DAY 12 **DATE:12/05/2025**

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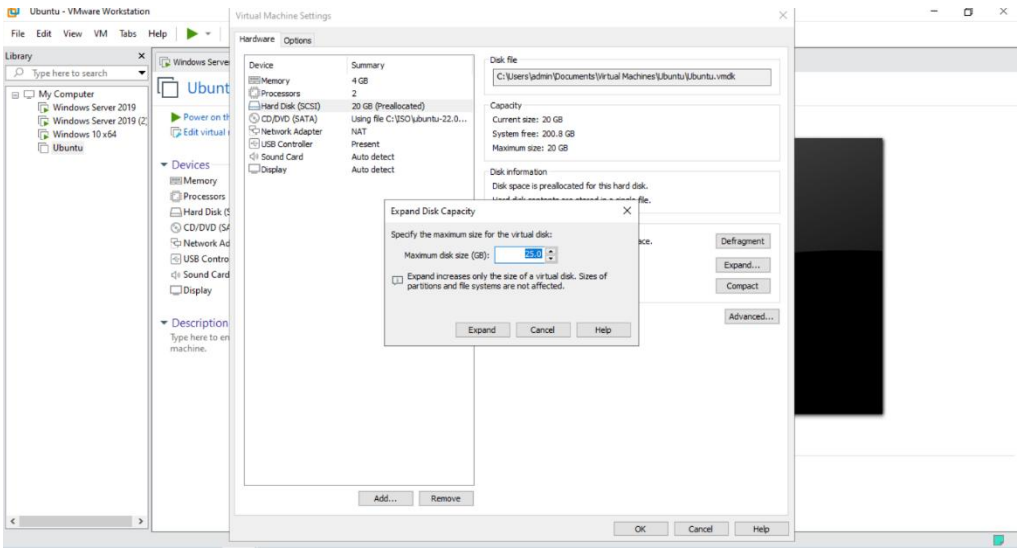
USER ID:27739

Batch: 25VID0885_DC_Batch4

TITLE: DISK MANAGEMENT - EXPANDING AND CREATING NEW VOLUME IN LINUX, INSTALLATION OF APACHE, LVM AND CONFIGURATION

➢ Extend Volume

1. **Step1:** Edit virtual machine settings->Hard disk->choose expand->expand the volume as required.



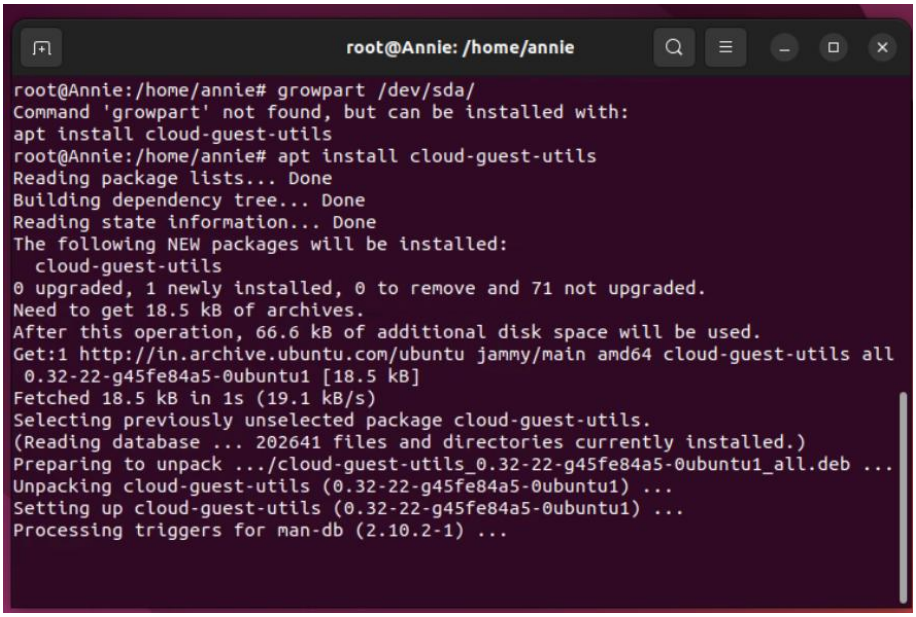
2. **Step 2:** To check volume
    - Command – lsblk

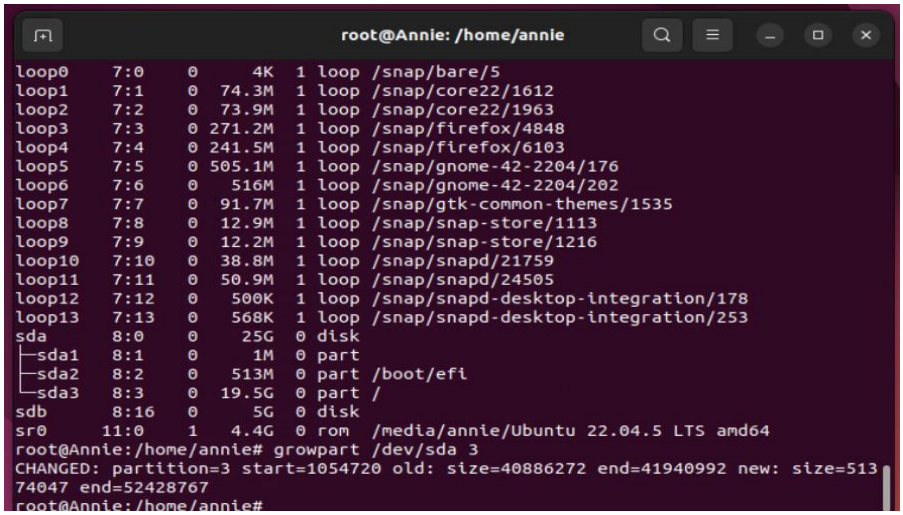
```
root@Annie:/home/annie# lsblk
NAME   MAJ:MIN RM   SIZE RO TYPE MOUNTPOINTS
loop0    7:0    0     4K  1 loop /snap/bare/5
loop1    7:1    0  74.3M  1 loop /snap/core22/1612
loop2    7:2    0  73.9M  1 loop /snap/core22/1963
loop3    7:3    0 271.2M  1 loop /snap/firefox/4848
loop4    7:4    0 241.5M  1 loop /snap/firefox/6103
loop5    7:5    0 505.1M  1 loop /snap/gnome-42-2204/176
loop6    7:6    0   516M  1 loop /snap/gnome-42-2204/202
loop7    7:7    0  91.7M  1 loop /snap/gtk-common-themes/1535
loop8    7:8    0  12.9M  1 loop /snap/snap-store/1113
loop9    7:9    0  12.2M  1 loop /snap/snap-store/1216
loop10   7:10   0  38.8M  1 loop /snap/snapd/21759
loop11   7:11   0  50.9M  1 loop /snap/snapd/24505
loop12   7:12   0   500K  1 loop /snap/snapd-desktop-integration/178
loop13   7:13   0   568K  1 loop /snap/snapd-desktop-integration/253
sda      8:0    0    25G  0 disk
├─sda1   8:1    0     1M  0 part
├─sda2   8:2    0   513M  0 part /boot/efi
└─sda3   8:3    0  19.5G  0 part /
sdb      8:16   0     5G  0 disk
sr0     11:0    1   4.4G  0 rom  /media/annie/Ubuntu 22.04.5 LTS amd64
root@Annie:/home/annie#
```

3. **Step 3:**Use command df -Th. The command df -Th is used in Linux to display disk space usage along with the filesystem type in a human-readable format. Here we can see the size is not extended.

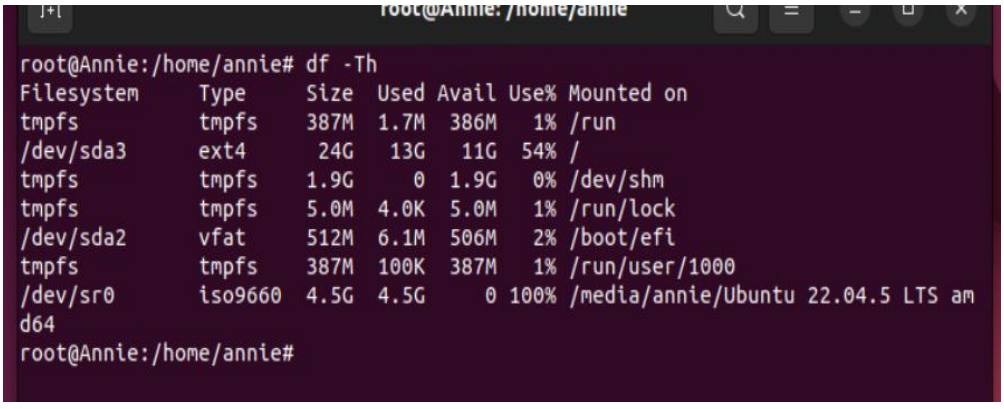
```
root@Annie:/home/annie# df -Th
Filesystem     Type     Size  Used Avail Use% Mounted on
tmpfs          tmpfs    387M  1.7M  386M   1% /run
/dev/sda3      ext4      20G   13G  6.0G  67% /
tmpfs          tmpfs    1.9G     0  1.9G   0% /dev/shm
tmpfs          tmpfs    5.0M  4.0K  5.0M   1% /run/lock
/dev/sda2      vfat     512M  6.1M  506M   2% /boot/efi
tmpfs          tmpfs    387M  104K  387M   1% /run/user/1000
/dev/sr0       iso9660  4.5G  4.5G     0 100% /media/annie/Ubuntu 22.04.5 LTS am
d64
```

4. **Step 4:** Command growpart is used
   It resizes a partition, not the filesystem inside it.
   Useful when you've increased the size of a disk (e.g., from 20GB to 25GB) and want the existing partition (like /dev/sda3) to take up the new space->use command resize2fs /dev/sda3.

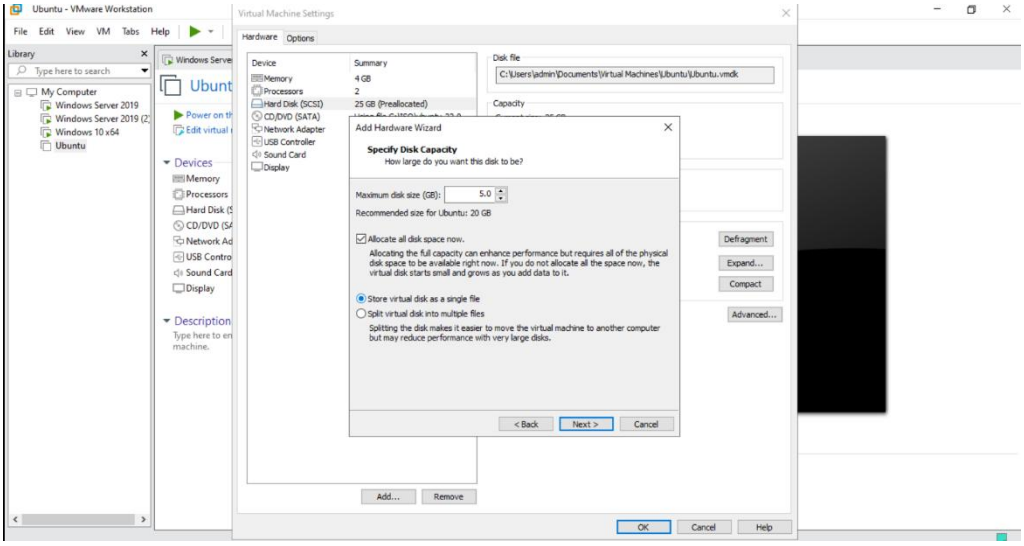




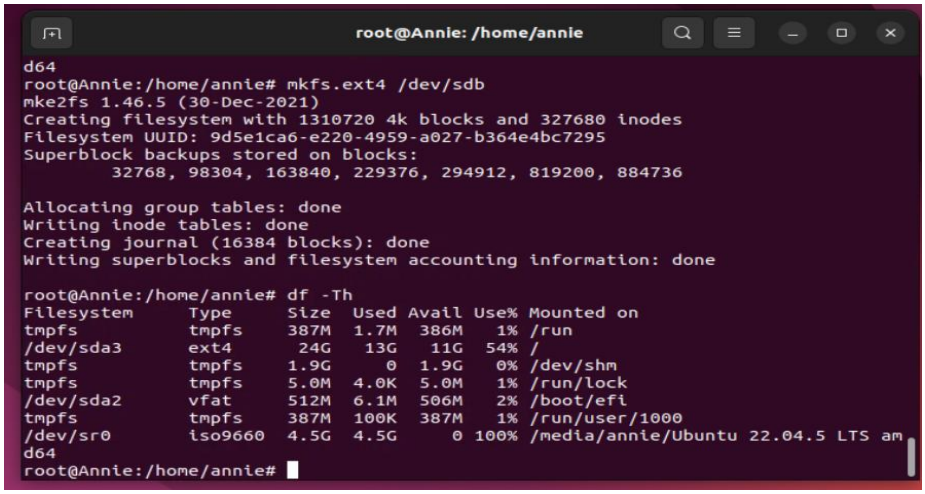
5. **Step 5:** Use command df -Th



- **Create new volume**
  1. Step 1: Power off the vm->Edit vm settings->Go to hard disk ->click on add->add volume->power on vm.



2. Step 2: Create a directory using command mkdir /dir1
3. Step 3: Create a file system using command – Mkfs.ext4 /dev/sdb



4. Step 4: The last step is mounting - Mounting is the process of attaching a storage device or filesystem (like a hard drive, USB, ISO file, or partition) to a specific directory in the Linux directory tree so that you can access its contents ->validate using the command df -Th.

```
root@Annie:/home/annie# mount /dev/sdb /dir1
root@Annie:/home/annie# df -Th
Filesystem     Type      Size  Used Avail Use% Mounted on
tmpfs          tmpfs     387M  1.7M  386M   1% /run
/dev/sda3      ext4       24G   13G   11G  54% /
tmpfs          tmpfs     1.9G     0  1.9G   0% /dev/shm
tmpfs          tmpfs     5.0M  4.0K  5.0M   1% /run/lock
/dev/sda2      vfat      512M  6.1M  506M   2% /boot/efi
tmpfs          tmpfs     387M  100K  387M   1% /run/user/1000
/dev/sr0       iso9660   4.5G  4.5G     0 100% /media/annie/Ubuntu 22.04.5 LTS am
d64
/dev/sdb       ext4      4.9G   24K  4.6G   1% /dir1
root@Annie:/home/annie#
```

- **Apache Configuration**

  - Apache HTTP Server (often just called Apache) is one of the most widely used web servers in the world. It serves web pages to users in response to their requests via a web browser.

1. Step 1: Install Apache->using the command apt install Apache.

```
root@Annie:/home/annie# apt install apache2
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
The following additional packages will be installed:
  apache2-bin apache2-data apache2-utils libapr1 libaprutil1
  libaprutil1-dbd-sqlite3 libaprutil1-ldap
Suggested packages:
  apache2-doc apache2-suexec-pristine | apache2-suexec-custom
The following NEW packages will be installed:
  apache2 apache2-bin apache2-data apache2-utils libapr1 libaprutil1
  libaprutil1-dbd-sqlite3 libaprutil1-ldap
0 upgraded, 8 newly installed, 0 to remove and 71 not upgraded.
Need to get 1,922 kB of archives.
After this operation, 7,728 kB of additional disk space will be used.
Do you want to continue? [Y/n]
```

  - Type y and continue with installation. Always check status of Apache using systemctl status apache2.

```
root@Annie:/home/annie# systemctl status apache2
● apache2.service - The Apache HTTP Server
     Loaded: loaded (/lib/systemd/system/apache2.service; enabled; vendor prese>
     Active: active (running) since Mon 2025-05-12 13:41:56 IST; 7h ago
       Docs: https://httpd.apache.org/docs/2.4/
    Process: 801 ExecStart=/usr/sbin/apachectl start (code=exited, status=0/SUC>
   Main PID: 888 (apache2)
      Tasks: 55 (limit: 4544)
     Memory: 8.0M
        CPU: 7.016s
     CGroup: /system.slice/apache2.service
             ├─888 /usr/sbin/apache2 -k start
             ├─891 /usr/sbin/apache2 -k start
             └─893 /usr/sbin/apache2 -k start

May 12 13:41:51 Annie systemd[1]: Starting The Apache HTTP Server...
May 12 13:41:55 Annie apachectl[825]: AH00558: apache2: Could not reliably dete>
May 12 13:41:56 Annie systemd[1]: Started The Apache HTTP Server.
lines 1-17/17 (END)
```

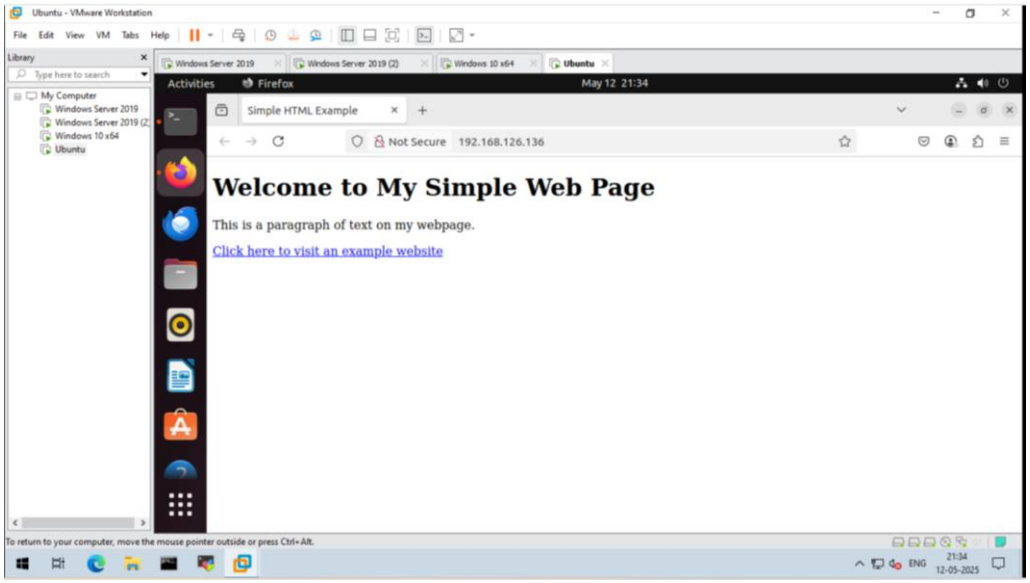
2. Step 2: Check IP address of your server using command hostname -I.

```
root@Annie:/home/annie# hostname -I
192.168.126.136
root@Annie:/home/annie#
```

3. Step 3: Open the Firefox or chrome search the ip.

- It will show apache2 default page. First, we have to change the directory using command “cd /var/www/html/” We have to change the html code using vi command, by removing already existing one using rm command (rm index.html) and now open vi

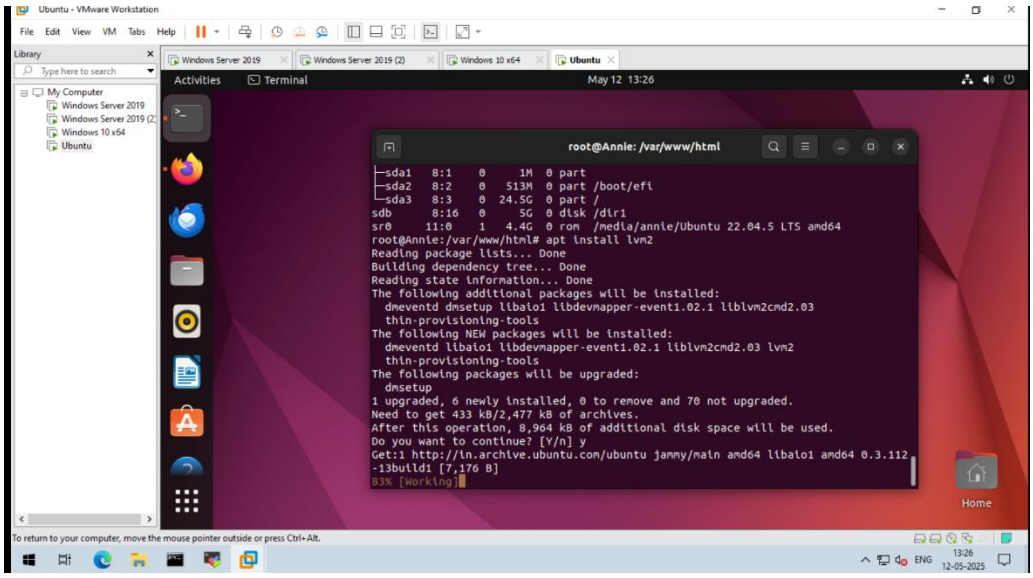
<filename> edit and save using (esc->:wq!). Again go to Firefox and refresh the page.



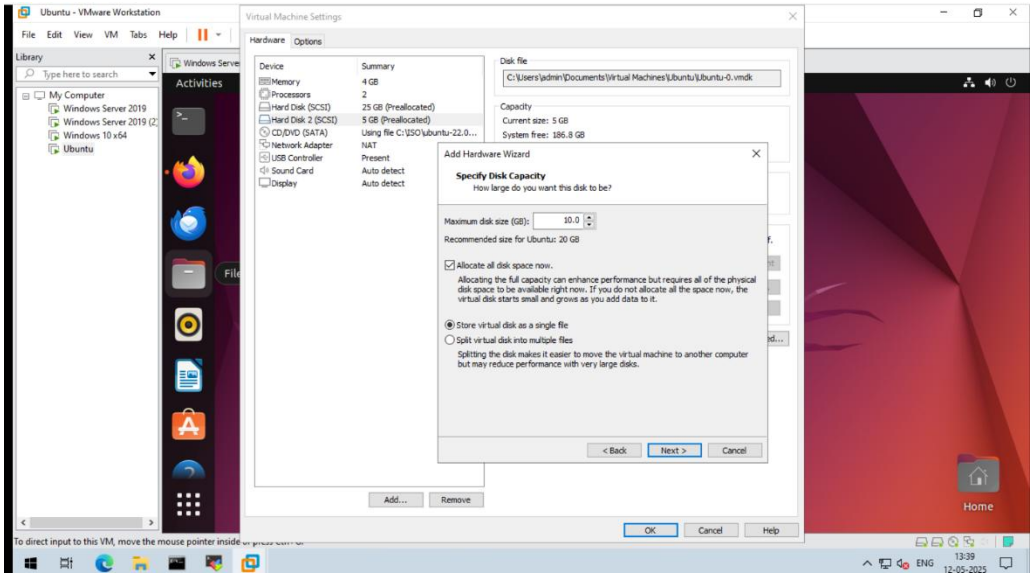
- **LVM** - LVM stands for Logical Volume Manager. It's a powerful tool for managing disk space more flexibly than traditional partitioning.

- **pvcreate** – Initializes a physical storage device or partition as a **Physical Volume (PV)** for use with LVM.
- **pvdisplay** – Shows detailed information about existing **Physical Volumes**.
- **vgcreate** – Creates a **Volume Group (VG)** by combining one or more physical volumes.
- **lvcreate** – Creates a **Logical Volume (LV)** from a specified volume group.
- **lvremove** – Deletes a **Logical Volume**, freeing up space in the volume group.

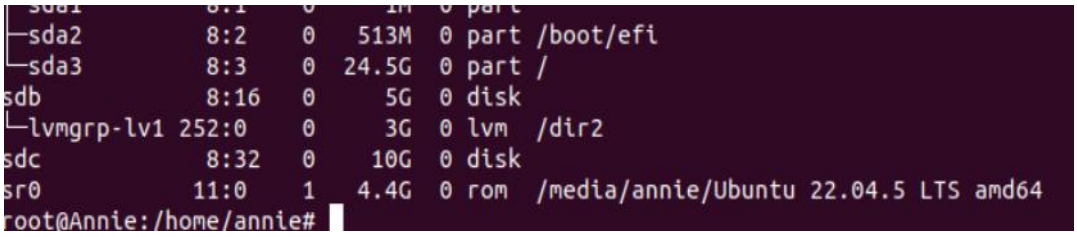
1. Step 1: Install LVM using the command apt install lvm2->click yes and continue with installation.



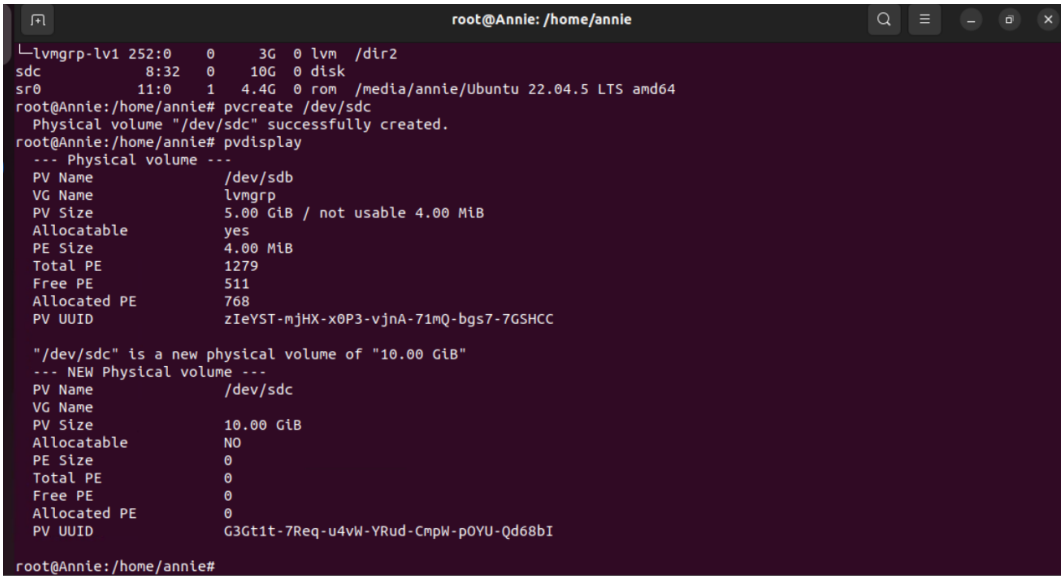
2. Step 2: Create a physical disk with a volume(eg:10) by clicking on vm settings and specify disk capacity.



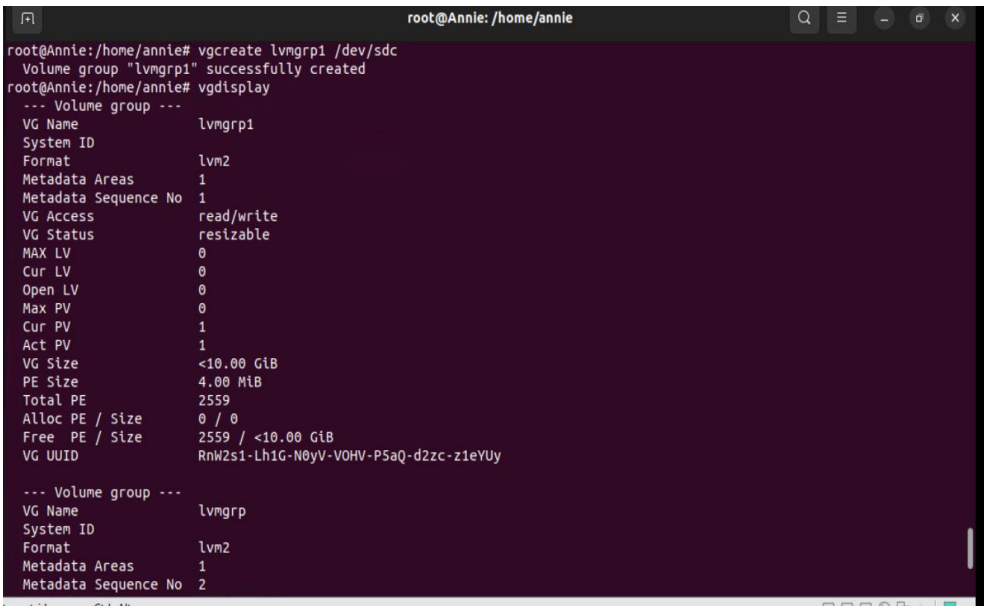
3. Step 3: Using lsblk command check 10g disk. We are going create physical volume.



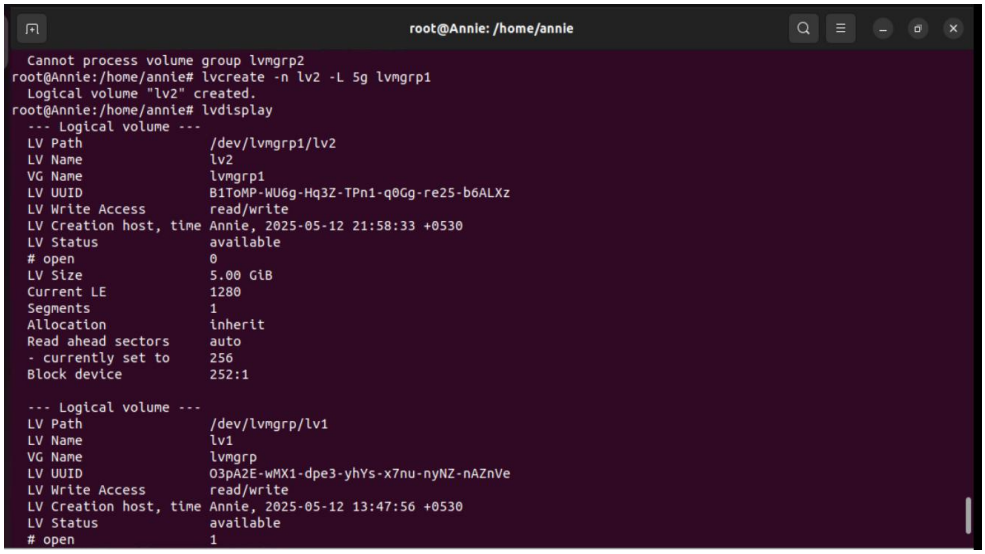
4. Step 4: Physical volume created and check it.



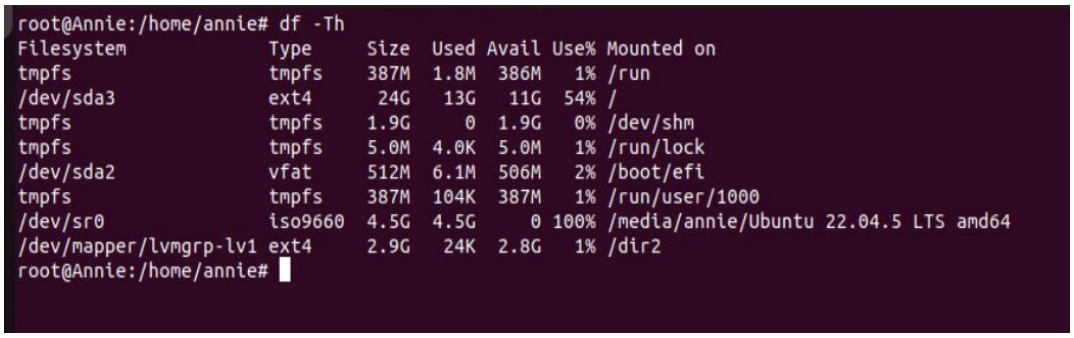
5. Step 5:Create volume group using command vgcreate <groupname> <device name>.check by using vgdisplay.



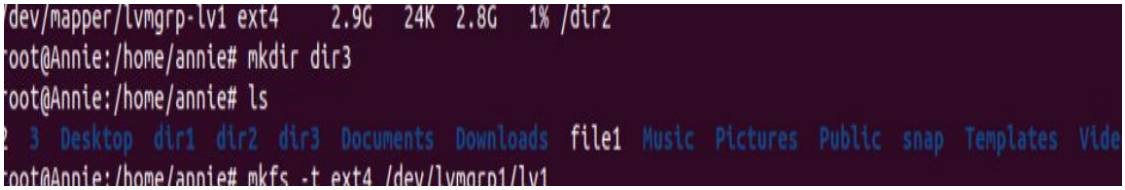
6. Step 6: Create logical volume

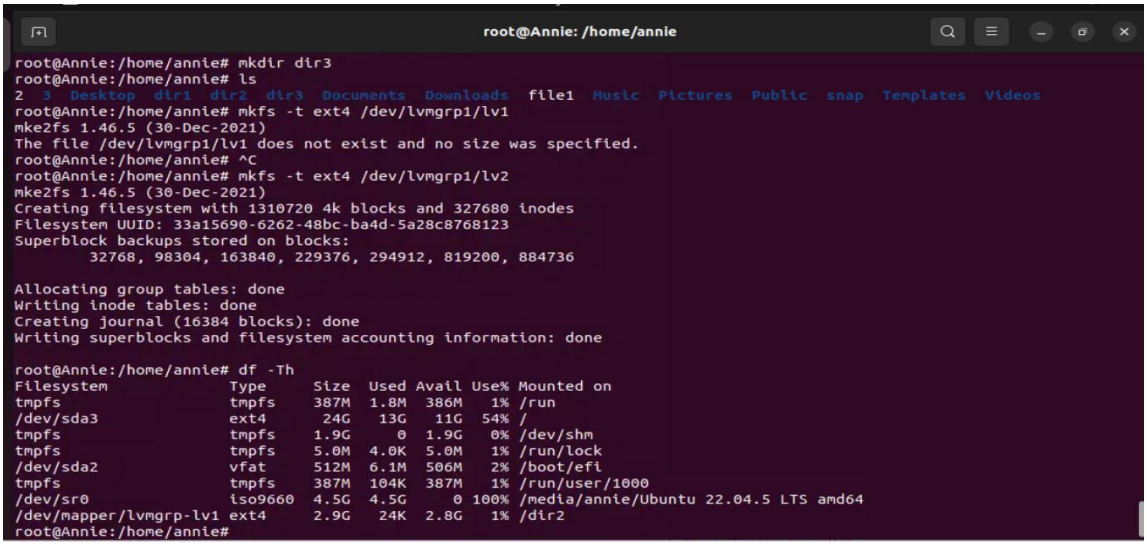


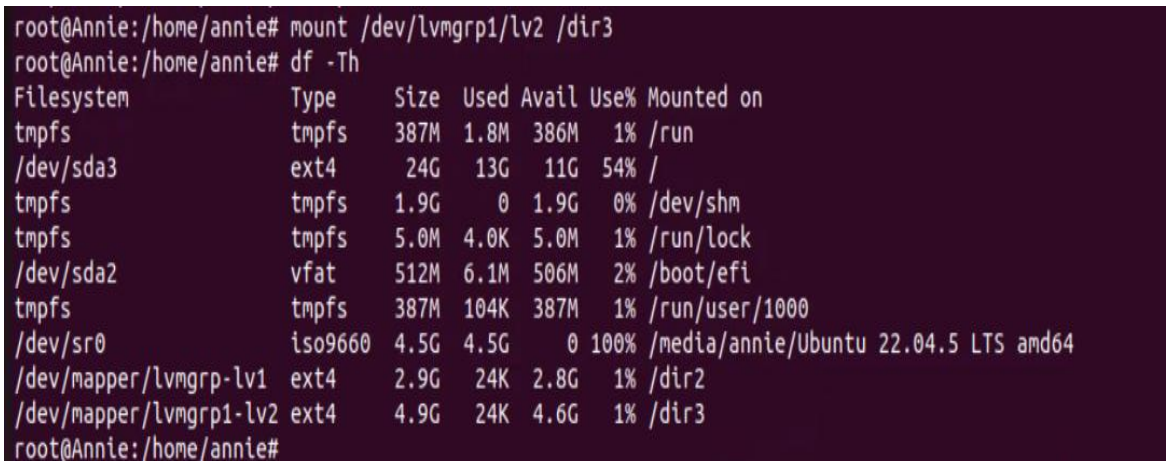
7. Step 7: Validate using df -Th.If not there we have to mount.



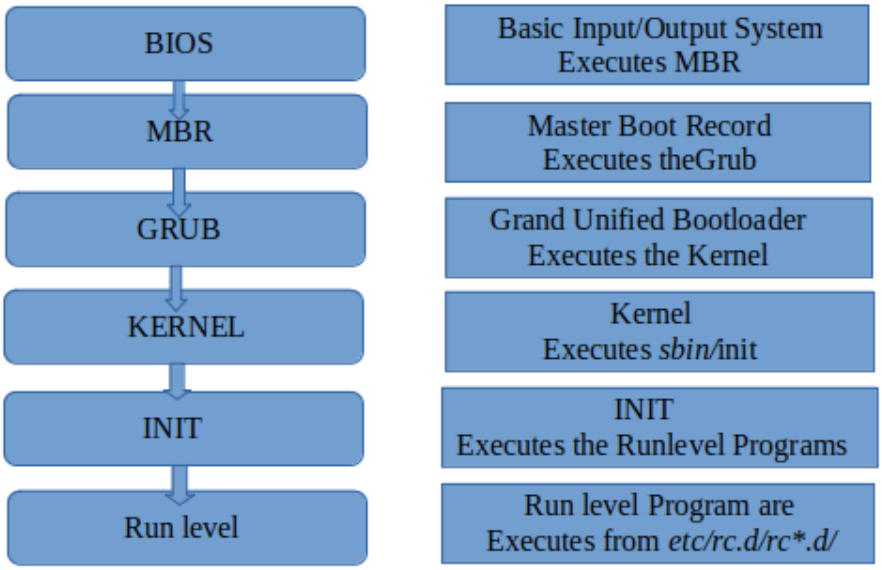
8. Step 8: Now to mount we have first to create directory using mkdir <directory name>->then create filesystem using mkfs -t <file system name><device name>.Check using df -Th.







- **Boot Process**



1. **BIOS (Basic Input/Output System)**

- What it does: Initializes the hardware (keyboard, disk, RAM, etc.).
- Next step: Loads and executes the MBR.
- Location: Stored on the motherboard.

2. **MBR (Master Boot Record)**

- What it does: It contains the bootloader information.
- Next step: Loads the GRUB (or any bootloader).
- Location: First 512 bytes of the bootable disk.

3. **GRUB (Grand Unified Bootloader)**

- What it does: Provides a menu to select which OS/kernel to boot.
- Next step: Loads and executes the selected Kernel.

4. **Kernel**

- What it does: Core of the OS; handles hardware, mounts root filesystem.
- Next step: Executes the /sbin/init program (or a replacement like systemd in modern distros).

5. **INIT**

- What it does: Initializes the system processes as per the runlevel.
- Next step: Runs scripts and services required for the system to operate.

6. **Run Level**

- What it does: Defines the state of the machine (e.g., single-user mode, multi-user mode, GUI, etc.).
- Scripts location: /etc/rc.d/rc*.d/
    - For example: /etc/rc.d/rc3.d/ contains scripts for runlevel 3.