Linux Disk Management

This document covers practical disk management tasks: viewing disks, partitioning, formatting, mounting, filesystem checks, and LVM (Logical Volume Manager) basics. Examples show command input and realistic outputs.

Viewing disks and usage

```
$ lsblk
NAME MAJ:MIN RM SIZE RO TYPE MOUNTPOINT
sda 8:0 0 100G 0 disk
■■sda1 8:1 0 1G 0 part /boot
■■sda2 8:2 0 99G 0 part /
sdb 8:16 0 500G 0 disk
```

Lists block devices, partitions and mount points.

```
$ blkid
/dev/sda1: UUID="a1b2c3d4-1111-2222-3333-abcdef123456" TYPE="ext4"
/dev/sda2: UUID="b2c3d4e5-4444-5555-6666-fedcba654321" TYPE="ext4"
```

Shows filesystem UUIDs and types for devices.

```
$ df -h
Filesystem Size Used Avail Use% Mounted on
/dev/sda2 99G 12G 82G 13% /
tmpfs 1.9G 0 1.9G 0% /run
```

Reports disk space usage in human-readable format.

```
$ du -sh /var/log
1.2G /var/log
```

Shows disk usage of a directory (summarized).

Mounting and filesystems

```
$ sudo mount /dev/sdb1 /mnt/backup
$ ls /mnt/backup
backup.tar.gz logs/
```

Mounts device /dev/sdb1 to /mnt/backup and lists contents.

```
$ sudo umount /mnt/backup
# (no output on success)
```

Unmounts the filesystem; successful unmount usually returns no output.

```
$ sudo mkfs.ext4 /dev/sdb1
mke2fs 1.45.6 (20-Mar-2020)
Creating filesystem with 131072 4k blocks and 32768 inodes
```

Creates an ext4 filesystem on the partition. Be careful: this erases data.

```
$ sudo tune2fs -l /dev/sda1
Filesystem volume name:
```

```
Last mount time: Wed Oct 29 10:00:00 2025
```

Shows ext2/3/4 filesystem parameters and last mount time.

Partitioning with fdisk (example flow)

```
$ sudo fdisk /dev/sdb
Welcome to fdisk (util-linux 2.34).
Command (m for help): n
Partition type
p primary (0 primary, 0 extended, 4 free)
Select (default p): p
Partition number (1-4, default 1): 1
First sector (2048-976773167, default 2048):
Last sector, +sectors or +size{K,M,G,T,P} (2048-976773167, default 976773167): +100G
Created a new partition 1 of type 'Linux' and of size 100 GiB.
Command (m for help): w
Partition table has been altered.
Calling ioctl() to re-read partition table.
```

Interactive fdisk session to create a new primary partition on /dev/sdb (100G). 'w' writes the table to disk.

Partitioning with parted (GPT & alignments)

```
$ sudo parted /dev/sdb --script mklabel gpt mkpart primary ext4 1MiB 100GiB
Information: You may need to update /etc/fstab.
$ sudo parted /dev/sdb print
Model: ATA VBOX HARDDISK (scsi)
Disk /dev/sdb: 536GB
Number Start End Size File system Name Flags
1 1049kB 107GB 107GB ext4
```

parted is preferred for GPT disks and scripting partition changes non-interactively.

Checking and repairing filesystems

```
$ sudo fsck -f /dev/sdb1
fsck from util-linux 2.34
e2fsck 1.45.6 (20-Mar-2020)
Pass 1: Checking inodes, blocks, and sizes
Pass 2: Checking directory structure
/dev/sdb1: ***** FILE SYSTEM WAS MODIFIED *****
```

Runs filesystem check and repair; it prompts or fixes issues depending on flags used.

LVM (Logical Volume Manager) basics

```
$ sudo pvcreate /dev/sdc1
Physical volume "/dev/sdc1" successfully created.
```

Initialize a physical partition as an LVM PV.

```
$ sudo vgcreate vg_data /dev/sdc1
Volume group "vg_data" successfully created
```

Create a volume group named 'vg_data' from physical volumes.

```
$ sudo lvcreate -n lv_storage -L 50G vg_data
Logical volume "lv_storage" created.
```

Create a logical volume 'lv_storage' of size 50G inside 'vg_data'.

```
$ sudo mkfs.ext4 /dev/vg_data/lv_storage
# create filesystem on the logical volume
```

Format the logical volume with ext4 filesystem.

```
$ sudo mount /dev/vg_data/lv_storage /mnt/storage
$ df -h | grep storage
/dev/mapper/vg_data-lv_storage 50G 1G 49G 2% /mnt/storage
```

Mount the LV and verify available space.

```
$ sudo lvextend -L +10G /dev/vg_data/lv_storage
Size of logical volume vg_data/lv_storage changed from 50.00 GiB (12800 extents) to 60.00
GiB (15360 extents).
$ sudo resize2fs /dev/vg_data/lv_storage
resize2fs 1.44.1 (24-Mar-2018)
Filesystem resized.
```

Extend LV size and resize filesystem to use new space.

Disk health: SMART (smartctl)

```
$ sudo smartctl -H /dev/sda
=== START OF READ SMART DATA SECTION ===
SMART overall-health self-assessment test result: PASSED
```

Checks drive health; 'PASSED' indicates no immediate failure detected.