

Shehab Hossam

Using Loop devices, create 4 PVs

```
dd if=/dev/zero of=disk1.disk bs=1024 count=100000 // x4
```

```
sudo losetup -f /home/shehab/disk1.disk // x4
```

```
losetup | grep disk
```

```
disk1 -> loop12
```

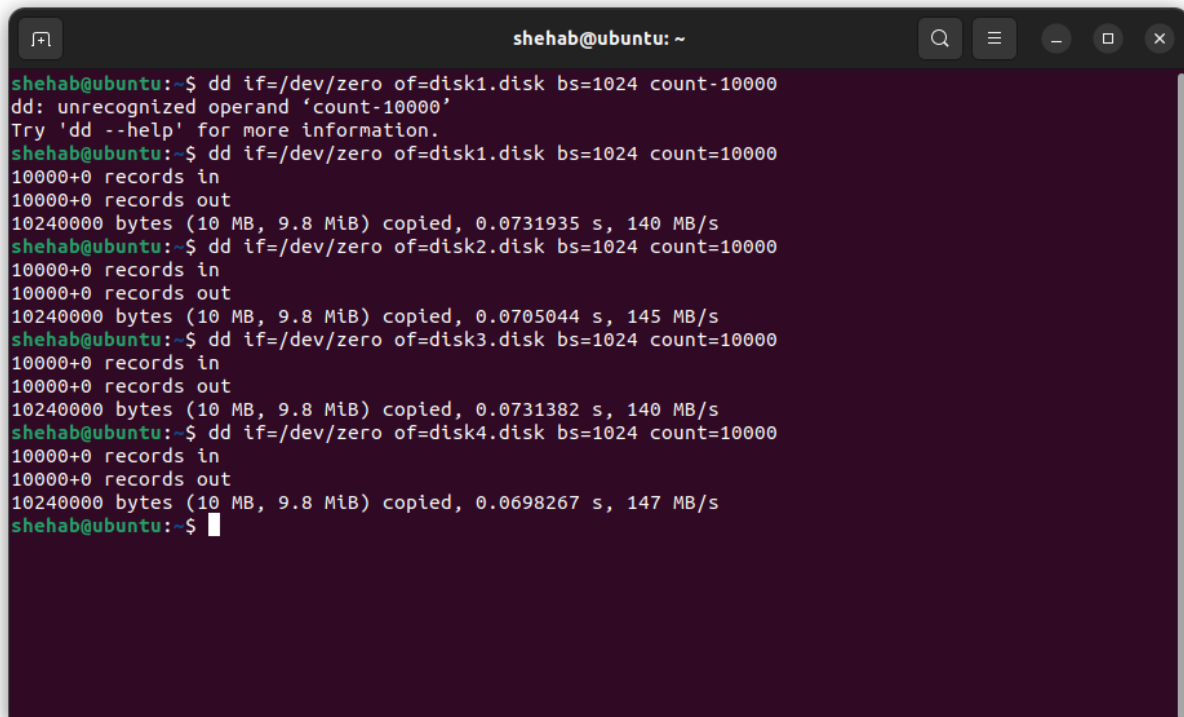
```
disk2 -> loop17
```

```
disk3 -> loop18
```

```
disk4 -> loop19
```

```
sudo pvcreate /dev/loop12 /dev/loop17
```

```
sudo pvcreate /dev/loop18 /dev/loop19
```



```
shehab@ubuntu: ~  
shehab@ubuntu:~$ dd if=/dev/zero of=disk1.disk bs=1024 count=10000  
dd: unrecognized operand 'count=10000'  
Try 'dd --help' for more information.  
shehab@ubuntu:~$ dd if=/dev/zero of=disk1.disk bs=1024 count=10000  
10000+0 records in  
10000+0 records out  
10240000 bytes (10 MB, 9.8 MiB) copied, 0.0731935 s, 140 MB/s  
shehab@ubuntu:~$ dd if=/dev/zero of=disk2.disk bs=1024 count=10000  
10000+0 records in  
10000+0 records out  
10240000 bytes (10 MB, 9.8 MiB) copied, 0.0705044 s, 145 MB/s  
shehab@ubuntu:~$ dd if=/dev/zero of=disk3.disk bs=1024 count=10000  
10000+0 records in  
10000+0 records out  
10240000 bytes (10 MB, 9.8 MiB) copied, 0.0731382 s, 140 MB/s  
shehab@ubuntu:~$ dd if=/dev/zero of=disk4.disk bs=1024 count=10000  
10000+0 records in  
10000+0 records out  
10240000 bytes (10 MB, 9.8 MiB) copied, 0.0698267 s, 147 MB/s  
shehab@ubuntu:~$
```

```
shehab@ubuntu: ~  
shehab@ubuntu:~$ man pvcreate  
shehab@ubuntu:~$ pvcreate /dev/loop12 /dev/loop17  
WARNING: Running as a non-root user. Functionality may be unavailable.  
/run/lock/lvm/P_global:aux: open failed: Permission denied  
shehab@ubuntu:~$ sudo pvcreate /dev/loop12 /dev/loop17  
Physical volume "/dev/loop12" successfully created.  
Physical volume "/dev/loop17" successfully created.  
shehab@ubuntu:~$ sudo pvcreate /dev/loop18 /dev/loop19  
Physical volume "/dev/loop18" successfully created.  
Physical volume "/dev/loop19" successfully created.  
shehab@ubuntu:~$
```

create VG and add 3 on PVs to it

```
sudo vgcreate vg1 /dev/loop12 /dev/loop17 /dev/loop18
```

create LV which has size of 250M

```
sudo lvcreate -L 250M vg1
```

```
shehab@ubuntu: ~  
shehab@ubuntu:~$ man lvm  
shehab@ubuntu:~$ man lvcreate  
shehab@ubuntu:~$ lvcreate -L 250M vg1  
WARNING: Running as a non-root user. Functionality may be unavailable.  
/dev/mapper/control: open failed: Permission denied  
Failure to communicate with kernel device-mapper driver.  
Incompatible libdevmapper 1.02.175 (2021-01-08) and kernel driver (unknown version).  
striped: Required device-mapper target(s) not detected in your kernel.  
Run 'lvcreate --help' for more information.  
shehab@ubuntu:~$ sudo !  
sudo: !: command not found  
shehab@ubuntu:~$ sudo lvcreate -L 250M vg1  
Rounding up size to full physical extent 252.00 MiB  
Logical volume "lvol0" created.  
shehab@ubuntu:~$ vgsdisplay  
WARNING: Running as a non-root user. Functionality may be unavailable.  
/run/lock/lvm/P_global:aux: open failed: Permission denied  
shehab@ubuntu:~$ sudo vgsdisplay  
--- Volume group ---  
VG Name          vg1  
System ID  
Format           lvm2  
Metadata Areas   3  
Metadata Sequence No 2  
VG Access        read/write  
VG Status        resizable  
MAX LV           0  
Cur LV          1  
Open LV          0  
Max PV           0  
Cur PV          3  
Act PV           3  
VG Size          288.00 MiB
```

format LV using ext4

mkfs.ext4 /dev/vg1/lvol0

```
shehab@ubuntu: ~  
Total PE          72  
Alloc PE / Size   63 / 252.00 MiB  
Free PE / Size    9 / 36.00 MiB  
VG UUID           V4xTdU-T1b3-PqUQ-4Srm-o4Ir-hS2x-sfr7cG  
  
shehab@ubuntu:~$ man df  
shehab@ubuntu:~$ df -h  
Filesystem      Size  Used Avail Use% Mounted on  
tmpfs           1021M  1.7M 1020M   1% /run  
/dev/sda3        24G   15G   7.9G  66% /  
tmpfs           5.0G   0   5.0G   0% /dev/shm  
tmpfs           5.0M  4.0K  5.0M   1% /run/lock  
/dev/sda2       512M   6.1M  506M   2% /boot/efi  
VMShared        932G  365G  567G  40% /media/sf_VMShared  
tmpfs           1021M  2.4M 1019M   1% /run/user/1000  
shehab@ubuntu:~$ mkfs.ext4 /dev/vg1/lvol0  
mke2fs 1.46.5 (30-Dec-2021)  
mkfs.ext4: Permission denied while trying to determine filesystem size  
shehab@ubuntu:~$ sudo mkfs.ext4 /dev/vg1/lvol0  
mke2fs 1.46.5 (30-Dec-2021)  
Discarding device blocks: done  
Creating filesystem with 64512 4k blocks and 64512 inodes  
Filesystem UUID: 4bf4150a-847a-487d-a403-18f0166f982c  
Superblock backups stored on blocks:  
32768  
  
Allocating group tables: done  
Writing inode tables: done  
Creating journal (4096 blocks): done  
Writing superblocks and filesystem accounting information: done  
  
shehab@ubuntu:~$ df -h  
Filesystem      Size  Used Avail Use% Mounted on
```

mount LV into /mnt directory

sudo mount /dev/vg1/lvol0 /mnt

```
shehab@ubuntu: ~  
tmpfs          5.0M  4.0K  5.0M   1% /run/lock  
/dev/sda2       512M  6.1M  506M   2% /boot/efi  
VMShared        932G  365G  567G  40% /media/sf_VMShared  
tmpfs          1021M  2.4M 1019M   1% /run/user/1000  
shehab@ubuntu:~$ mkfs.ext4 /dev/vg1/lvol0  
mke2fs 1.46.5 (30-Dec-2021)  
mkfs.ext4: Permission denied while trying to determine filesystem size  
shehab@ubuntu:~$ sudo mkfs.ext4 /dev/vg1/lvol0  
mke2fs 1.46.5 (30-Dec-2021)  
Discarding device blocks: done  
Creating filesystem with 64512 4k blocks and 64512 inodes  
Filesystem UUID: 4bf4150a-847a-487d-a403-18f0166f982c  
Superblock backups stored on blocks:  
        32768  
  
Allocating group tables: done  
Writing inode tables: done  
Creating journal (4096 blocks): done  
Writing superblocks and filesystem accounting information: done  
  
shehab@ubuntu:~$ df -h  
Filesystem      Size  Used Avail Use% Mounted on  
tmpfs           1021M  1.7M 1020M   1% /run  
/dev/sda3        24G   15G   8.1G  65% /  
tmpfs           5.0G    0   5.0G   0% /dev/shm  
tmpfs           5.0M  4.0K  5.0M   1% /run/lock  
/dev/sda2       512M  6.1M  506M   2% /boot/efi  
VMShared        932G  365G  567G  40% /media/sf_VMShared  
tmpfs          1021M  2.4M 1019M   1% /run/user/1000  
shehab@ubuntu:~$ mount /dev/vg1/lvol0 /mnt  
mount: /mnt: must be superuser to use mount.  
shehab@ubuntu:~$ sudo mount /dev/vg1/lvol0 /mnt  
shehab@ubuntu:~$
```

extend VG with the remaining PV

```
sudo vgextend vg1 /dev/loop19
```

extend LV with +50M

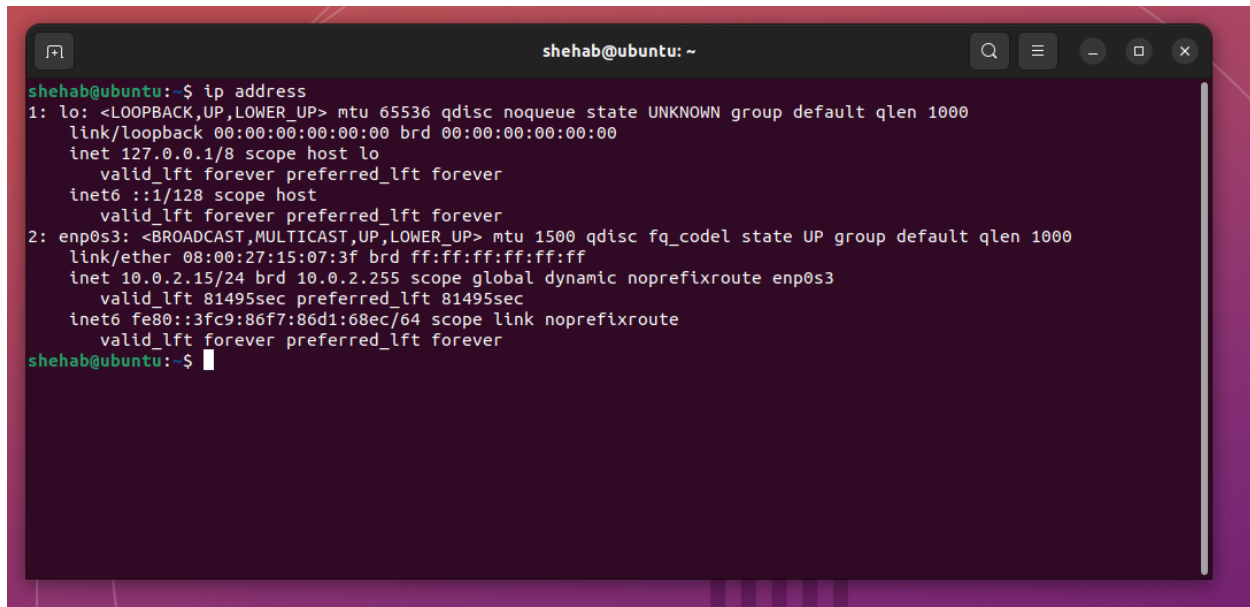
```
sudo lvextend /dev/vg1/lvol0 -L +50M
```

resize2fs LV with the 50M extra

```
sudo resize2fs /dev/vg1/lvol0 300M
```

Display the network interface information using ip command

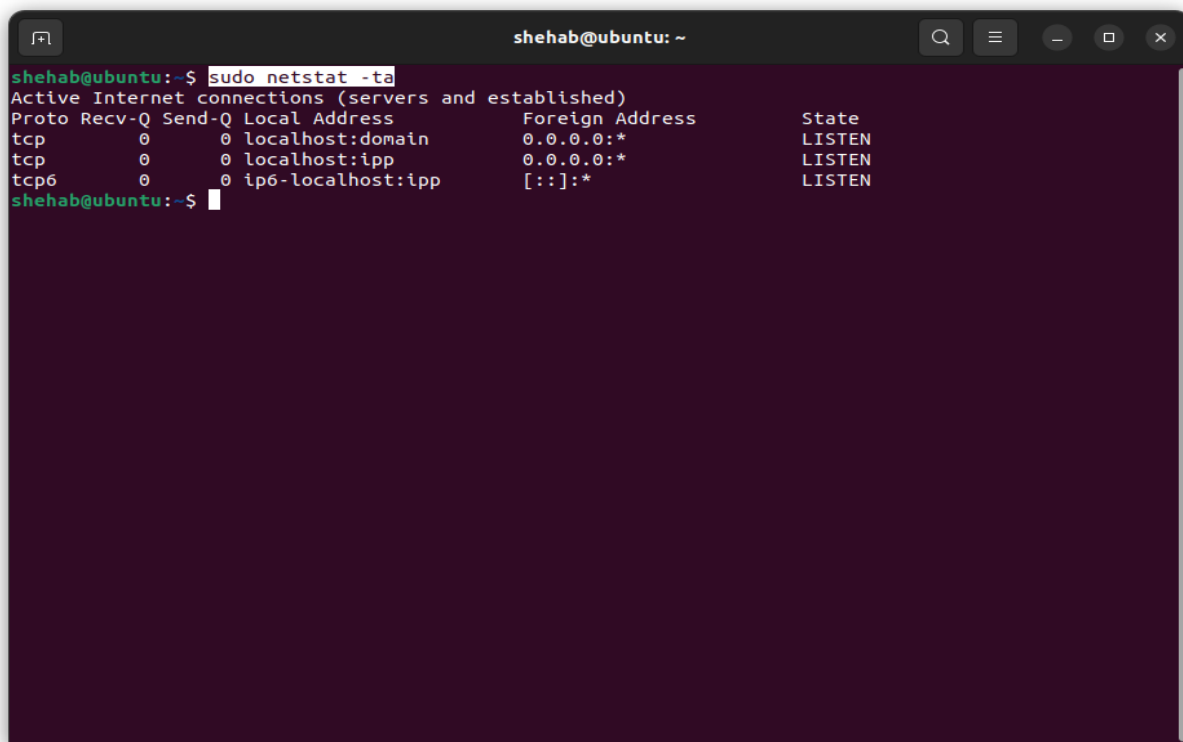
ip address

A terminal window titled 'shehab@ubuntu: ~' showing the output of the 'ip address' command. The output displays details for the loopback interface 'lo' and the ethernet interface 'enp0s3'.

```
shehab@ubuntu:~$ ip address
1: lo: <LOOPBACK,UP,LOWER_UP> mtu 65536 qdisc noqueue state UNKNOWN group default qlen 1000
    link/loopback 00:00:00:00:00:00 brd 00:00:00:00:00:00
    inet 127.0.0.1/8 scope host lo
        valid_lft forever preferred_lft forever
    inet6 ::1/128 scope host
        valid_lft forever preferred_lft forever
2: enp0s3: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc fq_codel state UP group default qlen 1000
    link/ether 08:00:27:15:07:3f brd ff:ff:ff:ff:ff:ff
    inet 10.0.2.15/24 brd 10.0.2.255 scope global dynamic noprefixroute enp0s3
        valid_lft 81495sec preferred_lft 81495sec
    inet6 fe80::3fc9:86f7:86d1:68ec/64 scope link noprefixroute
        valid_lft forever preferred_lft forever
shehab@ubuntu:~$
```

Display currently active TCP connections on your OS using netstat command

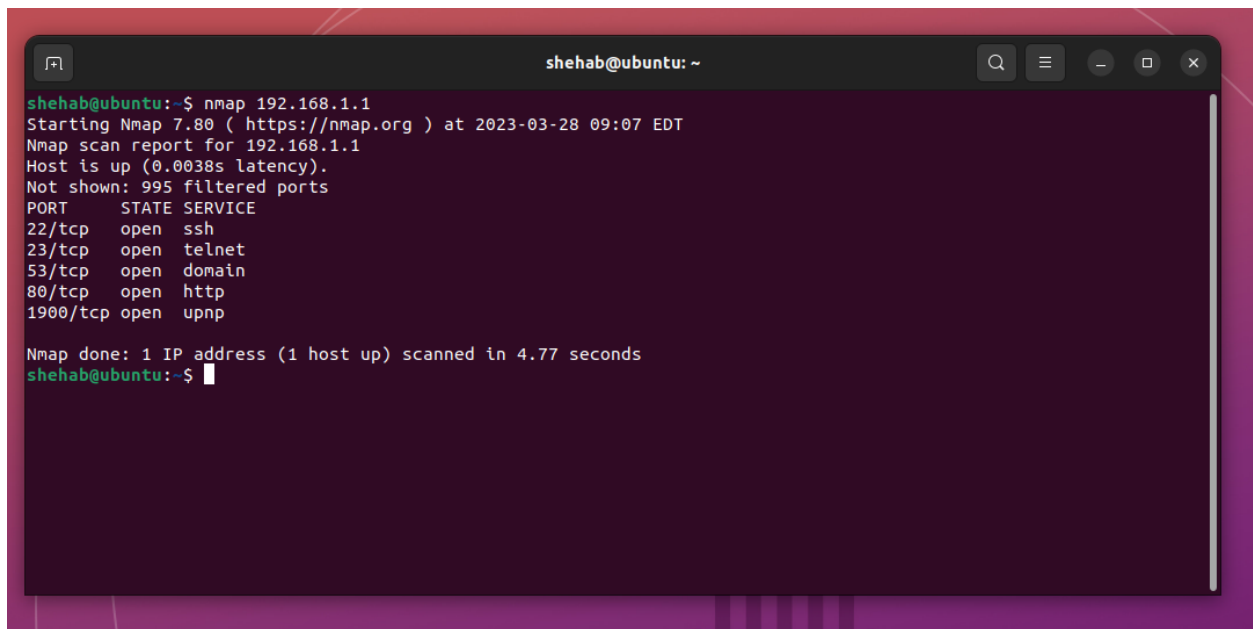
sudo netstat -ta

A terminal window titled 'shehab@ubuntu: ~' showing the output of the 'sudo netstat -ta' command. The output lists active internet connections, including listening ports for domain, http, and ip6-localhost.

```
shehab@ubuntu:~$ sudo netstat -ta
Active Internet connections (servers and established)
Proto Recv-Q Send-Q Local Address           Foreign Address         State
tcp        0      0 localhost:domain        0.0.0.0:*               LISTEN
tcp        0      0 localhost:ipp           0.0.0.0:*               LISTEN
tcp6       0      0 ip6-localhost:ipp      [::]:*                 LISTEN
shehab@ubuntu:~$
```

Display currently open ports on your system using nmap command (install it using apt)

nmap 192.168.1.1

A terminal window titled 'shehab@ubuntu: ~' with standard window controls. The terminal shows the execution of the 'nmap 192.168.1.1' command. The output includes the Nmap version (7.80), the scan date and time (2023-03-28 09:07 EDT), and a list of open ports with their corresponding services. The ports listed are 22/tcp (ssh), 23/tcp (telnet), 53/tcp (domain), 80/tcp (http), and 1900/tcp (upnp). The scan was completed in 4.77 seconds.

```
shehab@ubuntu:~$ nmap 192.168.1.1
Starting Nmap 7.80 ( https://nmap.org ) at 2023-03-28 09:07 EDT
Nmap scan report for 192.168.1.1
Host is up (0.0038s latency).
Not shown: 995 filtered ports
PORT      STATE SERVICE
22/tcp    open  ssh
23/tcp    open  telnet
53/tcp    open  domain
80/tcp    open  http
1900/tcp   open  upnp

Nmap done: 1 IP address (1 host up) scanned in 4.77 seconds
shehab@ubuntu:~$
```