Network

Display the network interface information using `ip` command

```
radwa@radwa-HP-Laptop-15t-dy200:~$ ip addr show
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: wlo1: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc noqueue state UP group default qlen 1000
    link/ether c8:94:02:64:60:e3 brd ff:ff:ff:ff:ff:ff
    altname wlp1s0
    inet 192.168.1.10/24 brd 192.168.1.255 scope global dynamic noprefixroute wlo1
       valid_lft 863999829sec preferred_lft 863999829sec
    inet6 fdb4:f58e:4349:2800:deb8:c2ac:fed5:3351/64 scope global temporary dynamic
       valid_lft 7059sec preferred_lft 3459sec
    inet6 fdb4:f58e:4349:2800:f562:c436:2ea1:1343/64 scope global dynamic mngtmpaddr noprefixroute
       valid_lft 7059sec preferred_lft 3459sec
    inet6 fe80::de2d:6e08:3f6d:bfb8/64 scope link noprefixroute
       valid_lft forever preferred_lft forever
```

- Display currently active TCP connections on your OS using `netstat` command

```
radwa@radwa-HP-Laptop-15t-dy200:~$ sudo apt install nmap
[sudo] password for radwa:
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
nmap is already the newest version (7.91+dfsg1+really7.80+dfsg1-2ubuntu0.1).
The following packages were automatically installed and are no longer required:
  libflashrom1 libftdi1-2
Use 'sudo apt autoremove' to remove them.
0 upgraded, 0 newly installed, 0 to remove and 45 not upgraded.
radwa@radwa-HP-Laptop-15t-dy200:~$
```

```
radwa@radwa-HP-Laptop-15t-dy200:~$ netstat -t
Active Internet connections (w/o servers)
Proto Recv-Q Send-Q Local Address          Foreign Address         State
tcp        0      0 radwa-HP-Laptop-1:47000 whatsapp-cdn-shv-:https ESTABLISHED
tcp        0    103 radwa-HP-Laptop-1:36846 ec2-34-236-83-94.:https FIN_WAIT1
tcp        0      0 radwa-HP-Laptop-1:39280 104.18.3.161:https      ESTABLISHED
tcp        0    103 radwa-HP-Laptop-1:48900 104.21.85.249:https     FIN_WAIT1
tcp        0      0 radwa-HP-Laptop-1:37418 ec2-54-201-249-32:https ESTABLISHED
tcp        0      0 radwa-HP-Laptop-1:42152 104.18.7.185:https      ESTABLISHED
tcp        0    124 radwa-HP-Laptop-1:60198 ec2-107-21-13-225:https FIN_WAIT1
tcp        0    103 radwa-HP-Laptop-1:51998 server-54-230-112:https FIN_WAIT1
tcp        0    103 radwa-HP-Laptop-1:39836 172.64.136.23:https     FIN_WAIT1
tcp        0    124 radwa-HP-Laptop-1:54696 ec2-3-82-237-115.:https FIN_WAIT1
tcp        0    124 radwa-HP-Laptop-1:50540 123.208.120.34.bc:https FIN_WAIT1
tcp        0      0 radwa-HP-Laptop-1:43544 host-156.200.36.9:https ESTABLISHED
radwa@radwa-HP-Laptop-15t-dy200:~$
```

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

```
  270  hlstory
radwa@radwa-HP-Laptop-15t-dy200:~$ netstat -a -n | grep ESTABLISHED
tcp        0      0 192.168.1.10:39572      172.67.212.253:443      ESTABLISHED
tcp        0      0 192.168.1.10:55768      142.251.37.194:443      ESTABLISHED
tcp        0      0 192.168.1.10:44294      172.217.19.34:443       ESTABLISHED
tcp        0      0 192.168.1.10:47004      102.132.97.54:443       ESTABLISHED
tcp        0      0 192.168.1.10:56152      34.107.148.139:443      ESTABLISHED
tcp        0      0 192.168.1.10:52204      142.251.37.34:443       ESTABLISHED
tcp        0      0 192.168.1.10:49864      104.18.2.161:443        ESTABLISHED
tcp        0      0 192.168.1.10:34796      104.26.14.167:443       ESTABLISHED
tcp        0      0 192.168.1.10:44262      34.200.97.132:443       ESTABLISHED
tcp        0      0 192.168.1.10:44276      34.117.65.55:443        ESTABLISHED
tcp        0      0 192.168.1.10:53574      3.231.99.187:443        ESTABLISHED
udp        0      0 192.168.1.10:68         192.168.1.1:67          ESTABLISHED
radwa@radwa-HP-Laptop-15t-dy200:~$
```

Part1

Using Loop devices, create 4 PVs

```
radwa@radwa-VirtualBox:~$ sudo dd if=/dev/zero of=/pv1.img bs=512M count=1
[sudo] password for radwa:
1+0 records in
1+0 records out
536870912 bytes (537 MB, 512 MiB) copied, 1.26254 s, 425 MB/s
radwa@radwa-VirtualBox:~$ sudo dd if=/dev/zero of=/pv2.img bs=512M count=1
1+0 records in
1+0 records out
536870912 bytes (537 MB, 512 MiB) copied, 0.884688 s, 607 MB/s
radwa@radwa-VirtualBox:~$ sudo dd if=/dev/zero of=/pv3.img bs=512M count=1
1+0 records in
1+0 records out
536870912 bytes (537 MB, 512 MiB) copied, 0.896981 s, 599 MB/s
radwa@radwa-VirtualBox:~$ sudo dd if=/dev/zero of=/pv4.img bs=512M count=1
1+0 records in
1+0 records out
536870912 bytes (537 MB, 512 MiB) copied, 0.971871 s, 552 MB/s
```

```
radwa@radwa-VirtualBox:~$ sudo losetup -f /pv1.img
radwa@radwa-VirtualBox:~$ sudo losetup -f /pv2.img
radwa@radwa-VirtualBox:~$ sudo losetup -f /pv3.img
radwa@radwa-VirtualBox:~$ sudo losetup -f /pv4.img
[sudo] password for radwa:
radwa@radwa-VirtualBox:~$ sudo losetup
```

create VG and add 3 on PVs to it

```
radwa@radwa-VirtualBox:~$ sudo vgcreate vg1 /dev/loop19 /dev/loop18 /dev/loop13
  Physical volume "/dev/loop19" successfully created.
  Physical volume "/dev/loop18" successfully created.
  Physical volume "/dev/loop13" successfully created.
  Volume group "vg1" successfully created
radwa@radwa-VirtualBox:~$
```

create LV which has size of 250M

```
radwa@radwa-VirtualBox:~$ sudo lvcreate -L 250M -n lv1 vg1
  Rounding up size to full physical extent 252.00 MiB
  Logical volume "lv1" created.
radwa@radwa-VirtualBox:~$
```

format LV using ext4

```
radwa@radwa-VirtualBox:~$ sudo mkfs.ext4 /dev/vg1/lv1
mke2fs 1.46.5 (30-Dec-2021)
Discarding device blocks: done
Creating filesystem with 64512 4k blocks and 64512 inodes
Filesystem UUID: 01e1e811-d9ce-481d-86e1-86e52dba78ca
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

radwa@radwa-VirtualBox:~$
```

mount LV into /mnt directory

```
radwa@radwa-VirtualBox:~$ sudo mkdir /mnt/mylv
radwa@radwa-VirtualBox:~$ sudo mount /dev/vg1/lv1 /mnt/mylv
radwa@radwa-VirtualBox:~$
```

extend VG with the remaining PV

```
radwa@radwa-VirtualBox:~$ sudo vgextend vg1 /dev/loop20
  Physical volume "/dev/loop20" successfully created.
  Volume group "vg1" successfully extended
```

extend LV with +50M

```
radwa@radwa-VirtualBox:~$ sudo lvextend /dev/vg1/lv1 -L +50M
  Rounding size to boundary between physical extents: 52.00 MiB.
  Size of logical volume vg1/lv1 changed from 252.00 MiB (63 extents) to 304.00 MiB (76 extents).
  Logical volume vg1/lv1 successfully resized.
radwa@radwa-VirtualBox:~$
```

resize2fs LV with the 50M extra

```
radwa@radwa-VirtualBox:~$ sudo umount /dev/vg1/lv1
radwa@radwa-VirtualBox:~$ sudo resize2fs /dev/vg1/lv1 +50M
resize2fs 1.46.5 (30-Dec-2021)
Please run 'e2fsck -f /dev/vg1/lv1' first.

radwa@radwa-VirtualBox:~$ sudo e2fsck -f /dev/vg1/lv1
e2fsck 1.46.5 (30-Dec-2021)
Pass 1: Checking inodes, blocks, and sizes
Pass 2: Checking directory structure
Pass 3: Checking directory connectivity
Pass 4: Checking reference counts
Pass 5: Checking group summary information
/dev/vg1/lv1: 11/64512 files (0.0% non-contiguous), 8204/64512 blocks
radwa@radwa-VirtualBox:~$ sudo resize2fs /dev/vg1/lv1 +50M
resize2fs 1.46.5 (30-Dec-2021)
Resizing the filesystem on /dev/vg1/lv1 to 12800 (4k) blocks.
The filesystem on /dev/vg1/lv1 is now 12800 (4k) blocks long.

radwa@radwa-VirtualBox:~$
```