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```
samir@samir-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, 0.755948 s, 135 MB/s
samir@samir-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, 0.330902 s, 309 MB/s
samir@samir-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, 0.324855 s, 315 MB/s
samir@samir-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, 0.48008 s, 213 MB/s
samir@samir-VirtualBox:/tmp$ sudo losetup -f
[sudo] password for samir:
/dev/loop13
samir@samir-VirtualBox:/tmp$ sudo losetup /dev/loop19 disk1.disk
samir@samir-VirtualBox:/tmp$ sudo losetup /dev/loop19 disk2.disk
losetup: disk2.disk: failed to set up loop device: Device or resource busy
samir@samir-VirtualBox:/tmp$ sudo losetup /dev/loop20 disk2.disk
samir@samir-VirtualBox:/tmp$ sudo losetup /dev/loop21 disk3.disk
samir@samir-VirtualBox:/tmp$ sudo losetup /dev/loop22 disk4.disk
samir@samir-VirtualBox:/tmp$
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samir@samir-VirtualBox:/tmp$ sudo apt install lvm2
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
The following package was automatically installed and is no longer required:
  systemd-hwe-hwdb
Use 'sudo apt autoremove' to remove it.
The following additional packages will be installed:
  dmeventd libaio1 libdevmapper-event1.02.1 liblvm2cmd2.03 thin-provisioning-tools
The following NEW packages will be installed:
  dmeventd libaio1 libdevmapper-event1.02.1 liblvm2cmd2.03 lvm2 thin-provisioning-tools
0 upgraded, 6 newly installed, 0 to remove and 199 not upgraded.
Need to get 2,395 kB of archives.
After this operation, 8,959 kB 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 libaio1 amd64 0.3.112-13build1 [7,176 B]
Get:2 http://eg.archive.ubuntu.com/ubuntu jammy/main amd64 libdevmapper-event1.02.1 amd64 2:1.02.175-2.1ubuntu4 [12.6 kB]
Get:3 http://eg.archive.ubuntu.com/ubuntu jammy/main amd64 liblvm2cmd2.03 amd64 2.03.11-2.1ubuntu4 [756 kB]
Get:4 http://eg.archive.ubuntu.com/ubuntu jammy/main amd64 dmeventd amd64 2:1.02.175-2.1ubuntu4 [38.4 kB]
Get:5 http://eg.archive.ubuntu.com/ubuntu jammy/main amd64 lvm2 amd64 2.03.11-2.1ubuntu4 [1,154 kB]
Get:6 http://eg.archive.ubuntu.com/ubuntu jammy/main amd64 thin-provisioning-tools amd64 0.9.0-2ubuntu1 [426 kB]
Fetched 2,395 kB in 22s (107 kB/s)
Selecting previously unselected package libaio1:amd64.
(Reading database ... 198716 files and directories currently installed.)
Preparing to unpack .../0-libaio1_0.3.112-13build1_amd64.deb ...
Unpacking libaio1:amd64 (0.3.112-13build1) ...
Selecting previously unselected package libdevmapper-event1.02.1:amd64.
Preparing to unpack .../1-libdevmapper-event1.02.1_2%3a1.02.175-2.1ubuntu4_amd64.deb ...
Unpacking libdevmapper-event1.02.1:amd64 (2:1.02.175-2.1ubuntu4) ...
Selecting previously unselected package liblvm2cmd2.03:amd64.
Preparing to unpack .../2-liblvm2cmd2.03_2.03.11-2.1ubuntu4_amd64.deb ...
Unpacking liblvm2cmd2.03:amd64 (2.03.11-2.1ubuntu4) ...
Selecting previously unselected package dmeventd.
Preparing to unpack .../3-dmeventd_2%3a1.02.175-2.1ubuntu4_amd64.deb ...
Unpacking dmeventd (2:1.02.175-2.1ubuntu4) ...
Selecting previously unselected package lvm2.
Preparing to unpack .../4-lvm2_2.03.11-2.1ubuntu4_amd64.deb ...
Unpacking lvm2 (2.03.11-2.1ubuntu4) ...
Selecting previously unselected package thin-provisioning-tools.
Preparing to unpack .../5-thin-provisioning-tools_0.9.0-2ubuntu1_amd64.deb ...

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Processing triggers for Man-db (2.10.2-1) ...

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samir@samir-VirtualBox:/tmp$ sudo pvcreate /dev/loop19
Physical volume "/dev/loop19" successfully created.
samir@samir-VirtualBox:/tmp$ sudo pvcreate /dev/loop20
Physical volume "/dev/loop20" successfully created.
samir@samir-VirtualBox:/tmp$ sudo pvcreate /dev/loop21
Physical volume "/dev/loop21" successfully created.
samir@samir-VirtualBox:/tmp$ sudo pvcreate /dev/loop22
Physical volume "/dev/loop22" successfully created.
samir@samir-VirtualBox:/tmp$

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samir@samir-VirtualBox:/tmp$ sudo vgcreate VG1 /dev/loop19 /dev/loop20 /dev/loop21
Volume group "VG1" successfully created
samir@samir-VirtualBox:/tmp$

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```
samir@samir-VirtualBox:/tmp$ sudo lvcreate -L 250M VG1
Rounding up size to full physical extent 252.00 MiB
Logical volume "lvol0" created.
samir@samir-VirtualBox:/tmp$ sudo lvdisplay
--- Logical volume ---
LV Path                /dev/VG1/lvol0
LV Name                 lvol0
VG Name                VG1
LV UUID                AFJL0L-K010-zFOF-wW0H-taem-fmCZ-a0XEEJ
LV Write Access         read/write
LV Creation host, time samir-VirtualBox, 2023-03-30 23:21:05 +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

samir@samir-VirtualBox:/tmp$
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```
samir@samir-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: bd67d9a2-6133-4a71-b03b-ae0327a00397
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

samir@samir-VirtualBox:/tmp$
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```
samir@samir-VirtualBox:/tmp$ sudo mount /dev/VG1/lvol0 /mnt
samir@samir-VirtualBox:/tmp$ sudo df -h /mnt
Filesystem      Size  Used Avail Use% Mounted on
/dev/mapper/VG1-lvol0 220M   24K  203M   1% /mnt
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```
samir@samir-VirtualBox:/tmp$ sudo lvextend -L +50M /dev/VG1/lvol0
[sudo] password for samir:
Rounding size to boundary between physical extents: 52.00 MiB.
Insufficient free space: 13 extents needed, but only 9 available
samir@samir-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.
samir@samir-VirtualBox:/tmp$
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```
samir@samir-VirtualBox:/tmp$ sudo resize2fs /dev/VG1/lvol0 +50M
[sudo] password for samir:
resize2fs 1.46.5 (30-Dec-2021)
Filesystem at /dev/VG1/lvol0 is mounted on /mnt; on-line resizing required
resize2fs: On-line shrinking not supported
samir@samir-VirtualBox:/tmp$ sudo resize2fs /dev/VG1/lvol0 +20M
resize2fs 1.46.5 (30-Dec-2021)
resize2fs: New size smaller than minimum (8217)

samir@samir-VirtualBox:/tmp$ sudo lvdisplay
--- Logical volume ---
LV Path                /dev/VG1/lvol0
LV Name                 lvol0
VG Name                 VG1
LV UUID                 AFJL0L-K010-zFOF-wWOH-taem-fmCZ-a0XEEJ
LV Write Access         read/write
LV Creation host, time  samir-VirtualBox, 2023-03-30 23:21:05 +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

samir@samir-VirtualBox:/tmp$
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```
samir@samir-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:d0:9a:f1 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 74851sec preferred_lft 74851sec
    inet6 fe80::2327:92b8:d928:8466/64 scope link noprefixroute
        valid_lft forever preferred_lft forever
samir@samir-VirtualBox:/tmp$
```

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```
samir@samir-VirtualBox:/tmp$ sudo apt install net-tools
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
The following package was automatically installed and is no longer required:
  systemd-hwe-hwdb
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 259 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-1ubu
Fetched 204 kB in 1s (307 kB/s)
Selecting previously unselected package net-tools.
(Reading database ... 198943 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) ...
```

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```
samir@samir-VirtualBox:/tmp$ snap install nmap # 7.93
nmap 7.93 from Maximiliano Bertacchini (maxiberta) installed
samir@samir-VirtualBox:/tmp$ nnmap 10.0.2015
Command 'nnmap' not found, did you mean:
  command 'nmap' from snap nmap (7.93)
  command 'nmap' from deb nmap (7.91+dfsg1+really7.80+dfsg1-2ubuntu0.1)
See 'snap info <snapname>' for additional versions.
samir@samir-VirtualBox:/tmp$ nnmap 10.0.2.15
Command 'nnmap' not found, did you mean:
  command 'nmap' from snap nmap (7.93)
  command 'nmap' from deb nmap (7.91+dfsg1+really7.80+dfsg1-2ubuntu0.1)
See 'snap info <snapname>' for additional versions.
samir@samir-VirtualBox:/tmp$ nmap 10.0.2.15
Starting Nmap 7.93 ( https://nmap.org ) at 2023-03-31 21:06 EET
Nmap scan report for samir-VirtualBox (10.0.2.15)
Host is up (0.00011s latency).
All 1000 scanned ports on samir-VirtualBox (10.0.2.15) are in ignored states.
Not shown: 1000 closed tcp ports (conn-refused)

Nmap done: 1 IP address (1 host up) scanned in 0.32 seconds
samir@samir-VirtualBox:/tmp$
```