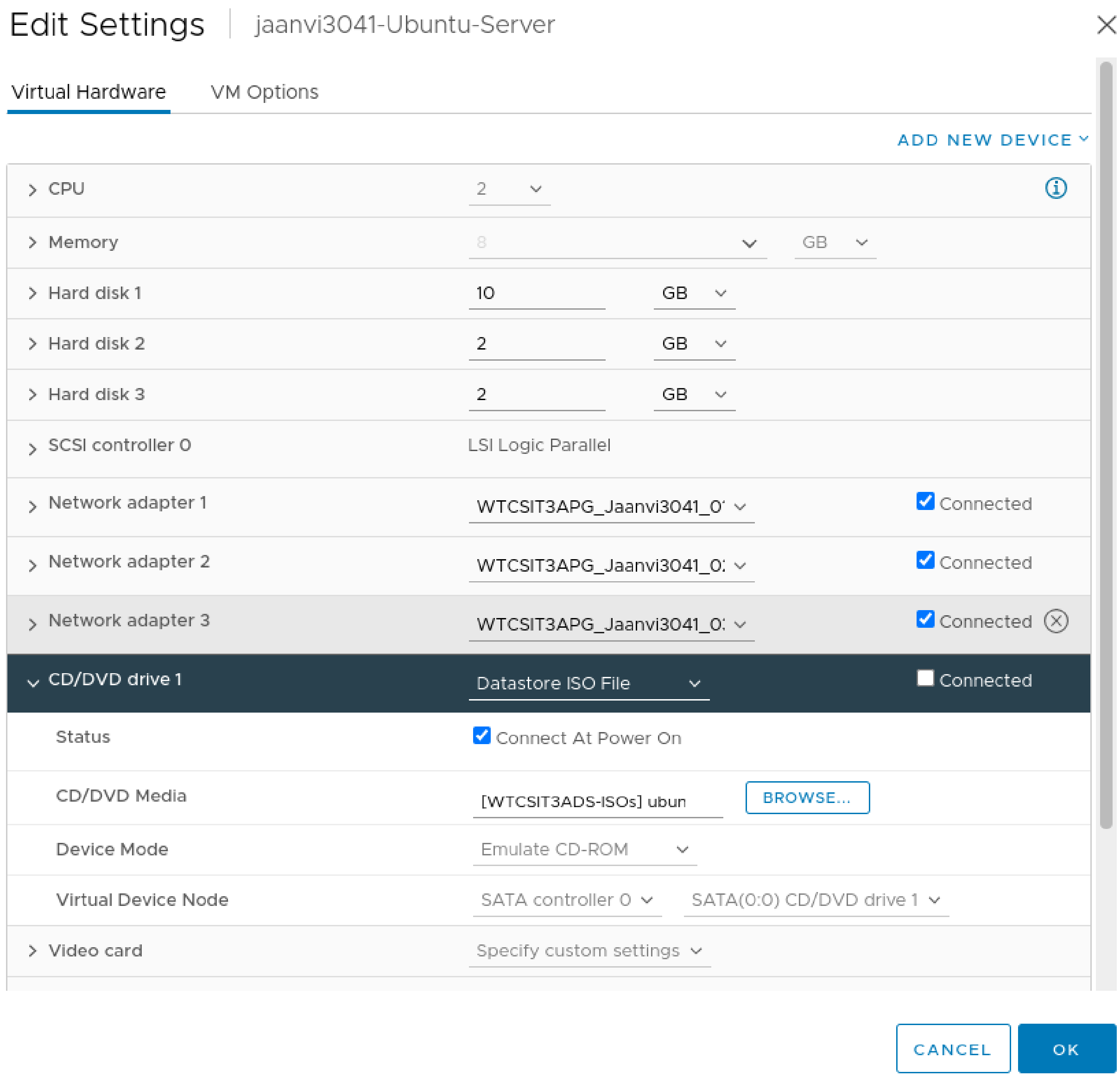
Table of Contents

Part 1: Prepare the iSCSI Storage Array

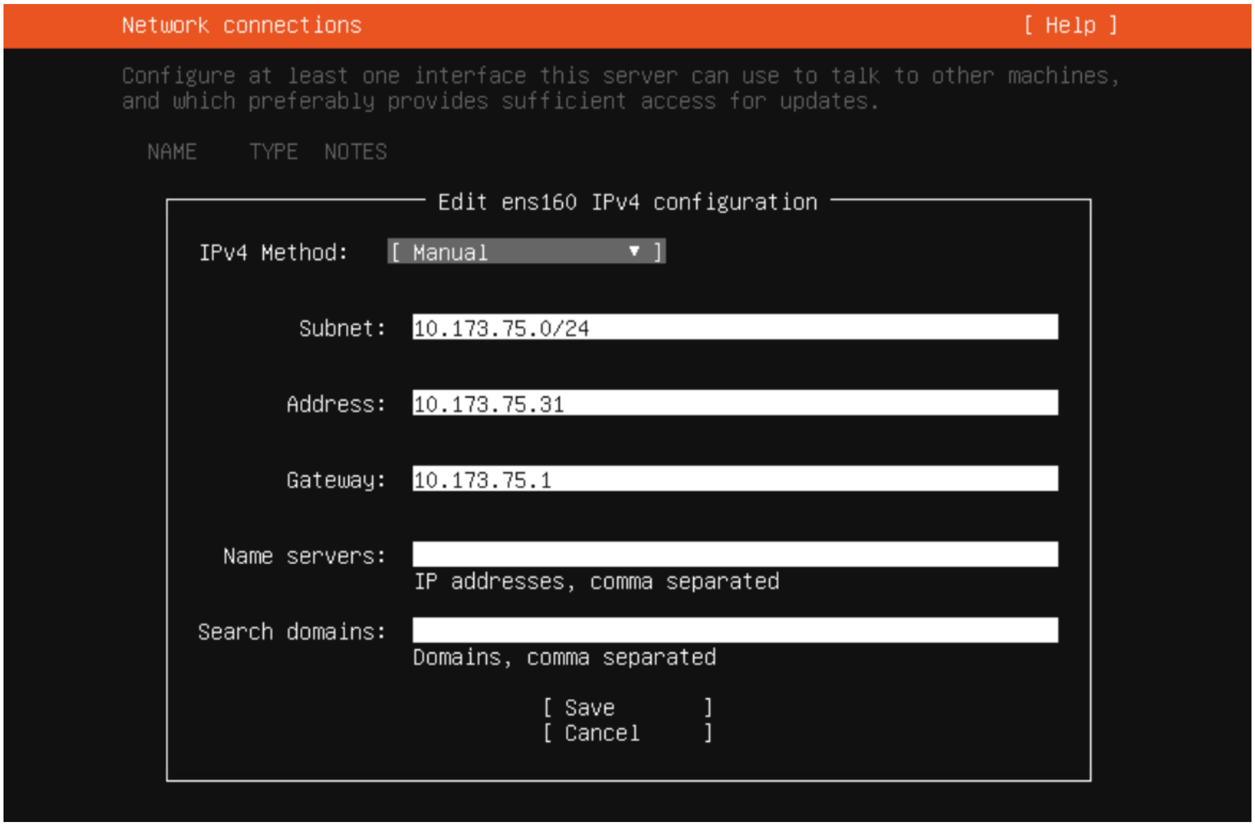
Step 1 - Install and Configure Ubuntu Server

A. Install Ubuntu Server LTS 20.04.03 using ISO file
B. Select 2 - CPU
C. Memory - 8 GB
D. 1 - HDD size - 10 GB
E. 2 x Additional NICs (Total 3)
F. 2 x Additional hard disks (2 GB each)



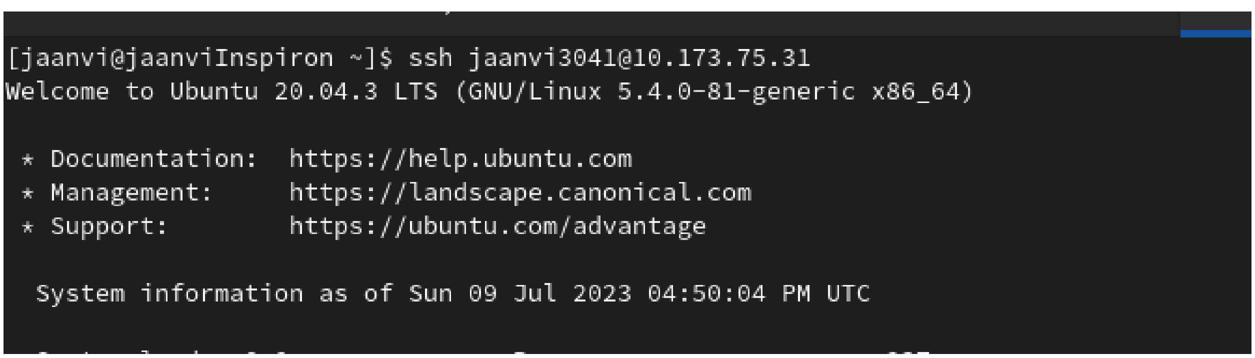
2. Configure the Host Operating System

I. Configure IPs, DNS



II. Created a user (jaanvi3041)

III. Once, the installation is completed. I have installed OpenSSH, while installing the server. Do SSH, and check network connection.



If there is no internet, check the /etc/netplan/00-installer-config.yaml. Edit the file if needed, and execute “netplan try”

This is the network config written by 'subiquity'

network:

```
 ethernets:
  ens160:
   addresses:
   - 10.173.75.31/24
   gateway4: 10.173.75.1
   nameservers:
    addresses: [8.8.8.8, 8.8.4.4]
    search: []
  ens192:
   dhcp4: true
  ens224:
   dhcp4: true
 version: 2
```

IV. Add hostname and domain name to the hosts file

Edit /etc/hosts

```
127.0.0.1 localhost
127.0.1.1 jaanvi3041-ubuntu-server
# The following lines are desirable for IPv6 capable hosts
::1     ip6-localhost ip6-loopback
fe00::0 ip6-localnet
ff00::0 ip6-mcastprefix
ff02::1 ip6-allnodes
ff02::2 ip6-allrouters
127.0.0.1 jaanvi3041-ubuntu-server.jaanvi3041.com
```

3. Test your configuration

A. Make sure that you can sudo

```
jaanvi3041@jaanvi3041-ubuntu-server:/etc/netplan$ ls
00-installer-config.yaml
jaanvi3041@jaanvi3041-ubuntu-server:/etc/netplan$ vim 00-installer-config.yaml
jaanvi3041@jaanvi3041-ubuntu-server:/etc/netplan$ cd ..
jaanvi3041@jaanvi3041-ubuntu-server:/etc$ vim host
host.conf     hostname     hosts        hosts.allow   hosts.deny
jaanvi3041@jaanvi3041-ubuntu-server:/etc$ vim hosts
jaanvi3041@jaanvi3041-ubuntu-server:/etc$ sudo -i
[sudo] password for jaanvi3041:
root@jaanvi3041-ubuntu-server:~#
```

B. Confirm that you have 2 x 2GB unpartitioned disk drives available (fdisk -l)

```
Disk /dev/sda: 10 GiB, 10737418240 bytes, 20971520 sectors
Disk model: Virtual disk
Units: sectors of 1 * 512 = 512 bytes
Sector size (logical/physical): 512 bytes / 512 bytes
I/O size (minimum/optimal): 512 bytes / 512 bytes
Disklabel type: gpt
Disk identifier: 186F60DB-58A6-4A4B-9C4B-24F264F93836

Device       Start      End  Sectors Size Type
/dev/sda1     2048     4095     2048   1M BIOS boot
/dev/sda2     4096  2101247  2097152   1G Linux filesystem
/dev/sda3  2101248 20969471 18868224   9G Linux filesystem


Disk /dev/sdb: 2 GiB, 2147483648 bytes, 4194304 sectors
Disk model: Virtual disk
Units: sectors of 1 * 512 = 512 bytes
Sector size (logical/physical): 512 bytes / 512 bytes
I/O size (minimum/optimal): 512 bytes / 512 bytes
Disklabel type: dos
Disk identifier: 0xf65aaa5c

Device     Boot Start     End Sectors Size Id Type
/dev/sdb1        2048 4194303 4192256   2G 83 Linux


Disk /dev/sdc: 2 GiB, 2147483648 bytes, 4194304 sectors
Disk model: Virtual disk
Units: sectors of 1 * 512 = 512 bytes
Sector size (logical/physical): 512 bytes / 512 bytes
I/O size (minimum/optimal): 512 bytes / 512 bytes
Disklabel type: dos
Disk identifier: 0x7ae7a714
```

Step 2 – Prepare Disk Subsystem

1. Prepare the physical disks (using fdisk)
    a. Identify available disks (fdisk -l)

```
Disk /dev/sda: 10 GiB, 10737418240 bytes, 20971520 sectors
Disk model: Virtual disk
Units: sectors of 1 * 512 = 512 bytes
Sector size (logical/physical): 512 bytes / 512 bytes
I/O size (minimum/optimal): 512 bytes / 512 bytes
Disklabel type: gpt
Disk identifier: 186F60DB-58A6-4A4B-9C4B-24F264F93836

Device       Start      End  Sectors Size Type
/dev/sda1     2048     4095     2048   1M BIOS boot
/dev/sda2     4096  2101247  2097152   1G Linux filesystem
/dev/sda3  2101248 20969471 18868224   9G Linux filesystem


Disk /dev/sdb: 2 GiB, 2147483648 bytes, 4194304 sectors
Disk model: Virtual disk
Units: sectors of 1 * 512 = 512 bytes
Sector size (logical/physical): 512 bytes / 512 bytes
I/O size (minimum/optimal): 512 bytes / 512 bytes


Disk /dev/sdc: 2 GiB, 2147483648 bytes, 4194304 sectors
Disk model: Virtual disk
Units: sectors of 1 * 512 = 512 bytes
Sector size (logical/physical): 512 bytes / 512 bytes
I/O size (minimum/optimal): 512 bytes / 512 bytes
```

b. Partition each disk with a single primary linux partition

sudo fdisk /dev/sdb

n # create new partition

p # primary partition

1 # partition number 1

press ENTER to accept default first sector

press ENTER again to accept default last sector

p # print partition table

w # write changes to disk

```
root@jaanvi3041-ubuntu-server:~# sudo fdisk /dev/sdb

Welcome to fdisk (util-linux 2.34).
Changes will remain in memory only, until you decide to write them.
Be careful before using the write command.

Device does not contain a recognized partition table.
Created a new DOS disklabel with disk identifier 0xf65aaa5c.

Command (m for help): n
Partition type
   p   primary (0 primary, 0 extended, 4 free)
   e   extended (container for logical partitions)
Select (default p): p
Partition number (1-4, default 1): 1
First sector (2048-4194303, default 2048):
Last sector, +/-sectors or +/-size{K,M,G,T,P} (2048-4194303, default 4194303):

Created a new partition 1 of type 'Linux' and of size 2 GiB.

Command (m for help): p
Disk /dev/sdb: 2 GiB, 2147483648 bytes, 4194304 sectors
Disk model: Virtual disk
Units: sectors of 1 * 512 = 512 bytes
Sector size (logical/physical): 512 bytes / 512 bytes
I/O size (minimum/optimal): 512 bytes / 512 bytes
Disklabel type: dos
Disk identifier: 0xf65aaa5c

Device     Boot Start     End Sectors Size Id Type
/dev/sdb1        2048 4194303 4192256   2G 83 Linux

Command (m for help): w
The partition table has been altered.
Calling ioctl() to re-read partition table.
Syncing disks.

root@jaanvi3041-ubuntu-server:~# sudo mkfs.ext4 /dev/sdb1
mke2fs 1.45.5 (07-Jan-2020)
Creating filesystem with 524032 4k blocks and 131072 inodes
Filesystem UUID: 85186141-6bc4-417f-a56d-34133d5d54a9
Superblock backups stored on blocks:
        32768, 98304, 163840, 229376, 294912

Allocating group tables: done
Writing inode tables: done
Creating journal (8192 blocks): done
Writing superblocks and filesystem accounting information: done

root@jaanvi3041-ubuntu-server:~#
```

Execute: sudo mkfs.ext4 /dev/sdb1

```
root@jaanvi3041-ubuntu-server:~# sudo mkfs.ext4 /dev/sdb1
mke2fs 1.45.5 (07-Jan-2020)
Creating filesystem with 524032 4k blocks and 131072 inodes
Filesystem UUID: 85186141-6bc4-417f-a56d-34133d5d54a9
Superblock backups stored on blocks:
        32768, 98304, 163840, 229376, 294912

Allocating group tables: done
Writing inode tables: done
Creating journal (8192 blocks): done
Writing superblocks and filesystem accounting information: done
```

Repeat the above steps for sdc.

Execute: sudo fdisk /dev/sdc

sudo mkfs.ext4 /dev/sdc1

```
root@jaanvi3041-ubuntu-server:~# sudo fdisk /dev/sdc

Welcome to fdisk (util-linux 2.34).
Changes will remain in memory only, until you decide to write them.
Be careful before using the write command.

Device does not contain a recognized partition table.
Created a new DOS disklabel with disk identifier 0x7ae7a714.

Command (m for help): n
Partition type
   p   primary (0 primary, 0 extended, 4 free)
   e   extended (container for logical partitions)
Select (default p): p
Partition number (1-4, default 1): 1
First sector (2048-4194303, default 2048):
Last sector, +/-sectors or +/-size{K,M,G,T,P} (2048-4194303, default 4194303):

Created a new partition 1 of type 'Linux' and of size 2 GiB.

Command (m for help): p
Disk /dev/sdc: 2 GiB, 2147483648 bytes, 4194304 sectors
Disk model: Virtual disk
Units: sectors of 1 * 512 = 512 bytes
Sector size (logical/physical): 512 bytes / 512 bytes
I/O size (minimum/optimal): 512 bytes / 512 bytes
Disklabel type: dos
Disk identifier: 0x7ae7a714

Device     Boot Start     End Sectors Size Id Type
/dev/sdc1        2048 4194303 4192256   2G 83 Linux

Command (m for help): w
The partition table has been altered.
Calling ioctl() to re-read partition table.
Syncing disks.
```

```
root@jaanvi3041-ubuntu-server:~# sudo mkfs.ext4 /dev/sdc1
mke2fs 1.45.5 (07-Jan-2020)
Creating filesystem with 524032 4k blocks and 131072 inodes
Filesystem UUID: 9b8cbb83-86b2-4f8b-98df-3d99ab03c169
Superblock backups stored on blocks:
        32768, 98304, 163840, 229376, 294912

Allocating group tables: done
Writing inode tables: done
Creating journal (8192 blocks): done
Writing superblocks and filesystem accounting information: done
```

c. Display disk and partition information for each hard disk

```
Disk /dev/sda: 10 GiB, 10737418240 bytes, 20971520 sectors
Disk model: Virtual disk
Units: sectors of 1 * 512 = 512 bytes
Sector size (logical/physical): 512 bytes / 512 bytes
I/O size (minimum/optimal): 512 bytes / 512 bytes
Disklabel type: gpt
Disk identifier: 186F60DB-58A6-4A4B-9C4B-24F264F93836

Device        Start      End  Sectors Size Type
/dev/sda1      2048     4095     2048   1M BIOS boot
/dev/sda2      4096  2101247  2097152   1G Linux filesystem
/dev/sda3  2101248 20969471 18868224   9G Linux filesystem


Disk /dev/sdb: 2 GiB, 2147483648 bytes, 4194304 sectors
Disk model: Virtual disk
Units: sectors of 1 * 512 = 512 bytes
Sector size (logical/physical): 512 bytes / 512 bytes
I/O size (minimum/optimal): 512 bytes / 512 bytes
Disklabel type: dos
Disk identifier: 0xf65aaa5c

Device     Boot Start     End Sectors Size Id Type
/dev/sdb1        2048 4194303 4192256   2G 83 Linux


Disk /dev/sdc: 2 GiB, 2147483648 bytes, 4194304 sectors
Disk model: Virtual disk
Units: sectors of 1 * 512 = 512 bytes
Sector size (logical/physical): 512 bytes / 512 bytes
I/O size (minimum/optimal): 512 bytes / 512 bytes
Disklabel type: dos
Disk identifier: 0x7ae7a714

Device     Boot Start     End Sectors Size Id Type
/dev/sdc1        2048 4194303 4192256   2G 83 Linux
```

2. Prepare logical volumes (using commands from LVM)
    a. Initialize Physical Volume for use with LVM

sudo apt update
sudo apt install lvm2

sudo pvcreate /dev/sdb1
sudo pvcreate /dev/sdc1

```
root@jaanvi3041-ubuntu-server:~# sudo pvcreate /dev/sdb1
WARNING: ext4 signature detected on /dev/sdb1 at offset 1080. Wipe it? [y/n]: y
  Wiping ext4 signature on /dev/sdb1.
  Physical volume "/dev/sdb1" successfully created.
root@jaanvi3041-ubuntu-server:~#
```

```
  Physical volume "/dev/sdb1" successfully created.
root@jaanvi3041-ubuntu-server:~# sudo pvcreate /dev/sdc1
WARNING: ext4 signature detected on /dev/sdc1 at offset 1080. Wipe it? [y/n]: y
  Wiping ext4 signature on /dev/sdc1.
  Physical volume "/dev/sdc1" successfully created.
root@jaanvi3041-ubuntu-server:~#
```

b. Create a Volume Group for each Physical Volume/Disk

sudo vgcreate vg_sdb /dev/sdb1
sudo vgcreate vg_sdc /dev/sdc1

c. Create Logical Volumes and assign them to Volume Groups

sudo lvcreate -l 100%FREE -n lv_sdb vg_sdb
sudo lvcreate -l 100%FREE -n lv_sdc vg_sdc

d. Display the volume group information

```
root@jaanvi3041-ubuntu-server:~# sudo vgs
  VG        #PV #LV #SN Attr   VSize  VFree
  ubuntu-vg   1   1   0 wz--n- <9.00g    0
  vg_sdb      1   1   0 wz--n- <2.00g    0
  vg_sdc      1   1   0 wz--n- <2.00g    0
root@jaanvi3041-ubuntu-server:~#
```

Step 3 – Configure and Present iSCSI Targets

1. Using Ubuntu's Advanced Packaging Tool
a. Install the iSCSI Target (free branch) command line interface (tragetcli-fb)

sudo apt update
sudo apt install targetcli
sudo apt install targetcli-fb
2. Configure targets using the targetcli program (Repeat for each Device)
a. Assign the block devices (created earlier) as backend storage (backstore) for your iSCSI Server

sudo targetcli
cd backstores/block
create name=lv_sdb dev=/dev/vg_sdb/lv_sdb
create name=lv_sdc dev=/dev/vg_sdc/lv_sdc
cd /
ls

```
Last login: Mon Jul  3 21:44:08 2023 from 10.192.117.229
jaanvi3041@jaanvi3041-ubuntu-server:~$ sudo targetcli
[sudo] password for jaanvi3041:
Warning: Could not load preferences file /root/.targetcli/prefs.bin.
targetcli shell version 2.1.51
Copyright 2011-2013 by Datera, Inc and others.
For help on commands, type 'help'.

/> cd backstores/block
/backstores/block> create name=lv_sdb dev=/dev/vg_sdb/lv_sdb
Created block storage object lv_sdb using /dev/vg_sdb/lv_sdb.
/backstores/block> create name=lv_sdc dev=/dev/vg_sdc/lv_sdc
Created block storage object lv_sdc using /dev/vg_sdc/lv_sdc.
/backstores/block>
```

b. From the iSCSI config level (cd /iscsi)

i. Create iSCSI Targets using iSCSI Qualified Name for each target that you are going to present, and Present the block devices that we linked in the backstore to the targets as Logical Unit Numbers (LUNS)

```
cd iscsi
create iqn.2023-07.com.example:target1
cd iqn.2023-07.com.example:target1/tpg1/luns
create /backstores/block/lv_sdb
cd /
saveconfig
exit
```

```
sudo targetcli
cd iscsi
create iqn.2023-07.com.example:target2
cd iqn.2023-07.com.example:target2/tpg1/luns
create /backstores/block/lv_sdc
cd /
saveconfig
exit
```

```
jaanvi3041@jaanvi3041-ubuntu-server: ~
   https://ubuntu.com/engage/secure-kubernetes-at-the-edge

104 updates can be applied immediately.
To see these additional updates run: apt list --upgradable

Failed to connect to https://changelogs.ubuntu.com/meta-release-lts. Check your Internet connection or proxy settings


*** System restart required ***
Last login: Mon Jul  3 21:44:08 2023 from 10.192.117.229
jaanvi3041@jaanvi3041-ubuntu-server:~$ sudo targetcli
[sudo] password for jaanvi3041:
Warning: Could not load preferences file /root/.targetcli/prefs.bin.
targetcli shell version 2.1.51
Copyright 2011-2013 by Datera, Inc and others.
For help on commands, type 'help'.

/> cd backstores/block
/backstores/block> create name=lv_sdb dev=/dev/vg_sdb/lv_sdb
Created block storage object lv_sdb using /dev/vg_sdb/lv_sdb.
/backstores/block> create name=lv_sdc dev=/dev/vg_sdc/lv_sdc
Created block storage object lv_sdc using /dev/vg_sdc/lv_sdc.
/backstores/block> cd /
/> ls
o- / ......................................................................................................... [...]
  o- backstores .............................................................................................. [...]
  | o- block .................................................................................. [Storage Objects: 2]
  | | o- lv_sdb .............................................................. [/dev/vg_sdb/lv_sdb (2.0GiB) write-thru deactivated]
  | | | o- alua ................................................................................... [ALUA Groups: 1]
  | | |   o- default_tg_pt_gp ....................................................... [ALUA state: Active/optimized]
  | | o- lv_sdc .............................................................. [/dev/vg_sdc/lv_sdc (2.0GiB) write-thru deactivated]
  | |   o- alua ................................................................................... [ALUA Groups: 1]
  | |     o- default_tg_pt_gp ....................................................... [ALUA state: Active/optimized]
  | o- fileio ................................................................................. [Storage Objects: 0]
  | o- pscsi .................................................................................. [Storage Objects: 0]
  | o- ramdisk ................................................................................ [Storage Objects: 0]
  o- iscsi ............................................................................................ [Targets: 0]
  o- loopback ......................................................................................... [Targets: 0]
  o- vhost ............................................................................................ [Targets: 0]
  o- xen-pvscsi ....................................................................................... [Targets: 0]
/> cd iscsi
/iscsi> create iqn.2023-07.com.example:target1
Created target iqn.2023-07.com.example:target1.
Created TPG 1.
Global pref auto_add_default_portal=true
Created default portal listening on all IPs (0.0.0.0), port 3260.
/iscsi> cd iqn.2023-07.com.example:target1/tpg1/luns
/iscsi/iqn.20...et1/tpg1/luns> create /backstores/block/lv_sdb
Created LUN 0.
/iscsi/iqn.20...et1/tpg1/luns> cd /
/> saveconfig
Configuration saved to /etc/rtslib-fb-target/saveconfig.json
/>
```

```
jaanvi3041@jaanvi3041-ubuntu-server: ~
Created block storage object lv_sdc using /dev/vg_sdc/lv_sdc.
/backstores/block> cd /
/> ls
o- / ......................................................................................................................... [...]
  o- backstores .............................................................................................................. [...]
  | o- block .................................................................................................. [Storage Objects: 2]
  | | o- lv_sdb ................................................................ [/dev/vg_sdb/lv_sdb (2.0GiB) write-thru deactivated]
  | | | o- alua ................................................................................................... [ALUA Groups: 1]
  | | |   o- default_tg_pt_gp ....................................................................... [ALUA state: Active/optimized]
  | | o- lv_sdc ................................................................ [/dev/vg_sdc/lv_sdc (2.0GiB) write-thru deactivated]
  | |   o- alua ................................................................................................... [ALUA Groups: 1]
  | |     o- default_tg_pt_gp ....................................................................... [ALUA state: Active/optimized]
  | o- fileio ................................................................................................. [Storage Objects: 0]
  | o- pscsi .................................................................................................. [Storage Objects: 0]
  | o- ramdisk ................................................................................................ [Storage Objects: 0]
  o- iscsi ............................................................................................................ [Targets: 0]
  o- loopback ......................................................................................................... [Targets: 0]
  o- vhost ............................................................................................................ [Targets: 0]
  o- xen-pvscsi ....................................................................................................... [Targets: 0]
/> cd iscsi
/iscsi> create iqn.2023-07.com.example:target1
Created target iqn.2023-07.com.example:target1.
Created TPG 1.
Global pref auto_add_default_portal=true
Created default portal listening on all IPs (0.0.0.0), port 3260.
/iscsi> cd iqn.2023-07.com.example:target1/tpg1/luns
/iscsi/iqn.20...et1/tpg1/luns> create /backstores/block/lv_sdb
Created LUN 0.
/iscsi/iqn.20...et1/tpg1/luns> cd /
/> saveconfig
Configuration saved to /etc/rtslib-fb-target/saveconfig.json
/> exit
Global pref auto_save_on_exit=true
Last 10 configs saved in /etc/rtslib-fb-target/backup/.
Configuration saved to /etc/rtslib-fb-target/saveconfig.json
jaanvi3041@jaanvi3041-ubuntu-server:~$ sudo targetcli
targetcli shell version 2.1.51
Copyright 2011-2013 by Datera, Inc and others.
For help on commands, type 'help'.

/> cd iscsi/
/iscsi> create iqn.2023-07.com.example:target2
Created target iqn.2023-07.com.example:target2.
Created TPG 1.
Global pref auto_add_default_portal=true
Created default portal listening on all IPs (0.0.0.0), port 3260.
/iscsi> cd iqn.2023-07.com.example:target2/tpg1/luns
/iscsi/iqn.20...et2/tpg1/luns> create /backstores/block/lv_sdc
Created LUN 0.
/iscsi/iqn.20...et2/tpg1/luns> cd /
/> saveconfig
Configuration saved to /etc/rtslib-fb-target/saveconfig.json
/>
```

3. Configure the portals for each target by assigning an IP and port address for each to listen on.

i. Change to target portals
cd /iscsi/iqn.2023-07.com.example:target1/tpg1/portals

ii. Delete any existing IP and Port address (i.e delete 0.0.0.0 3260)

iii. Create a new IP and Port address (create 10.173.75.31 3260) (Provide Target IP)

```
/iscsi/iqn.20.../tpg1/portals> delete 10.173.75.98 3260
Deleted network portal 10.173.75.98:3260
/iscsi/iqn.20.../tpg1/portals> create 10.173.75.31 3260
Using default IP port 3260
Created network portal 10.173.75.31:3260.
/iscsi/iqn.20.../tpg1/portals> cd iscsi/iqn.2023-07.com.example:target2/tpg1/acls/
No such path /iscsi/iqn.2023-07.com.example:target1/tpg1/portals/iscsi
/iscsi/iqn.20.../tpg1/portals> cd /iscsi/iqn.2023-07.com.example:target2/tpg1/acls/
/iscsi/iqn.20...et2/tpg1/acls> ls
```

4. Configure Security (ACL) on each target
a. Using the IQN of the initiators that you decided on during your planning stage i. Create an ACL entry on each target for every client that you wish to have access.

https://www.server-world.info/en/note?os=Ubuntu_22.04&p=iscsi&f=3

Created initiator of Ubuntu desktop.

Do below commands on the initiator machine:
apt update
Apt upgrade
apt -y install open-iscsi
vi /etc/iscsi/initiatorname.iscsi

/dev/vfio

—
Create the initiator on target machine:

cd /iscsi/iqn.2023-07.com.example:target1/tpg1/acls

create iqn.2023-07.com.example:initiator1

```
  o- xen-pvscsi ........................................................................ [Targets: 0]
/> cd iscsi/iqn.2023-07.com.example:target1/tpg1/acls/
/iscsi/iqn.20...et1/tpg1/acls> create iqn.2004-10.com.ubuntu:01:5a69669ccb1a
Created Node ACL for iqn.2004-10.com.ubuntu:01:5a69669ccb1a
Created mapped LUN 0.
/iscsi/iqn.20...et1/tpg1/acls> ls
o- acls ........................................................................................ [ACLs: 1]
  o- iqn.2004-10.com.ubuntu:01:5a69669ccb1a ............................................... [Mapped LUNs: 1]
    o- mapped_lun0 ........................................................................ [lun0 block/lv_sdb (rw)]
/iscsi/iqn.20...et1/tpg1/acls> exit
Global pref auto_save_on_exit=true
```

Now, install - apt -y install tgt

```
root@jaanvi3041-ubuntu-server:~# apt -y install tgt
Reading package lists... Done
Building dependency tree
Reading state information... Done
The following additional packages will be installed:
  ibverbs-providers libconfig-general-perl libibverbs1 libnl-3-200 libnl-genl-3-200 libnl-route-3-200 librdmacm1
Suggested packages:
  tgt-rbd
The following NEW packages will be installed:
  ibverbs-providers libconfig-general-perl libibverbs1 libnl-route-3-200 librdmacm1 tgt
The following packages will be upgraded:
```

vi /etc/tgt/conf.d/target01.conf

<target iqn.2023-07.com.example:target2>

  # provided devicce as a iSCSI target

  backing-store /dev/vg_sdc/lv_sdc

  # iSCSI Initiator's IQN you allow to connect

  initiator-address 10.173.75.147

  # authentication info (set anyone you like for "username", "password")

  incominguser username password

</target>

—-----------

systemctl restart tgt

```
root@jaanvi3041-ubuntu-server:~# vim /etc/tgt/conf.d/target01.conf
root@jaanvi3041-ubuntu-server:~# vim /etc/tgt/conf.d/target01.conf
root@jaanvi3041-ubuntu-server:~# vim /etc/tgt/conf.d/target01.conf
root@jaanvi3041-ubuntu-server:~# vim /etc/tgt/conf.d/target01.conf
root@jaanvi3041-ubuntu-server:~#
root@jaanvi3041-ubuntu-server:~# systemctl restart tgt
root@jaanvi3041-ubuntu-server:~# tgtadm --mode target --op show
Target 1: iqn.2023-07.com.example:target1
    System information:
        Driver: iscsi
        State: ready
    I_T nexus information:
    LUN information:
        LUN: 0
            Type: controller
            SCSI ID: IET     00010000
            SCSI SN: beaf10
            Size: 0 MB, Block size: 1
            Online: Yes
            Removable media: No
            Prevent removal: No
            Readonly: No
            SWP: No
            Thin-provisioning: No
            Backing store type: null
            Backing store path: None
            Backing store flags:
    Account information:
        username
    ACL information:
        10.173.75.58
root@jaanvi3041-ubuntu-server:~# ufw disable
Firewall stopped and disabled on system startup
root@jaanvi3041-ubuntu-server:~# targetcli
targetcli shell version 2.1.51
Copyright 2011-2013 by Datera, Inc and others.
For help on commands, type 'help'.
```

Created initiator of Windows desktop.

Do the same process on the target for windows

```
No such path /iscsi/iqn.2023-07.com.example:target1/tpg1/portals/iscsi
/iscsi/iqn.20.../tpg1/portals> cd /iscsi/iqn.2023-07.com.example:target2/tpg1/acls/
/iscsi/iqn.20...et2/tpg1/acls> ls
o- acls ........................................................................................ [ACLs: 1]
  o- iqn.2023-07.com.example:initiator2 ............................................... [Mapped LUNs: 1]
    o- mapped_lun0 .............................................................. [lun0 block/lv_sdc (rw)]
/iscsi/iqn.20...et2/tpg1/acls> delete iqn.2023-07.com.example:initiator2
Deleted Node ACL iqn.2023-07.com.example:initiator2.
/iscsi/iqn.20...et2/tpg1/acls> create iqn. 1991-05. com.microsoft: desktop-c2siord
Got 4 positionnal parameters, expected at most 2.
/iscsi/iqn.20...et2/tpg1/acls> create iqn.1991-05.com.microsoft:desktop-c2siord
Created Node ACL for iqn.1991-05.com.microsoft:desktop-c2siord
Created mapped LUN 0.
/iscsi/iqn.20...et2/tpg1/acls> ls
o- acls ........................................................................................ [ACLs: 1]
  o- iqn.1991-05.com.microsoft:desktop-c2siord ........................................ [Mapped LUNs: 1]
    o- mapped_lun0 .............................................................. [lun0 block/lv_sdc (rw)]
/iscsi/iqn.20...et2/tpg1/acls> cd ../portals/
/iscsi/iqn.20.../tpg1/portals> ls
o- portals .................................................................................. [Portals: 1]
  o- 10.173.75.100:3260 ................................................................................ [OK]
/iscsi/iqn.20.../tpg1/portals> delete 10.173.75.100 3260
Deleted network portal 10.173.75.100:3260
/iscsi/iqn.20.../tpg1/portals> create 10.173.75.31 3260
Using default IP port 3260
Created network portal 10.173.75.31:3260.
/iscsi/iqn.20.../tpg1/portals> ls
o- portals .................................................................................. [Portals: 1]
  o- 10.173.75.31:3260 ................................................................................. [OK]
/iscsi/iqn.20.../tpg1/portals> exit
Global pref auto_save_on_exit=true
Last 10 configs saved in /etc/rtslib-fb-target/backup/.
Configuration saved to /etc/rtslib-fb-target/saveconfig.json
root@jaanvi3041-ubuntu-server:~# vim /etc/tgt/conf.d/target02.conf
root@jaanvi3041-ubuntu-server:~# vim /etc/tgt/conf.d/target01.conf
root@jaanvi3041-ubuntu-server:~# vim /etc/tgt/conf.d/target02.conf
root@jaanvi3041-ubuntu-server:~# systemctl restart tgt
root@jaanvi3041-ubuntu-server:~# Timeout, server 10.173.75.31 not responding.
[jaanvi@jaanviInspiron ~]$
```

5. Manage the iSCSI Server Process

a. Check the Status of the targetcli service

b. Start the targetcli service

c. Configure targetcli to start as a system service

d. Check the Status of the targetcli service

systemctl enable rtslib-fb-targetctl

systemctl status rtslib-fb-targetctl

```
Created symlink /etc/systemd/system/multi-user.target.wants/rtslib-fb-targetctl.service → /lib/systemd/system/rtslib-fb-targetctl.service.
root@jaanvi3041-ubuntu-server:~# systemctl status rtslib-fb-targetctl
● rtslib-fb-targetctl.service - Restore LIO kernel target configuration
     Loaded: loaded (/lib/systemd/system/rtslib-fb-targetctl.service; enabled; vendor preset: enabled)
     Active: active (exited) since Mon 2023-07-03 23:29:34 UTC; 6 days ago
   Main PID: 228034 (code=exited, status=0/SUCCESS)
      Tasks: 0 (limit: 9448)
     Memory: 0B
     CGroup: /system.slice/rtslib-fb-targetctl.service
root@jaanvi3041-ubuntu-server:~#
```

e. Use commands to list

i. Available targets,

ii. Configuration information

iii. Connection (session) Status

```
root@jaanvi3041-ubuntu-server:~# targetcli
targetcli shell version 2.1.51
Copyright 2011-2013 by Datera, Inc and others.
For help on commands, type 'help'.

/> ls
o- / ............................................................ [...]
  o- backstores ................................................. [...]
  | o- block ...................................... [Storage Objects: 2]
  | | o- lv_sdb ......... [/dev/vg_sdb/lv_sdb (2.0GiB) write-thru activated]
  | | | o- alua ....................................... [ALUA Groups: 1]
  | | |   o- default_tg_pt_gp ............... [ALUA state: Active/optimized]
  | | o- lv_sdc ......... [/dev/vg_sdc/lv_sdc (2.0GiB) write-thru activated]
  | |   o- alua ....................................... [ALUA Groups: 1]
  | |     o- default_tg_pt_gp ............... [ALUA state: Active/optimized]
  | o- fileio ..................................... [Storage Objects: 0]
  | o- pscsi ...................................... [Storage Objects: 0]
  | o- ramdisk .................................... [Storage Objects: 0]
  o- iscsi .................................................. [Targets: 2]
  | o- iqn.2023-07.com.example:target1 ........................ [TPGs: 1]
  | | o- tpg1 ................................... [no-gen-acls, no-auth]
  | |   o- acls ............................................... [ACLs: 1]
  | |   | o- iqn.2004-10.com.ubuntu:01:5a69669ccb1a ...... [Mapped LUNs: 1]
  | |   |   o- mapped_lun0 ......................... [lun0 block/lv_sdb (rw)]
  | |   o- luns ............................................... [LUNs: 1]
  | |   | o- lun0 ....... [block/lv_sdb (/dev/vg_sdb/lv_sdb) (default_tg_pt_gp)]
  | |   o- portals ......................................... [Portals: 1]
  | |     o- 10.173.75.31:3260 ...................................... [OK]
  | o- iqn.2023-07.com.example:target2 ........................ [TPGs: 1]
  |   o- tpg1 ................................... [no-gen-acls, no-auth]
  |     o- acls ............................................... [ACLs: 1]
  |     | o- iqn.1991-05.com.microsoft:desktop-c2siord ... [Mapped LUNs: 1]
  |     |   o- mapped_lun0 ......................... [lun0 block/lv_sdc (rw)]
  |     o- luns ............................................... [LUNs: 1]
  |     | o- lun0 ....... [block/lv_sdc (/dev/vg_sdc/lv_sdc) (default_tg_pt_gp)]
  |     o- portals ......................................... [Portals: 1]
  |       o- 10.173.75.31:3260 ...................................... [OK]
  o- loopback ............................................... [Targets: 0]
  o- vhost .................................................. [Targets: 0]
  o- xen-pvscsi ............................................. [Targets: 0]
/>
```

6. Make sure that if you are running a firewall that you configure ufw to allow port 3260.

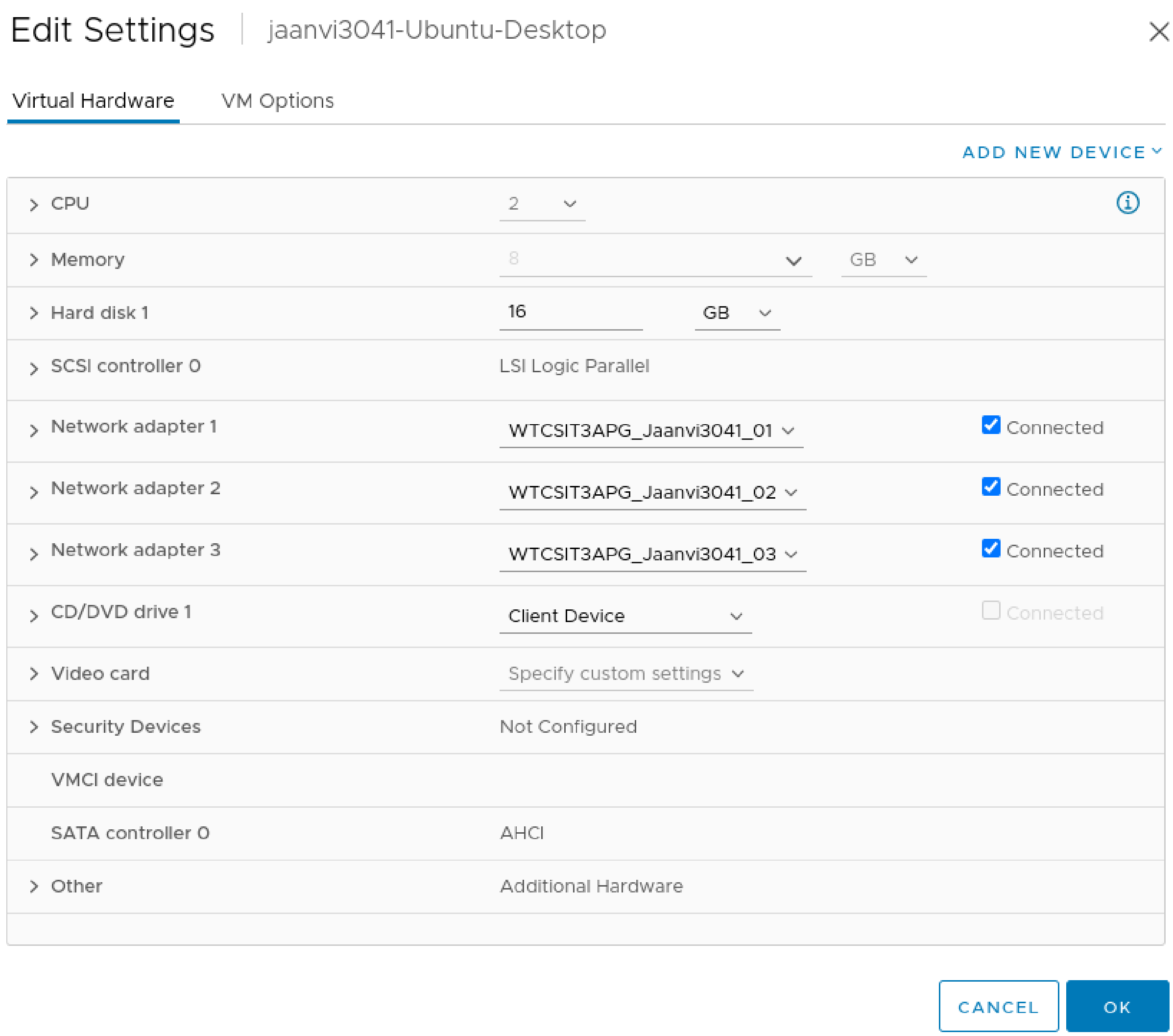
```
jaanvi3041@jaanvi3041-ubuntu-server:~$ sudo ufw allow 3260
Rules updated
Rules updated (v6)
jaanvi3041@jaanvi3041-ubuntu-server:~$ sudo ufw allow 3260/tcp
Rules updated
Rules updated (v6)
jaanvi3041@jaanvi3041-ubuntu-server:~$ sudo ufw status verbose
Status: inactive
jaanvi3041@jaanvi3041-ubuntu-server:~$
```

Part 2 – Prepare and Connect the Software iSCSI Initiators in Ubuntu and Windows Description

Step 1 - Install and Configure your Ubuntu Desktop

1. Create an Ubuntu Desktop VM using ISO
a. Select Ubuntu 64 Bit for Operating System
b. 1 x CPU
c. Memory to 4 GB
d. 1 X HDD size to 10 GB
e. CDROM

f. 2 x Additional NIC (Total 3)



2. Configure the Host Operating System

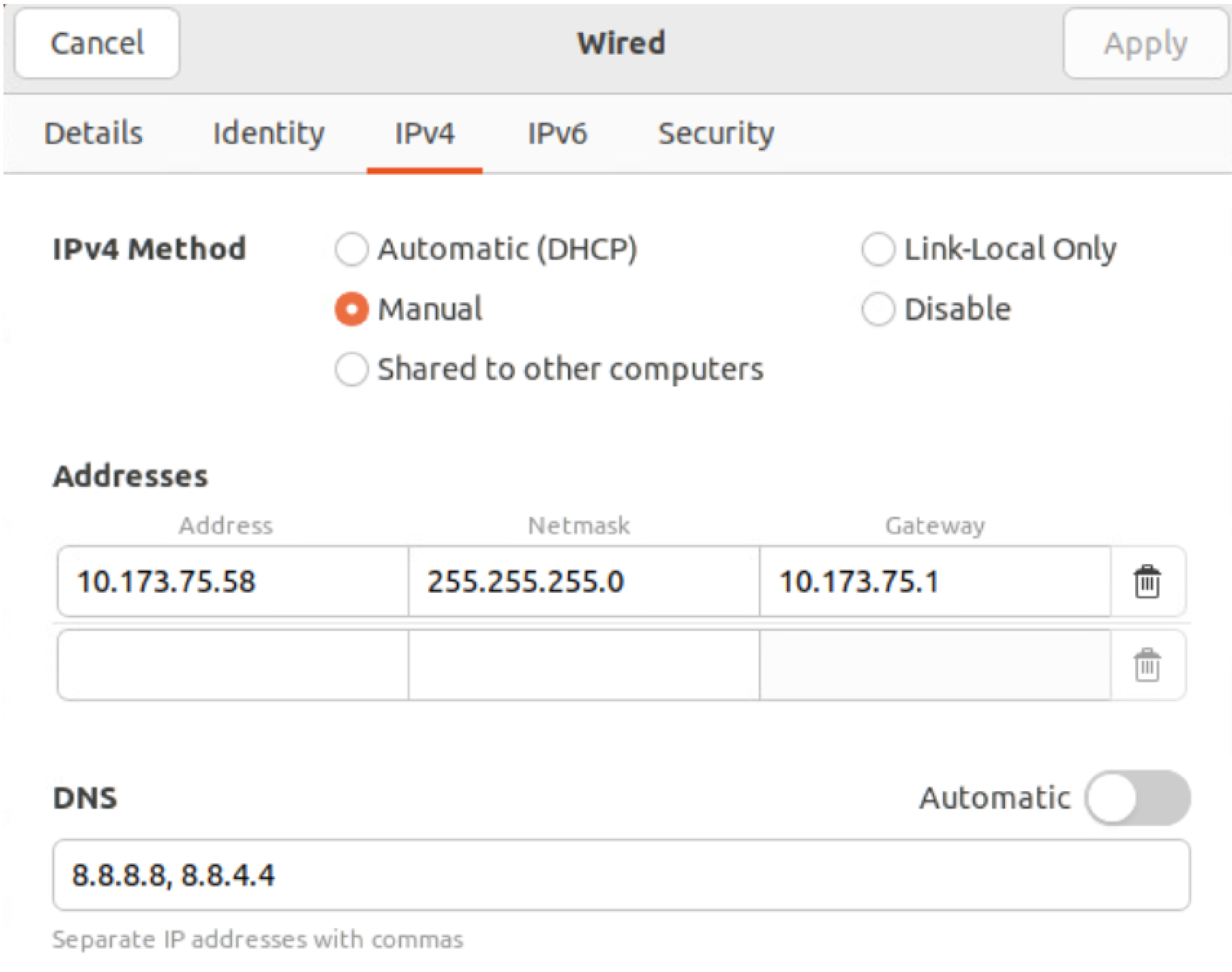
a. Install Ubuntu Desktop LTS 20.04.3

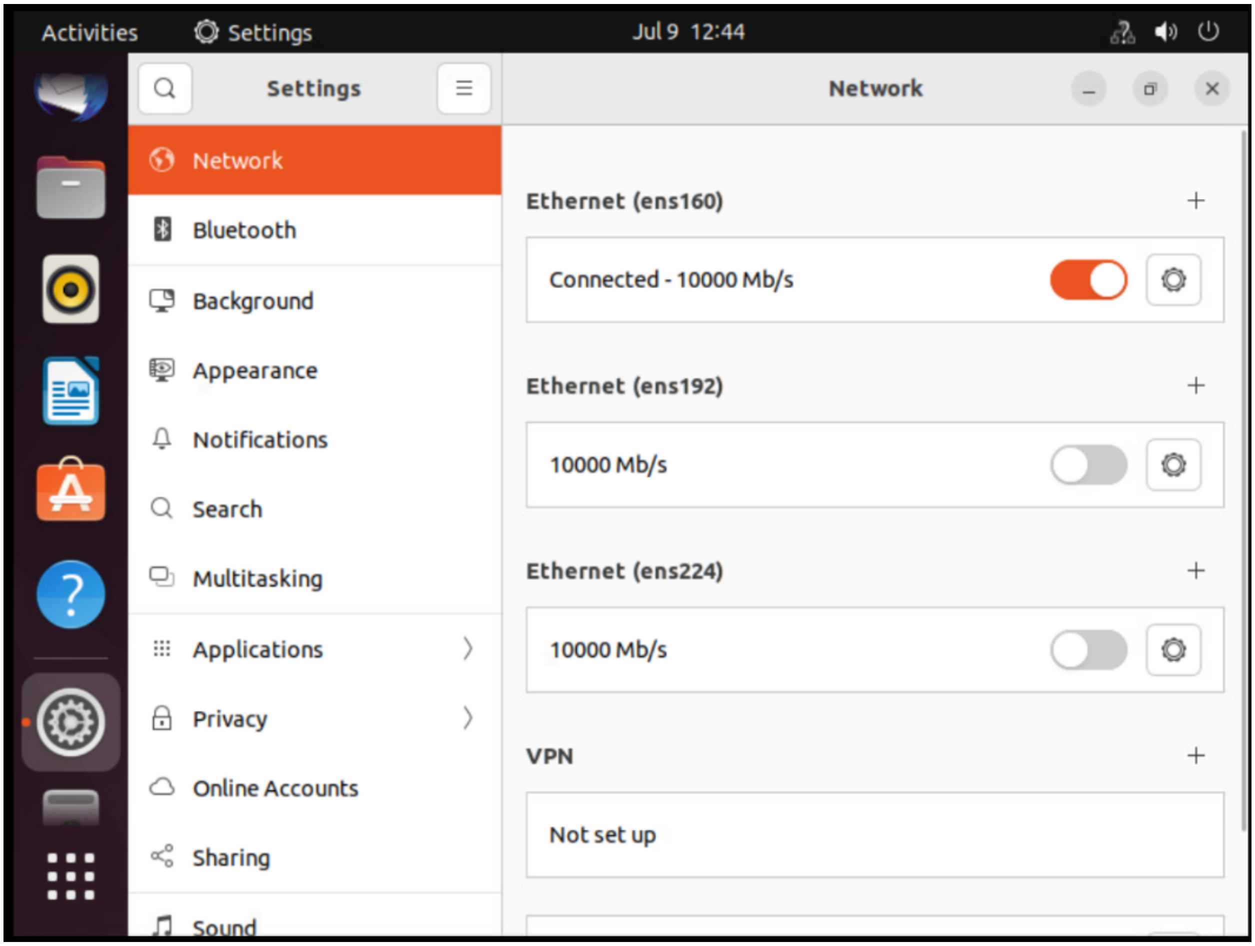
i. Configure hostname and domain name

ii. Add nameserver (10.144.6.3 & 8.8.8.8)

iii. Create a user (jaanvi3041)

iv. Configure network adapters


Cancel
Wired
Apply
Details
Identity
IPv4
IPv6
Security
IPv4 Method
Automatic (DHCP)
Link-Local Only
Manual
Disable
Shared to other computers
Addresses
Address
Netmask
Gateway
10.173.75.58
255.255.255.0
10.173.75.1
DNS
Automatic
8.8.8.8, 8.8.4.4
Separate IP addresses with commas



b. Add hostname and domain name of all hosts to the hosts file
c. Update the operating
d. Install Openssh Server

Sudo apt update
sudo apt install openssh-server

ssh to the ubuntu, ssh jaanvi3041@10.173.75.58

```
[sudo] password for jaanvi:
[jaanvi@jaanviInspiron ~]$ ssh jaanvi3041@10.173.75.58
The authenticity of host '10.173.75.58 (10.173.75.58)' can't be established.
ED25519 key fingerprint is SHA256:aZodI3KEX7LHmQvs0F+bxIpOn9f6knsLf5b2l0hklNw.
This key is not known by any other names
Are you sure you want to continue connecting (yes/no/[fingerprint])? yes
Warning: Permanently added '10.173.75.58' (ED25519) to the list of known hosts.
jaanvi3041@10.173.75.58's password:
Welcome to Ubuntu 22.04.1 LTS (GNU/Linux 5.15.0-43-generic x86_64)
```

3. Verify and Test your configuration

a. Make sure that you can resolve a hostname on the internet

b. Make sure you can resolve the fqdn of each host (including this one)

c. Make sure that you can ssh into this VM and the Ubuntu


```
[sudo] password for jaanvi:
[jaanvi@jaanviInspiron ~]$ ssh jaanvi3041@10.173.75.58
The authenticity of host '10.173.75.58 (10.173.75.58)' can't be established.
ED25519 key fingerprint is SHA256:aZodI3KEX7LHmQvs0F+bxIpOn9f6knsLf5b2l0hklNw.
This key is not known by any other names
Are you sure you want to continue connecting (yes/no/[fingerprint])? yes
Warning: Permanently added '10.173.75.58' (ED25519) to the list of known hosts.
jaanvi3041@10.173.75.58's password:
Welcome to Ubuntu 22.04.1 LTS (GNU/Linux 5.15.0-43-generic x86_64)
```


d. Make sure that you can sudo

```
jaanvi3041-virtual-machine
jaanvi3041@jaanvi3041-virtual-machine:~$ sudo -i
[sudo] password for jaanvi3041:
root@jaanvi3041-virtual-machine:~# apt -y install open-iscsi
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
The following additional packages will be installed:
  finalrd libisns0 libopeniscsiusr
```

e. Make sure that you can resolve the name and fqdn for all the hosts in this Lab

```
jaanvi3041@jaanvi3041-virtual-machine:~$ ls
Desktop  Documents  Downloads  Music  Pictures  Public  snap  Templates  Videos
jaanvi3041@jaanvi3041-virtual-machine:~$ hostname
jaanvi3041-virtual-machine
jaanvi3041@jaanvi3041-virtual-machine:~$ hostname --fqdn
jaanvi3041-virtual-machine
jaanvi3041@jaanvi3041-virtual-machine:~$
```

Step 2 – Configure iSCSI Initiators and LUNS

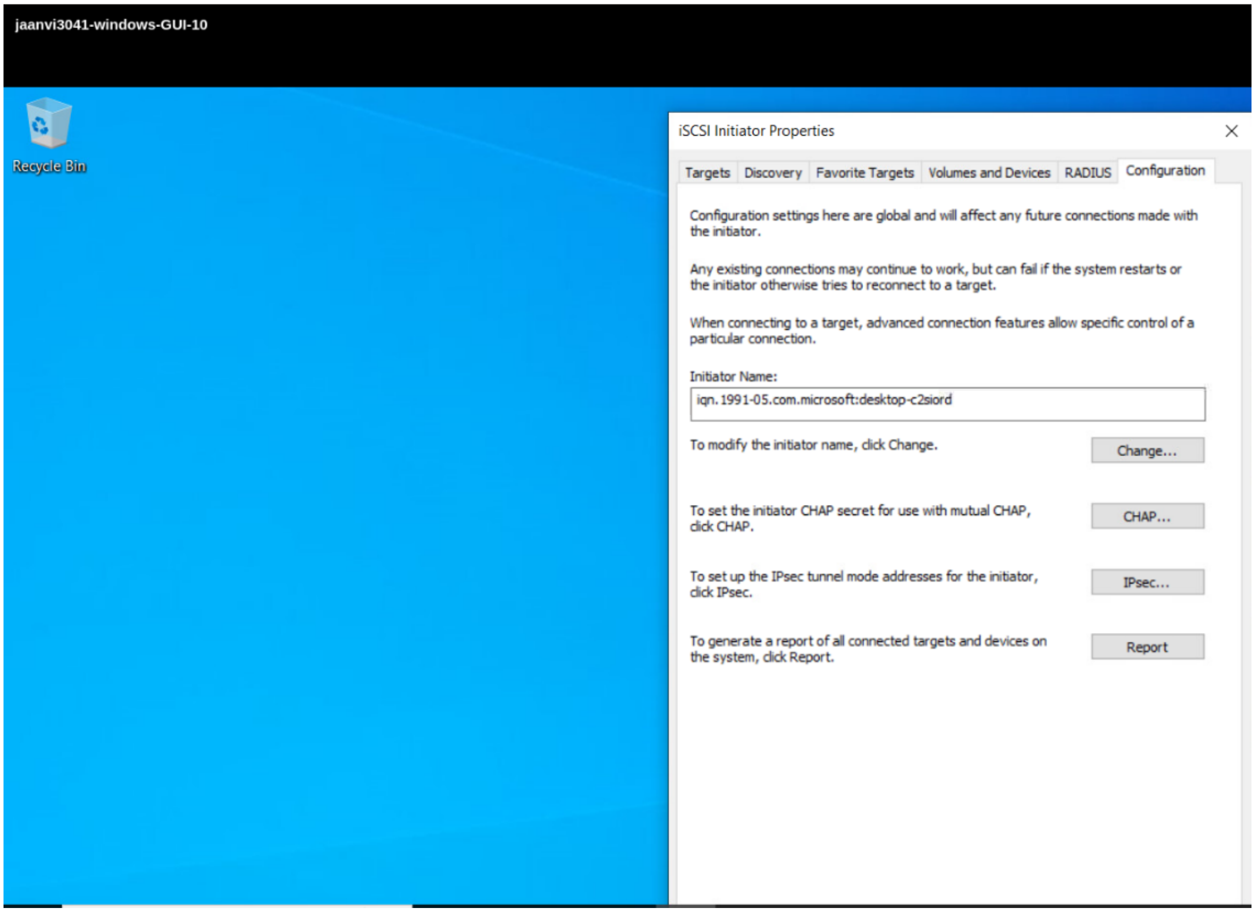
1. Install and Configure Open iSCSI

```
jaanvi3041@jaanvi3041-virtual-machine:~$ sudo -i
[sudo] password for jaanvi3041:
root@jaanvi3041-virtual-machine:~# apt -y install open-iscsi
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
The following additional packages will be installed:
  finalrd libisns0 libopeniscsiusr
The following NEW packages will be installed:
  finalrd libisns0 libopeniscsiusr open-iscsi
0 upgraded, 4 newly installed, 0 to remove and 405 not upgraded.
Need to get 494 kB of archives.
After this operation, 1,988 kB of additional disk space will be used.
Get:1 http://us.archive.ubuntu.com/ubuntu jammy/main amd64 libisns0 amd64 0.101-0ubuntu2 [96.3 kB]
Get:2 http://us.archive.ubuntu.com/ubuntu jammy/main amd64 libopeniscsiusr amd64 2.1.5-1ubuntu1 [67.4 kB]
Get:3 http://us.archive.ubuntu.com/ubuntu jammy/main amd64 open-iscsi amd64 2.1.5-1ubuntu1 [323 kB]
Get:4 http://us.archive.ubuntu.com/ubuntu jammy/main amd64 finalrd all 9build1 [7,306 B]
Fetched 494 kB in 0s (2,168 kB/s)
Preconfiguring packages ...
Selecting previously unselected package libisns0:amd64.
```

a. Edit initiator name (per standard iqn naming convention) and start the service

Vi /etc/iscsi/initiatorname.iscsi

```
root@jaanvi3041-virtual-machine:~# vi /etc/iscsi/initiatorname.iscsi
root@jaanvi3041-virtual-machine:~# systemctl restart iscsid open-iscsi
root@jaanvi3041-virtual-machine:~# iscsiadm -m discovery -t sendtargets -p 10.173.75.31
iscsiadm: cannot make connection to 10.173.75.31: Connection refused
```



b. Add initiator name to the ACL on the iSCSI Server and Assign LUNS to each initiator

```
  o- xen-pvscsi .......................................................................................... [Targets: 0]
/> cd iscsi/iqn.2023-07.com.example:target1/tpg1/acls/
/iscsi/iqn.20...et1/tpg1/acls> create iqn.2004-10.com.ubuntu:01:5a69669ccb1a
Created Node ACL for iqn.2004-10.com.ubuntu:01:5a69669ccb1a
Created mapped LUN 0.
/iscsi/iqn.20...et1/tpg1/acls> ls
o- acls ..................................................................................................... [ACLs: 1]
  o- iqn.2004-10.com.ubuntu:01:5a69669ccb1a ..................................................... [Mapped LUNs: 1]
    o- mapped_lun0 ................................................................... [lun0 block/lv_sdb (rw)]
/iscsi/iqn.20...et1/tpg1/acls> exit
Global pref auto_save_on_exit=true
```

```
/iscsi/iqn.20.../tpg1/portals> cd /
/> ls
o- / ......................................................................................... [...]
  o- backstores .............................................................................. [...]
  | o- block .................................................................. [Storage Objects: 2]
  | | o- lv_sdb ............................................. [/dev/vg_sdb/lv_sdb (2.0GiB) write-thru activated]
  | | | o- alua ................................................................... [ALUA Groups: 1]
  | | |   o- default_tg_pt_gp ....................................... [ALUA state: Active/optimized]
  | | o- lv_sdc ............................................. [/dev/vg_sdc/lv_sdc (2.0GiB) write-thru activated]
  | |   o- alua ................................................................... [ALUA Groups: 1]
  | |     o- default_tg_pt_gp ....................................... [ALUA state: Active/optimized]
  | o- fileio ................................................................. [Storage Objects: 0]
  | o- pscsi .................................................................. [Storage Objects: 0]
  | o- ramdisk ................................................................ [Storage Objects: 0]
  o- iscsi ............................................................................ [Targets: 2]
  | o- iqn.2023-07.com.example:target1 ..................................................... [TPGs: 1]
  | | o- tpg1 ............................................................... [no-gen-acls, no-auth]
  | |   o- acls .......................................................................... [ACLs: 1]
  | |   | o- iqn.2004-10.com.ubuntu:01:5a69669ccb1a ............................... [Mapped LUNs: 1]
  | |   |   o- mapped_lun0 ............................................... [lun0 block/lv_sdb (rw)]
  | |   o- luns .......................................................................... [LUNs: 1]
  | |   | o- lun0 ...................................... [block/lv_sdb (/dev/vg_sdb/lv_sdb) (default_tg_pt_gp)]
  | |   o- portals .................................................................... [Portals: 1]
  | |     o- 10.173.75.31:3260 ................................................................ [OK]
  | o- iqn.2023-07.com.example:target2 ..................................................... [TPGs: 1]
  |   o- tpg1 ............................................................... [no-gen-acls, no-auth]
  |     o- acls .......................................................................... [ACLs: 1]
  |     | o- iqn.1991-05.com.microsoft:desktop-c2siord ............................ [Mapped LUNs: 1]
  |     |   o- mapped_lun0 ............................................... [lun0 block/lv_sdc (rw)]
  |     o- luns .......................................................................... [LUNs: 1]
  |     | o- lun0 ...................................... [block/lv_sdc (/dev/vg_sdc/lv_sdc) (default_tg_pt_gp)]
  |     o- portals .................................................................... [Portals: 1]
  |       o- 10.173.75.31:3260 ................................................................ [OK]
  o- loopback ......................................................................... [Targets: 0]
  o- vhost ............................................................................ [Targets: 0]
  o- xen-pvscsi ....................................................................... [Targets: 0]
/>
```

c. Authenticate to the appropriate targets (LUNs).

d. Configure Automatic Login

vim /etc/tgt/conf.d/target01.conf

```
<target iqn.2023-07.com.example:target1>
    # provided devicce as a iSCSI target
    backing-store /dev/vg_sdb/lv_sdb
    # iSCSI Initiator's IQN you allow to connect
    initiator-address 10.173.75.58
    # authentication info ( set anyone you like for "username", "password" )
    incominguser username password
</target>
~
```

vim /etc/tgt/conf.d/target02.conf

```
<target iqn.2023-07.com.example:target2>
    # provided devicce as a iSCSI target
    backing-store /dev/vg_sdc/lv_sdc
    # iSCSI Initiator's IQN you allow to connect
    initiator-address 10.173.75.147
    # authentication info ( set anyone you like for "username", "password" )
    incominguser username password
</target>
```

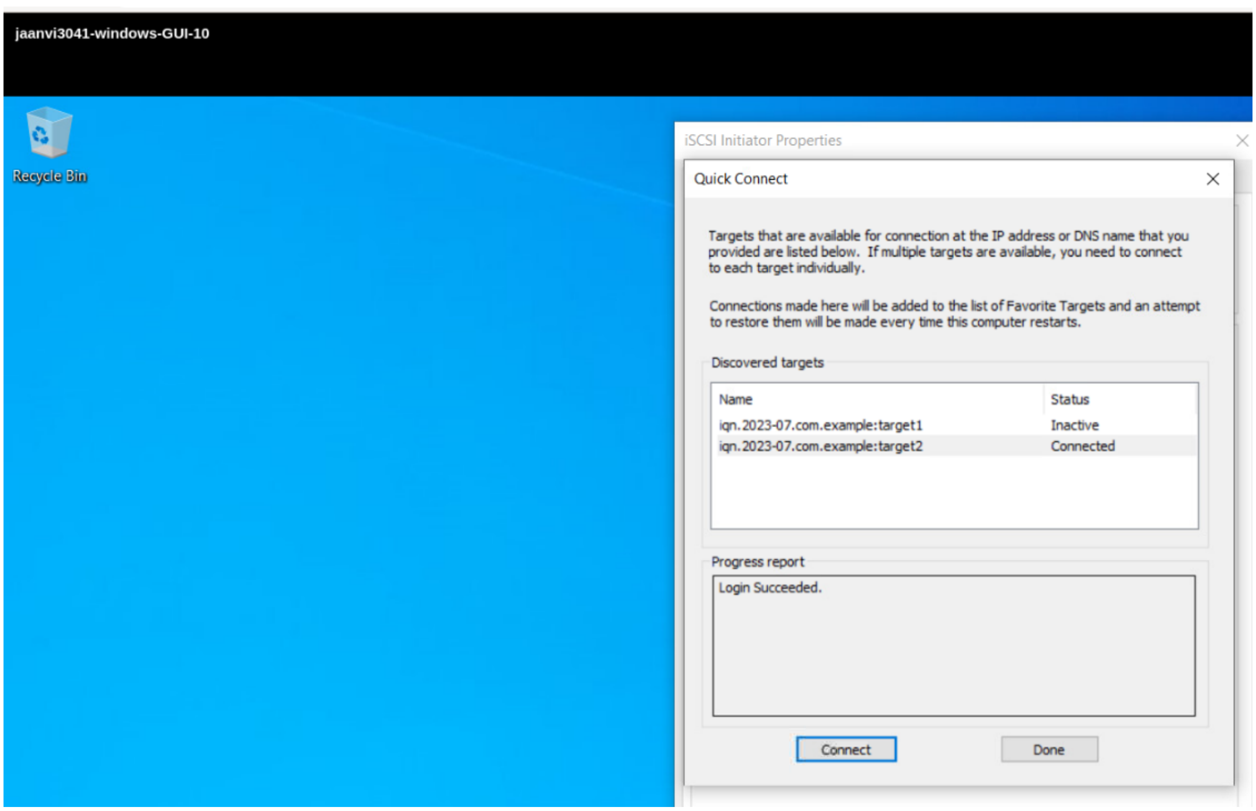
e. Make the LUNS Persistent

f. Verify iSCSI Sessions

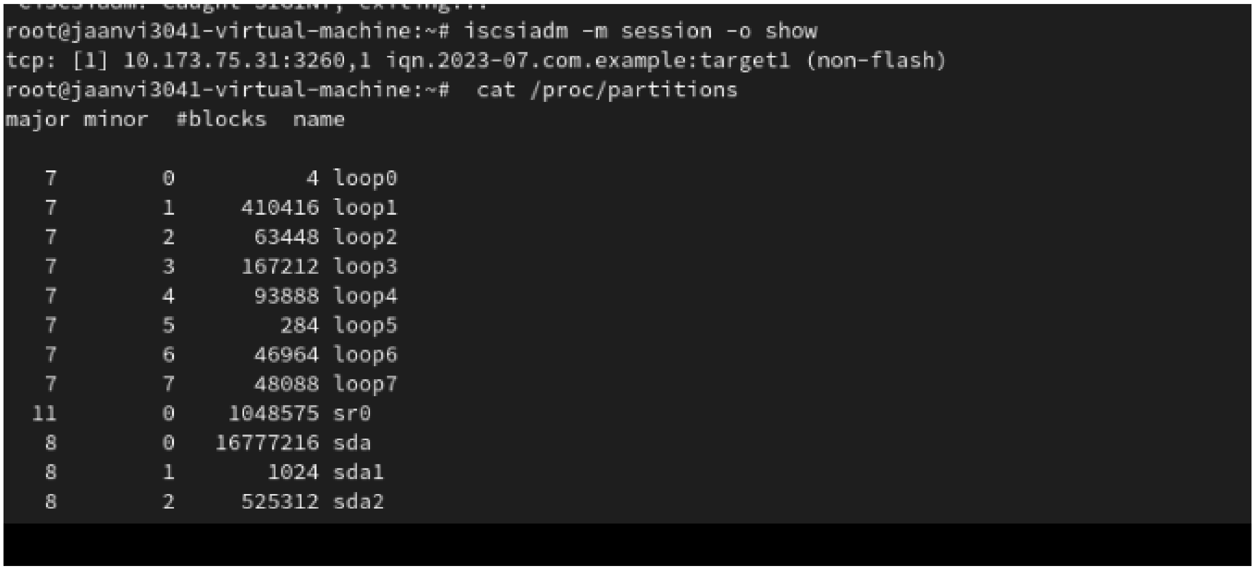
iscsiadm -m discovery -t sendtargets -p 10.0.0.30

```
root@jaanvi3041-virtual-machine:~# iscsiadm -m discovery -t sendtargets -p 10.173.75.31
10.173.75.31:3260,1 iqn.2023-07.com.example:target1
10.173.75.100:3260,1 iqn.2023-07.com.example:target2
root@jaanvi3041-virtual-machine:~# iscsiadm -m node -o show
# BEGIN RECORD 2.1.5
```

```
root@jaanvi3041-virtual-machine:~# iscsiadm -m node -o show
# BEGIN RECORD 2.1.5
node.name = iqn.2023-07.com.example:target1
node.tpgt = 1
node.startup = manual
node.leading_login = No
iface.iscsi_ifacename = default
iface.net_ifacename = <empty>
```



a. Display disk and partition information for each hard disk



```
root@jaanvi3041-virtual-machine:~# iscsiadm -m session -o show
tcp: [1] 10.173.75.31:3260,1 iqn.2023-07.com.example:target1 (non-flash)
root@jaanvi3041-virtual-machine:~#  cat /proc/partitions
major minor  #blocks  name

   7        0          4 loop0
   7        1     410416 loop1
   7        2      63448 loop2
   7        3     167212 loop3
   7        4      93888 loop4
   7        5        284 loop5
   7        6      46964 loop6
   7        7      48088 loop7
  11        0    1048575 sr0
   8        0   16777216 sda
   8        1       1024 sda1
   8        2     525312 sda2
```

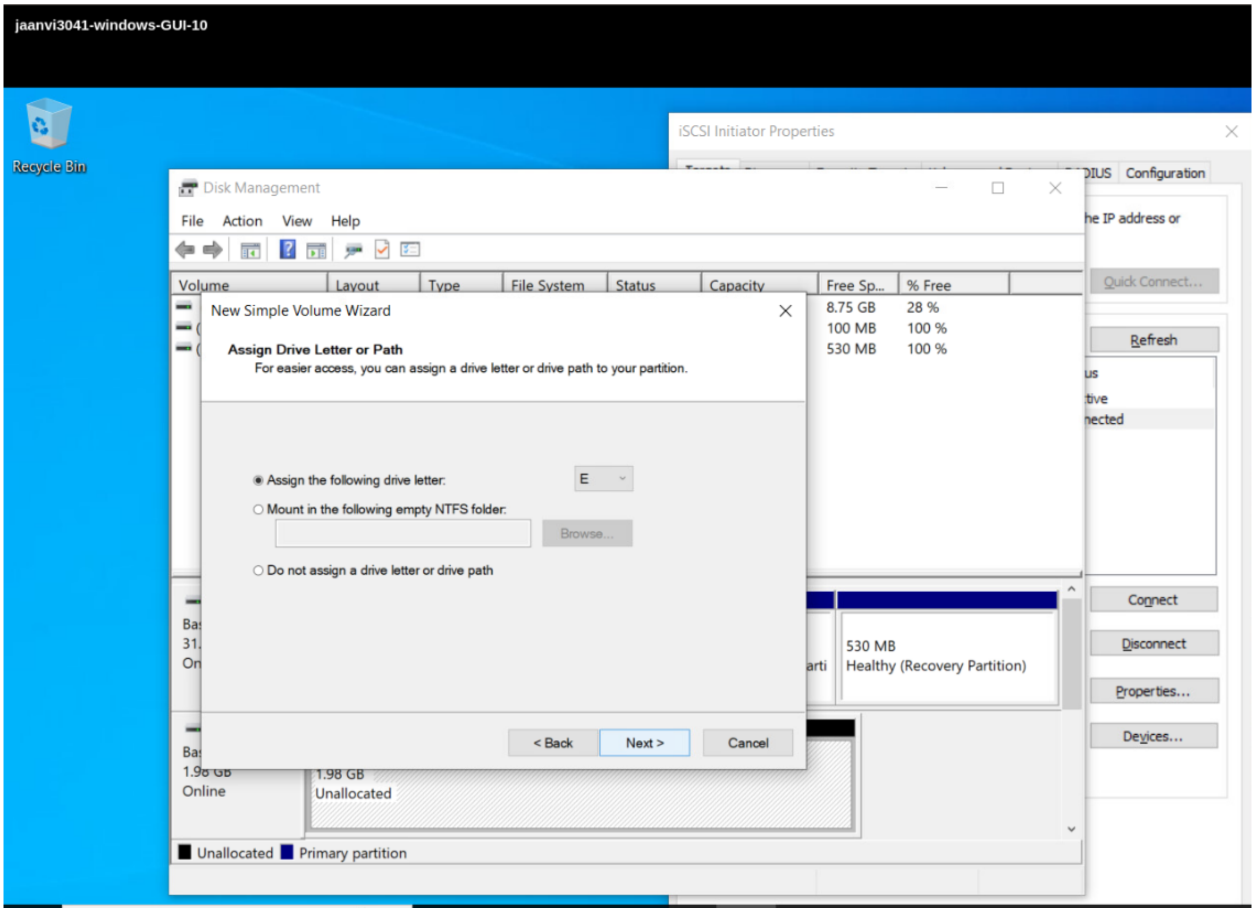
```
Disk /dev/sda: 16 GiB, 17179869184 bytes, 33554432 sectors
Disk model: Virtual disk
Units: sectors of 1 * 512 = 512 bytes
Sector size (logical/physical): 512 bytes / 512 bytes
I/O size (minimum/optimal): 512 bytes / 512 bytes
Disklabel type: gpt
Disk identifier: DCBBEEF1-E6A5-44CD-A1E0-FD59CA6A5499

Device       Start      End  Sectors  Size Type
/dev/sda1     2048     4095     2048    1M BIOS boot
/dev/sda2     4096  1054719  1050624  513M EFI System
/dev/sda3  1054720 33552383 32497664 15.5G Linux filesystem


Disk /dev/sdb: 2 GiB, 2143289344 bytes, 4186112 sectors
Disk model: lv_sdb
Units: sectors of 1 * 512 = 512 bytes
Sector size (logical/physical): 512 bytes / 512 bytes
I/O size (minimum/optimal): 512 bytes / 4194304 bytes
root@jaanvi3041-virtual-machine:~# parted --script /dev/sdb "mklabel gpt"
root@jaanvi3041-virtual-machine:~# parted --script /dev/sdb "mkpart primary 0% 100%"
root@jaanvi3041-virtual-machine:~# mkfs.ext4 /dev/sdb1
mke2fs 1.46.5 (30-Dec-2021)
Creating filesystem with 521216 4k blocks and 130304 inodes
Filesystem UUID: 6008e259-47bc-48d6-8f01-6bc7a5e39736
Superblock backups stored on blocks:
        32768, 98304, 163840, 229376, 294912

Allocating group tables: done
Writing inode tables: done
Creating journal (8192 blocks): done
Writing superblocks and filesystem accounting information: done
```

b. Partition each of the new disks with a single primary partition

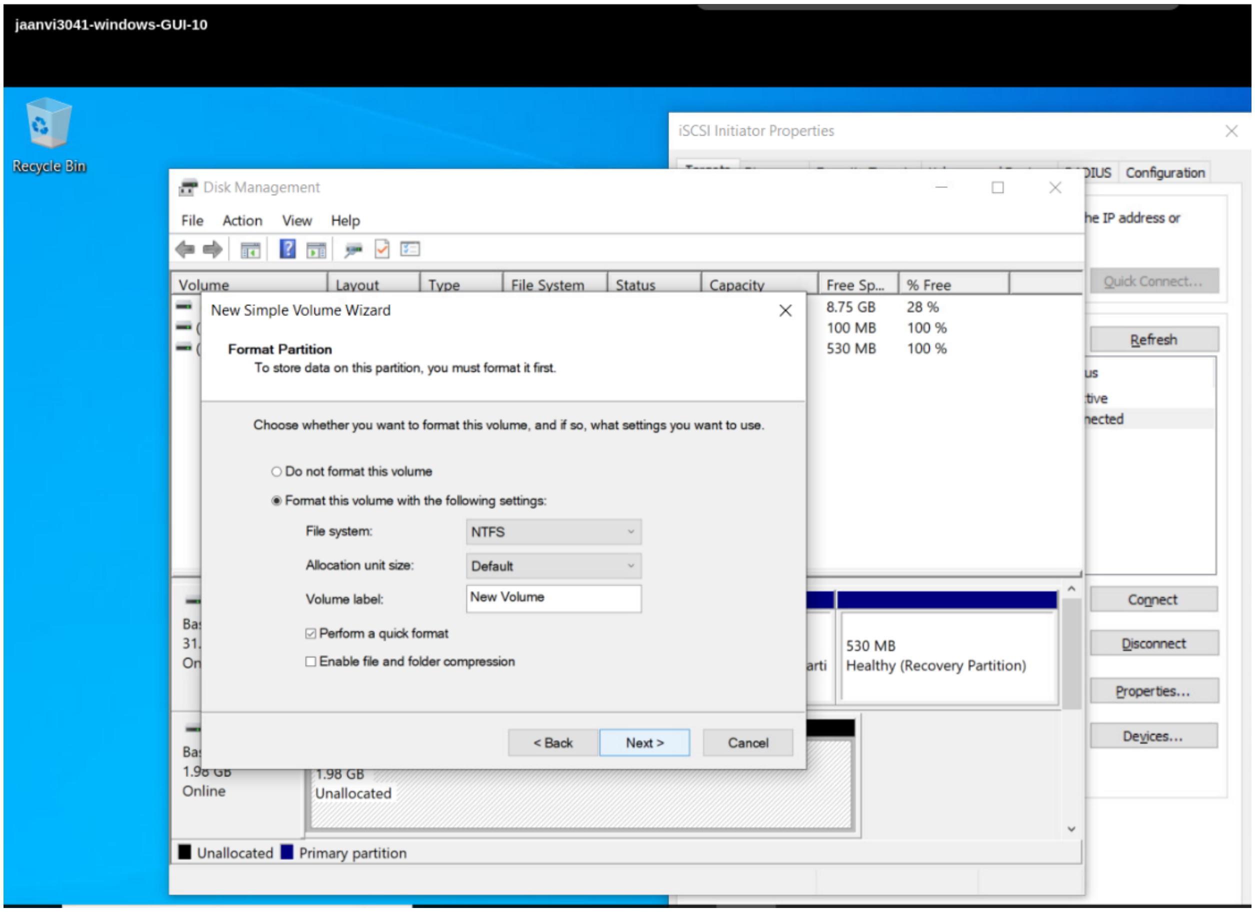
```
root@jaanvi3041-virtual-machine:~# parted --script /dev/sdb "mklabel gpt"
root@jaanvi3041-virtual-machine:~# parted --script /dev/sdb "mkpart primary 0% 100%"
root@jaanvi3041-virtual-machine:~# mkfs.ext4 /dev/sdb1
mke2fs 1.46.5 (30-Dec-2021)
Creating filesystem with 521216 4k blocks and 130304 inodes
Filesystem UUID: 6008e259-47bc-48d6-8f01-6bc7a5e39736
Superblock backups stored on blocks:
        32768, 98304, 163840, 229376, 294912

Allocating group tables: done
Writing inode tables: done
Creating journal (8192 blocks): done
Writing superblocks and filesystem accounting information: done
```

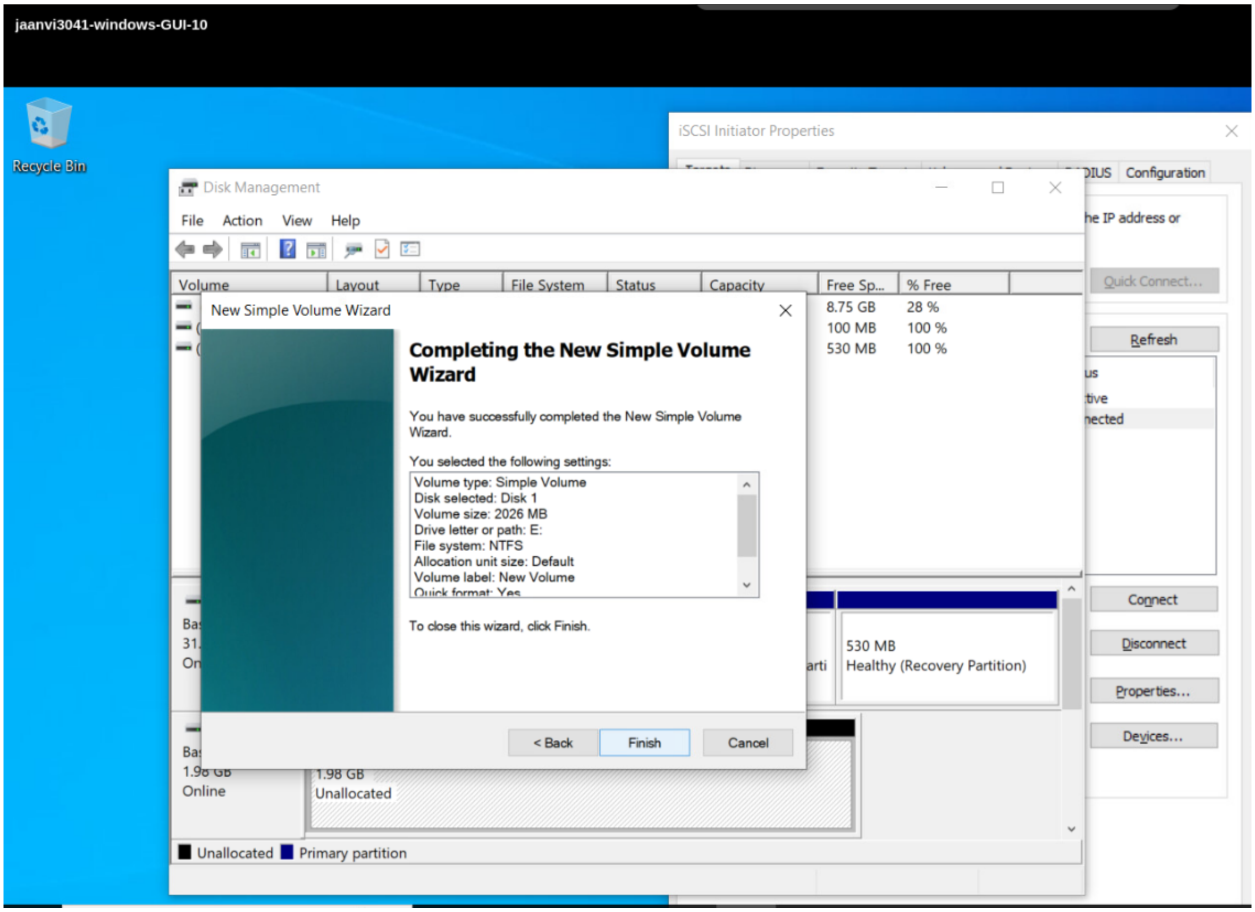
c. Create a filesystem on each disk

i. NTFS on the first disk



jaanvi3041-windows-GUI-10
Recycle Bin
iSCSI Initiator Properties
Configuration
Disk Management
File
Action
View
Help
Volume
Layout
Type
File System
Status
Capacity
Free Sp...
% Free
8.75 GB
28 %
100 MB
100 %
530 MB
100 %
New Simple Volume Wizard
Assign Drive Letter or Path
For easier access, you can assign a drive letter or drive path to your partition.
Assign the following drive letter:
E
Mount in the following empty NTFS folder:
Browse...
Do not assign a drive letter or drive path
< Back
Next >
Cancel
Quick Connect...
Refresh
Connect
Disconnect
Properties...
Devices...
530 MB
Healthy (Recovery Partition)
1.98 GB
Unallocated
Online
Unallocated
Primary partition


jaanvi3041-windows-GUI-10
Recycle Bin
iSCSI Initiator Properties
Configuration
Disk Management
File Action View Help
Volume Layout Type File System Status Capacity Free Sp... % Free
8.75 GB 28 %
100 MB 100 %
530 MB 100 %
New Simple Volume Wizard
Format Partition
To store data on this partition, you must format it first.
Choose whether you want to format this volume, and if so, what settings you want to use.
Do not format this volume
Format this volume with the following settings:
File system: NTFS
Allocation unit size: Default
Volume label: New Volume
Perform a quick format
Enable file and folder compression
< Back
Next >
Cancel
530 MB
Healthy (Recovery Partition)
1.98 GB
Unallocated
Online
Unallocated
Primary partition
Quick Connect...
Refresh
Connect
Disconnect
Properties...
Devices...

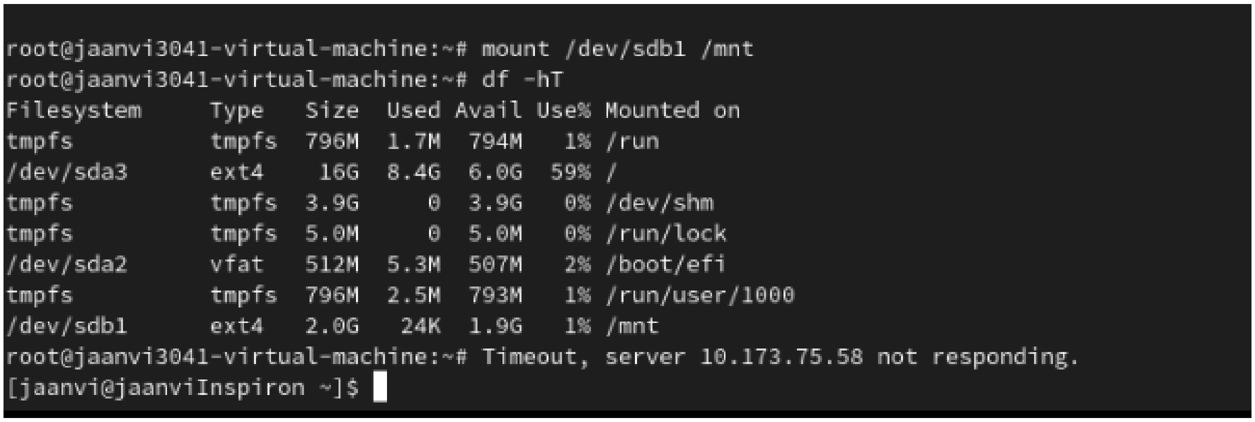


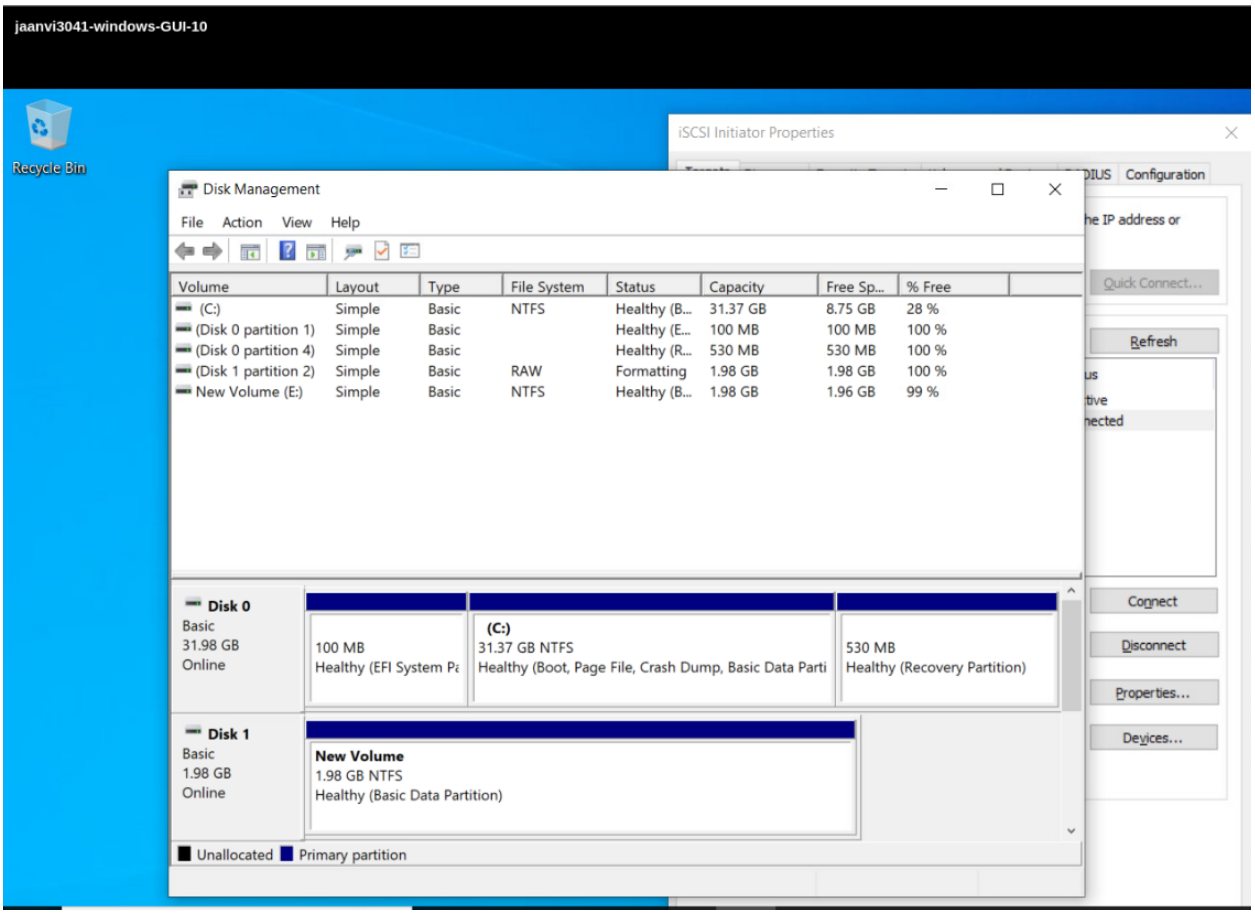
ii. Ext4 on the second disk

```
root@jaanvi3041-virtual-machine:~# parted --script /dev/sdb "mklabel gpt"
root@jaanvi3041-virtual-machine:~# parted --script /dev/sdb "mkpart primary 0% 100%"
root@jaanvi3041-virtual-machine:~# mkfs.ext4 /dev/sdb1
mke2fs 1.46.5 (30-Dec-2021)
Creating filesystem with 521216 4k blocks and 130304 inodes
Filesystem UUID: 6008e259-47bc-48d6-8f01-6bc7a5e39736
Superblock backups stored on blocks:
        32768, 98304, 163840, 229376, 294912

Allocating group tables: done
Writing inode tables: done
Creating journal (8192 blocks): done
Writing superblocks and filesystem accounting information: done
```

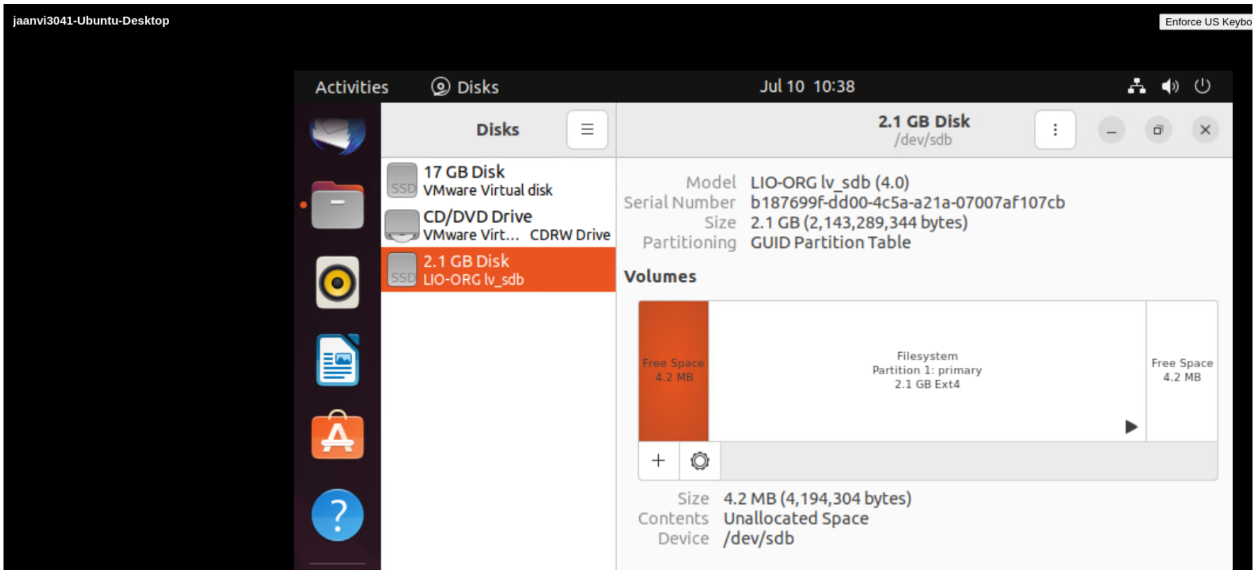
d. Mount the new disks.

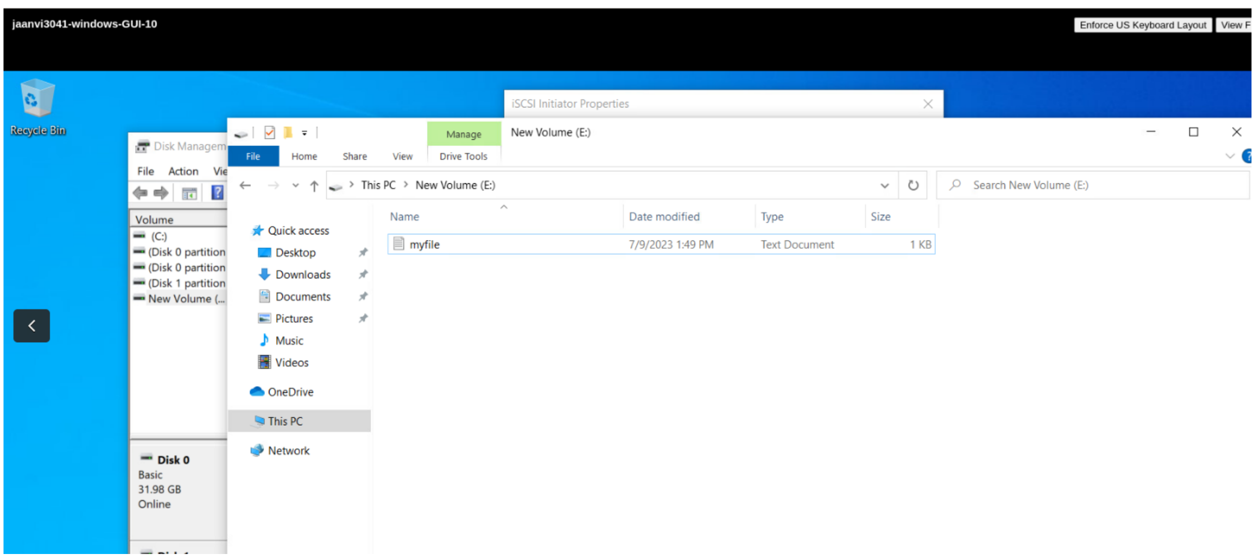
i. List the contents of the mount points





e. Copy data to and from each disk





Conclusion

In conclusion, these exercises provided a comprehensive understanding of how to manage and manipulate storage in Linux and Windows, particularly in a networked environment using iSCSI.

References

https://www.server-world.info/en/note?os=Ubuntu_22.04&p=iscsi&f=1
https://www.server-world.info/en/note?os=Ubuntu_22.04&p=iscsi&f=2
https://www.server-world.info/en/note?os=Ubuntu_22.04&p=iscsi&f=3