Linux Disk Management (Basic to Advanced)

Disk management in Linux refers to managing storage devices such as HDDs, SSDs, and USB drives. Linux treats everything as a file, including devices, which are usually located in the /dev directory (e.g., /dev/sda, /dev/sdb1).

Common tasks include checking disk space, partitioning, formatting, mounting/unmounting, and checking file systems.

Common Disk Management Tasks in Linux

Task: View disk space usage

Description: See how much space is used on mounted file systems

Example Command: df -h

Task: Check directory size

Description: See space used by a specific folder

Example Command: du -sh /home/user

Task: List block devices

Description: View all disks, partitions, and their mount points

Example Command: lsblk

Task: List partitions

Description: Detailed info about partitions

Example Command: fdisk -l

Task: Partition a disk

Description: Create or modify partitions

Example Command: fdisk /dev/sdb or parted /dev/sdb

Task: Format a partition

Description: Create a file system on a partition

Example Command: mkfs.ext4 /dev/sdb1

Task: Mount a partition

Description: Attach a device to the Linux file system

Example Command: mount /dev/sdb1 /mnt

Task: Unmount a partition

Description: Detach a device from the system

Example Command: umount /mnt

Task: Enable swap

Description: Use a partition or file as virtual memory

Example Command: swapon /dev/sdb2

Task: Check file system

Description: Scan and repair file system issues

Example Command: fsck /dev/sdb1

Useful Tools for Disk Management

CLI Tools:

- fdisk, parted, lsblk, df, du, mount, umount, mkfs, fsck, blkid

GUI Tools:

- GParted: A graphical tool for partitioning (install with: sudo apt install gparted)

Understanding Mount and Unmount in Linux

Mounting is the process of attaching a storage device (like a disk or partition) to a directory in the Linux file system. This makes the device accessible to the system and users. For example, mounting /dev/sdb1 to /mnt/mydrive allows access to its contents via that directory.

Unmounting is the opposite: it detaches the device from the mount point, ensuring all data is saved before the device is removed, preventing data loss.

Example Mount:

```
sudo mount /dev/sdb1 /mnt/mydrive
```

Example Unmount:

```
sudo umount /mnt/mydrive
```

To automatically mount devices on boot, entries can be added to /etc/fstab, like:

```
/dev/sdb1  /mnt/mydrive  ext4  defaults  0  2
```

Mounting ensures accessibility, while unmounting ensures data safety before removal.