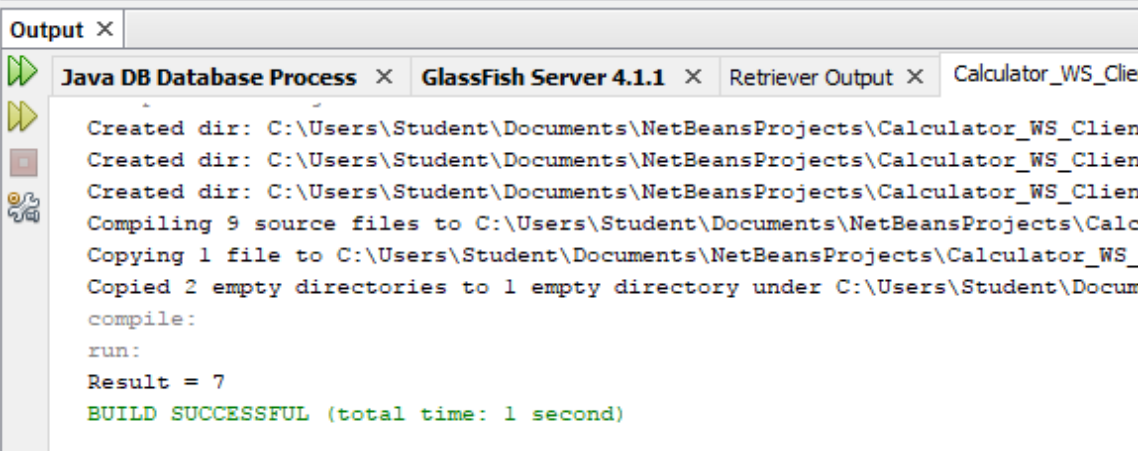


OUTPUT:

The screenshot shows the NetBeans IDE Output window with the following tabs: Java DB Database Process, GlassFish Server 4.1.1, Retriever Output, and Calculator_WS_Client. The output text for the Calculator_WS_Client tab is as follows:

```
Created dir: C:\Users\Student\Documents\NetBeansProjects\Calculator_WS_Client
Created dir: C:\Users\Student\Documents\NetBeansProjects\Calculator_WS_Client
Created dir: C:\Users\Student\Documents\NetBeansProjects\Calculator_WS_Client
Compiling 9 source files to C:\Users\Student\Documents\NetBeansProjects\Calculator_WS_Client
Copying 1 file to C:\Users\Student\Documents\NetBeansProjects\Calculator_WS_Client
Copied 2 empty directories to 1 empty directory under C:\Users\Student\Documents\NetBeansProjects\Calculator_WS_Client
compile:
run:
Result = 7
BUILD SUCCESSFUL (total time: 1 second)
```

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PRACTICAL 6

Date:

Aim: Installation and configuration of virtualization using KVM.

Objectives: From this experiment, the student will be able to,

- Understand the concept of virtualization.
- Understand KVM architecture and its configuration.

Outcomes: The learner will be able to

- Analyze user models and develop user centric interfaces.
- To analyze local and global impact of computing on individuals, organizations and society.
- To engage in life-long learning development and higher studies.
- To understand, identify, analyze and design the problem, implement and validate the solutions including both hardware and software.

Hardware / Software Required: Ubuntu operating system, open-source software KVM, Internet.

Theory:

Virtualization is software that separates physical infrastructures to create various dedicated resources. It is the fundamental technology that powers cloud computing. The technology behind virtualization is known as a virtual machine monitor (VMM) or virtual manager, which separates compute environments from the actual physical infrastructure.

Virtualizations make servers, workstations, storage and other systems independent of the physical hardware layer. This is done by installing a Hypervisor on top of the hardware layer, where the systems are then installed.

There are three areas of IT where virtualization is making headboards, network virtualization, storage virtualization and server virtualization:

- Network virtualization is a method of combining the available resources in a network by splitting up the available bandwidth into channels, each of which is independent from the others, and each of which can be assigned (or reassigned) to a particular server or device in real time. The idea is that virtualization disguises the true complexity of the network by separating it into manageable parts, much like your partitioned hard drive makes it easier to manage your files.

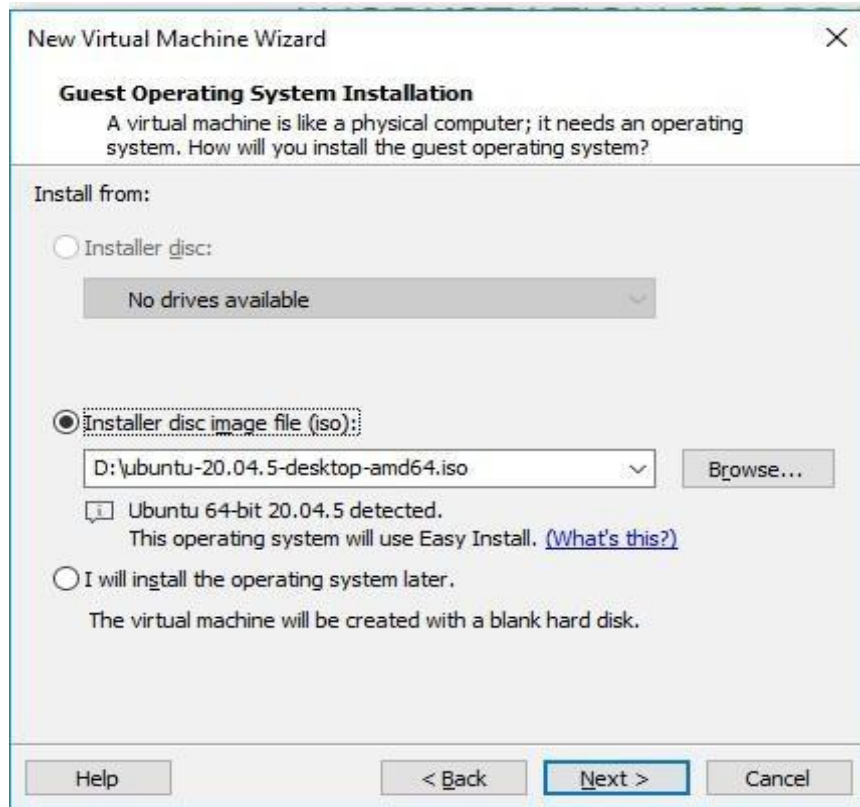
Step 1: Open VMware to create a new virtual machine and select the option “Create New Virtual Machine”.



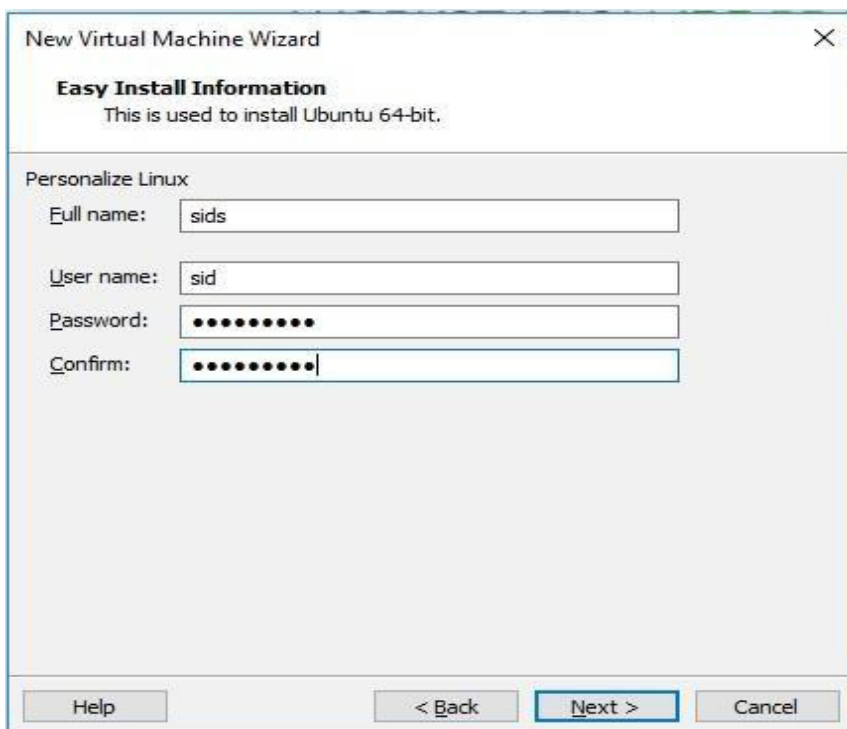
Step 2: Select the “Typical(recommended)” option and click on Next.



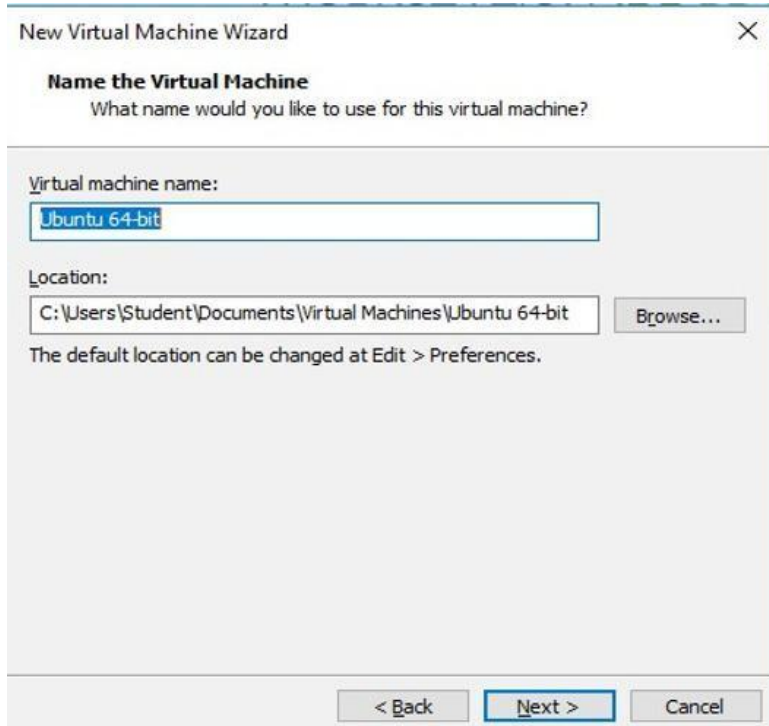
Step 3: The following window will appear click on Next and proceed.



Step 4: Fill the following fields such as the Full name, Username and Password . Click on Next.



Step 5: The following fields show the Name and Location where the Virtual Machine Is Stored



New Virtual Machine Wizard

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

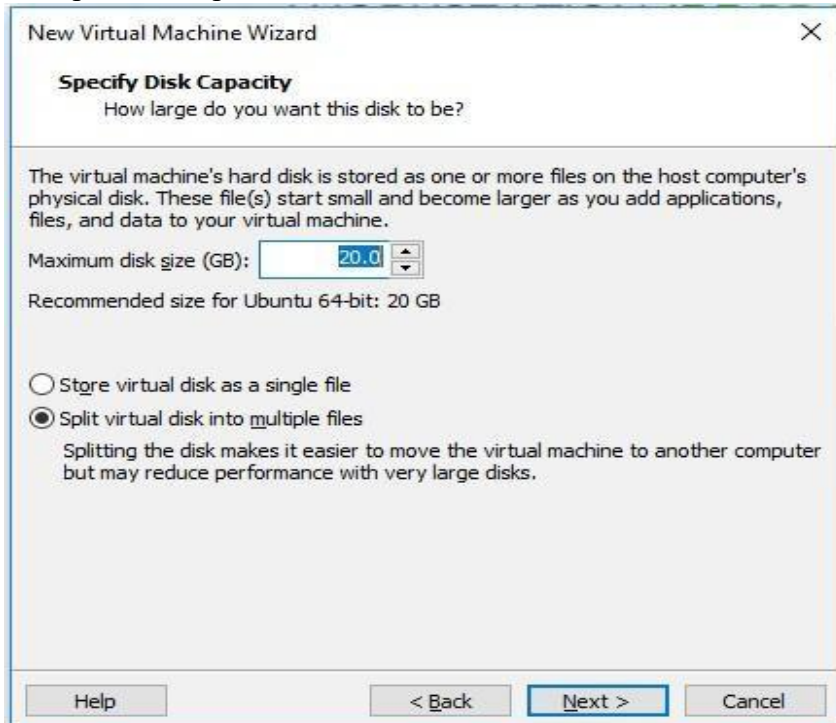
Virtual machine name:

Location:

The default location can be changed at Edit > Preferences.

< Back **Next >** Cancel

Step 6: Keep the maximum disk size as 20.0 GB and select the “Split virtual disk into multiple files” option.



New Virtual Machine Wizard

Specify Disk Capacity
How large do you want this disk to be?

The virtual machine's hard disk is stored as one or more files on the host computer's physical disk. These file(s) start small and become larger as you add applications, files, and data to your virtual machine.

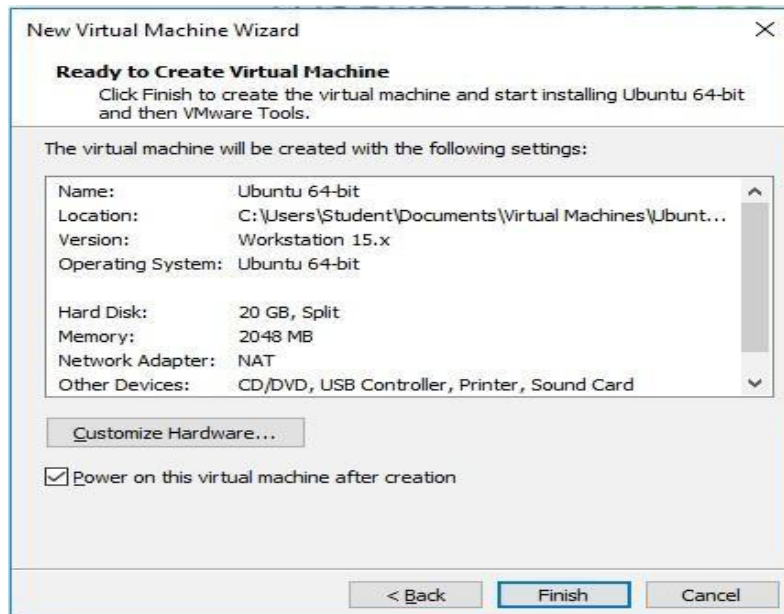
Maximum disk size (GB):

Recommended size for Ubuntu 64-bit: 20 GB

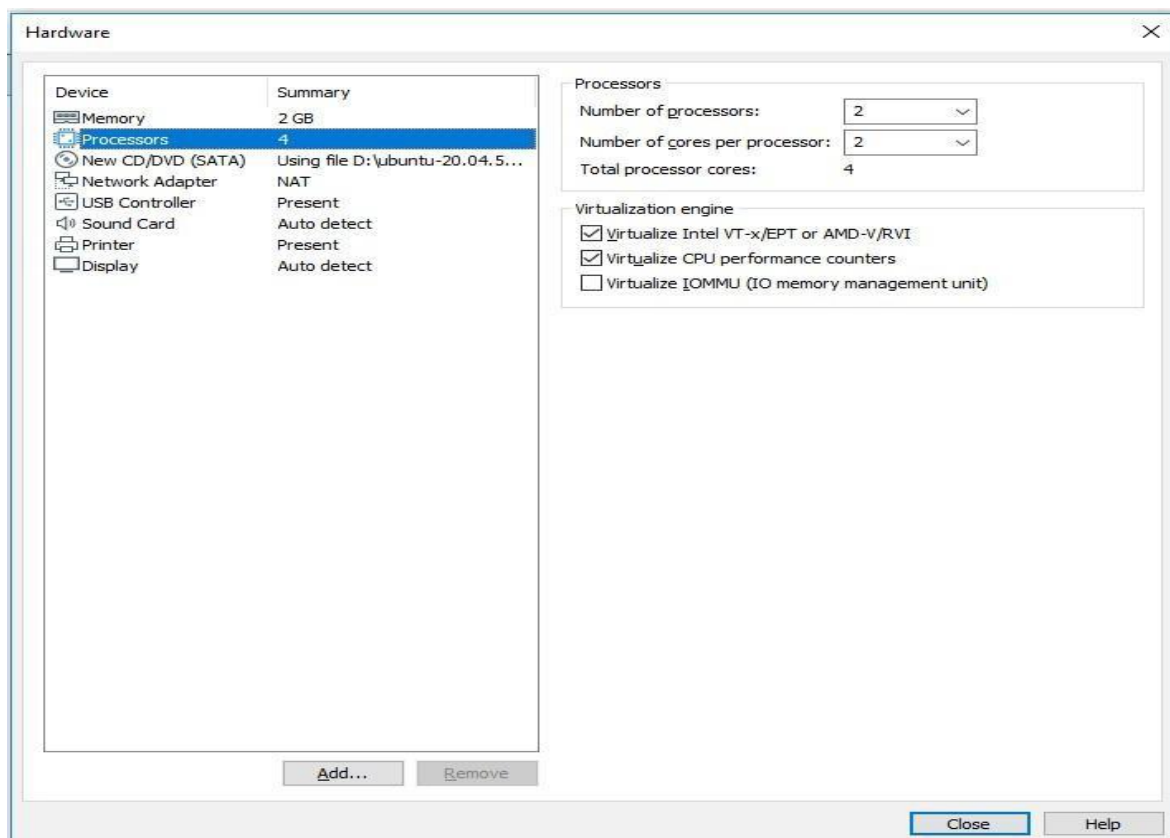
☐ Store virtual disk as a single file
☒ Split virtual disk into multiple files
Splitting the disk makes it easier to move the virtual machine to another computer but may reduce performance with very large disks.

Help < Back **Next >** Cancel

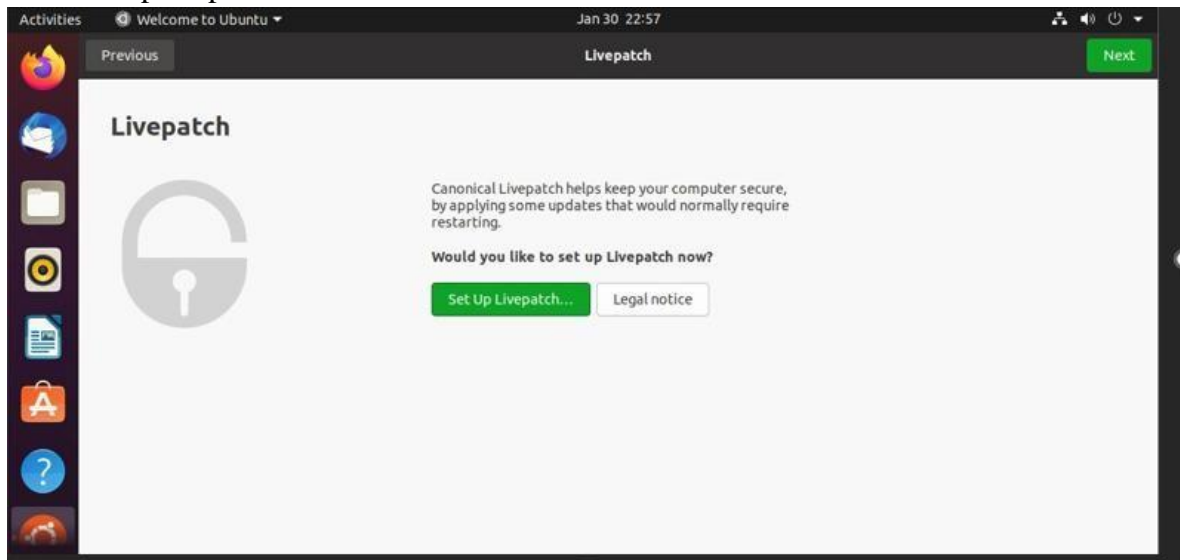
Step 7: Click on the option of “Customize Hardware”.



Step 8: Click on processors and keep the value of Number of processors and Number of core processors as 2. And make sure that the below two checkboxes are ticked . Click on close and then on finish.



Step 9: The following window will appear once the virtual machine starts, go to the command prompt section



Step 10: Update Ubuntu by executing following commands

- Sudo apt update
- Sudo apt upgrade

```

sid@ubuntu: ~/Desktop
To run a command as administrator (user "root"), use "sudo <command>".
See "man sudo_root" for details.

sid@ubuntu:~/Desktop$ sudo apt update
[sudo] password for sid:
Hit:1 http://us.archive.ubuntu.com/ubuntu focal InRelease
Hit:2 http://security.ubuntu.com/ubuntu focal-security InRelease
Hit:3 http://us.archive.ubuntu.com/ubuntu focal-updates InRelease
Hit:4 http://us.archive.ubuntu.com/ubuntu focal-backports InRelease
Reading package lists... Done
Building dependency tree
Reading state information... Done
425 packages can be upgraded. Run 'apt list --upgradable' to see them.
sid@ubuntu:~/Desktop$

sid@ubuntu:~/Desktop$ sudo apt upgrade
Reading package lists... Done
Building dependency tree
Reading state information... Done
Calculating upgrade... Done
The following package was automatically installed and is no longer required:
  gir1.2-goa-1.0
Use 'sudo apt autoremove' to remove it.
The following NEW packages will be installed:
  libatomic1 libxmlb2 ubuntu-advantage-desktop-daemon ubuntu-pro-client
  ubuntu-pro-client-l10n

```


Step 11: Check the virtualization support for Ubuntu by executing the following command. This command returns a numeric value ,if it returns 0 it means that our processor is not capable of running KVM. Any other value indicates its KVM.

```
sid@ubuntu:~/Desktop$ egrep -c '(vmx|svm)' /proc/cpuinfo
8
```

Step 12: Check if the system is accelerated by using the command “sudo kvm-ok”. If kvm-ok returns an error then install cpu-checker to resolve the issue .Once the installation is done rerun the command “sudo kvm-ok”.

```
sid@ubuntu:~/Desktop$ sudo kvm-ok
[sudo] password for sid:
sudo: kvm-ok: command not found
sid@ubuntu:~/Desktop$ sudo apt install cpu-checker
Reading package lists... Done
Building dependency tree
Reading state information... Done
The following package was automatically installed and is no longer required:
  gir1.2-goa-1.0
Use 'sudo apt autoremove' to remove it.
The following additional packages will be installed:
  msr-tools
The following NEW packages will be installed:
  cpu-checker msr-tools
0 upgraded, 2 newly installed, 0 to remove and 0 not upgraded.
Need to get 16.9 kB of archives.
After this operation, 66.6 kB of additional disk space will be used.
Do you want to continue? [Y/n] y
Get:1 http://us.archive.ubuntu.com/ubuntu focal/main amd64 msr-tools amd64 1.3-3 [10.0 kB]
Get:2 http://us.archive.ubuntu.com/ubuntu focal/main amd64 cpu-checker amd64 0.7-1.1 [6,936
```

```
sid@ubuntu:~/Desktop$ sudo kvm-ok
INFO: /dev/kvm exists
KVM acceleration can be used
```

Step 13: Install KVM package by executing the following command.

```
sid@ubuntu:~/Desktop$ sudo apt install qemu-kvm libvirt-daemon-system libvirt-clients bridge-utils -y
Reading package lists... Done
Building dependency tree
Reading state information... Done
The following package was automatically installed and is no longer required:
  gir1.2-goa-1.0
Use 'sudo apt autoremove' to remove it.
The following additional packages will be installed:
  dmeventd ibverbs-providers ipxe-qemu ipxe-qemu-256k-compat-efi-roms libaio1 libcacard0 libdevmapper-event1.02.
  libfdt1 libibverbs1 libiscsi7 liblvm2cmd2.03 libnss-mymachines libpmem1 librados2 librbdi librdmacm1 libreadli
  libslirp0 libspice-server1 libusbredirparser1 libvirt-clients libvirt-daemon libvirt-daemon-driver-qemu
```

Step 14: Only members of libvirt and KVM usergroups can run virtual machine . If you want a specific user to run a virtual machine then we have to add that user group with the following command.

```
sid@ubuntu:~/Desktop$ sudo adduser 'sid' libvirt
The user 'sid' is already a member of 'libvirt'.
```

Step 15: Do the same thing with the KVM group.

```
sid@ubuntu:~/Desktop$ sudo adduser 'sid' kvm
Adding user 'sid' to group 'kvm' ...
Adding user sid to group kvm
Done.
```

Step 16: Verify the installation. Confirm the KVM installation with virsh command .
The command will list all active and inactive virtual machines on the system.

```
sid@ubuntu:~/Desktop$ sudo virsh list --all
Id   Name   State
-----
```

Step 17: Use systemctl command to check the status of libvirtd, the daemon that provides the backend services for libvirt virtualization management system. If the virtualization is not active then activate it with following command

“sudo systemctl enable - - now libvirtd”

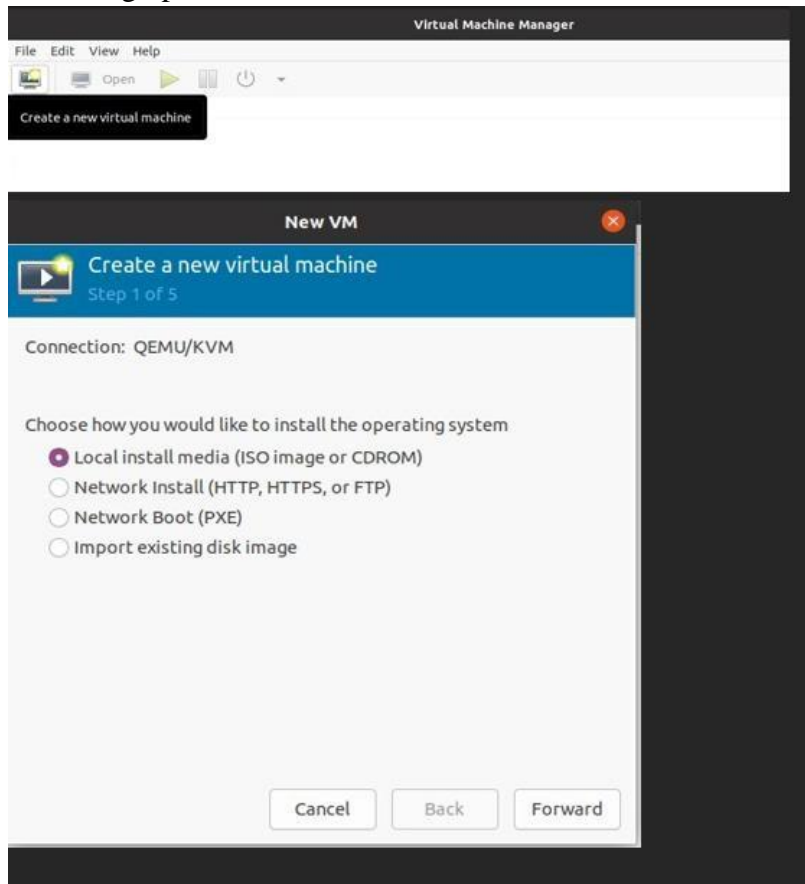
```
sid@ubuntu:~/Desktop$ sudo systemctl status libvirtd
● libvirtd.service - Virtualization daemon
   Loaded: loaded (/lib/systemd/system/libvirtd.service; enabled; vendor preset: enabled)
   Active: active (running) since Thu 2025-01-30 23:22:05 PST; 35min ago
   TriggeredBy: ● libvirtd-admin.socket
                 ● libvirtd-ro.socket
                 ● libvirtd.socket
   Docs: man:libvirtd(8)
         https://libvirt.org
   Main PID: 54966 (libvirtd)
    Tasks: 19 (limit: 32768)
   Memory: 15.9M
   CGroup: /system.slice/libvirtd.service
```

Step 18: Create a virtual machine on Ubuntu. For creating a virtual machine install virt-manager, it is a tool for creating and managing virtual machines.

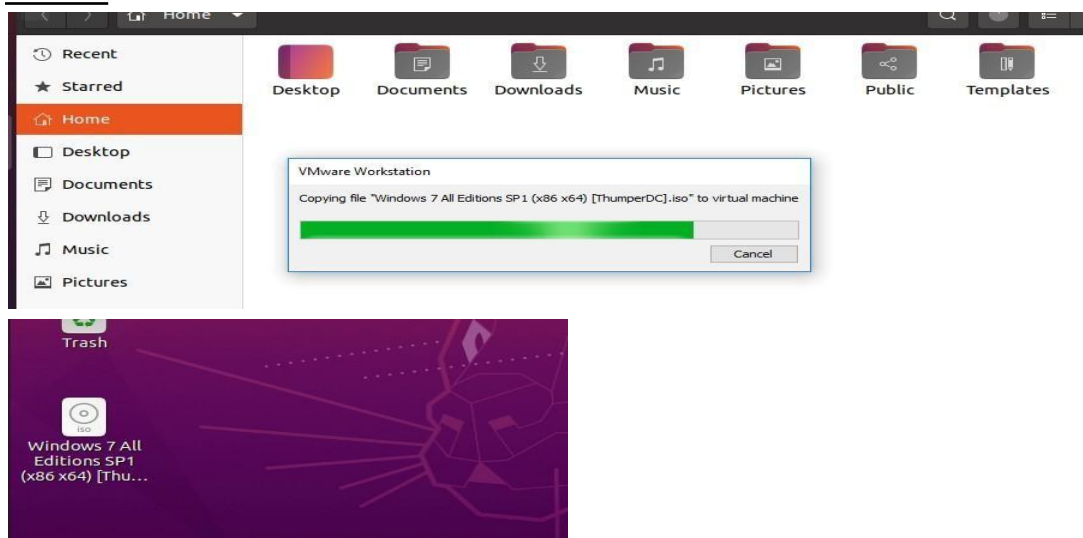
```
sid@ubuntu:~/Desktop$ sudo apt install virt-manager -y
Reading package lists... Done
Building dependency tree
Reading state information... Done
The following package was automatically installed and is no longer required:
  gir1.2-goa-1.0
Use 'sudo apt autoremove' to remove it.
The following additional packages will be installed:
  gir1.2-appindicator3-0.1 gir1.2-gtk-vnc-2.0 gir1.2-libosinfo-1.0 gir1.2-libvirt-glib-1.0 gir1.2-
  gir1.2-spiceclientgtk-3.0 i965-va-driver intel-media-va-driver libgovirt-common libgovirt2 libgt
  libgvnc-1.0-0 libigdgmm11 libosinfo-1.0-0 libphodav-2.0-0 libphodav-2.0-common libspice-client-g
  libspice-client-gtk-3.0-5 libusbredirhost1 libva-x11-2 libva2 libvirt-glib-1.0-0 mesa-va-drivers
  python3-distutils python3-libvirt python3-libxml2 spice-client-glib-usb-acl-helper va-driver-all
  virtinst
Suggested packages:
```

```
sid@ubuntu:~/Desktop$ sudo virt-manager
```

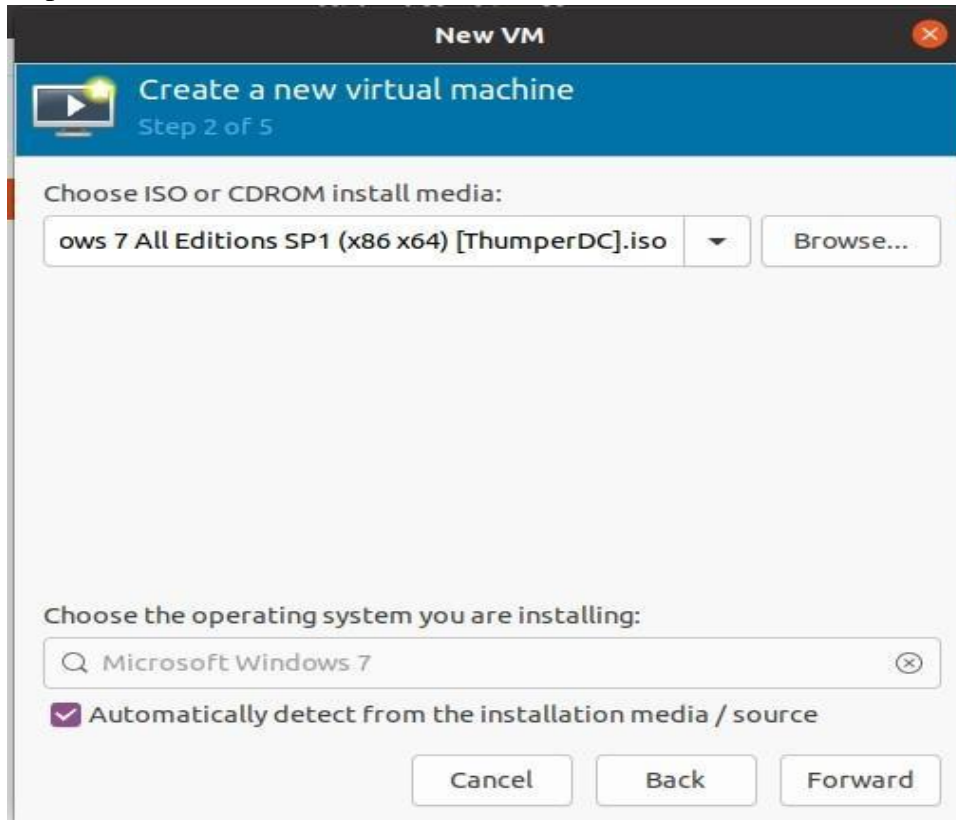
Step 19: Copy the Ubuntu ISO file to the desktop of the virtual machine and click on the Following option.



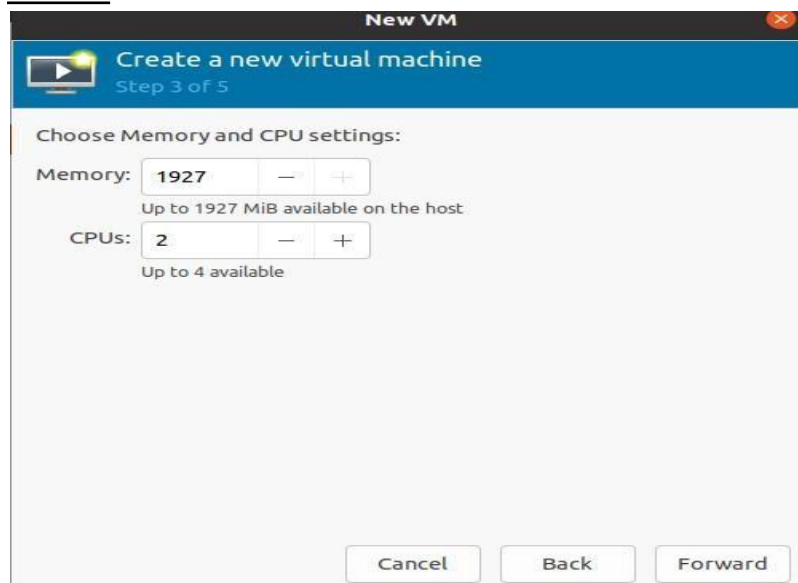
Step 20: Here the file is being copied.



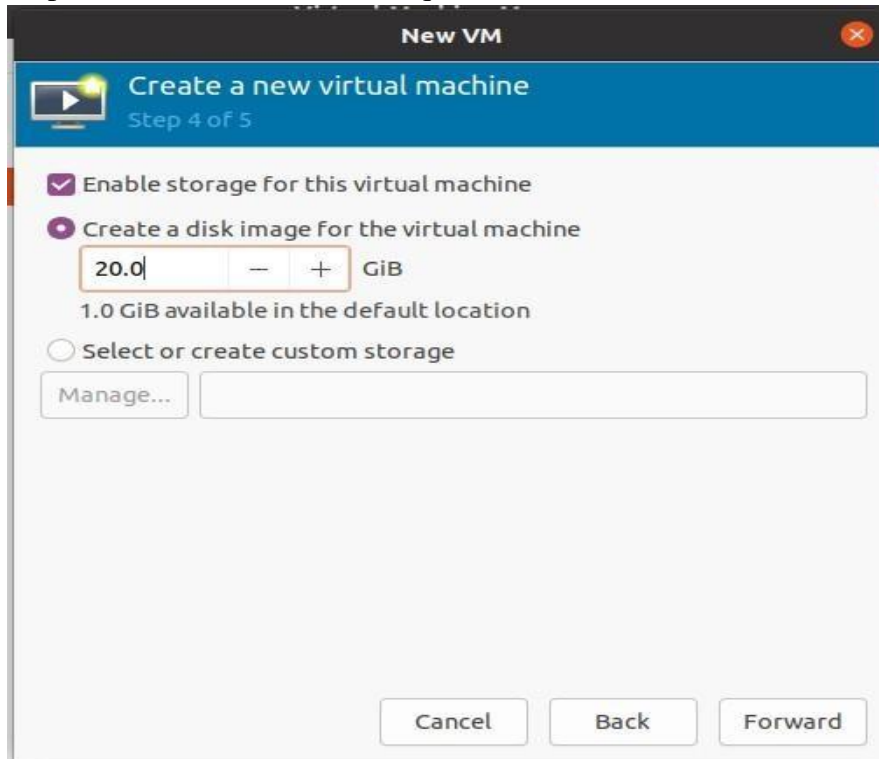
Step 21: Browse the ISO file and tick the checkbox as follows. Click on forward.



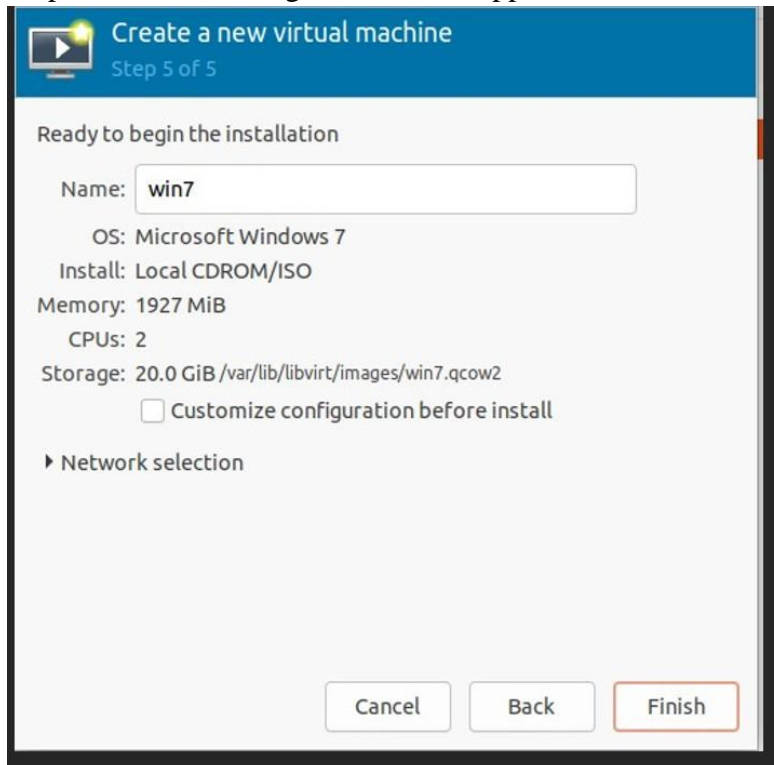
Step 22: Select the cpu and memory as required. Click on forward.



Step 23: Give the disk size as required in that field. Click on forward.



Step 24: The following window will appear which is the final stage of the installation



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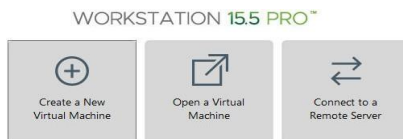
Pratik Patil
Date:-

Roll No:58

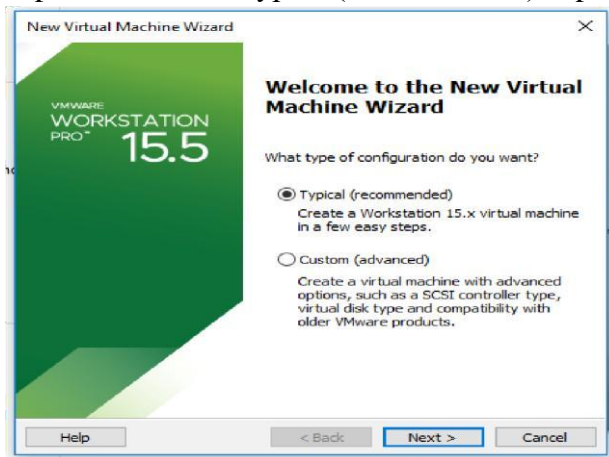
Practical 7

Aim : Study and implementation of Infrastructure as a Service.

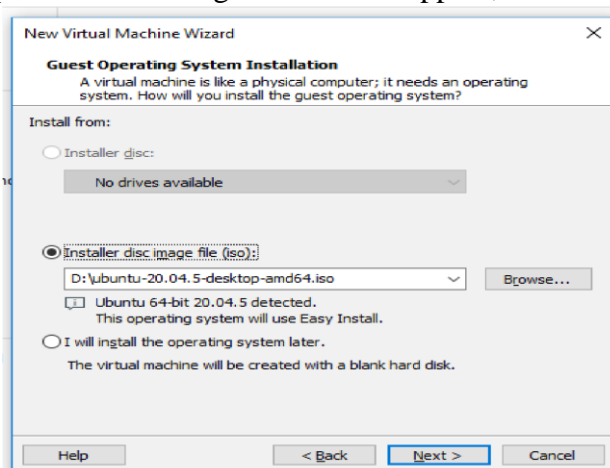
Step 1: Open VMware to create a new virtual machine and select the option “Create a New Virtual Machine”.



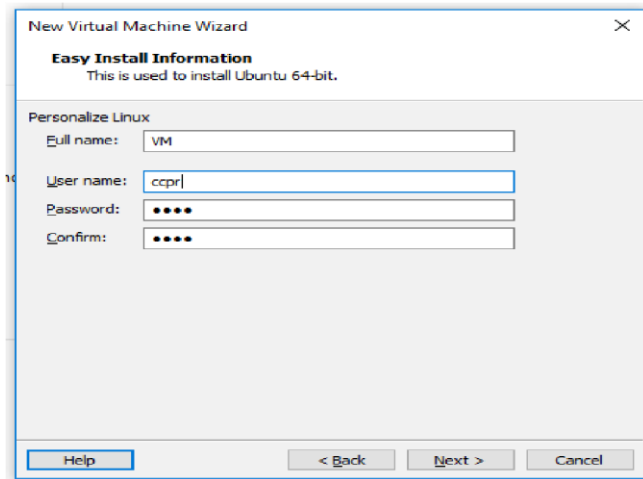
Step 2: Select the “Typical(recommended)” option and click on Next.



Step 3: The following window will appear, click on Next and proceed.

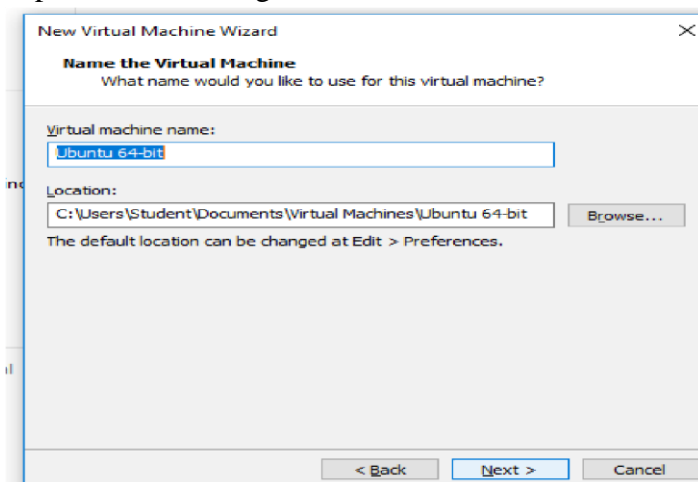


Step 4: Fill the following fields such as the Full name, Username and Password . Click on Next. (Password-ccpr)



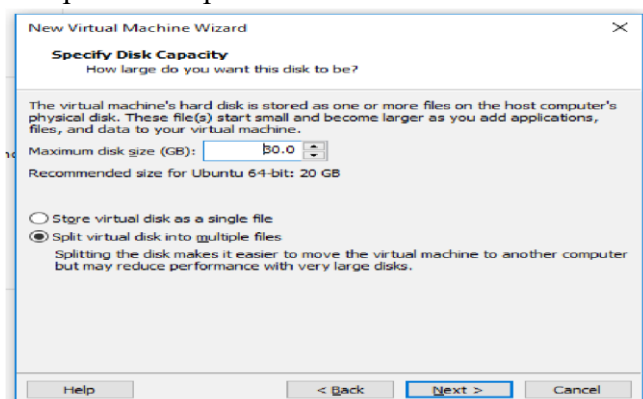
The screenshot shows the 'New Virtual Machine Wizard' window, specifically the 'Easy Install Information' step. The window title is 'New Virtual Machine Wizard'. Below the title bar, it says 'Easy Install Information' and 'This is used to install Ubuntu 64-bit.' The main section is titled 'Personalize Linux' and contains four input fields: 'Full name:' with the value 'VM', 'User name:' with the value 'ccpr', 'Password:' with four dots, and 'Confirm:' with four dots. At the bottom, there are four buttons: 'Help', '< Back', 'Next >', and 'Cancel'.

Step 5: The following fields show the Name, Location where the Virtual Machine is stored.



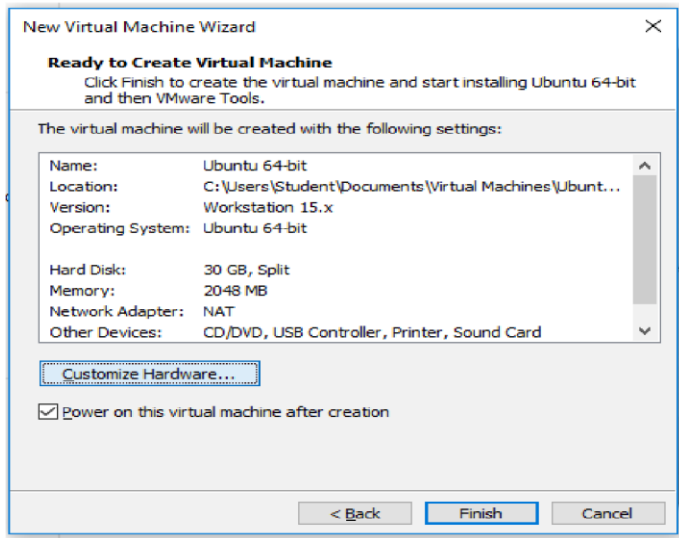
The screenshot shows the 'New Virtual Machine Wizard' window, specifically the 'Name the Virtual Machine' step. The window title is 'New Virtual Machine Wizard'. Below the title bar, it says 'Name the Virtual Machine' and 'What name would you like to use for this virtual machine?'. The main section contains two input fields: 'Virtual machine name:' with the value 'Ubuntu 64-bit' and 'Location:' with the value 'C:\Users\Student\Documents\Virtual Machines\Ubuntu 64-bit'. There is a 'Browse...' button next to the location field. Below the location field, it says 'The default location can be changed at Edit > Preferences.' At the bottom, there are three buttons: '< Back', 'Next >', and 'Cancel'.

Step 6: Keep the maximum disk size as 30.0 GB and select the “Split virtual disk into multiple files” option. Click on Next.



The screenshot shows the 'New Virtual Machine Wizard' window, specifically the 'Specify Disk Capacity' step. The window title is 'New Virtual Machine Wizard'. Below the title bar, it says 'Specify Disk Capacity' and 'How large do you want this disk to be?'. The main section contains a text box for 'Maximum disk size (GB):' with the value '30.0'. Below it, it says 'Recommended size for Ubuntu 64-bit: 20 GB'. There are two radio button options: 'Store virtual disk as a single file' (unselected) and 'Split virtual disk into multiple files' (selected). Below the selected option, it says 'Splitting the disk makes it easier to move the virtual machine to another computer but may reduce performance with very large disks.' At the bottom, there are four buttons: 'Help', '< Back', 'Next >', and 'Cancel'.

Step 7: Click on the option of “Customize Hardware”.



Step 8: Click on Memory and set the memory as 8000 MB and then click on processors and keep the value of Number of processors and Number of core processors as 2. And make sure that the below two checkboxes are ticked . Click on close and then on finish.

