

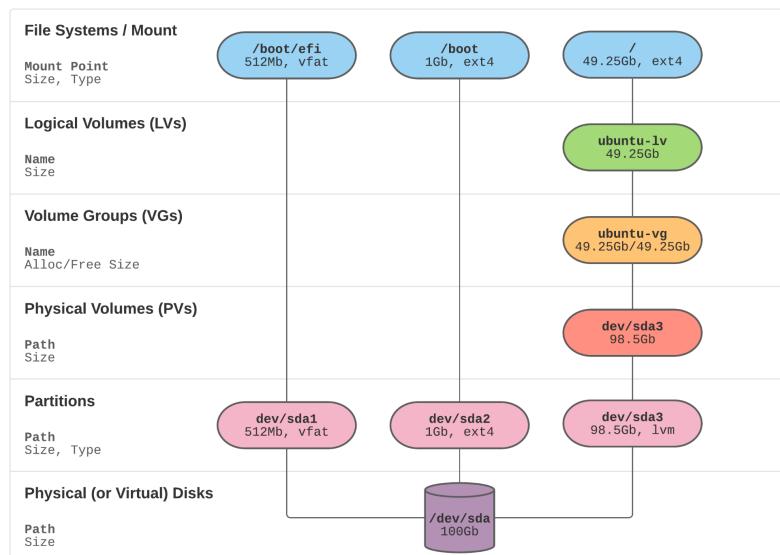
LVM

- LVM stands for **Logical Volume Management**. It is a system of managing logical volumes, or filesystems, that is much more advanced and flexible than the traditional method of partitioning a disk into one or more segments and formatting that partition with a filesystem.

There are 3 concepts that LVM manages:

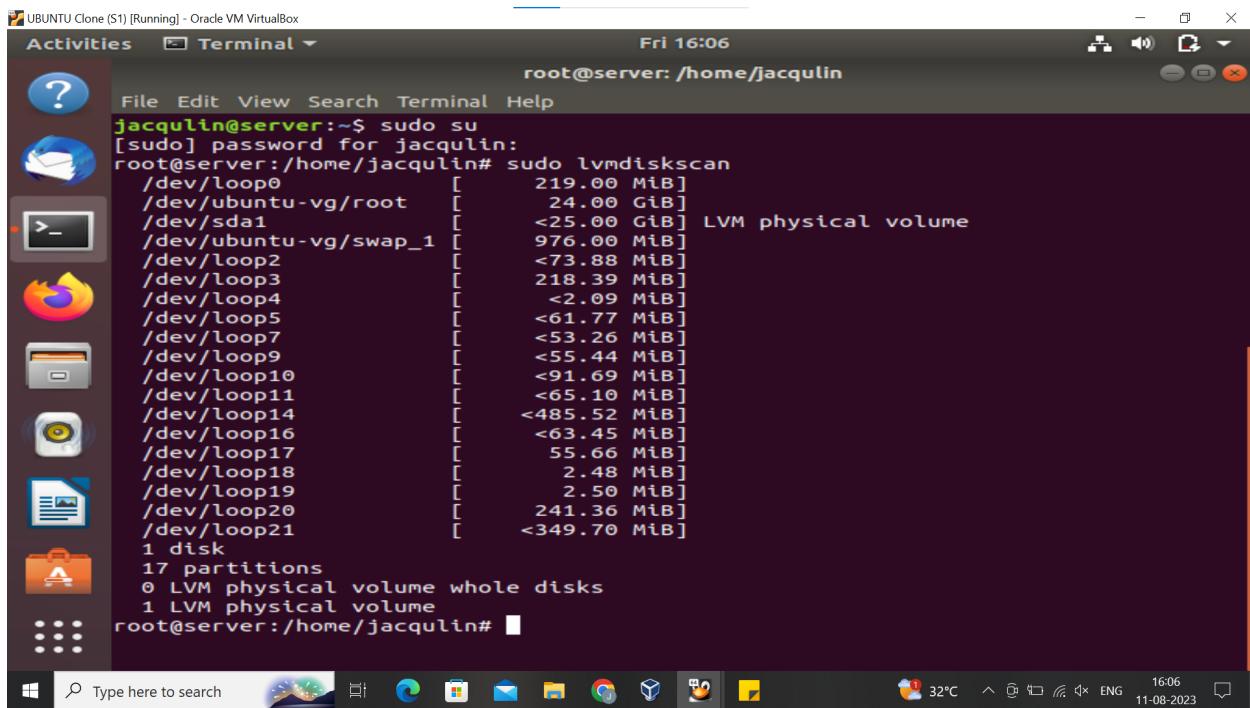
- 1. Volume Groups**
- 2. Physical Volumes**
- 3. Logical Volumes**

- Three main components of LVM are physical volumes, logical volumes and volume groups.
- The block devices that are used to store logical volumes are called **physical volumes**.
- Each logical volume holds a file system which corresponds to a partition and a unique name is assigned for each **logical volume**.
- The collection of all physical and logical volumes is called **volume group**.



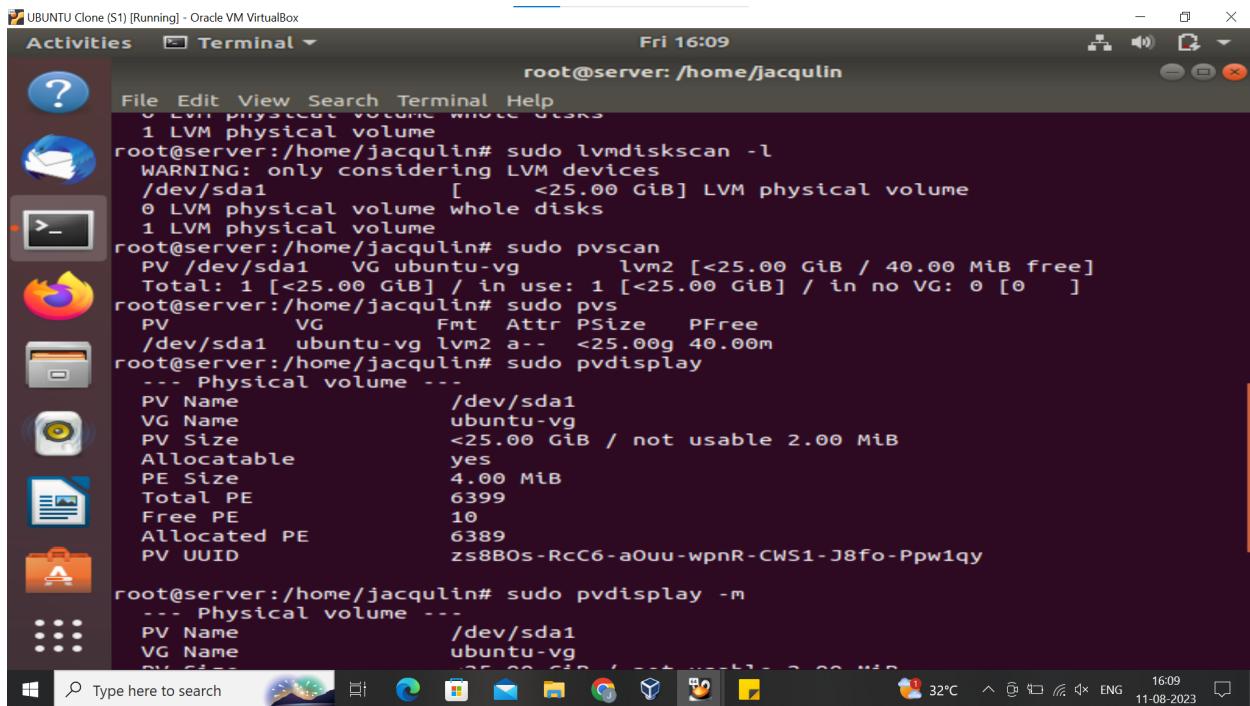
Displaying Information about Physical Volumes

sudo lvmdiskscan



```
UBUNTU Clone (S1) [Running] - Oracle VM VirtualBox
Activities Terminal Fri 16:06
root@server: /home/jacqulin
File Edit View Search Terminal Help
jacqulin@server:~$ sudo su
[sudo] password for jacqulin:
root@server:/home/jacqulin# sudo lvmdiskscan
/dev/loop0      [    219.00 MiB]
/dev/ubuntu-vg/root  [    24.00 GiB]
/dev/sda1       [    <25.00 GiB] LVM physical volume
/dev/ubuntu-vg/swap_1 [    976.00 MiB]
/dev/loop2      [    <73.88 MiB]
/dev/loop3      [    218.39 MiB]
/dev/loop4      [    <2.09 MiB]
/dev/loop5      [    <61.77 MiB]
/dev/loop7      [    <53.26 MiB]
/dev/loop9      [    <55.44 MiB]
/dev/loop10     [    <91.69 MiB]
/dev/loop11     [    <65.10 MiB]
/dev/loop14     [    <485.52 MiB]
/dev/loop16     [    <63.45 MiB]
/dev/loop17     [    55.66 MiB]
/dev/loop18     [    2.48 MiB]
/dev/loop19     [    2.50 MiB]
/dev/loop20     [    241.36 MiB]
/dev/loop21     [    <349.70 MiB]
1 disk
17 partitions
0 LVM physical volume whole disks
1 LVM physical volume
root@server:/home/jacqulin#
```

sudo lvmdiskscan -l



```
UBUNTU Clone (S1) [Running] - Oracle VM VirtualBox
Activities Terminal Fri 16:09
root@server: /home/jacqulin
File Edit View Search Terminal Help
      LVM physical volume whole disks
      1 LVM physical volume
root@server:/home/jacqulin# sudo lvmdiskscan -l
WARNING: only considering LVM devices
/dev/sda1      [    <25.00 GiB] LVM physical volume
0 LVM physical volume whole disks
1 LVM physical volume
root@server:/home/jacqulin# sudo pvscan
PV /dev/sda1 VG ubuntu-vg          lvm2 [<25.00 GiB / 40.00 MiB free]
Total: 1 [<25.00 GiB] / in use: 1 [<25.00 GiB] / in no VG: 0 [0   ]
root@server:/home/jacqulin# sudo pvs
PV          VG          Fmt Attr PSize  PFree
/dev/sda1   ubuntu-vg   lvm2 a--  <25.00g 40.00m
root@server:/home/jacqulin# sudo pvdisplay
--- Physical volume ---
PV Name           /dev/sda1
VG Name           ubuntu-vg
PV Size           <25.00 GiB / not usable 2.00 MiB
Allocatable        yes
PE Size           4.00 MiB
Total PE          6399
Free PE           10
Allocated PE      6389
PV UUID           zs8B0s-RcC6-a0uu-wpnR-CWS1-J8fo-Ppw1qy
root@server:/home/jacqulin# sudo pvdisplay -m
--- Physical volume ---
PV Name           /dev/sda1
VG Name           ubuntu-vg
PV Size           <25.00 GiB / not usable 2.00 MiB
```

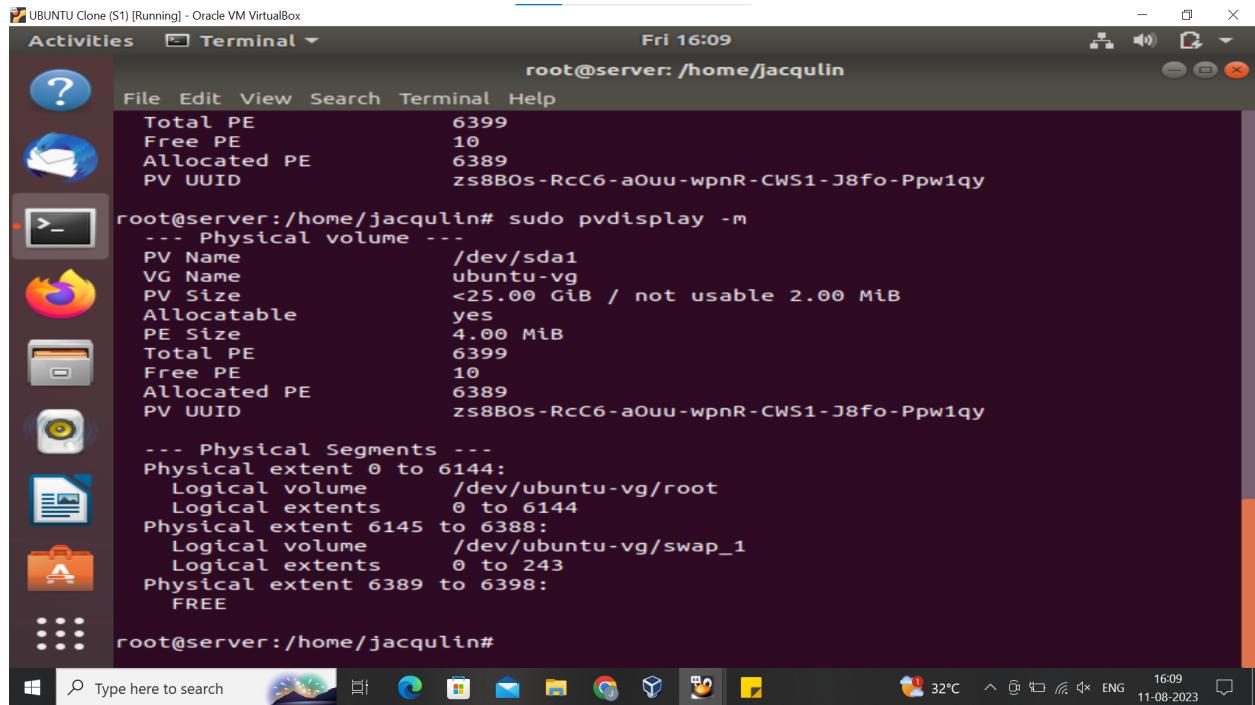
```
sudo pvscan  
sudo pvs
```

UBUNTU Clone (S1) [Running] - Oracle VM VirtualBox

Activities Terminal Fri 16:14 root@server: /home/jacqulin

```
File Edit View Search Terminal Help  
1 LVM physical volume  
root@server:/home/jacqulin# sudo lvmdiskscan -l  
WARNING: only considering LVM devices  
/dev/sda1 [ <25.00 GiB] LVM physical volume  
0 LVM physical volume whole disks  
1 LVM physical volume  
root@server:/home/jacqulin# sudo pvscan  
PV /dev/sda1 VG ubuntu-vg lvm2 [<25.00 GiB / 40.00 MiB free]  
Total: 1 [<25.00 GiB] / in use: 1 [<25.00 GiB] / in no VG: 0 [0 ]  
root@server:/home/jacqulin# sudo pvs  
PV VG Fmt Attr PSize PFree  
/dev/sda1 ubuntu-vg lvm2 a-- <25.00g 40.00m  
root@server:/home/jacqulin# sudo pvdisplay  
--- Physical volume ---  
PV Name /dev/sda1  
VG Name ubuntu-vg  
PV Size <25.00 GiB / not usable 2.00 MiB  
Allocatable yes  
PE Size 4.00 MiB  
Total PE 6399  
Free PE 10  
Allocated PE 6389  
PV UUID zs8B0s-RcC6-a0uu-wpnR-CWS1-J8fo-Ppw1qy  
root@server:/home/jacqulin# sudo pvdisplay -m  
--- Physical volume ---  
PV Name /dev/sda1  
VG Name ubuntu-vg  
PV Size <25.00 GiB / not usable 2.00 MiB
```

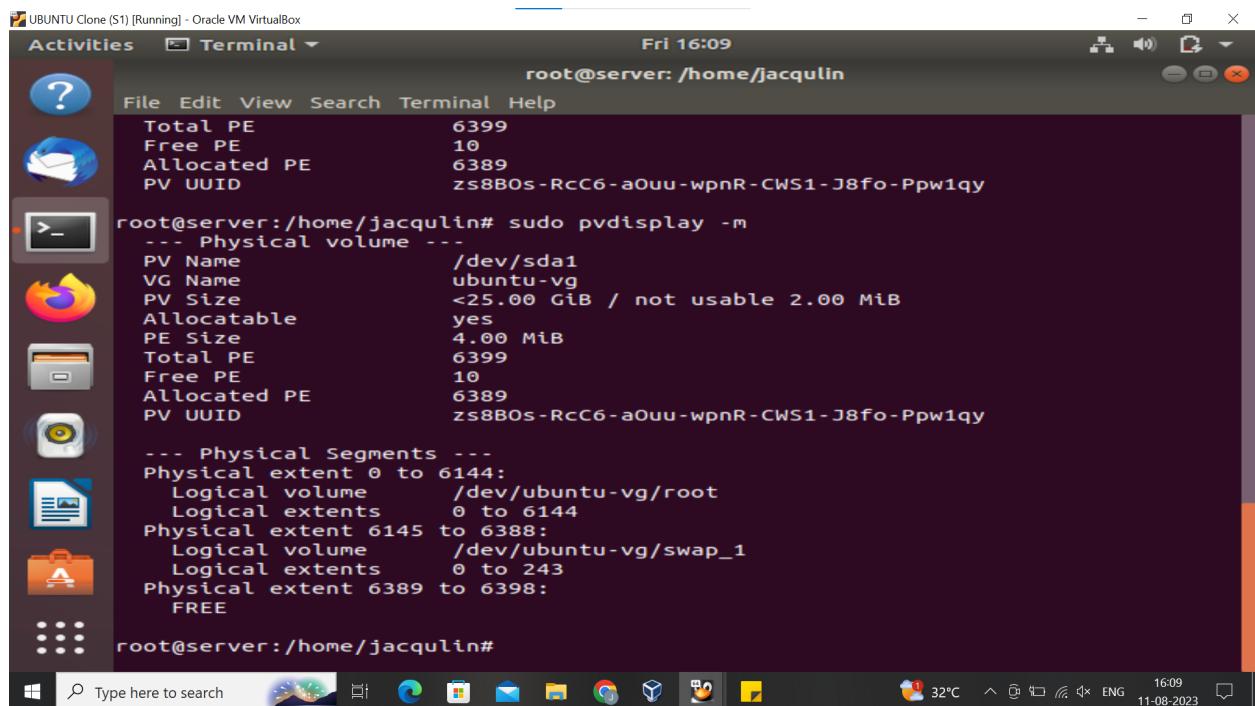
`sudo pvdisplay`



```
UBUNTU Clone (S1) [Running] - Oracle VM VirtualBox
Activities Terminal Fri 16:09
root@server: /home/jacqulin
File Edit View Search Terminal Help
Total PE 6399
Free PE 10
Allocated PE 6389
PV UUID zs8B0s-RcC6-a0uu-wpnR-CWS1-J8fo-Ppw1qy
root@server:/home/jacqulin# sudo pvdisplay -m
--- Physical volume ---
PV Name /dev/sda1
VG Name ubuntu-vg
PV Size <25.00 GiB / not usable 2.00 MiB
Allocatable yes
PE Size 4.00 MiB
Total PE 6399
Free PE 10
Allocated PE 6389
PV UUID zs8B0s-RcC6-a0uu-wpnR-CWS1-J8fo-Ppw1qy

--- Physical Segments ---
Physical extent 0 to 6144:
Logical volume /dev/ubuntu-vg/root
Logical extents 0 to 6144
Physical extent 6145 to 6388:
Logical volume /dev/ubuntu-vg/swap_1
Logical extents 0 to 243
Physical extent 6389 to 6398:
FREE
root@server:/home/jacqulin#
```

`sudo pvdisplay -m`

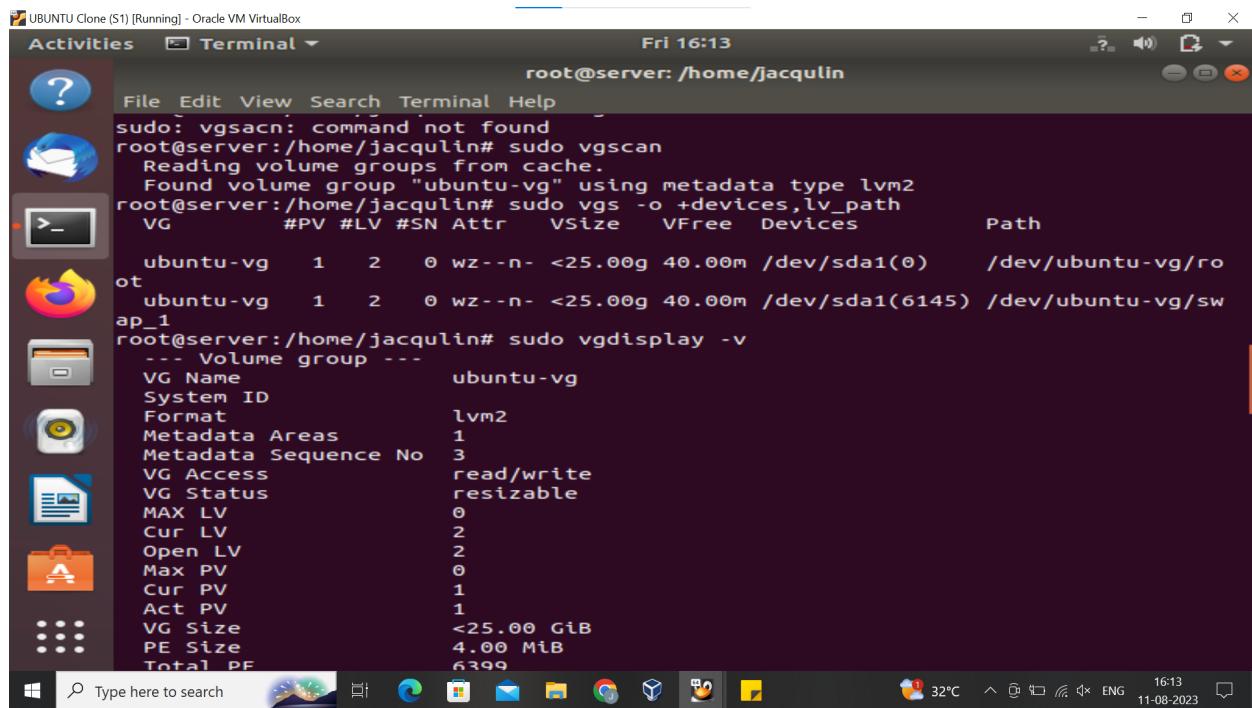


```
UBUNTU Clone (S1) [Running] - Oracle VM VirtualBox
Activities Terminal Fri 16:09
root@server: /home/jacqulin
File Edit View Search Terminal Help
Total PE 6399
Free PE 10
Allocated PE 6389
PV UUID zs8B0s-RcC6-a0uu-wpnR-CWS1-J8fo-Ppw1qy
root@server:/home/jacqulin# sudo pvdisplay -m
--- Physical volume ---
PV Name /dev/sda1
VG Name ubuntu-vg
PV Size <25.00 GiB / not usable 2.00 MiB
Allocatable yes
PE Size 4.00 MiB
Total PE 6399
Free PE 10
Allocated PE 6389
PV UUID zs8B0s-RcC6-a0uu-wpnR-CWS1-J8fo-Ppw1qy

--- Physical Segments ---
Physical extent 0 to 6144:
Logical volume /dev/ubuntu-vg/root
Logical extents 0 to 6144
Physical extent 6145 to 6388:
Logical volume /dev/ubuntu-vg/swap_1
Logical extents 0 to 243
Physical extent 6389 to 6398:
FREE
root@server:/home/jacqulin#
```

Displaying Information about Volume Groups

```
sudo vgscan
```



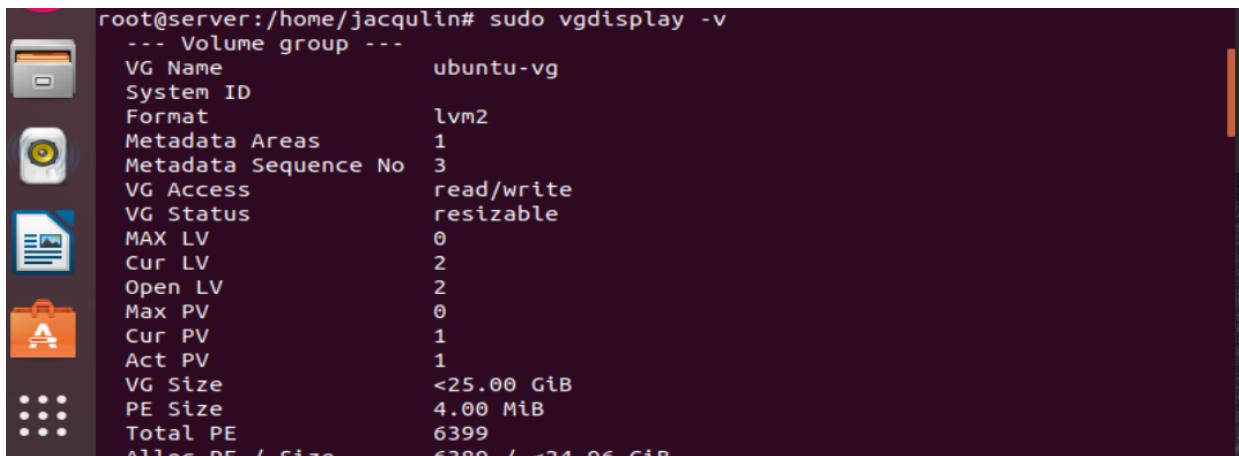
```
UBUNTU Clone (S1) [Running] - Oracle VM VirtualBox
Activities Terminal Fri 16:13
root@server: /home/jacqulin
File Edit View Search Terminal Help
sudo: vgsacn: command not found
root@server:/home/jacqulin# sudo vgscan
  Reading volume groups from cache.
  Found volume group "ubuntu-vg" using metadata type lvm2
root@server:/home/jacqulin# sudo vgs -o +devices,lv_path
  VG #PV #LV #SN Attr VSize VFree Devices Path
  ubuntu-vg   1   2   0 wz--n- <25.00g 40.00m /dev/sda1(0) /dev/ubuntu-vg/ro
ot
  ubuntu-vg   1   2   0 wz--n- <25.00g 40.00m /dev/sda1(6145) /dev/ubuntu-vg/sw
ap_1
root@server:/home/jacqulin# sudo vgdisplay -v
  --- Volume group ---
  VG Name          ubuntu-vg
  System ID
  Format          lvm2
  Metadata Areas  1
  Metadata Sequence No 3
  VG Access       read/write
  VG Status       resizable
  MAX LV          0
  Cur LV          2
  Open LV          2
  Max PV          0
  Cur PV          1
  Act PV          1
  VG Size         <25.00 GiB
  PE Size         4.00 MiB
  Total PE        6399
  Alloc PE / Size  6399 / <24.00 GiB
  
```

```
sudo vgs -o +devices,lv_path
```



```
Found volume group "ubuntu-vg" using metadata type lvm2
root@server:/home/jacqulin# sudo vgs -o +devices,lv_path
  VG #PV #LV #SN Attr VSize VFree Devices Path
  ubuntu-vg   1   2   0 wz--n- <25.00g 40.00m /dev/sda1(0) /dev/ubuntu-vg/ro
ot
  ubuntu-vg   1   2   0 wz--n- <25.00g 40.00m /dev/sda1(6145) /dev/ubuntu-vg/sw
ap_1
root@server:/home/jacqulin# sudo vgdisplay -v
  --- Volume group ---
  VG Name          ubuntu-vg
  System ID
  Format          lvm2
  Metadata Areas  1
  Metadata Sequence No 3
  VG Access       read/write
  VG Status       resizable
  MAX LV          0
  Cur LV          2
  Open LV          2
  Max PV          0
  Cur PV          1
  Act PV          1
  VG Size         <25.00 GiB
  PE Size         4.00 MiB
  Total PE        6399
  Alloc PE / Size  6399 / <24.00 GiB
  
```

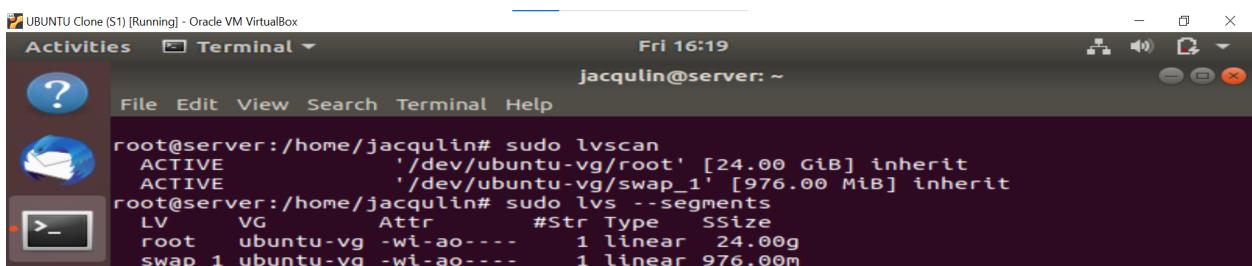
```
sudo vgdisplay -v
```



```
root@server:/home/jacqulin# sudo vgdisplay -v
--- Volume group ---
VG Name          ubuntu-vg
System ID
Format           lvm2
Metadata Areas   1
Metadata Sequence No  3
VG Access        read/write
VG Status         resizable
MAX LV
Cur LV
Open LV
Max PV
Cur PV
Act PV
VG Size         <25.00 GiB
PE Size          4.00 MiB
Total PE         6399
Alloc PE / L Size  6399 / <24.00 GiB
```

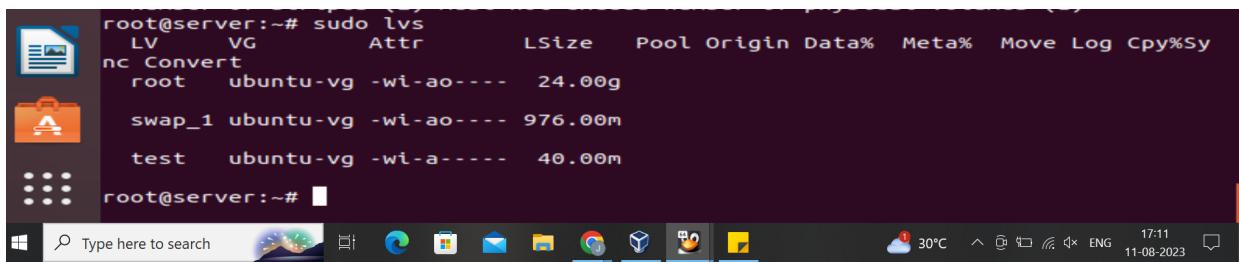
Displaying Information about Logical Volumes

```
sudo lvscan
```



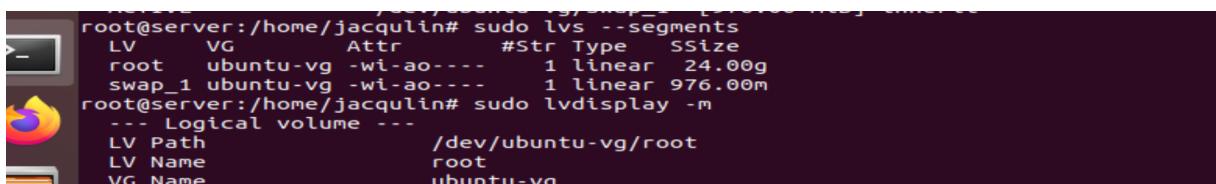
```
UBUNTU Clone (S1) [Running] - Oracle VM VirtualBox
Activities Terminal Fri 16:19
File Edit View Search Terminal Help
jacqulin@server: ~
root@server:/home/jacqulin# sudo lvscan
ACTIVE '/dev/ubuntu-vg/root' [24.00 GiB] inherit
ACTIVE '/dev/ubuntu-vg/swap_1' [976.00 MiB] inherit
root@server:/home/jacqulin# sudo lvs --segments
LV   VG     Attr      LSize   Pool Origin Data%  Meta%  Move Log Cpy%Sy
root  ubuntu-vg -wi-ao---- 24.00g
swap_1 ubuntu-vg -wi-ao---- 976.00m
```

```
sudo lvs
```



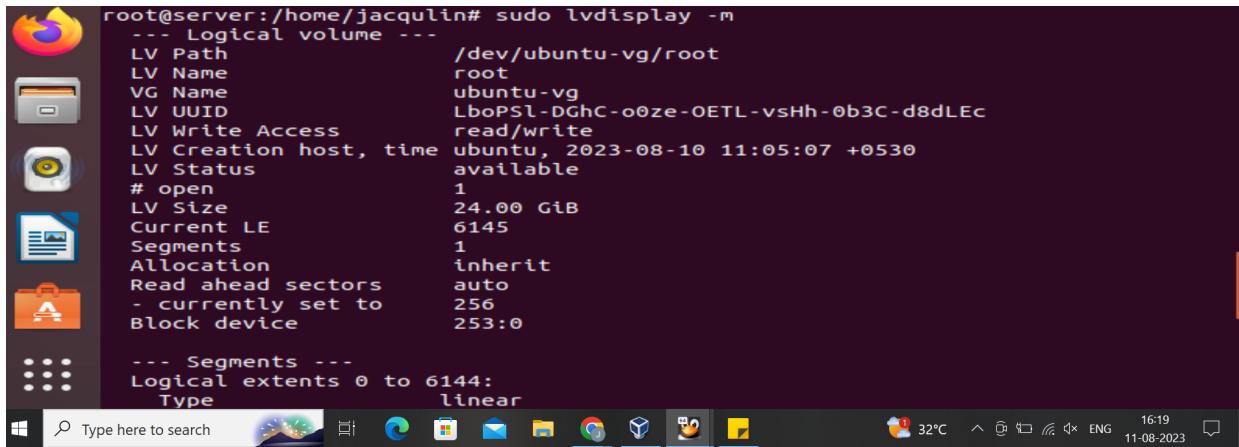
```
root@server:~# sudo lvs
  LV   VG     Attr      LSize   Pool Origin Data%  Meta%  Move Log Cpy%Sy
  nc Convert
  root  ubuntu-vg -wi-ao---- 24.00g
  swap_1 ubuntu-vg -wi-ao---- 976.00m
  test   ubuntu-vg -wi-a---- 40.00m
root@server:~#
```

```
sudo lvs --segments
```



```
root@server:/home/jacqulin# sudo lvs --segments
  LV   VG     Attr      #Str Type  SSize
  root  ubuntu-vg -wi-ao---- 1 linear 24.00g
  swap_1 ubuntu-vg -wi-ao---- 1 linear 976.00m
root@server:/home/jacqulin# sudo lvdisplay -m
--- Logical volume ---
  LV Path            /dev/ubuntu-vg/root
  LV Name           root
  VG Name           ubuntu-vg
```

```
sudo lvdisplay -m
```



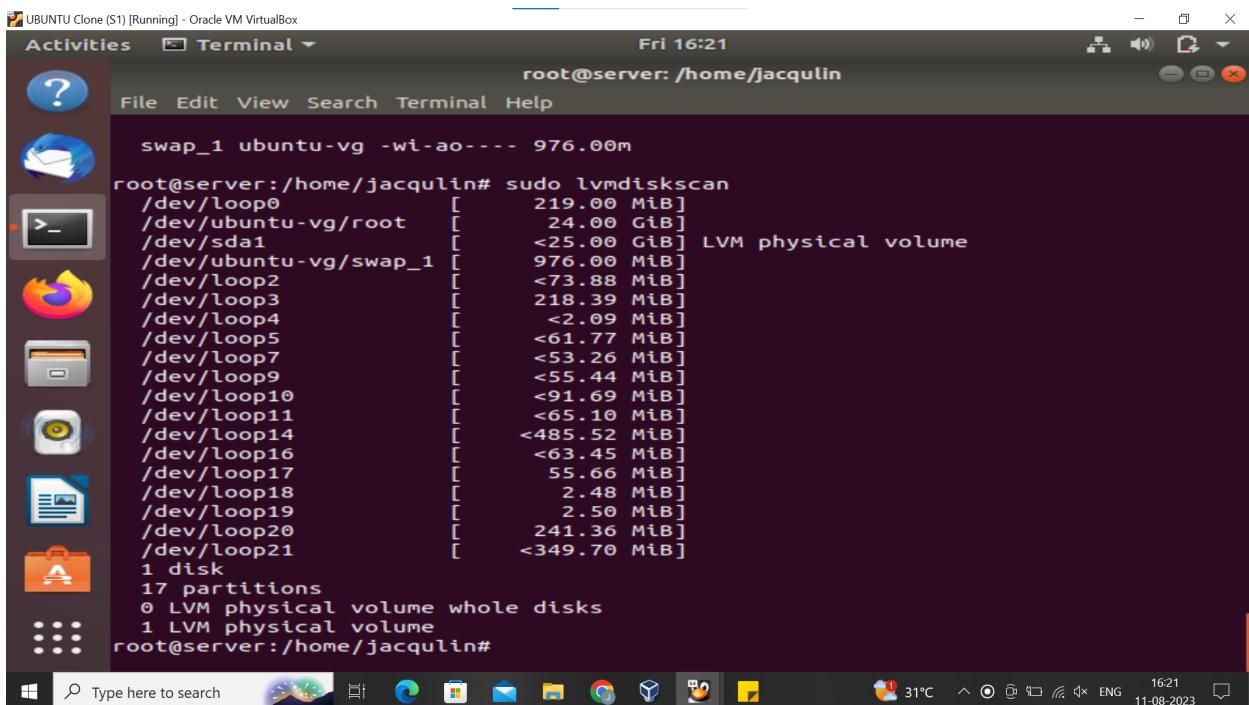
```
root@server:/home/jacqulin# sudo lvdisplay -m
--- Logical volume ---
LV Path          /dev/ubuntu-vg/root
LV Name          root
VG Name          ubuntu-vg
LV UUID          LboPSL-DGhC-o0ze-OETL-vsHh-0b3C-d8dLEc
LV Write Access  read/write
LV Creation host, time ubuntu, 2023-08-10 11:05:07 +0530
LV Status        available
# open           1
LV Size          24.00 GiB
Current LE      6145
Segments         1
Allocation      inherit
Read ahead sectors auto
- currently set to 256
Block device    253:0

--- Segments ---
Logical extents 0 to 6144:
  Type            linear
```

Create or Extend LVM Components

Creating Physical Volumes From Raw Storage Devices

sudo lvmdiskscan



```
UBUNTU Clone (S1) [Running] - Oracle VM VirtualBox
Activities Terminal Fri 16:21
File Edit View Search Terminal Help
root@server: /home/jacqulin
swap_1 ubuntu-vg -wi-ao---- 976.00m

root@server:/home/jacqulin# sudo lvmdiskscan
/dev/loop0      [     219.00 MiB]
/dev/ubuntu-vg/root [     24.00 GiB]
/dev/sda1       [ <25.00 GiB] LVM physical volume
/dev/ubuntu-vg/swap_1 [     976.00 MiB]
/dev/loop2      [     <73.88 MiB]
/dev/loop3      [     218.39 MiB]
/dev/loop4      [     <2.09 MiB]
/dev/loop5      [     <61.77 MiB]
/dev/loop7      [     <53.26 MiB]
/dev/loop9      [     <55.44 MiB]
/dev/loop10     [     <91.69 MiB]
/dev/loop11     [     <65.10 MiB]
/dev/loop14     [     <485.52 MiB]
/dev/loop16     [     <63.45 MiB]
/dev/loop17     [     55.66 MiB]
/dev/loop18     [     2.48 MiB]
/dev/loop19     [     2.50 MiB]
/dev/loop20     [     241.36 MiB]
/dev/loop21     [     <349.70 MiB]

1 disk
17 partitions
0 LVM physical volume whole disks
1 LVM physical volume
root@server:/home/jacqulin#
```

sudo pvcreate /dev/sda /dev/sdb

Creating a New Volume Group from Physical Volumes

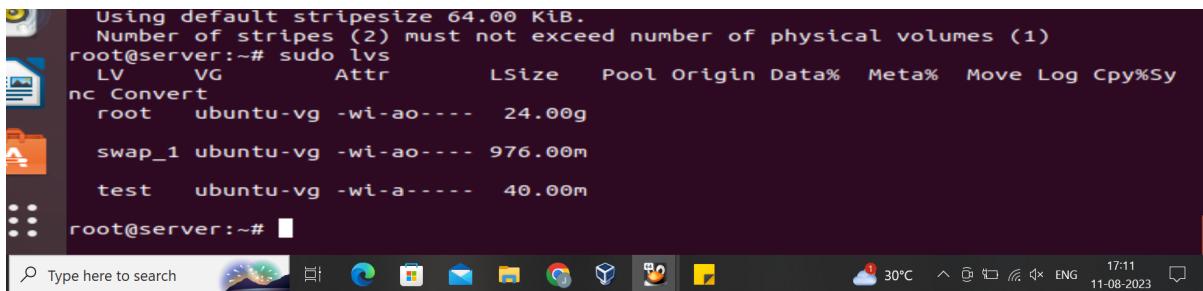
sudo vgcreate volume_group_name /dev/sda

sudo vgcreate volume_group_name /dev/sda /dev/sdb /dev/sdc

sudo vgcreate -s 8M volume_group_name /dev/sda

Creating a Logical Volume by Specifying Size

sudo lvcreate -L 10G -n test LVMVolGroup

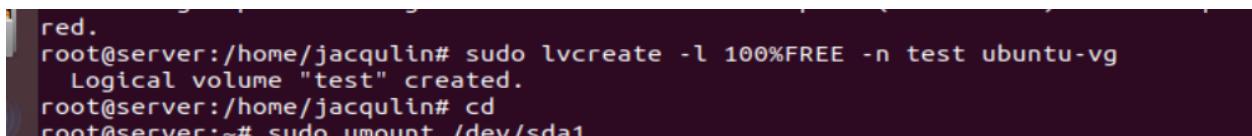


```
Using default stripesize 64.00 KiB.
Number of stripes (2) must not exceed number of physical volumes (1)
root@server:~# sudo lvs
  LV      VG      Attr       LSize   Pool Origin Data%  Meta%  Move Log Cpy%Sy
  nc Convert
    root  ubuntu-vg -wi-ao----  24.00g
  swap_1 ubuntu-vg -wi-ao----  976.00m
    test  ubuntu-vg -wi-a-----  40.00m
root@server:~#
```

Type here to search 30°C 17:11 11-08-2023

Creating a Logical Volume From All Remaining Free Space

sudo lvcreate -l 100%FREE -n test2 LVMVolGroup



```
red.
root@server:/home/jacqulin# sudo lvcreate -l 100%FREE -n test ubuntu-vg
Logical volume "test" created.
root@server:/home/jacqulin# cd
root@server:~# sudo umount /dev/sda1
```