

Admin2

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- Using Loop devices, create 4 PVs:

```
sara@sara-VirtualBox:~$ cd /tmp
sara@sara-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, 0.361576 s, 283 MB/s
sara@sara-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, 0.391516 s, 262 MB/s
sara@sara-VirtualBox:/tmp$ dd if=/dev/zero of=disk3.disk bs=1024 count=100000
100000+0 records in
100000+0 records out
102400000 bytes (102 MB, 98 MiB) copied, 0.463915 s, 221 MB/s
sara@sara-VirtualBox:/tmp$ dd if=/dev/zero of=disk4.disk bs=1024 count=100000
100000+0 records in
100000+0 records out
102400000 bytes (102 MB, 98 MiB) copied, 0.412773 s, 248 MB/s
sara@sara-VirtualBox:/tmp$ sudo losetup -f
[sudo] password for sara:
/dev/loop19
sara@sara-VirtualBox:/tmp$ sudo losetup /dev/loop19 disk1.disk
sara@sara-VirtualBox:/tmp$ sudo losetup /dev/loop20 disk2.disk
sara@sara-VirtualBox:/tmp$ sudo losetup /dev/loop21 disk3.disk
sara@sara-VirtualBox:/tmp$ sudo losetup /dev/loop22 disk4.disk
sara@sara-VirtualBox:/tmp$
```

- create VG and add 3 on PVs to it:

```
Use 'sudo apt autoremove' to remove it.
The following NEW packages will be installed:
  net-tools
0 upgraded, 1 newly installed, 0 to remove and 205 not upgraded.
Need to get 204 kB of archives.
After this operation, 819 kB of additional disk space will be used.
Get:1 http://eg.archive.ubuntu.com/ubuntu jammy/main amd64 net-tools amd64 1.60
+git20181103.0eebece-1ubuntu5 [204 kB]
Fetched 204 kB in 1s (141 kB/s)
Selecting previously unselected package net-tools.
(Reading database ... 198593 files and directories currently installed.)
Preparing to unpack .../net-tools_1.60+git20181103.0eebece-1ubuntu5_amd64.deb .
..
Unpacking net-tools (1.60+git20181103.0eebece-1ubuntu5) ...
Setting up net-tools (1.60+git20181103.0eebece-1ubuntu5) ...
Processing triggers for man-db (2.10.2-1) ...
sara@sara-VirtualBox:/tmp$ sudo pvcreate /dev/loop19
Physical volume "/dev/loop19" successfully created.
sara@sara-VirtualBox:/tmp$ sudo pvcreate /dev/loop20
Physical volume "/dev/loop20" successfully created.
sara@sara-VirtualBox:/tmp$ sudo pvcreate /dev/loop21
[sudo] password for sara:
Physical volume "/dev/loop21" successfully created.
sara@sara-VirtualBox:/tmp$ sudo pvcreate /dev/loop22
Physical volume "/dev/loop22" successfully created.
sara@sara-VirtualBox:/tmp$ sudo vgcreate VG1 /dev/loop19 /dev/loop20 /dev/loop2
1
Volume group "VG1" successfully created
sara@sara-VirtualBox:/tmp$
```

- create LV which has size of 250M:

```
sara@sara-VirtualBox:/tmp$ sudo lvcreate -L 250M VG1
Rounding up size to full physical extent 252.00 MiB
Logical volume "lvol0" created.
sara@sara-VirtualBox:/tmp$ sudo lvdisplay
--- Logical volume ---
LV Path                /dev/VG1/lvol0
LV Name                 lvol0
VG Name                 VG1
LV UUID                 Br1kfR-ef9L-EkXC-2YKg-YA6c-TEl9-9nv0cg
LV Write Access         read/write
LV Creation host, time sara-VirtualBox, 2023-03-28 14:19:07 +0200
LV Status                available
# open                  0
LV Size                 252.00 MiB
Current LE              63
Segments                3
Allocation               inherit
Read ahead sectors      auto
- currently set to      256
Block device            253:0
```

- format LV using ext4:

```
sara@sara-VirtualBox:/tmp$ 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: 0101764a-a0aa-45f7-8614-0219710a15cc
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
```

- mount LV into /mnt directory:

```
sara@sara-VirtualBox:/tmp$ sudo mount /dev/VG1/lvol0 /mnt
sara@sara-VirtualBox:/tmp$ sudo df -h /mnt
Filesystem              Size  Used Avail Use% Mounted on
/dev/mapper/VG1-lvol0  220M   24K  203M   1% /mnt
sara@sara-VirtualBox:/tmp$
```

- extend VG with the remaining PV:

```
sara@sara-VirtualBox:/tmp$ lvextend -l +50M /dev/VG1/lvol0
WARNING: Running as a non-root user. Functionality may be unavailable.
Invalid argument for --extents: +50M
Error during parsing of command line.
sara@sara-VirtualBox:/tmp$
```

- extend LV with +50M:

```
sara@sara-VirtualBox:/tmp$ sudo lvextend -L +50M /dev/VG1/lvol0
Rounding size to boundary between physical extents: 52.00 MiB.
Insufficient free space: 13 extents needed, but only 9 available
sara@sara-VirtualBox:/tmp$ sudo lvextend -L +20M /dev/VG1/lvol0
Size of logical volume VG1/lvol0 changed from 252.00 MiB (63 extents) to 272.00 MiB (68 extents).
Logical volume VG1/lvol0 successfully resized.
sara@sara-VirtualBox:/tmp$
```

- resize2fs LV with the 50M extra:

```
sara@sara-VirtualBox:/tmp$ sudo resize2fs /dev/VG1/lvol0 +20M
resize2fs 1.46.5 (30-Dec-2021)
resize2fs: New size smaller than minimum (8217)

sara@sara-VirtualBox:/tmp$ sudo lvs
--- Logical volume ---
LV Path                /dev/VG1/lvol0
LV Name                 lvol0
VG Name                 VG1
LV UUID                 Br1kfR-ef9L-EkXC-2YKg-YA6c-TEL9-9nv0cg
LV Write Access         read/write
LV Creation host, time sara-VirtualBox, 2023-03-28 14:19:07 +0200
LV Status                available
# open                  1
LV Size                 272.00 MiB
Current LE               68
Segments                3
Allocation               inherit
Read ahead sectors      auto
- currently set to      256
Block device            253:0
```

- Display the network interface information using ip command:

```
sara@sara-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 08:00:27:84:e0:92 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 84457sec preferred_lft 84457sec
    inet6 fe80::5d4b:2b93:bc54:c6e1/64 scope link noprefixroute
        valid_lft forever preferred_lft forever
```

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

```
sara@sara-VirtualBox:/tmp$ netstat -a
Active Internet connections (servers and established)
Proto Recv-Q Send-Q Local Address           Foreign Address         State
tcp        0      0 localhost:ipp           0.0.0.0:*               LISTEN
tcp        0      0 localhost:domain        0.0.0.0:*               LISTEN
tcp6       0      0 [::]:https              [::]:*                  LISTEN
tcp6       0      0 [::]:http                [::]:*                  LISTEN
tcp6       0      0 [::]:ftp                 [::]:*                  LISTEN
tcp6       0      0 [::]:mysql               [::]:*                  LISTEN
tcp6       0      0 ip6-localhost:ipp       [::]:*                  LISTEN
udp        0      0 0.0.0.0:631             0.0.0.0:*               LISTEN
udp        0      0 0.0.0.0:34700           0.0.0.0:*               LISTEN
udp        0      0 localhost:domain        0.0.0.0:*               LISTEN
udp        0      0 sara-VirtualBox:bootpc  _gateway:bootps        ESTABLISHED
udp        0      0 0.0.0.0:mdns             0.0.0.0:*               LISTEN
udp6       0      0 [::]:56519              [::]:*                  LISTEN
udp6       0      0 [::]:mdns                [::]:*                  LISTEN
raw6       0      0 [::]:ipv6-icmp           [::]:*                  LISTEN
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Active UNIX domain sockets (servers and established)
Proto RefCnt Flags               Type               State              I-Node      Path
unix   2      [ ACC ]                STREAM             LISTENING          19169       @/tmp/dbus-flMCvLR2
unix   2      [ ACC ]                STREAM             LISTENING          20502       /tmp/.X11-unix/X0
unix   2      [ ACC ]                STREAM             LISTENING          20504       /tmp/.X11-unix/X1
unix   2      [ ACC ]                STREAM             LISTENING          1609296     @/tmp/dbus-xYeJSUMW
unix   2      [ ACC ]                STREAM             LISTENING          20226       @/tmp/.ICE-unix/1056
unix   2      [ ACC ]                STREAM             LISTENING          20501       @/tmp/.X11-unix/X0
unix   2      [ ACC ]                STREAM             LISTENING          20503       @/tmp/.X11-unix/X1
unix   2      [ ]                DGRAM              CONNECTED          19663       /run/user/1000/syste
```

- Display currently open ports on your system using nmap command:

```
sara@sara-VirtualBox:/tmp$ nmap 10.0.2.15
Starting Nmap 7.80 ( https://nmap.org ) at 2023-03-28 14:36 EET
Nmap scan report for sara-VirtualBox (10.0.2.15)
Host is up (0.00016s latency).
Not shown: 996 closed ports
PORT      STATE SERVICE
21/tcp    open  ftp
80/tcp    open  http
443/tcp   open  https
3306/tcp   open  mysql

Nmap done: 1 IP address (1 host up) scanned in 0.30 seconds
```