

Day 13 – Linux Volume Management (LVM)

Objective

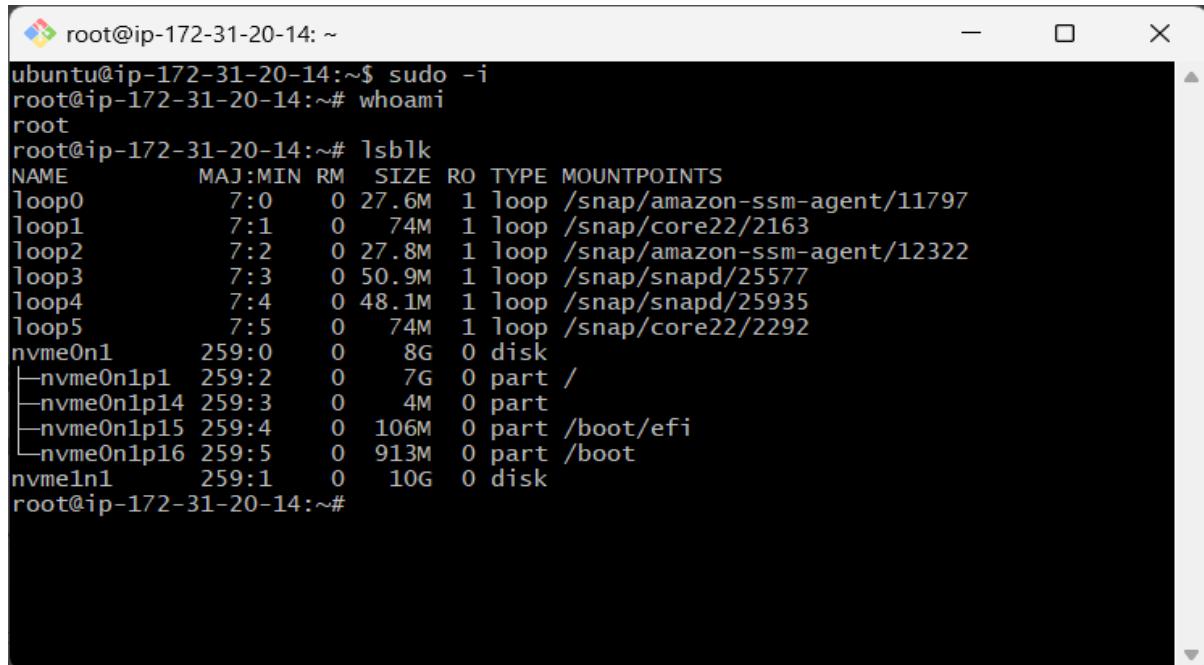
Practice Logical Volume Management by creating, mounting, and extending volumes on AWS EC2.

Commands Used

```
sudo -i
lsblk
pvcreate /dev/nvme2n1
pvs
vgcreate devops-vg /dev/nvme2n1
vgs
lvcreate -L 500M -n app-data devops-vg
lvs
mkfs.ext4 /dev/devops-vg/app-data
mount /dev/devops-vg/app-data /mnt/app-data
df -h
lvextend -L +200M /dev/devops-vg/app-data
resize2fs /dev/devops-vg/app-data
```

Screenshots of Outputs

Disk Detection



```
root@ip-172-31-20-14:~$ sudo -i
root@ip-172-31-20-14:~# whoami
root
root@ip-172-31-20-14:~# 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 27.8M  1 loop /snap/amazon-ssm-agent/12322
loop3       7:3    0 50.9M  1 loop /snap/snapd/25577
loop4       7:4    0 48.1M  1 loop /snap/snapd/25935
loop5       7:5    0   74M  1 loop /snap/core22/2292
nvme0n1    259:0   0   8G  0 disk
└─nvme0n1p1 259:2   0   7G  0 part /
  ├─nvme0n1p14 259:3   0   4M  0 part
  └─nvme0n1p15 259:4   0 106M 0 part /boot/efi
  └─nvme0n1p16 259:5   0 913M 0 part /boot
nvme1n1    259:1   0  10G  0 disk
root@ip-172-31-20-14:~#
```

Disk Usage and PV Status

```
root@ip-172-31-20-14: ~
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 27.8M  1 loop /snap/amazon-ssm-agent/12322
loop3      7:3    0 50.9M  1 loop /snap/snapd/25577
loop4      7:4    0 48.1M  1 loop /snap/snapd/25935
loop5      7:5    0 74M   1 loop /snap/core22/2292
nvme0n1    259:0 0 8G   0 disk
└─nvme0n1p1 259:2 0 7G   0 part /
└─nvme0n1p4 259:3 0 4M   0 part
└─nvme0n1p15 259:4 0 106M  0 part /boot/efi
└─nvme0n1p16 259:5 0 913M  0 part /boot
nvme1n1    259:1 0 10G  0 disk
root@ip-172-31-20-14:~# df -h
Filesystem      Size  Used Avail Use% Mounted on
/dev/root       6.8G  2.8G  4.0G  41% /
tmpfs          456M   0  456M  0% /dev/shm
tmpfs          183M  908K 182M  1% /run
tmpfs          5.0M   0  5.0M  0% /run/lock
efivars         128K  4.1K 119K  4% /sys/firmware/efi/efivars
/dev/nvme0n1p16 881M  156M 663M  20% /boot
/dev/nvme0n1p15 105M  6.2M  99M  6% /boot/efi
tmpfs          92M   12K  92M  1% /run/user/1000
root@ip-172-31-20-14:~# pvs|
```

Available Disks

```
ubuntu@ip-172-31-20-14: ~
ubuntu@ip-172-31-20-14:~$ 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 27.8M  1 loop /snap/amazon-ssm-agent/12322
loop3      7:3    0 50.9M  1 loop /snap/snapd/25577
loop4      7:4    0 48.1M  1 loop /snap/snapd/25935
loop5      7:5    0 74M   1 loop /snap/core22/2292
nvme0n1    259:0 0 8G   0 disk
└─nvme0n1p1 259:2 0 7G   0 part /
└─nvme0n1p4 259:3 0 4M   0 part
└─nvme0n1p15 259:4 0 106M  0 part /boot/efi
└─nvme0n1p16 259:5 0 913M  0 part /boot
nvme1n1    259:1 0 10G  0 disk
nvme2n1    259:6 0 2G   0 disk
ubuntu@ip-172-31-20-14:~$
```

Physical Volume Created

```
root@ip-172-31-20-14:~$ sudo -i
root@ip-172-31-20-14:~# pvcreate /dev/nvme2n1
  Physical volume "/dev/nvme2n1" successfully created.
root@ip-172-31-20-14:~# pvs
  PV          VG Fmt Attr PSize PFree
  /dev/nvme2n1    lvm2 ---  2.00g 2.00g
root@ip-172-31-20-14:~#
```

Logical Volume Extended

```
root@ip-172-31-20-14:~#
32768, 98304

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

Filesystem                      Size  Used Avail Use% Mounted on
/dev/mapper/devops--vg-app--data 452M   24K  417M   1% /mnt/app-data
root@ip-172-31-20-14:~# lvextend -L +200M /dev/devops-vg/app-data
resize2fs /dev/devops-vg/app-data
df -h /mnt/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.
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.

Filesystem                      Size  Used Avail Use% Mounted on
/dev/mapper/devops--vg-app--data 637M   24K  594M   1% /mnt/app-data
root@ip-172-31-20-14:~# |
```

What I Learned

1. LVM allows flexible storage management without affecting the main system.
2. Logical volumes can be extended dynamically without unmounting.
3. Filesystem resizing is required after extending volumes.