

Day 13 – Linux Volume Management (LVM)

Objective

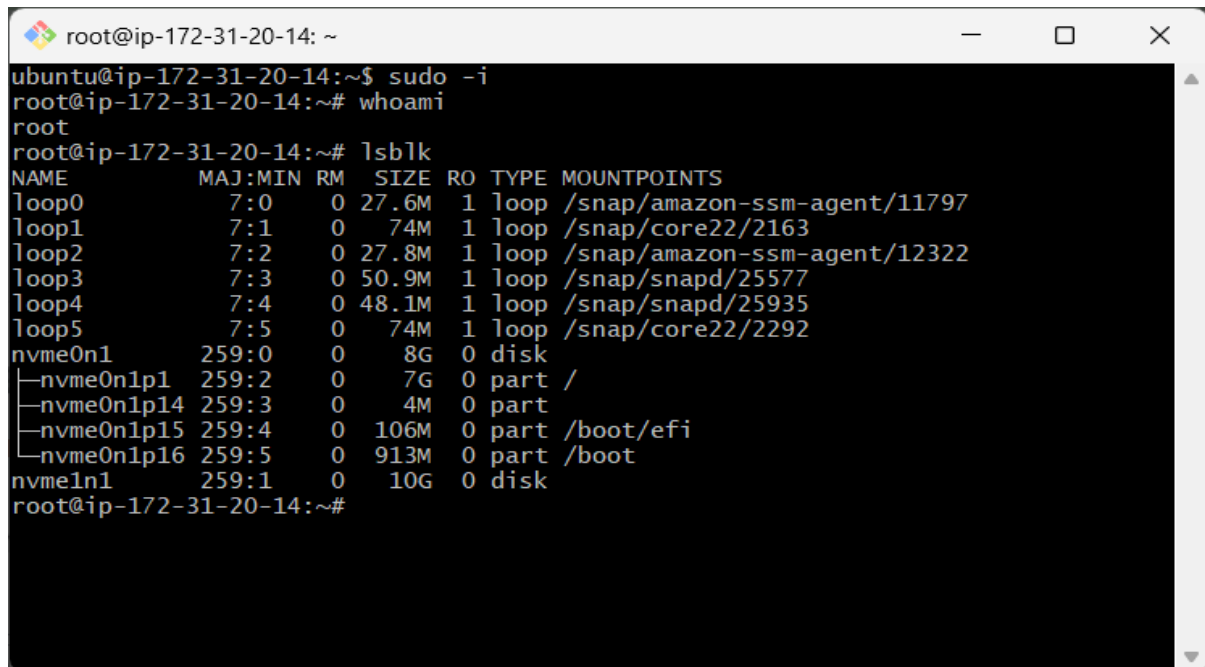
Practice Logical Volume Management by creating, mounting, and extending volumes on AWS EC2.

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: ~
ubuntu@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
```

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 /  
├─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:~# 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  
efivarfs 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 /  
├─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  
nvme2n1 259:6 0 2G 0 disk  
ubuntu@ip-172-31-20-14:~$
```

Physical Volume Created

```
root@ip-172-31-20-14: ~
ubuntu@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.