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# How to Partition a Disk in Linux



## Introduction

Creating disk partitions enables you to split your hard drive into multiple sections that act independently.

In Linux, users must structure storage devices (USB and hard drives) before using them. Partitioning is also useful when you are installing multiple operating systems on a single machine.

**In this step-by-step tutorial, you will learn how to create a partition using the Linux `parted` or `fdisk` command.**

## Prerequisites

- A system running Linux
- A user account with `sudo` or `root` privileges
- Access to a terminal window / command line (**Activities > Search > Terminal**)

# Option 1: Partition a Disk Using parted Command

Follow the steps below to partition a disk in Linux by using the `parted` command.

## Step 1: List Partitions

Before making a partition, list available storage devices and partitions. This action helps identify the storage device you want to partition.

Run the following command with `sudo` to list storage devices and partitions:

```
sudo parted -l
```

The terminal prints out available storage devices with information about:

- **Model** – Model of the storage device.
- **Disk** – Name and size of the disk.
- **Sector size** – Logical and physical size of the memory. Not to be confused with [available disk space](#).
- **Partition Table** – Partition table type (msdos, gpt, aix, amiga, bsd, dvh, mac, pc98, sun, and loop).
- **Disk Flags** – Partitions with information on size, type, file system, and flags.

Partitions types can be:

- **Primary** – Holds the operating system files. Only four primary partitions can be created.
- **Extended** – Special type of partition in which more than the four primary partitions can be created.
- **Logical** – Partition that has been created inside of an extended partition.

In our example, there are two storage devices (`/dev/sda` and `/dev/sdb`):

```
nevena@nevena-VirtualBox:~$ sudo parted -l
[sudo] password for nevena:
Model: ATA VBOX HARDDISK (scsi)
Disk /dev/sda: 33,3GB
Sector size (logical/physical): 512B/512B
Partition Table: msdos
Disk Flags:

Number  Start   End     Size    Type     File system  Flags
  1      1049kB  538MB   537MB   primary  fat32        boot
  2      539MB   33,3GB  32,8GB  extended
  5      539MB   33,3GB  32,8GB  logical  ext4

Model: ATA VBOX HARDDISK (scsi)
Disk /dev/sdb: 10,6GB
Sector size (logical/physical): 512B/512B
Partition Table: gpt
Disk Flags:

Number  Start   End     Size    File system  Name     Flags
  1      17,4kB  1396MB  1396MB                primary
```

**Note:** The first storage disk (`dev/sda` or `dev/vda`) contains the operating system. Creating a partition on this disk can make your system unbootable. Only create partitions on secondary disks (`dev/sdb`, `dev/sdc`, `dev/vdb`, or `dev/vdc`).

## Step 2: Open Storage Disk

Open the storage disk that you intend to partition by running the following command:

```
sudo parted /dev/sdb
```

```
nevena@nevena-VirtualBox:~$ sudo parted /dev/sdb
GNU Parted 3.3
Using /dev/sdb
Welcome to GNU Parted! Type 'help' to view a list of commands.
(parted) █
```

Always specify the storage device. If you don't specify a disk name, the disk is randomly selected. To change the disk to `dev/sdb` run:

```
select /dev/sdb
```

The `dev/sdb` disk is open:

```
nevena@nevena-VirtualBox:~$ sudo parted
GNU Parted 3.3
Using /dev/sda
Welcome to GNU Parted! Type 'help' to view a list of commands.
(parted) select /dev/sdb
Using /dev/sdb
(parted) █
```

## Step 3: Make a Partition Table

Create a partition table before partitioning the disk. A partition table is located at the start of a hard drive and it stores data about the size and location of each partition.

Partition table types are: **aix**, **amiga**, **bsd**, **dvh**, **gpt**, **mac**, **ms-dos**, **pc98**, **sun**, and **loop**.

To create a partition table, enter the following:

```
mklabel [partition_table_type]
```

For example, to create a **gpt** partition table, run the following command:

```
mklabel gpt
```

Type **Yes** to execute:

```
(parted) mklabel gpt
Warning: The existing disk label on /dev/sdb will be destroyed and all data on this
disk will be lost. Do you want to continue?
Yes/No? █
```

**Note:** The two most commonly used partition table types are **gpt** and **msdos**. The latter supports up to sixteen partitions and formats up to 16TB of space while gpt formats up to 9.4ZB and supports up to 128 partitions.

## Step 4: Check Table

Run the `print` command to review the partition table. The output displays information about the storage device:

```
(parted) print
Model: ATA VBOX HARDDISK (scsi)
Disk /dev/sdb: 10,6GB
Sector size (logical/physical): 512B/512B
Partition Table: gpt
Disk Flags:

Number  Start  End  Size  File system  Name  Flags
(parted) █
```

**Note:** Run `help mkpart` command to get additional help on how to create a new partition.

## Step 5: Create Partition

Let's make a new 1854MB-partition using the ext4 file system. The assigned disk start shall be 1MB and the disk end is at 1855MB.

To create a new partition, enter the following:

```
mkpart primary ext4 1MB 1855MB
```

After that, run the `print` command to review information on the newly created partition. The information is displayed under the *Disk Flags* section:

```
(parted) mkpart primary ext4 1MB 1855MB
(parted) PRINT
Model: ATA VBOX HARDDISK (scsi)
Disk /dev/sdb: 10,6GB
Sector size (logical/physical): 512B/512B
Partition Table: gpt
Disk Flags:

Number  Start  End  Size  File system  Name  Flags
1       1049kB 1855MB 1854MB ext4         primary
```

In a gpt partition table, the partition type is the mandatory partition name. In our example, **primary** is the name of the partition, not the partition type.

To save your actions and quit, enter the `quit` command. Changes are saved automatically with this command.

```
(parted) quit
Information: You may need to update /etc/fstab.

nevena@nevena-VirtualBox:~$ █
```

**Note:** The “You may need to update /etc/fstab file” message signals that the partition can be mounted automatically at boot time.

# Option 2: Partition a Disk Using fdisk Command

Follow the steps below to partition a disk in Linux by using the `fdisk` command.

## Step 1: List Existing Partitions

Run the following command to list all existing partitions:

```
sudo fdisk -l
```

The output contains information about storage disks and partitions:

```
Disk /dev/sda: 31,3 GiB, 33312931840 bytes, 65064320 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: 0x558d572e

Device      Boot    Start        End    Sectors    Size Id Type
/dev/sda1   *         2048     1050623     1048576    512M  b W95 FAT32
/dev/sda2             1052670    65062911    64010242    30,5G   5 Extended
/dev/sda5             1052672    65062911    64010240    30,5G   83 Linux

Disk /dev/sdb: 9,91 GiB, 10621960192 bytes, 20746016 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: gpt
Disk identifier: 96200583-C460-44DD-A69A-7B376C533B5D

Device      Start        End    Sectors    Size Type
/dev/sdb1    2048    3622911    3620864    1,7G Linux filesystem
```

## Step 2: Select Storage Disk

Select the storage disk you want to create partitions on by running the following command:

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

The `/dev/sdb` storage disk is open:

```
nevena@nevena-VirtualBox:~$ sudo fdisk /dev/sdb

Welcome to fdisk (util-linux 2.34).
Changes will remain in memory only, until you decide to write them.
Be careful before using the write command.
```

## Step 3: Create a New Partition

1. Run the `n` command to create a new partition.
2. Select the partition number by typing the default number (2).
3. After that, you are asked for the starting and ending sector of your hard drive. It is best to type the default number in this section (3622912).
4. The last prompt is related to the size of the partition. You can choose to have several sectors or to set the size in megabytes or gigabytes. Type `+2GB` to set the size of the partition to 2GB.

A message appears confirming that the partition is created.

```
Command (m for help): n
Partition number (2-128, default 2): 2
First sector (3622912-20745982, default 3622912): 3622912
Last sector, +/-sectors or +/-size[K,M,G,T,P] (3622912-20745982, default 20745982): +2GB
Created a new partition 2 of type 'Linux filesystem' and of size 1,9 GiB.
```

## Step 4: Write on Disk

The system created the partition, but the changes are not written on the disk.

1. To write the changes on disk, run the [w command](#):

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

2. Verify that the partition is created by running the following command:

```
sudo fdisk -l
```

As you can see, the partition `/dev/sdb2` has been created.

**Disk /dev/sda: 31,3 GiB, 33312931840 bytes, 65064320 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: 0x558d572e

Device	Boot	Start	End	Sectors	Size	Id	Type
/dev/sda1	*	2048	1050623	1048576	512M	b W95	FAT32
/dev/sda2		1052670	65062911	64010242	30,5G	5	Extended
/dev/sda5		1052672	65062911	64010240	30,5G	83	Linux

**Disk /dev/sdb: 9,91 GiB, 10621960192 bytes, 20746016 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: gpt

Disk identifier: 96200583-C460-44DD-A69A-7B376C533B5D

Device	Start	End	Sectors	Size	Type
/dev/sdb1	2048	3622911	3620864	1,7G	Linux filesystem
/dev/sdb2	3622912	7528447	3905536	1,9G	Linux filesystem





# Format the Partition

Once a partition has been created with the `parted` or `fdisk` command, format it before using it.

Format the partition by running the following command:

```
sudo mkfs -t ext4 /dev/sdb1
```

```
nevena@nevena-VirtualBox:~$ sudo mkfs -t ext4 /dev/sdb1
mke2fs 1.45.5 (07-Jan-2020)
Creating filesystem with 452608 4k blocks and 113344 inodes
Filesystem UUID: d2d0d85b-aac8-4c67-a92a-901779c9ce2d
Superblock backups stored on blocks:
    32768, 98304, 163840, 229376, 294912

Allocating group tables: done
Writing inode tables: done
Creating journal (8192 blocks): done
Writing superblocks and filesystem accounting information: done
```

**Note:** Check out our guide and learn how to [format and mount disk partitions in Linux](#) using ext4, FAT32, or NTFS file system!

# Mount the Partition

To begin interacting with the disk, create a **mount point** and **mount the partition** to it.

1. Create a mount point by running the following command:

```
sudo mkdir -p /mt/sdb1
```

2. After that, mount the partition by entering:

```
sudo mount -t auto /dev/sdb1 /mt/sdb1
```

The terminal does not print out an output if the commands are executed successfully.

3. Verify if partition is mounted by using the `df -h` command:

```

nevena@nevena-VirtualBox:~$ sudo mkdir -p /mnt/sdb1
nevena@nevena-VirtualBox:~$ sudo mount -t auto /dev/sdb1 /mnt/sdb1
nevena@nevena-VirtualBox:~$ df -hT

```

Filesystem	Type	Size	Used	Avail	Use%	Mounted on
udev	devtmpfs	1,2G	0	1,2G	0%	/dev
tmpfs	tmpfs	249M	1,4M	248M	1%	/run
/dev/sda5	ext4	30G	7,1G	22G	25%	/
tmpfs	tmpfs	1,3G	0	1,3G	0%	/dev/shm
tmpfs	tmpfs	5,0M	4,0K	5,0M	1%	/run/lock
tmpfs	tmpfs	1,3G	0	1,3G	0%	/sys/fs/cgroup
/dev/loop0	squashfs	55M	55M	0	100%	/snap/core18/1880
/dev/loop1	squashfs	56M	56M	0	100%	/snap/core18/1885
/dev/loop2	squashfs	63M	63M	0	100%	/snap/gtk-common-themes/1506
/dev/loop3	squashfs	256M	256M	0	100%	/snap/gnome-3-34-1804/36
/dev/loop4	squashfs	30M	30M	0	100%	/snap/snapd/8790
/dev/loop5	squashfs	50M	50M	0	100%	/snap/snap-store/467
/dev/loop6	squashfs	31M	31M	0	100%	/snap/snapd/9279
/dev/sda1	vfat	511M	4,0K	511M	1%	/boot/efi
tmpfs	tmpfs	249M	20K	249M	1%	/run/user/1000
/dev/sdb1	ext4	1,7G	5,2M	1,6G	1%	/mnt/sdb1

```

nevena@nevena-VirtualBox:~$

```

**Note:** If you have NTFS partitions on your hard drive, check out our article on [how to mount NTFS partitions in Linux](#).

## Conclusion

After following this step-by-step tutorial, you should have a better understanding on how to partition a disk in Linux by using the `parted` or `fdisk` command.