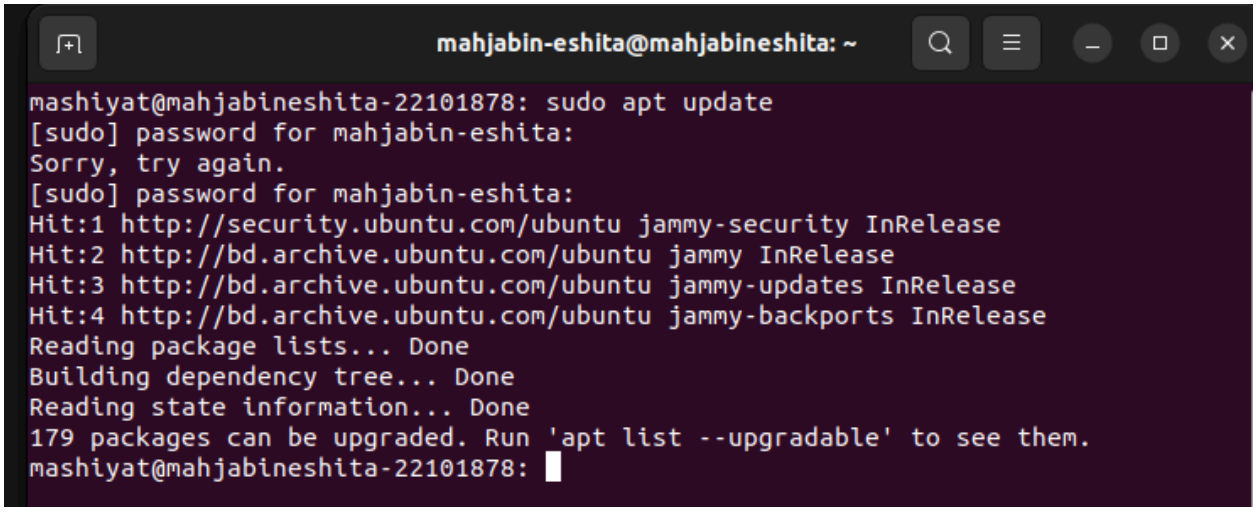
Note: I faced a lot of problems running the commands so I took help from the internet multiple times whenever I needed

1. **KVM Installation**

I finished the other process then I started the process of installing KVM
I opened a terminal in my Ubuntu virtual machine then I updated the package list by running a package using **sudo apt update**



Then I am installing the necessary packages I will be using for KVM :
Used command: **sudo apt install qemu-kvm libvirt-daemon-system libvirt-clients bridge-utils**

```
179 packages can be upgraded. Run 'apt list --upgradable' to see them.
mashiyat@mahjabineshita-22101878: sudo apt install qemu-kvm libvirt-daemon-syste
m libvirt-clients bridge-utils
[sudo] password for mahjabin-eshita:
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
Note, selecting 'qemu-system-x86' instead of 'qemu-kvm'
The following additional packages will be installed:
  cpu-checker dmeventd ibverbs-providers ipxe-qemu
  ipxe-qemu-256k-compat-efi-roms jq libaio1 libboost-iostreams1.74.0
  libboost-thread1.74.0 libcacard0 libdaxctl1 libdecor-0-0
  libdecor-0-plugin-1-cairo libdevmapper-event1.02.1 libfdt1 libgfapi0
  libgfrpc0 libgfxdr0 libglusterfs0 libibverbs1 libiscsi7 libjq1
  liblvm2cmd2.03 libndctl6 libnss-mymachines libonig5 libpmem1 libpmemobj1
  librados2 librbd1 librdmacm1 libsdl2-2.0-0 libslirp0 libspice-server1
  libtpms0 liburing2 libusbredirparser1 libvirglrenderer1 libvirt-daemon
  libvirt-daemon-config-network libvirt-daemon-config-nwfilter
  libvirt-daemon-driver-qemu libvirt-daemon-system-systemd libvirt0
  libxml2-utils libyajl2 lvm2 mdevctl msr-tools ovmf qemu-block-extra
  qemu-system-common qemu-system-data qemu-system-gui qemu-utils seabios swtpm
```

```
179 packages can be upgraded. Run 'apt list --upgradable' to see them.
mashiyat@mahjabineshita-22101878: sudo apt install qemu-kvm libvirt-daemon-syste
m libvirt-clients bridge-utils
[sudo] password for mahjabin-eshita:
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
Note, selecting 'qemu-system-x86' instead of 'qemu-kvm'
The following additional packages will be installed:
  cpu-checker dmeventd ibverbs-providers ipxe-qemu
  ipxe-qemu-256k-compat-efi-roms jq libaio1 libboost-iostreams1.74.0
  libboost-thread1.74.0 libcacard0 libdaxctl1 libdecor-0-0
  libdecor-0-plugin-1-cairo libdevmapper-event1.02.1 libfdt1 libgfapi0
  libgfrpc0 libgfxdr0 libglusterfs0 libibverbs1 libiscsi7 libjq1
  liblvm2cmd2.03 libndctl6 libnss-mymachines libonig5 libpmem1 libpmemobj1
  librados2 librbd1 librdmacm1 libsdl2-2.0-0 libslirp0 libspice-server1
  libtpms0 liburing2 libusbredirparser1 libvirglrenderer1 libvirt-daemon
  libvirt-daemon-config-network libvirt-daemon-config-nwfilter
  libvirt-daemon-driver-qemu libvirt-daemon-system-systemd libvirt0
  libxml2-utils libyajl2 lvm2 mdevctl msr-tools ovmf qemu-block-extra
  qemu-system-common qemu-system-data qemu-system-gui qemu-utils seabios swtpm
```

Now I am adding myself to **libvirt** and **KVM** groups to allow managing the virtual machines without sudo

Sudo adduser $USER libvirt

Sudo adduser $USER kvm

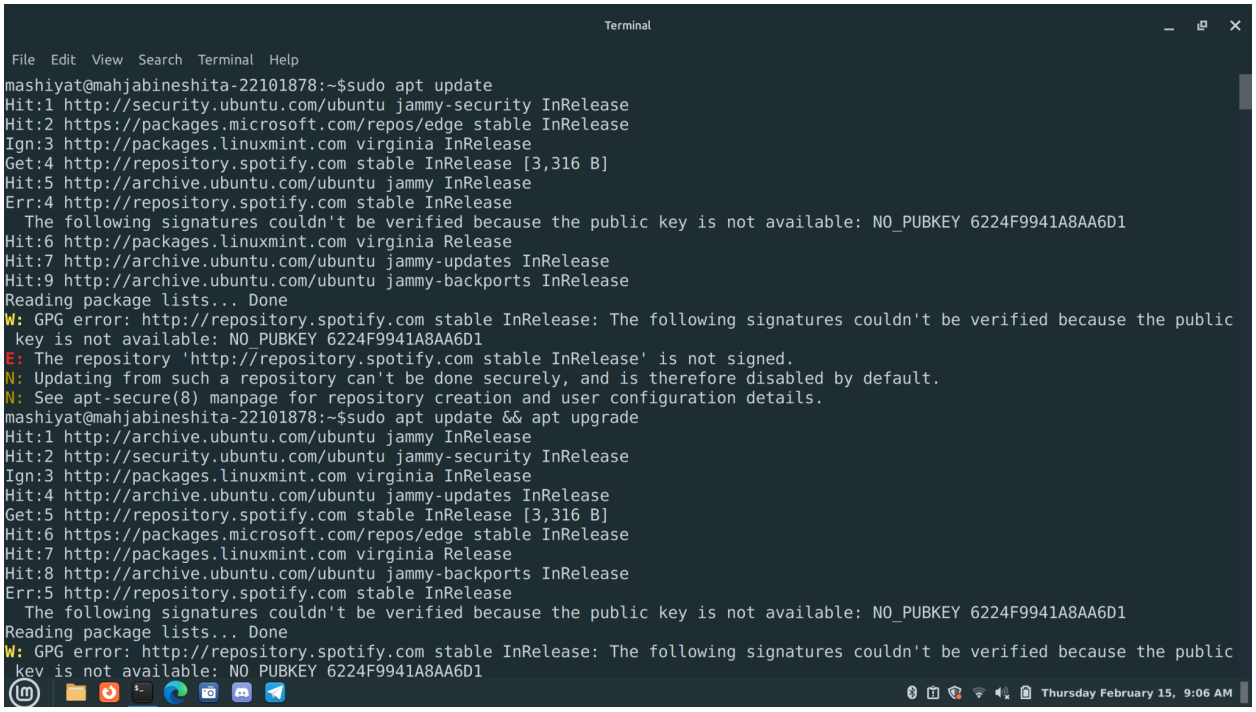
```
Processing triggers for dbus (1.12.20-2ubuntu4.1) ...
Processing triggers for initramfs-tools (0.140ubuntu13.2) ...
update-initramfs: Generating /boot/initrd.img-6.5.0-17-generic
Processing triggers for hicolor-icon-theme (0.17-2) ...
Processing triggers for libc-bin (2.35-0ubuntu3.6) ...
Processing triggers for man-db (2.10.2-1) ...
mashiyat@mahjabineshita-22101878: Sudo adduser $USER libvirt
Command 'Sudo' not found, did you mean:
  command 'ludo' from snap ludo (0.17.1)
  command 'sudo' from deb sudo (1.9.9-1ubuntu2.4)
  command 'sudo' from deb sudo-ldap (1.9.9-1ubuntu2.4)
  command 'udo' from deb udo (6.4.1-6)
See 'snap info <snapname>' for additional versions.
mashiyat@mahjabineshita-22101878: sudo adduser $USER libvirt
The user `mahjabin-eshita' is already a member of `libvirt'.
mashiyat@mahjabineshita-22101878: sudo adduser $USER kvm
Adding user `mahjabin-eshita' to group `kvm' ...
Adding user mahjabin-eshita to group kvm
Done.
mashiyat@mahjabineshita-22101878:
```

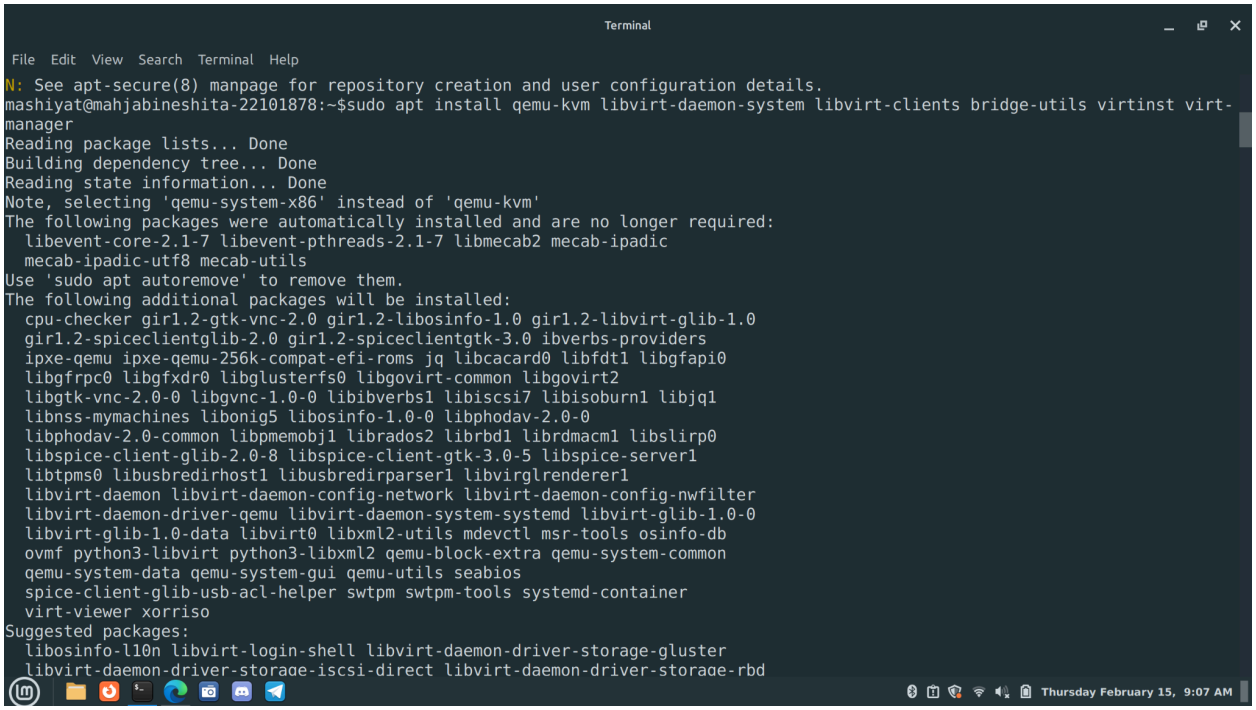
I started working on my PC again so I am just giving the screenshots here without many details as I explained the commands before

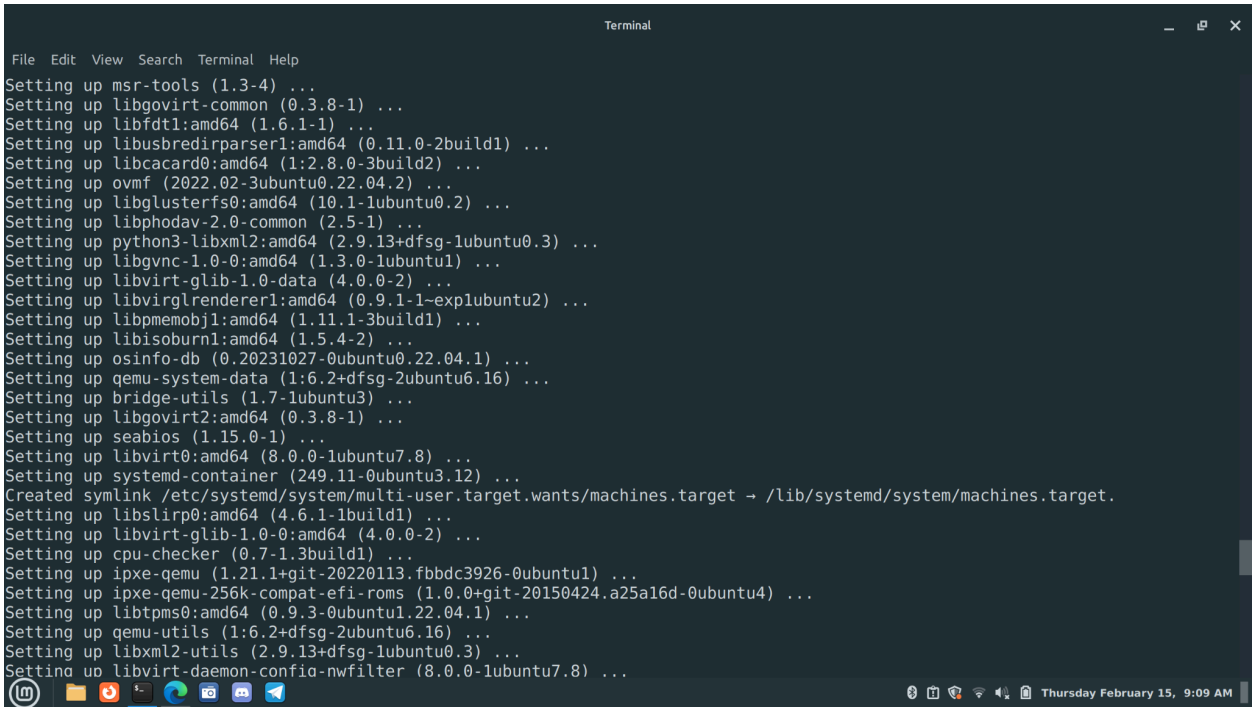
sudo apt update

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

Using this to install qemu-kvm, daemon library, and virt-manager



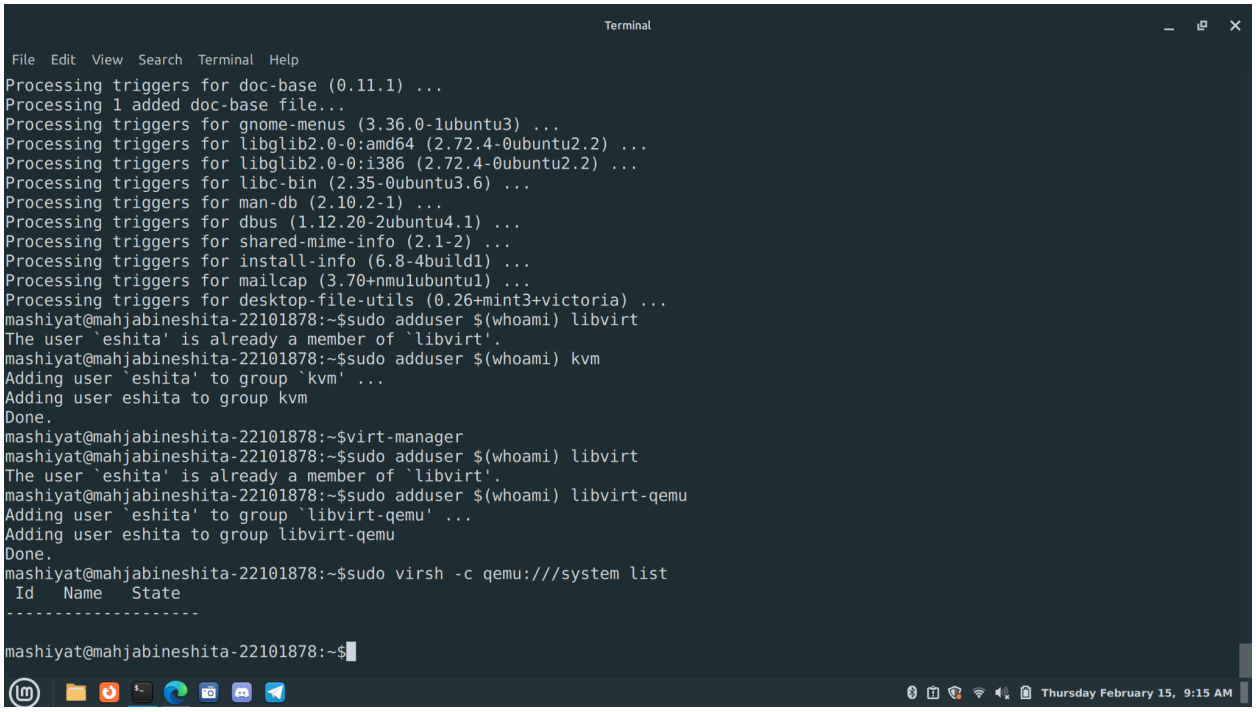

Terminal
File Edit View Search Terminal Help
N: See apt-secure(8) manpage for repository creation and user configuration details.
mashiyat@mahjabineshita-22101878:~$sudo apt install qemu-kvm libvirt-daemon-system libvirt-clients bridge-utils virtinst virt-manager
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
Note, selecting 'qemu-system-x86' instead of 'qemu-kvm'
The following packages were automatically installed and are no longer required:
libevent-core-2.1-7 libevent-pthreads-2.1-7 libmecab2 mecab-ipadic
mecab-ipadic-utf8 mecab-utils
Use 'sudo apt autoremove' to remove them.
The following additional packages will be installed:
cpu-checker gir1.2-gtk-vnc-2.0 gir1.2-libosinfo-1.0 gir1.2-libvirt-glib-1.0
gir1.2-spiceclientglib-2.0 gir1.2-spiceclientgtk-3.0 ibverbs-providers
ipxe-qemu ipxe-qemu-256k-compat-efi-roms jq libcacard0 libfdt1 libgfapi0
libgfrpc0 libgfxdr0 libglusterfs0 libgovirt-common libgovirt2
libgtk-vnc-2.0-0 libgvnc-1.0-0 libibverbs1 libiscsi7 libisoburn1 libjq1
libnss-mymachines libonig5 libosinfo-1.0-0 libphodav-2.0-0
libphodav-2.0-common libpmemobj1 librados2 librbd1 librdmacm1 libslirp0
libspice-client-glib-2.0-8 libspice-client-gtk-3.0-5 libspice-server1
libtpms0 libusbredirhost1 libusbredirparser1 libvirglrenderer1
libvirt-daemon libvirt-daemon-config-network libvirt-daemon-config-nwfilter
libvirt-daemon-driver-qemu libvirt-daemon-system-systemd libvirt-glib-1.0-0
libvirt-glib-1.0-data libvirt0 libxml2-utils mdevctl msr-tools osinfo-db
ovmf python3-libvirt python3-libxml2 qemu-block-extra qemu-system-common
qemu-system-data qemu-system-gui qemu-utils seabios
spice-client-glib-usb-acl-helper swtpm swtpm-tools systemd-container
virt-viewer xorriso
Suggested packages:
libosinfo-l10n libvirt-login-shell libvirt-daemon-driver-storage-gluster
libvirt-daemon-driver-storage-iscsi-direct libvirt-daemon-driver-storage-rbd
Thursday February 15, 9:07 AM


Terminal
File Edit View Search Terminal Help
Setting up msr-tools (1.3-4) ...
Setting up libgovirt-common (0.3.8-1) ...
Setting up libfdt1:amd64 (1.6.1-1) ...
Setting up libusbredirparser1:amd64 (0.11.0-2build1) ...
Setting up libcacard0:amd64 (1:2.8.0-3build2) ...
Setting up ovmf (2022.02-3ubuntu0.22.04.2) ...
Setting up libglusterfs0:amd64 (10.1-1ubuntu0.2) ...
Setting up libphodav-2.0-common (2.5-1) ...
Setting up python3-libxml2:amd64 (2.9.13+dfsg-1ubuntu0.3) ...
Setting up libgvnc-1.0-0:amd64 (1.3.0-1ubuntu1) ...
Setting up libvirt-glib-1.0-data (4.0.0-2) ...
Setting up libvirglrenderer1:amd64 (0.9.1-1~exp1ubuntu2) ...
Setting up libpmemobj1:amd64 (1.11.1-3build1) ...
Setting up libisoburn1:amd64 (1.5.4-2) ...
Setting up osinfo-db (0.20231027-0ubuntu0.22.04.1) ...
Setting up qemu-system-data (1:6.2+dfsg-2ubuntu6.16) ...
Setting up bridge-utils (1.7-1ubuntu3) ...
Setting up libgovirt2:amd64 (0.3.8-1) ...
Setting up seabios (1.15.0-1) ...
Setting up libvirt0:amd64 (8.0.0-1ubuntu7.8) ...
Setting up systemd-container (249.11-0ubuntu3.12) ...
Created symlink /etc/systemd/system/multi-user.target.wants/machines.target → /lib/systemd/system/machines.target.
Setting up libslirp0:amd64 (4.6.1-1build1) ...
Setting up libvirt-glib-1.0-0:amd64 (4.0.0-2) ...
Setting up cpu-checker (0.7-1.3build1) ...
Setting up ipxe-qemu (1.21.1+git-20220113.fbbdc3926-0ubuntu1) ...
Setting up ipxe-qemu-256k-compat-efi-roms (1.0.0+git-20150424.a25a16d-0ubuntu4) ...
Setting up libtpms0:amd64 (0.9.3-0ubuntu1.22.04.1) ...
Setting up qemu-utils (1:6.2+dfsg-2ubuntu6.16) ...
Setting up libxml2-utils (2.9.13+dfsg-1ubuntu0.3) ...
Setting up libvirt-daemon-config-nwfilter (8.0.0-1ubuntu7.8) ...
Thursday February 15, 9:09 AM

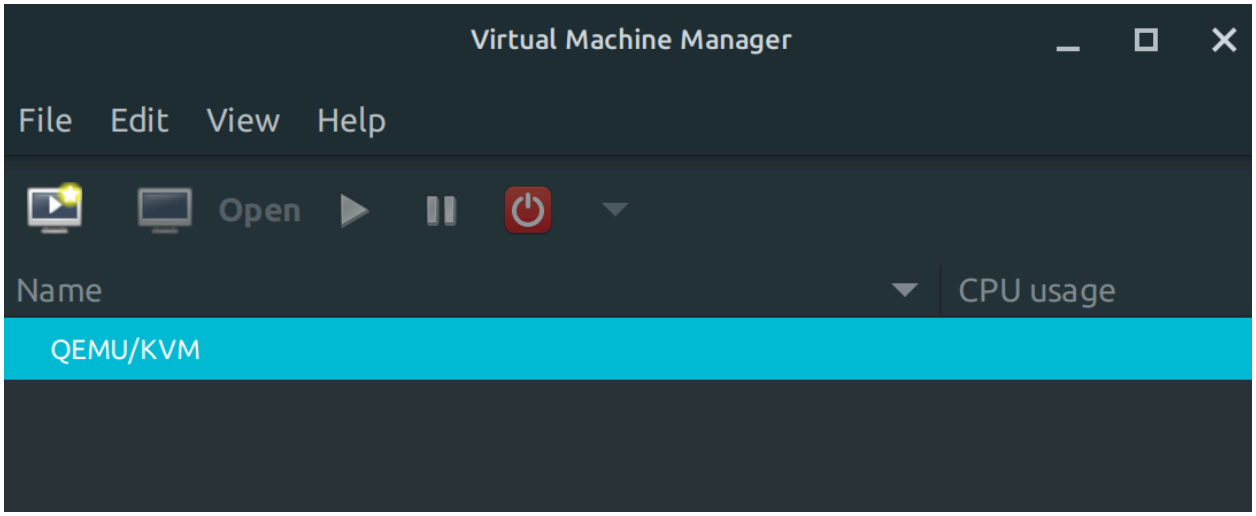
```
Processing triggers for mailcap (3.70+nmu1ubuntu1) ...
Processing triggers for desktop-file-utils (0.26+mint3+victoria) ...
mashiyat@mahjabineshita-22101878:~$sudo adduser $(whoami) libvirt
The user `eshita' is already a member of `libvirt'.
mashiyat@mahjabineshita-22101878:~$sudo adduser $(whoami) kvm
Adding user `eshita' to group `kvm' ...
Adding user eshita to group kvm
Done.
mashiyat@mahjabineshita-22101878:~$virt-manager
mashiyat@mahjabineshita-22101878:~$
```

Then after adding the user, I am going to further explain the commands.
I could not connect to the virt-manager properly which is why I used some commands that can help me to solve the problem. Then I used the commands given below for further steps. I rebooted my system so I could not get any screenshots here.

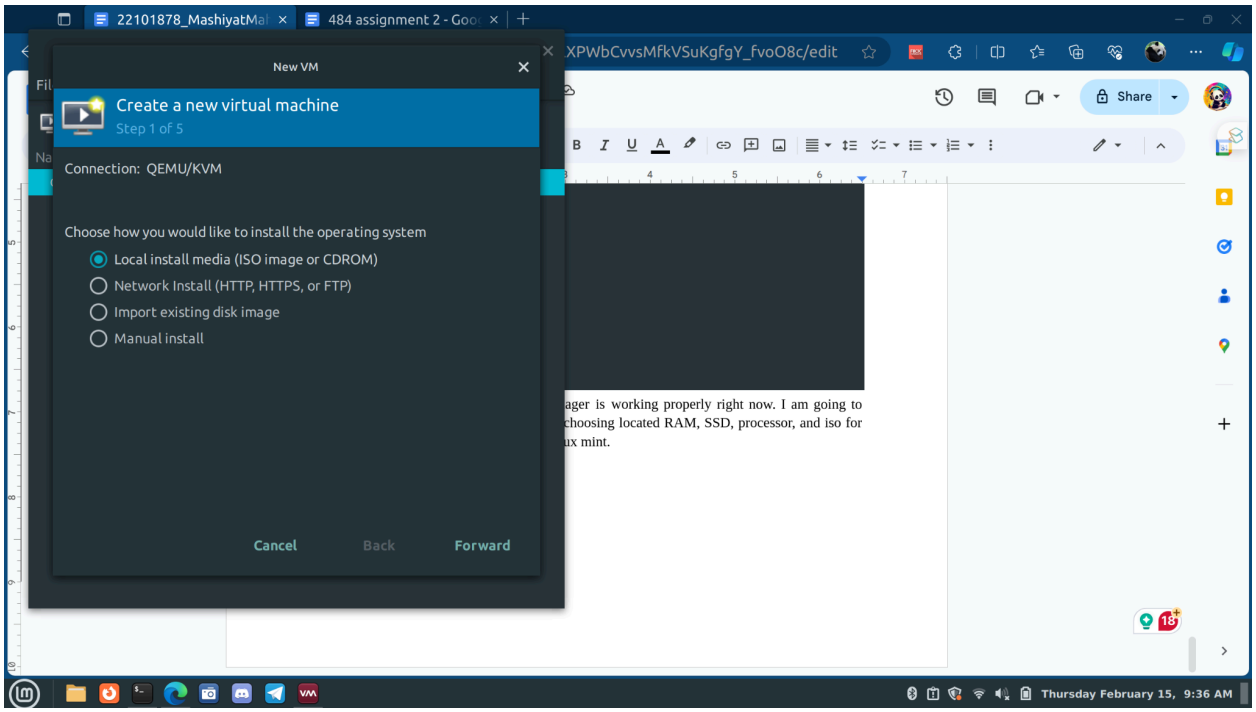
sudo adduser $(whoami) libvirt
sudo adduser $(whoami) libvirt-qemu
sudo virsh -c qemu:///system list
sudo reboot

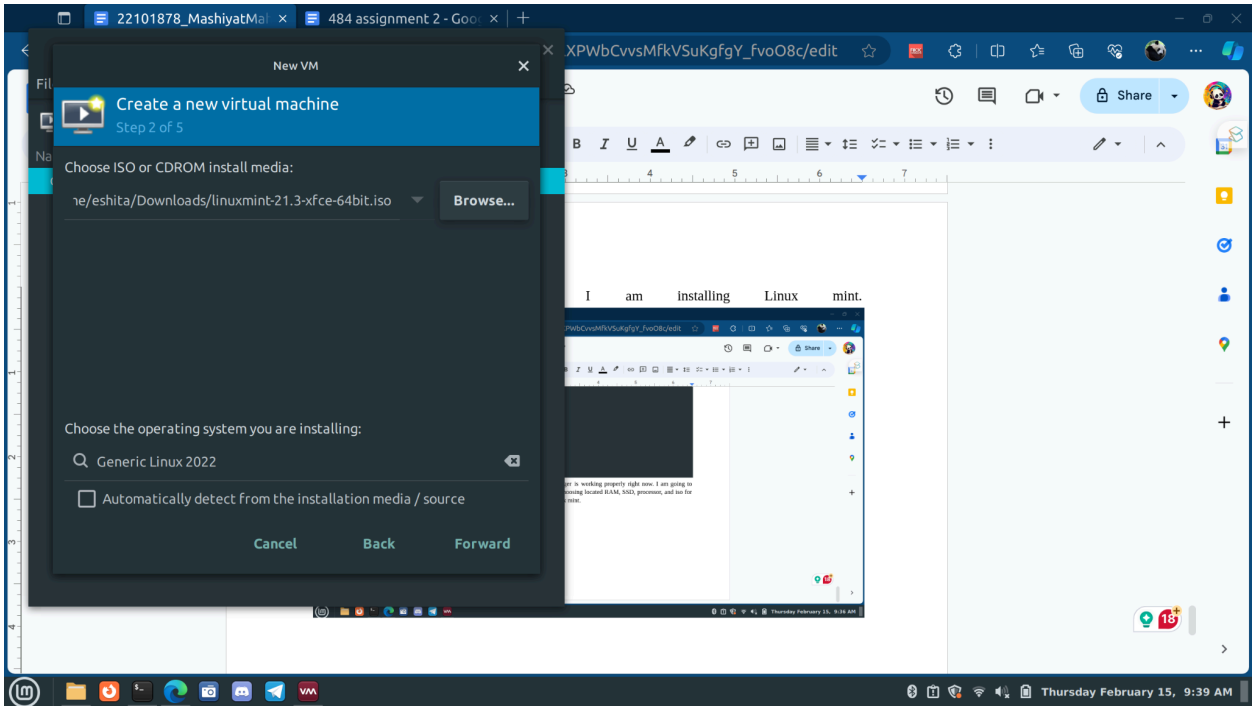


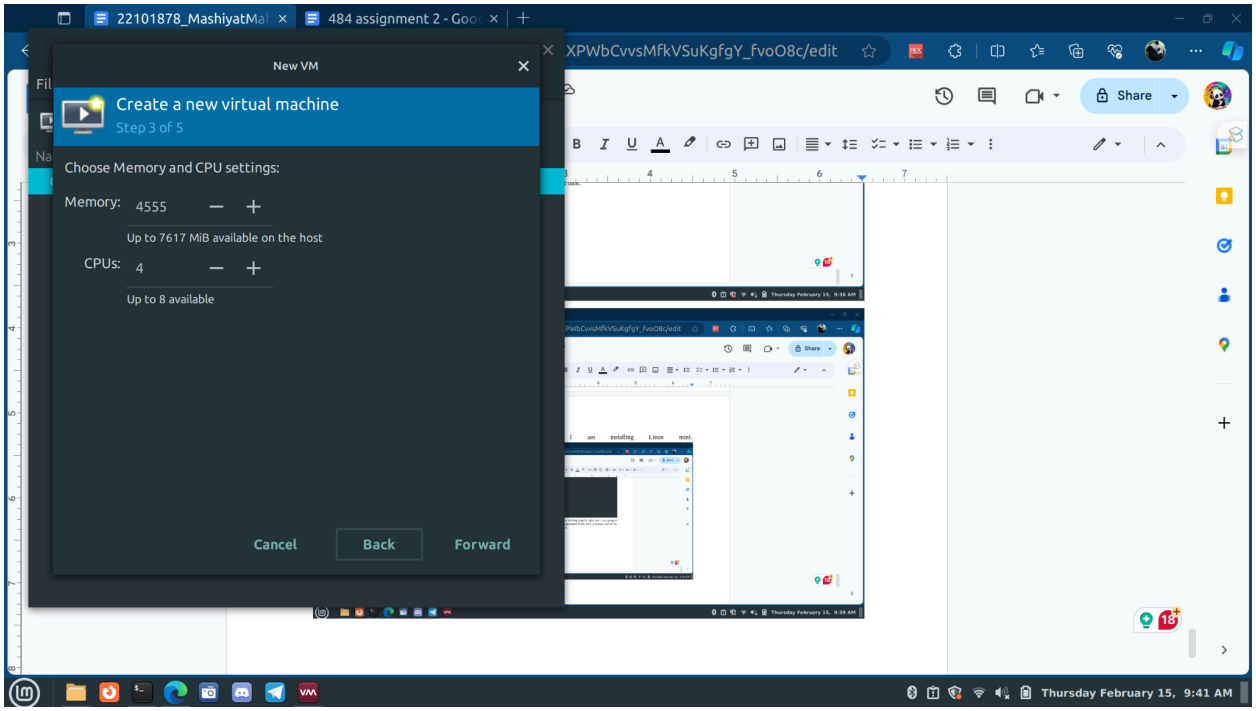
My system has been updated successfully right now. So, I am going to apply the further commands. I am opening my **virt-manager**. Let's see if it is working properly or not.

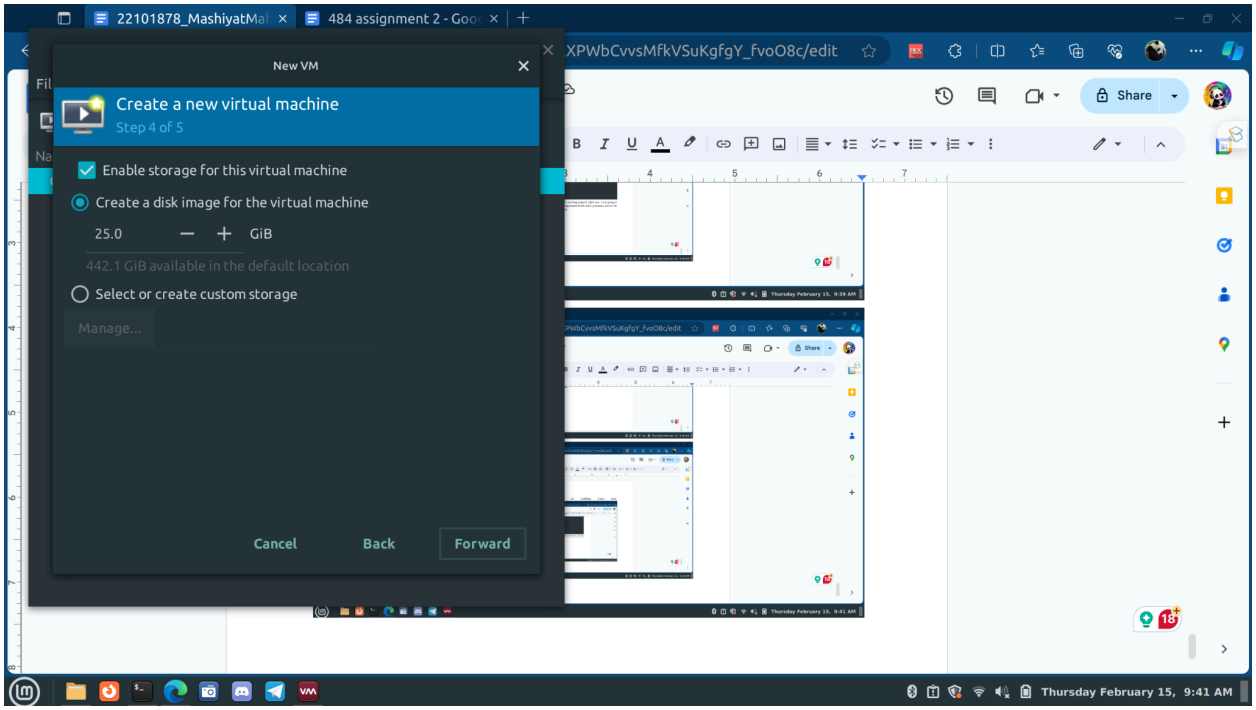


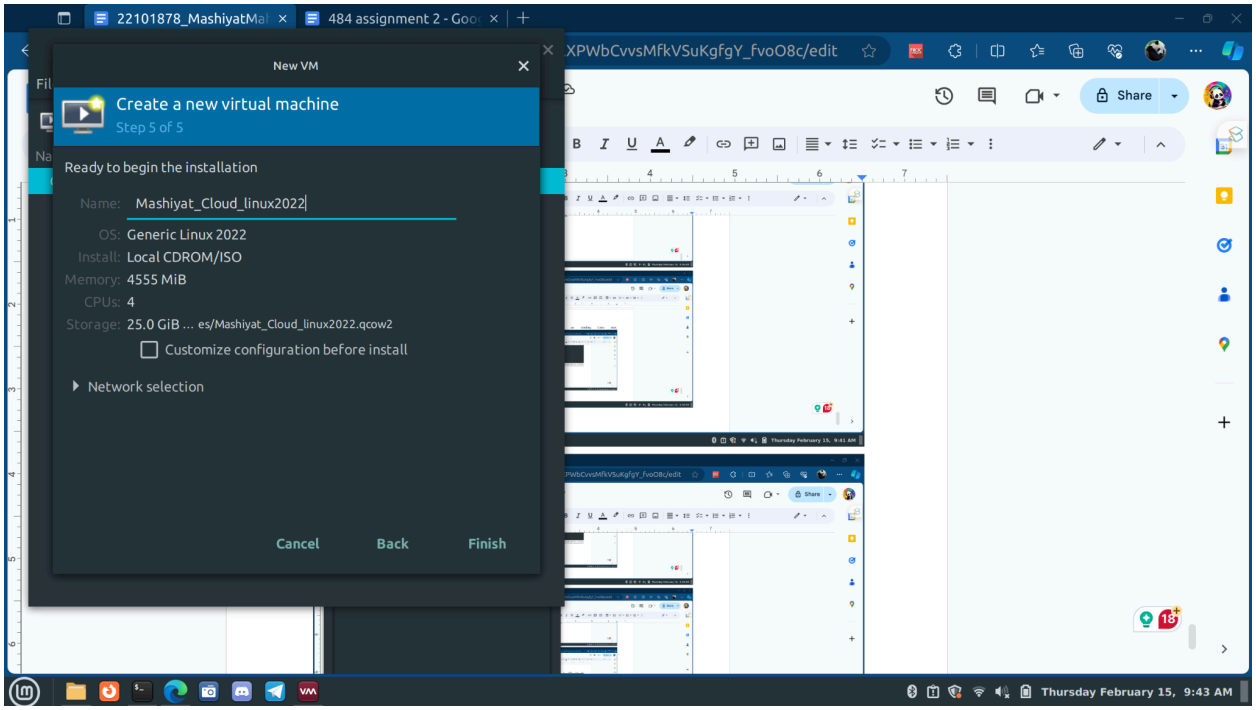
Now, we can see the virtual machine manager is working properly right now. I am going to create the virtual machine using gui. I am choosing located RAM, SSD, processor, and iso for the virtual machine. Here I am installing Linux mint.

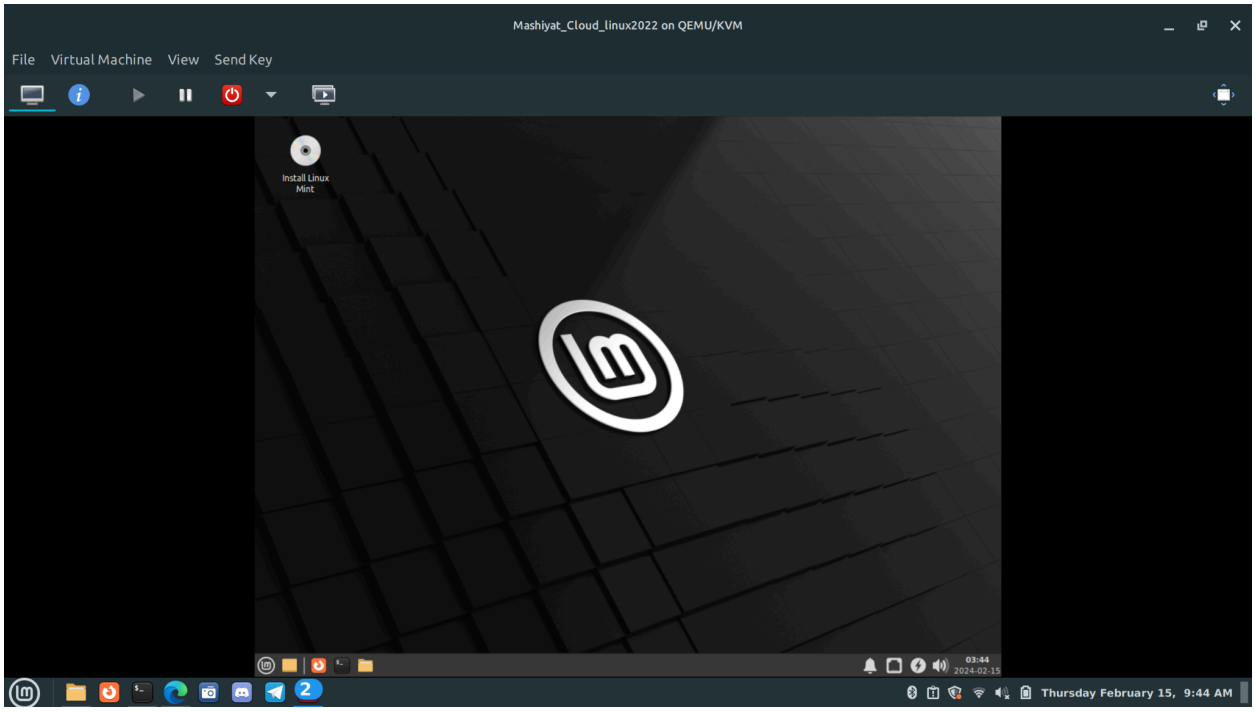



New VM
Create a new virtual machine
Step 2 of 5
Choose ISO or CDROM install media:
ıe/eshita/Downloads/linuxmint-21.3-xfce-64bit.iso
Browse...
Choose the operating system you are installing:
Generic Linux 2022
Automatically detect from the installation media / source
Cancel
Back
Forward
I am installing Linux mint.
Share
Thursday February 15, 9:39 AM


New VM
Create a new virtual machine
Step 3 of 5
Choose Memory and CPU settings:
Memory: 4555
Up to 7617 MiB available on the host
CPUs: 4
Up to 8 available
Cancel
Back
Forward
Share
Thursday February 15, 9:41 AM

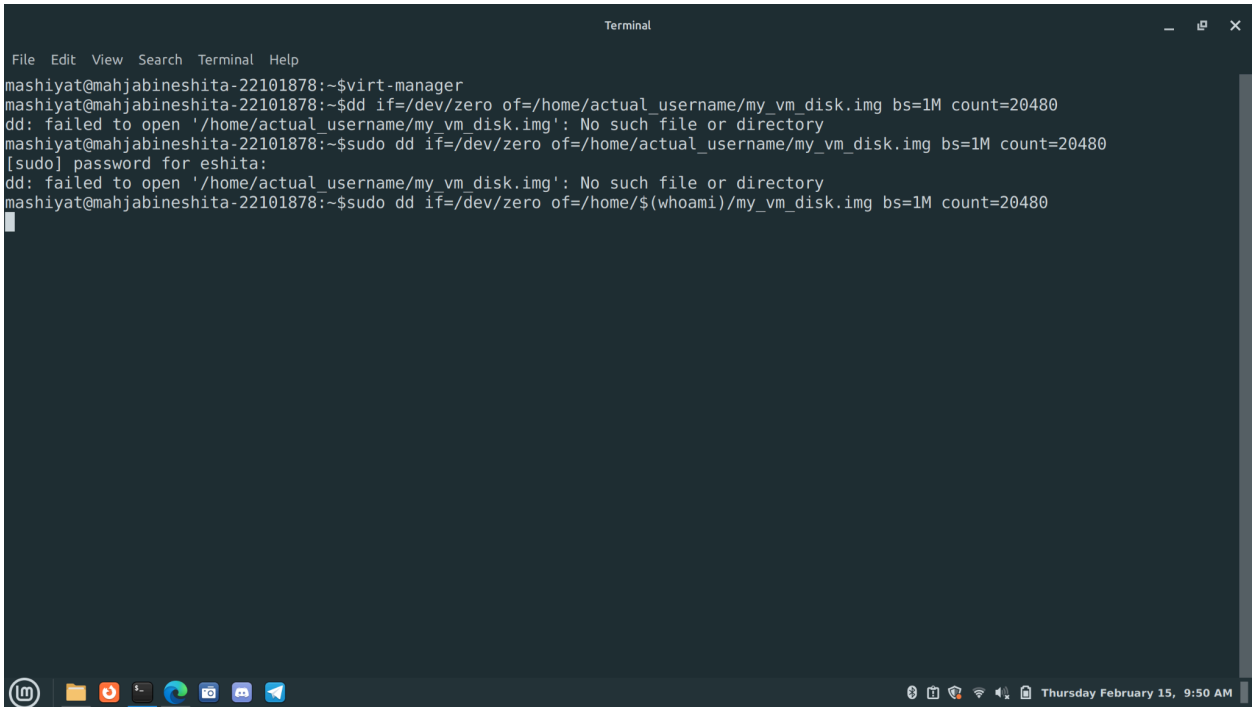

New VM
Create a new virtual machine
Step 4 of 5
Enable storage for this virtual machine
Create a disk image for the virtual machine
25.0
GiB
442.1 GiB available in the default location
Select or create custom storage
Manage...
Cancel
Back
Forward
Share
Thursday February 15, 9:41 AM



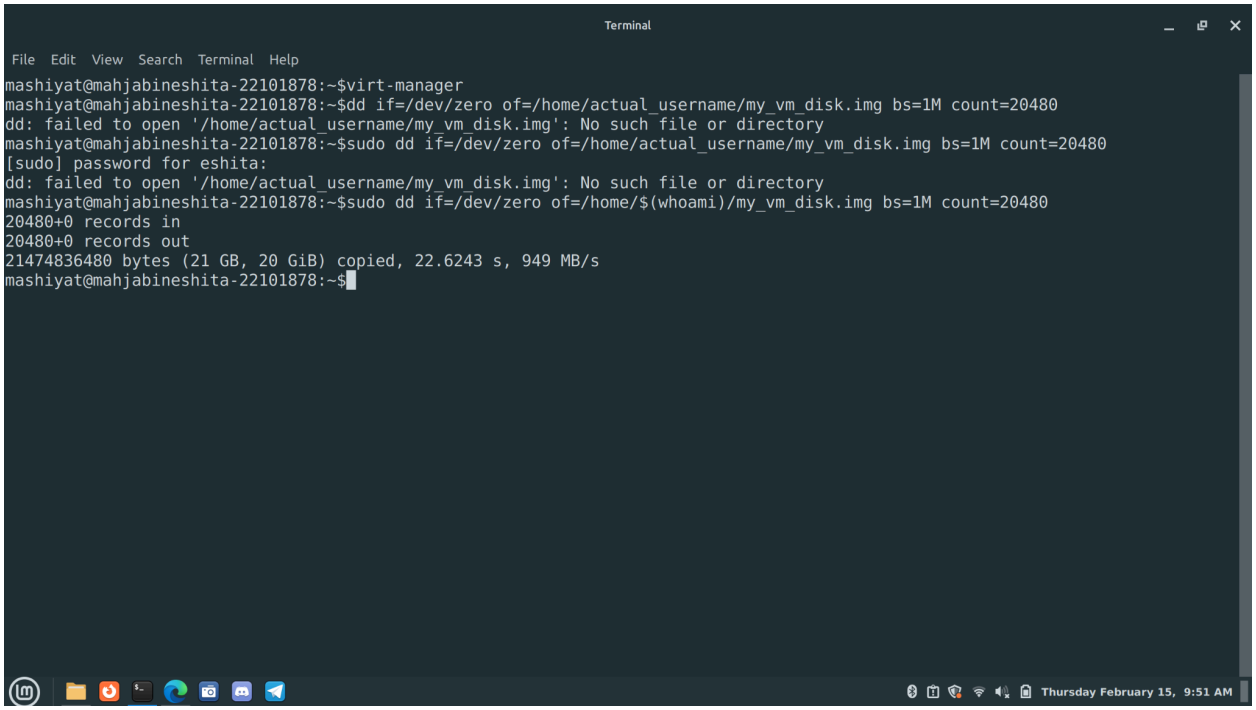


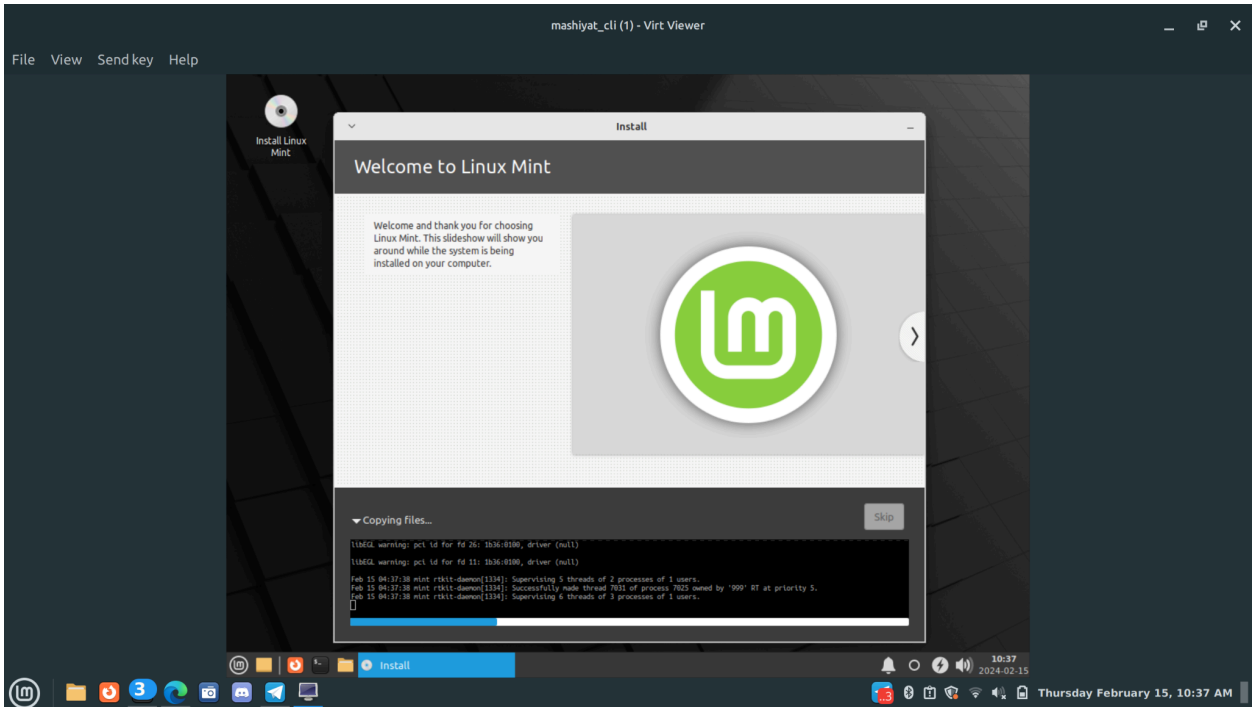
I took some screenshots of the time while I was making the new Linux Mint after installing Linux Mint on my PC. I have booted the OS but I did not permanently install the OS on my PC

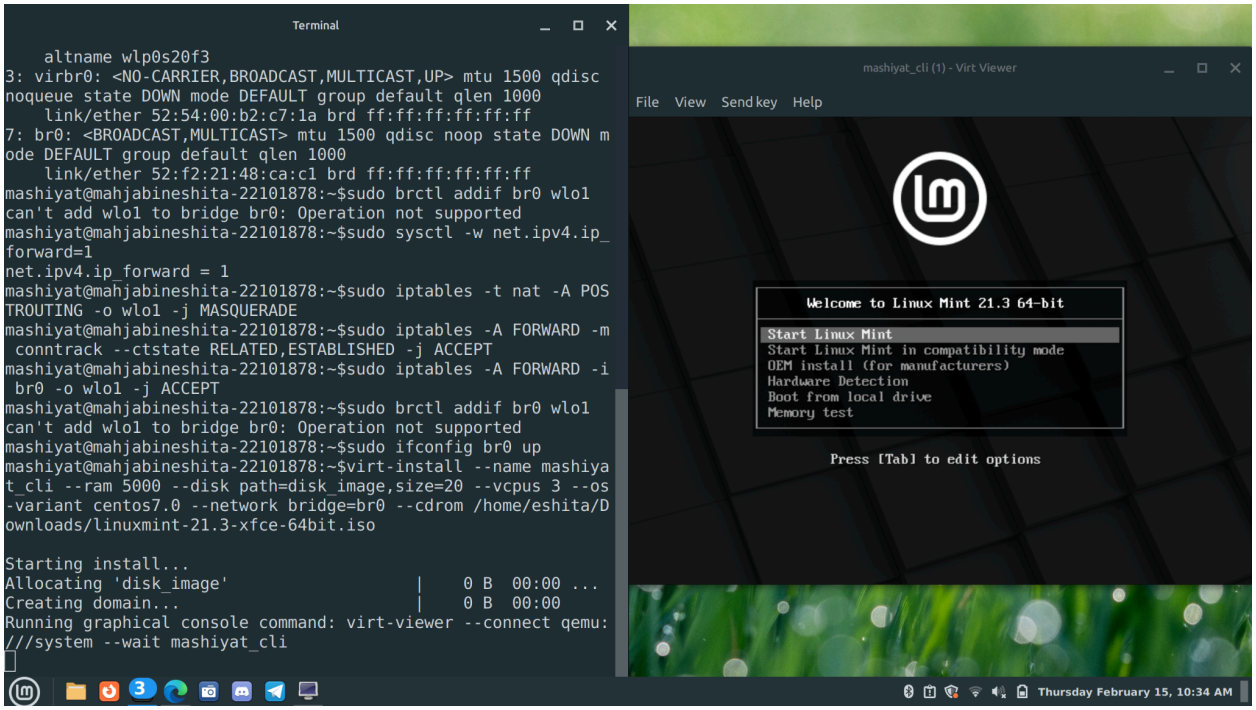
because I already use Linux Mint as my operating system from before.

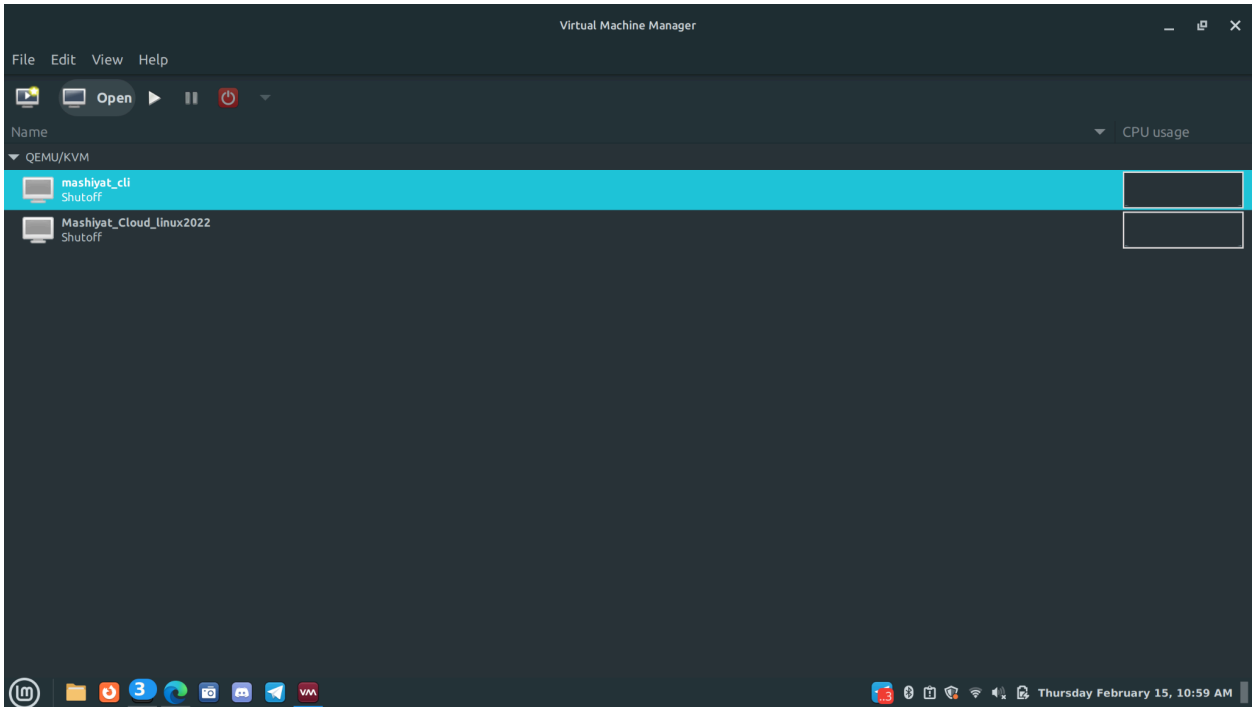


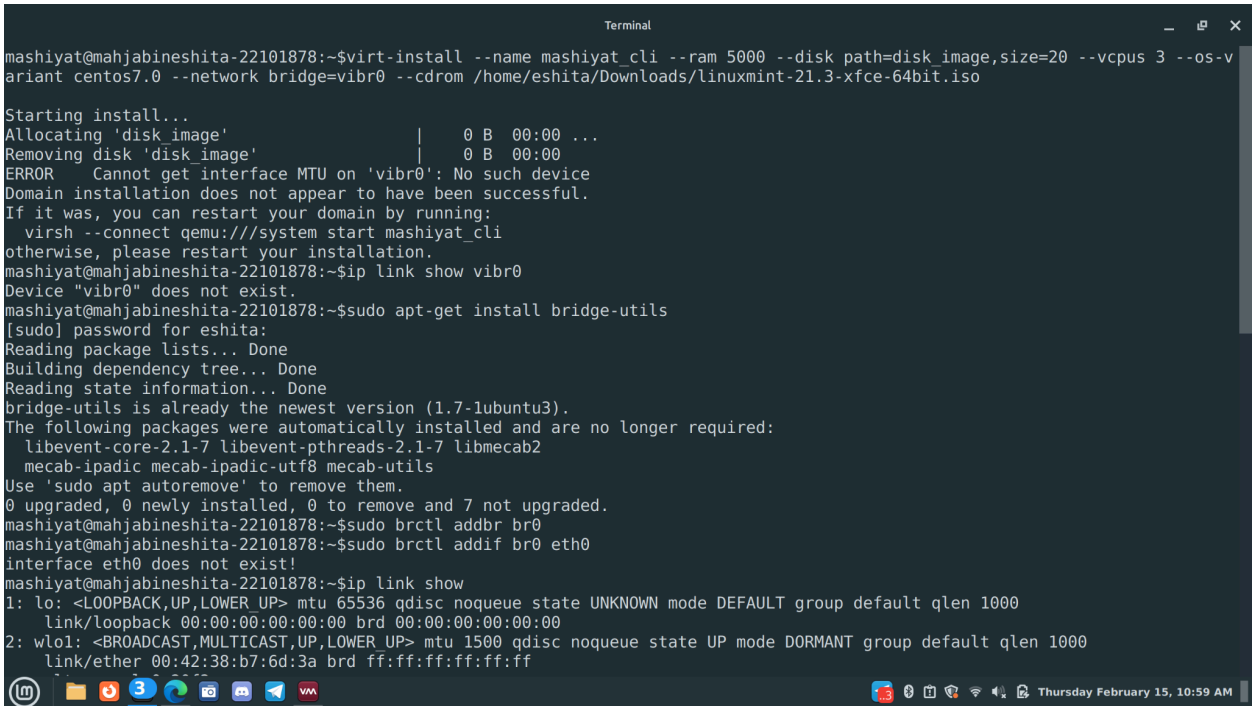
Firstly, I did not use the command properly so I got some error, and then I failed to open. I used the command properly then so I got no error and it has successfully created the image file or iso.

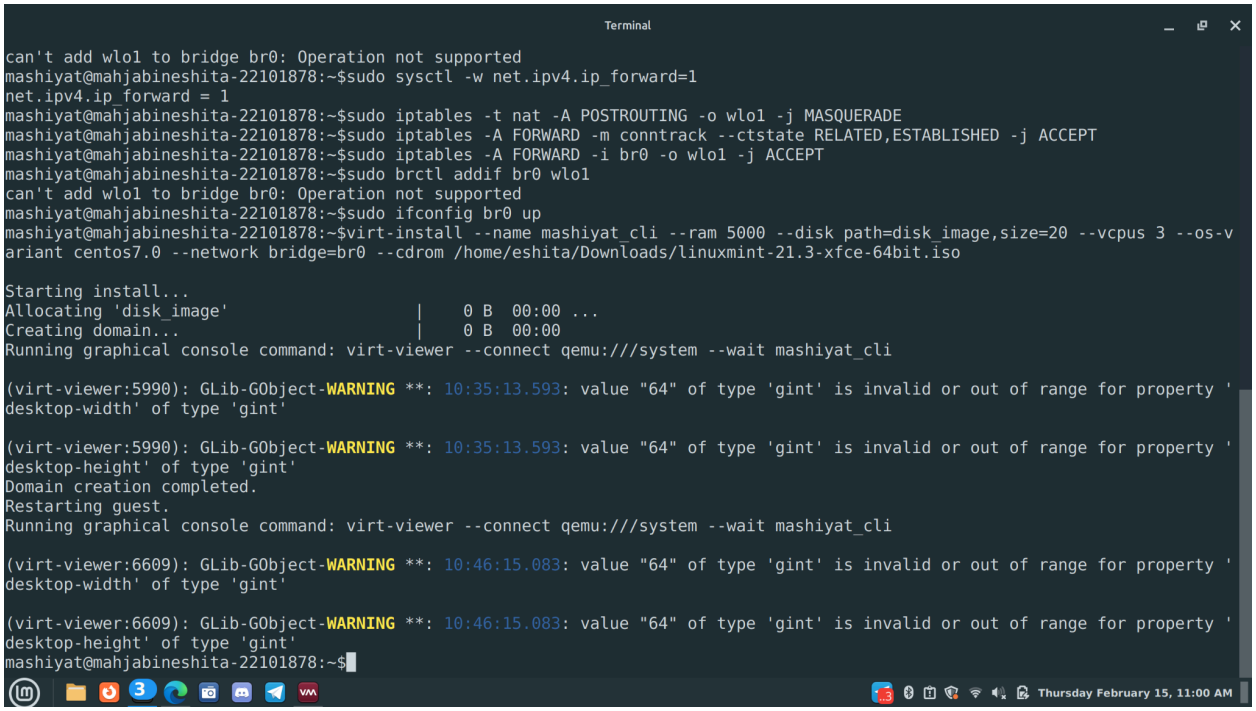

Terminal
File Edit View Search Terminal Help
mashiyat@mahjabineshita-22101878:~$virt-manager
mashiyat@mahjabineshita-22101878:~$dd if=/dev/zero of=/home/actual_username/my_vm_disk.img bs=1M count=20480
dd: failed to open '/home/actual_username/my_vm_disk.img': No such file or directory
mashiyat@mahjabineshita-22101878:~$sudo dd if=/dev/zero of=/home/actual_username/my_vm_disk.img bs=1M count=20480
[sudo] password for eshita:
dd: failed to open '/home/actual_username/my_vm_disk.img': No such file or directory
mashiyat@mahjabineshita-22101878:~$sudo dd if=/dev/zero of=/home/$(whoami)/my_vm_disk.img bs=1M count=20480
20480+0 records in
20480+0 records out
21474836480 bytes (21 GB, 20 GiB) copied, 22.6243 s, 949 MB/s
mashiyat@mahjabineshita-22101878:~$
Thursday February 15, 9:51 AM

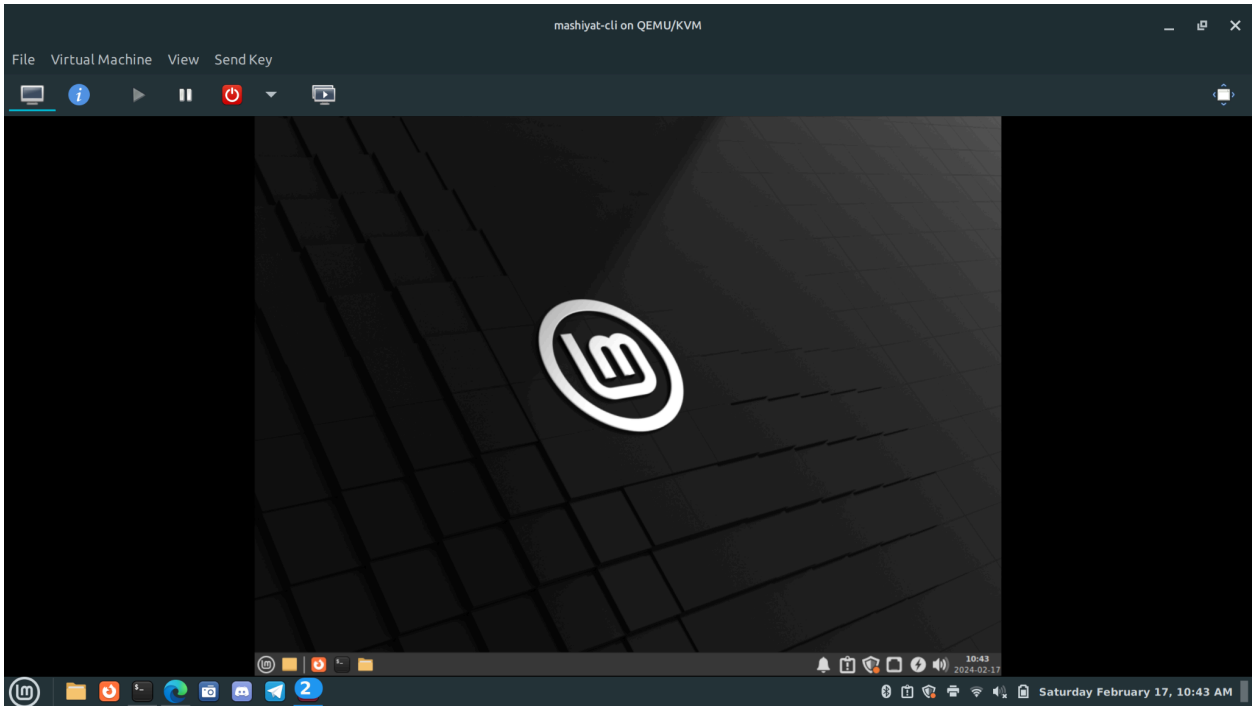

mashiyat_cli (1) - Virt Viewer
File View Send key Help
Install Linux Mint
Install
Welcome to Linux Mint
Welcome and thank you for choosing Linux Mint. This slideshow will show you around while the system is being installed on your computer.
Copying files...
Skip
Install
10:37
2024-02-15
Thursday February 15, 10:37 AM


Terminal
altname wlp0s20f3
3: virbr0: <NO-CARRIER,BROADCAST,MULTICAST,UP> mtu 1500 qdisc noqueue state DOWN mode DEFAULT group default qlen 1000
link/ether 52:54:00:b2:c7:1a brd ff:ff:ff:ff:ff:ff
7: br0: <BROADCAST,MULTICAST> mtu 1500 qdisc noop state DOWN mode DEFAULT group default qlen 1000
link/ether 52:f2:21:48:ca:c1 brd ff:ff:ff:ff:ff:ff
mashiyat@mahjabineshita-22101878:~$sudo brctl addif br0 wlo1
can't add wlo1 to bridge br0: Operation not supported
mashiyat@mahjabineshita-22101878:~$sudo sysctl -w net.ipv4.ip_forward=1
net.ipv4.ip_forward = 1
mashiyat@mahjabineshita-22101878:~$sudo iptables -t nat -A POSTROUTING -o wlo1 -j MASQUERADE
mashiyat@mahjabineshita-22101878:~$sudo iptables -A FORWARD -m conntrack --ctstate RELATED,ESTABLISHED -j ACCEPT
mashiyat@mahjabineshita-22101878:~$sudo iptables -A FORWARD -i br0 -o wlo1 -j ACCEPT
mashiyat@mahjabineshita-22101878:~$sudo brctl addif br0 wlo1
can't add wlo1 to bridge br0: Operation not supported
mashiyat@mahjabineshita-22101878:~$sudo ifconfig br0 up
mashiyat@mahjabineshita-22101878:~$virt-install --name mashiyat_cli --ram 5000 --disk path=disk_image,size=20 --vcpus 3 --os-variant centos7.0 --network bridge=br0 --cdrom /home/eshita/Downloads/linuxmint-21.3-xfce-64bit.iso
Starting install...
Allocating 'disk_image' | 0 B 00:00 ...
Creating domain... | 0 B 00:00
Running graphical console command: virt-viewer --connect qemu:///system --wait mashiyat_cli
mashiyat_cli (1) - Virt Viewer
File View Send key Help
Welcome to Linux Mint 21.3 64-bit
Start Linux Mint
Start Linux Mint in compatibility mode
OEM install (for manufacturers)
Hardware Detection
Boot from local drive
Memory test
Press [Tab] to edit options
Thursday February 15, 10:34 AM


Virtual Machine Manager
File Edit View Help
Open
Name
CPU usage
QEMU/KVM
mashiyat_cli
Shutoff
Mashiyat_Cloud_linux2022
Shutoff
Thursday February 15, 10:59 AM


Terminal
mashiyat@mahjabineshita-22101878:~$virt-install --name mashiyat_cli --ram 5000 --disk path=disk_image,size=20 --vcpus 3 --os-v
ariant centos7.0 --network bridge=vibr0 --cdrom /home/eshita/Downloads/linuxmint-21.3-xfce-64bit.iso
Starting install...
Allocating 'disk_image' | 0 B 00:00 ...
Removing disk 'disk_image' | 0 B 00:00
ERROR Cannot get interface MTU on 'vibr0': No such device
Domain installation does not appear to have been successful.
If it was, you can restart your domain by running:
virsh --connect qemu:///system start mashiyat_cli
otherwise, please restart your installation.
mashiyat@mahjabineshita-22101878:~$ip link show vibr0
Device "vibr0" does not exist.
mashiyat@mahjabineshita-22101878:~$sudo apt-get install bridge-utils
[sudo] password for eshita:
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
bridge-utils is already the newest version (1.7-1ubuntu3).
The following packages were automatically installed and are no longer required:
libevent-core-2.1-7 libevent-pthreads-2.1-7 libmecab2
mecab-ipadic mecab-ipadic-utf8 mecab-utils
Use 'sudo apt autoremove' to remove them.
0 upgraded, 0 newly installed, 0 to remove and 7 not upgraded.
mashiyat@mahjabineshita-22101878:~$sudo brctl addbr br0
mashiyat@mahjabineshita-22101878:~$sudo brctl addif br0 eth0
interface eth0 does not exist!
mashiyat@mahjabineshita-22101878:~$ip link show
1: lo: <LOOPBACK,UP,LOWER_UP> mtu 65536 qdisc noqueue state UNKNOWN mode DEFAULT group default qlen 1000
link/loopback 00:00:00:00:00:00 brd 00:00:00:00:00:00
2: wlo1: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc noqueue state UP mode DORMANT group default qlen 1000
link/ether 00:42:38:b7:6d:3a brd ff:ff:ff:ff:ff:ff
Thursday February 15, 10:59 AM


Terminal
can't add wlo1 to bridge br0: Operation not supported
mashiyat@mahjabineshita-22101878:~$sudo sysctl -w net.ipv4.ip_forward=1
net.ipv4.ip_forward = 1
mashiyat@mahjabineshita-22101878:~$sudo iptables -t nat -A POSTROUTING -o wlo1 -j MASQUERADE
mashiyat@mahjabineshita-22101878:~$sudo iptables -A FORWARD -m conntrack --ctstate RELATED,ESTABLISHED -j ACCEPT
mashiyat@mahjabineshita-22101878:~$sudo iptables -A FORWARD -i br0 -o wlo1 -j ACCEPT
mashiyat@mahjabineshita-22101878:~$sudo brctl addif br0 wlo1
can't add wlo1 to bridge br0: Operation not supported
mashiyat@mahjabineshita-22101878:~$sudo ifconfig br0 up
mashiyat@mahjabineshita-22101878:~$virt-install --name mashiyat_cli --ram 5000 --disk path=disk_image,size=20 --vcpus 3 --os-v
ariant centos7.0 --network bridge=br0 --cdrom /home/eshita/Downloads/linuxmint-21.3-xfce-64bit.iso
Starting install...
Allocating 'disk_image' | 0 B 00:00 ...
Creating domain... | 0 B 00:00
Running graphical console command: virt-viewer --connect qemu:///system --wait mashiyat_cli
(virt-viewer:5990): GLib-GObject-WARNING **: 10:35:13.593: value "64" of type 'gint' is invalid or out of range for property '
desktop-width' of type 'gint'
(virt-viewer:5990): GLib-GObject-WARNING **: 10:35:13.593: value "64" of type 'gint' is invalid or out of range for property '
desktop-height' of type 'gint'
Domain creation completed.
Restarting guest.
Running graphical console command: virt-viewer --connect qemu:///system --wait mashiyat_cli
(virt-viewer:6609): GLib-GObject-WARNING **: 10:46:15.083: value "64" of type 'gint' is invalid or out of range for property '
desktop-width' of type 'gint'
(virt-viewer:6609): GLib-GObject-WARNING **: 10:46:15.083: value "64" of type 'gint' is invalid or out of range for property '
desktop-height' of type 'gint'
mashiyat@mahjabineshita-22101878:~$
Thursday February 15, 11:00 AM

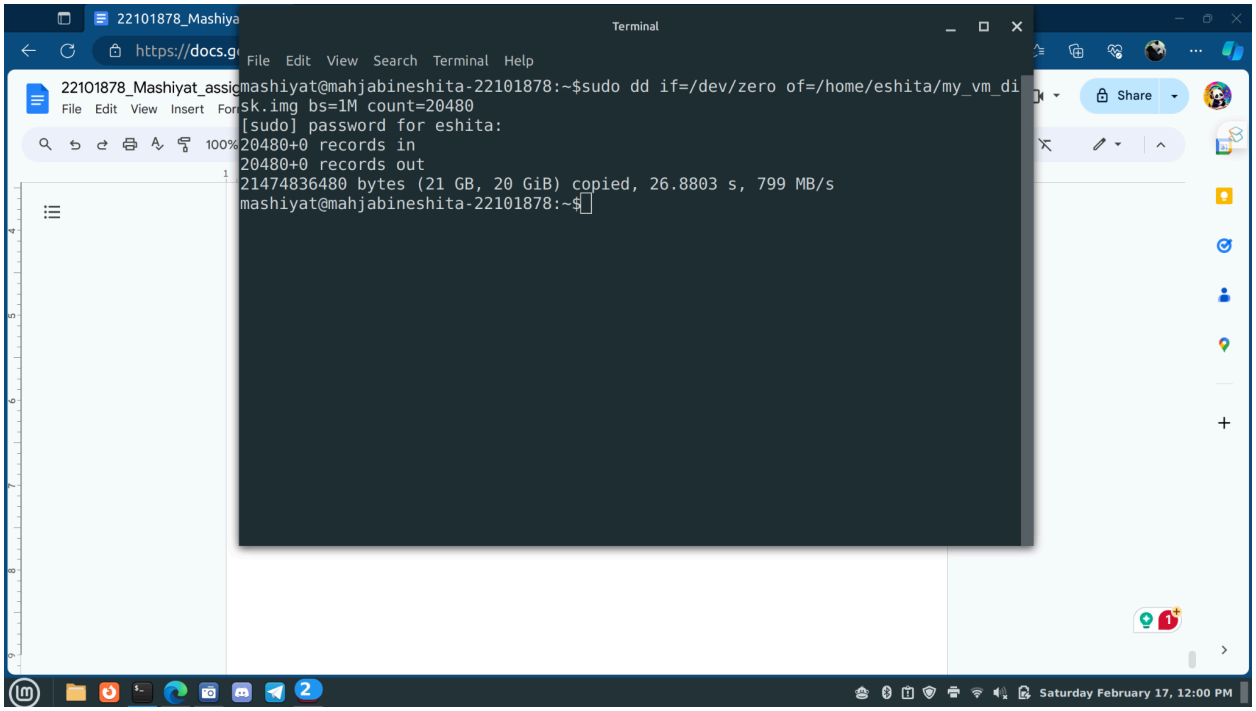


Task 2 and Task 3

Creating VM using VMM (using GUI) and creating kvm-based VM using (virt-install)

I again created the disk and successfully rebooted Linux Mint on my PC. After that, I made it using the **graphical user interface (GUI),** and then I am going to use the command lines
Firstly, I am going to declare my image file to store my OS. I used this command to do so:

sudo dd if=/dev/zero of=/home/eshita/my_vm_disk.img bs=1M count=20480



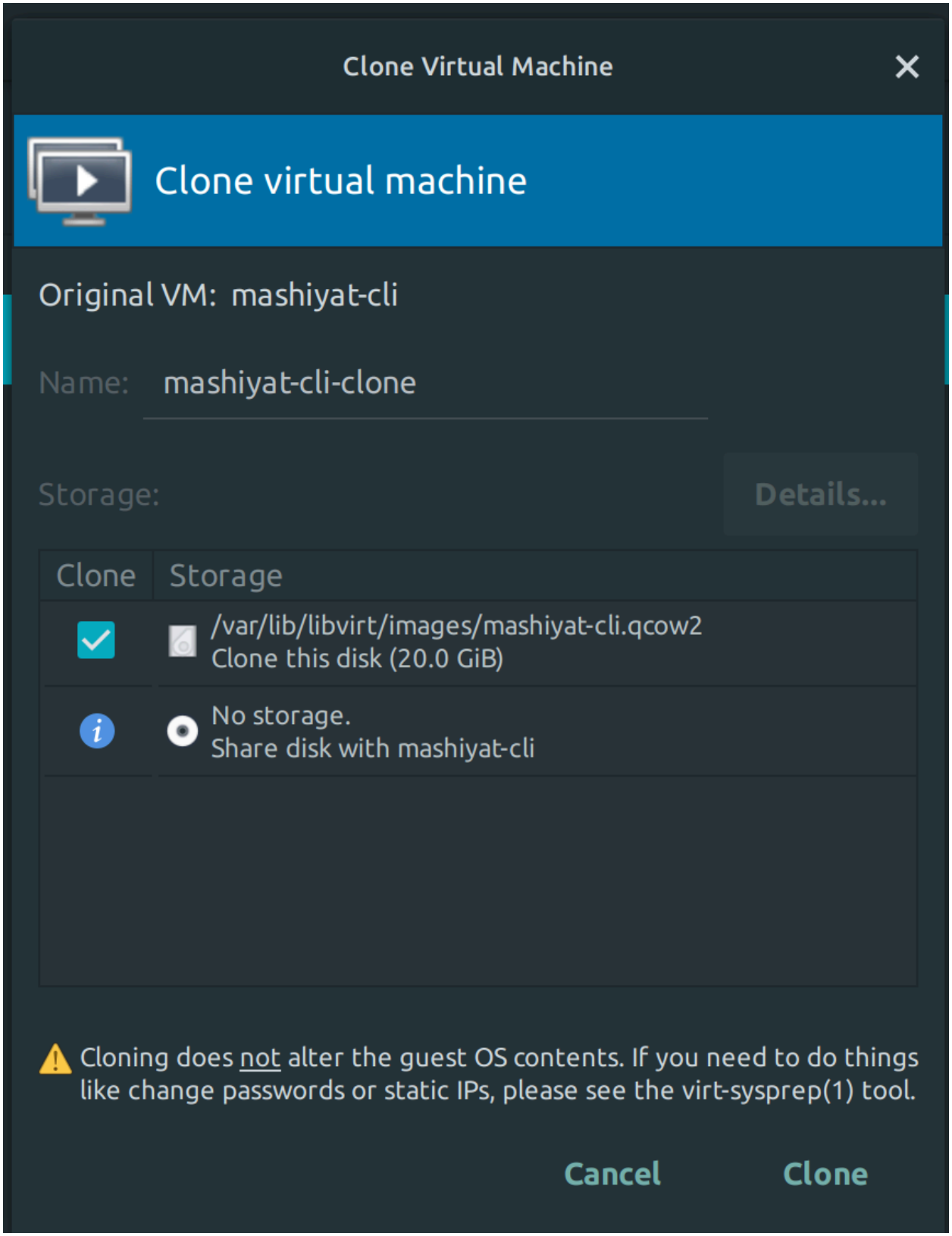
Then I used the command :

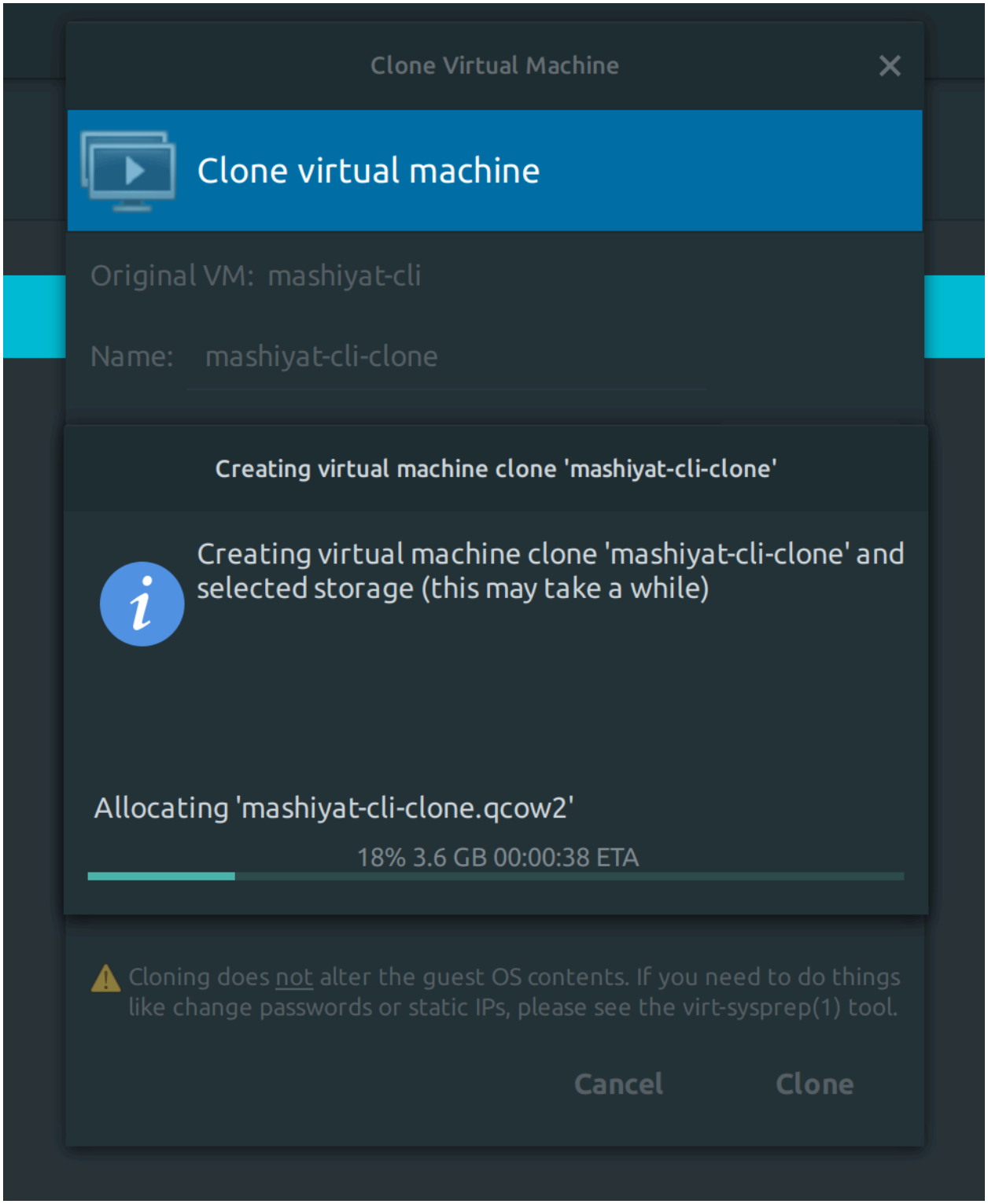
**virt-install **
**--name your_vm_name **
**--ram 4096 **
**--disk path=path_to_your_disk_image,size=20 **
**--vcpus 2 **
**--os-variant generic **
**--network bridge=virbr0 **
**--console pty,target_type=serial **
--cdrom /home/eshita/Downloads/Game/linuxmint-21.3-xfce-64bit.iso

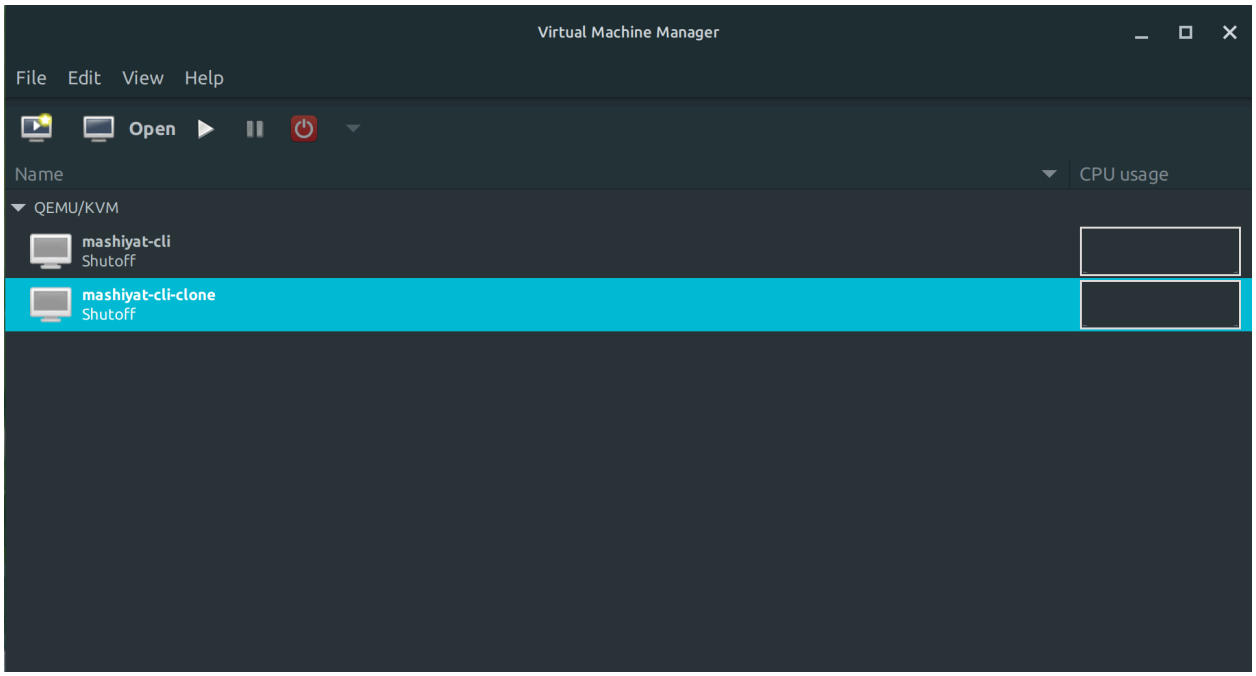
I used this command but it did not work out so I again did the task. So, did not add the screenshot here.

7. Clone Virtual Machine

I used GUI and cloned my virtual machine manager. Firstly, I decided which VM I wanted to use then I selected the **clone** option to clone the OS.


Clone Virtual Machine
Clone virtual machine
Original VM: mashiyat-cli
Name: mashiyat-cli-clone
Storage:
Details...
Clone
Storage
/var/lib/libvirt/images/mashiyat-cli.qcow2
Clone this disk (20.0 GiB)
No storage.
Share disk with mashiyat-cli
Cloning does not alter the guest OS contents. If you need to do things like change passwords or static IPs, please see the virt-sysprep(1) tool.
Cancel
Clone


Clone Virtual Machine
Clone virtual machine
Original VM: mashiyat-cli
Name: mashiyat-cli-clone
Creating virtual machine clone 'mashiyat-cli-clone'
Creating virtual machine clone 'mashiyat-cli-clone' and selected storage (this may take a while)
Allocating 'mashiyat-cli-clone.qcow2'
18% 3.6 GB 00:00:38 ETA
Cloning does not alter the guest OS contents. If you need to do things like change passwords or static IPs, please see the virt-sysprep(1) tool.
Cancel
Clone



I am cloning the mashiyat-cli here

CLI BASED CLONE

For cli-based cloning, I used:

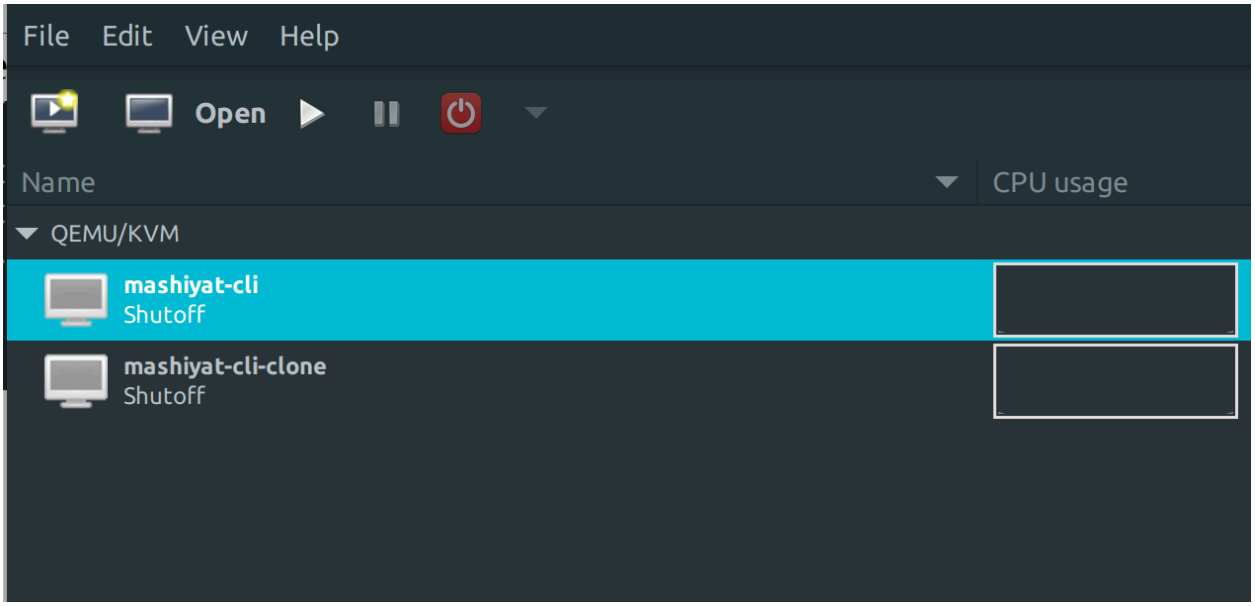
Virt-clone –-original mashiyat-cli – mashiyat-cli -clone –file /var/lib/libvirt/image/mashiyat2022clone.img

Here virt -clone is the command used to clone the virtual machine.

–original mashiyat-cli is the name of the machine I am cloning

And **-file /var/lib/libvirt/image/mashiyat2022clone.img** is the new image file I am creating for my cloned virtual machine

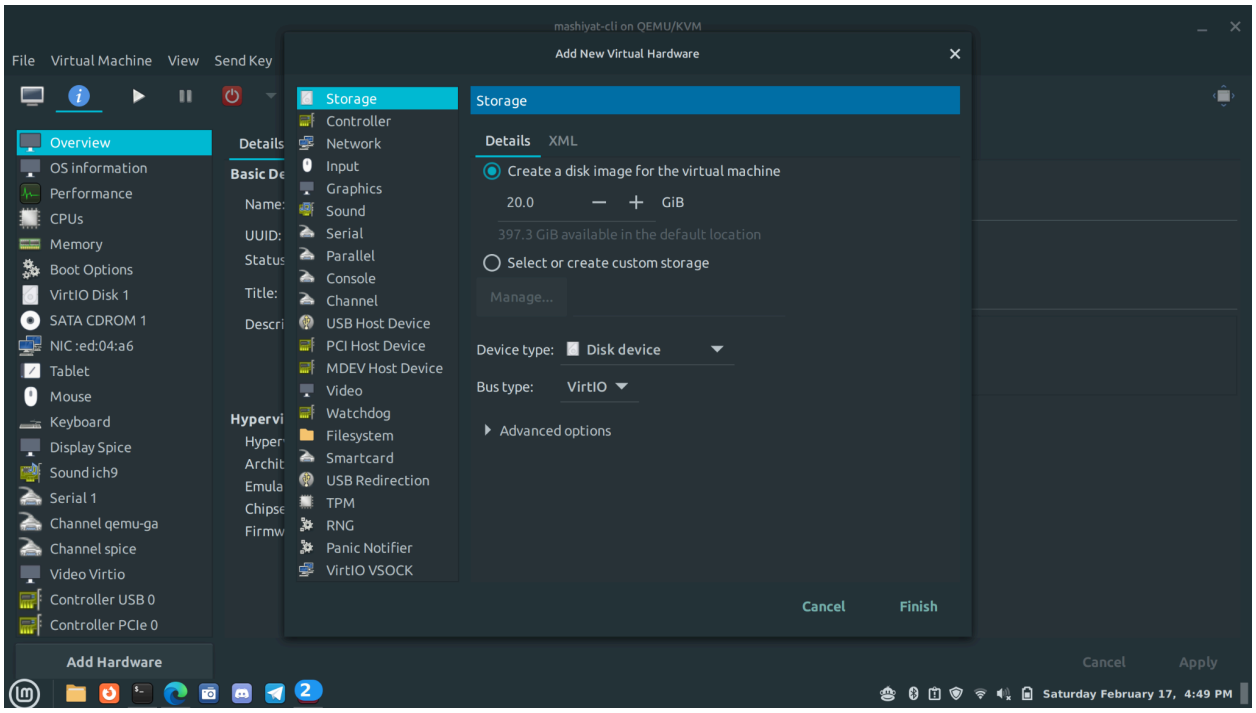
```
root@eshita-asus-vivobook:/home/eshita# virt-clone --original root@eshita-asus-v
ivobook:/home/eshita# virt-clone --original mashiyat-cli --name mashiyat-cli-clo
ne --file /var/lib/libvirt/images/mashiyat2022clone.img
Allocating 'mashiyat2022clone.img'        |  11 GB  00:23 ...

Clone 'mashiyat-cli-clone' created successfully.
root@eshita-asus-vivobook:/home/eshita#
```



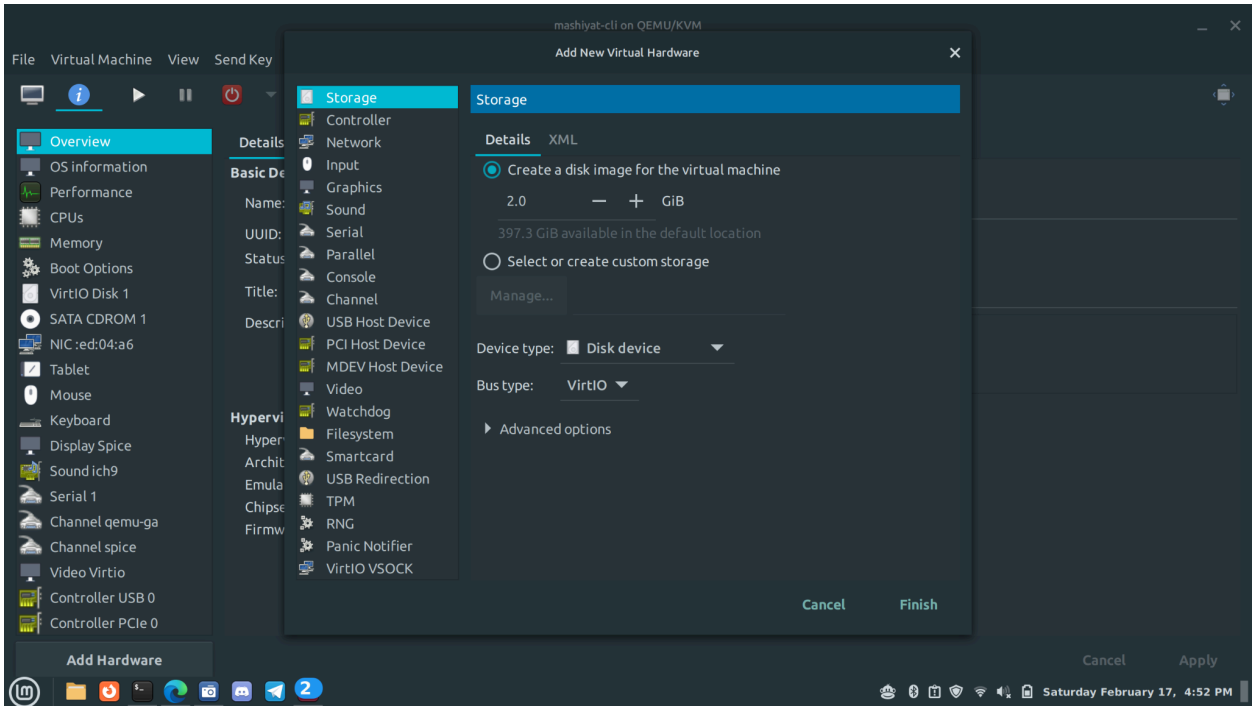
Here, we can see the clone is completed.

Adding two hard disks to my cloned virtual machine

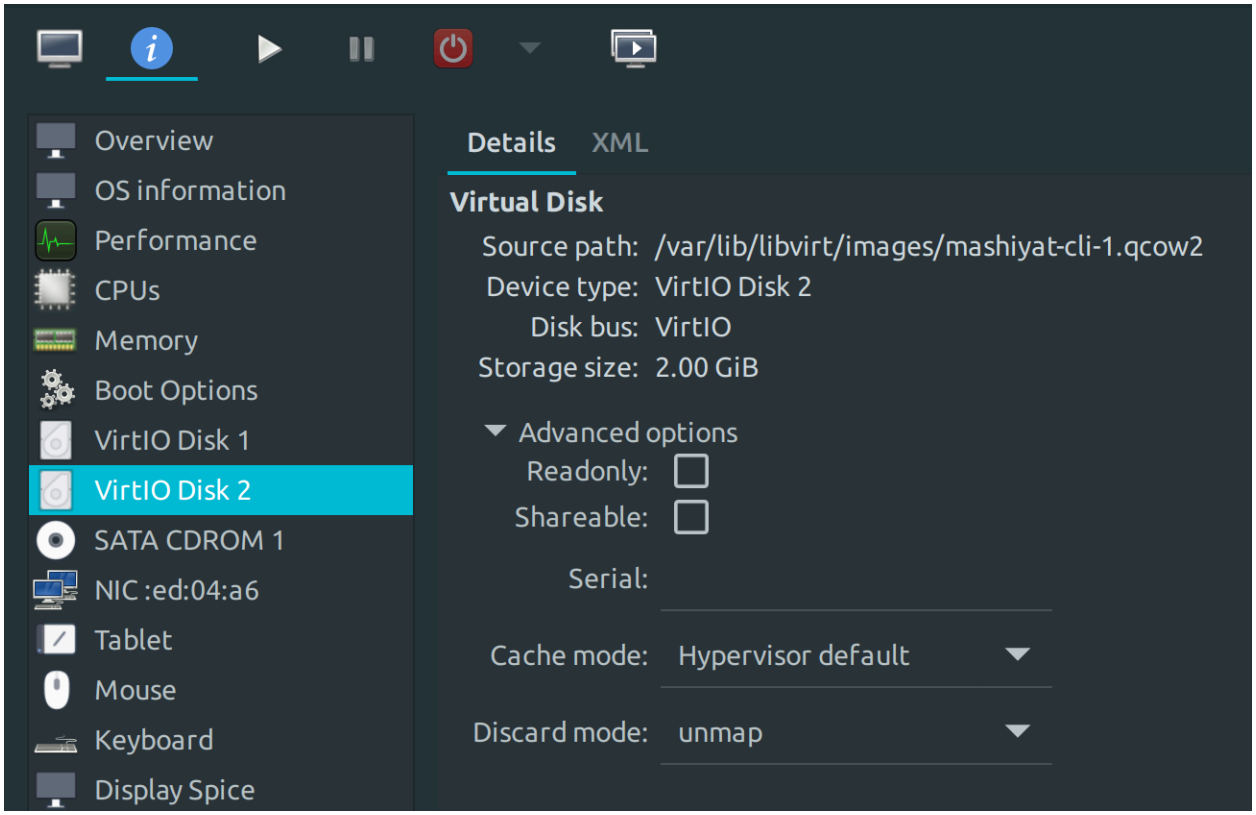
For storage issues, I had to do it on my main PC. I am doing it on the virtual machine I made using GUI. I opened my VM, and then I used the **i** icon in it. Then it showed all the mounted hardware as you can see too from my screenshot.

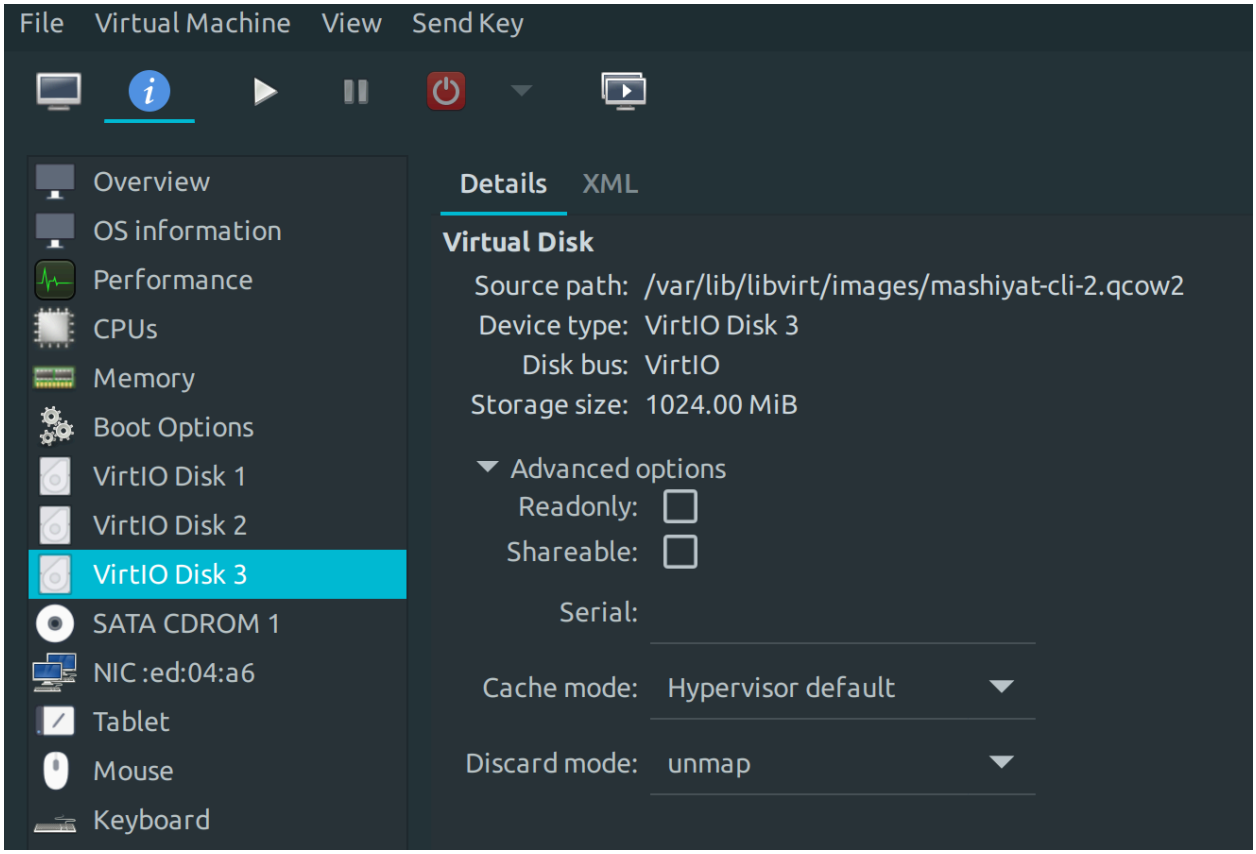


Then I used **Add Hardware** from the bottom left corner I allocated 2 GB to the storage for disk2 and then I allocated 1 GB for disk3.



As you can see from my details.





USING CLI

Accessed root user, by

sudo su root

Accessed the folder of images by**/var/lib/libvirt/images**

In the folder, I created to image files:

sudo qemu-img create -f raw newdisk1.img 2G

sudo qemu-img create -f raw newdisk2.img 2G

Then I attached the two disks with my existing vms

sudo virsh attach-disk mashiyat-cli --source /var/lib/libvirt/images/newdisk1.img --target vdd --persistent

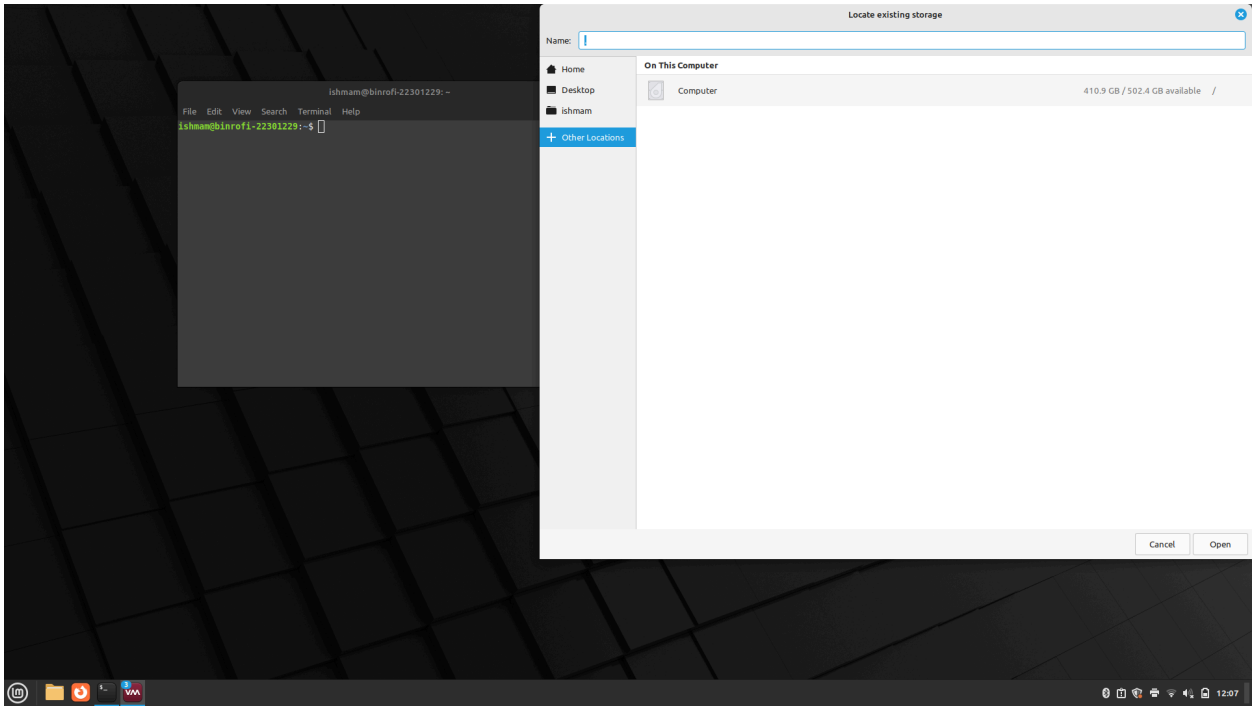
sudo virsh attach-disk mashiyat-cli --source /var/lib/libvirt/images/newdisk2.img --target vde --persistent

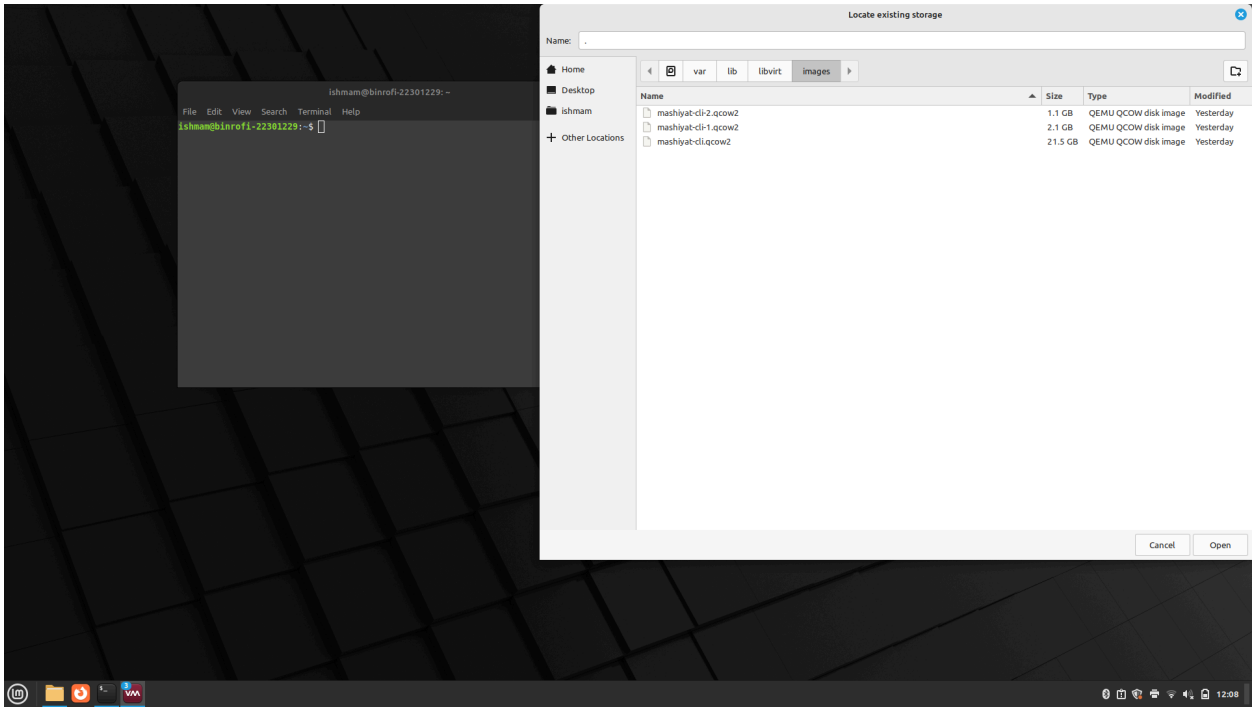
```
mashiyat@mahjabineshita-22101878:~$sudo su root
[sudo] password for eshita:
root@eshita-asus-vivobook:/home/eshita# /var/lib/libvirt/images
bash: /var/lib/libvirt/images: Is a directory
root@eshita-asus-vivobook:/home/eshita# sudo qemu-img create -f raw newdisk1.img
 2G
Formatting 'newdisk1.img', fmt=raw size=2147483648
root@eshita-asus-vivobook:/home/eshita# sudo qemu-img create -f raw newdisk2.img
 2G
Formatting 'newdisk2.img', fmt=raw size=2147483648
root@eshita-asus-vivobook:/home/eshita# sudo virish attach-disk mashiyat-cli --s
ource /home/eshita/newdisk1.img --target vdd --persistent
sudo: virish: command not found
root@eshita-asus-vivobook:/home/eshita# sudo virsh attach-disk mashiyat-cli --so
urce /home/eshita/newdisk1.img --target vdd --persistent
Disk attached successfully

root@eshita-asus-vivobook:/home/eshita# sudo virsh attach-disk mashiyat-cli --so
urce /home/eshita/newdisk2.img --target vde --persistent
Disk attached successfully

root@eshita-asus-vivobook:/home/eshita#
```

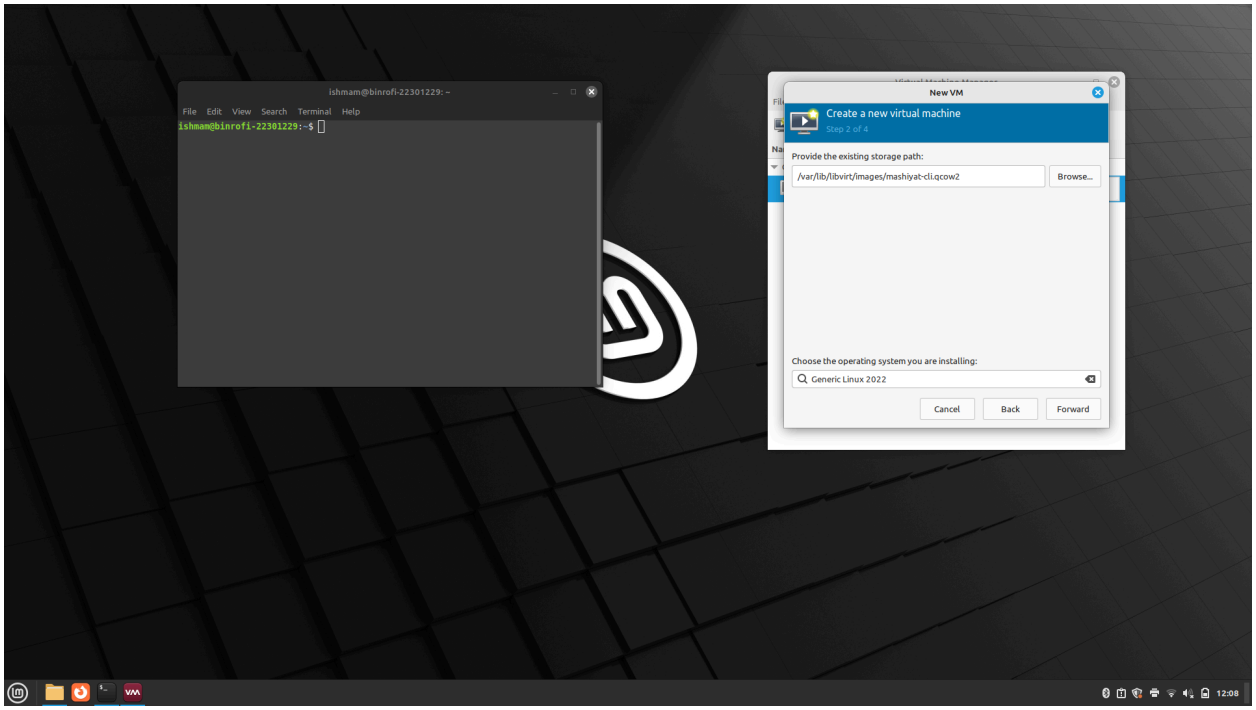
Migrate VM

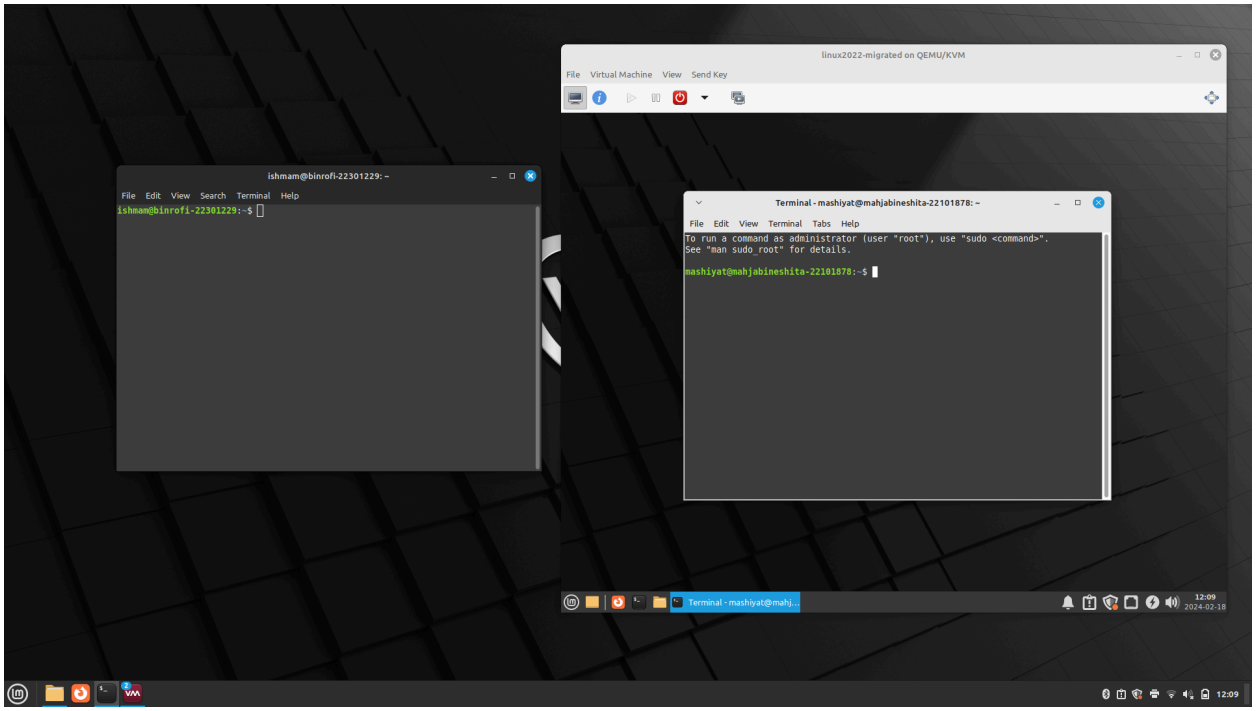
Firstly, for migrating image files, I used my friend Ishmam's PC. I moved my PC's **/var/lib/libvirt/images/** to his PC. Then on his PC, I started the **virtual machine manager** app. Then I selected the option **Import Existing Disk Image** then imported the image file on his PC. Then I used the same procedures again which I have used in task1 before then migrated my Virtual Machine successfully.

Here, you can see the differences from the differences in the terminal name clearly that I have used two different devices.


ishmam@binrofi-22301229: ~
File Edit View Search Terminal Help
ishmam@binrofi-22301229:~$
Locate existing storage
Name:
Home
Desktop
ishmam
Other Locations
On This Computer
Computer
410.9 GB / 502.4 GB available /
Cancel
Open
12:07


ishmam@binrofi-22301229: ~
File Edit View Search Terminal Help
ishmam@binrofi-22301229:~$
Locate existing storage
Name:
Home
Desktop
ishmam
Other Locations
var
lib
libvirt
images
Name
Size
Type
Modified
mashiyat-cli-2.qcow2
1.1 GB
QEMU QCOW disk image
Yesterday
mashiyat-cli-1.qcow2
2.1 GB
QEMU QCOW disk image
Yesterday
mashiyat-cli.qcow2
21.5 GB
QEMU QCOW disk image
Yesterday
Cancel
Open
12:08





==========

Tasks 5 and 6 are here.

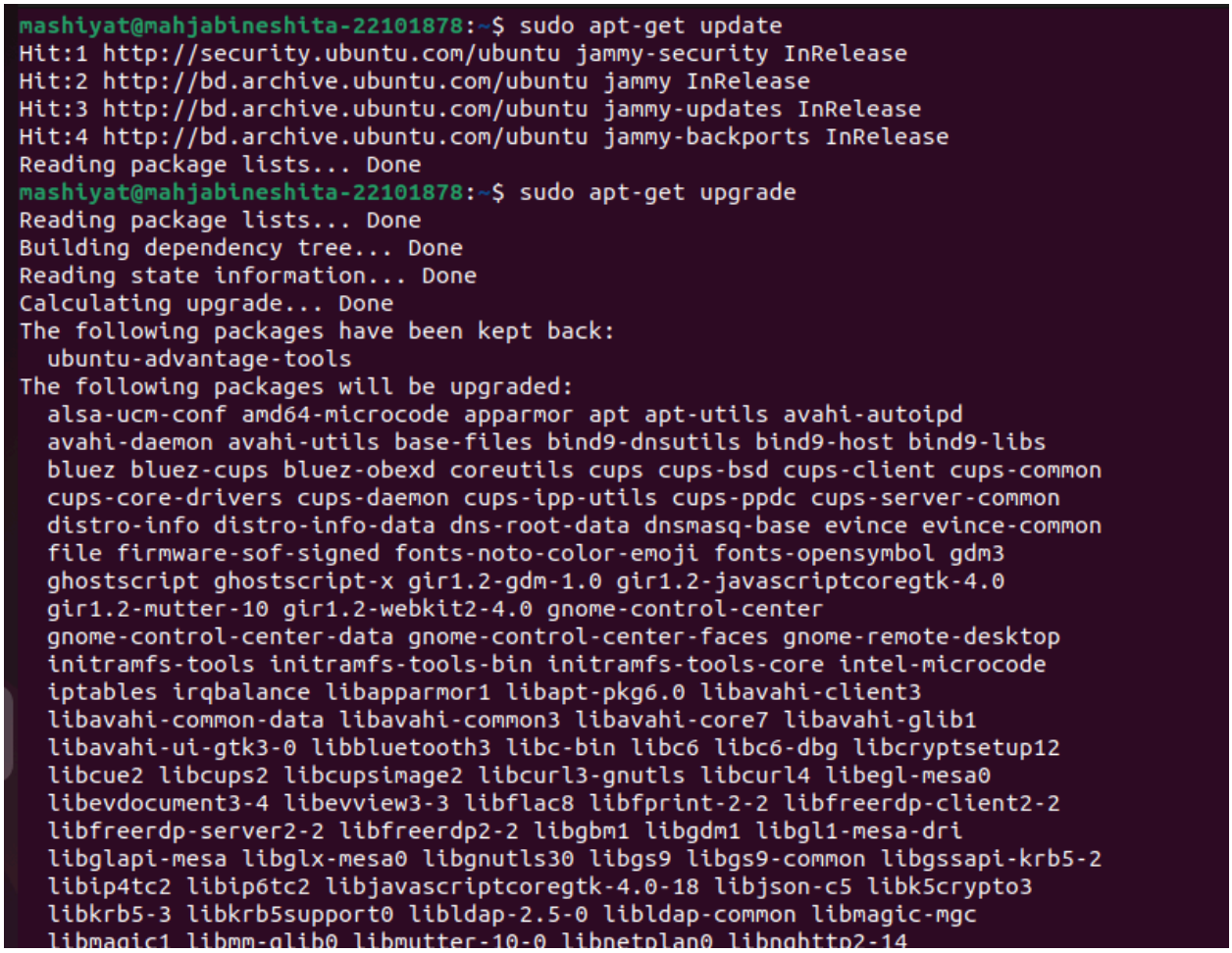
Making Shared Folder

For making a shared folder between the host and the guest PC I made a directory on my host the updated all on my host. Also updated my guest using these commands too. I used the guest's updated screenshots here.

sudo apt-get update

sudo apt-get upgrade

sudo apt-get install build-essential dkms

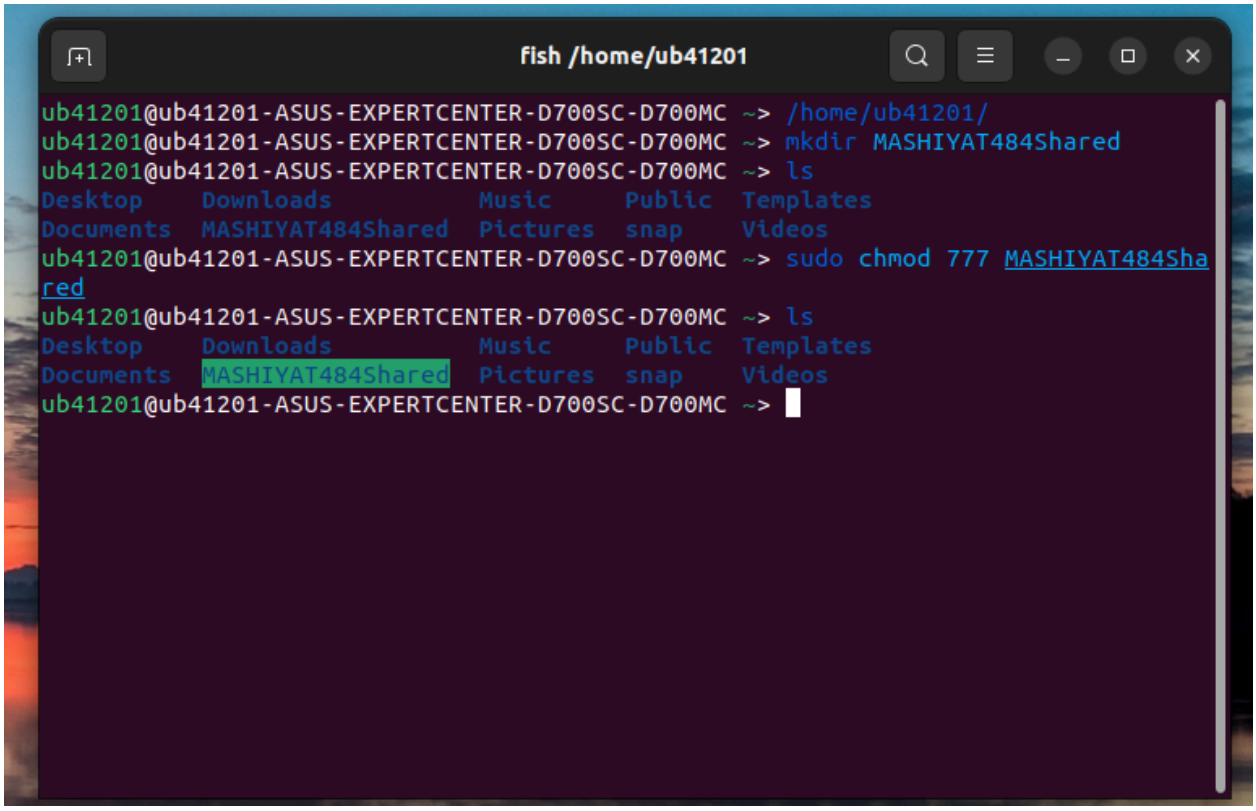


sudo apt-get install virtualbox-guest-additions-iso

```
update-alternatives: using /usr/bin/g++ to provide /usr/bin/c++ (c++) in auto mode
Setting up build-essential (12.9ubuntu3) ...
Processing triggers for man-db (2.10.2-1) ...
Processing triggers for libc-bin (2.35-0ubuntu3.6) ...
mashiyat@mahjabineshita-22101878:~$ sudo apt-get install virtualbox-guest-additions-iso
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
The following additional packages will be installed:
  libdouble-conversion3 libgsoap-2.8.117 liblzf1 libmd4c0 libpcre2-16-0
  libqt5core5a libqt5dbus5 libqt5gui5 libqt5network5 libqt5opengl5
  libqt5printsupport5 libqt5svg5 libqt5widgets5 libqt5x11extras5
  libsdl1.2debian libxcb-xinerama0 libxcb-xinput0 qt5-gtk-platformtheme
  qttranslations5-l10n virtualbox virtualbox-dkms virtualbox-qt
Suggested packages:
  qt5-image-formats-plugins qtwayland5 vde2
The following NEW packages will be installed:
  libdouble-conversion3 libgsoap-2.8.117 liblzf1 libmd4c0 libpcre2-16-0
  libqt5core5a libqt5dbus5 libqt5gui5 libqt5network5 libqt5opengl5
  libqt5printsupport5 libqt5svg5 libqt5widgets5 libqt5x11extras5
  libsdl1.2debian libxcb-xinerama0 libxcb-xinput0 qt5-gtk-platformtheme
  qttranslations5-l10n virtualbox virtualbox-dkms
  virtualbox-guest-additions-iso virtualbox-qt
0 upgraded, 23 newly installed, 0 to remove and 1 not upgraded.
Need to get 107 MB of archives.
After this operation, 293 MB of additional disk space will be used.
Do you want to continue? [Y/n] Y
Get:1 http://bd.archive.ubuntu.com/ubuntu jammy/universe amd64 libdouble-conversion3 amd64
 kB]
Get:2 http://bd.archive.ubuntu.com/ubuntu jammy-updates/main amd64 libpcre2-16-0 amd64 10
[203 kB]
Get:3 http://bd.archive.ubuntu.com/ubuntu jammy-updates/universe amd64 libqt5core5a amd64
buntu0.2 [2,006 kB]
Get:4 http://bd.archive.ubuntu.com/ubuntu jammy/universe amd64 libmd4c0 amd64 0.4.8-1 [42
```

Here the previous screenshots did not affect the work that much but I still kept them for better understanding.

Here I have made the virtiofs storage and I created the folder named **MASHIYAT484Shared** and used **mkdir MASHIYAT484Shared** then used ls to see that. It was done in my host pc.

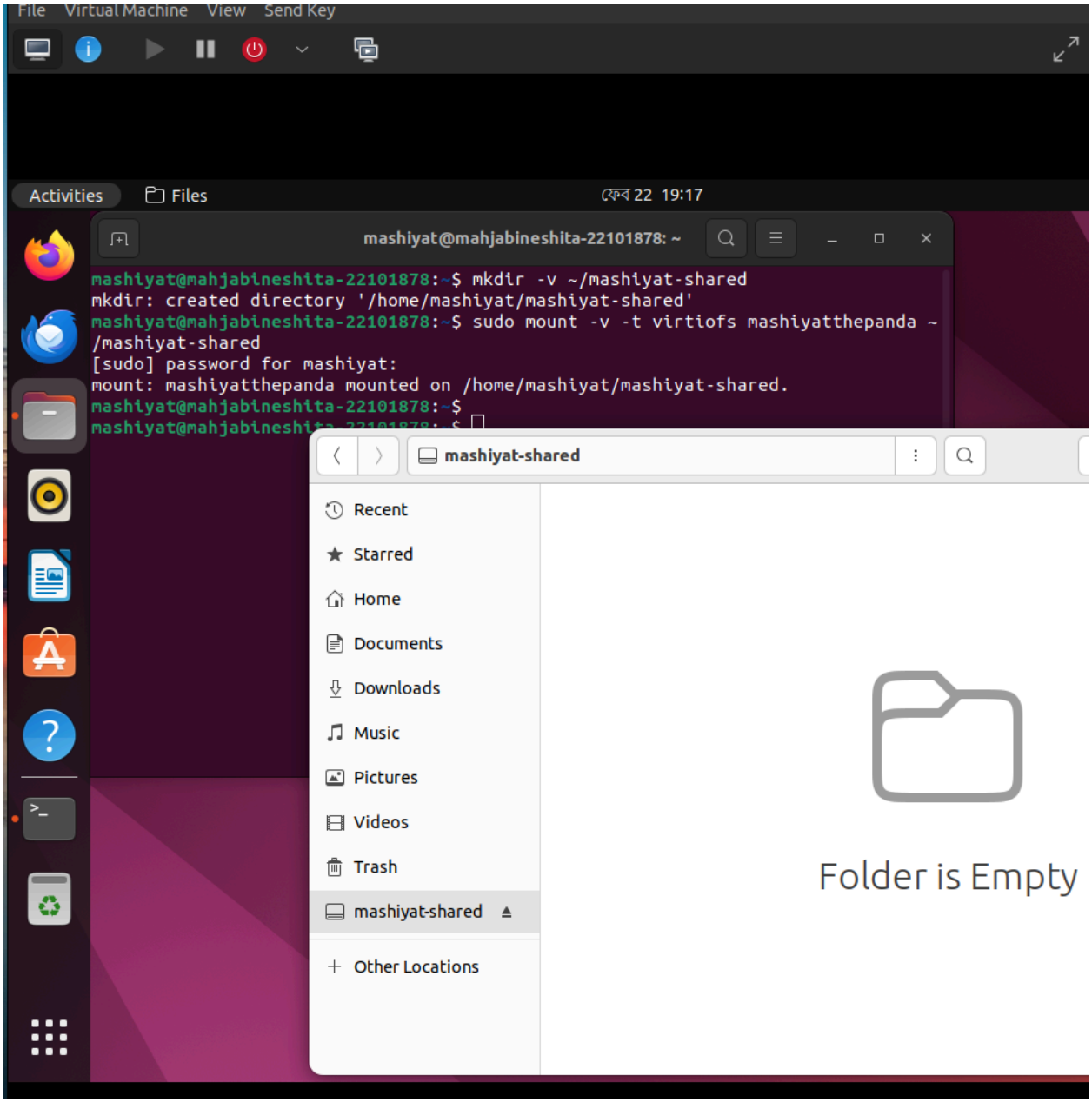



```
ub41201@ub41201-ASUS-EXPERTCENTER-D700SC-D700MC:~$ sudo virsh edit ubuntu22.04
[sudo] password for ub41201:

Select an editor.  To change later, run 'select-editor'.
  1. /bin/nano        <---- easiest
  2. /usr/bin/vim.tiny
  3. /bin/ed

Choose 1-3 [1]: 1
error: XML document failed to validate against schema: Unable to validate doc agains
irt/schemas/domain.rng
Extra element memoryBacking in interleave
Invalid sequence in interleave
Element domain failed to validate content

Failed. Try again? [y,n,i,f,?]:
Domain 'ubuntu22.04' XML configuration edited.

ub41201@ub41201-ASUS-EXPERTCENTER-D700SC-D700MC:~$
```

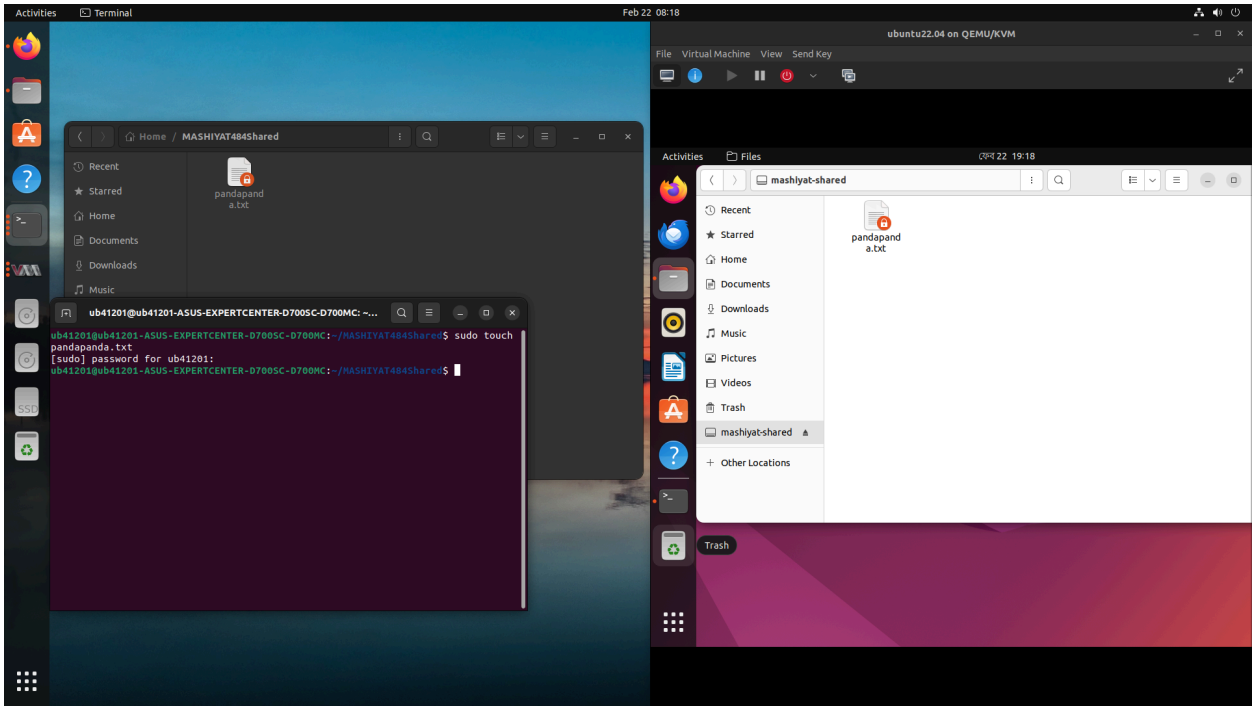
```
    <filesystem type='mount' accessmode='passthrough'>
      <driver type='virtiofs'/>
      <source dir='/home/ub41201/MASHIYAT484Shared/'/>
      <target dir='mashiyatthepanda'/>
      <address type='pci' domain='0x0000' bus='0x07' slot='0x00' function='0x0' />
    </filesystem>
```

```
<currentMemory unit='KiB'>5120000</currentMemo
<memoryBacking>
  <nonsharepages/>
  <source type='memfd'/>
  <access mode='shared'/>
</memoryBacking>
<vcpu placement='static'>4</vcpu>
```

Then I opened and mounted the directory on my KVM



I added a text file to that folder for confirmation.

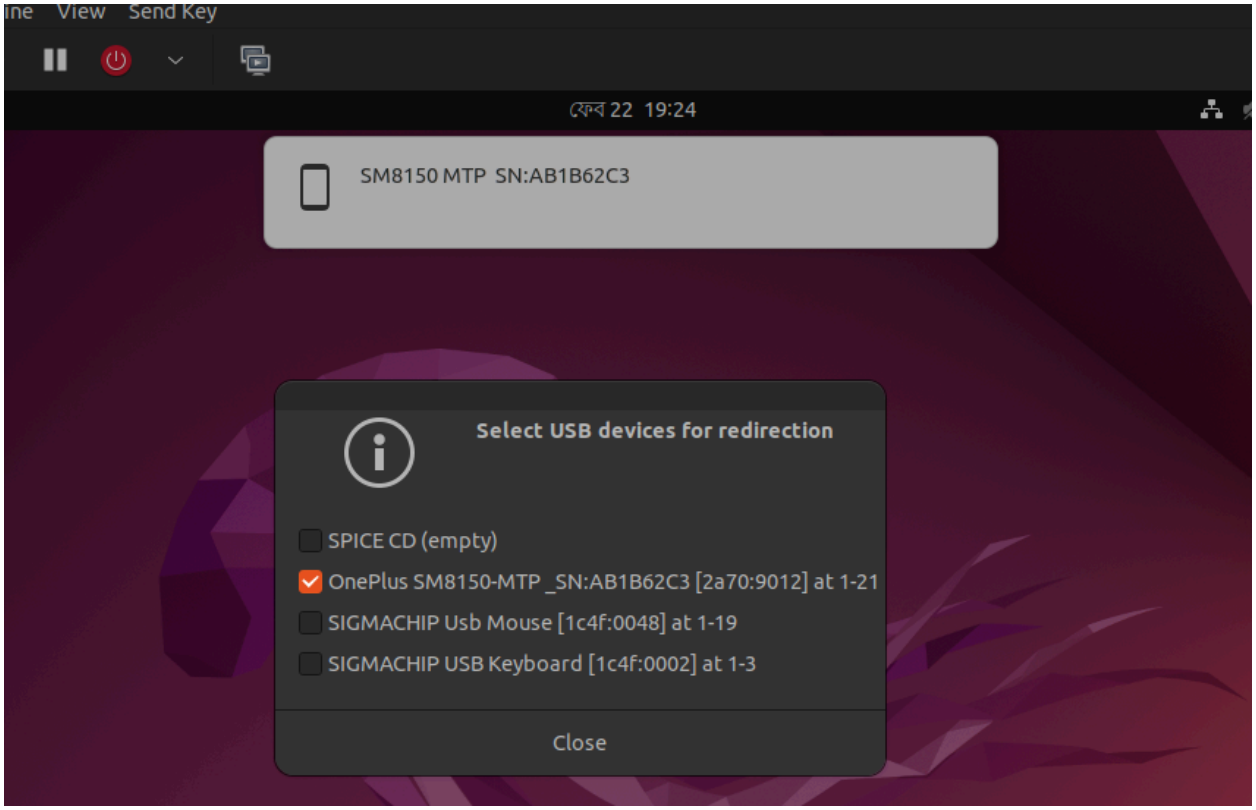


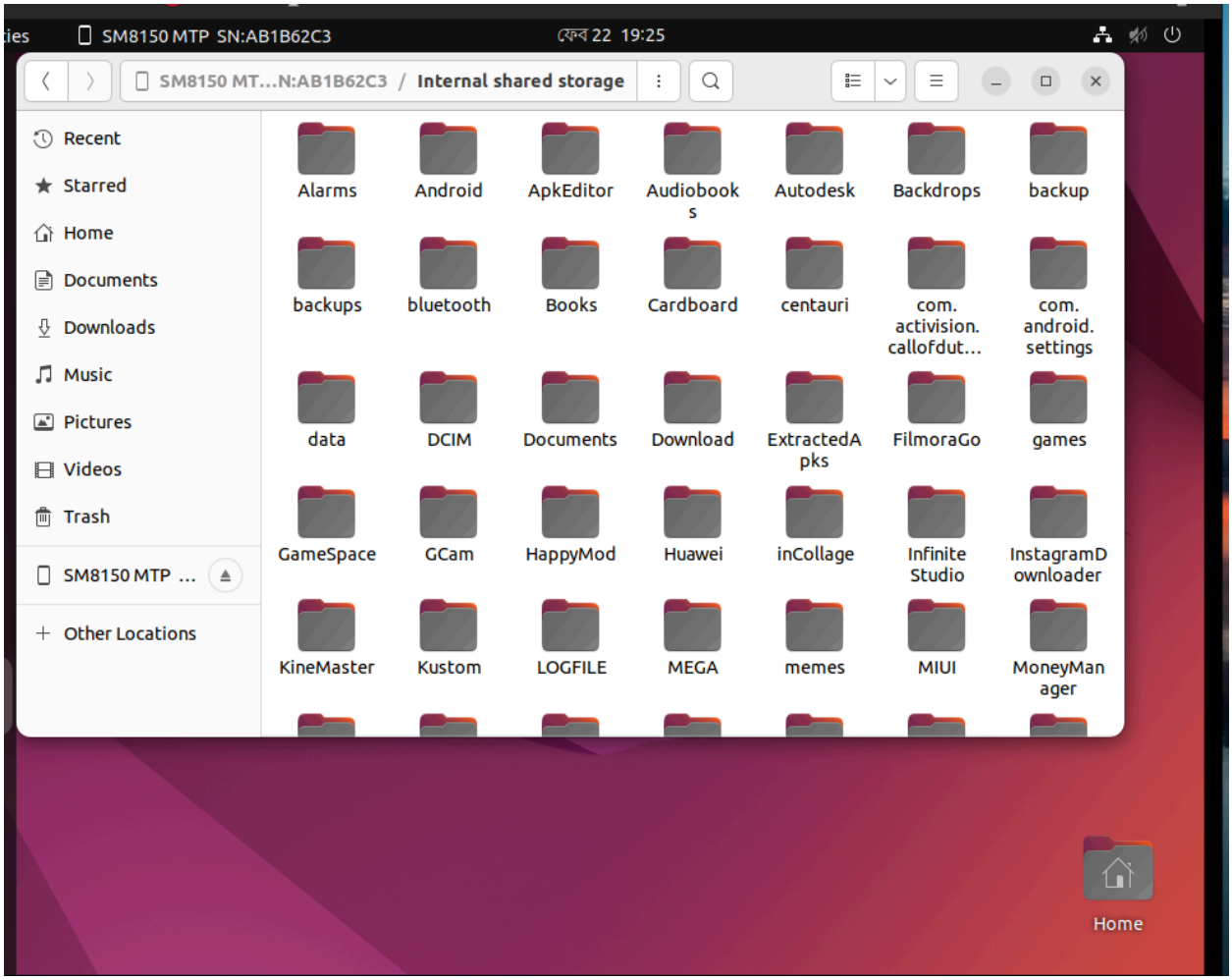
Mount a phone on KVM

I use Oppo so, my phone was not working. Then I took help from my friend and I used his phone to show the whole process

I mounted his phone on my host. Unmounted it from the Host.

Then I opened my KVM and ran my guest, there I selected Redirect USB Device and selected the One Plus phone under the Virtual Machine tab and here in the next second screenshot, the phone is successfully mounted.


ine View Send Key
ফেব 22 19:24
SM8150 MTP SN:AB1B62C3
Select USB devices for redirection
SPICE CD (empty)
OnePlus SM8150-MTP _SN:AB1B62C3 [2a70:9012] at 1-21
SIGMACHIP Usb Mouse [1c4f:0048] at 1-19
SIGMACHIP USB Keyboard [1c4f:0002] at 1-3
Close


SM8150 MTP SN:AB1B62C3
ফেব 22 19:25
SM8150 MT...N:AB1B62C3 / Internal shared storage
Recent
Starred
Home
Documents
Downloads
Music
Pictures
Videos
Trash
SM8150 MTP ...
Other Locations
Alarms
Android
ApkEditor
Audiobooks
Autodesk
Backdrops
backup
backups
bluetooth
Books
Cardboard
centauri
com.activision.callofdut...
com.android.settings
data
DCIM
Documents
Download
ExtractedApks
FilmoraGo
games
GameSpace
GCam
HappyMod
Huawei
inCollage
Infinite Studio
InstagramDownloader
KineMaster
Kustom
LOGFILE
MEGA
memes
MIUI
MoneyManager
Home