trunk
Switch(config-if)#

```

Copy**Paste**

STEP 14: Select the Router and run the following commands on under CLI to create sub interface vlans

```
Router>en
Router#config t
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#interface fastEthernet 0/0
Router(config-if)#no shut

Router(config-if)#
%LINK-5-CHANGED: Interface FastEthernet0/0, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/0, changed state to up
Router(config-if)#interface fastEthernet 0/0.10
Router(config-subif)#
%LINK-5-CHANGED: Interface FastEthernet0/0.10, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/0.10, changed state to up
Router(config-subif)#encapsulation dot1Q 10
Router(config-subif)#ip address 192.168.1.5 255.255.255.0
Router(config-subif)#interface fastEthernet 0/0.20
Router(config-subif)#
%LINK-5-CHANGED: Interface FastEthernet0/0.20, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/0.20, changed state to up
Router(config-subif)#encapsulation dot1Q 20
Router(config-subif)#ip address 192.168.10.5 255.255.255.0
Router(config-subif)#

```

STEP 15: Run the stimulation by assigning packets and analyse the output comes from simulation.

RESULT:

EX. NO. 7**INSTALL KVM IN LINUX****DATE:****AIM:****PROCEDURE:**

STEP 1: Check Hardware Support: Before installing KVM, ensure that your system's CPU supports hardware virtualization extensions (Intel VT-x or AMD- V). You can check this by running the following command:

```
egrep -c '(vmx|svm)' /proc/cpuinfo
```

If the output is greater than zero (1 or more), it means your CPU supports hardware virtualization.

STEP 2: Install KVM Packages in Ubuntu

```
sudo apt update
```

```
sudo apt install qemu-kvm libvirt-daemon-system libvirt-clients bridge-utils  
virt-manager
```

STEP 3: Verify Installation: After installing the required packages, check if KVM kernel modules are loaded correctly:

```
lsmod | grep kvm
```

The output should show kvm and kvm_intel or kvm_amd modules loaded, depending upon the CPU

STEP 4: Configure Permissions: For non-root users to manage virtual machines using KVM, add them to the libvirt group,

```
sudo usermod -aG libvirt <username>
```

Remember to log out and log back in for the changes to take effect.

STEP 5: Enable Nested Virtualization (Optional): If you plan to run virtual machines with nested virtualization (e.g., running KVM inside a KVM guest), it may need to enable nested virtualization on the host. This step is only required to intend to run virtual machines with KVM as guests.

For Intel CPUs:

```
echo "options kvm-intel nested=1" | sudo tee /etc/modprobe.d/kvm-intel.conf  
sudo modprobe -r kvm_intel  
sudo modprobe kvm_intel
```

For AMD CPUs:

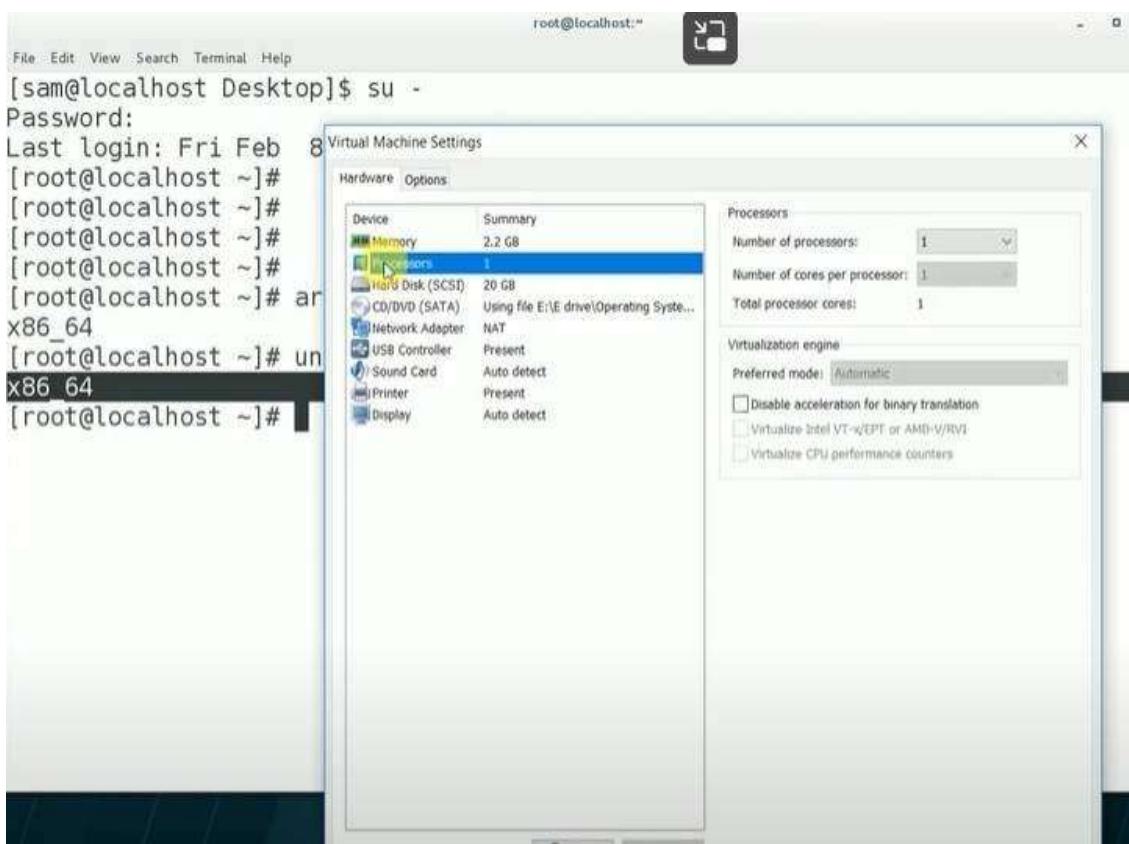
```
echo "options kvm-amd nested=1" | sudo tee /etc/modprobe.d/kvm- amd.conf  
sudo modprobe -r kvm_amd sudo  
modprobe kvm_amd
```

Step 6: Install and Configure Virt-Manager (Optional): Virt-Manager is a graphical user interface tool to manage virtual machines using KVM. If you prefer a GUI interface, you can install Virt-Manager:

```
sudo apt install virt-manager
```

Once the installation is complete, you can start creating and managing virtual machines using KVM

OUTPUT:

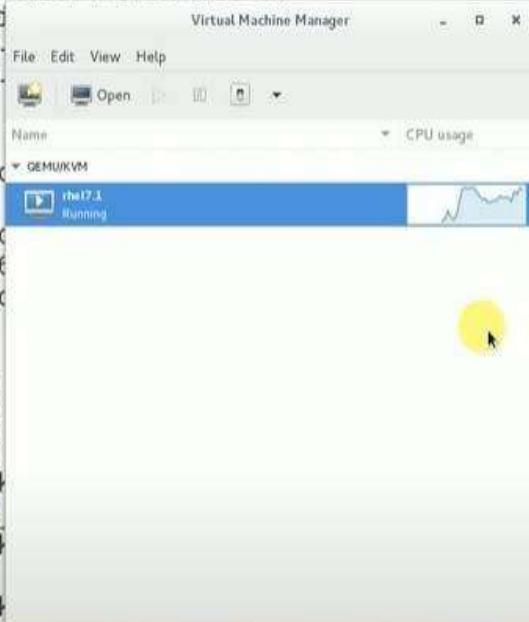


```

File Edit View Search Terminal Help
root@localhost ~]#
root@localhost ~]# lsmod | grep kvm
vm_intel           162153  0
vm                   525259  1 kvm_intel
root@localhost ~]# cat /proc/cpuinfo | egrep -E "svm|vmx"
lags          : fpu vme de pse tsc msr pae mce cx8 apic sep mtrr pge mca cmc
at pse36 clflush dts mmx fxsr sse sse2 ss syscall nx pdpe1gb rdtscp lm consti
tsc arch_perfmon pebs bts nopl xtopology tsc_reliable nonstop_tsc aperfmpfperf
erfpu dni pclmulqdq vmx ssse3 fma cx16 pcid sse4_1 sse4_2 x2apic movbe popcnt
c_deadline_timer aes xsave avx f16c rdrand hypervisor lahf_lm abm 3dnowprefei
arat pln pts dtherm hwp hwp_noitfy hwp_act_window hwp_epp tpr_shadow vnmi epi
id fsgsbase tsc_adjust bmi1 avx2 smep bmi2 invpcid rdseed adx smap xsaveopt
root@localhost ~]# yum groups install "Virtualization Host"
loaded plugins: langpacks, product-id, search-disabled-repos, subscription-
    : manager
This system is not registered to Red Hat Subscription Management. You can use
scription-manager to register.
here is no installed groups file.
aybe run: yum groups mark convert (see man yum)
est
arning: group Virtualization Host does not exist.
aybe run: yum groups mark install (see man yum)
o packages in any requested group available to install or update
root@localhost ~]# ■

```

Installing : virt-manager-common-1.2.1-8.el7.noarch	4/5
Installing : virt-manager-1.2.1-8.el7.noarch	5/5
Verifying : python-ipaddr-2.1.9-5.el7.noarch	1/5
Verifying : vte3-0.36.4-1.el7.x86_64	2/5
Verifying : libvirt	3/5
Verifying : virt	4/5
Verifying : virt	5/5
 Installed: virt-manager.noarch	
 Dependency Installed: libvirt-python.x86_64 virt-manager-common	0:2.1.9-5.el7 0:0.36.4-1.el7
 Complete!	
[root@localhost ~]#	
[root@localhost ~]#	
[root@localhost ~]#	
[root@localhost Des]	
rhel-server-7.2-x86_64	
[root@localhost Des]	
/root/Desktop	
[root@localhost Des]	

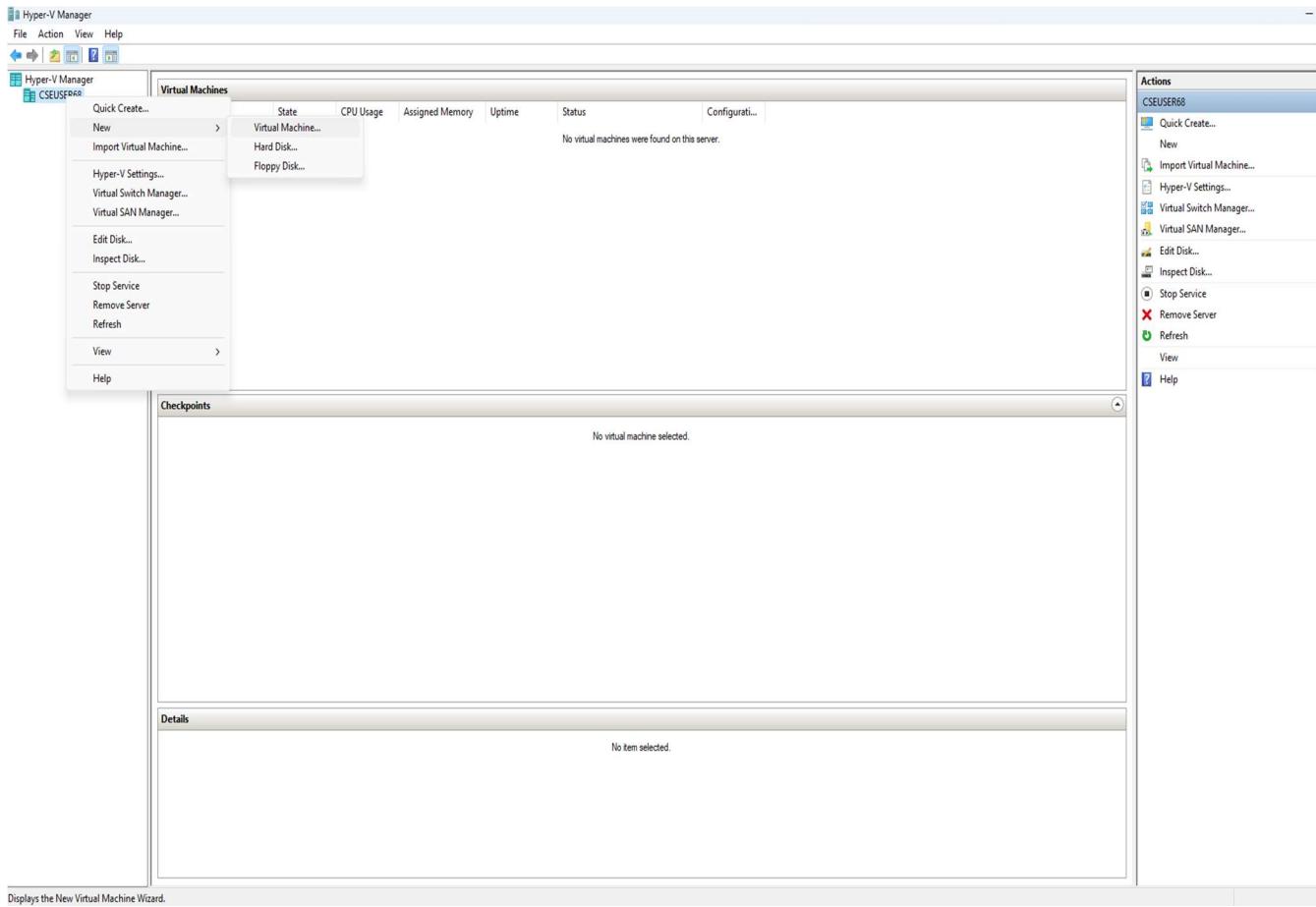


The screenshot shows the 'Virtual Machine Manager' window. At the top, there's a toolbar with icons for file operations like Open, Save, and Print. Below the toolbar is a dropdown menu labeled 'Name' which is set to 'GEMUKVM'. Underneath this is a list of VMs. The first item in the list is 'rhel7.2' with the status 'Running'. To the right of the list, there's a small graph showing CPU usage over time.

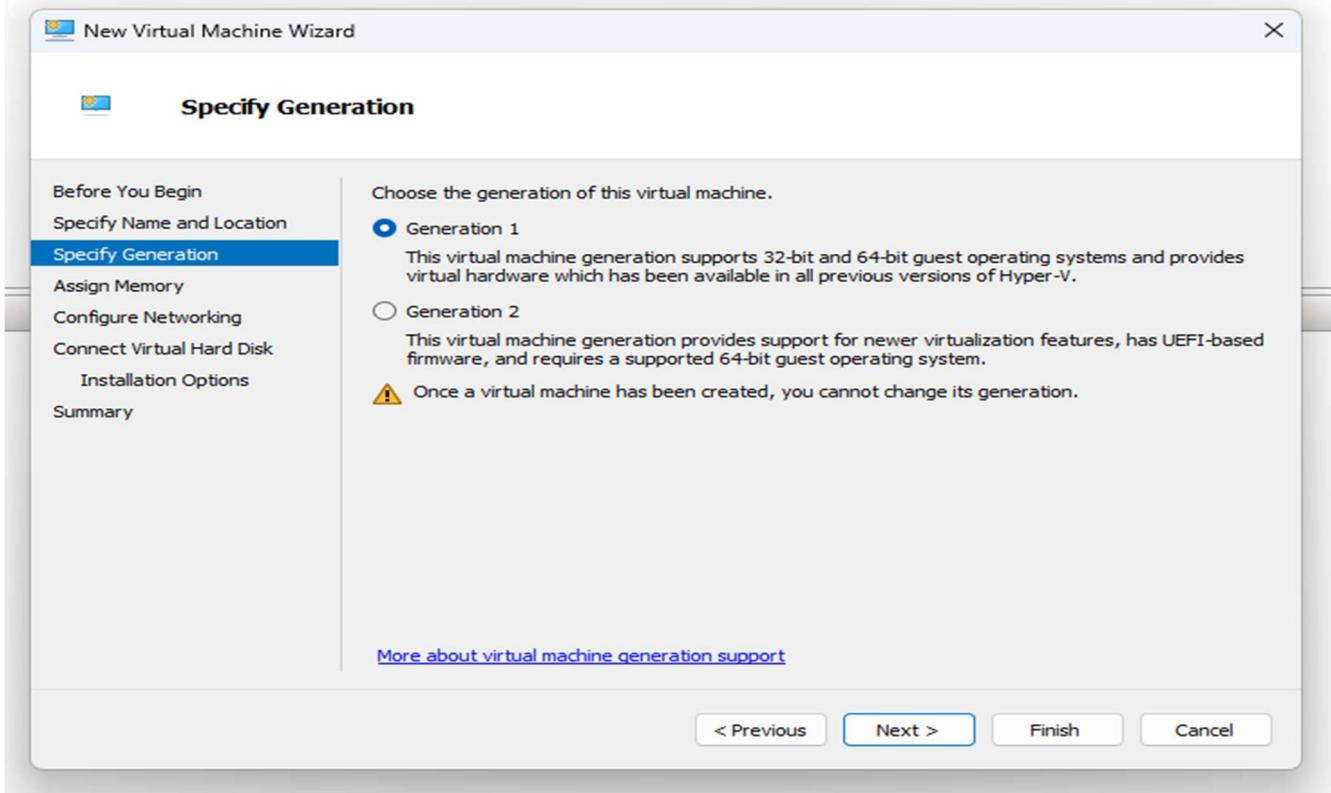
RESULT:

EX. NO. 8 CREATE NESTED VIRTUAL MACHINE (VM UNDER ANOTHER VM)**DATE:****AIM:****PROCEDURE:**

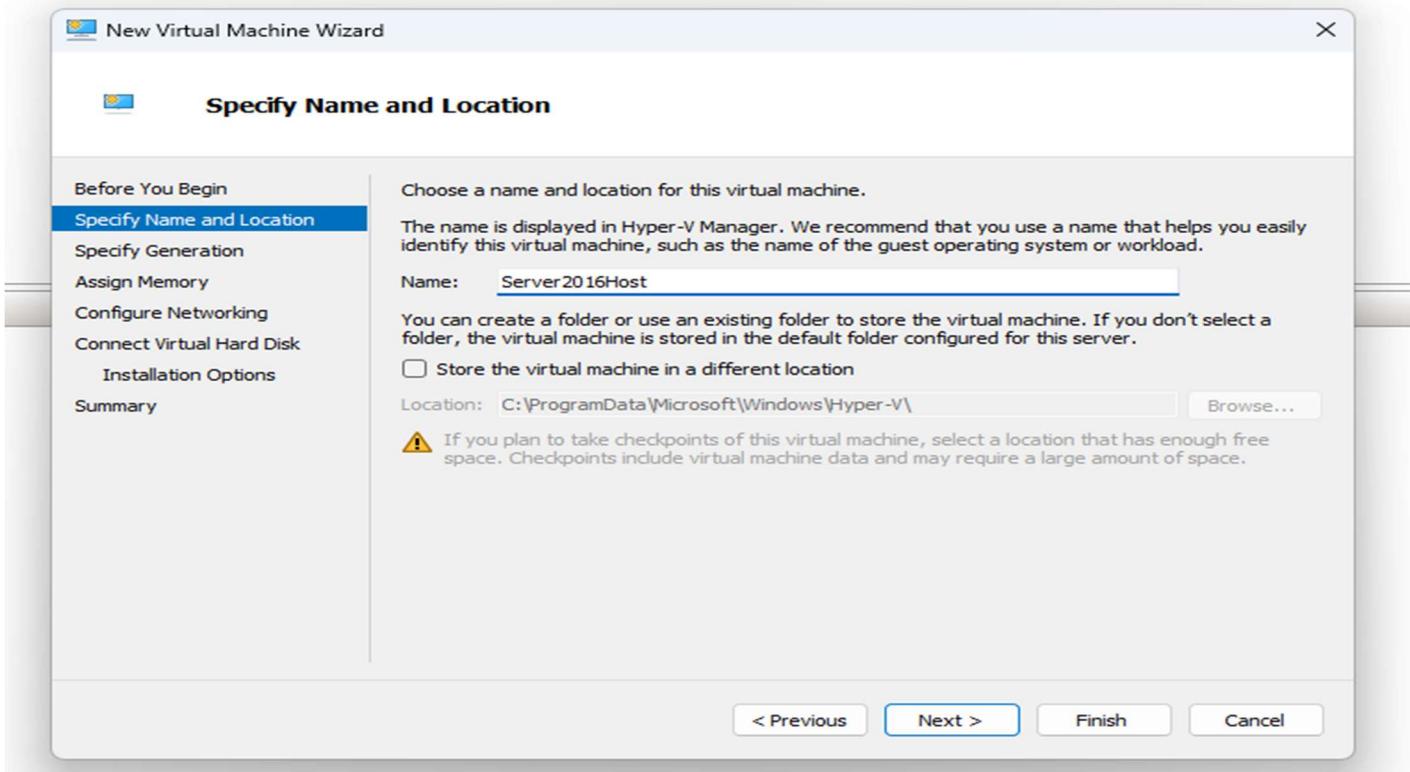
STEP 1: Before get into the Nested Procedure, first configure the virtual machine in Microsoft Hyper-V.

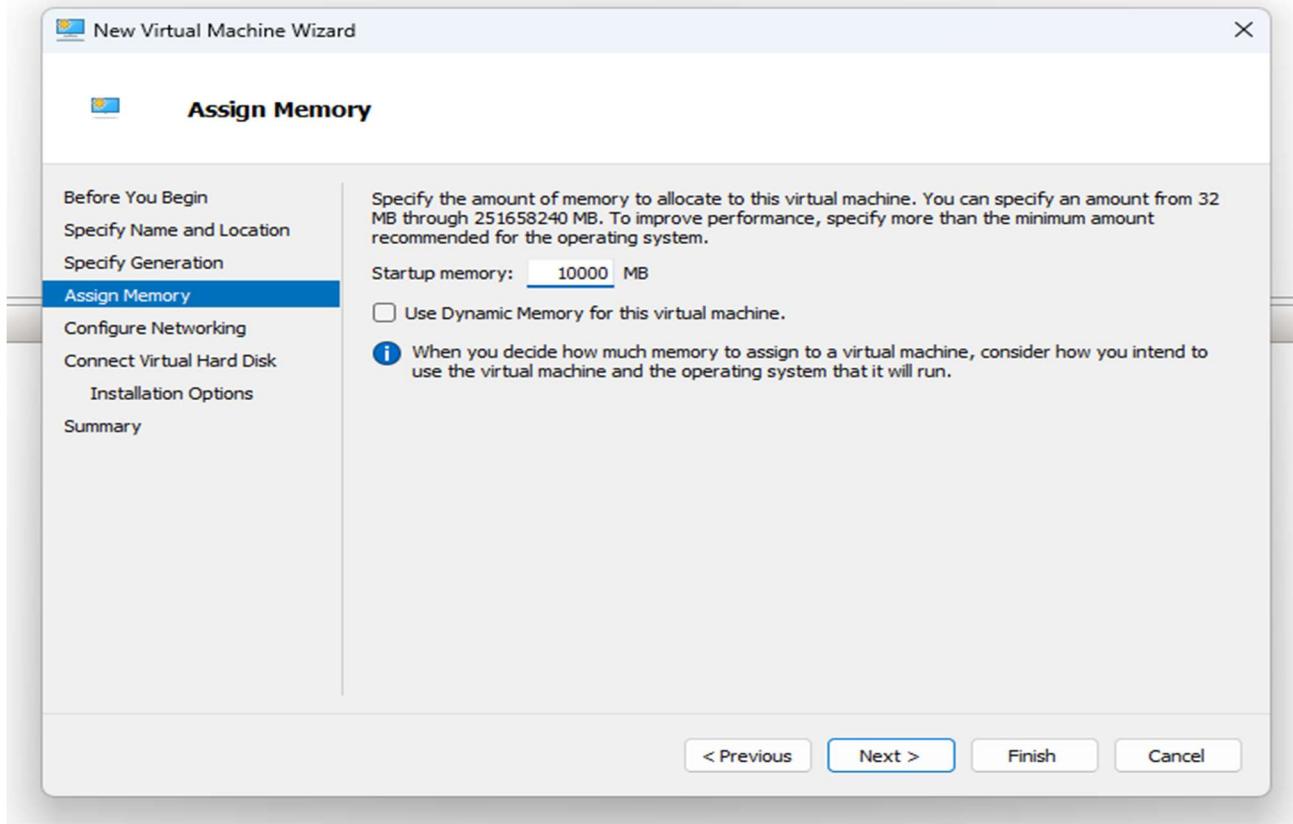
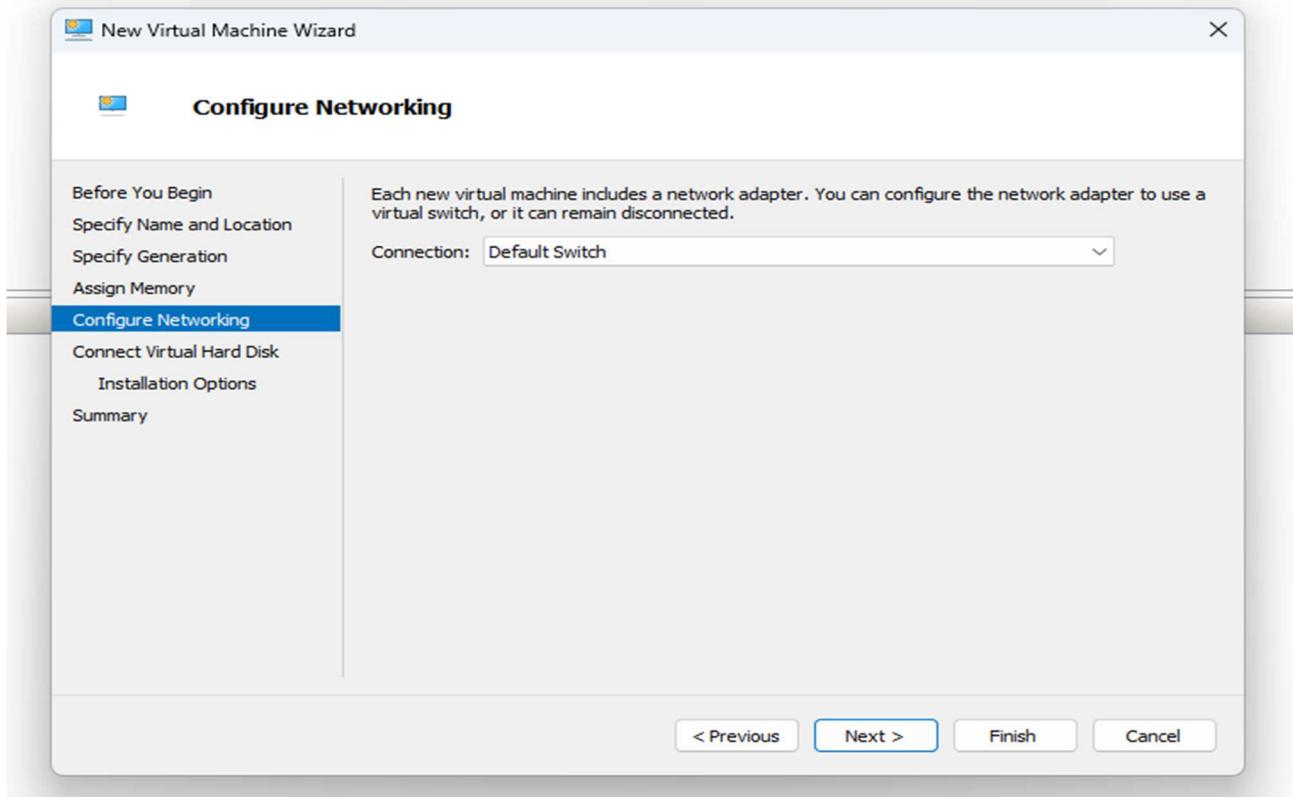


STEP 2: Choosing the generation of the virtual machine that going to install on the physical machine.

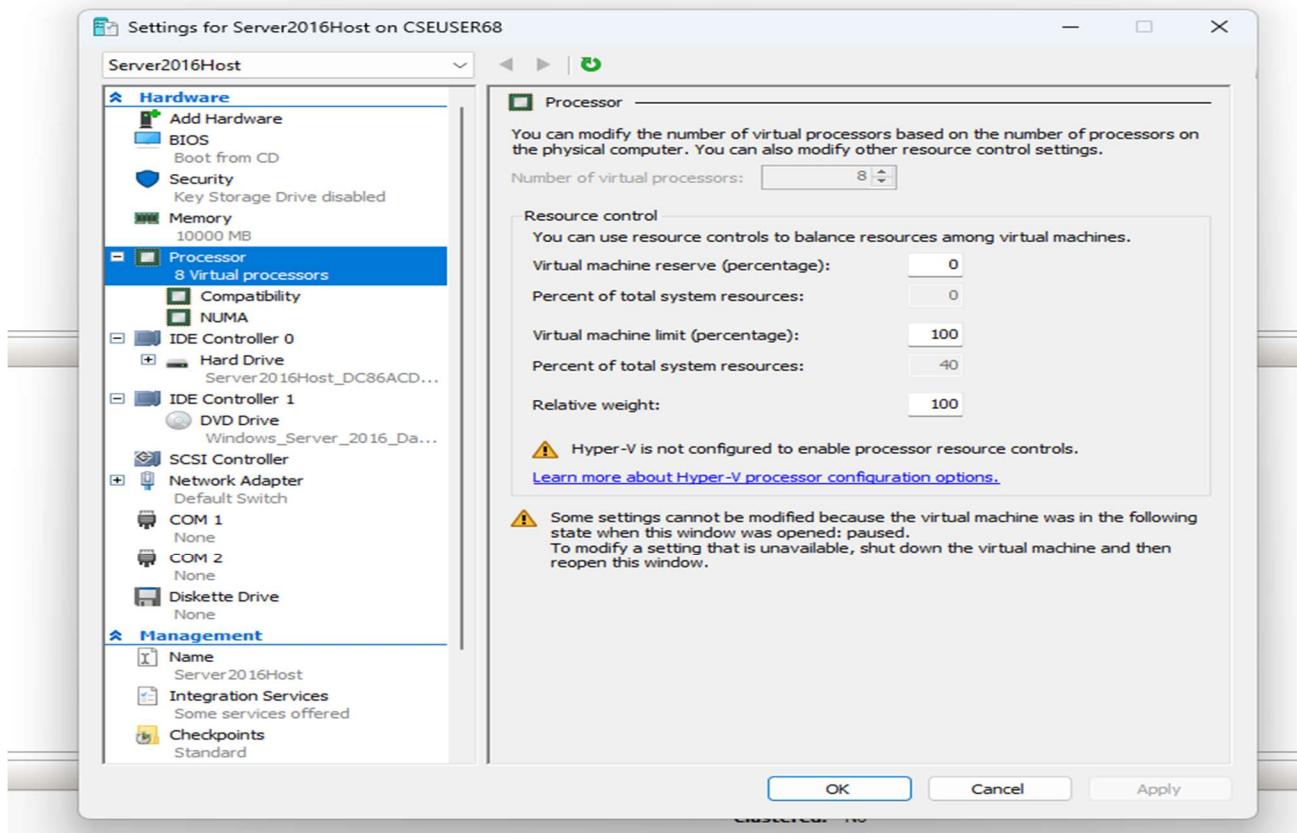


STEP 3: Specify the name and location the virtual machine that is going to install on the physical machine.

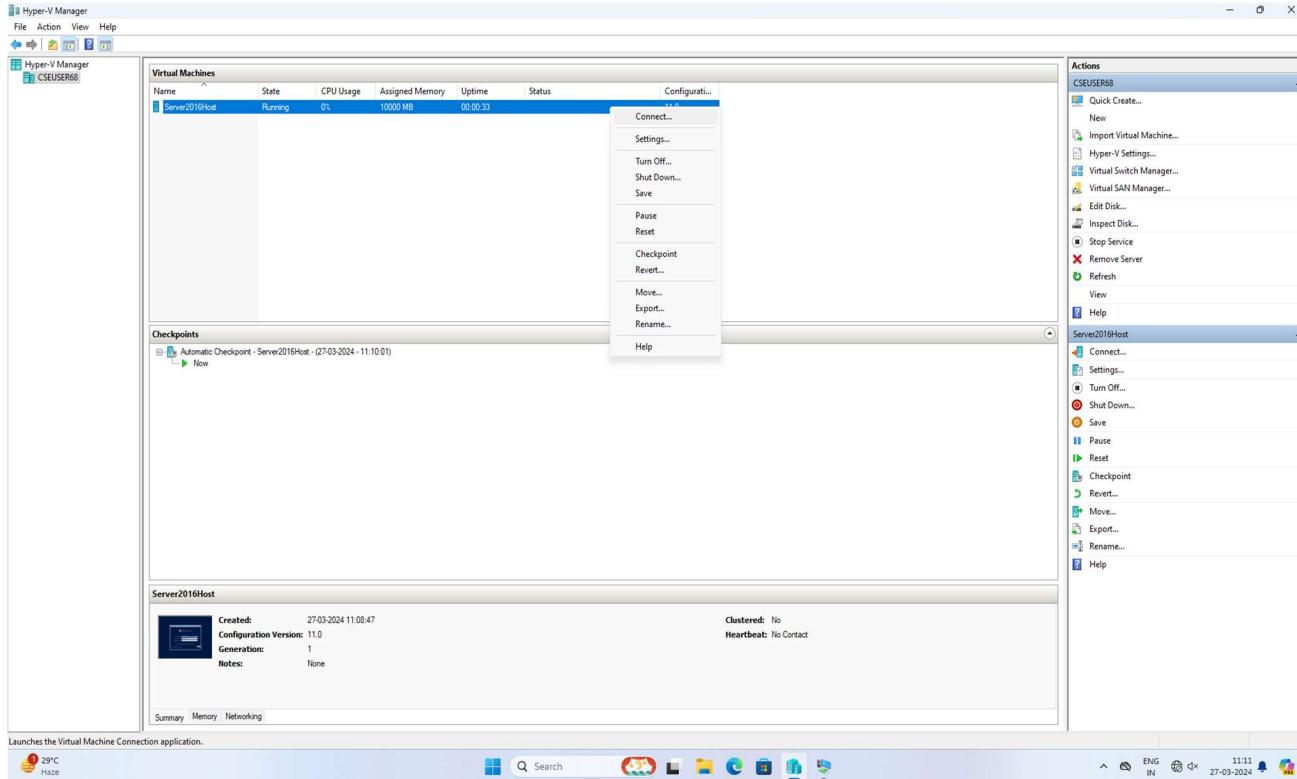


STEP 4: Allocate memory and storage space for the virtual machine that going to install.**STEP 5:** Configure the networking

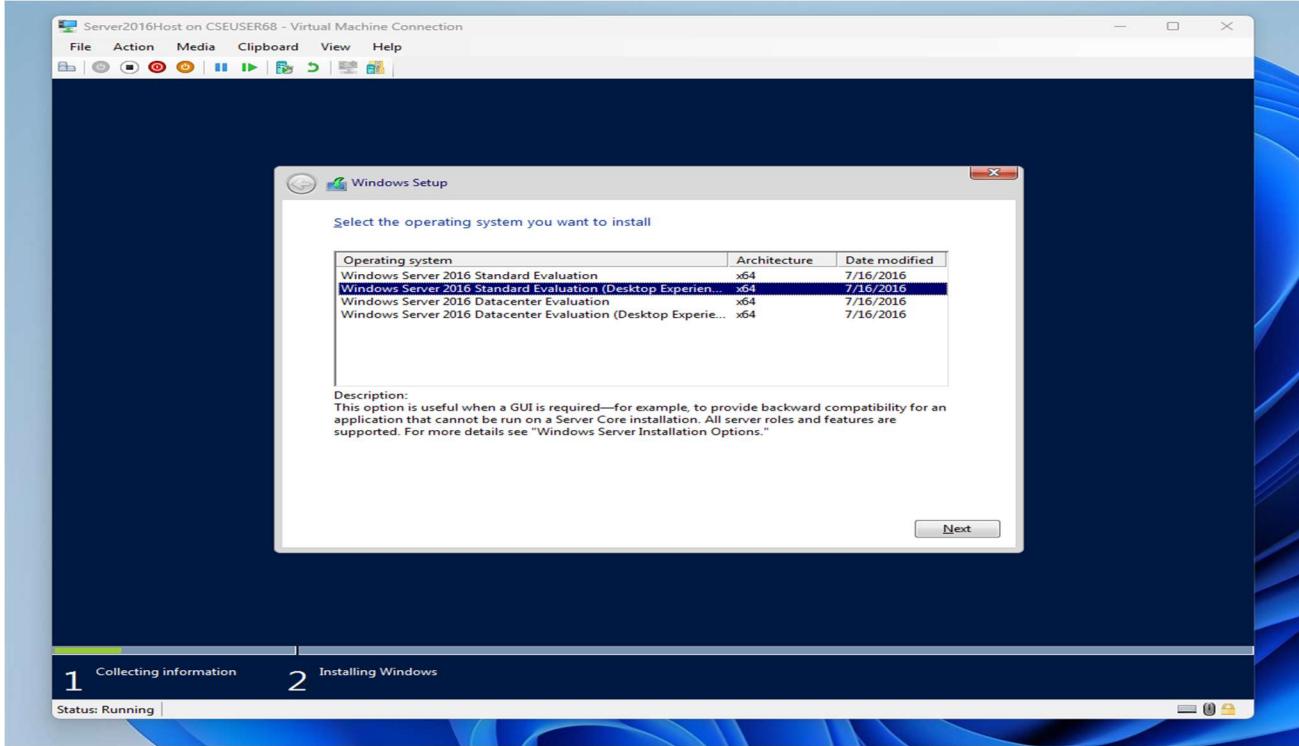
STEP 6: Assigning the number of virtual processors from the physical machine



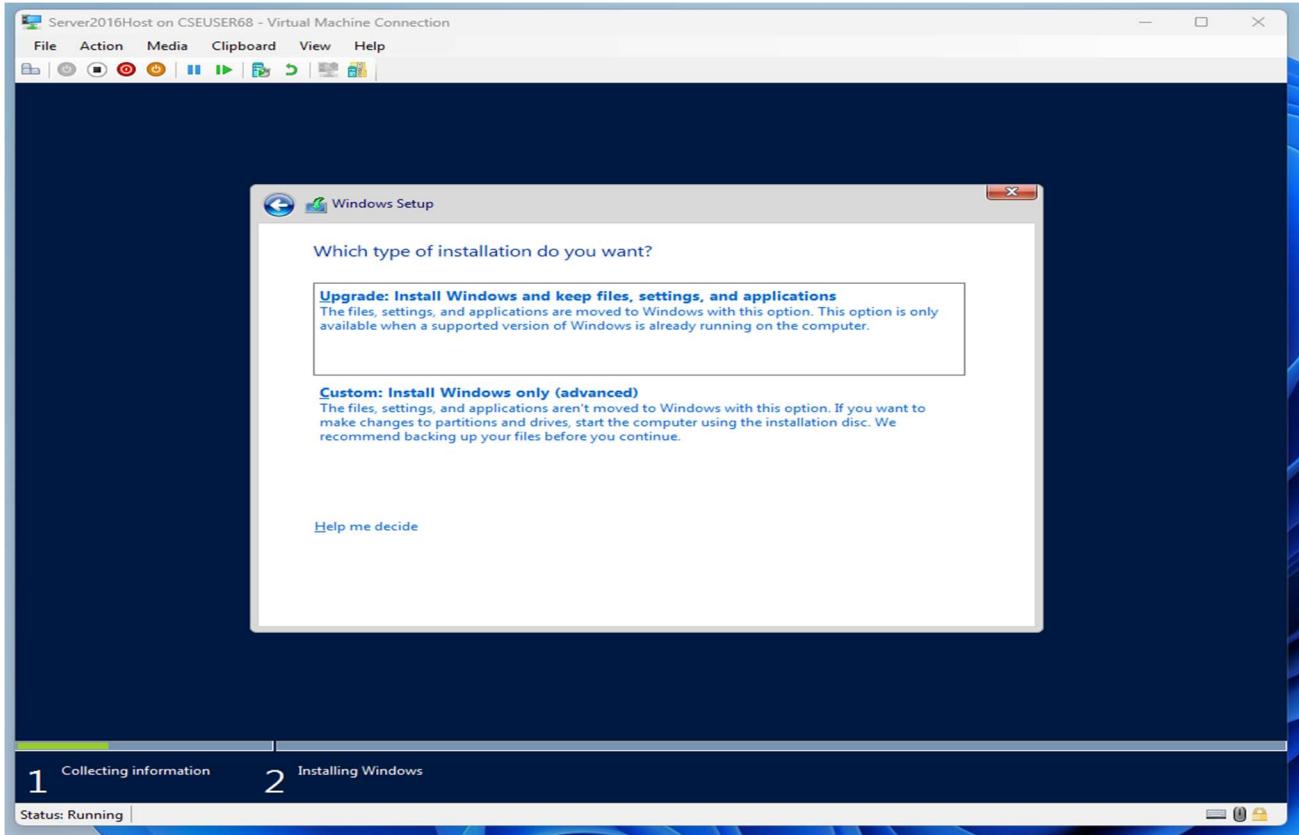
STEP 7: Virtual Machine has created and trying to establishing the connection from the physical machine



STEP 8: Choose the OS from the list that wants to install in the virtual machine.



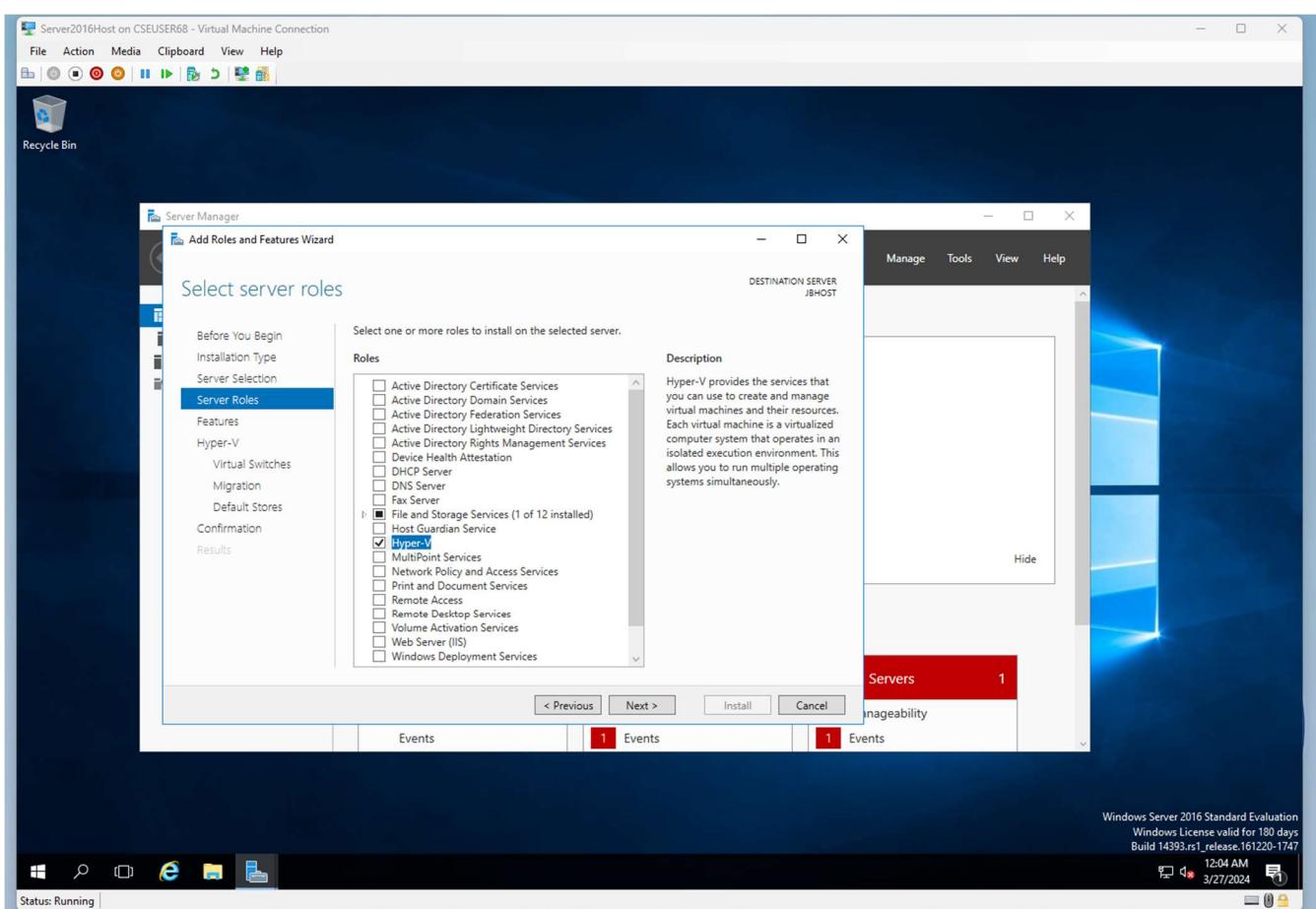
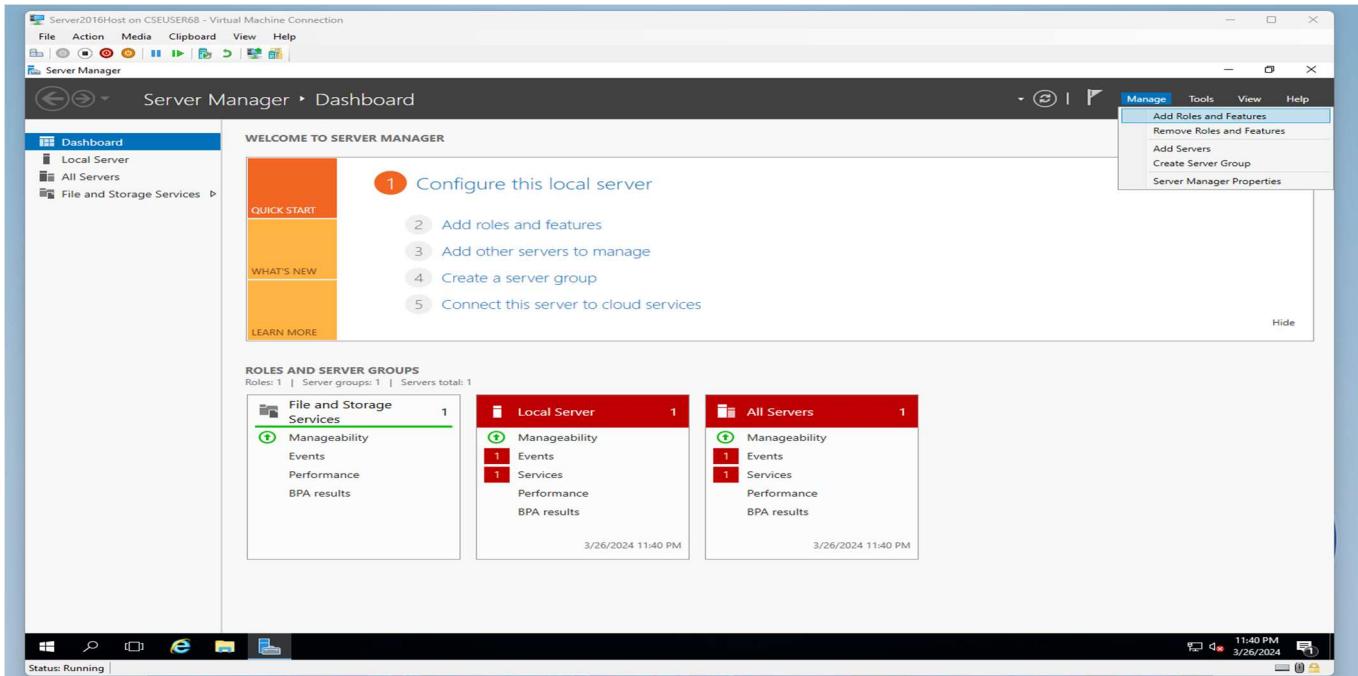
STEP 9: Type of installation – Choose Custom



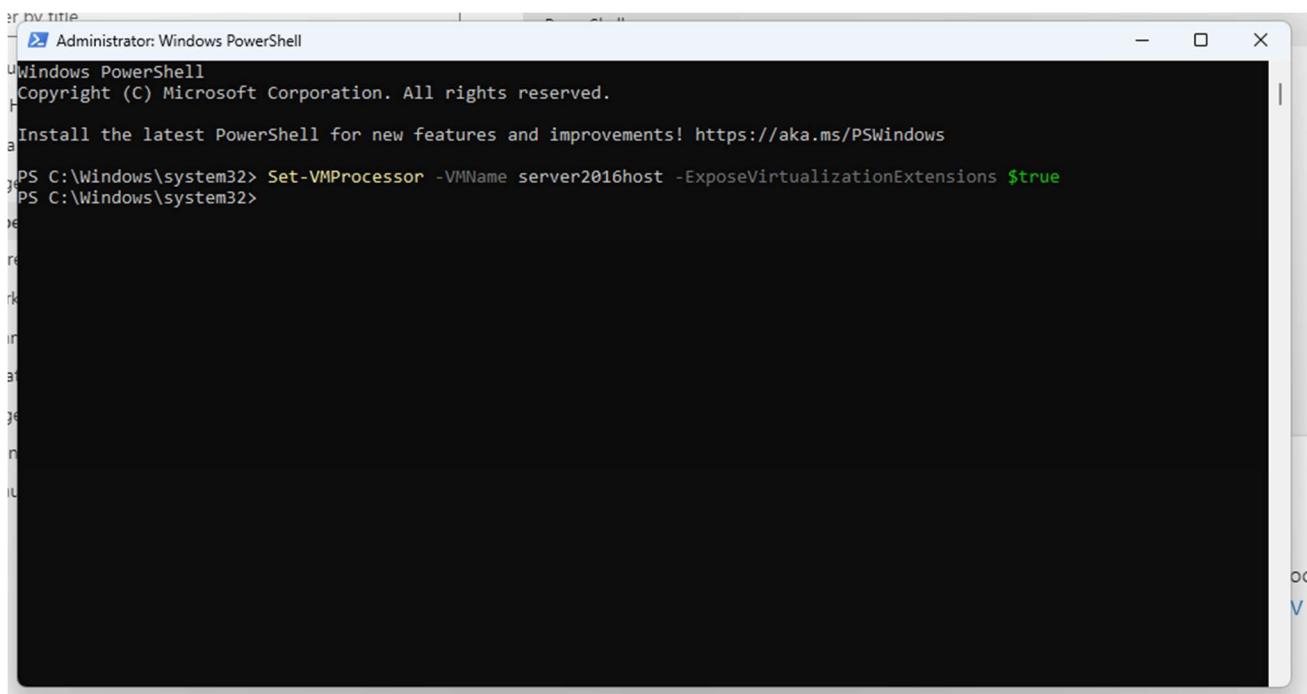
STEP 10: After all done with the Guest OS installation, assign password for the Guest OS.

STEP 11: Before configuring the Nested Virtual Machine, we have to enable the Hyper-V from the Server Manager.

Choose Manage from options -> Add Roles and Features -> Server Roles -> Enable Hyper-V



STEP 12: Here the virtual machine do not have the rights to enable the Hyper-V. So, we can directly access the physical OS to enable Hyper-V for creation of the Nested Procedure.



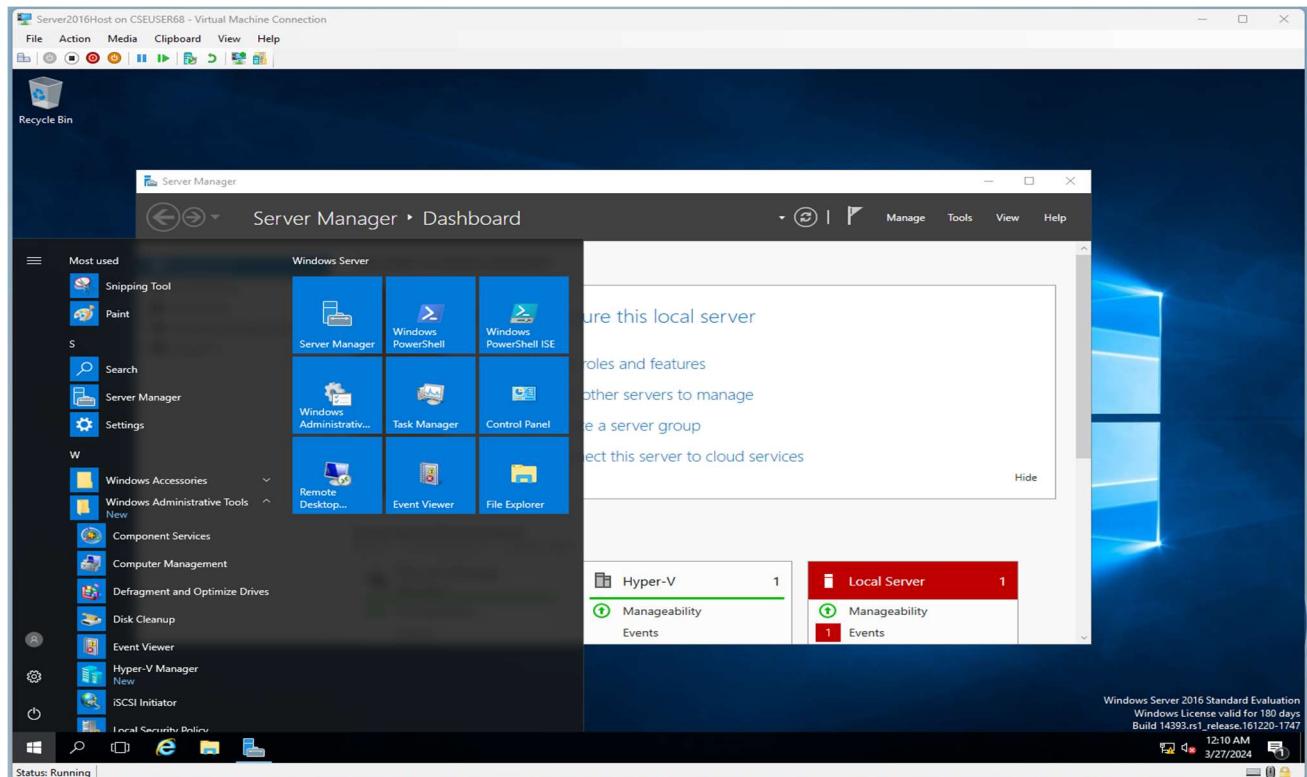
```
Administrator: Windows PowerShell
Windows PowerShell
Copyright (C) Microsoft Corporation. All rights reserved.

Install the latest PowerShell for new features and improvements! https://aka.ms/PSWindows

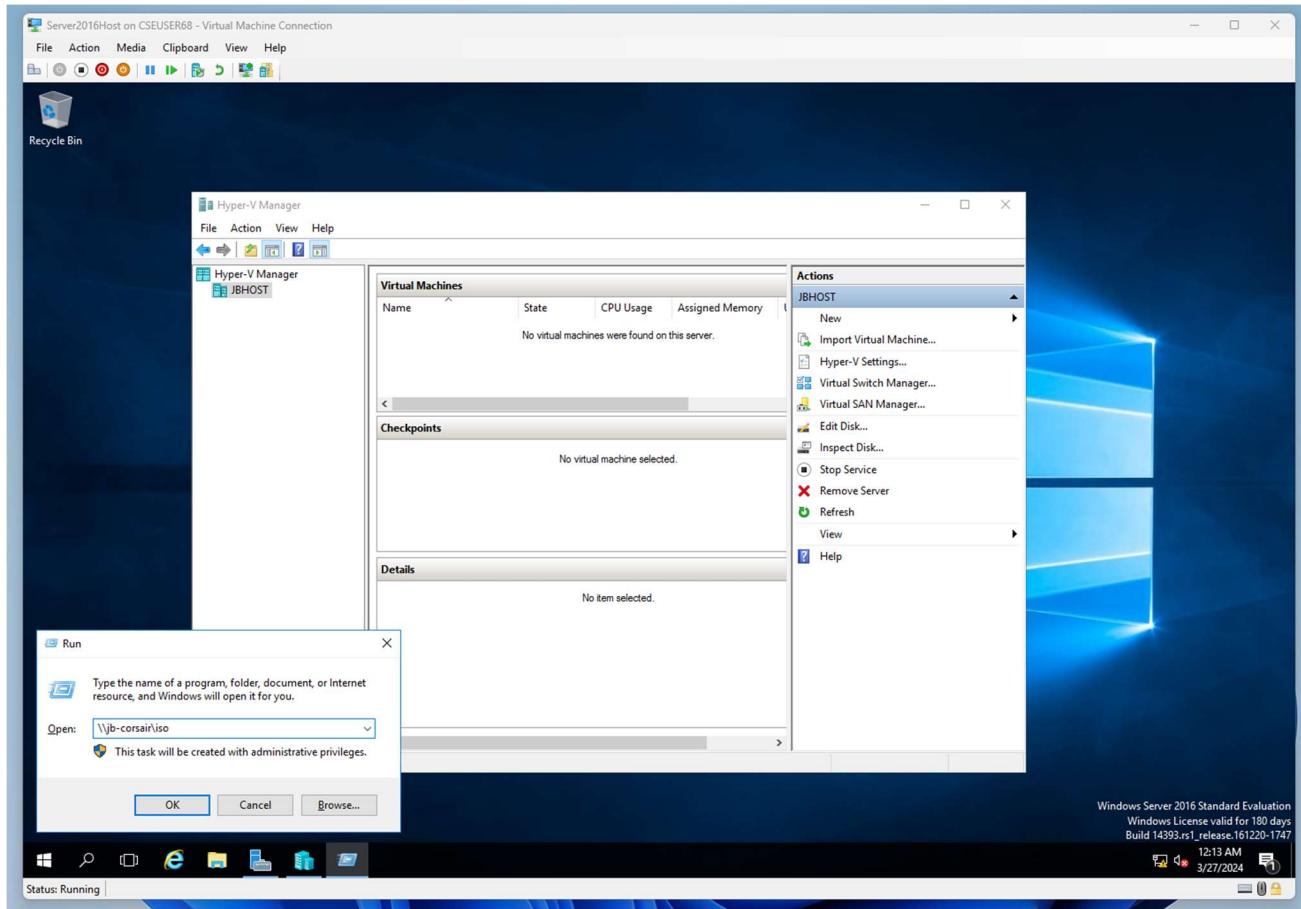
PS C:\Windows\system32> Set-VMProcessor -VMName server2016host -ExposeVirtualizationExtensions $true
PS C:\Windows\system32>
```

STEP 13: After enabling of Hyper-V from the physical machine, restart the virtual OS and the following procedure.

Windows->Start->Windows Administrator Tools-> check whether Hyper-V is enabled or not.



STEP 14: Go to the Virtual OS and repeat the above procedures (from Steps 1 to 13) for creation of the Nester virtual machine under another virtual machine.



RESULT: