Linux Volume Management (LVM)

Sudo su: The command is used to switch to the root user.

❖ Task 1: Check current storage

Run: lsblk , pvs, vgs, lvs, df –h

Lsblk: List block devices. lsblk lists information about all available or the specified block devices. The lsblk command reads the sysfs filesystem and udev db to gather information.

```
root@ip-172-31-33-244:/mnt/data# lsblk
NAME         MAJ:MIN RM  SIZE RO TYPE MOUNTPOINTS
loop0          7:0    0 27.6M  1 loop /snap/amazon-ssm-agent/11797
loop1          7:1    0   74M  1 loop /snap/core22/2163
loop2          7:2    0   74M  1 loop /snap/core22/2292
loop3          7:3    0 48.1M  1 loop /snap/snapd/25935
loop4          7:4    0 27.8M  1 loop /snap/amazon-ssm-agent/12322
loop5          7:5    0 50.9M  1 loop /snap/snapd/25577
loop6          7:6    0    1G  0 loop
nvme0n1      259:0    0   20G  0 disk
├─nvme0n1p1  259:1    0   19G  0 part /
├─nvme0n1p14 259:2    0    4M  0 part
├─nvme0n1p15 259:3    0  106M  0 part /boot/efi
└─nvme0n1p16 259:4    0  913M  0 part /boot
nvme1n1      259:5    0   10G  0 disk
```

Pvs : Display information about physical volumes.

```
lvm> pvdisplay
  --- Physical volume ---
  PV Name               /dev/nvme2n1
  VG Name               devops-vg
  PV Size               12.00 GiB / not usable 4.00 MiB
  Allocatable           yes
  PE Size               4.00 MiB
  Total PE              3071
  Free PE               3071
  Allocated PE          0
  PV UUID               AKTIH1-GanA-dSYP-Jf6K-5lAv-sXbT-I0vJdY
```

Vgs : Display information about volumes groups.

```
lvm> vgcreate devops-vg /dev/nvme2n1
  Volume group "devops-vg" successfully created
lvm> vgs
  VG         #PV #LV #SN Attr   VSize   VFree
  devops-vg    1   0   0 wz--n- <12.00g <12.00g
```

Lvs : Display information about logical volumes.

```
lvm> lvs
  LV       VG        Attr       LSize   Pool Origin Data%  Meta%  Move Log Cpy%Sync Convert
  app-data devops-vg -wi-a----- 500.00m
```

Df –h: report free disk space '–h' print sizes in powers of 1024.

```
root@ip-172-31-33-244:~# df -h /mnt/app-data
Filesystem                         Size  Used Avail Use% Mounted on
/dev/mapper/devops--vg-app--data  452M   24K  417M   1% /mnt/app-data
root@ip-172-31-33-244:~#
```

❖ Task 2: Create Physical Volume

Pvcreate: Initialize physical volumes for use by LVM.

```
lvm> pvcreate /dev/nvme2n1
  Physical volume "/dev/nvme2n1" successfully created.
lvm> vgcreate
```

❖ Task 3: Create Volume Group

Vgcreate: create a volume group.

```
lvm> vgcreate devops-vg /dev/nvme2n1
  Volume group "devops-vg" successfully created
lvm> vgs
  VG        #PV #LV #SN Attr   VSize   VFree
  devops-vg   1   0   0 wz--n- <12.00g <12.00g
```

❖ Task 4: Create Logical Volume

Lvcreate -L 500 –n app-data devops-vg

Lvs

```
lvm> lvcreate -L 500M -n app-data devops-vg
  Logical volume "app-data" created.
lvm> lvs
  LV       VG        Attr       LSize   Pool Origin Data%  Meta%  Move Log Cpy%Sync Convert
  app-data devops-vg -wi-a----- 500.00m
```

❖ Task 5: Format and Mount

Mkfs.ext4 /dev/devops-vg/app-data

Mkfs.ext4 makes filesystem utility that formats a partition, volume with the 'ext4' filesystem /dev/devops-vg/app-data target logical volume path. This command formats the logical volume, creating an 'ext4' filesystem structure on it.

```
root@ip-172-31-33-244:~# mkfs.ext4 /dev/devops-vg/app-data
mke2fs 1.47.0 (5-Feb-2023)
Creating filesystem with 128000 4k blocks and 128000 inodes
Filesystem UUID: 912d3292-a4a6-479d-a52b-65fff642725e
Superblock backups stored on blocks:
        32768, 98304

Allocating group tables: done
Writing inode tables: done
Creating journal (4096 blocks): done
Writing superblocks and filesystem accounting information: done
```

Mkdir –p /mnt/app-data: Create the directory in the root_user. To mount the filesystems or store application data that may be mounted from external sources.

```
root@ip-172-31-33-244:~# mkdir -p /mnt/app-data
root@ip-172-31-33-244:~#
```

Mount /dev/devops-vg/app-data /mnt/app-data: This command assumes the LV has already been created and formatted. To make data stored on LV available to the system.

```
root@ip-172-31-33-244:~# mount /dev/devops-vg/app-data /mnt/app-data
mount: (hint) your fstab has been modified, but systemd still uses
       the old version; use 'systemctl daemon-reload' to reload.
root@ip-172-31-33-244:~#
```

Df –h /mnt/app-data: report free disk space '–h' print sizes in powers of 1024.

```
root@ip-172-31-33-244:~# df -h /mnt/app-data
Filesystem                      Size  Used Avail Use% Mounted on
/dev/mapper/devops--vg-app--data  452M   24K  417M   1% /mnt/app-data
root@ip-172-31-33-244:~#
```

❖ Task 6: Extend the volume

Lvextend –L +200M /dev/devops-vg/app-data

Lvextend: to extend a logical volume in LVM

-L +200M: add 200 mb to the current size.

/dev/devops-vg/app-data: The path to the logical volume to be extended.

```
root@ip-172-31-33-244:~# lvextend -L +200M /dev/devops-vg/app-data
  Size of logical volume devops-vg/app-data changed from 500.00 MiB (125 extents) to 700.00 MiB (175 extents).
  Logical volume devops-vg/app-data successfully resized.
root@ip-172-31-33-244:~#
```

Resize2fs /dev/devops-vg/app-data: This command will adjust the filesystem to the maximum available size of the logical volume.

```
root@ip-172-31-33-244:~# resize2fs /dev/devops-vg/app-data
resize2fs 1.47.0 (5-Feb-2023)
Filesystem at /dev/devops-vg/app-data is mounted on /mnt/app-data; on-line resizing required
old_desc_blocks = 1, new_desc_blocks = 1
The filesystem on /dev/devops-vg/app-data is now 179200 (4k) blocks long.
```

Df –h /mnt/app-data: report free disk space '–h' print sizes in powers of 1024.

```
root@ip-172-31-33-244:~# df -h /mnt/app-data
Filesystem                        Size  Used Avail Use% Mounted on
/dev/mapper/devops--vg-app--data  637M   24K  594M   1% /mnt/app-data
root@ip-172-31-33-244:~#
```