

## PARTITIONS

### 1- What is a Partition?

A section of a hard disk made up of a group of its sectors(\*1). Every section or partition of a hard disk can be addressed separately from another sections and can hold a different filesystem(\*2) or even, a different operating system. For normal use, you must create at least one partition on a hard disk.

Every partition is a different logical storage unit. Partitioning a disk allows you to treat one physical disk drive as if it were multiple disks.

### 2- What is a partition table?

A partition table holds information about the partitions of a hard disk. (Size, filesystem, start sector, end sector, state,...). Partition table is stored in a special sector of the hard disk called boot sector.

The size of a partition table is 64 bytes. The total data storage space of a hard disk can be divided into at most four partitions. These partitions are described by 16-byte entries (each partition is an entry). The maximum number of partitions is 4 (64 bytes/16 bytes per entry means only 4 entries, and so, 4 partitions)

### 3- Partition types

a) Primary partitions: A primary partition contains one file system and can contain an operating system.

b) Extended partition: A hard disk may contain only one extended partition. The extended partition can be subdivided into multiple logical partitions. An extended partition can not contain one file system or operating system. It really functions as a "container" that holds logical partitions. This structure is used to be able to work with more than 4 partitions.

c) Logical partition: A logical partition contains one file system and can contain an operating system. A logical partition must be contained inside an Extended partition.

### 4- Boot (or Active) partition

That partition will be used for booting the system if you do not install a boot manager(\*3). Some operating systems require a partition flagged as "boot partition". These operating systems are installed in the "boot partition".

### 5- Rules

The rules that govern partition setup are as follows:

1- A maximum of four partitions (called primary partitions) can be placed on any hard disk.

2- Only one partition may be designated, at any given time, as active. That partition will be used for booting the system and any other primary partitions will be ignored if you do not use a boot manager.

3- One of the four partitions may be designated as an extended partition. This partition may then be subdivided into multiple logical partitions.

4- Combination of partitions:

- |                           |                                 |
|---------------------------|---------------------------------|
| a) 4 primary + 0 extended | e) 1 primary + 0 extended       |
| b) 3 primary + 1 extended | f) 1 primary + 1 extended       |
| c) 3 primary + 0 extended | g) 0 primary + 1 extended       |
| d) 2 primary + 1 extended | Even --> 0 primary + 0 extended |

### 5- What is a Partition editor? What is gparted?

a) A partition editor is an application for creating, formatting(installing a filesystem), resizing, reorganizing and deleting disk partitions.

b) Gparted is GUI (Graphic User Interface) and easy to use partitions editor. The GParted project provides a live operating (Debian) system including GParted which can be written to a Live CD or a Live USB. GParted is also available on other GNU/Linux live CDs, including Ubuntu.

### NOTES:

(\*1) A sector is the basic unit of data storage, in other words, is the minimum unit of memory that is read from and written to a disk by a disk driver. A sector can store 512 bytes of user data (but all major hard disk drive manufacturers began releasing hard disk drive platforms using the [Advanced Format](#) of 4096 byte logical blocks since 2011)

(\*2) A data structure that usually resides on a part of a disk. You have to install a filesystem in a partition, otherwise, the operating system will be not able to store or recover data from the hard disk. You have to install a filesystem in a partition, otherwise, you will be not able to install an operating system.

(\*3) A boot manager is loaded when the computer is turned on and allows you to choose the operating system you want to use.