

ITIM

PRACTICAL - 6

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Tasks :

Question 1: Demonstrate how to increase the size of the volume group when the memory is exhausted in the volume group.

Question 2 : Demonstrate how to remove a physical volume from a volume group

Question 3 : Demonstrate how to Rename LVM

Question 4 : Create a LVM- Create a partition : 1200M

- 1PE = 16MB

- Volume Group name: dell

- logical Vol: lenevo

- Logical vol size: 20PE

- Filesystem: xfs

- Mount Point: /mnt/extend

Question 5 : Set the size of the logical volume to 50PE under dell volume group.

Question 6: Demonstrate how to manage the storage using Stratis (Perform the Guided exercise and Final lab of chapter 8)

Steps :

Question 1: Demonstrate how to increase the size of the volume group when the memory is exhausted in the volume group.

In the below fig. We can see the volume group dell

Now if we want to extend dell then we can do it by

1- **creating a new partition (/dev/vdd1)**

2- **creating a physical volume** with the newly created partition (`pvcreate /dev/vdd1`)

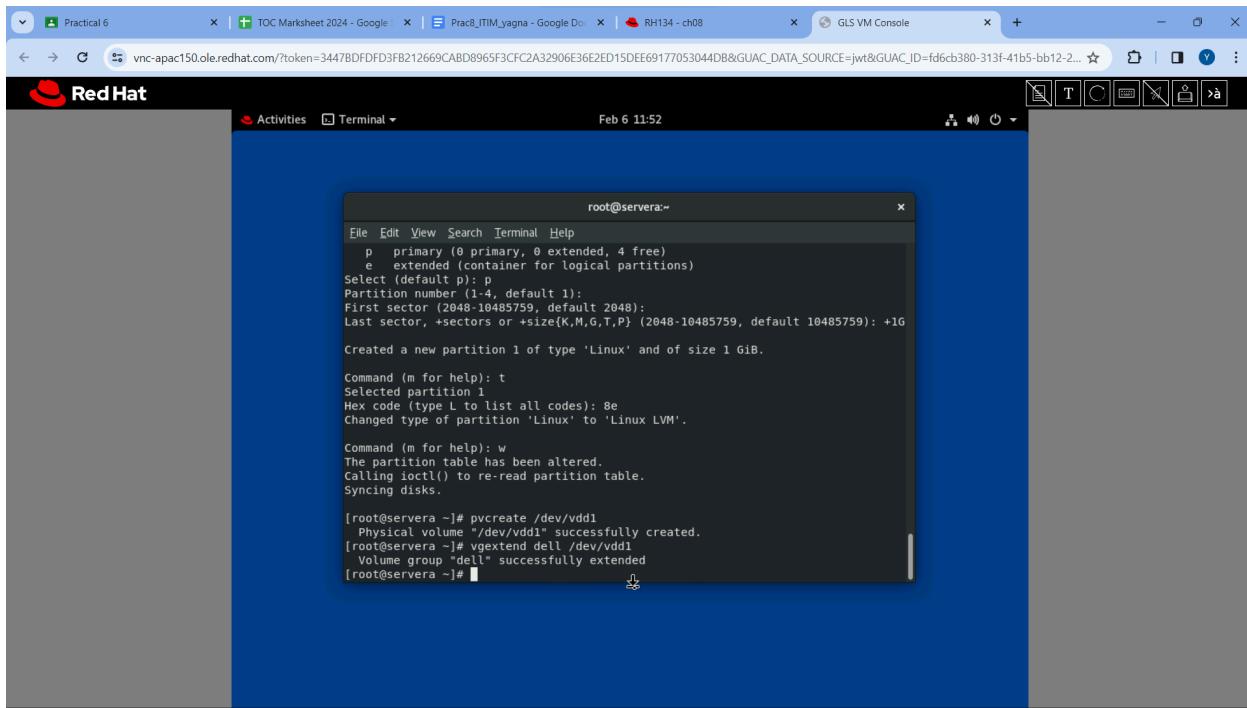
3- **extending the current volume group** and adding the physical volume to it
(`vgextend dell /dev/vdd1`)

Now we can extend the logical volume (`lvextend -n name -L +size /dev/dell/lenovo`)

```
root@servera:~ 
File Edit View Search Terminal Help
[root@servera ~]# reboot
Connection to servera closed by remote host.
Connection to servera closed.
[student@workstation ~]$ ssh root@servera
Activate the web console with: systemctl enable --now cockpit.socket

This system is not registered to Red Hat Insights. See https://cloud.redhat.com/
To register this system, run: insights-client --register

Last login: Tue Feb  6 11:31:32 2024 from 172.25.250.9
[root@servera ~]# lsblk
NAME      MAJ:MIN RM  SIZE RO TYPE MOUNTPOINT
vda       252:0    0   10G  0 disk
└─vda1     252:1    0   1M  0 part
  └─vda2     252:2    0 100M  0 part /boot/efi
  └─vda3     252:3    0  9.9G  0 part /
vdb       252:16   0    5G  0 disk
└─vdb1     252:17   0   1G  0 part
  └─dell-lenovo 253:0    0  1.2G  0 lvm  /mnt/extend
  └─vdb2     252:18   0   1G  0 part
    └─dell-lenovo 253:0    0  1.2G  0 lvm  /mnt/extend
vdc       252:32   0    5G  0 disk
vdd       252:48   0    5G  0 disk
[root@servera ~]#
```



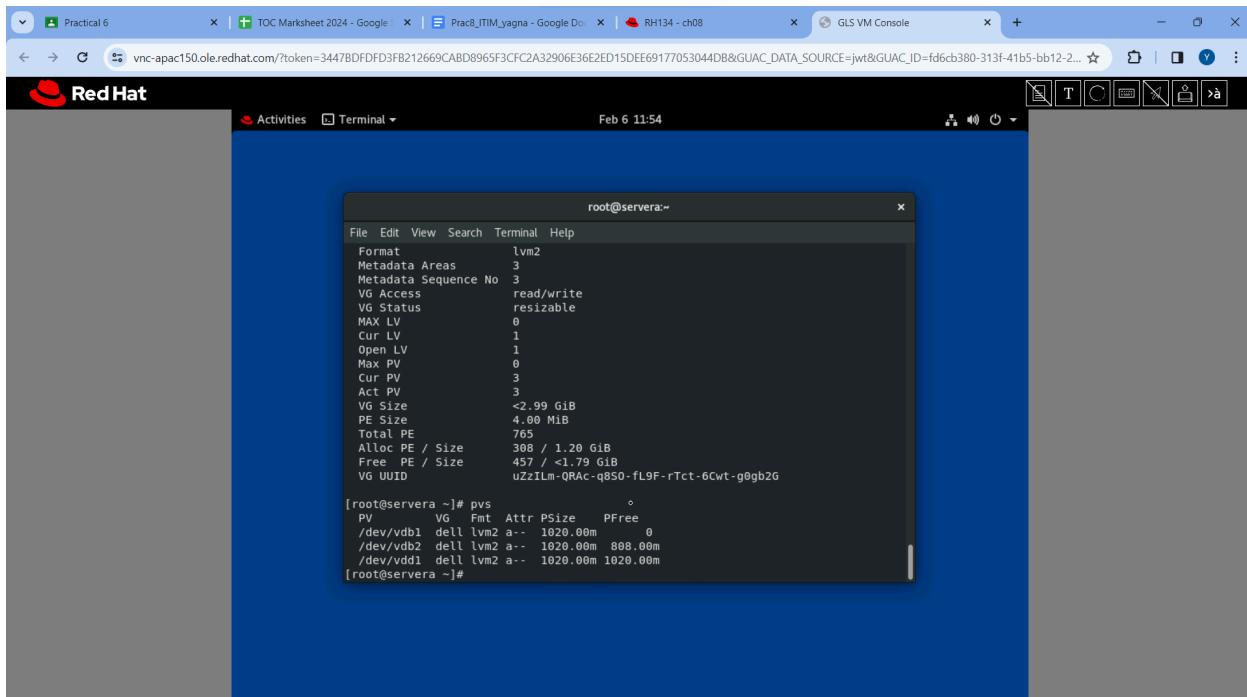
A screenshot of a Red Hat Linux desktop environment. The terminal window shows the root user performing the following steps:

```
root@servera:~# fdisk /dev/vdd1
File Edit View Search Terminal Help
p primary (0 primary, 0 extended, 4 free)
e extended (container for logical partitions)
Select (default p): p
Partition number (1-4, default 1):
First sector (2048-10485759, default 2048):
Last sector, +sectors or +size{K,M,G,T,P} (2048-10485759, default 10485759): +1G
Created a new partition 1 of type 'Linux' and of size 1 GiB.

Command (m for help): t
Selected partition 1
Hex code (type L to list all codes): 8e
Changed type of partition 'Linux' to 'Linux LVM'.

Command (m for help): w
The partition table has been altered.
Calling ioctl() to re-read partition table.
Syncing disks.

[root@servera ~]# pvcreate /dev/vdd1
Physical volume "/dev/vdd1" successfully created.
[root@Servera ~]# vgextend dell /dev/vdd1
Volume group "dell" successfully extended
[root@Servera ~]#
```



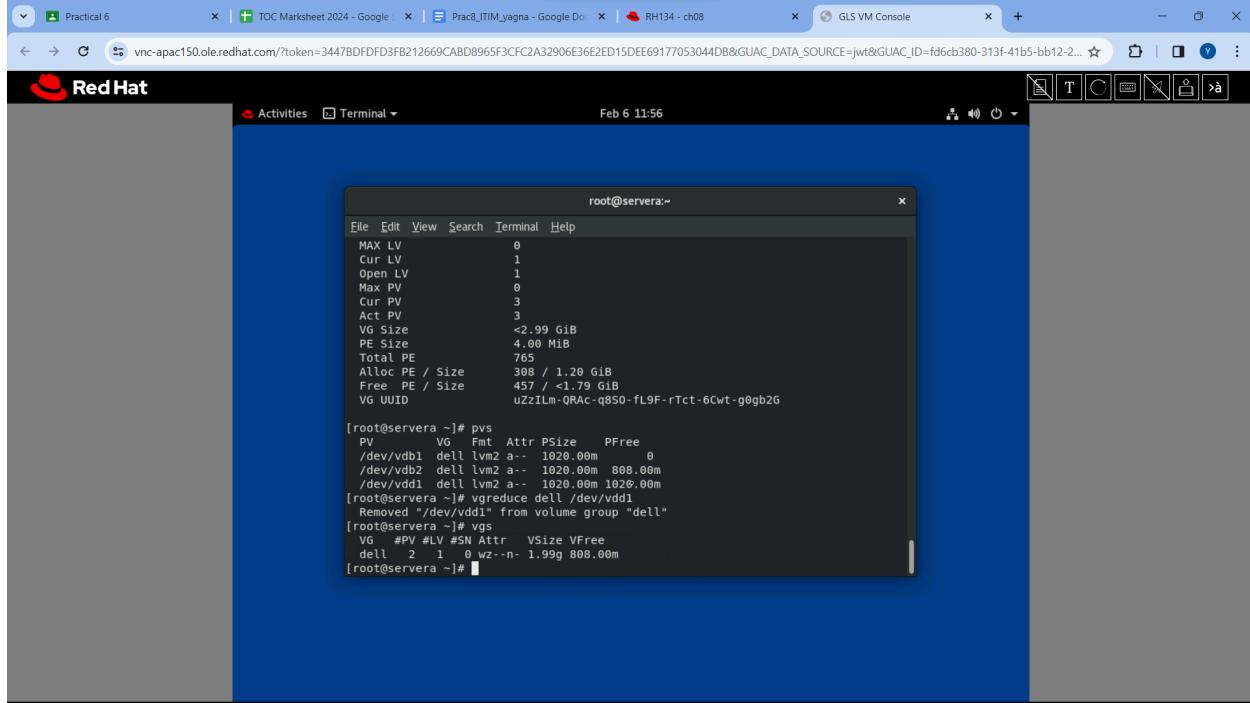
A screenshot of a Red Hat Linux desktop environment. The terminal window shows the root user displaying LVM configuration details:

```
root@servera:~# pvs
File Edit View Search Terminal Help
Format          lvm2
Metadata Areas   3
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          3
Act PV          3
VG Size         <2.99 GiB
PE Size          4.00 MiB
Total PE        765
Alloc PE / Size 308 / 1.20 GiB
Free  PE / Size 457 / <1.79 GiB
VG UUID         uzzILm-QRAC-q850-fL9F-rTct-6Cwt-g0gb2G

[root@servera ~]#
```

Q2) Demonstrate how to remove a physical volume from a volume group

`vgreduce dell /dev/vdd1` where dell is the volume group name and vdd1 physical volume



The screenshot shows a Red Hat Linux desktop environment with a terminal window open. The terminal window title is "root@servera:~". The command history in the terminal shows the following steps:

```
root@servera ~]# pvs
PV          VG  Fmt Attr PSize  PFree
/dev/vdb1   dell lvm2 a-- 1020.00m    0
/dev/vdb2   dell lvm2 a-- 1020.00m  808.00m
/dev/vdd1   dell lvm2 a-- 1020.00m 1020.00m
[root@servera ~]# vgreduce dell /dev/vdd1
Removed "/dev/vdd1" from volume group "dell"
[root@servera ~]# vgs
VG #PV #LV #SN Attr  VSize VFree
dell  2   1   0 wz--n- 1.99g 808.00m
[root@servera ~]#
```

Q3 Demonstrate how to Rename LVM : **lvrename dell lenovo hp** (dell is volume group lenovo is current logical volume name and hp is the new name of logical volume)

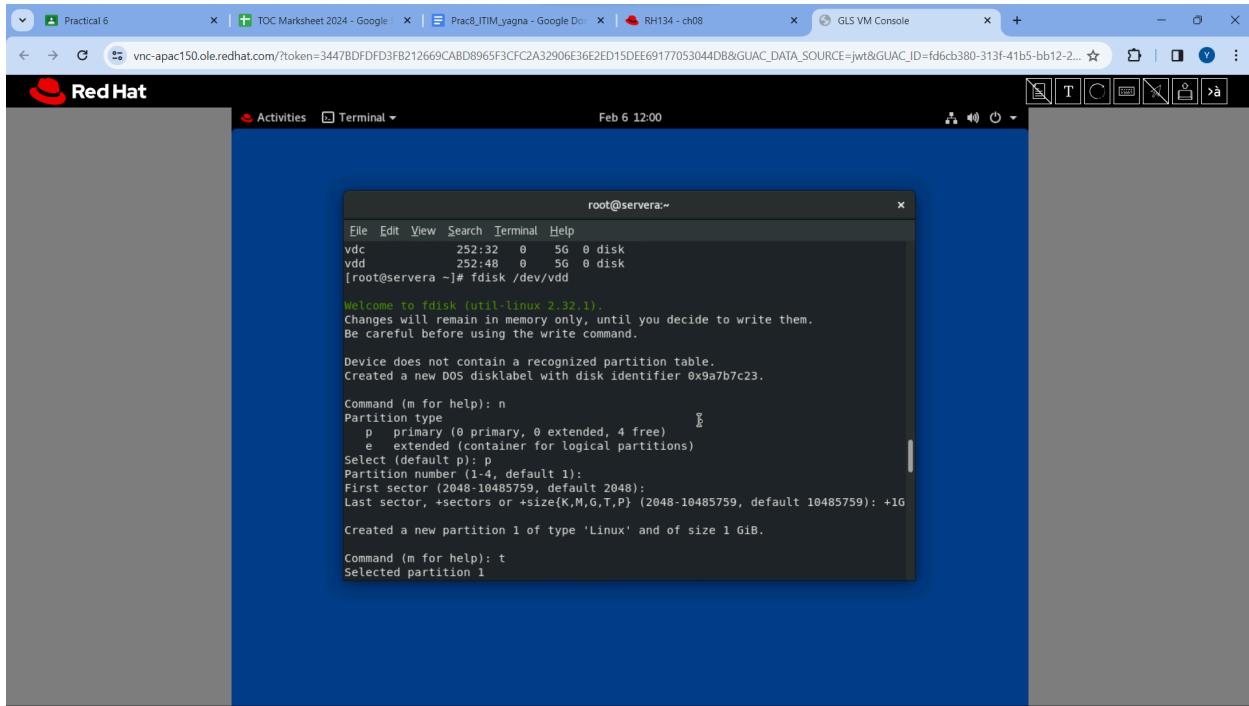
The screenshot shows a Red Hat Linux desktop environment with a terminal window open. The terminal window title is "root@servera:~". The terminal content shows the following command sequence:

```
[root@servera ~]# pvs
PV          VG  Fmt Attr PSize   PFree
/dev/vdb1    dell lvm2 a-- 1020.00m      0
/dev/vdb2    dell lvm2 a-- 1020.00m  808.00m
/dev/vdd1    dell lvm2 a-- 1020.00m 1020.00m
[root@servera ~]# vgreduce dell /dev/vdd1
Removed "/dev/vdd1" from volume group "dell"
[root@servera ~]# vgs
VG #PV #LV #SN Attr  VSize VFree
dell  2   1   0 wz-n- 1.99g 808.00m
[root@servera ~]# lvrename dell lenovo hp
Renamed "lenovo" to "hp" in volume group "dell"
[root@servera ~]# lvrename dell hp lenovo
Renamed "hp" to "lenovo" in volume group "dell"
[root@servera ~]#
```

Q4 Create a LVM- Create a partition : 1200M

- 1PE = 16MB
- Volume Group name: dell
- logical Vol: lenovo
- Logical vol size: 20PE
- Filesystem: xfs
- Mount Point: /mnt/extend

1- Create a partition using `fdisk /dev/vdd`



The screenshot shows a Red Hat Linux desktop environment with a terminal window open. The terminal window title is "root@server:~". The terminal content shows the following session:

```
root@server:~# fdisk /dev/vdd
Welcome to fdisk (util-linux 2.32.1).
Changes will remain in memory only, until you decide to write them.
Be careful before using the write command.

Device does not contain a recognized partition table.
Created a new DOS disklabel with disk identifier 0x9a7b7c23.

Command (m for help): n
Partition type
   p - primary (0 primary, 0 extended, 4 free)
   e - extended (container for logical partitions)
Select (default p): p
Partition number (1-4, default 1):
First sector (2048-10485759, default 2048):
Last sector, +sectors or +size(K,M,G,T,P) (2048-10485759, default 10485759): +1G
Created a new partition 1 of type 'Linux' and of size 1 GiB.

Command (m for help): t
Selected partition 1
```

2- Create a physical volume with that partition : `pvcreate /dev/vdd1`

3- Create a volume group named dell (created before so extended) :

`vgextend dell /dev/vdd1` (if vg exists) , `vgcreate dell /dev/vdd1` (for new vg)

```

root@servera:~# pvcreate /dev/vdd1
Physical volume "/dev/vdd1" successfully created.
[root@servera ~]# vgextend dell /dev/vdd1
Volume group "dell" successfully extended
[root@servera ~]# lsblk
NAME      MAJ:MIN RM  SIZE RO TYPE MOUNTPOINT
vda       252:0   0  10G  0 disk
└─vda1    252:1   0   1M  0 part
  └─vda2    252:2   0 100M  0 part /boot/efi
  └─vda3    252:3   0 9.9G  0 part /
vdb       252:16  0   5G  0 disk
└─vdb1    252:17  0   1G  0 part
  └─vdb2    252:18  0   1G  0 part
vdc       252:32  0   5G  0 disk
vdd       252:48  0   5G  0 disk

```

4- Create a physical volume named lenovo : **lvcreate -l 20 -n lenovo dell (old ss)**

-l to extend the LV -n to give name of physical volume with vgnname

```

root@servera:~# pvcreate /dev/vdb1
Physical volume "/dev/vdb1" successfully created.
Physical volume "/dev/vdb2" successfully created.
[root@servera ~]# vgcreate dell /dev/vdb1 /dev/vdb2
Volume group "dell" successfully created
[root@servera ~]# lvcreate -L +1.2G -n lenovo dell
Rounding up size to full physical extent 1.20 GiB
Logical volume "lenovo" created.
[root@servera ~]# lsblk
NAME      MAJ:MIN RM  SIZE RO TYPE MOUNTPOINT
vda       252:0   0  10G  0 disk
└─vda1    252:1   0   1M  0 part
  └─vda2    252:2   0 100M  0 part /boot/efi
  └─vda3    252:3   0 9.9G  0 part /
vdb       252:16  0   5G  0 disk
└─vdb1    252:17  0   1G  0 part
  └─vdb2    252:18  0   1G  0 part
vdc       252:32  0   5G  0 disk
vdd       252:48  0   5G  0 disk

```

A screenshot of a Red Hat Linux desktop environment. The desktop has a blue header bar with the Red Hat logo and various application icons. A central terminal window is open, showing the command output of `vgdisplay`. The output details a volume group named "dell" with a single logical volume "lvm2".

```
[root@servera ~]# vgdisplay
-- Volume group --
VG Name           dell
System ID
Format            lvm2
Metadata Areas    2
Metadata Sequence No  6
VG Access         read/write
VG Status         resizable
MAX LV
Cur LV
Open LV
Max PV
Cur PV
Act PV
VG Size          1.99 GiB
PE Size           4.00 MiB
Total PE          510
Alloc PE / Size   308 / 1.20 GiB
Free  PE / Size   202 / 888.00 MiB
VG UUID           0ZzILm-QRAC-q850-fL9F-rTct-6Cwt-g0gb2G
[root@servera ~]#
```

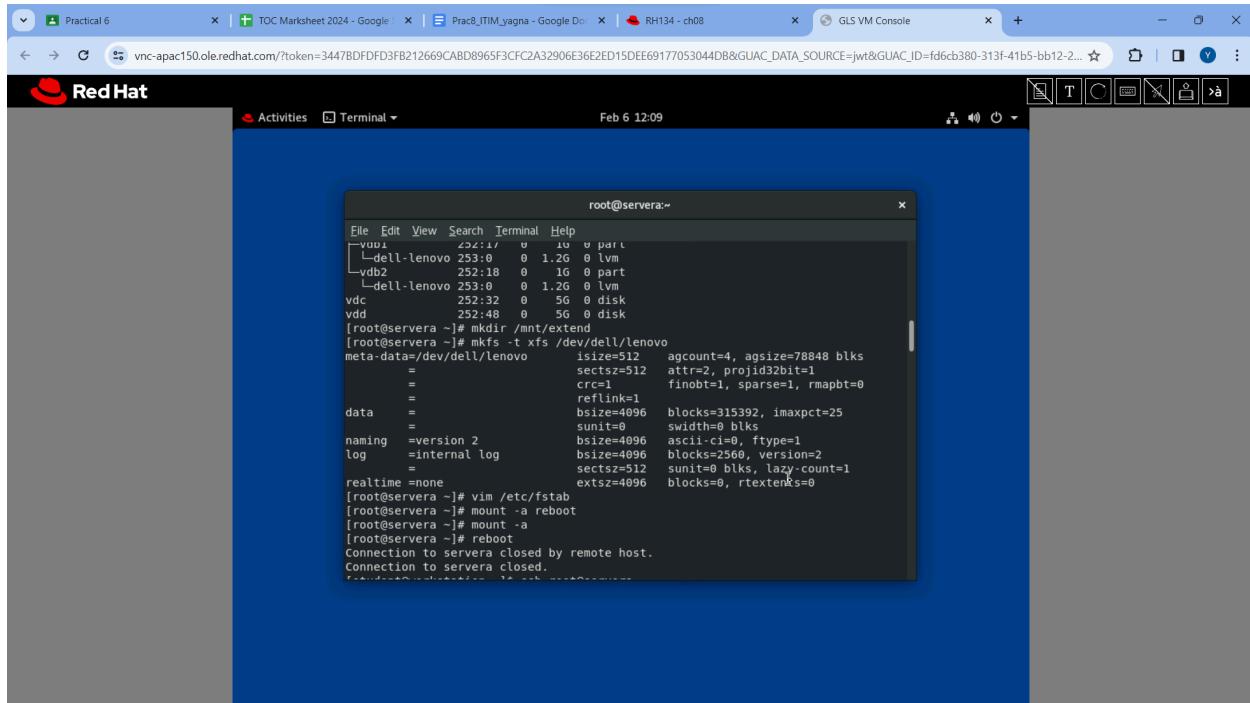
A screenshot of a Red Hat Linux desktop environment. The desktop has a blue header bar with the Red Hat logo and various application icons. A central terminal window is open, showing the command output of `lvextend` followed by `lvdisplay`. The user attempts to extend a logical volume "lenovo" on "dell" but receives an error about an invalid argument for --extents. Subsequent commands show the logical volume "lenovo" with its current configuration.

```
[root@servera ~]# lvextend -l /dev/dell/lenovo
Invalid argument for --extents: /dev/dell/lenovo
Error during parsing of command line.
[root@servera ~]# lvextend -l 20 /dev/dell/lenovo
New size given (20 extents) not larger than existing size (308 extents)
[root@servera ~]# lvdisplay
-- Logical volume --
LV Path           /dev/dell/lenovo
LV Name           lenovo
VG Name           dell
LV UUID           ssIAYG-NrB3-7bf7-auXj-BYtr-wRKD-nyXQig
LV Write Access   read/write
LV Creation host, time server.lab.example.com, 2024-02-06 11:41:04 -0500
LV Status         available
# open            1
LV Size           1.20 GiB
Current LE        308
Segments          2
Allocation        inherit
Read ahead sectors auto
- currently set to 8192
Block device      253:0
[root@servera ~]#
```

6- Assign filesystem : `mkfs -t xfs /dev/dell/lenovo` where **xfs** is the filesystem and **lenovo** is the logical volume. Then create a dir /mnt/extend to mount later : `mkdir /mnt/extend`

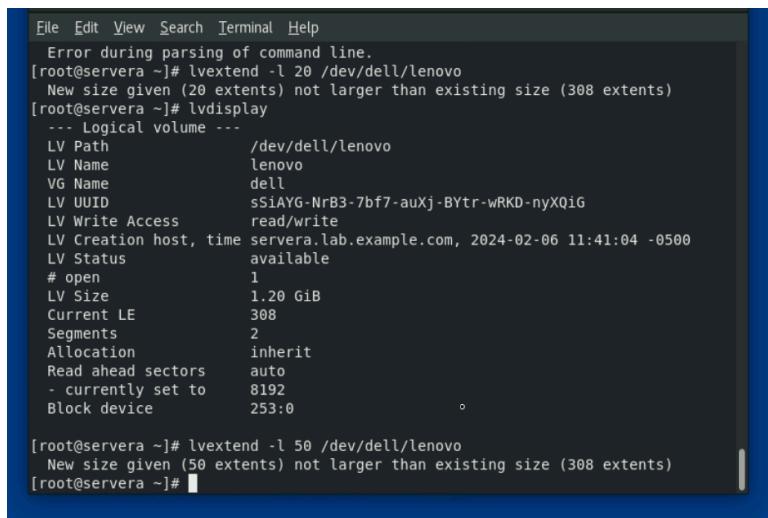
7- Enter the logical volume path in `/etc/fstab` file: `/dev/dell/lenovo /mnt/extend/ xfs defaults 0 0`

8- Mount the dir with : `mount -a` (-a for all) and reboot the server : `reboot`



Question 5 : Set the size of the logical volume to 50PE under dell volume group.

Lvextend -l 50 /dev/dell/lenovo



Question 6: Demonstrate how to manage the storage using Stratis (Perform the Guided exercise and Final lab of chapter 8)

GUIDED EXERCISE-1:

Firstly connected to the provided lab and installed the stratis cli.

```
[root@servera ~]# yum install stratisd stratis-cli
Last metadata expiration check: 0:43:41 ago on Wed 31 Jan 2024 03:06:27 AM EST.
Dependencies resolved.
=====
Package      Arch    Version     Repository      Size
=====
Installing:
stratis-cli  noarch  2.0.0-1.el8  rhel-8.2-for-x86_64-appstream-rpms  60 k
stratisd     x86_64  2.0.0-4.el8  rhel-8.2-for-x86_64-appstream-rpms  1.2 M
```

Activated the stratisd service using terminal command.

Created the pool named “**stratispool1**” and added **/dev/vdb** and then checked for the same, After that added **/dev/vdc** as well.

Verified the block devices that are member of stratispool1 using the

Command : stratis blockdev list

```
[root@servera ~]# stratis pool create stratispool1 /dev/vdb
[root@servera ~]# stratis pool list
Name          Total Physical
stratispool1  5 GiB / 37.63 MiB / 4.96 GiB
[root@servera ~]# stratis pool add-data /dev/vdc
usage: stratis pool add-data [-h] pool_name blockdev [blockdev ...]
stratis pool add-data: error: the following arguments are required: blockdev
[root@servera ~]# stratis pool add-data stratispool1 /dev/vdc
[root@servera ~]# stratis blockdev pool stratispool1
usage: stratis blockdev [-h] {list} ...
stratis blockdev: error: invalid choice: 'pool' (choose from 'list')
[root@servera ~]# stratis blockdev list stratispool1
Pool Name   Device Node  Physical Size  Tier
stratispool1 /dev/vdb           5 GiB  Data
stratispool1 /dev/vdc           5 GiB  Data
[root@servera ~]#
```

Created the thin provision file system and verified the availability of the created file system.

```
[root@servera ~]# stratis filesystem create stratispool1 stratis-filesystem1
[root@servera ~]# stratis filesystem list
Pool Name      Name          Used     Created        Device
      UUID
stratispool1  stratis-filesystem1  546 MiB Jan 31 2024 04:18 /stratis/stratispool1/strati
s-filesystem1  a51dd07c93bc41b7a47686fc04469d70
[root@servera ~]#
```

Created the directory named “**stratisvol**” and mounted the file system on this directory,
Then created the text file inside that directory.

```
[root@servera ~]# mount /stratis/stratispool1/stratis-filesystem1 /stratisvol
[root@servera ~]# mount
sysfs on /sys type sysfs (rw,nosuid,nodev,noexec,relatime,seclabel)
proc on /proc type proc (rw,nosuid,nodev,noexec,relatime)
devtmpfs on /dev type devtmpfs (rw,nosuid,seclabel,size=907716k,nr_inodes=226929,mode=755)
securityfs on /sys/kernel/security type securityfs (rw,nosuid,nodev,noexec,relatime)
tmpfs on /dev/shm type tmpfs (rw,nosuid,nodev,seclabel)
devpts on /dev/pts type devpts (rw,nosuid,noexec,relatime,seclabel,gid=5,mode=620,ptmxmode=000)
tmpfs on /run type tmpfs (rw,nosuid,nodev,seclabel,mode=755)
tmpfs on /sys/fs/cgroup type tmpfs (ro,nosuid,nodev,noexec,seclabel,mode=755)
cgroup on /sys/fs/cgroup/systemd type cgroup (rw,nosuid,nodev,noexec,relatime,seclabel,xatt
r,release_agent=/usr/lib/systemd/systemd-cgroups-agent,name=systemd)
pstore on /sys/fs/pstore type pstore (rw,nosuid,nodev,noexec,relatime,seclabel)
bpf on /sys/fs/bpf type bpf (rw,nosuid,nodev,noexec,relatime,mode=700)
cgroup on /sys/fs/cgroup/devices type cgroup (rw,nosuid,nodev,noexec,relatime,seclabel,devi
ces)
cgroup on /sys/fs/cgroup/cpuset type cgroup (rw,nosuid,nodev,noexec,relatime,seclabel,cpuse
t)
cgroup on /sys/fs/cgroup/freezer type cgroup (rw,nosuid,nodev,noexec,relatime,seclabel,frie
zer)
cgroup on /sys/fs/cgroup/memory type cgroup (rw,nosuid,nodev,noexec,relatime,seclabel,memor
```

Verified that created file system dynamically grows as the data on the file system grows.

```
[root@servera ~]# echo "Hello World " > /stratisvol/file1
[root@servera ~]# dd if=/dev/urandom of=/stratisvol/file2 bs=1M count=2048
2048+0 records in
2048+0 records out
2147483648 bytes (2.1 GB, 2.0 GiB) copied, 12.8331 s, 167 MB/s
[root@servera ~]# stratis filesystem list
Pool Name      Name          Used     Created        Device
      UUID
stratispool1  stratis-filesystem1  2.53 GiB Jan 31 2024 04:18 /stratis/stratispool1/strati
s-filesystem1  a51dd07c93bc41b7a47686fc04469d70
[root@servera ~]#
```

Created a snapshot of the stratis-filesystem-1 , that will provide you the access to any
file that is deleted from stratis-filesystem1.

```
[root@servera ~]# stratis filesystem snapshot stratispool1 stratis-filesystem1 stratis-fil
esystem1-snap
[root@servera ~]# stratis filesystem lis
usage: stratis filesystem [-h] {create,snapshot,list,destroy,rename} ...
stratis filesystem: error: invalid choice: 'lis' (choose from 'create', 'snapshot', 'list'
, 'destroy', 'rename')
[root@servera ~]# stratis filesystem list
Pool Name      Name           Used   Created        Device
                         UUID
stratispool1  stratis-filesystem1    2.53 GiB Jan 31 2024 04:18 /stratis/stratispool1
/stratis-filesystem1      a51dd07c93bc41b7a47686fc04469d70
stratispool1  stratis-filesystem1-snap  2.53 GiB Jan 31 2024 04:23 /stratis/stratispool1
/stratis-filesystem1-snap  70d0f4854ff44d36831ebb8295c74c2a
[root@servera ~]#
```

Removed the **stratisvol/file1** and then created another directory to recover the file1 using the snapshot that was created earlier.

```
[root@servera ~]# rm /stratisvol/file1
rm: remove regular file '/stratisvol/file1'? y
[root@servera ~]# mkdir /stratisvil-snap
[root@servera ~]# mount /stratis/stratispool1/stratis-filesystem1-snap /stratisvil-snap
[root@servera ~]# cat /stratisvil/file1
cat: /stratisvil/file1: No such file or directory
[root@servera ~]# cat /stratisvil-snap/file1
Hello World
[root@servera ~]#
```

```
[root@servera ~]# umount /stratisvil-snap
[root@servera ~]# umount /stratisvol
[root@servera ~]# stratis filesystem destroy stratispool1 stratis-filesystem-snap
Execution failed:
You issued a command that would have a partial or no effect: The 'destroy' action has no e
ffect for resource stratis-filesystem-snap
[root@servera ~]# stratis filesystem destroy stratispool1 stratis-filesystem1-snap
[root@servera ~]# stratis filesystem destroy stratispool1 stratis-filesystem1
[root@servera ~]#
```

GUIDED EXERCISE -2:

Started the lab from the workstation then connected to the server “a” and then installed vdo.

```
[student@workstation ~]$ lab advstorage-vdo start
Starting lab.

Preparing servera for lab exercise work:

  · Downloading install.img on servera..... SUCCESS
  · Ensuring vd01 volume does not exist on servera..... SUCCESS
  · Verifying that /dev/vdd is clean on servera..... SUCCESS

[student@workstation ~]$ sudo -i
[sudo] password for student:
[root@workstation ~]# ssh servera
Activate the web console with: systemctl enable --now cockpit.socket

This system is not registered to Red Hat Insights. See https://cloud.redhat.com/
To register this system, run: insights-client --register

Last login: Wed Jan 31 04:07:34 2024 from 172.25.250.9
[root@servera ~]# yum list installed vdo
Installed Packages
vdo.x86_64          6.2.2.117-13.el8           @rhel-8-for-x86_64-baseos-rpms
```

Created the vdo volume ie “**vdo1**” using /dev/vdd device and set it’s logical size to 50GB.

```
[root@servera ~]# vdo create --name=vdo1 \
> --device=/dev/vdd --vdoLogicalSize=50G
Creating VDO vdo1
    The VDO volume can address 2 GB in 1 data slab.
    It can grow to 16 TB of physical storage in 8192 slabs.
    If a larger maximum size might be needed, use bigger slabs.
Starting VDO vdo1
Starting compression on VDO vdo1
VDO instance 0 volume is ready at /dev/mapper/vdo1
[root@servera ~]# vdo list
vdo1
[root@servera ~]# █
```

Verified that the vdo1 volume has both compression and deduplication features enabled.

```
[root@servera ~]# vdo status --name=vdo1 \
> | grep -E 'Deduplication|Compression'
  Compression: enabled
  Deduplication: enabled
[root@servera ~]# udevadm settle
```

Formatted the vdo1 volume with the **xfs** file system and mounted on the **/mnt/vdo1**

```
[root@servera ~]# mkfs.xfs -K /dev/mapper/vd01
meta-data=/dev/mapper/vd01      isize=512    agcount=4, agsize=3276800 blks
                                =          sectsz=4096  attr=2, projid32bit=1
                                =          crc=1    K  finobt=1, sparse=1, rmapbt=0
                                =          reflink=1
data     =          bsize=4096   blocks=13107200, imaxpct=25
                                =          sunit=0    swidth=0 blks
naming   =version 2           bsize=4096   ascii-ci=0, ftype=1
log      =internal log        bsize=4096   blocks=6400, version=2
                                =          sectsz=4096  sunit=1 blks, lazy-count=1
realtime =none                extsz=4096   blocks=0, rtextents=0
[root@servera ~]# mkdir /mnt.vd01
[root@servera ~]# mkdir /mnt/vd01
[root@servera ~]# mount /dev/mapper/vd01 /mnt/vd01
[root@servera ~]#
```

Created the three copies of the same file named “/root/install.img” on the volume vd01 and compared the statistics of the volume to verify the compression and deduplication happening on the volume

```
[root@servera ~]# vdstostats --human-readable
Device              Size      Used Available Use% Space saving%
/dev/mapper/vd01    5.0G    3.0G    2.0G  60%      99%
[root@servera ~]# cp /root/install.img /mnt/vd01/install.img.1
[root@servera ~]# vdstostats --human-readable
Device              Size      Used Available Use% Space saving%
/dev/mapper/vd01    5.0G    3.5G    1.5G  69%      5%
[root@servera ~]# cp /root/install.img /mnt/vd01/install.img.2
[root@servera ~]# vdstostats --human-readable
Device              Size      Used Available Use% Space saving%
/dev/mapper/vd01    5.0G    3.5G    1.5G  70%      42%
[root@servera ~]#
```

Final Lab : Implementing advanced storage features.

Started the lab from the workstation and then logged in to the server “b” as a student and then switched to root user.

```
[student@workstation ~]$ lab advstorage-review start
Starting lab.

Preparing serverb for lab exercise work:

· Backing up original /etc/fstab on serverb..... SUCCESS
· Ensuring labfs-snap does not exist on serverb..... SUCCESS
· Ensuring labfs does not exist on serverb..... SUCCESS
· Ensuring labpool does not exist on serverb..... SUCCESS
· Ensuring /labstratisvol does not exist on serverb..... SUCCESS
· Ensuring /labstratisvol-snap does not exist on serverb..... SUCCESS
· Downloading install.img on serverb..... SUCCESS
· Ensuring labvdo volume does not exist on serverb..... SUCCESS
· Ensuring clean additional disks on serverb..... SUCCESS

[student@workstation ~]$ sudo^o-i
[sudo] password for student:
[root@workstation ~]# ssh serverb
Activate the web console with: systemctl enable --now cockpit.socket

This system is not registered to Red Hat Insights. See https://cloud.redhat.com/
To register this system, run: insights-client --register

Last login: Fri Sep 11 03:42:59 2020
[root@serverb ~]#
```

Installed stratisd and stratis-cli packages using yum and enabled the service using systemctl command.

```
[root@serverb ~]# systemctl enable --now stratisd
[root@serverb ~]# stratis pool create
usage: stratis pool create [-h] [--redundancy {none}]
                           pool_name blockdevs [blockdevs ...]
stratis pool create: error: the following arguments are required: pool_name, blockdevs
[root@serverb ~]# stratis pool create labpool /dev/vdb
[root@serverb ~]# stratis pool list
Name          Total Physical
labpool  5 GiB / 37.63 MiB / 4.96 GiB
[root@serverb ~]#
```

Created the stratispool with the **/dev/vdb** and then expanded the pool using **/dev/vdc** .

```
[root@serverb ~]# stratis pool list
Name          Total Physical
labpool  5 GiB / 37.63 MiB / 4.96 GiB
[root@serverb ~]# stratis pool add-data labpool /dev/vdc
[root@serverb ~]# stratis pool list
Name          Total Physical
labpool  10 GiB / 41.63 MiB / 9.96 GiB
[root@serverb ~]# stratis blockdev list labpool
Pool Name  Device Node  Physical Size  Tier
labpool    /dev/vdb      5 GiB  Data
labpool    /dev/vdc      5 GiB  Data
[root@serverb ~]#
```

Made the thin provisioning file system named “**labfs**” and mounted that on the “**labstratisvol**” and created a file1 that contains some text.

```
[root@serverb ~]# stratis filesystem create labpool labfs
[root@serverb ~]# stratis filesystem list
Pool Name  Name  Used   Created       Device           UUID
labpool    labfs  546 MiB Jan 31 2024 05:08  /stratis/labpool/labfs  d8a72cfe3beb43b79121
05d1202ea18e
[root@serverb ~]# lsblk --output=UUID /stratis/labpool/labfs
UUID
d8a72cfe-3beb-43b7-9121-05d1202ea18e
[root@serverb ~]# vim /etc/fstab
[root@serverb ~]# mkdir /labstratisvol
[root@serverb ~]# mount /labstratisvol
[root@serverb ~]#
```

```
UUID=399C-0F7D      /boot/efi        vfat    defaults,uid=0,gid=0,umask=077,sho
rtnname=winnt 0 2
UUID=d8a72cfe-3beb-43b7-9121-05d1202ea18e /labstratisvol xfs defaults,x-systemd.require=st
ratisd.service 0 0
~
```

Verified that the pool’s file system grows dynamically as the data grows and then took the snapshot named “**labs-snap**” and then deleted the file1.

```
[root@serverb ~]# stratis filesystem list
Pool Name  Name  Used   Created      Device          UUID
labpool    labfs  546 MiB Jan 31 2024 05:08  /stratis/labpool/labfs  d8a72cfe3beb43b79121
05d1202ea18e
[root@serverb ~]# dd if=/dev/urandom of=/labstratisvol/labfile2 bs=1M count=2048
2048+0 records in
2048+0 records out
2147483648 bytes (2.1 GB, 2.0 GiB) copied, 12.2746 s, 175 MB/s
[root@serverb ~]# stratis filesystem list
Pool Name  Name  Used   Created      Device          UUID
labpool    labfs  2.39 GiB Jan 31 2024 05:08  /stratis/labpool/labfs  d8a72cfe3beb43b7912
105d1202ea18e
[root@serverb ~]#
```

```
[root@serverb ~]# stratis filesystem snapshot labpool \
> labfs labfs-snap
[root@serverb ~]# stratis filesystem list
Pool Name  Name  Used   Created      Device          UUID
labpool    labfs  2.53 GiB Jan 31 2024 05:08  /stratis/labpool/labfs      d8a72cfe3
beb43b7912105d1202ea18e
labpool    labfs-snap 2.53 GiB Jan 31 2024 05:16  /stratis/labpool/labfs-snap  fac45e051
7a94612bf06e86d5a6fe890
[root@serverb ~]# rm /labstratisvol/file1
rm: cannot remove '/labstratisvol/file1': No such file or directory
[root@serverb ~]# mkdir /labstratisvol-snap
[root@serverb ~]# mount /stratis/labpool/labfs-snap \
> /labstratisvol-snap
[root@serverb ~]# cat /labstratisvol-snap/labfile1
cat: /labstratisvol-snap/labfile1: No such file or directory
[root@serverb ~]#
```

Created the vdo volume named “**labvo**” with the device **/dev/vdd** with logical size as 50GB.

```
[root@serverb ~]# vdo create --name=labvo --device=/dev/vdd --vdoLogicalSize=50G
Creating VDO labvo
The VDO volume can address 2 GB in 1 data slab.
It can grow to address at most 16 TB of physical storage in 8192 slabs.
If a larger maximum size might be needed, use bigger slabs.
Starting VDO labvo
Starting compression on VDO labvo
VDO instance 0 volume is ready at /dev/mapper/labvo
[root@serverb ~]# vdo list
labvo
[root@serverb ~]#
```

Mounted the volume “**labvo**” onto “**labdovol**” with **xfs** file system so that it persists on reboot.

Created three copies of the file to verify that deduplication and compression is happening or not on “**labvo**”

```
[root@serverb ~]# vim /etc/fstab
[root@serverb ~]# mount /labvdovol
mount: /labvdovol: mount point does not exist.
[root@serverb ~]# mkdir /labvdovol
[root@serverb ~]# mount /labvdovol
mount: /labvdovol: wrong fs type, bad option, bad superblock on /dev/mapper/labvo, missing
  codepage or helper program, or other error.
[root@serverb ~]# vdostats --human-readable
Device          Size     Used Available Use% Space saving%
/dev/mapper/labvo    5.0G    3.0G     2.0G  60%      99%
```

```
[root@serverb ~]# vdostats --human-readable
Device          Size     Used Available Use% Space saving%
/dev/mapper/labvo    5.0G    3.0G     2.0G  60%      99%
[root@serverb ~]# cp /root/install.img /labvdovol/install.img.2
^[[A[root@serverb vdostats --human-readable
Device          Size     Used Available Use% Space saving%
/dev/mapper/labvo    5.0G    3.0G     2.0G  60%      99%
[root@serverb ~]# cp /root/install.img /labvdovol/install.img.2
cp: overwrite '/labvdovol/install.img.2'? y
```