

Operating systems Additional class

- Starts at 9:05 p.m.

Agenda.

1. Package manager commands
2. tmux
3. vimrc
4. systemd and demo on how to create your own service.
5. Filesystems LVM and mounting

Package Manager.

A **package manager** is a tool that automates the process of installing, upgrading, configuring, and removing software packages from a computer's operating system.

`apt` → ubuntu. Advanced Package Tool.

① Installing.

`sudo apt install <package-name>`

② Searching

`apt search " "`

③ Removing

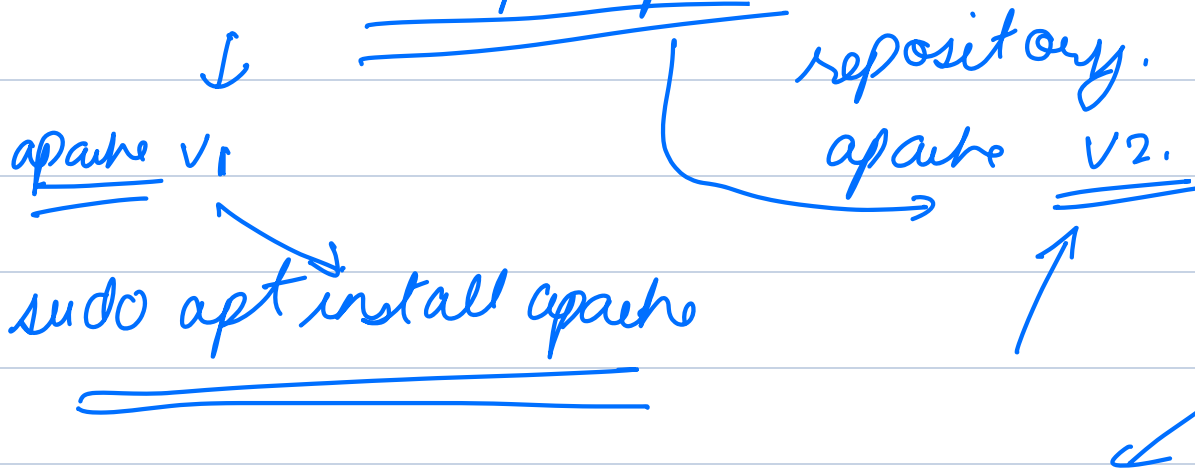
sudo apt remove "

④ upgrading installed Packages.

sudo apt upgrade.

⑤ updating the repository

sudo apt update.



✓ nginx v x.

upgrade \longrightarrow v y.

update \rightarrow fetching latest soft info from repo.

upgrade \rightarrow upgrading already installed softwares.

apt list --upgradable.

→ Software - version. → v X.1

→ sudo apt upgrade "software"

↓

v X.2

systemd.

→ service manager

rob.

- ① booting up of system
- ② managing process
- ③ handling system services.

/lib/systemd

→

****Purpose****: This directory contains the default systemd unit files and configuration files that are ****provided by the**
operating system or software packages.******

/etc/systemd

****Purpose****: This directory is intended for ****user-specific or administrator-customized configurations and unit files.****

multi-user target.



State in which multiple users can login.

****systemctl is a command line utility used to interact with systemd****

****Commands**:**

- ****Start a Service****: `sudo systemctl start <service_name>`

- ****Stop a Service****: `sudo systemctl stop <service_name>`

- ****Enable a Service****: `sudo systemctl enable <service_name>` (starts at boot) (creates a symbolic link)

- ****Disable a Service****: `sudo systemctl disable <service_name>`

- ****Check Status****: `sudo systemctl status <service_name>`

Back at 10:28 pm.

sudo vi /usr/local/bin/hello.sh

Creating your own
service.

#!/bin/bash

echo "Hello, World!" >> /tmp/hello.log

****Make the file executable****

```
sudo chmod +x /usr/local/bin/hello.sh
```

****create service file****

```
sudo vi /etc/systemd/system/hello.service
```

[Unit]

Description=Hello World Service

[Service]

ExecStart=/usr/local/bin/hello.sh

[Install]

WantedBy=multi-user.target

Content of hello.
service.

```
sudo systemctl start hello.service
```

→ start the service

cat /tmp/hello.log.

TMUX.

`tmux` is a terminal multiplexer that allows you to manage multiple terminal sessions within a single window.

****Detach from a session**:**

- Press `Ctrl + b`, then `d`.

****Switch between windows**:**

- Press `Ctrl + b`, then use the arrow keys or number keys.

****Split window vertically**:**

- Press `Ctrl + b`, then `%`.

****Split window horizontally**:**

- Press `Ctrl + b`, then `\"`.

→ *Filesystems.*



A **file system** is the method used to organize, store, retrieve, and manage files/data on storage devices such as hard drives, SSDs, and USB drives.

Components of a file system.

- ① File
- ② Directories
- ③ Inode (metadata of file and directory)
- ④ superblock.
(metadata of the filesystem)
- ⑤ Data Blocks.

Types of filesystems

- ① NTFS (New technology filesystem)

16 EB \rightarrow 1 million TB

1 TB \rightarrow 1024 GB.

\rightarrow journaling.

\rightarrow drawback \rightarrow compatibility with other OS.

② ext (extended file system) (1992)

ext 2 → 1993

ext 3 → 2001

ext 4 → 2008

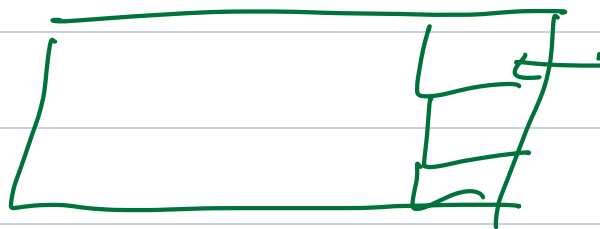
filesize 16 TB volume 1 EB.

Neither windows or Mac support it.

③ XFS. (high performance computing environments)

→ snapshots . → point in time backup.

handles files upto 8 EB.



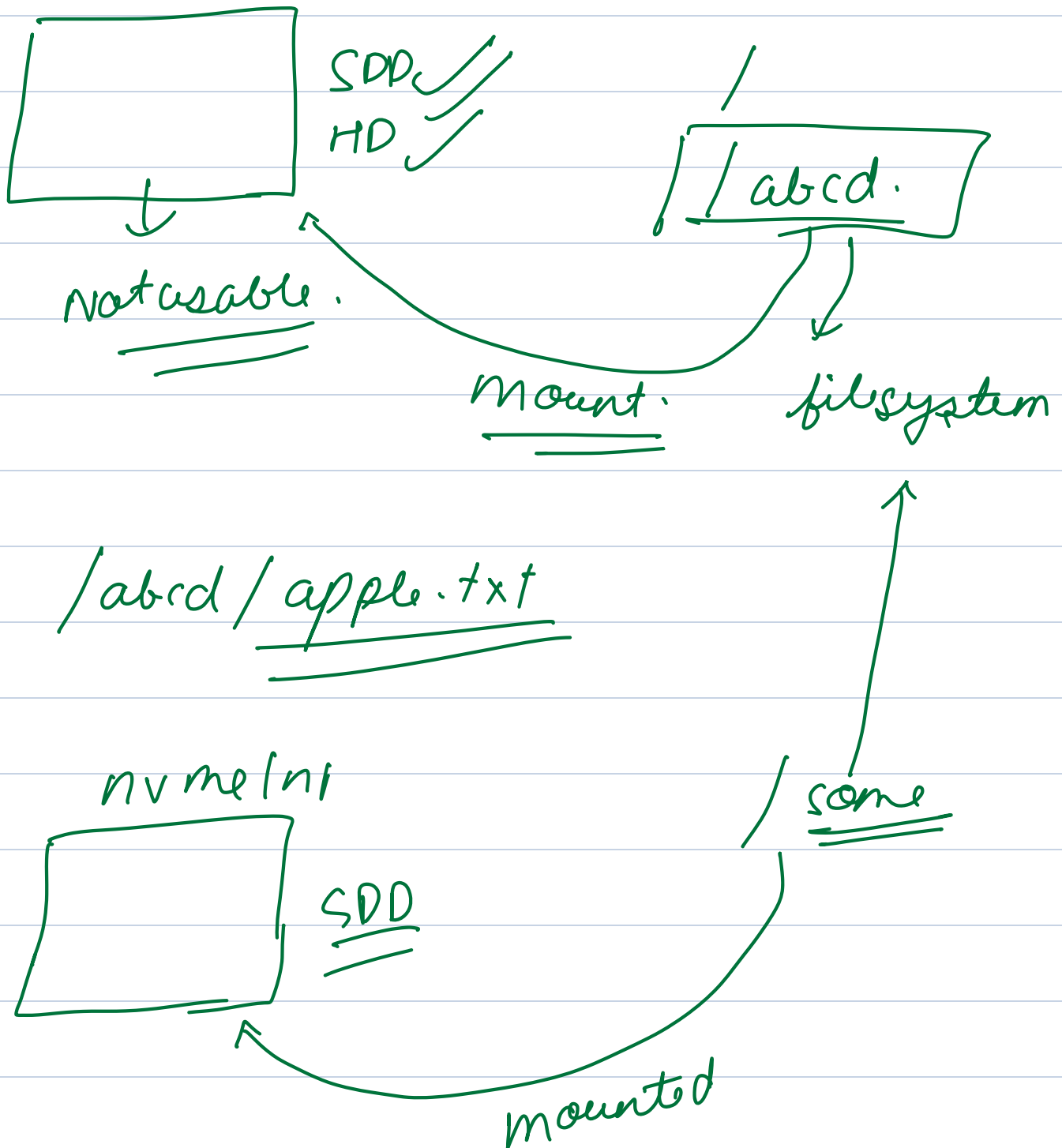
→ delayed file allocation.

→ ZFS

→ Btrfs

→ FAT32

→ tmpfs → temporary file system
(resides on the RAM)



/some/ appl. 1x1

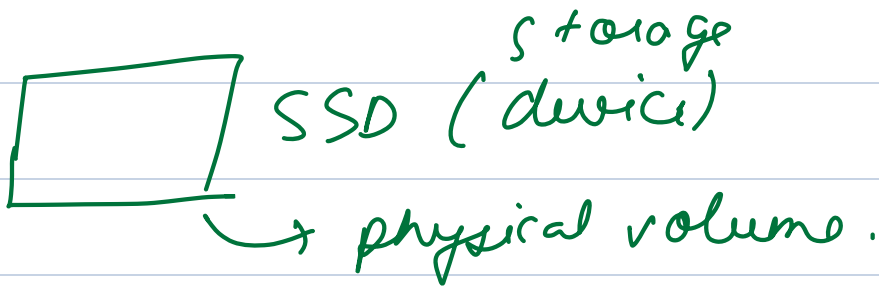
EFIVARS.

EFI → Extensible Firmware
interface.

BIOS → UEFI
↓
legacy.

↓
new modern version.

LVM. Logical volume manager.



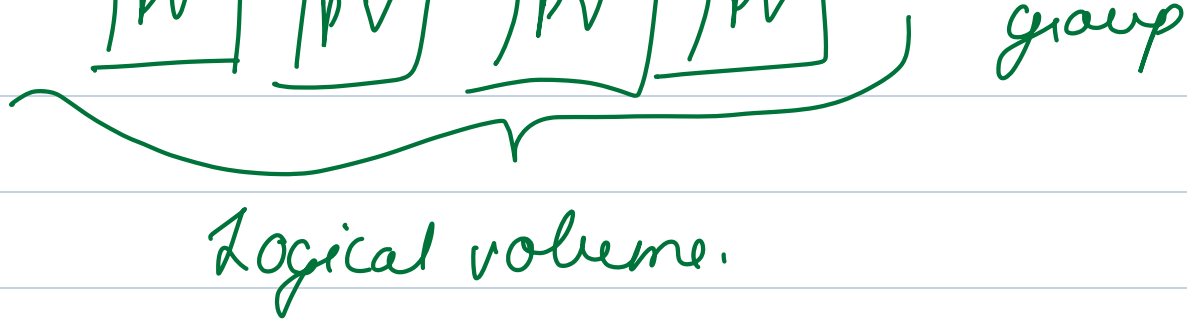
① Physical volume

② volume group

③ Logical volume.

collection of physical
volumes





****Physical Volume (PV)**:** The actual physical storage devices or partitions that you use in LVM. These can be hard disks, SSDs, or partitions.

- ****Volume Group (VG)**:** A collection of physical volumes.

- You can think of a volume group as a pool of storage from which logical volumes can be created.

- ****Logical Volume (LV)**:** A virtual partition created from the space in a volume group.

- Logical volumes can be resized, moved, and managed independently of the underlying physical volumes.

LVM and Mounting Demo

Create Physical Volume

```
sudo pvcreate /dev/nvme1n1
```

Physical volume "/dev/nvme1n1" successfully created.

Create Volume Group

```
sudo vgcreate myvg /dev/nvme1n1
```

Create Logical Volume

```
sudo lvcreate -n mylv -L 5G myvg
```

```
sudo lvcreate -n mylv1 -L 2G myvg
```

****Resize a Logical Volume****: To resize a logical volume:

```
sudo lvresize -L +1G /dev/myvg/mylv # Increase by 5GB
```

```
sudo lvresize -L -1G /dev/myvg/mylv # Decrease by 5GB
```

Format the logical volume

```
1. sudo mkfs.ext4 /dev/myvg/mylv
```

5. Create a mount point

```
1. sudo mkdir /mnt/mylv
```

6. Mount the logical volume

```
1. sudo mount /dev/myvg/mylv /mnt/mylv
```

7. Verify the mount

```
1. df -h # or lsblk
```

8. touch /mnt/mylv/test.txt

to unmount



umount

Thanks! 😊