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Task 3 : LVM Commands In CentOS

- LVM (Logical Volume Manager)in Linux is a system for managing disk storage
- LVM provides flexibility and control over how storage is allocated, resized, and used.
- It allows you to combine multiple physical storage devices into a single logical unit, which can be resized dynamically and managed more easily than traditional partitions.

Key Concepts of LVM

1. **Physical Volume (PV)**: These are the actual storage devices or partitions (e.g., /dev/sda1, /dev/sdb) that are used in LVM. Physical volumes are initialized using the pvcreate command.
2. **Volume Group (VG)**: A volume group is created by combining one or more physical volumes. The volume group acts as a storage pool from which logical volumes are created. This can be dynamically resized by adding or removing physical volumes. VGs are created using the vgcreate command.
3. **Logical Volume (LV)**: Logical volumes are created from the storage available in a volume group. These are analogous to partitions but are much more flexible. You can resize them, create snapshots, or even strip across multiple physical devices. LVs are created using the lvcreate command.
4. **Physical Extents (PE)**: Physical volumes are divided into fixed-size chunks called physical extents. The size of these extents is determined when the volume group is created. Logical volumes are composed of these extents.
5. **Logical Extents (LE)**: Logical volumes are also divided into logical extents, which map one-to-one with physical extents.

Advantages of Using LVM

- **Flexible Resizing**: You can increase or decrease the size of logical volumes dynamically without needing to unmount them.
- **Snapshots**: LVM allows you to create snapshots of a logical volume, which is useful for backups and testing.
- **Pooling Storage**: You can combine multiple physical disks or partitions into a single logical volume group, allowing for better utilization of disk space.
- **Redundancy and Striping**: LVM can be combined with RAID to offer redundancy or striping for performance improvement.

vgcreate techmpst /dev/sdb /dev/sdc :

It creates a Volume Group (VG) named techmpst by combining the three physical volumes /dev/sdb, /dev/sdc, and /dev/sdd. This volume group pools the storage from these disks, allowing you to create flexible logical volumes (LVs) on top of it.

Result:

```
[root@localhost ~]# vgcreate techmpst /dev/sdb/ /dev/sdc /dev/sdd
  No device found for /dev/sdb/.
  Command requires all devices to be found.
[root@localhost ~]# vgcreate techmpst /dev/sdb /dev/sdc /dev/sdd
  Volume group "techmpst" successfully created
```

Vgdisplay :

The vgdisplay command in LVM provides detailed information about volume groups, including their name, size, free space, and physical extent details. It displays whether the volume group is allocatable, the number of physical extents (PEs), and the unique identifier (UUID) of the volume group. This helps in monitoring and managing storage pools created from physical volumes.

```
[root@localhost ~]# vgdisplay
  --- Volume group ---
  VG Name               techmpst
  System ID
  Format                lvm2
  Metadata Areas        3
  Metadata Sequence No  1
  VG Access             read/write
  VG Status             resizable
  MAX LV                0
  Cur LV                0
  Open LV               0
  Max PV                0
  Cur PV                3
  Act PV                3
  VG Size               <59.99 GiB
  PE Size               4.00 MiB
  Total PE              15357
  Alloc PE / Size       0 / 0
  Free  PE / Size       15357 / <59.99 GiB
  VG UUID               BHWLW6-kWK7-UcHg-YbVr-89Jo-cJyu-drqt3H

  --- Volume group ---
  VG Name               cs
```

lvcreate :

It is used to create a Logical Volume (LV) named sales with a size of 8000MB (8GB) from the Volume Group (VG) named techmpst. The -L 8000 option specifies the desired size for the logical volume, while the -n sales optionsets its name. Importantly, there is no need to specify the individual physical volumes (such as /dev/sdb, /dev/sdc, or /dev/sdd) again, as they are already included in the techmpst volume group. After executing this command, the logical volume can be formatted with a filesystem and mounted for use in yoursystem.
In the same manner,

lvcreate -L 8000 techmpst -n mkt /dev/sdb /dev/sdc /dev/sdd

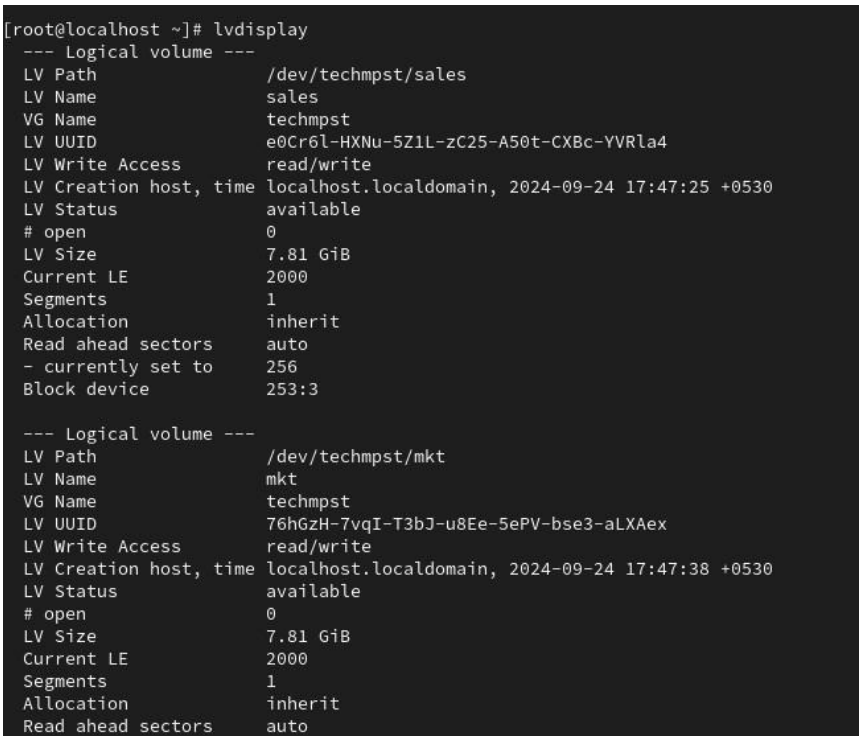
lvcreate -L 4000 techmpst -n IT /dev/sdb /dev/sdc /dev/sdd

lvcreate -L 4000 techmpst -n researchdept /dev/sdb /dev/sdc /dev/sdd

```
[root@localhost ~]# lvcreate -L 8000 techmpst -n sales /dev/sdb /dev/sdc /dev/sdd
  Logical volume "sales" created.
[root@localhost ~]# lvcreate -L 8000 techmpst -n mkt /dev/sdb /dev/sdc /dev/sdd
  Logical volume "mkt" created.
[root@localhost ~]# lvcreate -L 4000 techmpst -n IT /dev/sdb /dev/sdc /dev/sdd
  Logical volume "IT" created.
```

lvdisplay :

It is used to show detailed information about logical volumes (LVs) in LVM (Logical Volume Manager). When executed, it provides a summary of each logical volume, including its name, the volume group it belongs to, the device path, size, number of allocated and current logical extents, type, access permissions, status, creation time, and unique identifier (UUID).



```
[root@localhost ~]# lvdisplay
  --- Logical volume ---
  LV Path                /dev/techmpst/sales
  LV Name                sales
  VG Name                techmpst
  LV UUID                e0Cr6l-HXNu-5Z1L-zC25-A50t-CXBc-YVRla4
  LV Write Access        read/write
  LV Creation host, time localhost.localdomain, 2024-09-24 17:47:25 +0530
  LV Status              available
  # open                 0
  LV Size                7.81 GiB
  Current LE             2000
  Segments               1
  Allocation             inherit
  Read ahead sectors     auto
  - currently set to     256
  Block device           253:3

  --- Logical volume ---
  LV Path                /dev/techmpst/mkt
  LV Name                mkt
  VG Name                techmpst
  LV UUID                76hGzH-7vqI-T3bJ-u8Ee-5ePV-bse3-aLXAex
  LV Write Access        read/write
  LV Creation host, time localhost.localdomain, 2024-09-24 17:47:38 +0530
  LV Status              available
  # open                 0
  LV Size                7.81 GiB
  Current LE             2000
  Segments               1
  Allocation             inherit
  Read ahead sectors     auto
```

mkdir /sales /mkt /IT /researchdept:

It creates four directories in the root filesystem: /sales, /mkt, /IT, and /researchdept. Each directory serves as a separate folder for organizing files and data related to their respective departments or purposes.

Breakdown of the Command:

mkdir: Stands for "make directory," which is the command used to create new directories.

/sales: Creates a directory named sales.

/mkt: Creates a directory named mkt (possibly for marketing).

/IT: Creates a directory named IT (for information technology).

/researchdept: Creates a directory named researchdept (for the research

department).

mount -a /techmpst /sales /sales

Breakdown of the Commands:

mount -a:

This command mounts all filesystems listed in the /etc/fstab file that are not currently mounted. It does not require any additional parameters.

mount /dev/techmpst /sales:

This command mounts the logical volume located at /dev/techmpst to the directory /sales. Make sure that the /sales directory exists before you attempt to mount.

The same manner,

mount -a /techmpst /mkt /mkt

mount -a /techmpst /IT /IT

mount -a /techmpst /researchdept / researc