Lab 1

Lab objectives:

*Using Loop devices, create 4 PVs
*create VG and add 3 on PVs to it
*create LV which has size of 250M
*format LV using ext4
*mount LV into /mnt directory
*extend VG with the remaining PV
*extend LV with +50M
*resize2fs LV with the 50M extra
Network:
*Display the network interface information using ip command
*Display currently active TCP connections on your OS using netstatcommand
*Display currently open ports on your system using nmap command (install it using apt)

```
ahmed@ahmed-VirtualBox:~$ cd /tmp
ahmed@ahmed-VirtualBox:/tmp$ losetup -f
losetup: cannot find an unused loop device: Permission denied
ahmed@ahmed-VirtualBox:/tmp$ sudo losetp -f
sudo: losetp: command not found
ahmed@ahmed-VirtualBox:/tmp$ sudo losetup -f
/dev/loop23
ahmed@ahmed-VirtualBox:/tmp$ dd if=/dev/zero of=disk1.disk bs=1024 count=100000
100000+0 records in
100000+0 records out
102400000 bytes (102 MB, 98 MiB) copied, 1.90324 s, 53.8 MB/s
ahmed@ahmed-VirtualBox:/tmp$ dd if=/dev/zero of=disk2.disk bs=1024 count=100000
100000+0 records in
100000+0 records out
102400000 bytes (102 MB, 98 MiB) copied, 1.79531 s, 57.0 MB/s
ahmed@ahmed-VirtualBox:/tmp$ dd if=/dev/zero of=disk3.disk bs=1024 count=50000
^[[A50000+0 records in
50000+0 records out
51200000 bytes (51 MB, 49 MiB) copied, 0.943227 s, 54.3 MB/s
ahmed@ahmed-VirtualBox:/tmp$ dd if=/dev/zero of=disk4.disk bs=1024 count=50000
50000+0 records in
50000+0 records out
51200000 bytes (51 MB, 49 MiB) copied, 0.900989 s, 56.8 MB/s
ahmed@ahmed-VirtualBox:/tmp$ sudo losetup -f
/dev/loop23
ahmed@ahmed-VirtualBox:/tmp$ sudo losetup /dev/loop23 disk1.disk
ahmed@ahmed-VirtualBox:/tmp$ sudo losetup /dev/loop24 disk2.disk
ahmed@ahmed-VirtualBox:/tmp$ sudo losetup /dev/loop25 disk3.disk
ahmed@ahmed-VirtualBox:/tmp$ sudo losetup /dev/loop26 disk4.disk
```

```
dd if=/dev/zero of=disk1.disk bs=1024 count 100000
dd if=/dev/zero of=disk2.disk bs=1024 count 100000
dd if=/dev/zero of=disk3.disk bs=1024 count 50000
dd if=/dev/zero of=disk4.disk bs=1024 count 50000
losetup -f
sudo losetup /dev/loop18 disk1.disk
sudo losetup /dev/loop19 disk2.disk
sudo losetup /dev/loop20 disk3.disk
sudo losetup /dev/loop21 disk4.disk
```

```
ahmed@ahmed-VirtualBox:/tmp$ sudo pvcreate /dev/loop23
  WARNING: Not using device /dev/loop15 for PV bX5h7L-a8re-GGFd-1hAC-krf5-9V2n-DOHWQj.
  WARNING: Not using device /dev/loop21 for PV 1j22Cd-R25W-522S-aLjR-9qsG-d1M2-Nb4Bpx.
  WARNING: Not using device /dev/loop22 for PV sfzAGe-vUsa-TJ6Q-m3Yl-2Z3M-2H27-ZNCFa3.
  WARNING: PV bX5h7L-a8re-GGFd-1hAC-krf5-9V2n-DOHWQj prefers device /dev/loop14 because device was seen first.
  WARNING: PV 1j22Cd-R25W-522S-aLjR-9qsG-d1M2-Nb4Bpx prefers device /dev/loop16 because device was seen first.
  WARNING: PV sfzAGe-vUsa-TJ6Q-m3Yl-2Z3M-2H27-ZNCFa3 prefers device /dev/loop17 because device was seen first.
  Physical volume "/dev/loop23" successfully created.
ahmed@ahmed-VirtualBox:/tmp$ sudo pvcreate /dev/loop24
  WARNING: Not using device /dev/loop15 for PV bX5h7L-a8re-GGFd-1hAC-krf5-9V2n-DOHWQj.
  WARNING: Not using device /dev/loop21 for PV 1j22Cd-R25W-522S-aLjR-9qsG-d1M2-Nb4Bpx.
  WARNING: Not using device /dev/loop22 for PV sfzAGe-vUsa-TJ6Q-m3Yl-2Z3M-2H27-ZNCFa3.
  WARNING: PV bX5h7L-a8re-GGFd-1hAC-krf5-9V2n-DOHWQj prefers device /dev/loop14 because device was seen first.
  WARNING: PV 1j22Cd-R25W-522S-aLjR-9qsG-d1M2-Nb4Bpx prefers device /dev/loop16 because device was seen first.
  WARNING: PV sfzAGe-vUsa-TJ6Q-m3Yl-2Z3M-2H27-ZNCFa3 prefers device /dev/loop17 because device was seen first.
  Physical volume "/dev/loop24" successfully created.
ahmed@ahmed-VirtualBox:/tmp$ sudo pvcreate /dev/loop25
  WARNING: Not using device /dev/loop15 for PV bX5h7L-a8re-GGFd-1hAC-krf5-9V2n-DOHWQj.
  WARNING: Not using device /dev/loop21 for PV 1j22Cd-R25W-522S-aLjR-9qsG-d1M2-Nb4Bpx.
  WARNING: Not using device /dev/loop22 for PV sfzAGe-vUsa-TJ6Q-m3Yl-2Z3M-2H27-ZNCFa3.
  WARNING: PV bX5h7L-a8re-GGFd-1hAC-krf5-9V2n-DOHWQj prefers device /dev/loop14 because device was seen first.
  WARNING: PV 1j22Cd-R25W-522S-aLjR-9qsG-d1M2-Nb4Bpx prefers device /dev/loop16 because device was seen first.
  WARNING: PV sfzAGe-vUsa-TJ6Q-m3Yl-2Z3M-2H27-ZNCFa3 prefers device /dev/loop17 because device was seen first.
  Physical volume "/dev/loop25" successfully created.
ahmed@ahmed-VirtualBox:/tmp$ sudo pvcreate /dev/loop26
  WARNING: Not using device /dev/loop15 for PV bX5h7L-a8re-GGFd-1hAC-krf5-9V2n-DOHWQj.
  WARNING: Not using device /dev/loop21 for PV 1j22Cd-R25W-522S-aLjR-9qsG-d1M2-Nb4Bpx.
  WARNING: Not using device /dev/loop22 for PV sfzAGe-vUsa-TJ6Q-m3Yl-2Z3M-2H27-ZNCFa3.
  WARNING: PV bX5h7L-a8re-GGFd-1hAC-krf5-9V2n-DOHWQj prefers device /dev/loop14 because device was seen first.
  WARNING: PV 1j22Cd-R25W-522S-aLjR-9qsG-d1M2-Nb4Bpx prefers device /dev/loop16 because device was seen first.
  WARNING: PV sfzAGe-vUsa-TJ6Q-m3Yl-2Z3M-2H27-ZNCFa3 prefers device /dev/loop17 because device was seen first.
  Physical volume "/dev/loop26" successfully created.
```

```
sudo pvcreate /dev/loop23
sudo pvcreate /dev/loop24
sudo pvcreate /dev/loop25
sudo pvcreate /dev/loop26
```

Sudo vgcreate VG1 /dev/loop23 /dev/loop24 /dev/loop25

Man lvm

Sudo lvcreate -L 236M VG1

Sudo lvdisplay

```
ahmed@ahmed-VirtualBox:/tmp$ vgdisplay
  WARNING: Running as a non-root user. Functionality may be unavailable.
  /run/lock/lvm/P_global:aux: open failed: Permission denied
ahmed@ahmed-VirtualBox:/tmp$ sudo vgdisplay
  WARNING: Not using device /dev/loop15 for PV bX5h7L-a8re-GGFd-1hAC-krf5-9V2n-DOHWQj.
  WARNING: Not using device /dev/loop21 for PV 1j22Cd-R25W-522S-aLjR-9qsG-d1M2-Nb4Bpx.
  WARNING: Not using device /dev/loop22 for PV sfzAGe-vUsa-TJ6Q-m3Yl-2Z3M-2H27-ZNCFa3.
  WARNING: PV bX5h7L-a8re-GGFd-1hAC-krf5-9V2n-DOHWQj prefers device /dev/loop14 because device was seen first.
  WARNING: PV 1j22Cd-R25W-522S-aLjR-9qsG-d1M2-Nb4Bpx prefers device /dev/loop16 because device was seen first.
  WARNING: PV sfzAGe-vUsa-TJ6Q-m3Yl-2Z3M-2H27-ZNCFa3 prefers device /dev/loop17 because device was seen first.
  --- 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               236.00 MiB
  PE Size               4.00 MiB
  Total PE              59
  Alloc PE / Size       59 / 236.00 MiB
  Free  PE / Size       0 / 0
  VG UUID               x0JCzK-VdgR-zD04-9kyA-VL7J-3kQj-KfQdzy

ahmed@ahmed-VirtualBox:/tmp$ sudo mkfs.ext4 /dev/VG1/lvol0
```

```
ahmed@ahmed-VirtualBox:/tmp$ sudo mkfs.ext4 /dev/VG1/lvol0
mke2fs 1.46.5 (30-Dec-2021)
Discarding device blocks: done
Creating filesystem with 60416 4k blocks and 60416 inodes
Filesystem UUID: 0af1139e-58d5-4d5e-9663-9a784e8c317d
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

ahmed@ahmed-VirtualBox:/tmp$ sudo mount /dev/VG1/lvol0 /mnt
ahmed@ahmed-VirtualBox:/tmp$ sudo vgextend /dev/loop26
  No command with matching syntax recognised.  Run 'vgextend --help' for more information.
  Correct command syntax is:
  vgextend VG PV ...

ahmed@ahmed-VirtualBox:/tmp$ sudo vgextend VG1 /dev/loop26
  WARNING: Not using device /dev/loop15 for PV bX5h7L-a8re-GGFd-1hAC-krf5-9V2n-DOHWQj.
  WARNING: Not using device /dev/loop21 for PV 1j22Cd-R25W-522S-aLjR-9qsG-d1M2-Nb4Bpx.
  WARNING: Not using device /dev/loop22 for PV sfzAGe-vUsa-TJ6Q-m3Yl-2Z3M-2H27-ZNCFa3.
  WARNING: PV bX5h7L-a8re-GGFd-1hAC-krf5-9V2n-DOHWQj prefers device /dev/loop14 because device was seen first.
  WARNING: PV 1j22Cd-R25W-522S-aLjR-9qsG-d1M2-Nb4Bpx prefers device /dev/loop16 because device was seen first.
  WARNING: PV sfzAGe-vUsa-TJ6Q-m3Yl-2Z3M-2H27-ZNCFa3 prefers device /dev/loop17 because device was seen first.
  Volume group "VG1" successfully extended
ahmed@ahmed-VirtualBox:/tmp$ sudo vgdisplay
```

```
ahmed@ahmed-VirtualBox:/tmp$ sudo vgdisplay
  WARNING: Not using device /dev/loop15 for PV bX5h7L-a8re-GGFd-1hAC-krf5-9V2n-DOHWQj.
  WARNING: Not using device /dev/loop21 for PV 1j22Cd-R25W-522S-aLjR-9qsG-d1M2-Nb4Bpx.
  WARNING: Not using device /dev/loop22 for PV sfzAGe-vUsa-TJ6Q-m3Yl-2Z3M-2H27-ZNCFa3.
  WARNING: PV bX5h7L-a8re-GGFd-1hAC-krf5-9V2n-DOHWQj prefers device /dev/loop14 because device was seen first.
  WARNING: PV 1j22Cd-R25W-522S-aLjR-9qsG-d1M2-Nb4Bpx prefers device /dev/loop16 because device was seen first.
  WARNING: PV sfzAGe-vUsa-TJ6Q-m3Yl-2Z3M-2H27-ZNCFa3 prefers device /dev/loop17 because device was seen first.
  --- Volume group ---
  VG Name               VG1
  System ID
  Format                lvm2
  Metadata Areas        4
  Metadata Sequence No  3
  VG Access             read/write
  VG Status             resizable
  MAX LV                0
  Cur LV                1
  Open LV               1
  Max PV                0
  Cur PV                4
  Act PV                4
  VG Size               280.00 MiB
  PE Size               4.00 MiB
  Total PE              70
  Alloc PE / Size       59 / 236.00 MiB
  Free  PE / Size       11 / 44.00 MiB
  VG UUID               x0JCzK-VdgR-zD04-9kyA-VL7J-3kQj-KfQdzy

ahmed@ahmed-VirtualBox:/tmp$ sudo lvextend /dev/VG1/lvol0 -L +44M
```

sudo mkfs.ext4 /dev/Vg1/lvol0
sudo mount /dev/Vg1/lvol0 /mnt/dev
sudo vgextend VG1 /dev/loop21
sudo lvextend /dev/VG1/lvol0 +44

```
ahmed@ahmed-VirtualBox:/tmp$ ip addr
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 08:00:27:2b:6d:be 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 82656sec preferred_lft 82656sec
    inet6 fe80::29c0:7ed6:7e83:978/64 scope link noprefixroute
       valid_lft forever preferred_lft forever
ahmed@ahmed-VirtualBox:/tmp$ netstat -t
Active Internet connections (w/o servers)
Proto Recv-Q Send-Q Local Address           Foreign Address         State
ahmed@ahmed-VirtualBox:/tmp$ sudo apt install nmap
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
The following additional packages will be installed:
  libblas3 liblinear4 lua-lpeg nmap-common
Suggested packages:
  liblinear-tools liblinear-dev ncat ndiff zenmap
The following NEW packages will be installed:
  libblas3 liblinear4 lua-lpeg nmap nmap-common
0 upgraded, 5 newly installed, 0 to remove and 242 not upgraded.
Need to get 5,973 kB of archives.
After this operation, 26.3 MB of additional disk space will be used.
Do you want to continue? [Y/n] y
Get:1 http://eg.archive.ubuntu.com/ubuntu jammy/main amd64 libblas3 amd64 3.10.0-2ubuntu1 [228 kB]
Get:2 http://eg.archive.ubuntu.com/ubuntu jammy/universe amd64 liblinear4 amd64 2.3.0+dfsg-5 [41.4 kB]
```

```
ahmed@ahmed-VirtualBox:/tmp$ nmap 192.168.1.1
Starting Nmap 7.80 ( https://nmap.org ) at 2023-03-28 17:30 EET
Nmap scan report for 192.168.1.1
Host is up (0.013s latency).
Not shown: 997 filtered ports
PORT     STATE SERVICE
53/tcp   open  domain
80/tcp   open  http
443/tcp  open  https

Nmap done: 1 IP address (1 host up) scanned in 6.75 seconds
```