

## LAB 1

- **STEP-1:** Using Loop devices, create 4 PVs

### Commands

- `dd if=/dev/zero of=/tmp/disk1.img bs=1024 count=100000`
- `dd if=/dev/zero of=/tmp/disk2.img bs=1024 count=100000`
- `dd if=/dev/zero of=/tmp/disk3.img bs=1024 count=100000`
- `dd if=/dev/zero of=/tmp/disk4.img bs=1024 count=100000`
  
- `sudo losetup -f /tmp/disk1.img`
- `sudo losetup -f /tmp/disk2.img`
- `sudo losetup -f /tmp/disk3.img`
- `sudo losetup -f /tmp/disk4.img`
  
- `sudo pvcreate /dev/loop16`
- `sudo pvcreate /dev/loop17`
- `sudo pvcreate /dev/loop18`
- `sudo pvcreate /dev/loop19`

```
hager@hager-VirtualBox:~$ dd if=/dev/zero of=/tmp/disk1.img bs=1024 count=100000
0
100000+0 records in
100000+0 records out
102400000 bytes (102 MB, 98 MiB) copied, 0.411431 s, 249 MB/s
hager@hager-VirtualBox:~$ dd if=/dev/zero of=/tmp/disk2.img bs=1024 count=100000
0
100000+0 records in
100000+0 records out
102400000 bytes (102 MB, 98 MiB) copied, 0.412831 s, 248 MB/s
hager@hager-VirtualBox:~$ dd if=/dev/zero of=/tmp/disk3.img bs=1024 count=100000
0
100000+0 records in
100000+0 records out
102400000 bytes (102 MB, 98 MiB) copied, 0.465001 s, 220 MB/s
hager@hager-VirtualBox:~$ dd if=/dev/zero of=/tmp/disk4.img bs=1024 count=100000
0
100000+0 records in
100000+0 records out
102400000 bytes (102 MB, 98 MiB) copied, 0.431035 s, 238 MB/s
```

```
hager@hager-VirtualBox:~$ sudo losetup -f /tmp/disk1.img
[sudo] password for hager:
hager@hager-VirtualBox:~$ sudo losetup -f /tmp/disk2.img
hager@hager-VirtualBox:~$ sudo losetup -f /tmp/disk3.img
hager@hager-VirtualBox:~$ sudo losetup -f /tmp/disk4.img
```

```
hager@hager-VirtualBox:~$ sudo pvcreate /dev/loop16
Physical volume "/dev/loop16" successfully created.
hager@hager-VirtualBox:~$ sudo pvcreate /dev/loop17
Physical volume "/dev/loop17" successfully created.
hager@hager-VirtualBox:~$ sudo pvcreate /dev/loop18
Physical volume "/dev/loop18" successfully created.
hager@hager-VirtualBox:~$ sudo pvcreate /dev/loop19
Physical volume "/dev/loop19" successfully created.
```

- **STEP-2:** Create VG and add 3 on PVs to it

#### Commands

- `sudo vgcreate newVG /dev/loop16 /dev/loop17 /dev/loop18`

```
hager@hager-VirtualBox:~$ sudo vgcreate newVG /dev/loop16 /dev/loop17 /dev/loop18
Volume group "newVG" successfully created
```

- **STEP-3:** Create LV which has size of 250M

#### Commands

- `sudo lvcreate -L 252M newVG`

```
hager@hager-VirtualBox:~$ sudo lvcreate -L 252M newVG
```

- **STEP-4:** Format LV using ext4

#### Commands

- `sudo mkfs.ext4 /dev/newVG/lvol0`
- `sudo vgdisplay newVG`

```
hager@hager-VirtualBox:~$ sudo mkfs.ext4 /dev/newVG/lvol0
```

```
hager@hager-VirtualBox:~$ sudo vgdisplay newVG
--- Volume group ---
VG Name                newVG
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
PE Size                 4.00 MiB
Total PE                72
Alloc PE / Size        63 / 252.00 MiB
Free PE / Size          9 / 36.00 MiB
VG UUID                B5u1Zq-ZrGC-wp8V-ZFwr-VIeJ-LeZU-Zma03y
```

- **STEP-5:** Mount LV into /mnt directory

Commands

- Sudo mkdir /mnt/newlv
- Sudo mount /dev/newVG/lvol0 /mnt/newlv

```
hager@hager-VirtualBox:~$ sudo mkdir /mnt/newlv
hager@hager-VirtualBox:~$ sudo mount /dev/newVG/lvol0 /mnt/newlv
```

- **STEP-6:** Extend VG with the remaining PV

Commands

- Sudo vgextend newVG /dev/loop19

```
hager@hager-VirtualBox:~$ sudo vgextend newVG /dev/loop19
Volume group "newVG" successfully extended
```

- **STEP-7:** Extend LV with +50M

Commands

- Sudo lvextend /dev/newVG/lvol0 -L +50M

```
hager@hager-VirtualBox:~$ sudo lvextend /dev/newVG/lvol0 -L +50M
Rounding size to boundary between physical extents: 52.00 MiB.
Size of logical volume newVG/lvol0 changed from 252.00 MiB (63 extents) to 304.00 MiB (76 extents).
Logical volume newVG/lvol0 successfully resized.
```

- **STEP-8:** Extend LV with +50M

Commands

- Sudo umount /dev/newVG/lvol0
- Sudo e2fsck -f /dev/newVG/lvol0
- Sudo resize2fs /dev/newVG/lvol0 +50M

```
hager@hager-VirtualBox:~$ sudo umount /dev/newVG/lvol0
hager@hager-VirtualBox:~$ sudo e2fsck -f /dev/newVG/lvol0
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/newVG/lvol0: 11/64512 files (0.0% non-contiguous), 8204/64512 blocks
hager@hager-VirtualBox:~$ sudo resize2fs /dev/newVG/lvol0 +50M
resize2fs 1.46.5 (30-Dec-2021)
Resizing the filesystem on /dev/newVG/lvol0 to 12800 (4k) blocks.
The filesystem on /dev/newVG/lvol0 is now 12800 (4k) blocks long.
```

- **STEP-9:** Display the network interface information using ip command

#### Commands

- ip addr show

```
hager@hager-VirtualBox:~$ ip addr show
1: lo: <LOOPBACK,UP,LOWER_UP> mtu 65536 qdisc noqueue state UNKNOWN group defau
lt 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 g
roup default qlen 1000
    link/ether 08:00:27:00:f5:64 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 85952sec preferred_lft 85952sec
    inet6 fe80::1c35:1004:d20a:890d/64 scope link noprefixroute
        valid_lft forever preferred_lft forever
```

- **STEP-10:** Display currently active TCP connections on your OS using netstat command

#### Commands

- sudo apt install nmap
- sudo apt install net-tools
- netstat -t
- netstat -a



```
hager@hager-VirtualBox:~$ sudo apt install nmap
```

```
hager@hager-VirtualBox:~$ sudo apt install net-tools
```

```
hager@hager-VirtualBox:~$ netstat -t
Active Internet connections (w/o servers)
Proto Recv-Q Send-Q Local Address           Foreign Address         State
```

```
hager@hager-VirtualBox:~$ netstat -a
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
udp        0      0 0.0.0.0:mdns            0.0.0.0:*               *
udp        0      0 0.0.0.0:631             0.0.0.0:*               *
udp        0      0 0.0.0.0:48079           0.0.0.0:*               *
udp        0      0 localhost:domain        0.0.0.0:*               *
udp        0      0 10.0.2.15:bootpc        10.0.2.2:bootps        ESTABLISHED
udp6       0      0 [::]:42201              [::]:*                  *
udp6       0      0 [::]:mdns                [::]:*                  *
raw6       0      0 [::]:ipv6-icmp          [::]:*                  7
Active UNIX domain sockets (servers and established)
```

- **STEP-11:** Display currently open ports on your system using nmap command (install it using apt)

#### Commands

➤ Netstat -a -n | grep ESTABLISHED

```
hager@hager-VirtualBox:~$ netstat -a -n | grep ESTABLISHED
udp        0      0 10.0.2.15:68            10.0.2.2:67             ESTABLISHED
```