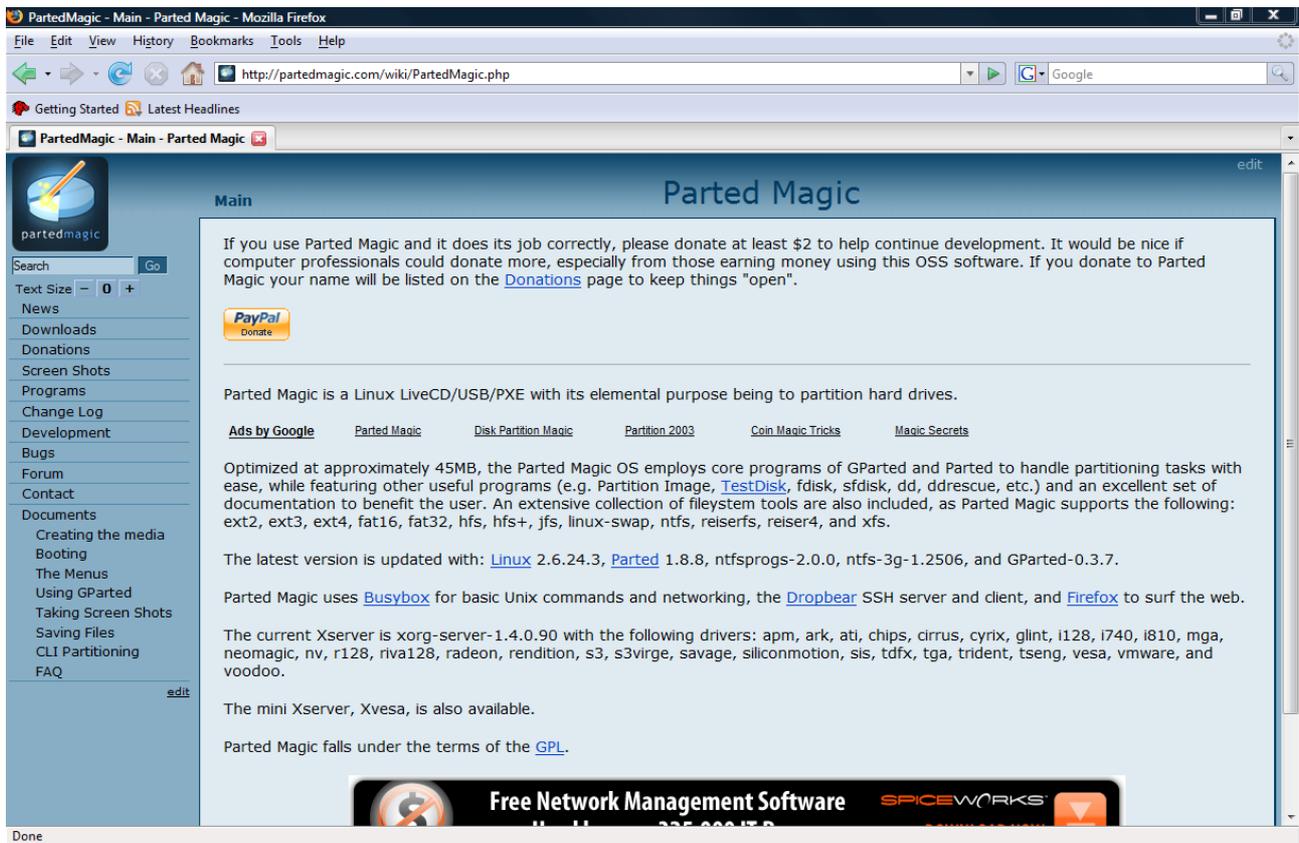


How to partition your disk with the parted magic linux liveCD



Disclaimer: If you do not understand the concept of partitioning or do not know what you are doing then please stay away from *any* partitioning tool. Any important data you might have on disk might be lost!! Please consult someone who has more than basic understanding of partitions and operating systems. Yes, this tutorial informs you of what partitions are, and in theory you should be able to use it wisely. However, I am not (!) looking over your shoulder!!! So I cannot prevent or correct any errors that you might make. If you wish to learn about partitioning do not (!) try it out on your state of the art machine; *I cannot overemphasize this*. And if you do use your machine, please remove all hard drives from it first and store them in a safe place. Then go out and buy a cheap hard drive and place it in your machine. Then get familiar with partitioning and installing operating systems (e.g. linux, e.g. freebsd). Know how they work. Experiment. Make sure that you know what partitions carry your operating system. Also learn how to fuck things up. And do not do anything on your original hard drive unless you have gained a *very thorough* understanding of partitions and operating systems in general. **You have been warned!!!**

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1. Why should you have the need for a partitioning tool?

If you are installing an operating system (e.g. Ubuntu Linux on the same hard drive as Microsoft Windows Vista), or if you just bought a new external hard drive and wish to divide it into several sections, you need a partitioning tool. And parted magic is one of the best; and it is free as well!

2. Downloading parted magic

Open your favourite browser and go to the parted magic website (<http://partedmagic.com/>). Go to the downloads section of the website. At the time this tutorial was written, the latest version of parted magic was version 2.2. Browse to one of the download mirrors and download the pmagic-x.x.iso to a folder on your computer. Then burn it onto a cdrom disk using the “burn disk from .iso” method (do not just burn the .iso as a file, the cdrom will not work; use the “burn .iso” function which undoubtedly all cd/dvd burning software has).

3. Some background information (about partitions)

3.1. A partition is a part of a hard disk that holds a file system

A *partition* is a part of a disk, usually a hard disk. Partitions are used to hold *file systems*.

3.2. File systems are used to store files and operating systems

File systems are used to *store files and operating systems*. Files are series of bytes that contain some *form of data*. There can be different kinds of files, e.g. *.html* (webpages), *.pdf* (portable document format), *.jpeg* (photographs), any many more. Files in a file system can be stored into different *locations* of the file system. These locations are called *directories* or *folders*. The file system thus is a *collection* of folders and files (*just like a .zip file*, or perhaps just like a *database* if you are familiar with the term). Any file system has *limits* on the number of folders and files that can be placed inside of it, depending on the type of file system being used and of how much space that file system was allocated. If a file system is stored inside a space of only 1 megabytes, only few files and folders can be placed inside it; now if it were 1 terabyte, the file system could contain many, many files and folders. File systems are usually of a fixed size; once created, it's size never changes. Sometimes you can grow or shrink file systems, but generally they do not do that on their own. Well known file systems are FAT32 (Microsoft Windows, *most external drives nowadays are FAT32 formatted*), NTFS (Windows XP and Windows Vista), EXT3 (linux), UFS2 (freebsd), ZFS (Solaris). Different operating systems use different file systems.

3.3. There can be only four fdisk partitions

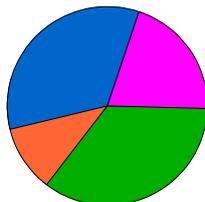


figure 1. Disk with four fdisk partitions (slices)

So a disk can be divided into partitions. However, the number of partitions is limited to four (because of historical reasons). They can be of different sizes. These partitions are called *fdisk partitions*, *dos partitions*, *msdos partitions*, or *slices*, all of these terms mean the same. Any hard disk can contain a maximum of four fdisk partitions, but at least contains one.

3.4. Special kind of fdisk partition: the extended partition

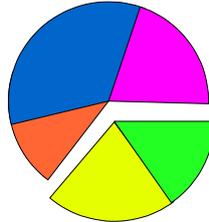


figure 2. Disk with four fdisk partitions of which one is an extended fdisk partition. The extended fdisk partition is divided into two logical partitions

Of the four fdisk partitions one is allowed to function as an *extended* partition. An extended partition is an artificial construct that allows the creation of more than just four partitions. Partitions inside an extended partition are called *logical partitions*. An extended partition can contain up to 24 logical partitions.

3.5. Primary fdisk partitions are also called logical partitions

When an fdisk partition is not an extended one, it is called a *primary* fdisk partition. Each primary fdisk partition is also a *logical* partition.

3.6. Logical partitions contain file systems

Each logical partition *usually* contains a single file system (whether encrypted by e.g. www.truecrypt.org or not).

3.7. How logical partitions are referenced depends on the operating system

How each partition is referenced depends on the operating system in question. In windows all partitions are referenced as drives, and all of them are assigned a drive letter, e.g. C:, D:, F:, G:, etc. (at least if windows is able to read the partition). In the unix like operating systems (freebsd, solaris, linux, and mac osx) partitions are referenced in a different but comparable way.

3.8. What else you need to know

Any hard disk contains a section (*master partitioning table*) that informs any computer and operating system of how the disk is partitioned. The master partitioning table is stored inside the *master boot record* (MBR). The master boot record is necessary to start an operating system.

3.9. More info on partitions and boot records

If you wish to learn more please open your favourite browser and go to your favourite search engine

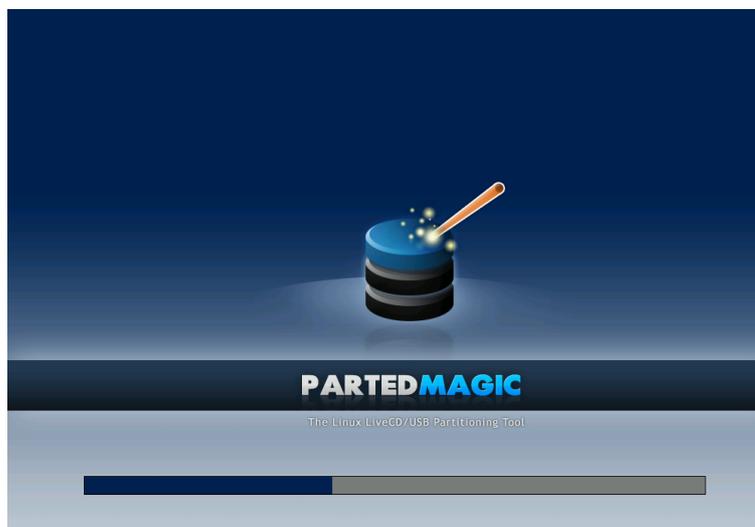
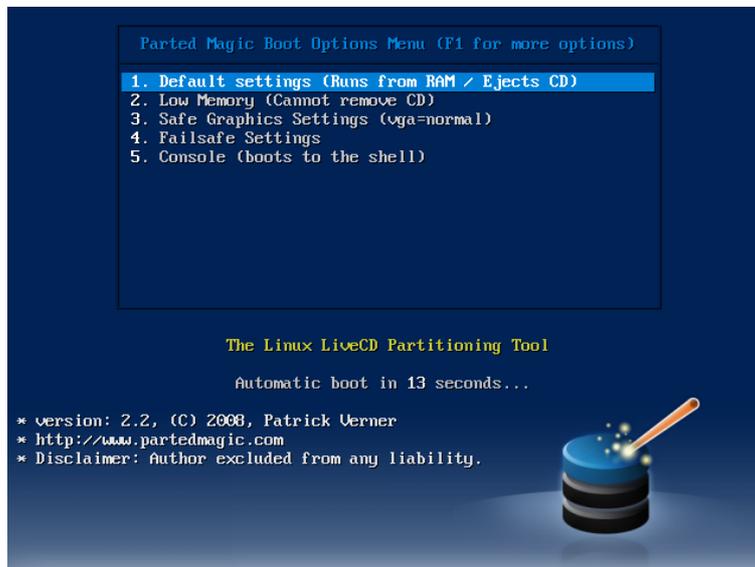
and simply search for “extended partition” or “master boot record”, or e.g. visit <http://www.pcguide.com/topic.html>.

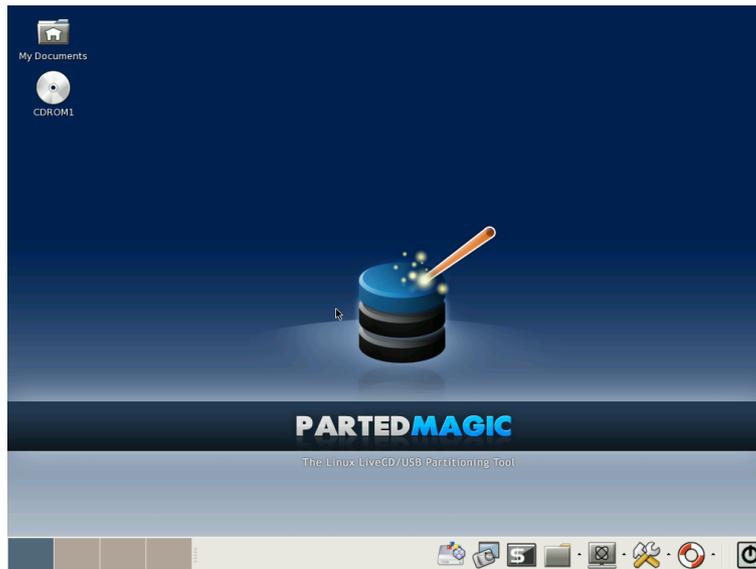
4. Starting the parted magic linux liveCD

Place the cdrom inside the cd/dvd drive. Restart your computer. If your computer does not appear to start from the cd/dvd drive, please restart your computer and enter the BIOS. Usually this is accomplished through pressing some magic key, such as [F2], [ESC], [DEL], or whatever (look at the output on the screen during the bootprocess to discover the magic key, or, alternatively, look it up in the user’s manual of your computer). Locate the section that establishes boot priority. Make sure the cd/dvd drive is listed prior to any hard drives and exit saving all changes. Your computer should now start from cdrom.

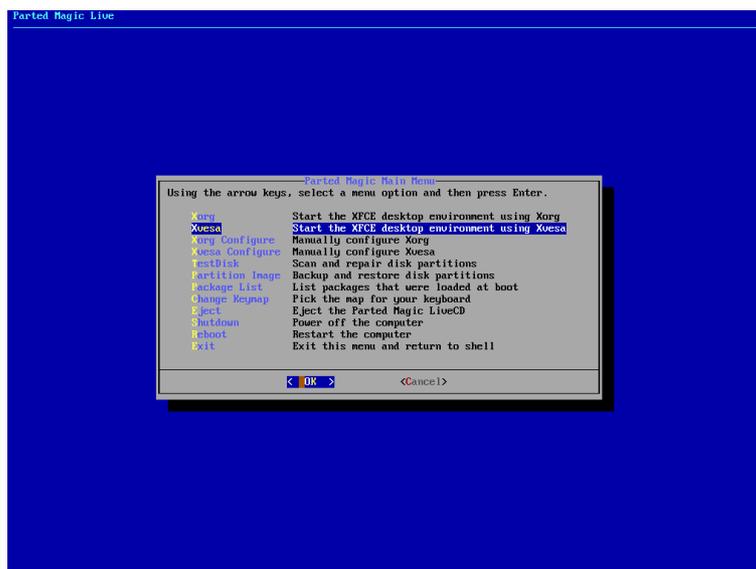
5. Running Parted Magic

Let the computer boot from the parted magic cdrom. During the boot process the boot menu appears. Select the appropriate option. On a new computer the default settings will probably work best. During the default boot process the cdrom is ejected.





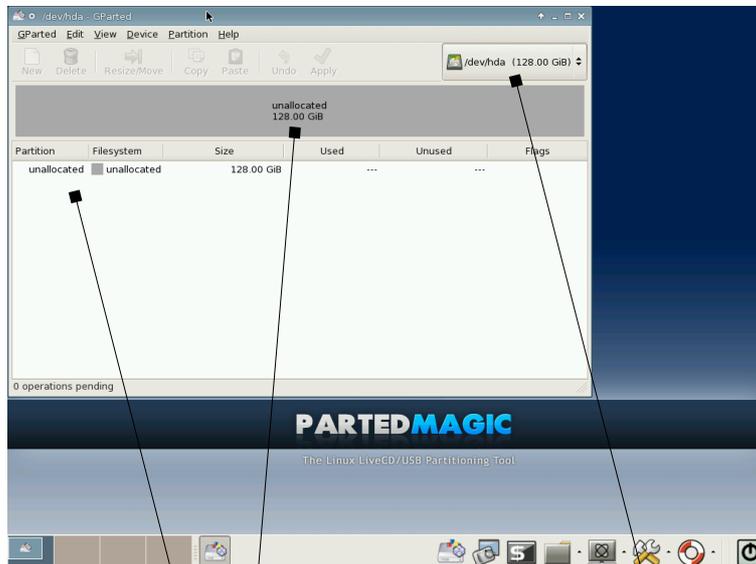
If parted magic does not appear to work properly for the display type you have on your machine, you can press the button in the right lower corner and “Exit X-windows:”. Then retry with the Xvesa option. If the following screen is not displayed automatically the follow directions on the screen.



Okay, we can now start the partitioning tool.

6. Starting the partitioning tool GParted

Start the gnome partition editor by clicking on its symbol () in the application launch bar.

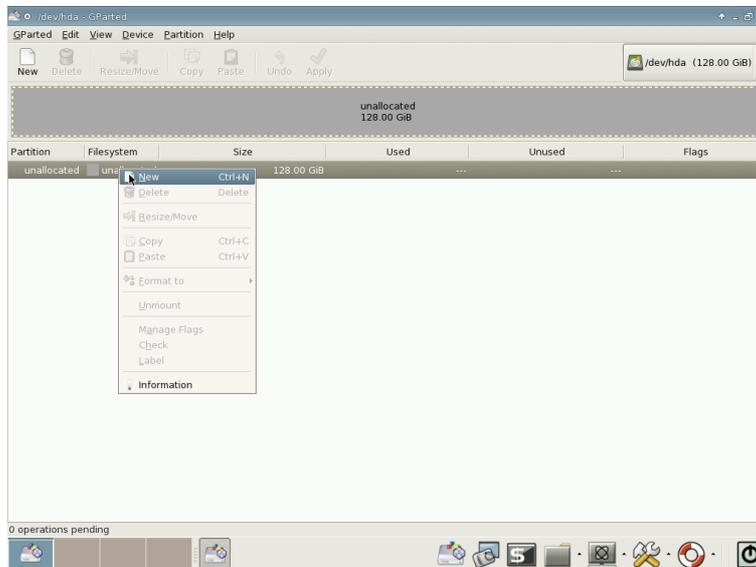


here will be displayed a list of partitions, their type etc.; in this case all space on the drive is unallocated, meaning it contains 'zero' partitions

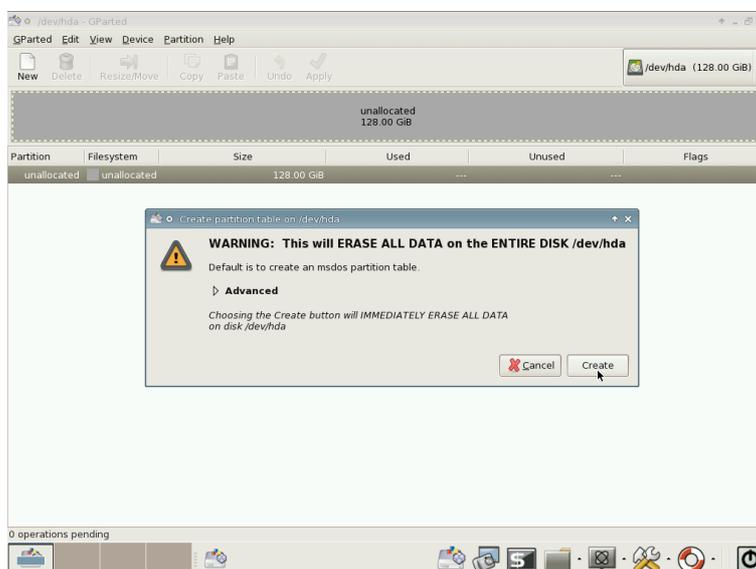
use this listbutton to select the drive you wish to inspect, partition, or repartition

If you wish to partition an external drive, please run GParted on your machine before you connect your external medium. This enables you to learn how your hard drives on your computer are being referenced by linux. This in order to prevent you from accessing and partitioning the wrong drive. If you do not understand what you are doing, and you are not learning on a test machine that is allowed to be fucked up, then please, please do not do any partitioning. All data on your disks might be lost if you make a mistake!

7. Creating a primary fdisk partition on unallocated space when the existing number of fdisk partitions is below the number of four



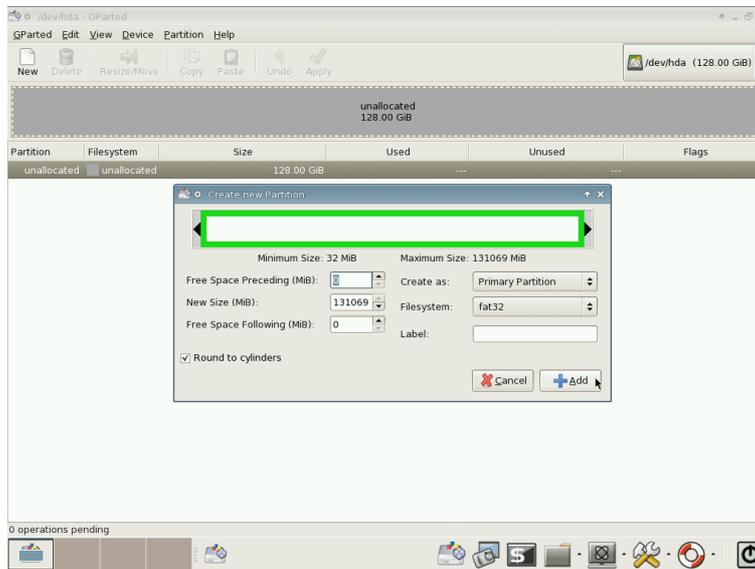
Right-click on the unallocated space. Select New from the pop up menu. If the disk does not contain any partitioning table, you will get a warning (and in this case the advanced option to create a specific kind of partition table; if you do not know what any of this means you will probably need an msdos style partition table, since you are then probably working on a ibm-compatible pc machine).



If the disk you have already contains a partition table msdos style, you will not get the option to select a partitioning table style. If you wish to create a new partition table, you can select Device from the main menu and then Create Partition table... . But generally, this is not necessary at all!

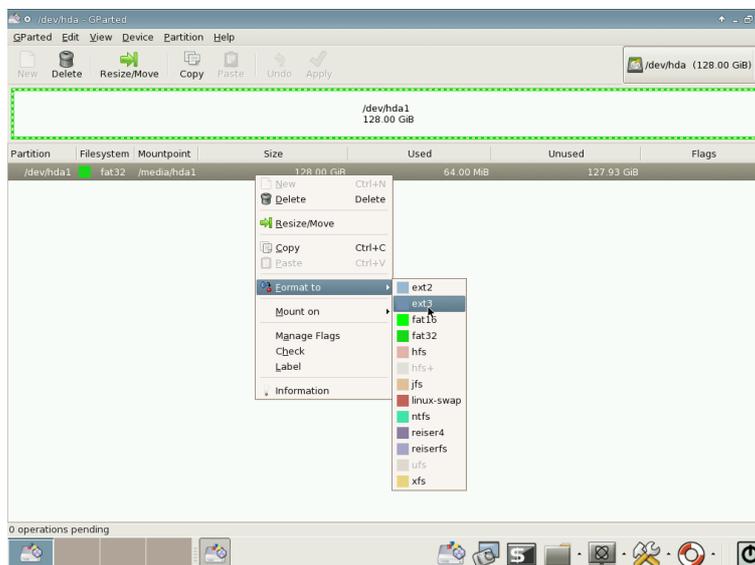


Usually you will get something like the following when selecting New from the pop up menu:



If you do not change any size settings you will capture all available space. In this case the partition created will be a primary partition and will be formatted as FAT32. If you press Add, the creation of the partition is added to the to-do list. To actually perform the partitioning and formatting, please press Apply in the button bar above (and then confirm your intentions in the warning box).

8. Reformatting a logical partition



Reformatting a logical partition is easy. Select Format to from the pop up menu (appears when right-clicking on an item). All data on that particular partition is lost if you press Apply!

If you wish a partition to be unformatted, you need to delete the partition (select Delete from the pop up menu) and then recreate it and leave it unformatted in its creation process.

9. Further instructions

GParted is very intuitive and easy to use. Experiment with all of the available options on a dedicated blank hard drive in a safe environment (meaning: with the blank hard drive as only available storage medium). You will learn how to use GParted. By experimenting you will gain further knowledge of what partitions are and how they are stored on a hard drive. This will prove vital when using the GParted partitioning tool on a live system. As with all things, you will need to practice this skill frequent enough to be comfortable performing partitioning operations. If you haven't used GParted for a while it might be very wise to relearn to use GParted in a safe environment. Sometimes GParted's options change, please select GParted in the main menu, and then Show Features.

