

Using Various Disk Management Tools

- **Introduction**
- **Lab Topology**
- **Exercise 1 - Using Various Disk Management Tools**
- **Review**

Introduction

Welcome to the **Using Various Disk Management Tools** Practice Lab. In this module you will be provided with the instructions and devices needed to develop your hands-on skills.

Disk Management

Filesystems

Free Disk Space

Monitor Free Disk

Learning Outcomes

In this module, you will complete the following exercise:

- Exercise 1 - Using Various Disk Management Tools

After completing this lab, you will be able to:

- View filesystems (lsblk)
- View the content of a block device (blkid)
- Use disk partitioning tools (fdisk, parted)
- Monitor Free Disk Space and Inodes using various commands and utilities

Exam Objectives

The following exam objectives are covered in this lab:

- **LPI: 104.1 Create partitions and filesystems**

- **CompTIA:** 1.4 Given a scenario, manage storage in a Linux environment.

Note: Our main focus is to cover the practical, hands-on aspects of the exam objectives. We recommend referring to course material or a search engine to research theoretical topics in more detail.

Lab Duration

It will take approximately **1 hour** to complete this lab.

Help and Support

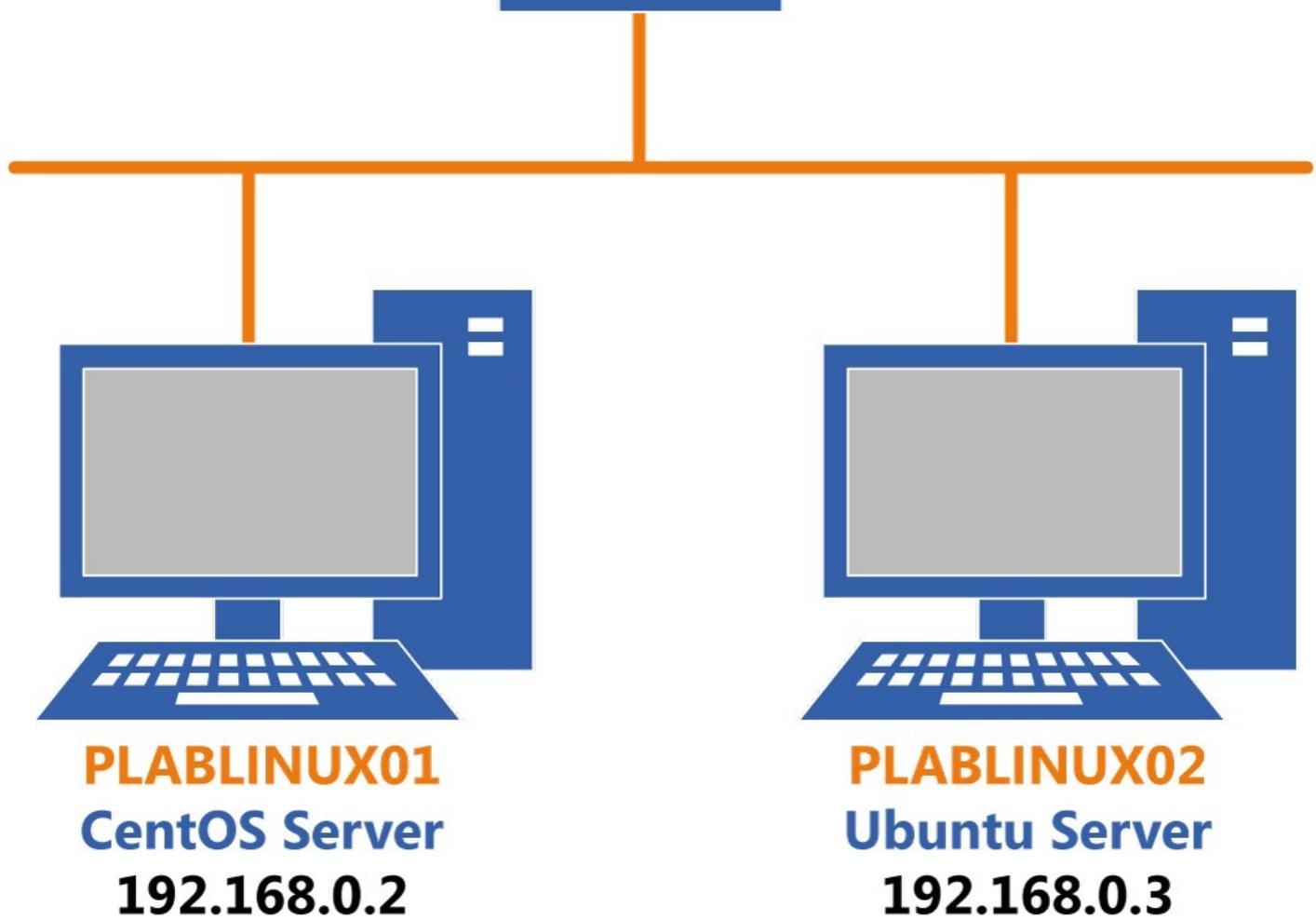
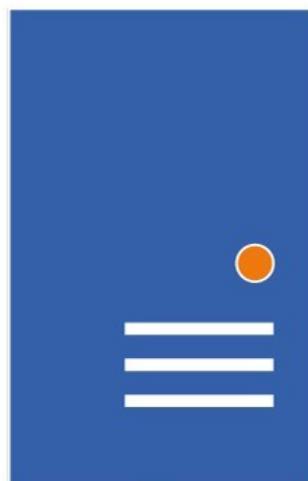
For more information on using Practice Labs, please see our **Help and Support** page. You can also raise a technical support ticket from this page.

Click Next to view the Lab topology used in this module.

Lab Topology

During your session, you will have access to the following lab configuration.

PLABSA01
Windows Server 2016
192.168.0.1



Depending on the exercises you may or may not use all of the devices, but they are shown here in the layout to get an overall understanding of the topology of the lab.

- **PLABSA01** (Windows Server 2016)
- **PLABLINUX01** (CentOS Server)
- **PLABLINUX02** (Ubuntu Server)

Click Next to proceed to the first exercise.

Exercise 1 - Using Various Disk Management Tools

Linux contains various disk management tools, which allow you to monitor information, such as partitions on a disk, the total size of partitions, used and free space on a partition, and type of file system. An administrator should use these tools from time to time to ensure the disk remains healthy.

In this exercise, you will use various disk management tools.

Learning Outcomes

After completing this exercise, you will be able to:

- Log into a Linux System
- View filesystems (lsblk)
- View the content of a block device (blkid)
- Use disk partitioning tools (fdisk, parted)
- Use absolute and relative paths

Your Devices

You will be using the following device in this lab. Please power these on now.

- **PLABLINUX02** (Ubuntu Server)



Task 2 - View filesystems (lsblk)

The `lsblk` command displays the information about the storage blocks. In the output of this command, the following information is displayed:

- the total size of the partition
- The total size of the block
- The mount points if any available

However, the `lsblk` command does not provide any information on the used or free disk space.

In this task, you will learn to view filesystems using the `lsblk` command. To do this, perform the following steps:

Step 1

On the desktop, right-click and select **Open in Terminal**.

Note: If you are prompted with the **Software Updater** dialog box, click **Remind Me Later**. This dialog box may occur before or after this step.

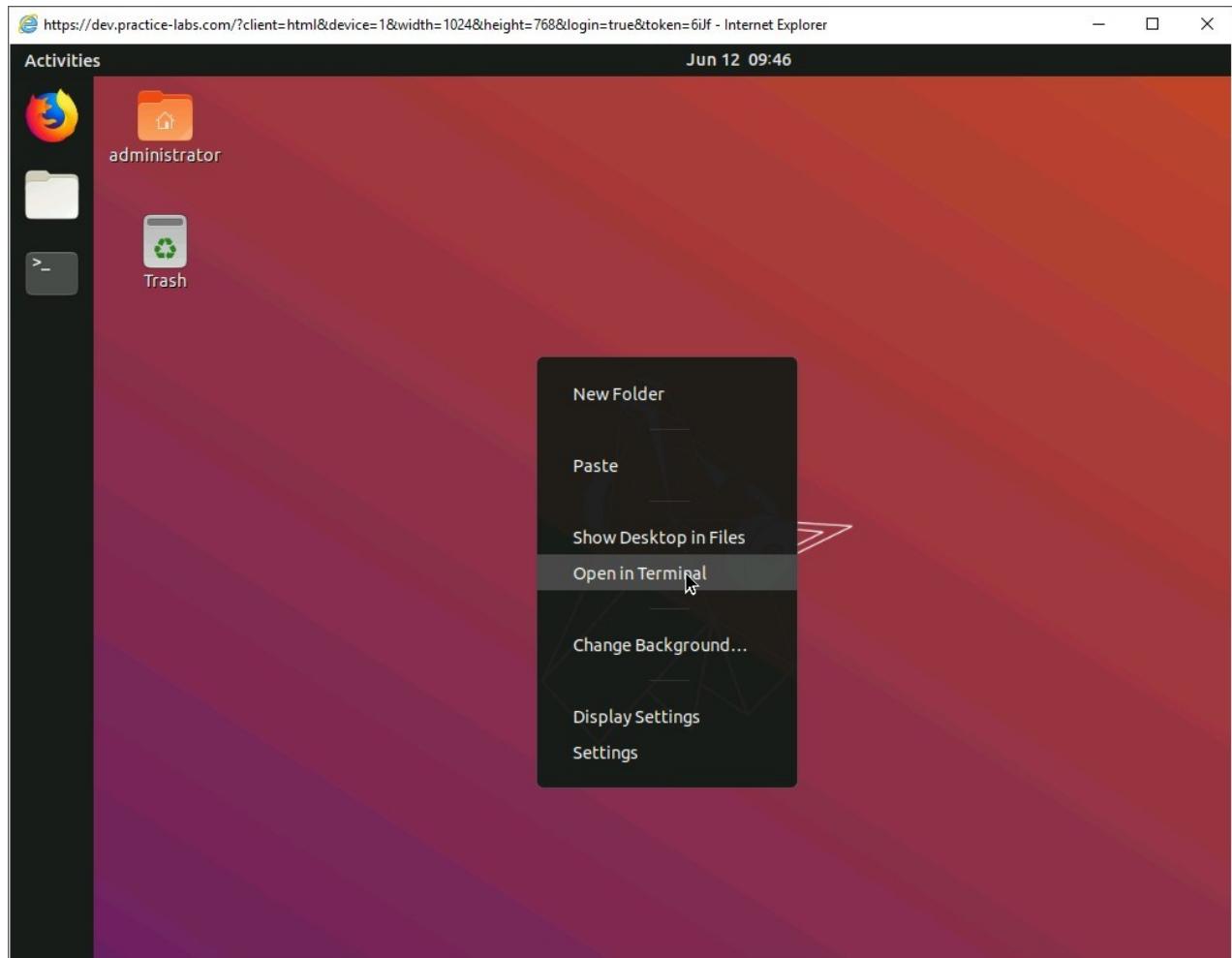


Figure 1.1 Screenshot of PLABLINUX02: Selecting the Open Terminal option from the context menu.

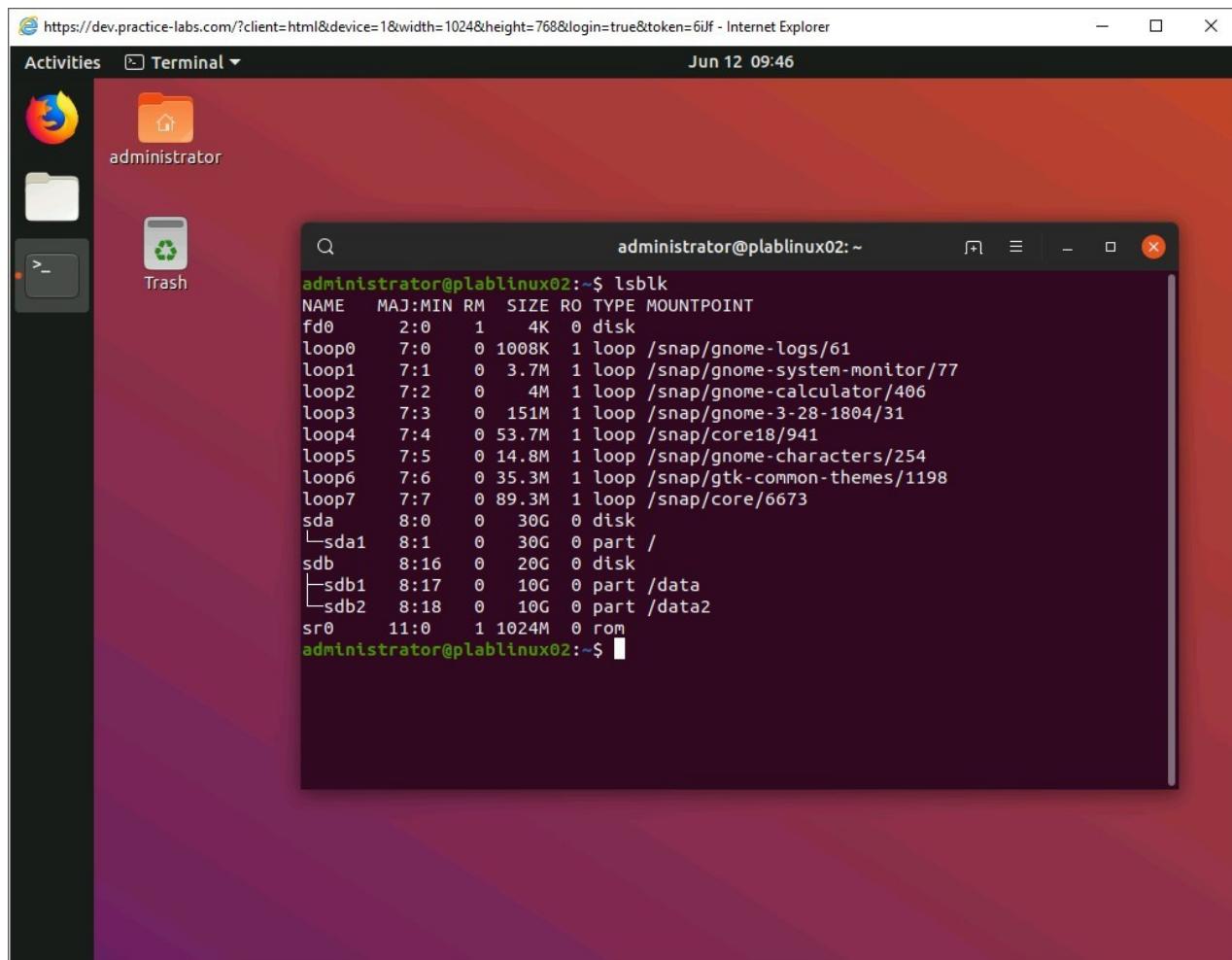
Step 2

The terminal window is displayed.

To list the devices on the Ubuntu system, type the following command:

```
lsblk
```

Press **Enter**.



A screenshot of the PLABLINUX02 desktop environment. The desktop has a red and purple gradient background. On the left, there is a vertical dock with icons for a browser (Mozilla Firefox), a file manager (Nautilus), and a terminal window titled "Terminal". The terminal window is open and displays the command "lsblk" followed by its output. The output shows various device entries, including loop devices and physical disks like sda and sdb. The terminal window has a dark theme with white text and a black border. The desktop environment includes a top bar with the URL "https://dev.practice-labs.com/?client=html&device=1&width=1024&height=768&login=true&token=6ijf - Internet Explorer", the date "Jun 12 09:46", and standard window control buttons.

```
administrator@plablinux02:~$ lsblk
NAME   MAJ:MIN RM  SIZE RO TYPE MOUNTPOINT
fd0      2:0    1   4K  0 disk
loop0     7:0    0 1008K 1 loop /snap/gnome-logs/61
loop1     7:1    0  3.7M 1 loop /snap/gnome-system-monitor/77
loop2     7:2    0   4M  1 loop /snap/gnome-calculator/406
loop3     7:3    0 151M  1 loop /snap/gnome-3-28-1804/31
loop4     7:4    0 53.7M 1 loop /snap/core18/941
loop5     7:5    0 14.8M 1 loop /snap/gnome-characters/254
loop6     7:6    0 35.3M 1 loop /snap/gtk-common-themes/1198
loop7     7:7    0 89.3M 1 loop /snap/core/6673
sda      8:0    0   30G  0 disk
└─sda1   8:1    0   30G  0 part /
sdb      8:16   0   20G  0 disk
└─sdb1   8:17   0   10G  0 part /data
└─sdb2   8:18   0   10G  0 part /data2
sr0     11:0   1 1024M 0 rom
administrator@plablinux02:~$
```

Figure 1.2 Screenshot of PLABLINUX02: Listing the devices on the Ubuntu system.

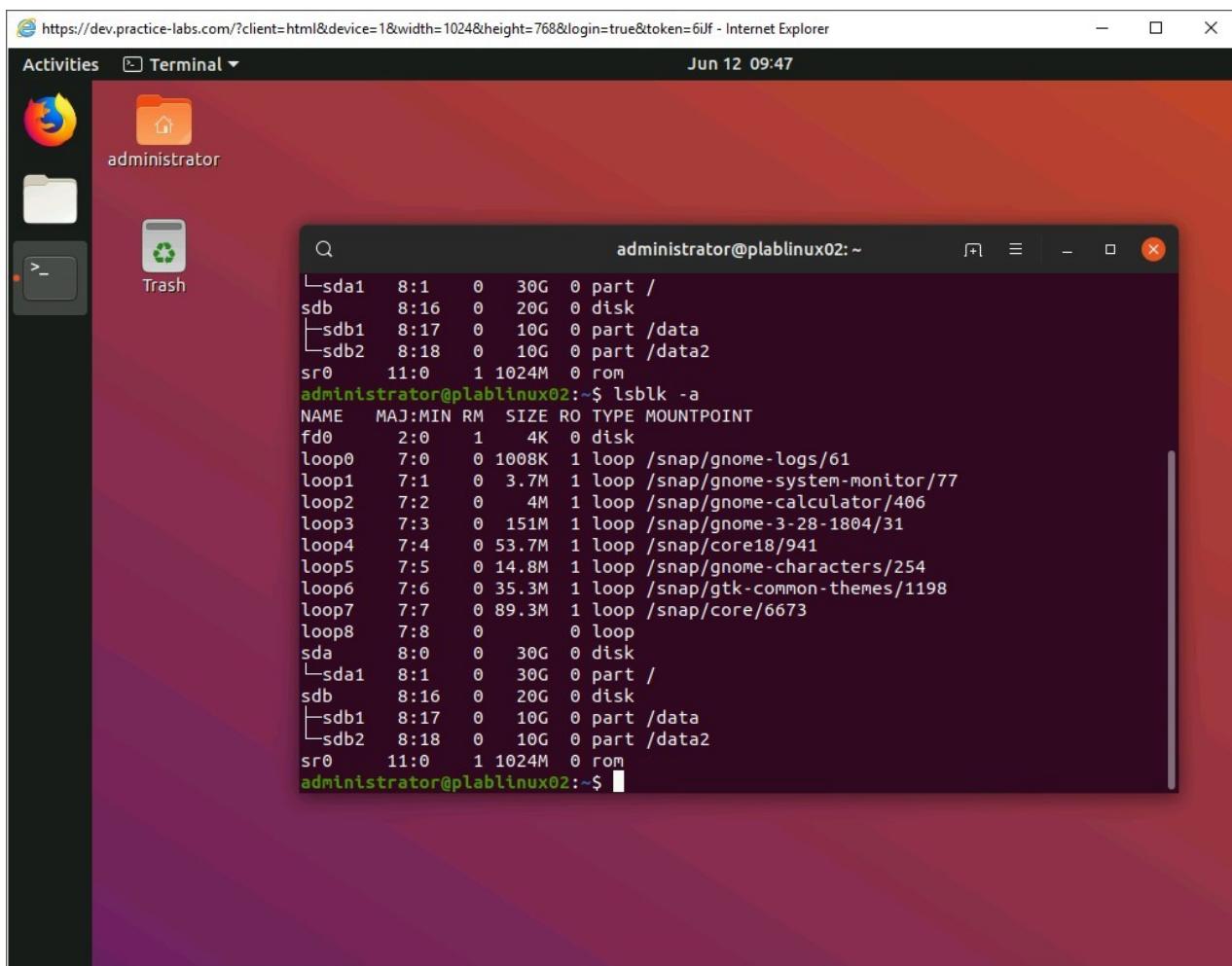
Step 3

By default, the `lsblk` command does not include the empty devices in the list. You can, however, list the empty devices as well.

To do this, type the following command:

```
lsblk -a
```

Press **Enter**.

A screenshot of a Linux desktop environment, specifically PLABLINUX02, showing a terminal window. The terminal window title is "administrator@plablinux02:~". It displays the output of the command "lsblk -a", which lists all block devices on the system. The output shows various disk and loop devices with their major/minor numbers, sizes, types, and mount points. For example, it lists "/dev/sda1" as a 30G part of a disk mounted at "/", and several loop devices (loop0, loop1, etc.) used for snaps. The desktop background is red and purple, and the taskbar shows icons for the terminal, file manager, and browser.

```
administrator@plablinux02:~$ lsblk -a
NAME   MAJ:MIN RM  SIZE RO TYPE MOUNTPOINT
fd0    2:0      1   4K  0 disk 
loop0   7:0      0 1008K 1 loop /snap/gnome-logs/61
loop1   7:1      0  3.7M 1 loop /snap/gnome-system-monitor/77
loop2   7:2      0   4M  1 loop /snap/gnome-calculator/406
loop3   7:3      0  151M 1 loop /snap/gnome-3-28-1804/31
loop4   7:4      0  53.7M 1 loop /snap/core18/941
loop5   7:5      0 14.8M 1 loop /snap/gnome-characters/254
loop6   7:6      0 35.3M 1 loop /snap/gtk-common-themes/1198
loop7   7:7      0 89.3M 1 loop /snap/core/6673
loop8   7:8      0     0 loop 
sda    8:0      0   30G  0 disk 
└─sda1  8:1      0   30G  0 part /
sdb    8:16     0   20G  0 disk 
├─sdb1  8:17     0   10G  0 part /data
└─sdb2  8:18     0   10G  0 part /data2
sr0    11:0     1 1024M 0 rom
```

Figure 1.3 Screenshot of PLABLINUX02: Listing the devices along with the empty devices on the Ubuntu system.

Step 4

Clear the screen by entering the following command:

```
clear
```

You can also list the device size in bytes. To do this, type the following command:

```
lsblk -b
```

Press **Enter**.

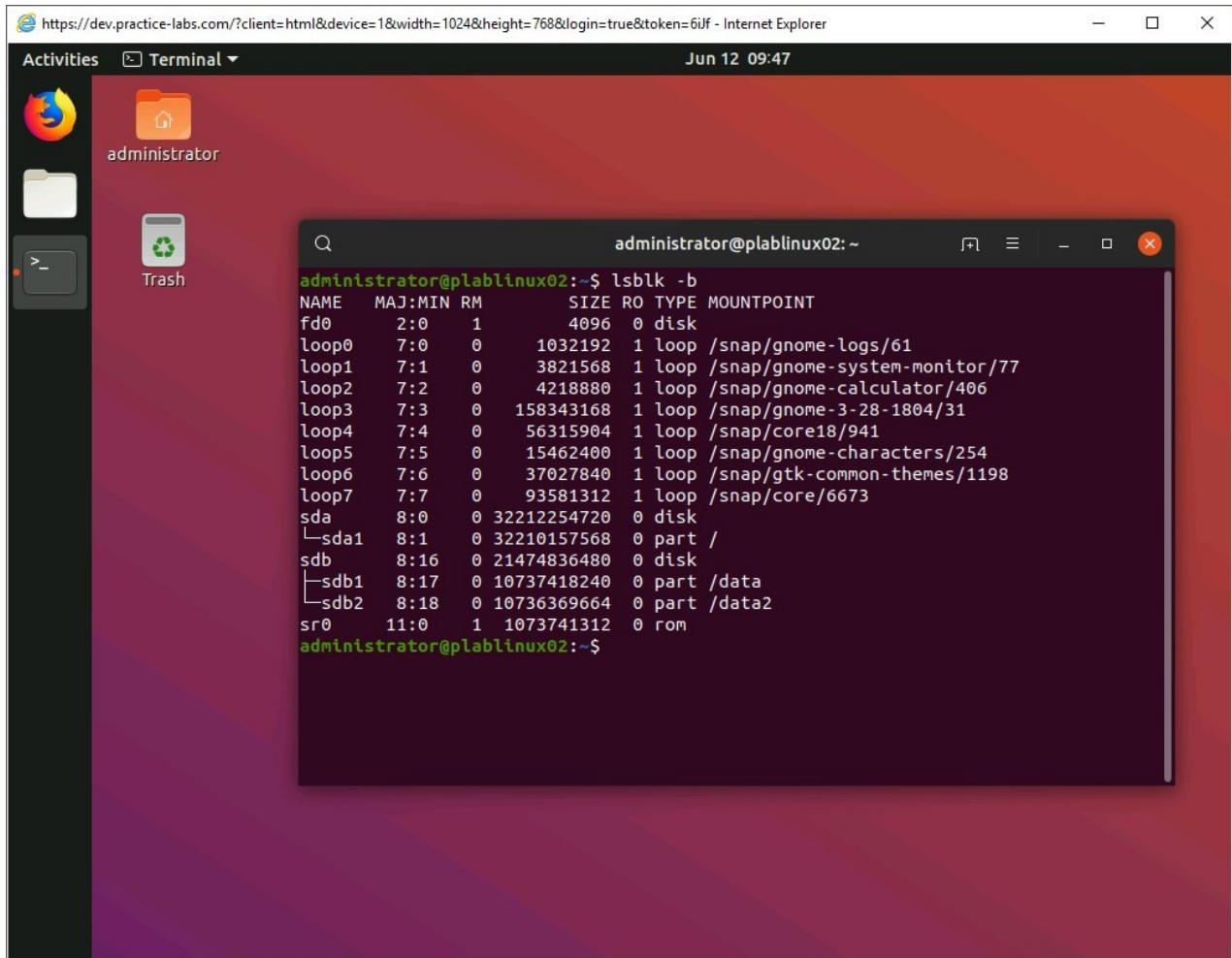


Figure 1.4 Screenshot of PLABLINUX02: Listing the device size in bytes.

Step 5

Clear the screen by entering the following command:

```
clear
```

You can also list only the main devices and skip the slave device. For example, you can list **/dev/sdb** but not **/dev/sdb1** and **/dev/sdb2**. To do this, type the following command:

```
lsblk -d
```

Press **Enter**.

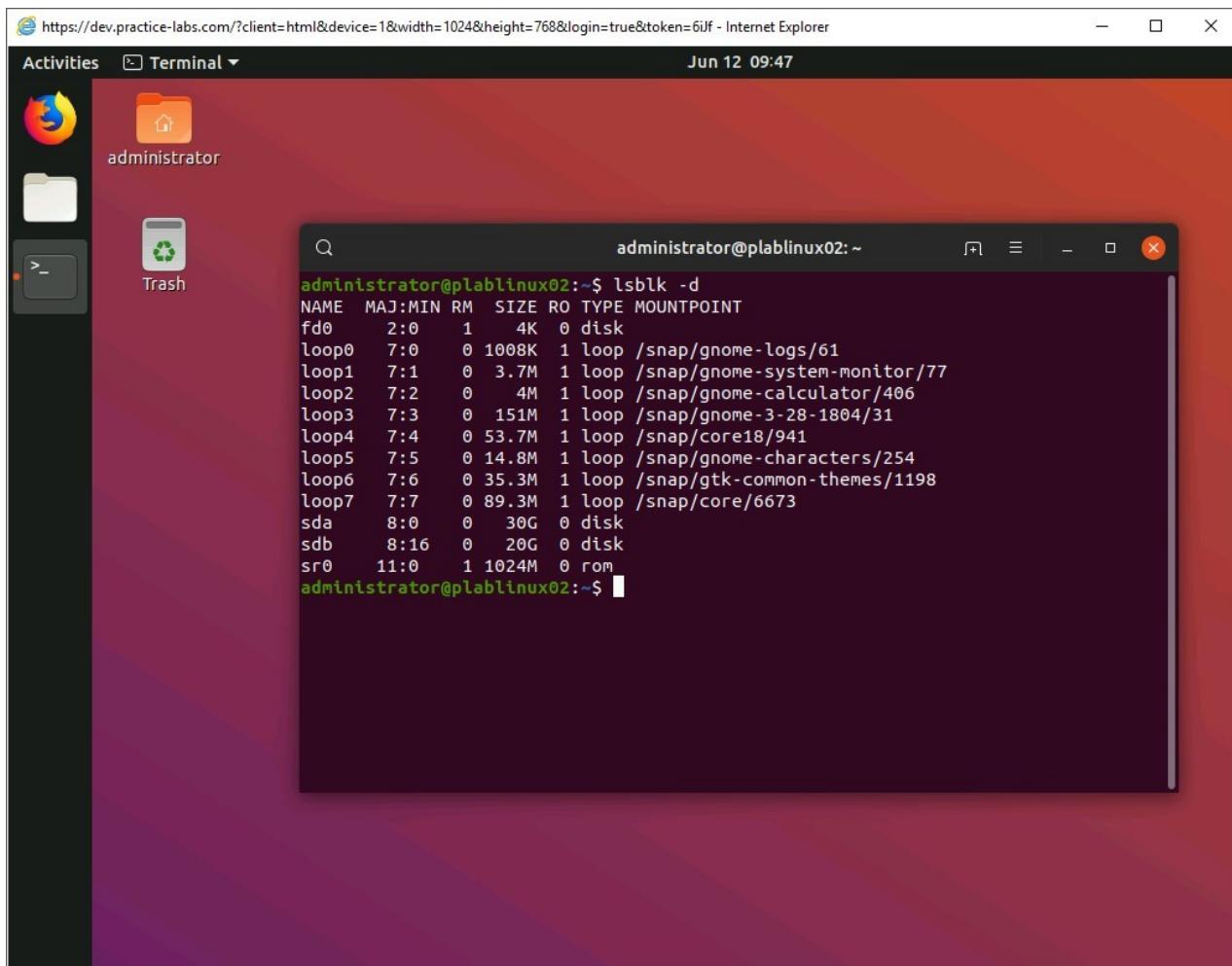


Figure 1.5 Screenshot of PLABLINUX02: Listing only the main devices and skipping the slave device.

Step 6

Using the **lsblk** command, you can also display the information about the device owner, group, and mode. To do this, type the following command:

```
lsblk -m
```

Press **Enter**.

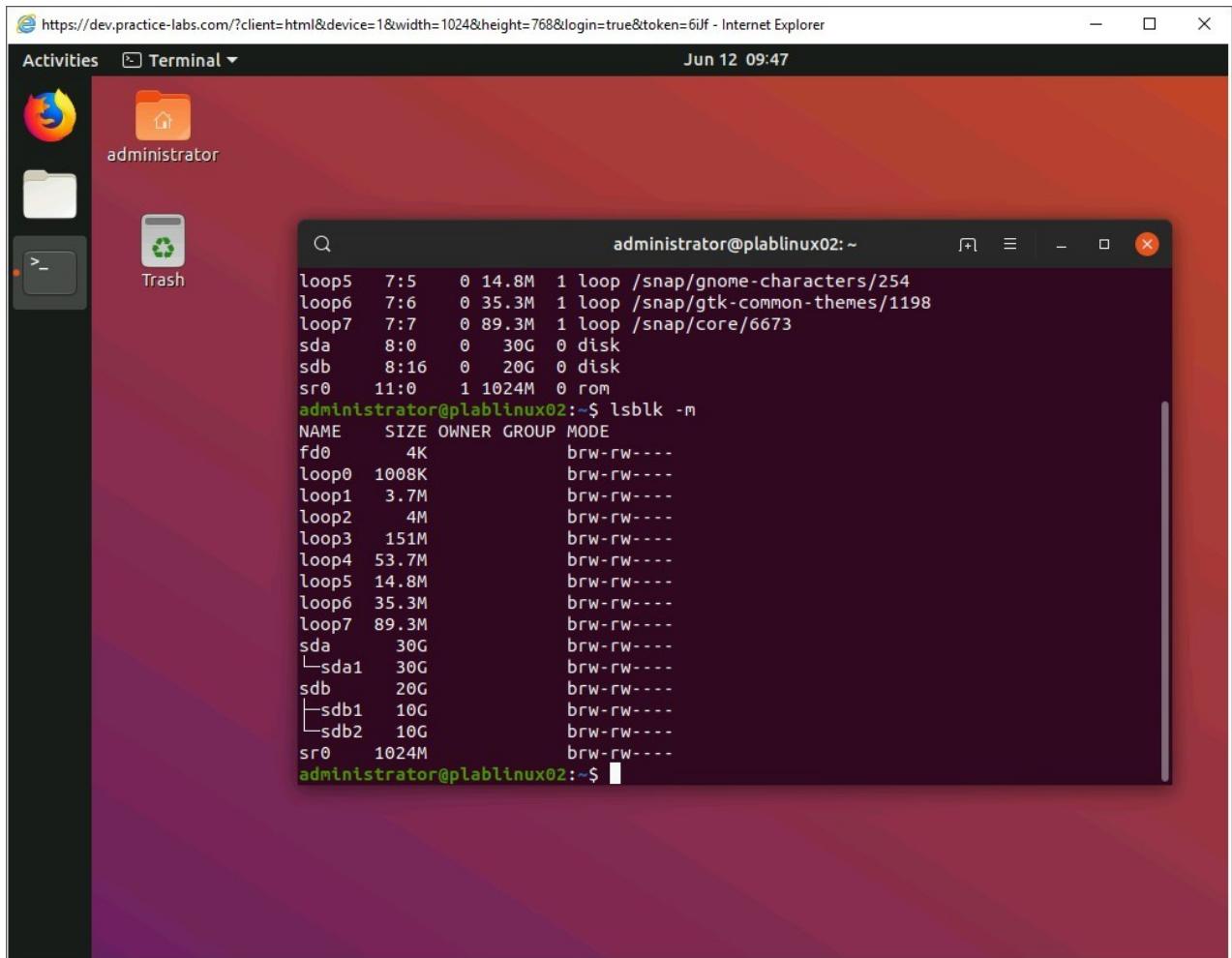


Figure 1.6 Screenshot of PLABLINUX02: Displaying the information about device owner, group, and mode.

Step 7

Clear the screen by entering the following command:

```
clear
```

Instead of displaying all columns, you can choose to display only the selected columns. To do this, type the following command:

```
lsblk -o NAME,SIZE
```

Press **Enter**.

Note: If you provide space between NAME and SIZE, you will receive an error. There should not be any space after the comma.

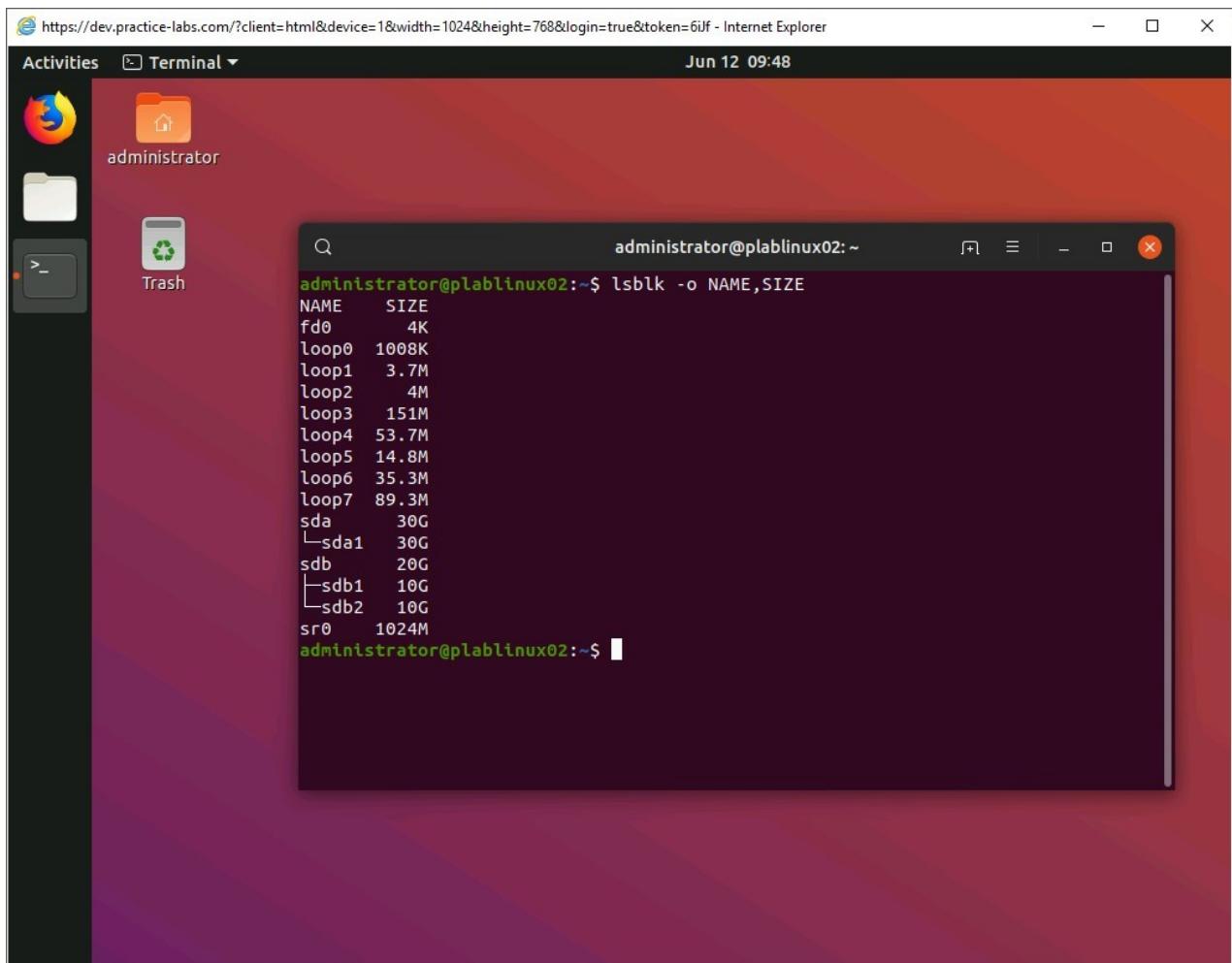


Figure 1.7 Screenshot of PLABLINUX02: Displaying only the selected columns with the lsblk command.

Task 3 - View the content of a block device (blkid)

Using the blkid command, you can view the attributes of the block devices.

In this task, you will learn to differentiate between the absolute and relative paths.

Step 1

Clear the screen by entering the following command:

```
clear
```

To display all the block devices on a Linux system, type the following command:

```
sudo blkid
```

If prompted, type the following password:

Passw0rd

Press **Enter**.

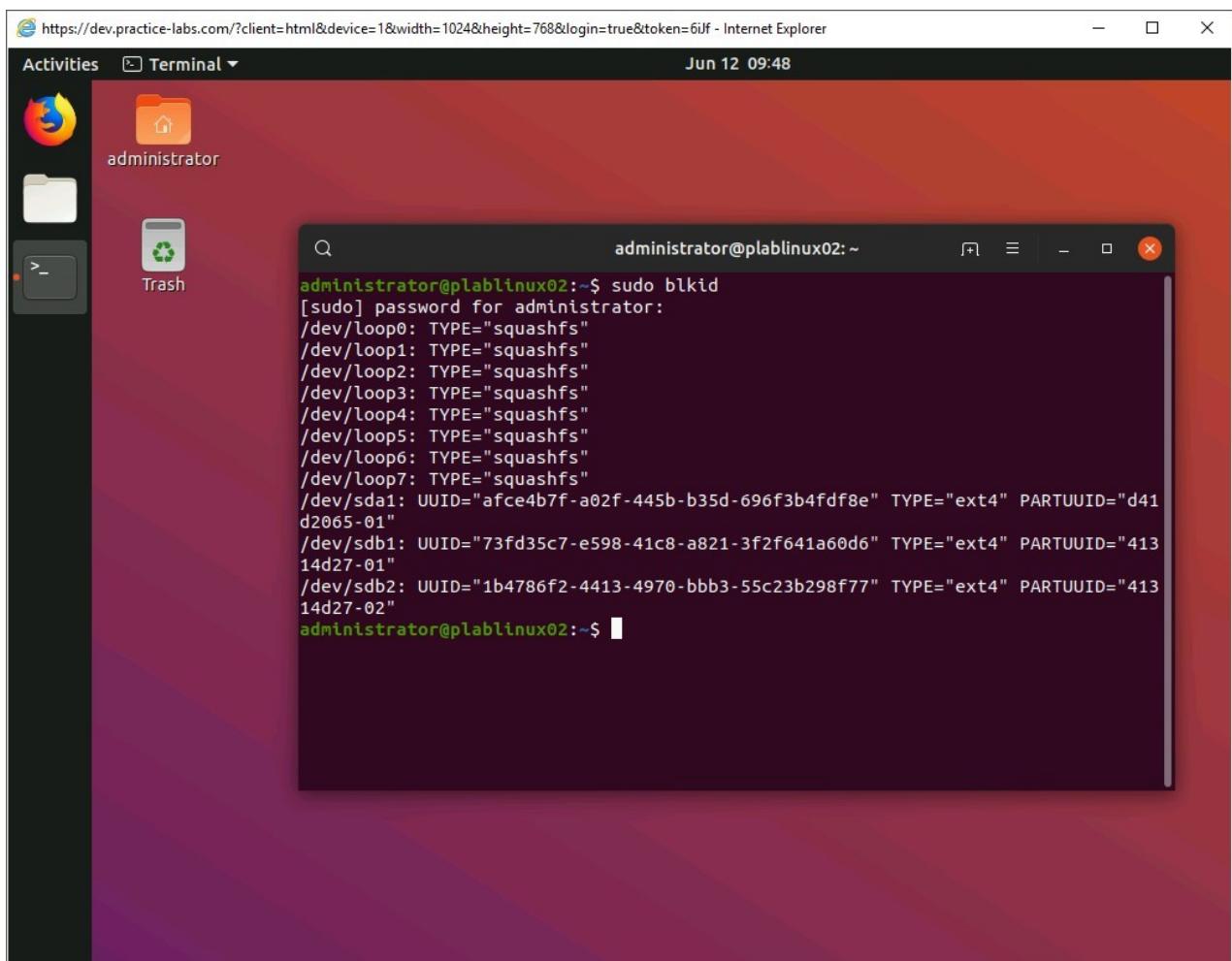


Figure 1.8 Screenshot of PLABLINUX02: Displaying all the block devices on a Linux system.

Step 2

Clear the screen by entering the following command:

```
clear
```

You can use the `-i` parameter to display the I/O limits on a specific block device. Type the following command:

```
sudo blkid -i /dev/sdb1
```

Press **Enter**.

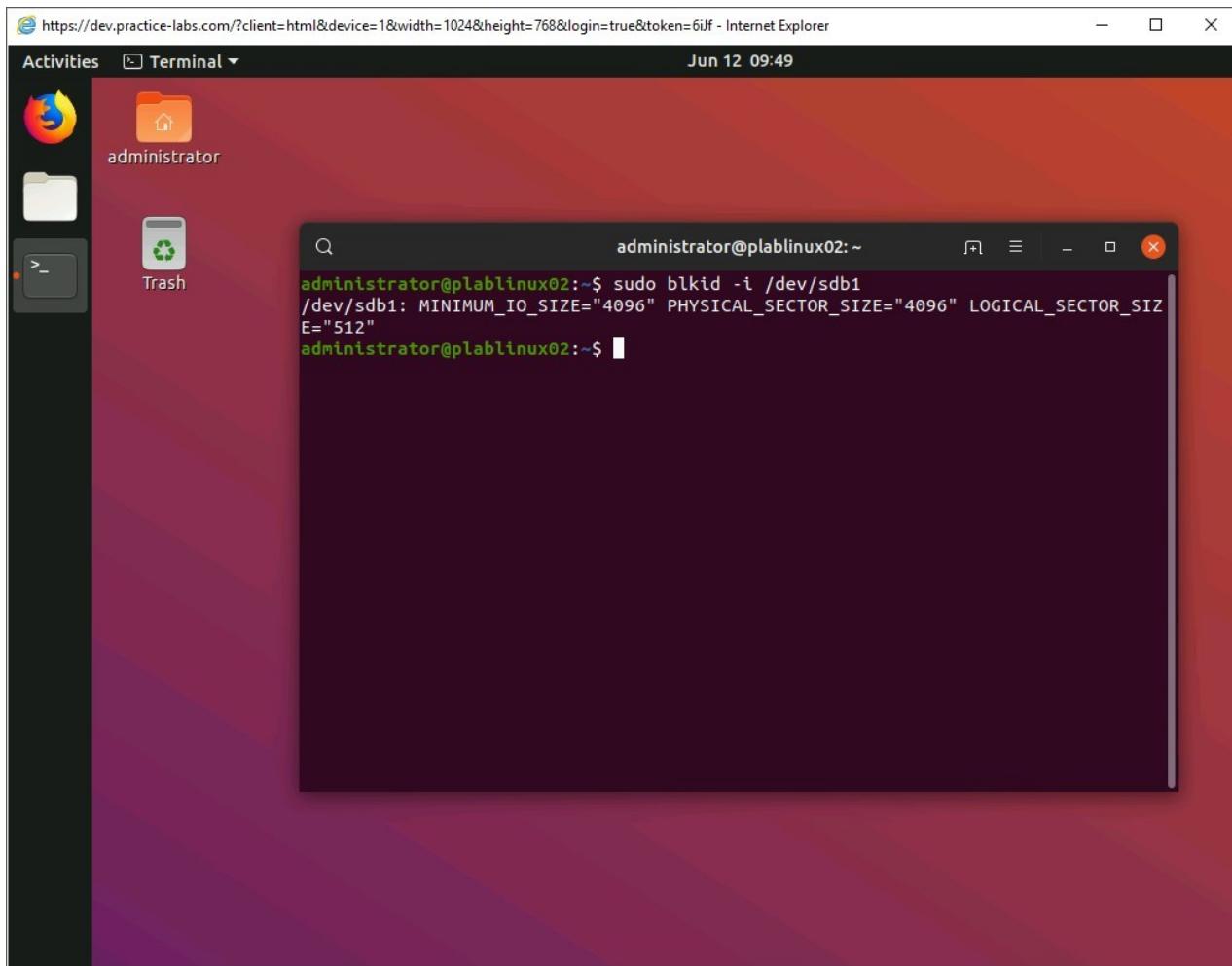


Figure 1.9 Screenshot of PLABLINUX02: Displaying the I/O limits on a specific block device.

Step 3

You can use the `-p` parameter to display additional information on a specific block device. Type the following command:

```
sudo blkid -p /dev/sdb1
```

Press **Enter**.

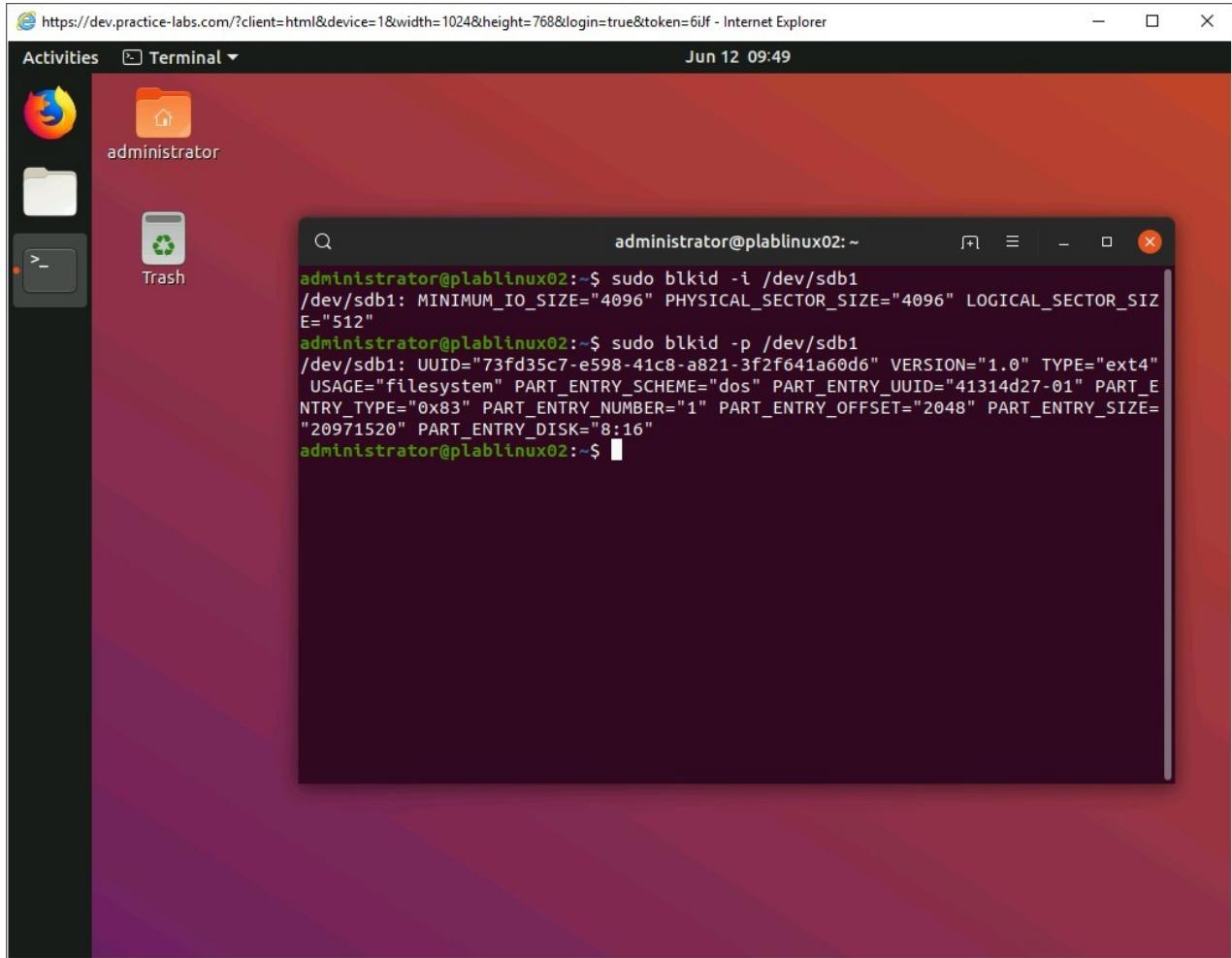


Figure 1.10 Screenshot of PLABLINUX02: Displaying additional information on a specific block device.

Step 4

Clear the screen by entering the following command:

```
clear
```

You can also use the blkid command to display the file system type and also the mount points. Type the following command:

```
sudo blkid -o list
```

Press **Enter**.

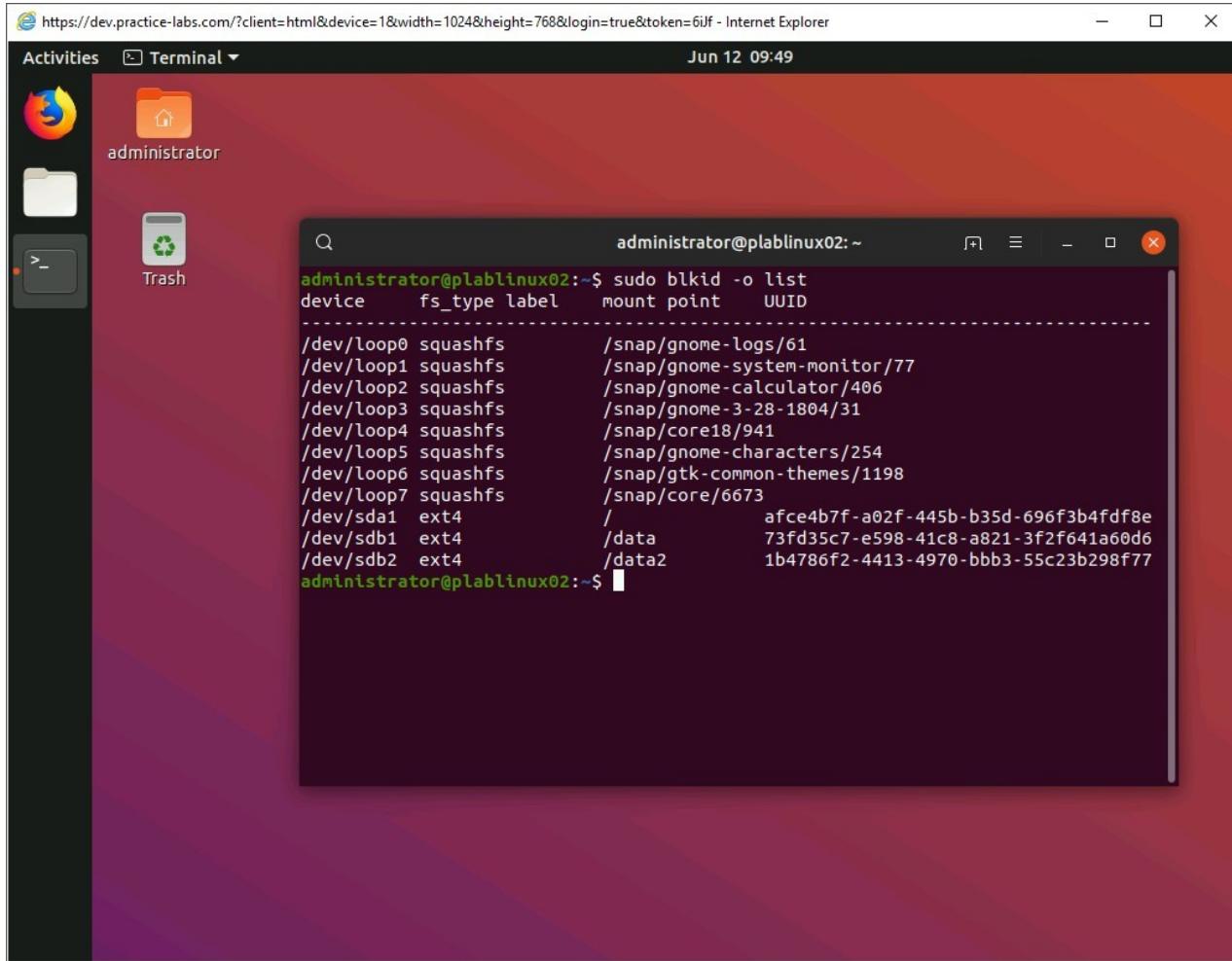


Figure 1.11 Screenshot of PLABLINUX02: Displaying the file system type and also the mount points.

Task 4 - Use Disk Partitioning Tools (fdisk, parted)

Disk partitioning is an essential part of disk management. When a new disk is installed on a system, it cannot be used in a raw format. You will need to create at least one partition, which then needs to be formatted with a specific file system, such as EXT4. In this task, you will learn to use different disk partitioning tools. To do this, perform the following steps:

Step 1

Clear the screen by entering the following command:

```
clear
```

You can use the fdisk command to display the partition information along with their file system information. You can also use it to add, modify, or remove partitions. To display the partition information, type the following command:

```
sudo fdisk -l
```

Press **Enter**.

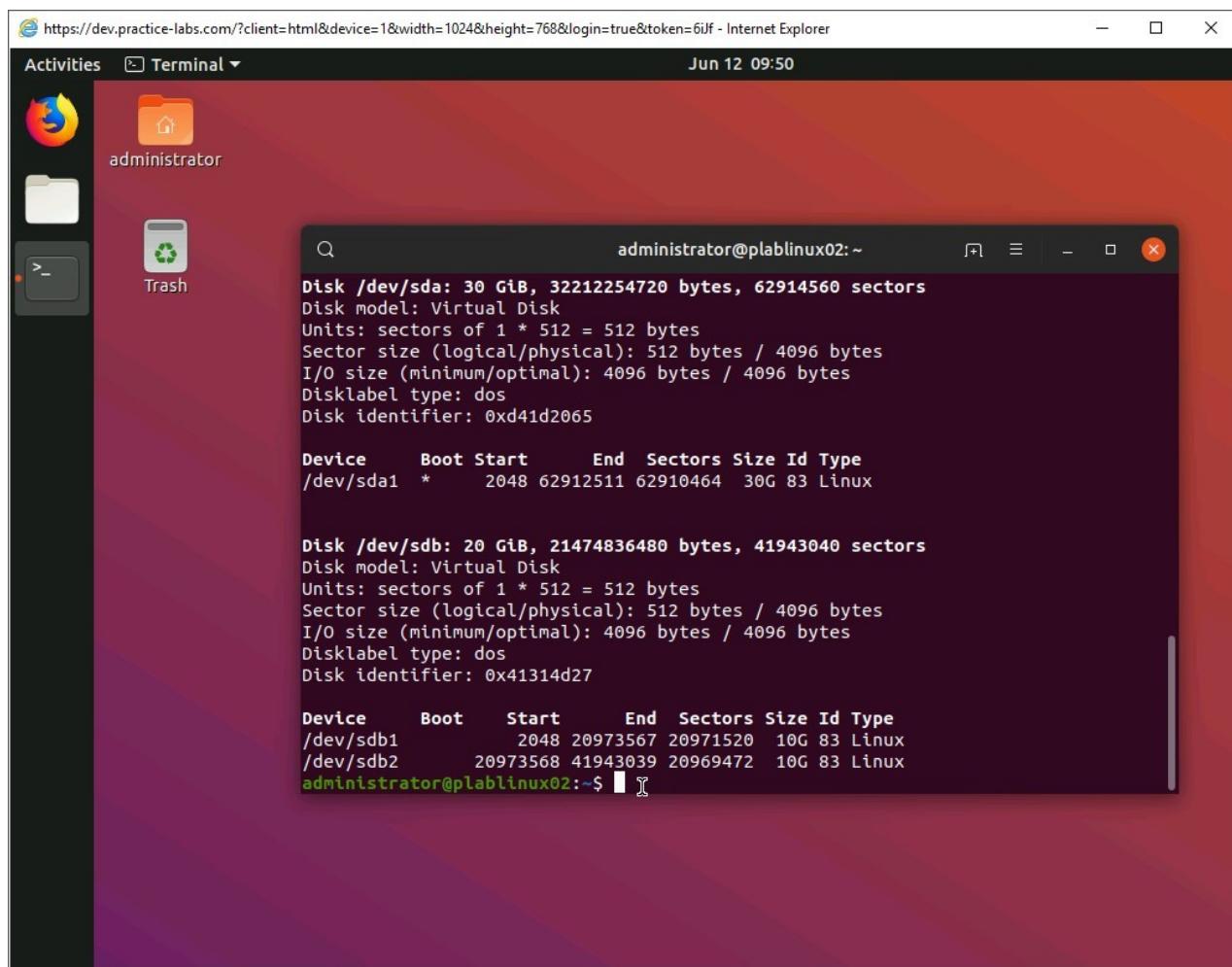


Figure 1.12 Screenshot of PLABLINUX02: Displaying the partition information.

Step 2

Clear the screen by entering the following command:

```
clear
```

To view the partitions of a specific device, type the following command:

```
sudo fdisk -l /dev/sdb
```

Press **Enter**.

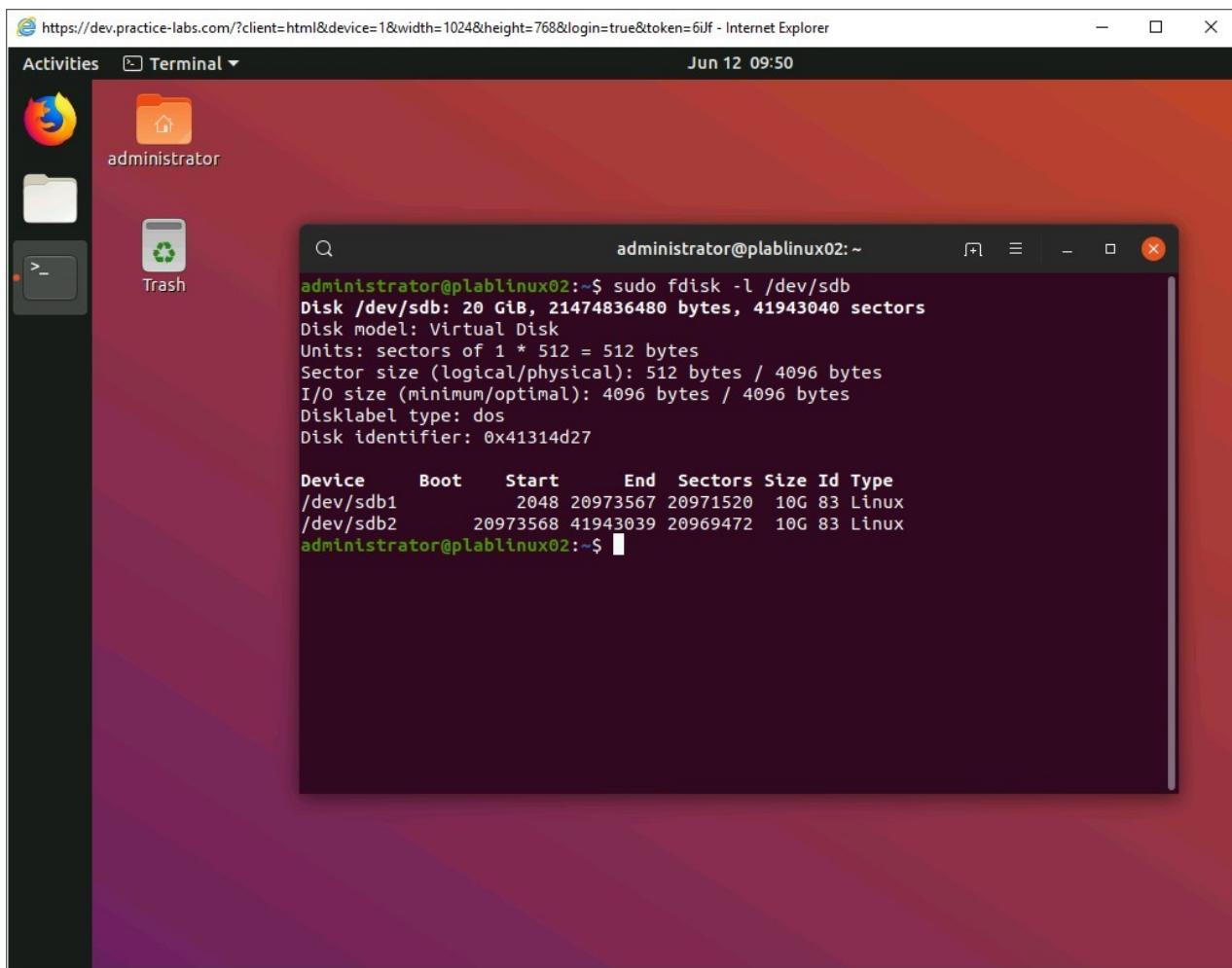


Figure 1.13 Screenshot of PLABLINUX02: Viewing the partitions of a specific device.

Step 3

Clear the screen by entering the following command:

```
clear
```

You can view all commands for fdisk. To do this, type the following command:

```
sudo fdisk /dev/sdb
```

Press **Enter**.

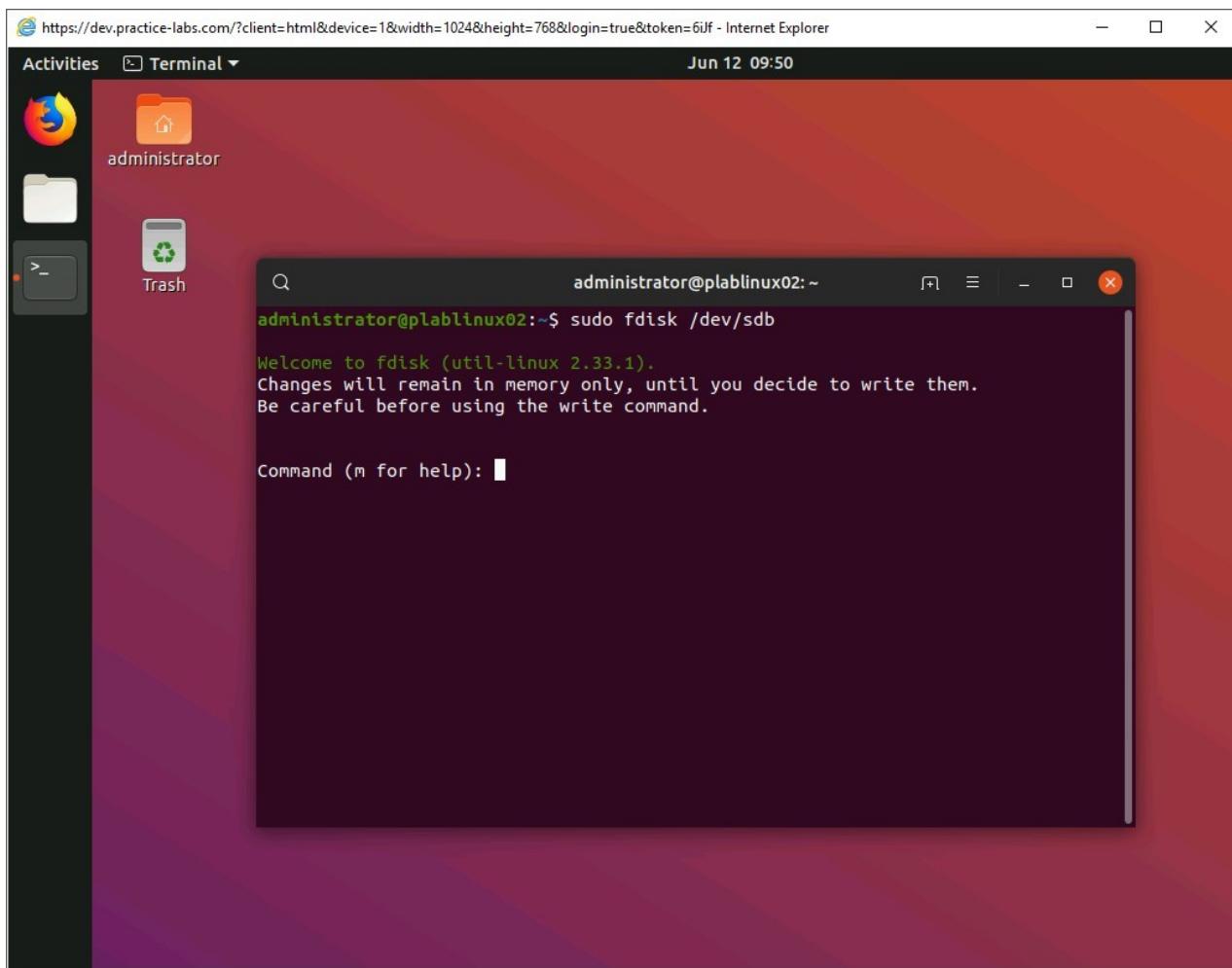


Figure 1.14 Screenshot of PLABLINUX02: Viewing all commands for fdisk.

Step 4

To print the menu, type the following:

```
m
```

Press **Enter**.

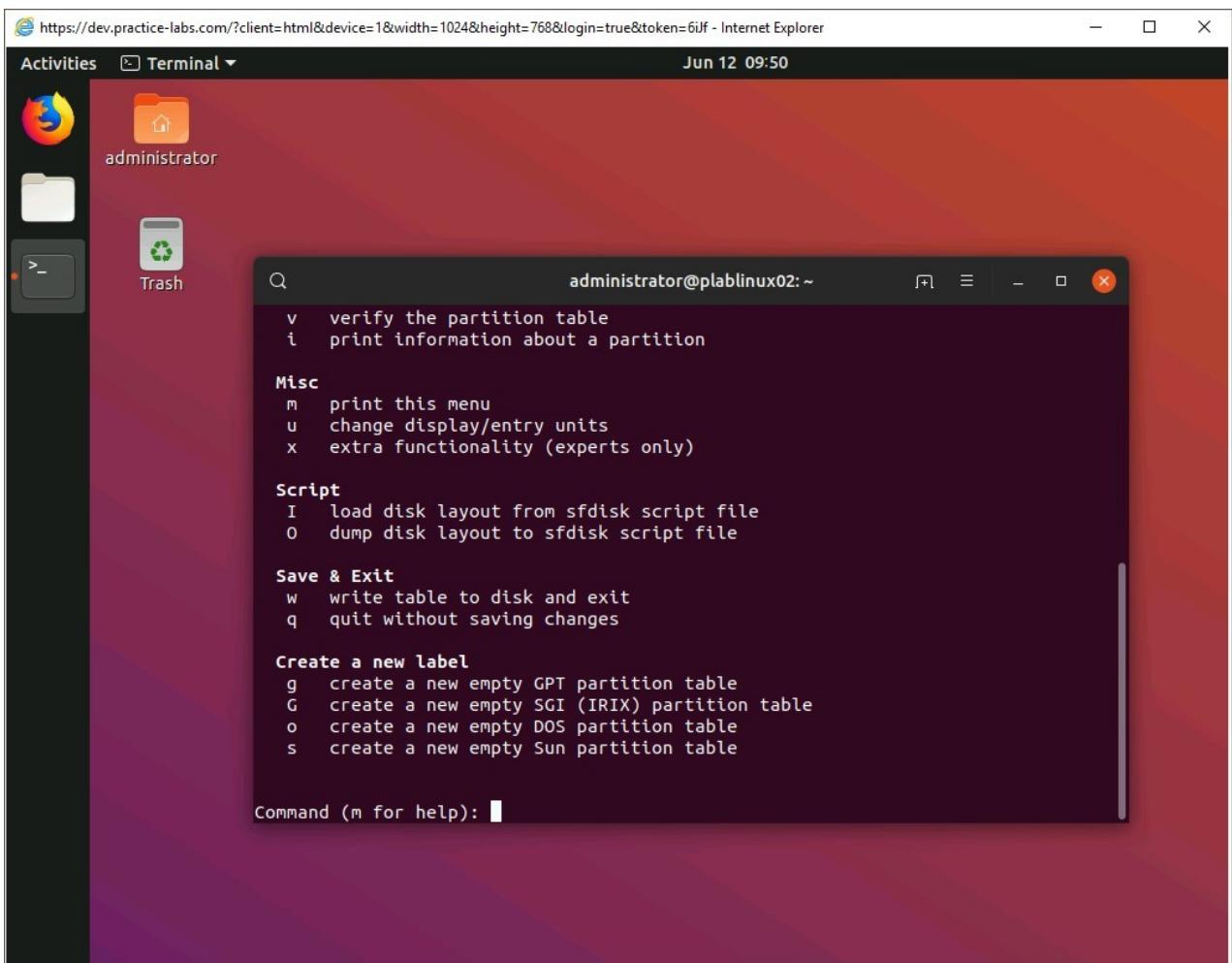


Figure 1.15 Screenshot of PLABLINUX02: Printing the fdisk menu.

Step 5

To print the partitions for **/dev/sdb**, type the following:

p

Press **Enter**.

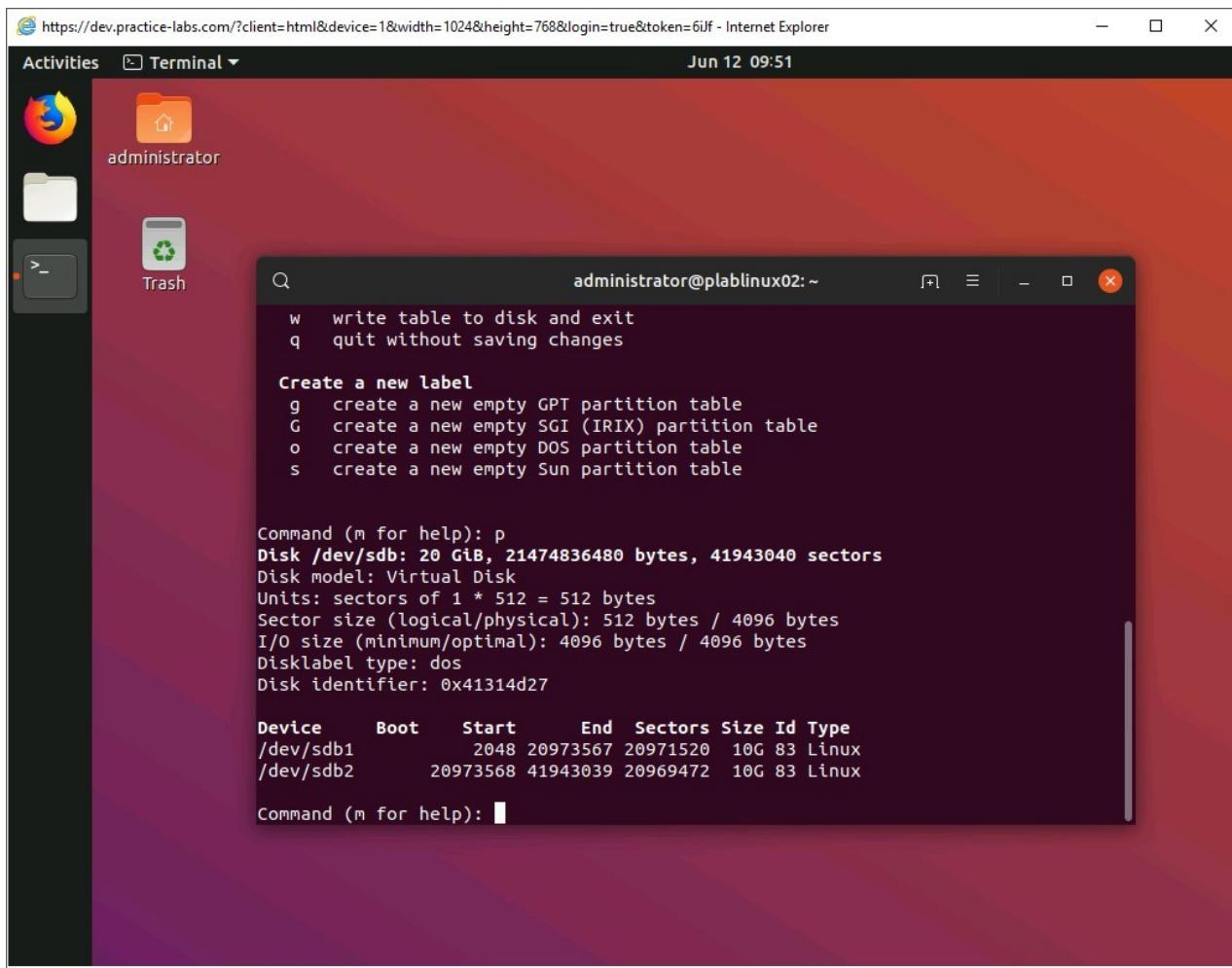


Figure 1.16 Screenshot of PLABLINUX02: Printing the partitions for /dev/sdb.

Step 6

To delete a partition of **/dev/sdb**, type the following:

d

Press **Enter**. You are now prompted for the partition number.

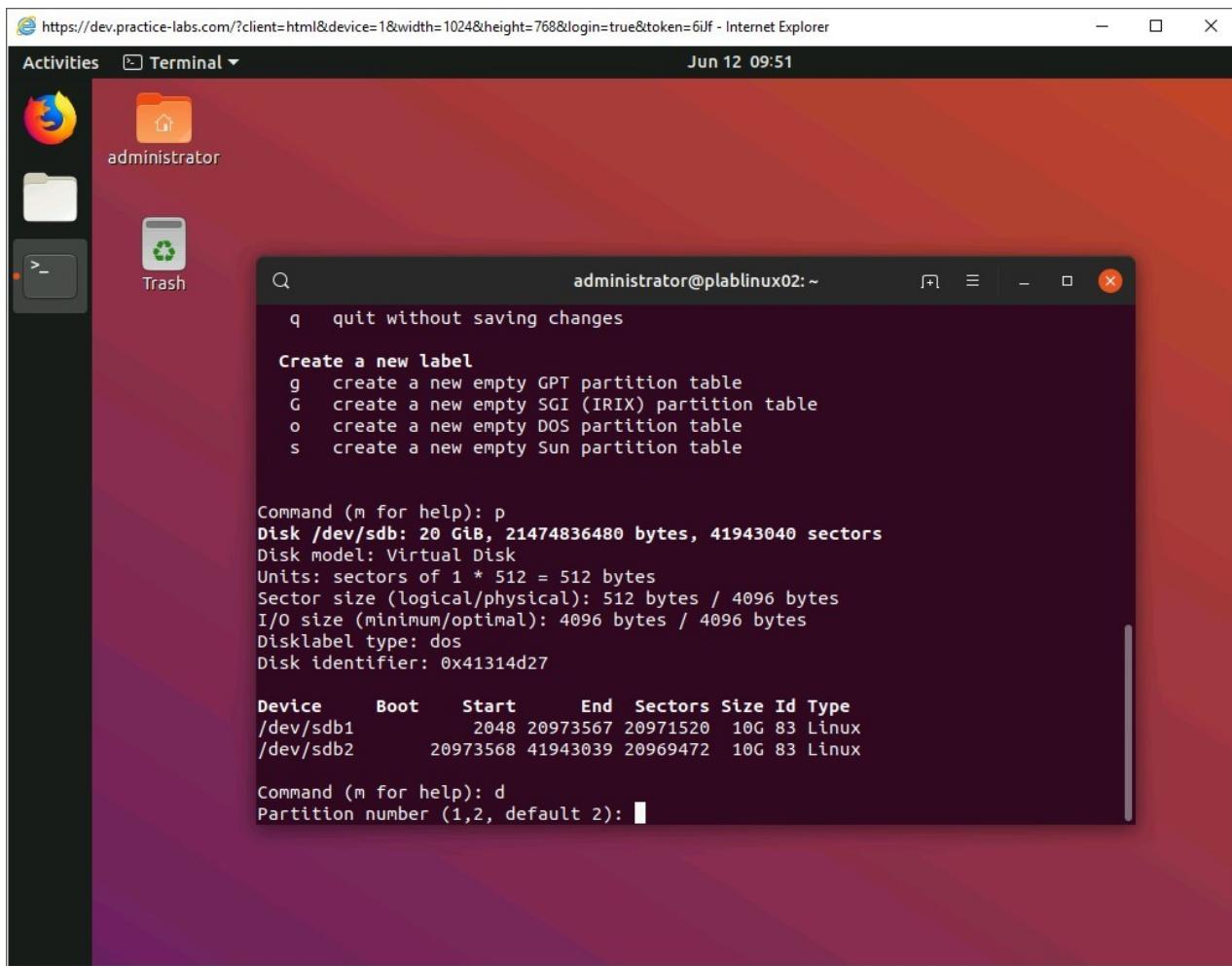


Figure 1.17 Screenshot of PLABLINUX02: Deleting a partition of /dev/sdb.

Step 7

Type the following partition number:

2

Press **Enter**. The partition **2** is now deleted.

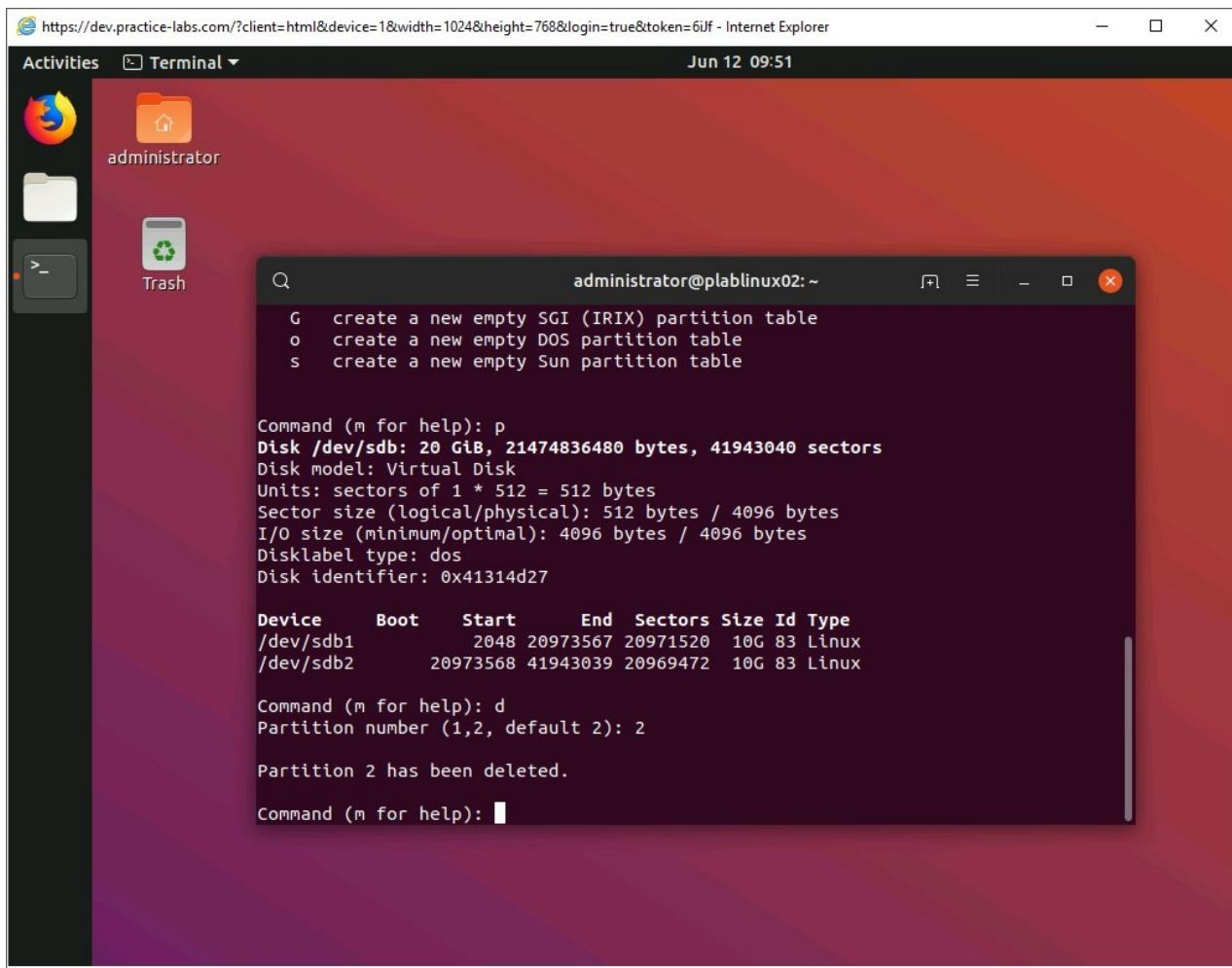


Figure 1.18 Screenshot of PLABLINUX02: Entering the partition number for deletion.

Step 8

After you make changes to the partition table, you need to write the partition table to the disk. To do this, type the following:

W

Press **Enter**. Notice that the partition table has been altered but not written. This is because the partition is currently mounted. If you need to write the partition table to the disk immediately, you will need to unmount the partition with the `umount` command.

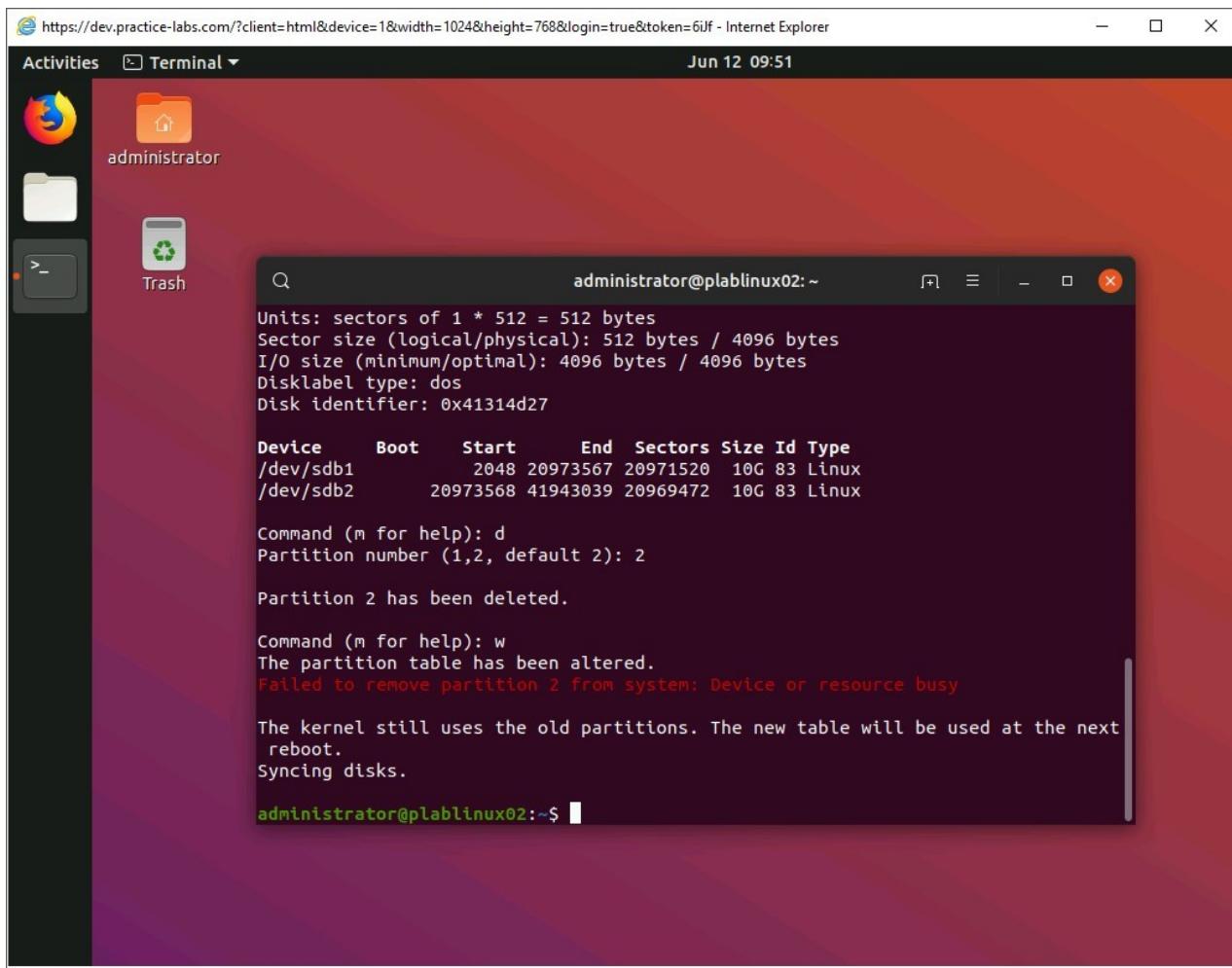


Figure 1.19 Screenshot of PLABLINUX02: Writing the modified partition table to the disk.

Step 9

Note: Before proceeding with the next steps, it is better to reset the device in the Practice Labs environment. After the device is reset, re-login with the administrator account and open the terminal window.

Parted is another utility that you can use to manipulate the partitions. To start the parted command, type the following command:

```
sudo parted
```

Press **Enter**. Notice by default that parted is used **/dev/sda**. The **(parted)** prompt is displayed.

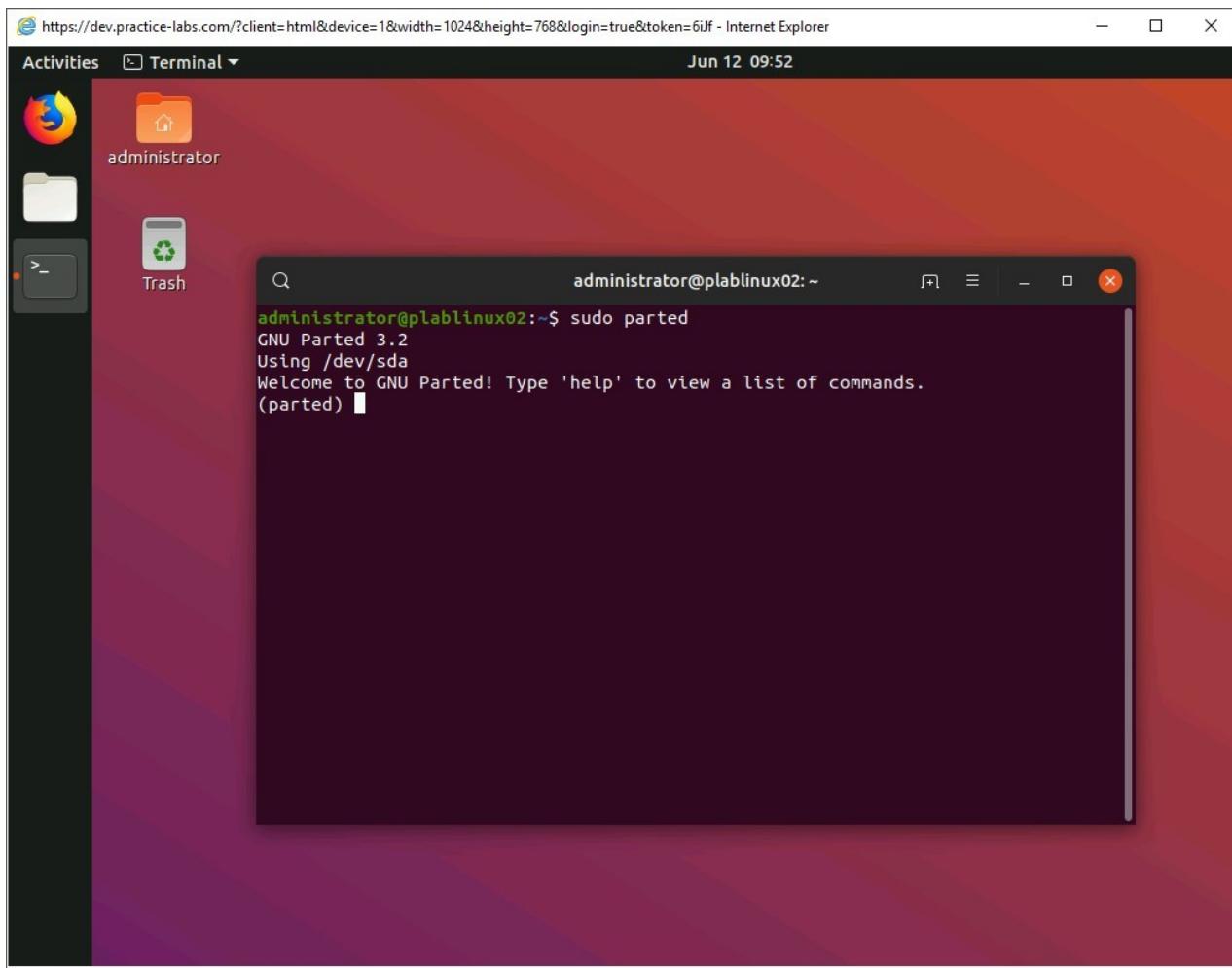


Figure 1.20 Screenshot of PLABLINUX02: Starting the parted utility.

Step 10

To select another device, type the following command:

```
select /dev/sdb
```

Press **Enter**. The **/dev/sdb** device is now being used by parted.

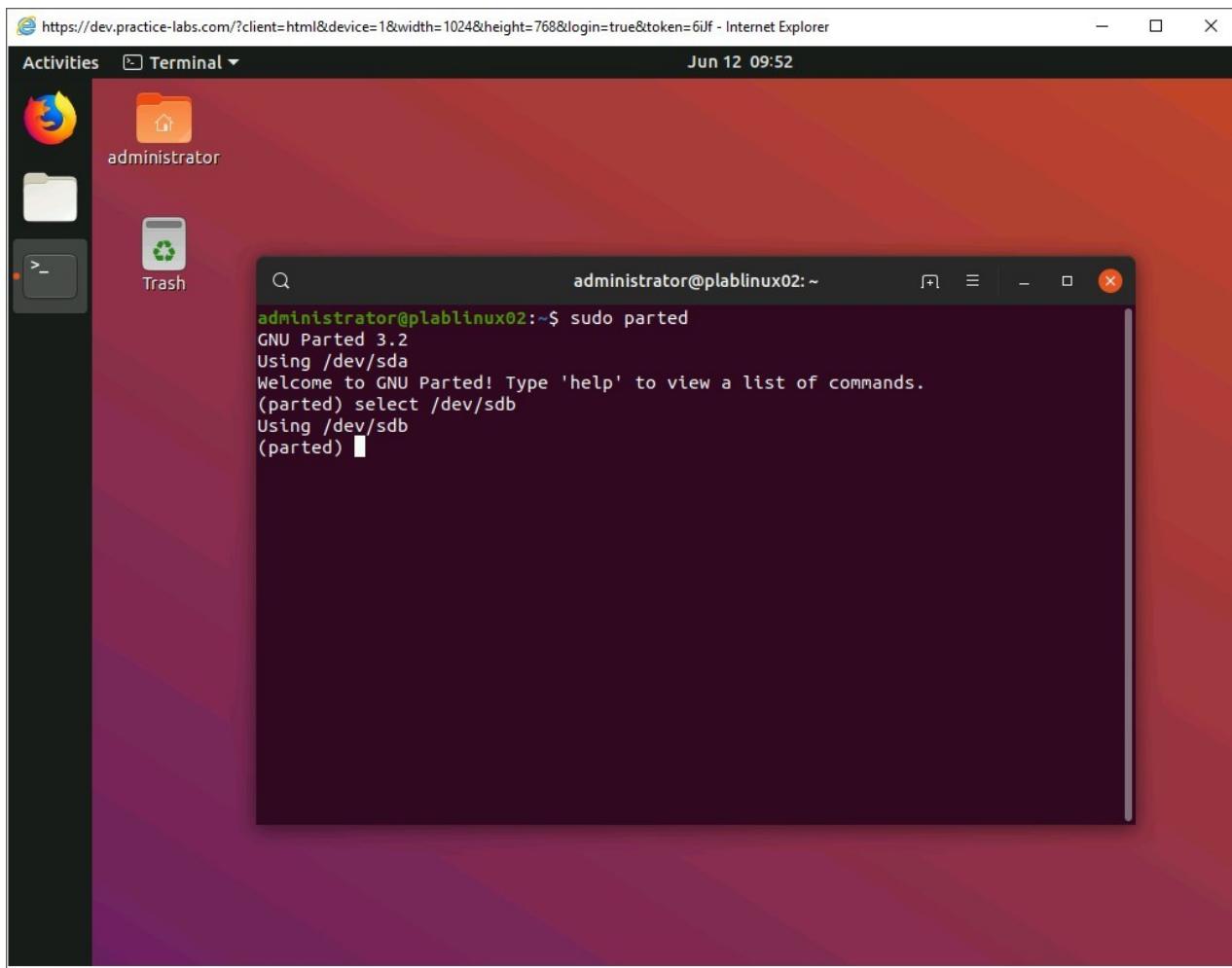


Figure 1.21 Screenshot of PLABLINUX02: Selecting a different device in the parted utility.

Step 11

To print the partitions available on **/dev/sdb**, type the following command:

```
print
```

Press **Enter**. The partitions on the **/dev/sdb** device are now listed.

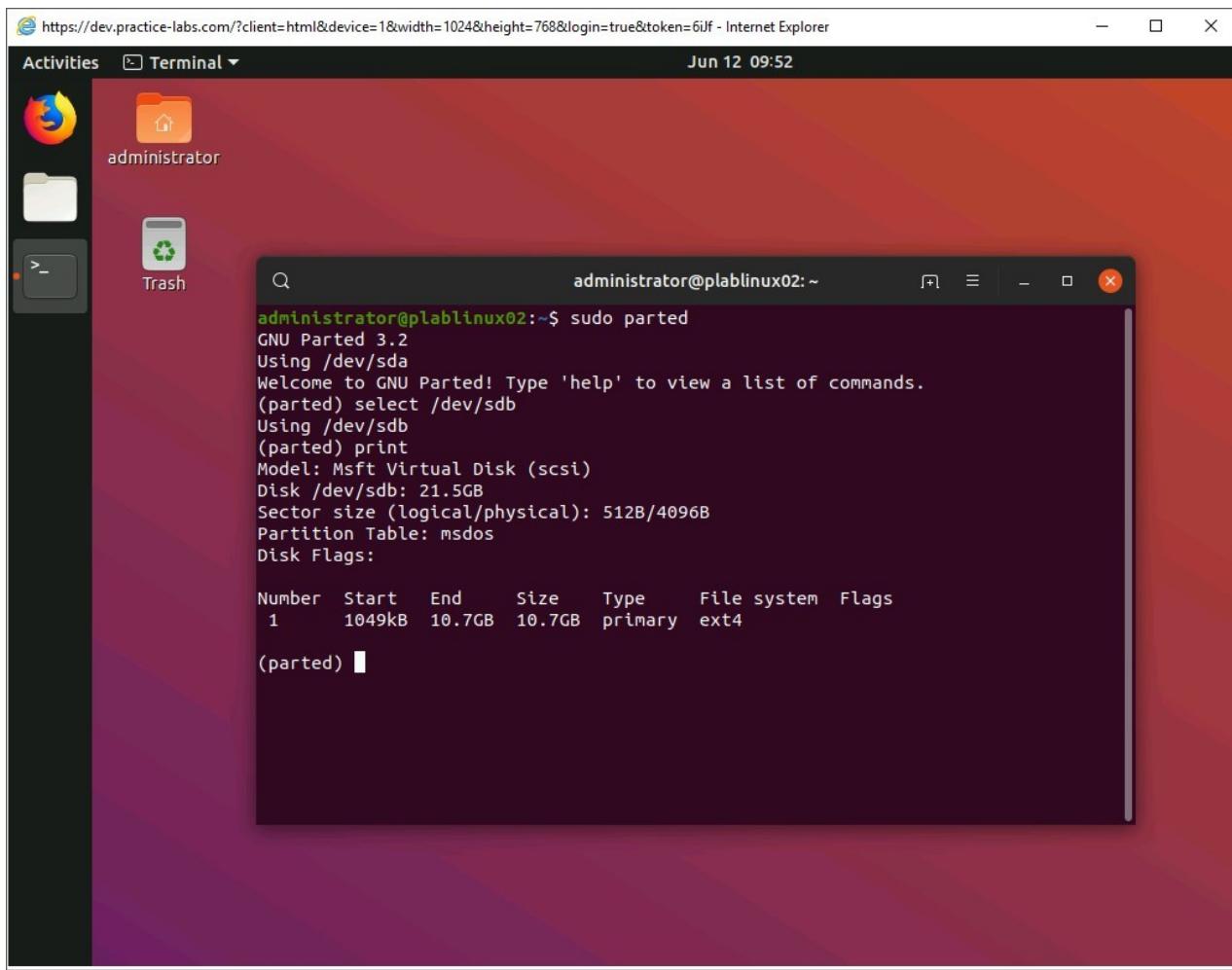


Figure 1.22 Screenshot of PLABLINUX02: Printing the partition information.

Step 12

To delete a partition using parted, type the following command:

```
rm
```

Press **Enter**. You will be prompted with the partition number.

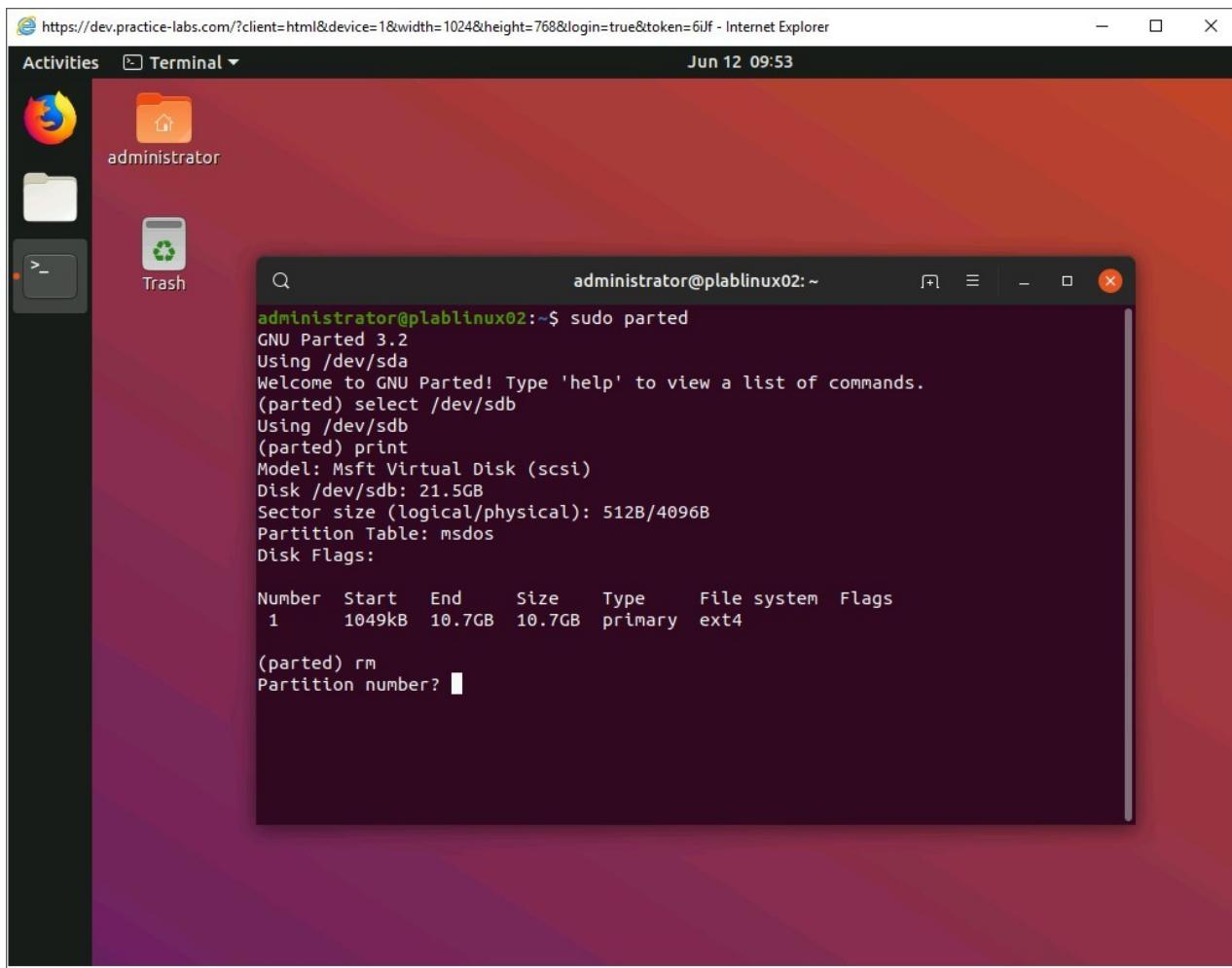


Figure 1.23 Screenshot of PLABLINUX02: Deleting a partition using parted.

Step 13

To select a partition for deletion, type the following number:

1

Press **Enter**. You will be prompted to confirm the deletion.

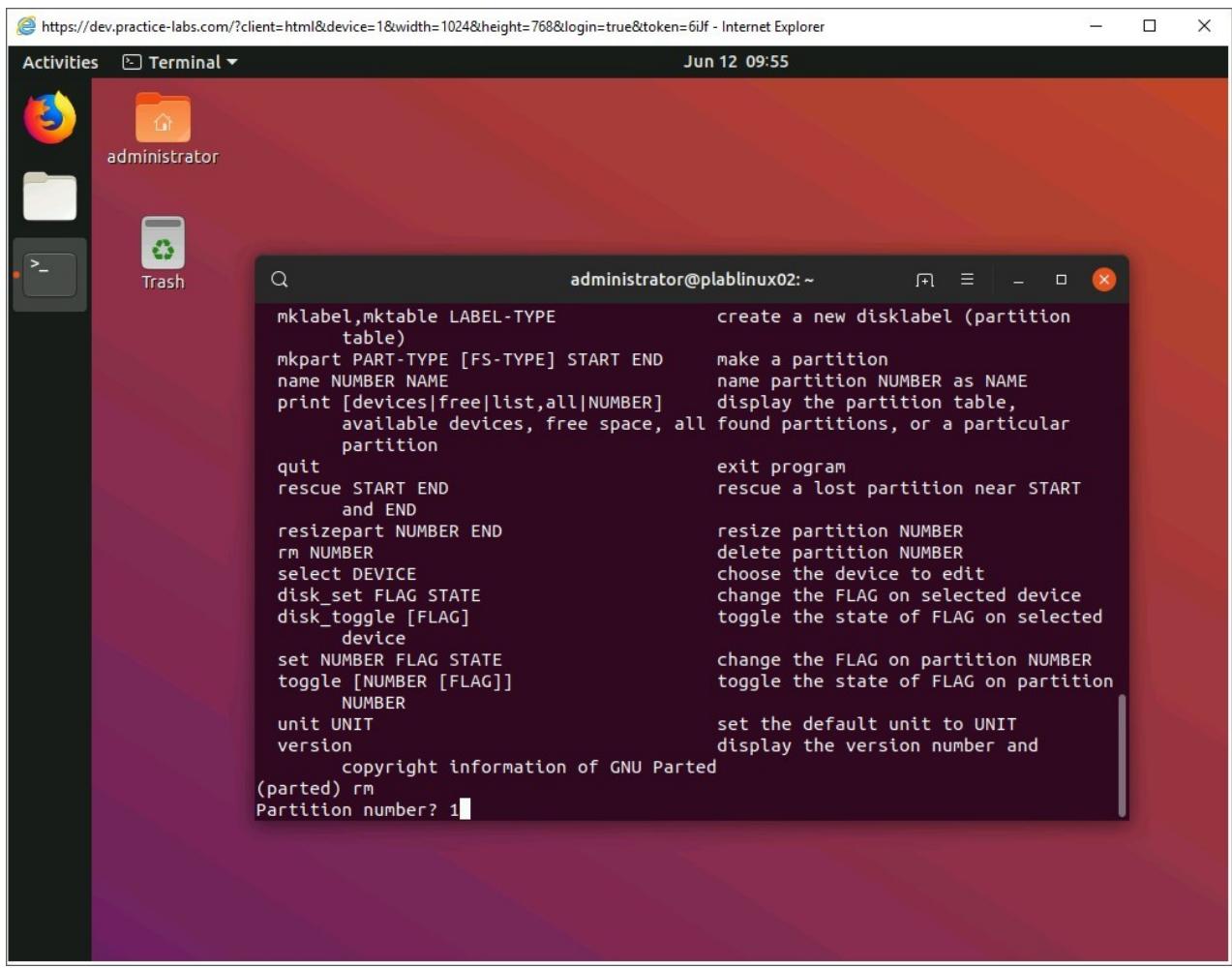


Figure 1.24 Screenshot of PLABLINUX02: Entering the partition number for deletion.

Step 14

To confirm, type the following:

Yes

Press **Enter**.

To ignore the error message, type the following:

Ignore

Press **Enter**. You are now back on the prompt.

Note: To avoid this error message, you should first unmount the partition and then delete it using parted. At present, even though the partition has been deleted, it is still not written to the disk.

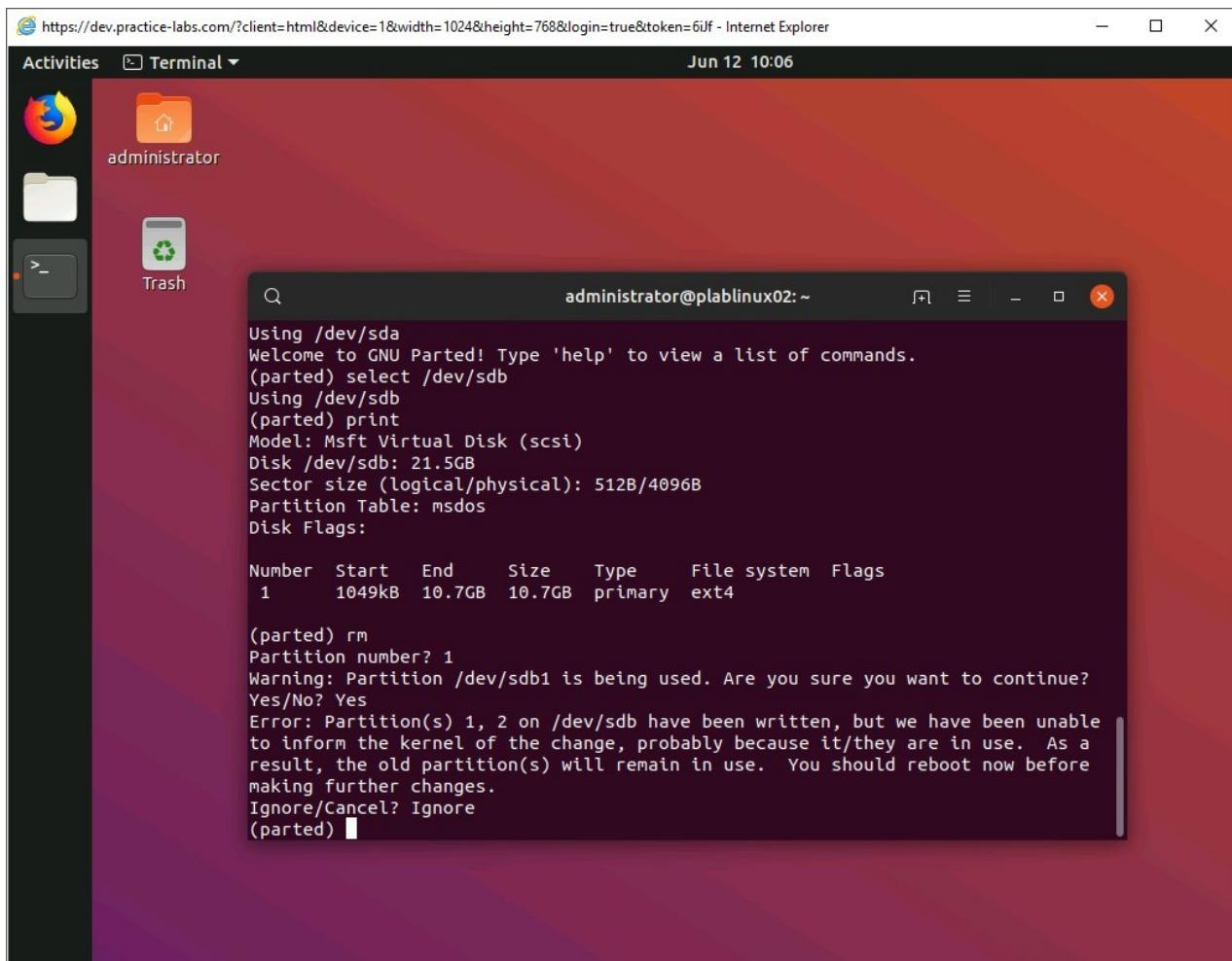


Figure 1.25 Screenshot of PLABLINUX02: Ignoring the error message.

Step 15

To confirm the deletion of the partition, type the following:

```
print
```

Press **Enter**. Notice that there is only one partition.

Type the following command to exit from parted:

```
quit
```

Press Enter.

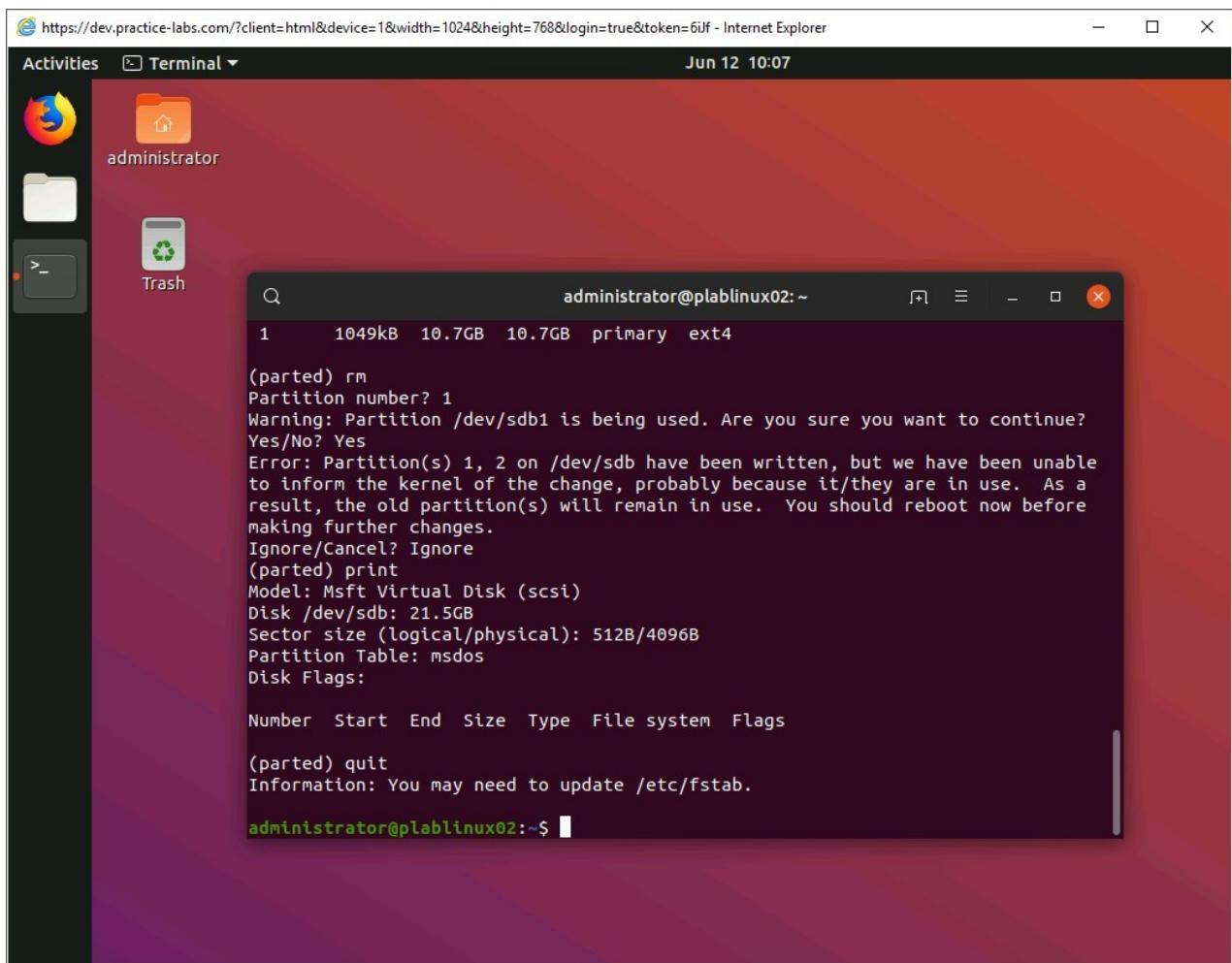


Figure 1.26 Screenshot of PLABLINUX02: Confirming the deletion of the partition.

Task 5 - Monitoring Free Disk Space and Inodes using various commands and utilities

Monitoring disk utilization is crucial in system management. The administrator must know a handful of tools to monitor the disk space.

In this task, you will learn to monitor free disk space and inodes. To do this, perform the following steps:

Step 1

Clear the screen by entering the following command:

```
clear
```

To find the free disk space, type the following command:

```
df -a
```

Press **Enter**.

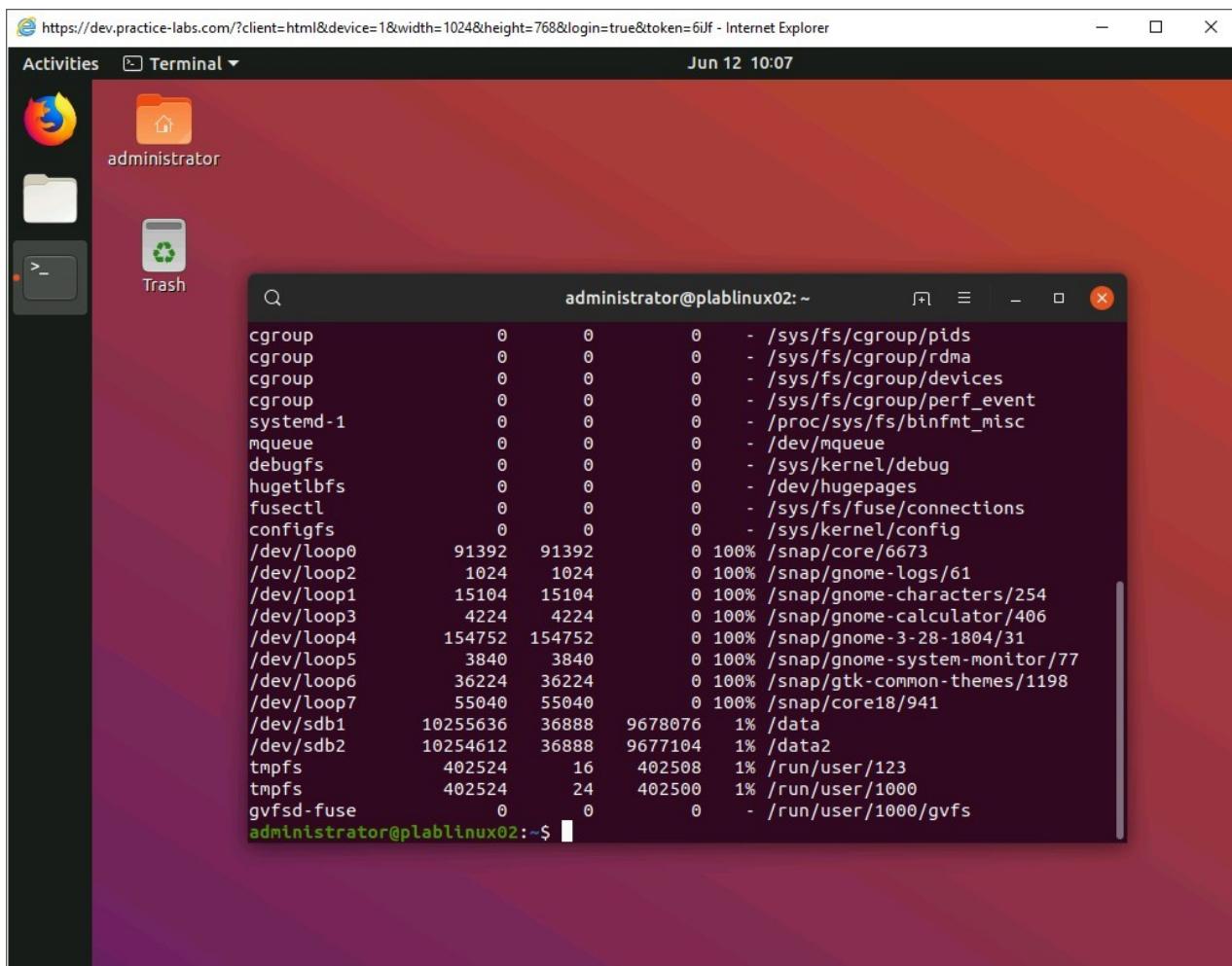


Figure 1.27 Screenshot of PLABLINUX02: Finding the free disk space.

Step 2

Clear the screen by entering the following command:

```
clear
```

To find the free disk space in **Kilobytes**, **Megabytes**, and **Gigabytes**, type the following command:

```
df -h
```

Press **Enter**.

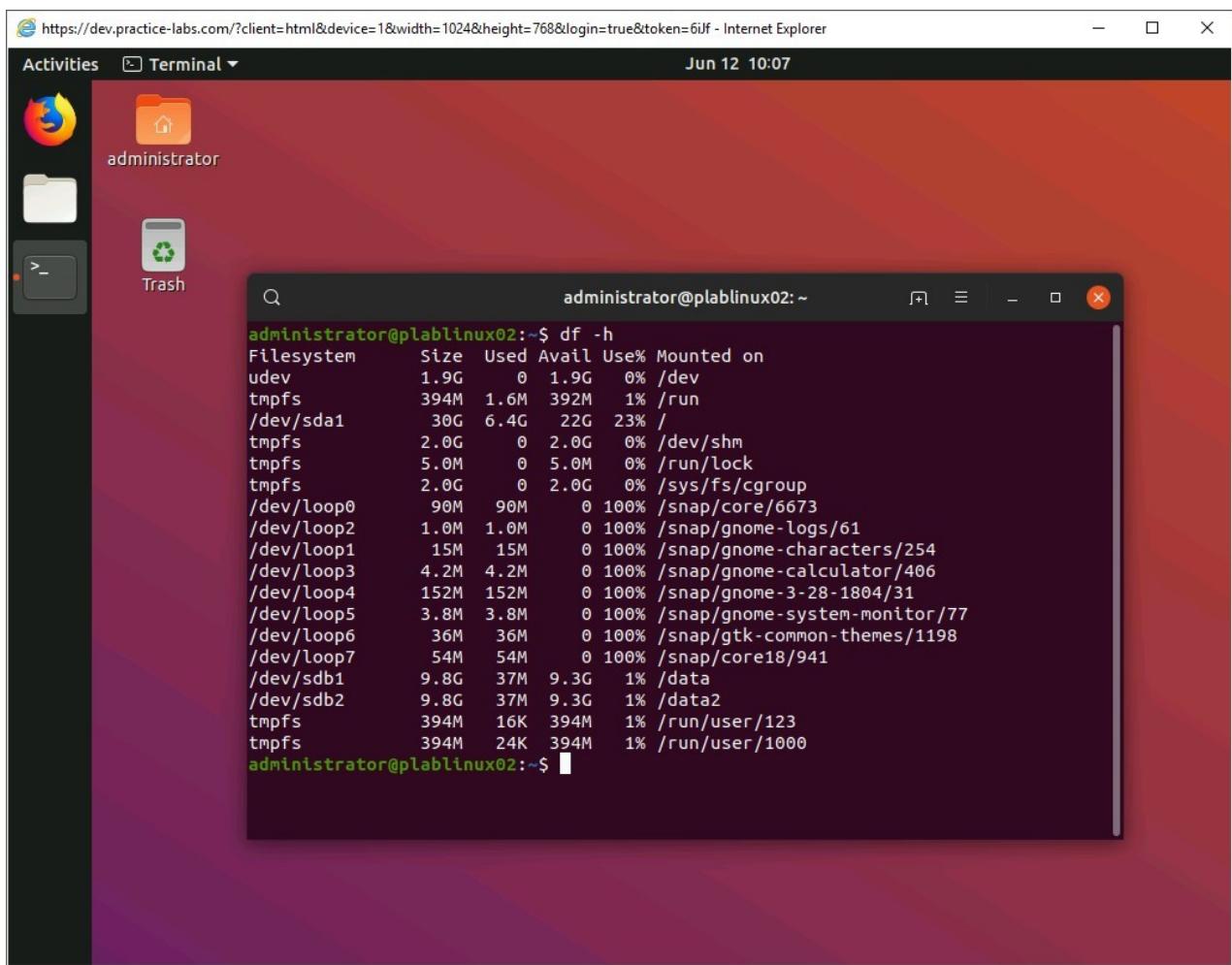


Figure 1.28 Screenshot of PLABLINUX02: Finding the free disk space in Kilobytes, Megabytes, and Gigabytes.

Step 3

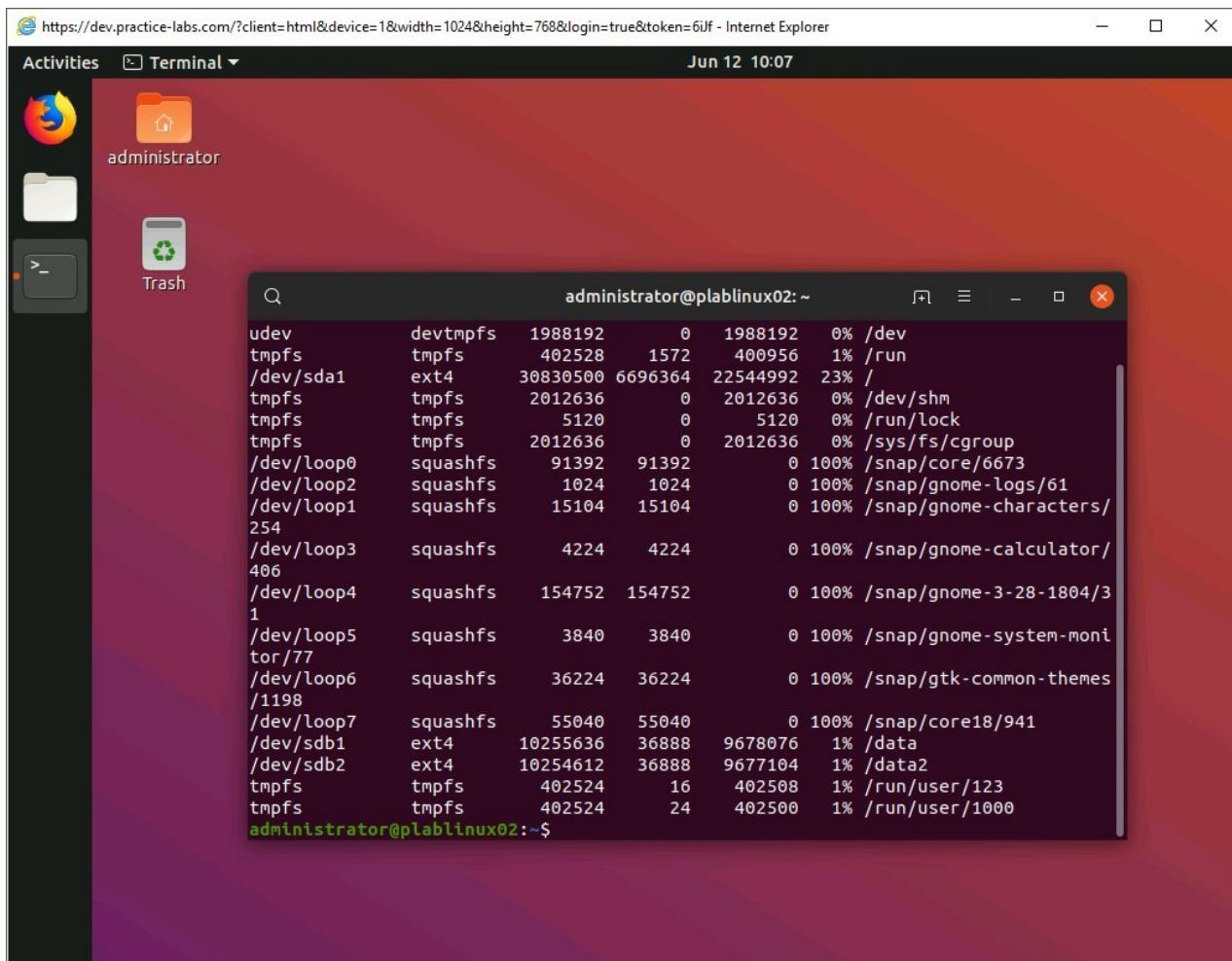
Clear the screen by entering the following command:

```
clear
```

To find the free disk space disk usage along with the filesystem usage, type the following command:

```
df -T
```

Press **Enter**.



The screenshot shows a Linux desktop environment with a terminal window open. The terminal window title is "Q administrator@plablinux02: ~". It displays the output of the "df -T" command, which provides a detailed breakdown of disk usage across various file systems. The output includes columns for the device name, file system type, total size, used space, available space, percentage usage, and the mount point. Notable entries include "/dev/sda1" (ext4, 30830500 MB total, 6696364 MB used), several tmpfs entries (tmpfs, 402528 MB total, 1572 MB used), and various snap directory entries like "/snap/core/6673" and "/snap/gnome-logs/61".

File System	Type	Total	Used	Free	Usage (%)	Mnt Point
udev	devtmpfs	1988192	0	1988192	0%	/dev
tmpfs	tmpfs	402528	1572	400956	1%	/run
/dev/sda1	ext4	30830500	6696364	22544992	23%	/
tmpfs	tmpfs	2012636	0	2012636	0%	/dev/shm
tmpfs	tmpfs	5120	0	5120	0%	/run/lock
tmpfs	tmpfs	2012636	0	2012636	0%	/sys/fs/cgroup
/dev/loop0	squashfs	91392	91392	0	100%	/snap/core/6673
/dev/loop2	squashfs	1024	1024	0	100%	/snap/gnome-logs/61
/dev/loop1	squashfs	15104	15104	0	100%	/snap/gnome-characters/254
/dev/loop3	squashfs	4224	4224	0	100%	/snap/gnome-calculator/406
/dev/loop4	squashfs	154752	154752	0	100%	/snap/gnome-3-28-1804/31
/dev/loop5	squashfs	3840	3840	0	100%	/snap/gnome-system-monitor/1198
/dev/loop6	squashfs	36224	36224	0	100%	/snap/gtk-common-themes/1198
/dev/loop7	squashfs	55040	55040	0	100%	/snap/core18/941
/dev/sdb1	ext4	10255636	36888	9678076	1%	/data
/dev/sdb2	ext4	10254612	36888	9677104	1%	/data2
tmpfs	tmpfs	402524	16	402508	1%	/run/user/123
tmpfs	tmpfs	402524	24	402500	1%	/run/user/1000

Figure 1.29 Screenshot of PLABLINUX02: Finding the free disk space disk usage along with the filesystem usage.

Step 4

Clear the screen by entering the following command:

```
clear
```

To show the free and used nodes, type the following command:

```
df -i
```

Press **Enter**.

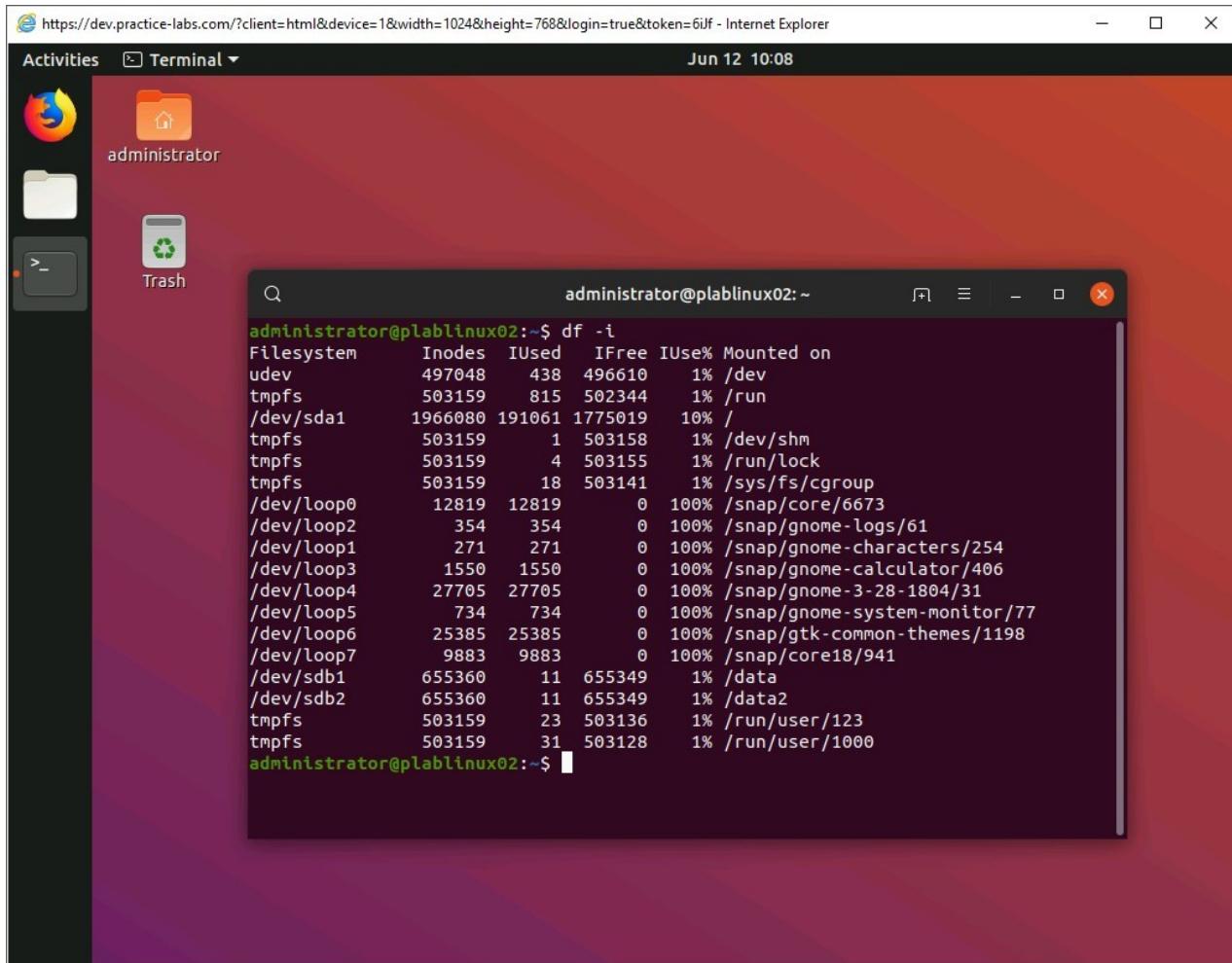


Figure 1.30 Screenshot of PLABLINUX02: Showing the free and used nodes.

Step 5

Clear the screen by entering the following command:

```
clear
```

You can use the stat command to display the inode data of a file or directory. Type the following command:

```
stat /etc
```

Press **Enter**.

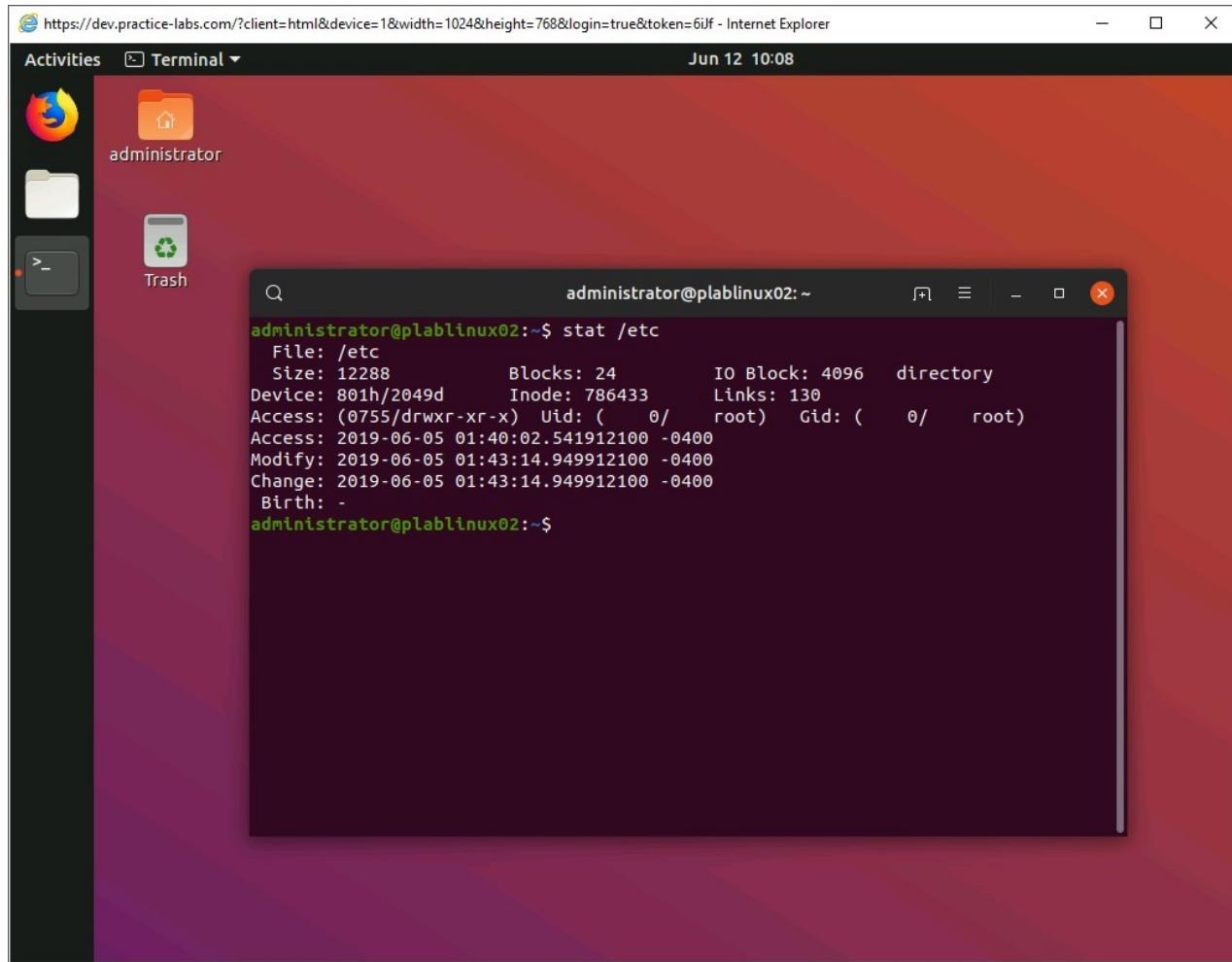


Figure 1.31 Screenshot of PLABLINUX02: Using the stat command to display the inode data of a file or directory.

Step 6

You can also display the inode of a single file or directory. To display the inode of a file, type the following command:

```
stat --format=%i /etc/hosts
```

Press **Enter**.

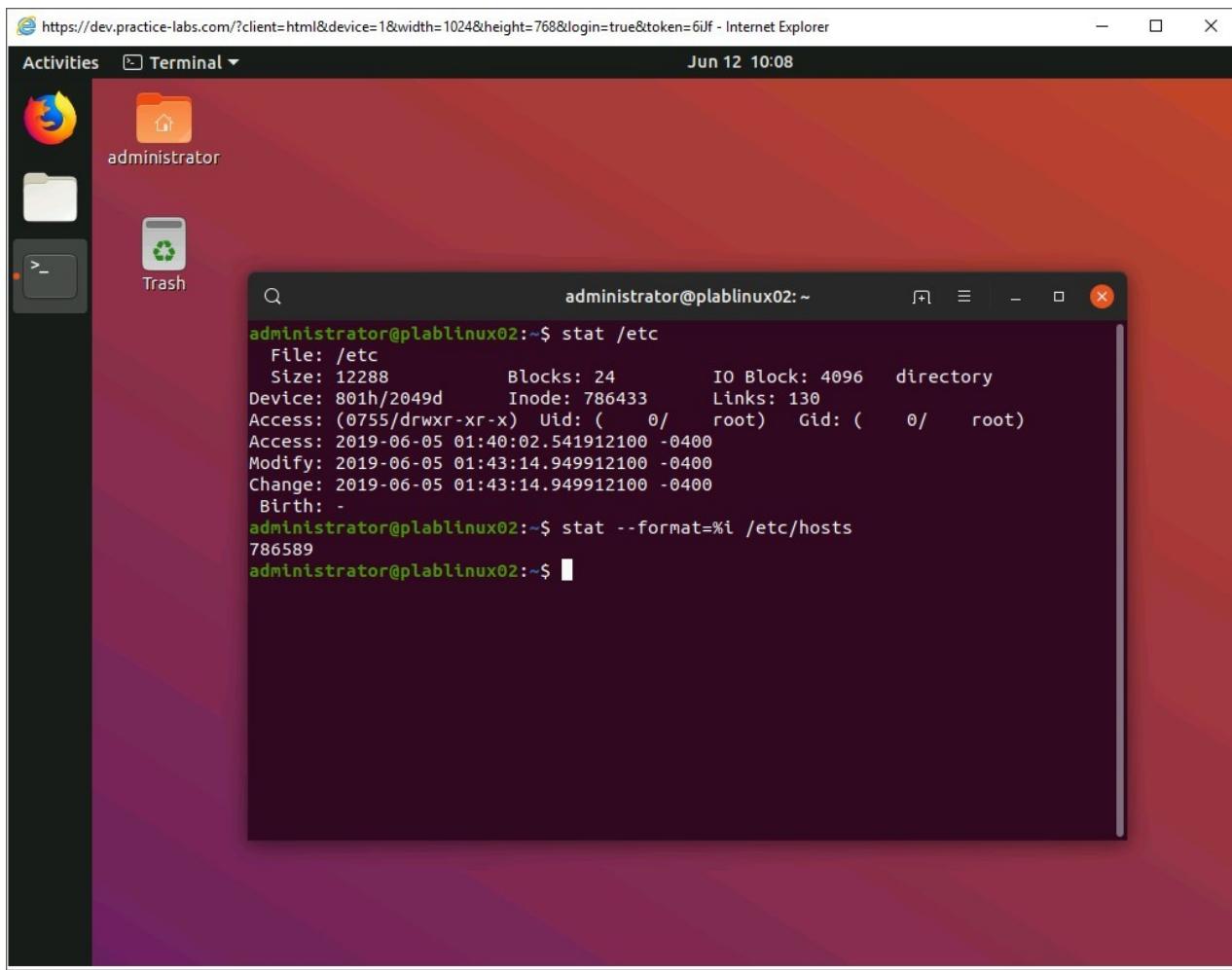


Figure 1.32 Screenshot of PLABLINUX02: Displaying the inode of a single file.

Step 7

You can also display the inode of single or multiple files. To display the inode of a file, type the following command:

```
ls -il /etc/hosts
```

Press **Enter**.

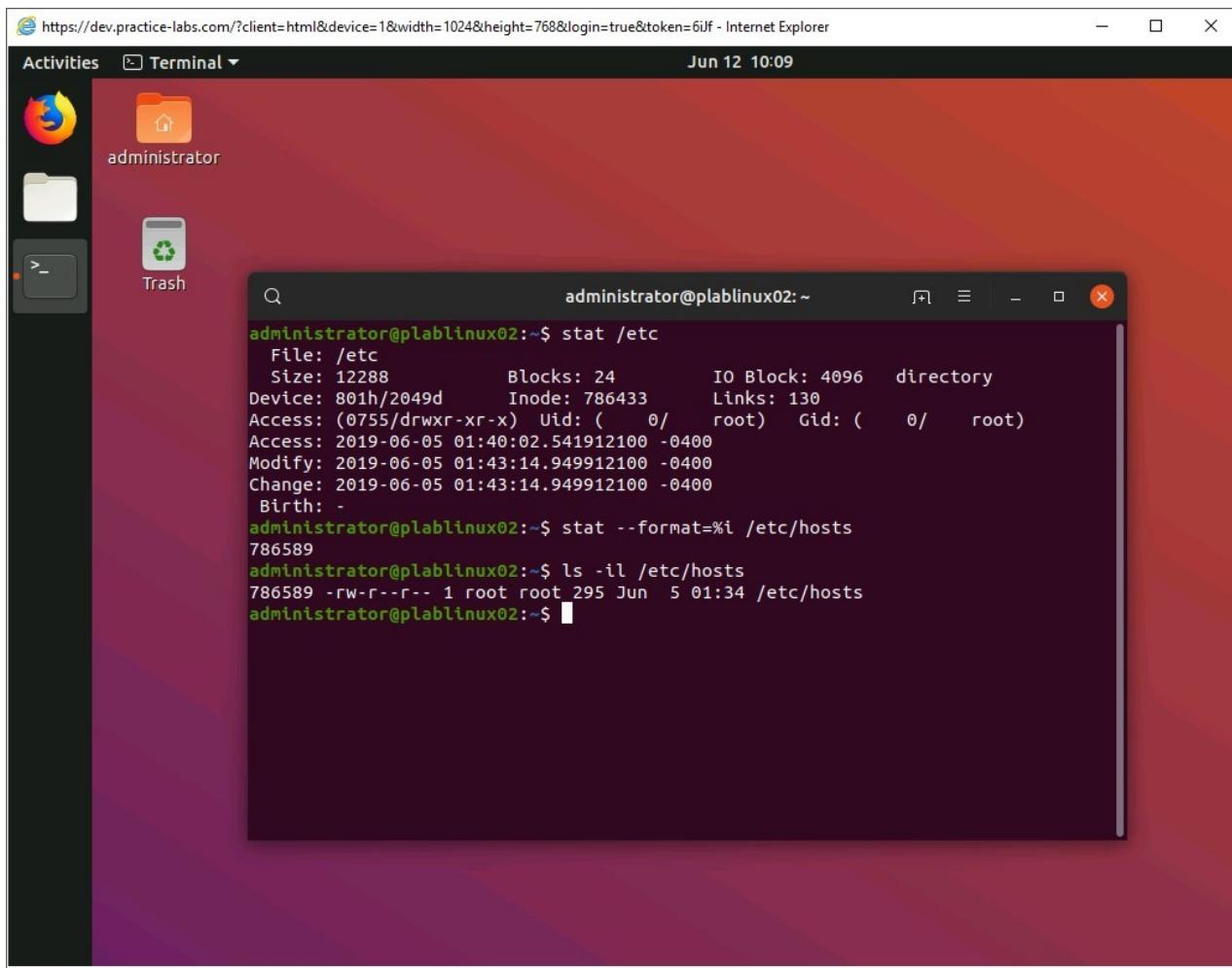


Figure 1.33 Screenshot of PLABLINUX02: Displaying the inode of a file using the ls command.

Step 8

Clear the screen by entering the following command:

```
clear
```

To display the inode of multiple files in the **/etc** directory, type the following command:

```
ls -il /etc
```

Press **Enter**. All files that are stored in the **/etc** directory are now listed with their inode numbers.

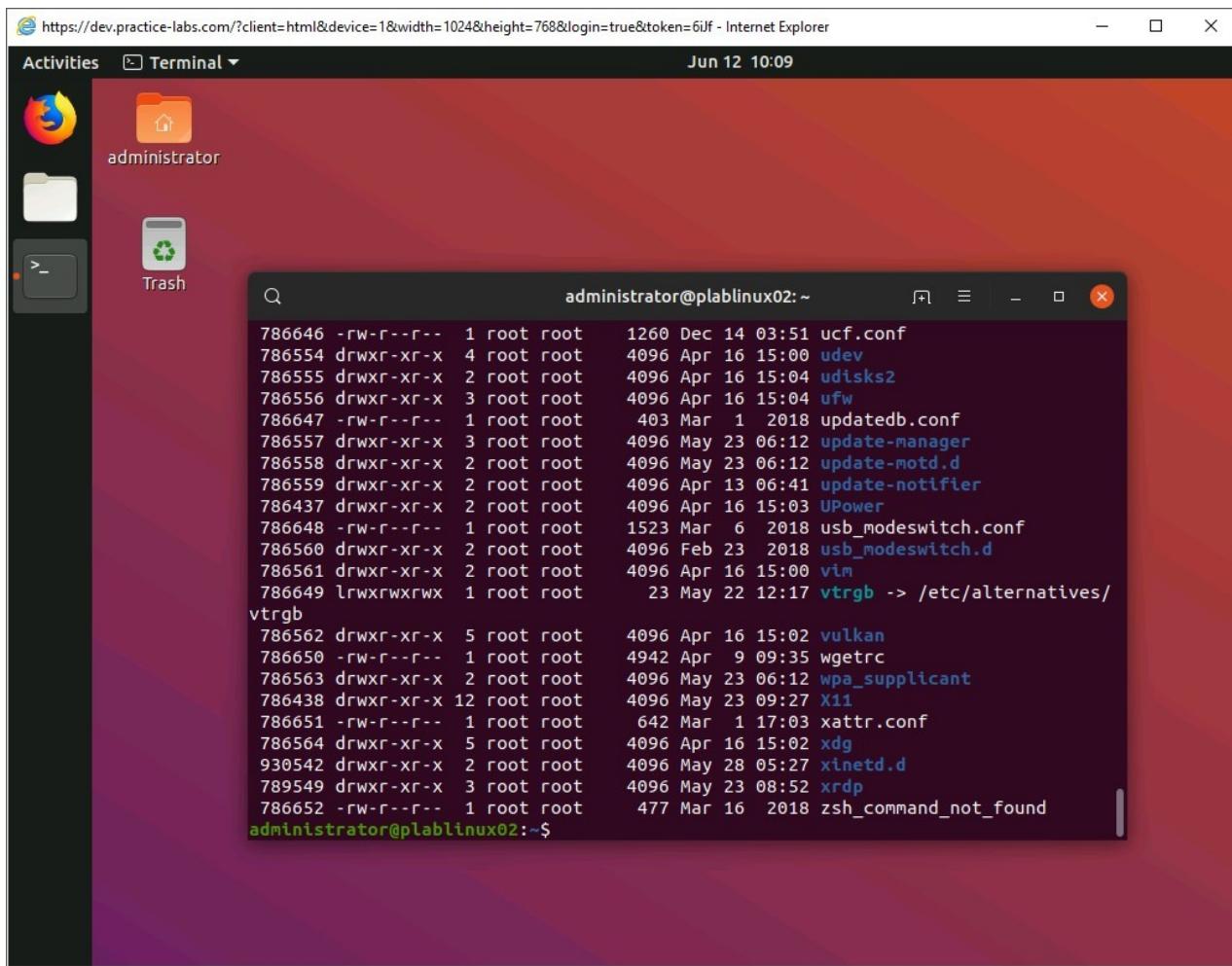


Figure 1.34 Screenshot of PLABLINUX02: Displaying the inode of multiple files in the /etc directory.

Keep all devices in their current state and proceed to the next exercise.

Review

Well done, you have completed the **Using Various Disk Management Tools** Practice Lab.

Summary

You completed the following exercise:

- Exercise 1 - Using Various Disk Management Tools

You should now be able to:

- View filesystems (lsblk)
- View the content of a block device (blkid)
- Use disk partitioning tools (fdisk, parted)
- Use absolute and relative paths

Feedback

Shutdown all virtual machines used in this lab. Alternatively, you can log out of the lab platform.