

Partitions

Under Linux, disks are divided into partitions; the term slices is not often used, but when it is, it is used interchangeably with the term partitions.

Up to four primary partitions can be created and information stored about them in the MBR (Master Boot Record). More flexibility can be obtained by creating up to three primary partitions and an extended partition, which can contain as many logical partitions as can be accommodated, which may depend on the type of disk involved. For example, SCSI disks can have only up to sixteen partitions.

The Linux kernel discovers all pre-attached hard disks during system boot, and there is normally no configuration files required to inform about what is present. In hotplug situations, the udev system will find disks upon insertion in the system and read in their partition tables.

The command line utility for creating and examining hard disk partitions is **fdisk**; to see all currently attached device, you can do:

```

1  $ sudo /sbin/fdisk -l
2
3  Disk /dev/sda: 2000.4 GB, 2000398934016 bytes, 3907029168 sectors
4  Units = sectors of 1 * 512 = 512 bytes
5  Sector size (logical/physical): 512 bytes / 4096 bytes
6  I/O size (minimum/optimal): 4096 bytes / 4096 bytes
7  Disk label type: dos
8  Disk identifier: 0x000852df
9
10     Device Boot      Start         End      Blocks   Id  System
11     /dev/sda1            2048    1048578047    524288000    8e  Linux LVM
12     /dev/sda2    1048578048    2097154047    524288000    8e  Linux LVM
13     /dev/sda3    2097154048    3907028991    904937472     5  Extended
14     /dev/sda5    2097156096    3145732095    524288000    8e  Linux LVM
15     /dev/sda6    3890448384    3907028991     8290304    82  Linux swap / Solaris
16
17  Disk /dev/sdb: 256.1 GB, 256060514304 bytes, 500118192 sectors
18  Units = sectors of 1 * 512 = 512 bytes
19  Sector size (logical/physical): 512 bytes / 4096 bytes
20  I/O size (minimum/optimal): 4096 bytes / 4096 bytes
21  Disk label type: dos
22  Disk identifier: 0x00089e7f
23
24     Device Boot      Start         End      Blocks   Id  System
25     /dev/sdb1            2048     40962047    20480000    83  Linux
26     /dev/sdb2    40962048    500118191    229578072    83  Linux
27
28  Disk /dev/sdc: 256.1 GB, 256060514304 bytes, 500118192 sectors
29  Units = sectors of 1 * 512 = 512 bytes
30  Sector size (logical/physical): 512 bytes / 4096 bytes
31  I/O size (minimum/optimal): 4096 bytes / 4096 bytes
32  Disk label type: dos
33  Disk identifier: 0x00022650
34
35     Device Boot      Start         End      Blocks   Id  System
36     /dev/sdc1            2048     500117503    250057728    83  Linux
37
38  Disk /dev/loop0: 2562 MB, 2562695168 bytes, 5005264 sectors
39  Units = sectors of 1 * 512 = 512 bytes
40  Sector size (logical/physical): 512 bytes / 512 bytes

```

The **fdisk** utility can be used to create and remove partitions and change their type.

Note that **fdisk** does not allow you to move partitions or resize them. Resizing has to be done in two steps; if you are increasing, you have to increase the size of the partition, and then increase the filesystem size (for example, with **resize2fs**); if you are decreasing the size, you have to decrease the size of the filesystem and then the partition.

Partitions can be formatted for various filesystems with the **mkfs** command, or more usually, with specific commands for each type of filesystem. For example, either of the two following commands:

```
1 $ sudo mkfs -t ext4 /dev/sda10
2 $ sudo mkfs.ext4 /dev/sda10
```

will place an ext4 filesystem on **/dev/sda10** with default options.

The **gparted** utility (and some equivalents) let you do all these operations in a graphical user-friendly manner. Starting this up (as root) gives:

The screenshot shows the GParted application window. The top menu bar includes 'GParted', 'Edit', 'View', 'Device', 'Partition', and 'Help'. Below the menu is a toolbar with icons for creating, deleting, moving, copying, pasting, and committing changes. A dropdown menu on the right shows the selected device: '/dev/sda (476.94 GiB)'. The main area displays a visual representation of the disk layout, with a large yellow partition labeled '/dev/sda6' and '400.00 GiB' highlighted. Below this is a table of partitions.

Partition	File System	Mount Point	Label	Size	Used	Unused
/dev/sda1	fat32	/boot/efi	SYSTEM	260.00 MiB	53.08 MiB	206.92 MiB
/dev/sda2	unknown		Microsoft reserved partition	16.00 MiB	---	---
/dev/sda3	ntfs		Windows	39.96 GiB	29.52 GiB	10.44 GiB
/dev/sda6	ext4	/	CENTOS7	400.00 GiB	281.07 GiB	118.93 GiB
unallocated	unallocated			21.08 GiB	---	---
/dev/sda5	ext4	/UBUNTU		14.65 GiB	6.63 GiB	8.02 GiB
/dev/sda4	ntfs		WinRE_DRV	1000.00 MiB	378.09 MiB	621.91 MiB

At the bottom of the window, a status bar indicates '0 operations pending'.