Linux Storage & Partition Management

Hands-On Guide (Beginner → Practical)

1. What is Disk Partitioning?

A **disk** is the physical storage device (e.g., `C:`, `/dev/sda`, `/dev/sdb`).
A **partition** is a logical section of that disk (e.g., `/dev/sda1`).

Why we partition:

1. Organize data
2. Use different filesystems
3. Improve system management
4. Separate OS and data

2. MBR vs GPT (Important — Don't Skip)

MBR (Master Boot Record)

- Old partitioning system
- Maximum disk size: **2 TB**
- Maximum **4 primary partitions**
- Not recommended for modern systems

GPT (GUID Partition Table)

- Modern standard
- Supports very large disks
- Allows many partitions
- Required for **UEFI**
- Has backup partition table (more reliable)

⚠ Use GPT unless you have a very old system.

3. Viewing Disks and Partitions

Before touching anything, **identify the disk**:

```
lsblk
fdisk -l
```

Example output:

- Disk: `/dev/sdb`
- Partition: `/dev/sdb1`

⚠ Never guess disk names. Guessing = data loss.

4. Creating a GPT Partition

Assume the new disk is `/dev/sdb`.

```
fdisk /dev/sdb
```

Inside `fdisk`:

1. Type `g` → create GPT partition table
2. Type `n` → create new partition
3. Press Enter to accept defaults
4. Type `w` → write changes

Verify:

```
lsblk
```

You should see `/dev/sdb1`.

5. Creating a Filesystem (ext4)

A partition is useless without a filesystem.

```
mkfs.ext4 /dev/sdb1
```

This formats the partition as **ext4** (most common Linux filesystem).

⚠ **Warning:** This **erases all data** on that partition.

6. Mounting the Partition

Create a mount point:

```
mkdir /mnt/mydisk1
```

Mount manually:

```
mount /dev/sdb1 /mnt/mydisk1
```

Check:

```
df -h
```

If you see `/mnt/mydisk1`, it worked.

7. Automounting with `/etc/fstab`

Manual mount disappears after reboot. For permanent mount, use **UUID**.

Get UUID:

```
blkid /dev/sdb1
```

Example:

```
UUID="a1b2c3d4-xxxx-xxxx-xxxx-xxxxxxxx"
```

Edit fstab:

```
nano /etc/fstab
```

Add this line:

```
UUID=a1b2c3d4-xxxx-xxxx-xxxx-xxxxxxxx  /mnt/mydisk1  ext4  defaults  0  2
```

Test (VERY IMPORTANT):

```
mount -a
```

- If there are **no errors**, automount is correct.
- ❌ Skipping `mount -a` and rebooting is asking for trouble.

8. Deleting a Partition

Unmount first:

```
umount /mnt/mydisk1
```

Delete partition:

```
fdisk /dev/sdb
```

Inside `fdisk`:

1. Type `d` → delete partition
2. Type `w` → write changes

Confirm:

```
lsblk
```

Partition is gone.

9. Common Beginner Mistakes (Read This Twice)

- Formatting the **wrong disk**
- Using `/dev/sdb1` in fstab instead of UUID
- Forgetting to create mount directory
- Not testing fstab with `mount -a`
- Thinking partition = filesystem (it’s not)