BREAKDOWN:

1. **WHAT IS LVM**
2. **KEY FEATURES OF LVM**
3. **BASIC LVM TERMINOLOGY**
4. **COMMON LINUX FOR DISK MANAGEMENT**
5. **LVM COMMANDS IN CONTEXT**

1) What is LVM?

LVM (Logical Volume Manager) is a tool for managing storage on Linux systems. It allows you to create, resize, and manage storage flexibly. Instead of dealing with fixed partitions, LVM lets you create logical volumes that can be resized or moved without affecting the data**.**

2) Key Features of LVM:

Flexibility: You can expand or shrink storage easily.
Snapshots: Capture the current state of your data for backups.
Scalability: Manage multiple disks as one logical storage.

Basic LVM Terminology:

Physical Volume (PV): Represents physical storage (like disks or partitions).

- Example: /dev/sda1

Volume Group (VG): Combines multiple physical volumes into one storage pool.

- Example: vg_data

Logical Volume (LV): Acts like a partition but is flexible.

- Example: /dev/vg_data/lv_app1

Common Linux Commands for Disk Management:

1. lsblk (List Block Devices):

Displays information about block devices (disks and partitions).

- Usage: lsblk
- Details:
  - Shows the device name, size, and mount point.
  - Example:

```
NAME   MAJ:MIN RM   SIZE RO TYPE MOUNTPOINT
sda      8:0    0   50G  0 disk
├─sda1   8:1    0   10G  0 part /
├─sda2   8:2    0   20G  0 part /data
└─sda3   8:3    0   20G  0 part /backup
```

2. lsblk -l (List Block Devices in Long Format):

Provides detailed, line-by-line information about block devices.

- Usage: lsblk -l
- Details: Each block device is listed in a tabular format.

3. free (Show Memory Usage):

Displays memory usage (RAM and swap).

- Usage: free
- Details:
  - Columns: Total, Used, Free, Shared, Buff/Cache, Available.
  - Example:

```
total        used        free      shared  buff/cache   available
Mem:       3882968     1240964     1791068      122352      850936     2239988
```

4. free -h (Human-Readable Format):

Displays memory usage in a more understandable format (e.g., GB/MB).

- Usage: free -h
- Details:
  - Example:

```
total        used        free      shared  buff/cache   available
Mem:          3.7G        1.2G        1.8G        120M        850M        2.2G
```

5. df (Disk Free):

Shows available and used disk space for file systems.

- Usage: df
- Details:
  - Example:

```
Filesystem     1K-blocks    Used Available Use% Mounted on
/dev/sda1       41943040  2048000  39995040   5% /
```

6. df -h (Human-Readable Disk Usage):

Same as df but displays sizes in GB/MB.

- Usage: df -h

7. mount (List Mounted File Systems):

Shows file systems currently mounted and their mount points.

- Usage: mount
- Details:
  - Example:

```
/dev/sda1 on / type ext4 (rw,relatime)
```

8. umount (Unmount a File System):

Used to unmount a mounted file system.

- Usage: umount <mount_point>

9. more (View File Contents):

Allows you to view large files one screen at a time.

- Usage: more <file>

10. fdisk (Partition Manager):

Used to create, delete, or modify disk partitions.

- Usage: sudo fdisk /dev/sda
- Details:
    - Type m for help inside the fdisk menu.

11. mkfs (Make File System):

Used to format a disk or partition.

- Usage: sudo mkfs.ext4 /dev/sda1

12. blkid (Block ID):

Displays UUID and type of file systems on block devices.

- Usage: sudo blkid

13. pvcreate (Create Physical Volume):

Initializes a disk or partition for use with LVM.

- Usage: sudo pvcreate /dev/sdb

14. vgcreate (Create Volume Group):

Combines physical volumes into a volume group.

- Usage: sudo vgcreate vg_data /dev/sdb

15. lvcreate (Create Logical Volume):

Creates a logical volume within a volume group.

- Usage: sudo lvcreate -L 1G -n lv_app1 vg_data

LVM Commands in Context:

1. **Initialize LVM:**

   sudo pvcreate /dev/sdb
   sudo vgcreate vg_data /dev/sdb
   sudo lvcreate -L 1G -n lv_app1 vg_data

2. **Format and Mount:**

   mkdir /mnt/app1
   sudo mkfs.ext4 /dev/vg_data/lv_app1
   sudo mkdir /mnt/app1
   sudo mount /dev/vg_data/lv_app1 /mnt/app1

3. **Check Mounted Devices:**

   df -h
   lsblk