

# **CYSE 270: Linux System for Cybersecurity**

## **Lab 7 – Manage Local Storage**

**CYSE 270: Linux System for Cybersecurity Part I– Check your file system (30 points).**

Submit the screenshot for All the three steps.

**Step 1.** Execute the `ls /dev/sd*` command to see the current hard disk devices. [use sudo ]

```
(kevin1@Kali)-[~]
└─$ sudo ls /dev/sd*
[sudo] password for kevin1:
/dev/sda /dev/sda1 /dev/sda2 /dev/sda5

(kevin1@Kali)-[~]
└─$ █
```

The command "ls /dev/sd\*" lists the current hard disk devices.

**Step 2.** Execute the `fdisk -l` command to list the current hard disk partitions. [use sudo ]

```
(kevin1@Kali)-[~]
└─$ sudo fdisk -l
Disk /dev/sda: 126.72 GiB, 136061452288 bytes, 265745024 sectors
Disk model: VBOX HARDDISK
Units: sectors of 1 * 512 = 512 bytes
Sector size (logical/physical): 512 bytes / 512 bytes
I/O size (minimum/optimal): 512 bytes / 512 bytes
Disklabel type: dos
Disk identifier: 0x21541f5c

Device      Boot      Start          End      Sectors   Size Id Type
/dev/sda1   *                2048 252184575 252182528 120.3G 83 Linux
/dev/sda2                252186622 265744383 13557762    6.5G  f W95 Ext'd (LBA)
/dev/sda5                252186624 265744383 13557760    6.5G 82 Linux swap / Solaris

(kevin1@Kali)-[~]
└─$ █
```

As root user, the command "fdisk -l" lists hard disk partitions.

**Step 3.** Execute the **parted -l** command to list the current hard disk partition table. [use `sudo` ]

```
(kevin1@Kali)-[~]
└─$ sudo parted -l
Model: ATA VBOX HARDDISK (scsi)
Disk /dev/sda: 136GB
Sector size (logical/physical): 512B/512B
Partition Table: msdos
Disk Flags:

Number  Start   End     Size    Type     File system  Flags
  1      1049kB  129GB   129GB   primary  ext4         boot
  2      129GB   136GB   6942MB  extended
  5      129GB   136GB   6942MB  logical  linux-swap(v1)  swap

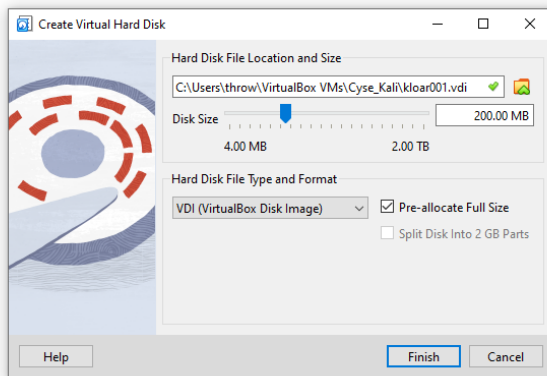
(kevin1@Kali)-[~]
└─$
```

As root user, the command "parted -l" lists the current hard disk partition table.

## **Part II**– Create a new virtual disk (30 points)

Submit the screenshot for All the three steps.

**Step 1.** In the VM setting, attach a new virtual hard disk with the size of 200 MB to our current Linux VM. Name it as “your\_midas.vdi” [ **HINT:** Please refer to the slides and discussion during the class for week 7 ]



In the VM settings, I added the virtual hard disk of 200 MB to my current Linux VM.

**Step 2.** Load this virtual hard disk to your virtual machine.



**Step 3.** Repeat the steps in Part I and **highlight the differences** after adding the new virtual hard disk.

```
(kevin1@Kali)-[~]
└─$ sudo ls /dev/sd*
[sudo] password for kevin1:
/dev/sda /dev/sda1 /dev/sda2 /dev/sda5 /dev/sdb

(kevin1@Kali)-[~]
└─$ sudo fdisk -l
Disk /dev/sda: 126.72 GiB, 136061452288 bytes, 265745024 sectors
Disk model: VBOX HARDDISK
Units: sectors of 1 * 512 = 512 bytes
Sector size (logical/physical): 512 bytes / 512 bytes
I/O size (minimum/optimal): 512 bytes / 512 bytes
Disklabel type: dos
Disk identifier: 0x21541f5c

Device Boot      Start         End      Sectors   Size Id Type
/dev/sda1 *        2048    252184575  252182528  120.3G 83 Linux
/dev/sda2          252186622  265744383  13557762   6.5G  f W95 Ext'd (LBA)
/dev/sda5          252186624  265744383  13557760   6.5G 82 Linux swap / Solaris

Disk /dev/sdb: 200 MiB, 209715200 bytes, 409600 sectors
Disk model: VBOX HARDDISK
Units: sectors of 1 * 512 = 512 bytes
Sector size (logical/physical): 512 bytes / 512 bytes
I/O size (minimum/optimal): 512 bytes / 512 bytes

(kevin1@Kali)-[~]
└─$ sudo parted -l
Model: ATA VBOX HARDDISK (scsi)
Disk /dev/sda: 136GB
Sector size (logical/physical): 512B/512B
Partition Table: msdos
Disk Flags:

Number  Start   End     Size    Type     File system  Flags
  1      1049kB  129GB   129GB   primary  ext4         boot
  2      129GB  136GB   6942MB  extended lba
  5      129GB  136GB   6942MB  logical  linux-swap(v1) swap

Error: /dev/sdb: unrecognised disk label
Model: ATA VBOX HARDDISK (scsi)
Disk /dev/sdb: 210MB
Sector size (logical/physical): 512B/512B
Partition Table: unknown
Disk Flags:
```

The following gets added: /dev/sdb, displays information of /dev/sdb (model, units, sector size, etc), and then shows the error at the bottom.

**Part III** – Creating Partitions and Filesystems (60 points)

Submit the screenshot for All the three eight steps.

**Step 1.** Use the **fdisk** command to create a new primary partition on the new virtual hard disk attached in Part II.

```
(kevin1@Kali)-[~]
└─$ sudo fdisk /dev/sdb

Welcome to fdisk (util-linux 2.41).
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 (MBR) disklabel with disk identifier 0xd6ab8b73.

Command (m for help): m
```

The "sudo fdisk /dev/sdb" command would create a new primary partition on the new virtual hard disk.

```
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 (2048-409599, default 2048):
Last sector, +/-sectors or +/-size{K,M,G,T,P} (2048-409599, default 409599):

Created a new partition 1 of type 'Linux' and of size 199 MiB.

Command (m for help): █
```

**Step 2.** Use the correct command to **create an ext4 filesystem** on the new partition.

```
(kevin1@Kali)-[~]
└─$ sudo mkfs -t ext4 /dev/sdb
mke2fs 1.47.2 (1-Jan-2025)
Found a dos partition table in /dev/sdb
Proceed anyway? (y,N) y
Creating filesystem with 204800 1k blocks and 51200 inodes
Filesystem UUID: f77cd4b6-65c6-4a95-a038-c12047dccc13
Superblock backups stored on blocks:
    8193, 24577, 40961, 57345, 73729

Allocating group tables: done
Writing inode tables: done
Creating journal (4096 blocks): done
Writing superblocks and filesystem accounting information: done

(kevin1@Kali)-[~]
└─$ █
```

The "sudo mkfs -t ext 4 /dev/sdb" command would create an ext4 filesystem on the new partition.

**Step 3. Repeat the steps in Part I and highlight the differences.**

```
(kevin1@Kali)-[~]
└─$ sudo ls /dev/sd*
/dev/sda /dev/sda1 /dev/sda2 /dev/sda5 /dev/sdb

(kevin1@Kali)-[~]
└─$ sudo fdisk -l
Disk /dev/sda: 126.72 GiB, 136061452288 bytes, 265745024 sectors
Disk model: VBOX HARDDISK
Units: sectors of 1 * 512 = 512 bytes
Sector size (logical/physical): 512 bytes / 512 bytes
I/O size (minimum/optimal): 512 bytes / 512 bytes
Disklabel type: dos
Disk identifier: 0x21541f5c

Device Boot Start End Sectors Size Id Type
/dev/sda1 * 2048 252184575 252182528 120.3G 83 Linux
/dev/sda2 252186622 265744383 13557762 6.5G f W95 Ext'd (LBA)
/dev/sda5 252186624 265744383 13557760 6.5G 82 Linux swap / Solaris

Disk /dev/sdb: 200 MiB, 209715200 bytes, 409600 sectors
Disk model: VBOX HARDDISK
Units: sectors of 1 * 512 = 512 bytes
Sector size (logical/physical): 512 bytes / 512 bytes
I/O size (minimum/optimal): 512 bytes / 512 bytes

(kevin1@Kali)-[~]
└─$ sudo parted -l
Model: ATA VBOX HARDDISK (scsi)
Disk /dev/sda: 136GB
Sector size (logical/physical): 512B/512B
Partition Table: msdos
Disk Flags:

Number Start End Size Type File system Flags
 1 1049kB 129GB 129GB primary ext4 boot
 2 129GB 136GB 6942MB extended lba
 5 129GB 136GB 6942MB logical linux-swap(v1) swap

Model: ATA VBOX HARDDISK (scsi)
Disk /dev/sdb: 210MB
Sector size (logical/physical): 512B/512B
Partition Table: loop
Disk Flags:

Number Start End Size File system Flags
 1 0.00B 210MB 210MB ext4

(kevin1@Kali)-[~]
└─$
```

The same differences in step 3 for part 2, but this time it doesn't show the error at the bottom.

**Step 4.** Make a new directory named `/cyse`. And **mount** the new partition under this directory.

```
(kevin1@Kali)-[~]
└─$ sudo mkdir /cyse

(kevin1@Kali)-[~]
└─$ sudo mount /dev/sdb /cyse

(kevin1@Kali)-[~]
└─$
```

The command `mkdir` would create the directory `/cyse` and the `mount` command would put `/dev/sdb` to `/cyse`.

**Step 5.** Use the `df` command to check the mounting point of the new partition.

```
(kevin1@Kali)-[~]
└─$ sudo df
Filesystem      1K-blocks    Used Available Use% Mounted on
udev            5562212      0   5562212  0% /dev
tmpfs           1126024     1016   1125008  1% /run
/dev/sda1      123526644 15367108 101838592 14% /
tmpfs           5630120      4    5630116  1% /dev/shm
tmpfs            1024         0      1024    0% /run/credentials/systemd-journald.service
tmpfs            5120         0      5120    0% /run/lock
tmpfs           5630120     108    5630012  1% /tmp
tmpfs            1024         0      1024    0% /run/credentials/getty@tty1.service
tmpfs           1126024     116    1125908  1% /run/user/1000
/dev/sdb        186299       64    171899  1% /cyse
```

The `df` commands display the mounting point of the new partition at the bottom.

**Step 6.** Create a new file named for **YourMIDAS.txt** (replace YourMIDAS with your MIDAS ID) in the directory /cyse and put your name in that file.

```
(kevin1@Kali)-[~]
└─$ touch kload001.txt

(kevin1@Kali)-[~]
└─$ cat kload001.txt

(kevin1@Kali)-[~]
└─$ vim kload001.txt

(kevin1@Kali)-[~]
└─$ cat kload001.txt
Kevin

(kevin1@Kali)-[~]
└─$ sudo mv kload001.txt /cyse

(kevin1@Kali)-[~]
└─$ sudo cd /cyse
sudo: cd: command not found
sudo: "cd" is a shell built-in command, it cannot be run directly.
sudo: the -s option may be used to run a privileged shell.
sudo: the -D option may be used to run a command in a specific directory.

(kevin1@Kali)-[~]
└─$ cd /cyse

(kevin1@Kali)-[/cyse]
└─$ ls
kload001.txt  lost+found
```

First, I used the touch command to create the file, used vim to edit my name in, then used mv to move the file into the cyse directory. To check, I moved into the directory and used ls to see if the file is there.

**Step 7. Unmount /cyse directory.**

```
File Actions Edit View Help

(kevin1@Kali)-[~]
└─$ sudo umount /cyse
[sudo] password for kevin1:
```

The command unmounts the directory.

Step 8. Check the contents in /cyse directory. What do you find?

```
(kevin1@Kali)-[~]
└─$ ls /cyse

(kevin1@Kali)-[~]
└─$ █
```

Nothing shows up anymore because of the command that was used in step 7.

## Reflection

In this lab, I was changing the settings in the virtual machine to practice how to change the virtual disk drive and add more storage. This is useful to do as I would be able to mount more virtual storage in case I begin to lose storage. Overall, there were no challenges present in this lab.