Software Requirements Specification

for

GParted

Requirements for Version 0.6.0-1

Prepared by Bill Karatzidis

ISE: Introduction to Software Engineering (Aristotle University)

2010-06-19

Table of Contents

1. Introduction

1.1 Purpose

The purpose of this document is to describe and define the functional requirements of the Gparted application. It follows the IEEE standard for Software Requirements Specification documents.

Gparted is a graphical partition editor for creating, reorganizing, and deleting disk partitions. Otherwise known as the *Gnome Partition Editor*, it is a frontend to the *GNU Parted* partition editor, and specifically uses its library, *libparted,* to detect and manipulate devices and partition tables, and perform all the functions it has been designed for. Several optional file system tools provide support for file systems not included in *libparted*.
This document deals with the functions of the 0.6.0-1 version, made available for public testing in 2010-06-19. It is a LiveCD application, which means it runs at system boot, resides in your computer's RAM memory, and disappears upon reboot, after having performed the desired functions. No installs are necessary in any operating system.

1.2 Document Conventions

The software being described in this document has already been developed. The functions and characteristics that will be analysed have already been implemented.
This document has to stay updated with any new features that will be added in future versions of the application.
The System Features in section 3 are described in order of appearance, as the application runs.

1.3 Intended Audience and Reading Suggestions

This document is intended for casual users, developers, testers and documentation writers, each one having their own needs and uses of the software. For a more thorough analysis on this matter, please refer to section 2.3.
Section 2 provides an overall description of the software, and section 3 describes the functional requirements of the project, particularly useful to all of the aforementioned groups. Section 4 discusses the external interface requirements, and finally, in section 5, you can find the nonfunctional requirements of the project.
Each section is divided in subsections where different matters are discussed.
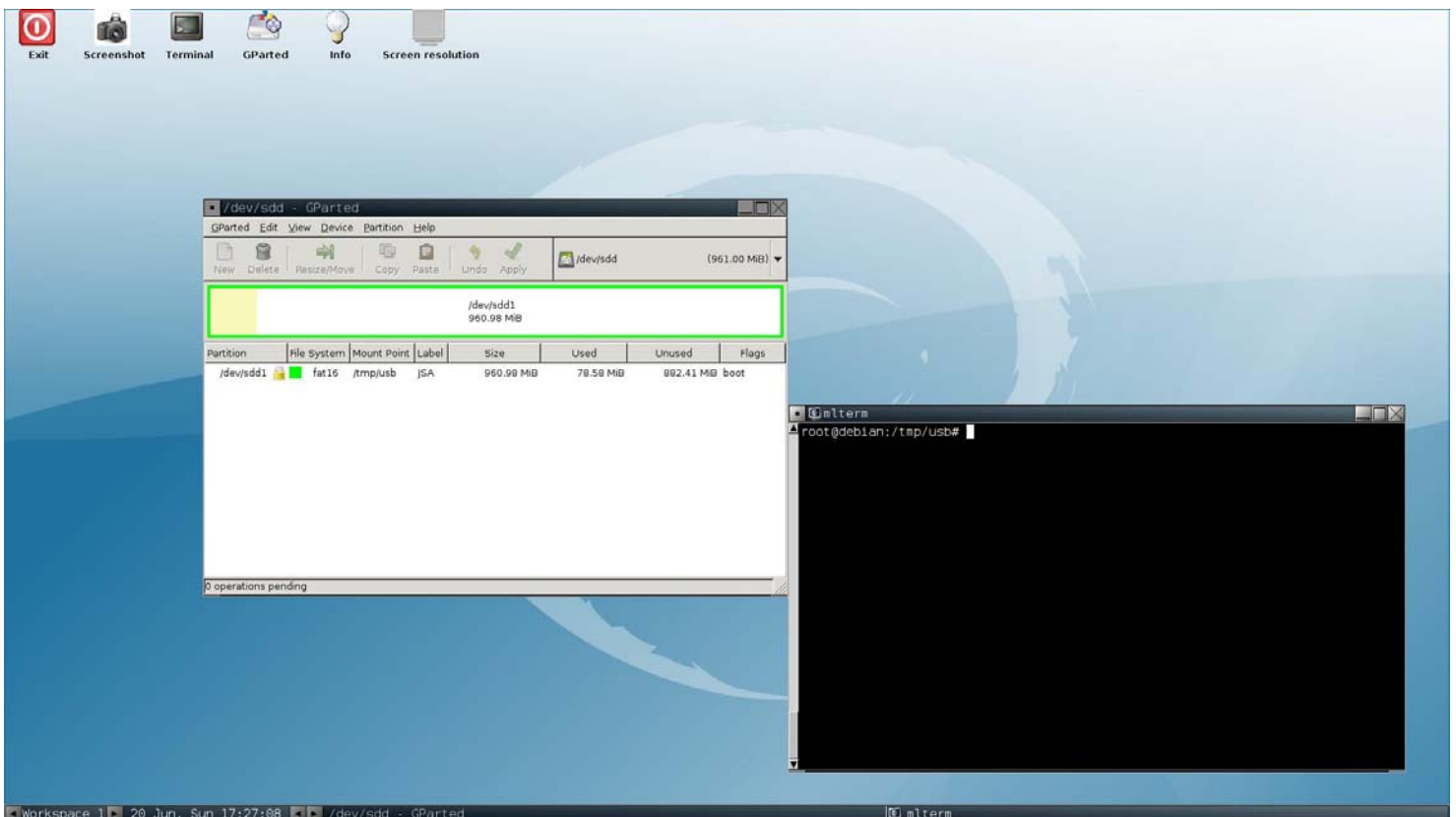
1.4 Project Scope

GParted is one of many programs used for creating, deleting, resizing, moving, checking and copying partitions, and the file systems on them. This is useful for creating space for new operating systems, reorganizing disk space, copying data residing on hard disks and mirroring one partition with another (disk imaging).

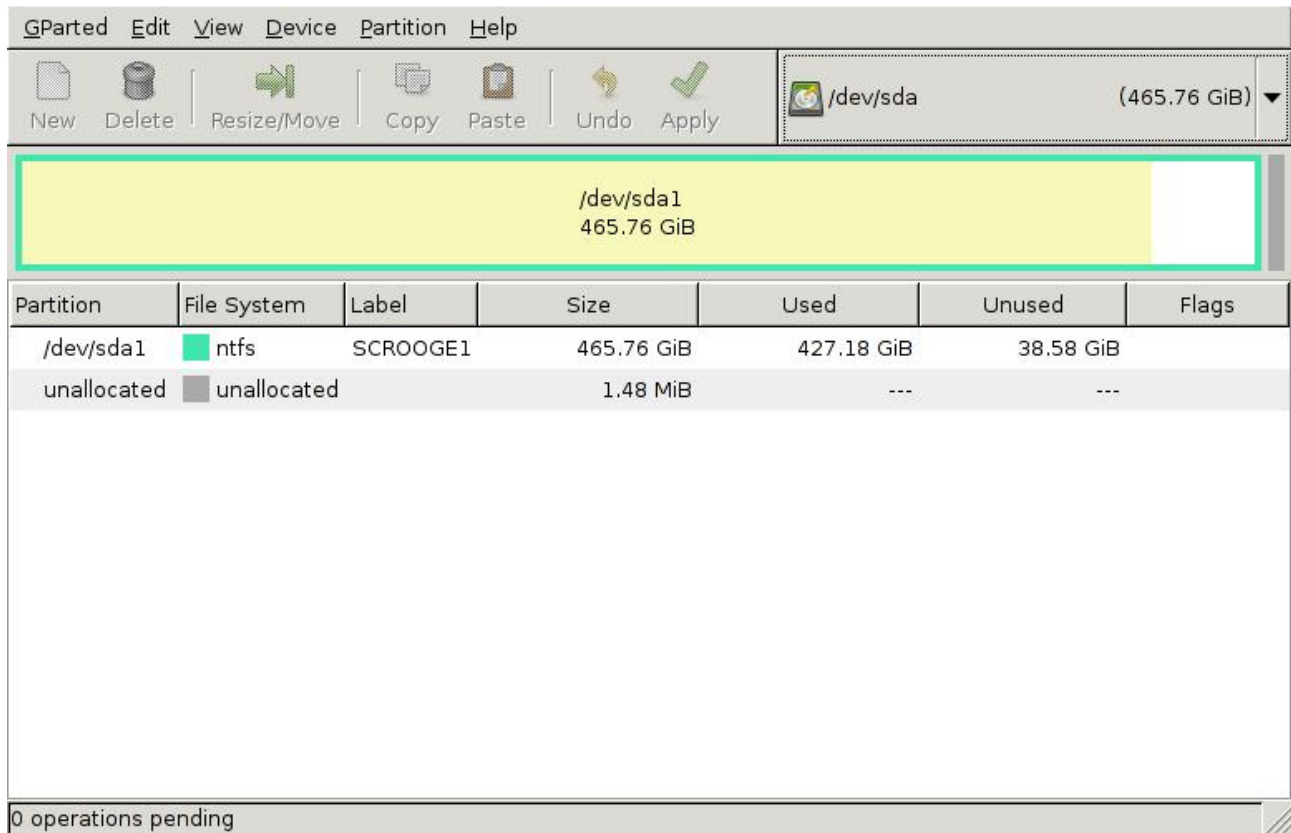The GParted project deals with two different versions.
- GParted, the install version, is an application that resides permanently in your computer's hard drive, as a program installed on a Linux operating system. https://sourceforge.net/projects/gparted/files/gparted/
- GParted Live is a .zip or an .iso file which you download and burn as an image on a cd. With this you can boot your computer and use the application. With the .zip file, you can create a bootable USB flash drive, and use that instead of the cd. There is a tutorial on this online:http://gparted.sourceforge.net/liveusb.php There used to be different files for LiveCD and LiveUSB, but they have been combined to make the GParted Live application, a long time ago. https://sourceforge.net/projects/gparted/files/gparted-live-testing/

GParted uses *GNU Parted* as a backend, and aims at keeping the GUI as simple as possible, so it does not become a hindrance to the overall casual user experience.

Next, some screenshots of the main user interface follow.

Main menu of GParted, background is shown, together with the program and an open Terminal window.

Main screen of GParted

Terminal

1.5 References

- Official page – Home of GParted

  http://gparted.sourceforge.net/index.php

- Project GParted page on Sourceforge

  https://sourceforge.net/projects/gparted/

- Wikipedia GParted page

  http://en.wikipedia.org/wiki/GParted

- Wikipedia GNU Parted page

  http://en.wikipedia.org/wiki/GNU_Parted

- GParted Forum

  http://gparted-forum.surf4.info/index.php

- How to save files and take screenshots in GParted

  http://gparted.sourceforge.net/larry/tips/save_details.htm

2. Overall Description

2.1 Product Perspective

GParted, as already mentioned, is a program for manipulating disk partitions. It is one of the best among the many of its kind, supporting more file systems and providing more functions than the rest (Clonezilla, Parted Magic, Parted (backend to GParted), Partition Image, Partition Magic for Windows etc.). It is written in C++ and is based on the Debian GNU/Linux operating system. It is a frontend to the GNU Parted application which was written by the GNU team and supports creating, destroying, resizing, checking, and copying partitions, and the file systems on them, but only through command line. GParted provides the graphical user interface for ease of access. Other programs use the Parted libraries as well, like *KDE Partition Manager* and *Pyparted*.

Because this is a Linux-based application it relies on some other software in order for it to work. GParted uses GNU libparted to detect and manipulate devices and partition tables. This includes but is not limited to:
- Parted >= 1.7.1
- Gtkmm >= 2.8.x (toolkit for creating GUIs)
- Several optional file system tools provide support for file systems not included in libparted.

2.2 Product Features

A summary of product features follows:

- Create partition tables (e.g., msdos, gpt)
- Enable and disable partition flags (e.g., boot, hidden)
- Perform actions with partitions such as:
    - create or delete
    - resize or move (while preserving data)
    - check
    - label
    - copy and paste
- Supports file systems such as:
  ext2/ext3/ext4, FAT16/FAT32, hfs/hfs+, linux-swap, NTFS, reiserfs/4, ufs, xfs file systems.
- Supports hardware RAID, motherboard BIOS RAID, and Linux software RAID.

The following actions and file systems are supported by GParted.

File System	Detect	Read	Create	Grow	Shrink	Move	Copy	Check	Label	Required software
btrfs	✓	✗	✗	✗	✗	✗	✗	✗	✗	
crypt-luks	✓	✗	✗	✗	✗	✗	✗	✗	✗	
ext2	✓	✓	✓	✓	✓	✓	✓	✓	✓	e2fsprogs
ext3	✓	✓	✓	✓	✓	✓	✓	✓	✓	e2fsprogs
ext4	✓	✓	✓	✓	✓	✓	✓	✓	✓	e2fsprogs v1.41+
fat16	✓	✓	✓	✓	✓	✓	✓	✓	✓	dosfstools
fat32	✓	✓	✓	✓	✓	✓	✓	✓	✓	dosfstools
hfs	✓	✓	✓	✗	✓	✓	✓	✗	✗	hfsutils
hfs+	✓	✓	✓	✗	✓	✓	✓	✓	✗	hfsprogs
jfs	✓	✓	✓	✓	✗	✓	✓	✓	✓	jfsutils
linux-swap	✓	✗	✓	✓	✓	✓	✓	✗	✗	mkswap (part of util-linux)
lvm2 pv	✓	✗	✗	✗	✗	✗	✗	✗	✗	
ntfs	✓	✓	✓	✓	✓	✓	✓	✓	✓	ntfsprogs
reiser4	✓	✓	✓	✗	✗	✓	✓	✓	✗	reiser4progs
reiserfs	✓	✓	✓	✓	✓	✓	✓	✓	✓	reiserfsprogs
ufs	✓	✗	✗	✗	✗	✓	✓	✗	✗	
xfs	✓	✓	✓	✓	✗	✓	✓	✓	✓	xfsprogs
File System	**Detect**	**Read**	**Create**	**Grow**	**Shrink**	**Move**	**Copy**	**Check**	**Label**	**Required software**

For more details on system features please refer to section 3.

2.3 User Classes and Characteristics

This application is intended for use by four user classes:

- Casual Users who may want to partition a hard drive, move or resize their partitions, clone or delete, etc. Basic understanding of computers and disk partitions is required. Most of the users will use the program in their native

language, since there is a list the most common ones, during the program startup.
- Developers who are interested in making the application better, find and correct bugs and generally contribute to the GParted community.
- Testers who use the beta versions of the product and test it in many ways for bugs and errors, then submit the data to the bug tracking system.
- Documentation writers who can use this document to assist them in documenting the program's functions and features. This is important, documentation and help files are vital to any project's completeness.

2.4 Operating Environment

GParted is developed on x86 based computers using GNU/Linux. It can be used on other operating systems, such as Windows or Mac OS X, by booting from media containing GParted Live.
In other words you will need a Linux operating system for the install version of GParted. The Live version, on which this document is based, needs a basic x86 [1]computer, regardless of the operating system, with a CD drive and/or USB port. In general, it does not consume many resources and almost every computer will be able to handle it properly.

2.5 Design and Implementation Constraints

The program does not support every kind of operation performed in every kind of file system, but it is constantly being updated and more and more actions and file systems will be supported in the future. The table of permitted actions in supported file systems is in section 2.2.
GParted does not support logical volume management (LVM[2]) at present, although this feature has been requested by many users and may be implemented in a future release.
It also must be noted that GParted is not to blame, on most occasions, if a specific operation cannot be performed on a specific file system. It uses a wide variety of third party libraries and tools which perform these operations. GParted is simply a frontend, which brings together all these underlying functions and processes, and presents them in a graphical and accessible way.

---

[1] Systems with 32-bit processors
[2] http://en.wikipedia.org/wiki/Logical_volume_management

2.6 User Documentation

Online Documentation:

- http://gparted.sourceforge.net/documentation.php
- http://gparted.sourceforge.net/docs/help-manual/C/gparted.html
- http://gparted.sourceforge.net/docs/man-page/C/gparted.8.html

Third party Documentation and Tutorials:

- http://www.dedoimedo.com/computers/gparted.html
- http://www.howtogeek.com/howto/windows-vista/using-gparted-to-resize-your-windows-vista-partition/

GParted Forum:

- http://gparted-forum.surf4.info/index.php

2.7 Assumptions and Dependencies

GParted requires a working Linux environment for it to work. The Live version requires a working CD/DVD drive for it to boot the computer.

As every other Linux application, there is a list of dependencies, or a list of packages required for the program to work. In this occasion, they are file system tools. On http://packages.debian.org/sid/gparted there is a comprehensive list for the depended, recommended and suggested packages.

3. System Features

3.1 Boot Menu

After booting your computer with GParted Live, this is the first screen you see.
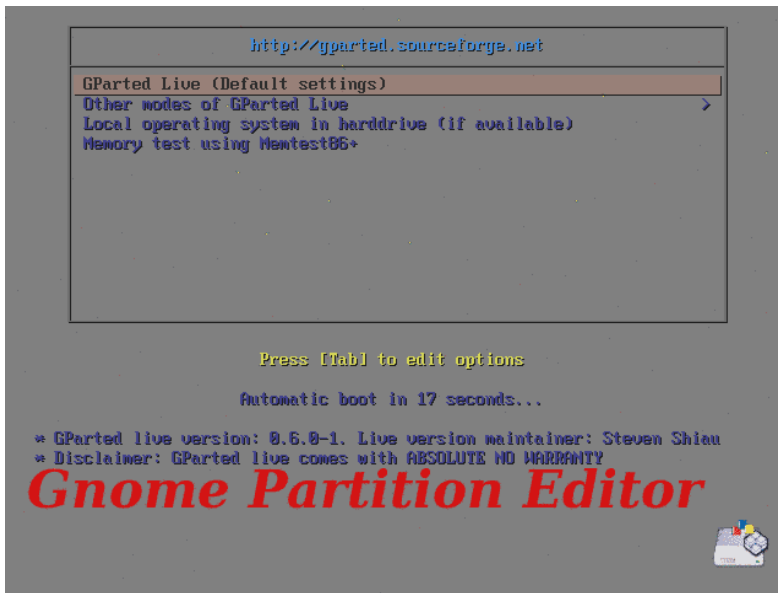
GParted provides some other modes, other than the first default. These include loading to RAM only, safe graphic settings, and failsafe mode. You can also boot your computer's operating system (if any) and run RAM tests using Memtest86+. Selecting the first option, advances the application forwards and presents us with the next screen.
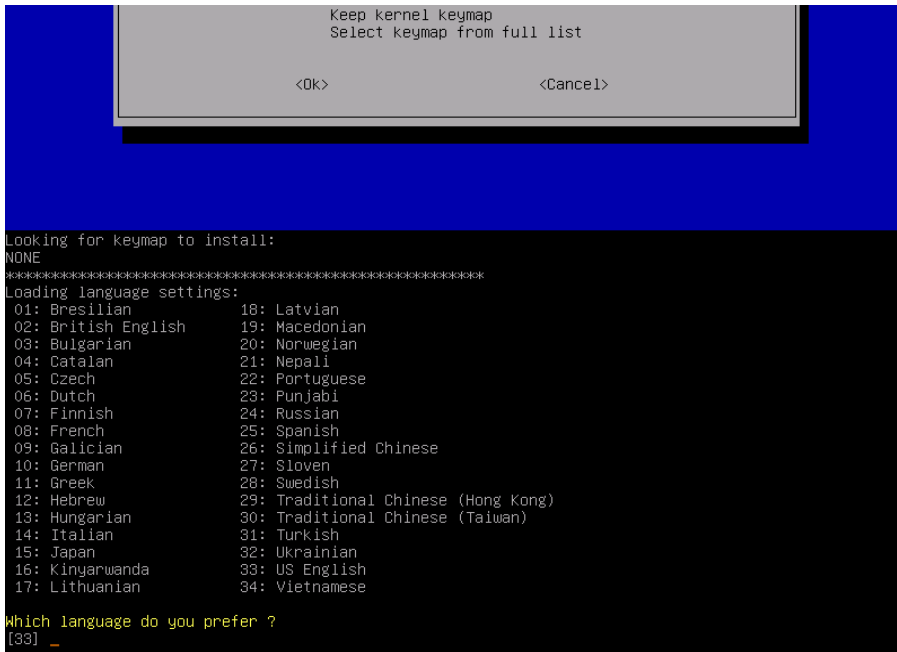
3.2 Select Keymap

The keymap is the layout of symbols on your keyboard.
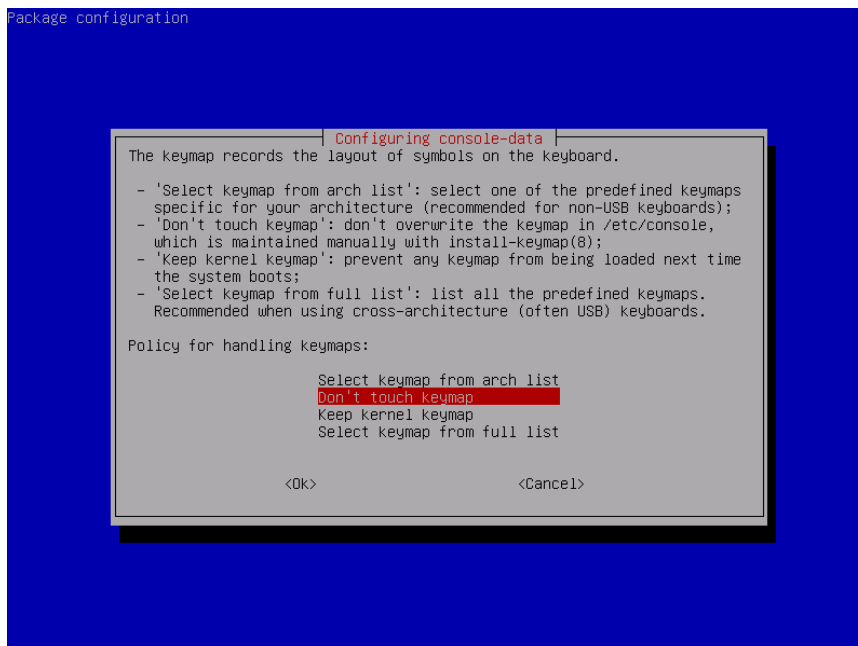
Different keymaps are supported; this screen gives info about them. The default option (don't touch keymap) is the recommended one.

3.3 Language Selection Menu

Selecting the keymap you want, brings you to the language selection menu.

A list of a wide variety of supported languages is displayed. You then enter the number that corresponds to the desired language. After that, you are presented with a video mode preference menu. The default value you type is 0, which loads the GParted Live application. If X-window graphical environment fails to load, then you can type 1 for manual configuration, or 2 for going to command line.

3.4 GParted Desktop

On the desktop you can find all the program's functions.
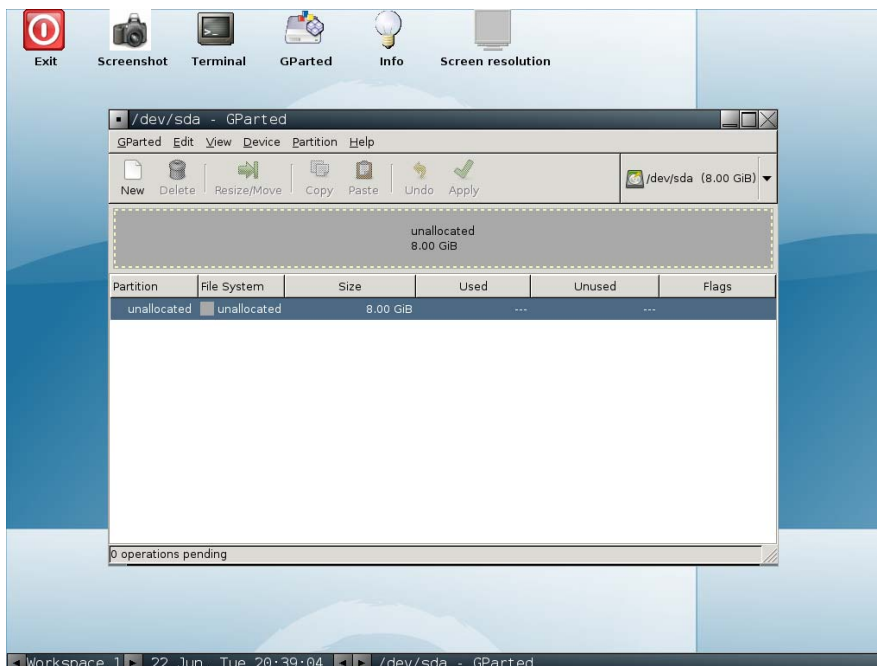
From here you can click on exit to quit, take a screenshot of the desktop or a window, open the terminal, open the main GParted window, find some info about GParted and its packages, or launch the screen resolution application.

3.5 GParted Main Window

From this window you can perform all the actions supported by GParted.
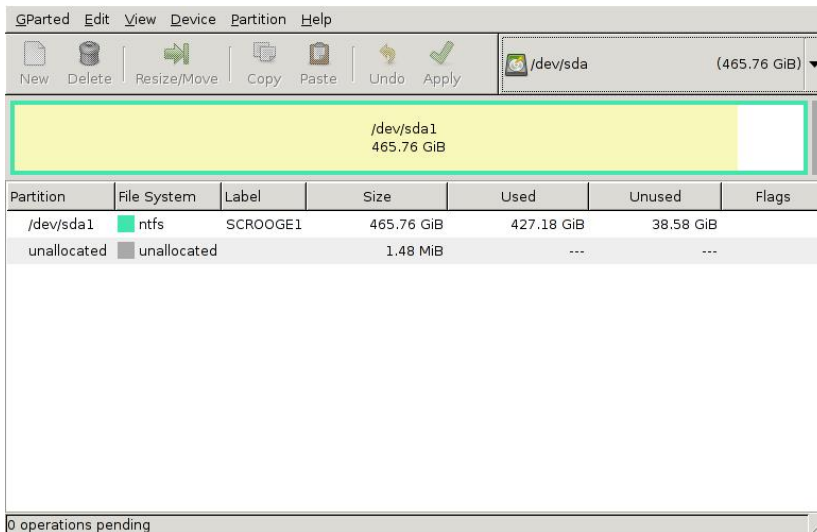
There is a menu bar on the top of the window, with each option (GParted, Edit, View, Device, Partition) corresponding to a set of actions you can perform on a disk. Under that, is a bar which contains the most common functions of the program, which you can perform on the drive (hard disk, USB flash etc.) selected from the drop down menu on the far right. Then a graphical representation of the selected drive's partitions appears, together with a more detailed list under that.

3.6 Refresh Connected Devices

From GParted->Refresh Devices you can refresh the list of the connected devices in the system. This can be useful if, for example, you plug in a USB flash drive after GParted has booted. This function enables the recognition of the drive.
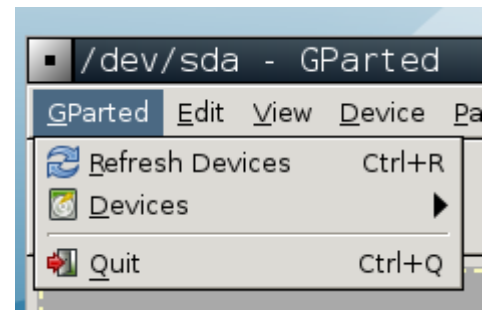
3.7 Undo & Apply

Every time you perform an operation, it goes in pending mode. Then, you can undo if you regret your choice, or go ahead and click apply for the changes to happen. This can be done from Edit->Undo Last Operation, Clear All Operations, Apply All Operations. Clear all removes every pending operation from the list. You can also undo and apply from the respective buttons on the main functions bar.
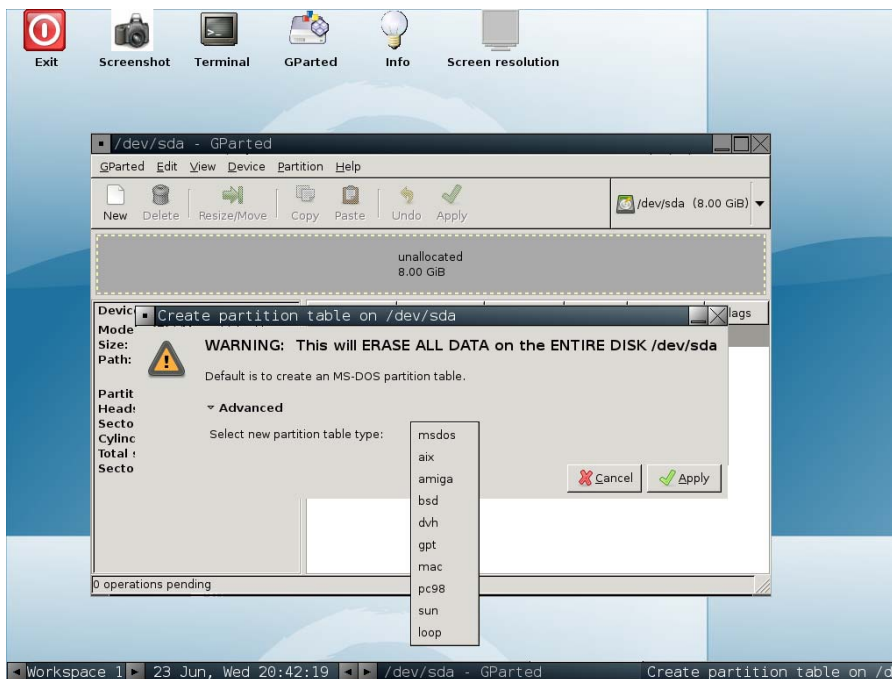
3.8 View Device Information

You can view the selected device's information by clicking View->Device Information. This brings up information about the selected drive on the left side of the GParted main window. Details like the device's model, size, heads, sectors, cylinders etc. are shown.
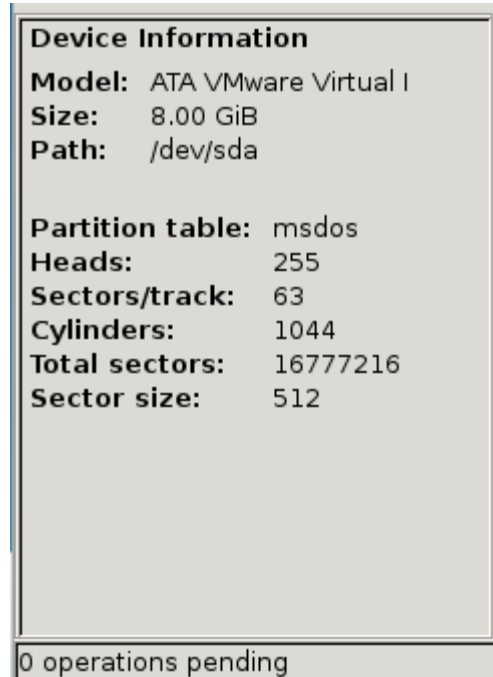
3.9 Create Partition Table

Clicking on Device->Create Partition Table lets you create the drive's partition table[3]. A warning is displayed saying that *all of your data will be erased*. So proceed with caution. A wide variety of partition tables are supported and the default one is ms-dos.

---

[3] http://en.wikipedia.org/wiki/Partition_table

3.10 Create a New Partition

To create a new partition, first select the desired hard disk or other device, from the drop down menu on the right. Then you can either click on *New* from the main functions bar, or go to Partition->New. A pop up dialog window appears on screen.
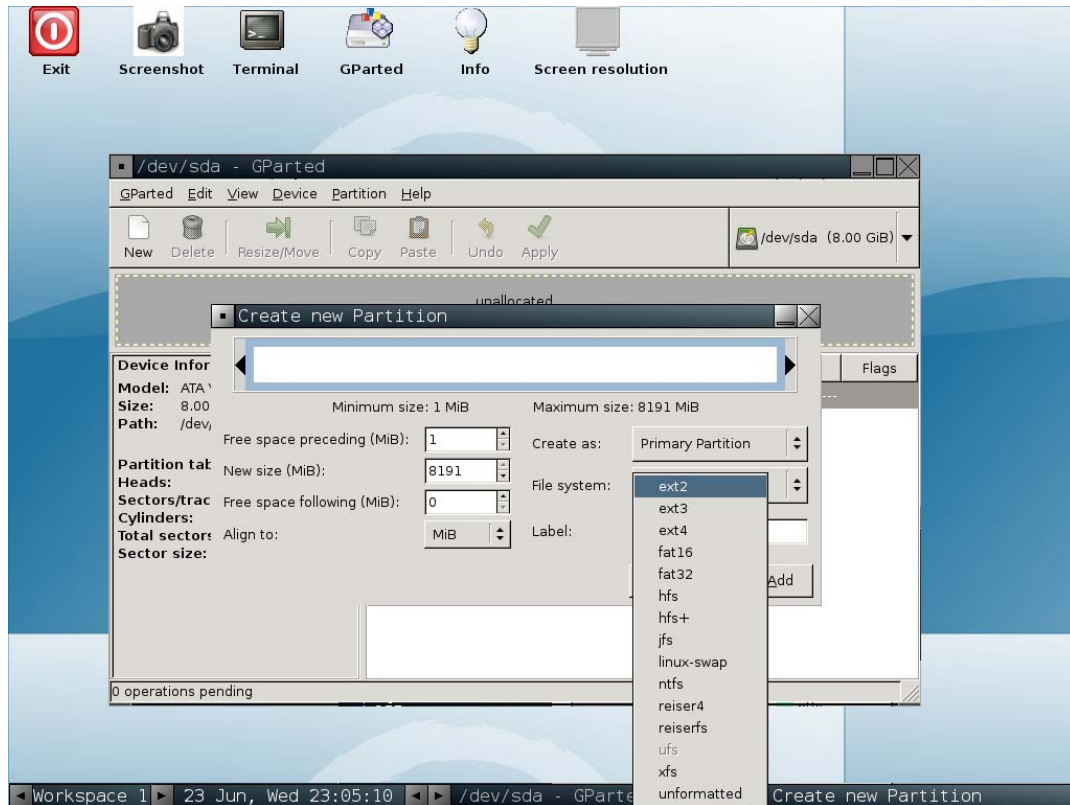
Here you have various options. First of all, there is a slider which shrinks and moves to either side. This represents the size and position of the partition you will create. You can type in values by hand, or just use the slider. Then, you define the type of the partition (Primary, Logical, Extended) and select the desired file system to format the partition. The list is displayed in the last screenshot. You can also leave the partition unformatted if you wish to and format it later. If you wish to label the partition, GParted lets you do so in this dialog. Press *Add* and then *Apply* to create the partition.
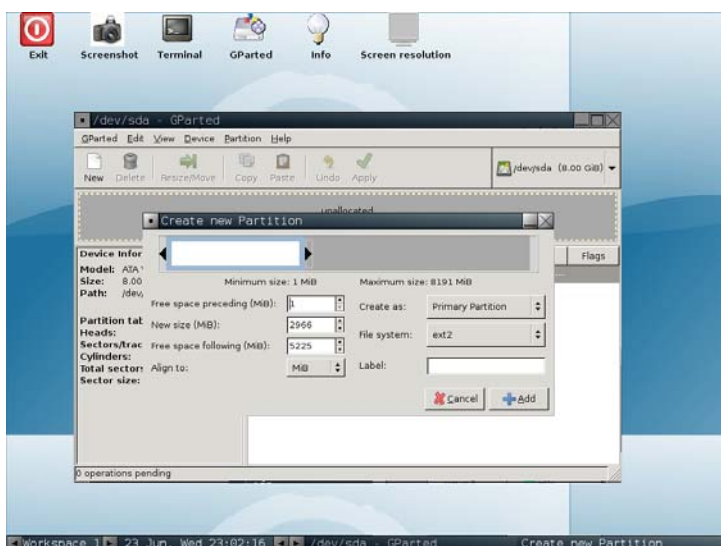

In this screenshot we have selected this part of the disk as the partition we will create. It is shrunk and sits on the start of the disk. In the same way, it can be larger or smaller, and sit in the end, or anywhere else on the disk.

3.11 Delete a Partition

Select the partition you want to delete. Then press *Delete* on the main functions bar or go to Partition->Delete. There is no dialog, or warning for this action. Of course you have to press *Apply* for the changes to take effect, or *Undo* if you changed your mind.

3.12 Resize or Move a Partition

Select the partition you want to resize or move. Then click on *Resize/Move* from the main functions bar or go to Partition->Resize/Move.
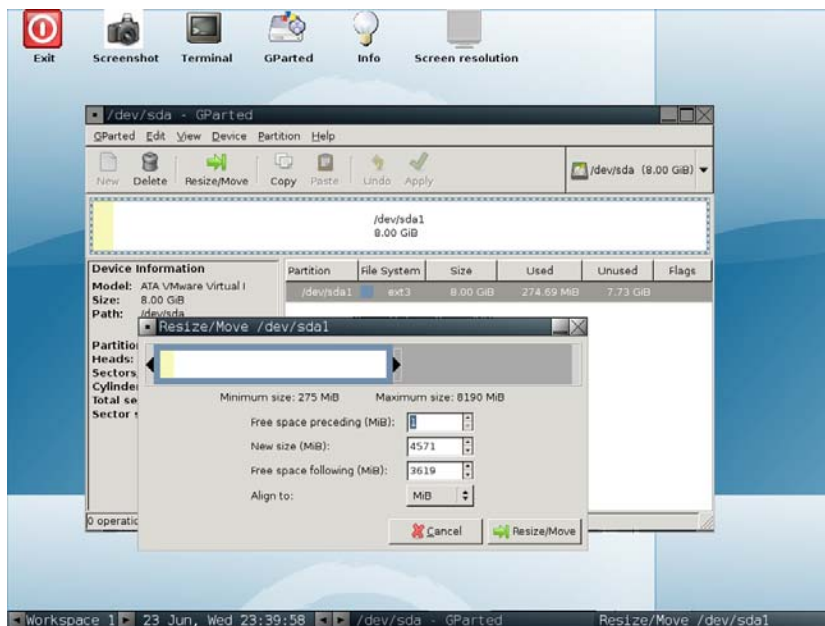
A dialog window appears, with the same slider as in the create partition window. You use it in the same way or type in the numbers in Megabytes directly. In this screenshot, it appears that the partition spans the whole drive; we want to shrink it and free up the disk space after it, which will then become unallocated space. Press *Resize/Move* and then *Apply*.

3.13 Copy Partition

Select the partition you would like to copy. This is partition cloning, useful if, for example, you migrate to a larger hard drive and wish to keep your data and operating system (without reformatting). Click on *Copy* from the main functions bar or go to Partition->Copy. The selected partition is then copied to the clipboard.

3.14 Paste Partition

With this action you can paste the copied partition to unallocated space of the same drive, another drive in its entirety, or to unallocated space of another drive. Select the whole drive or partition of a drive and then press *Paste* on the main functions bar or go to Partition->Paste. A dialog window opens. As with Resize/Move, there is a slider. You can leave it at the default setting, which the exact same size of the partition being copied, or you can only slide it <u>up</u> for the pasted partition to take up more (free) space

than the copied one. You can also move around the pasted partition, it doesn't have to be at the start of the unallocated space.
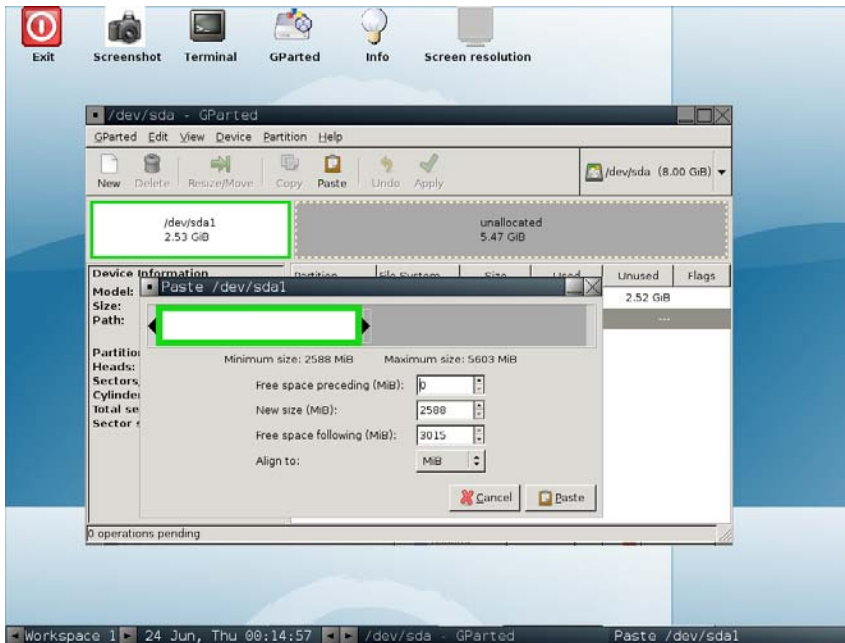

Here you see the slider which defaults at the size of the partition to copy, but you can change that if you want.
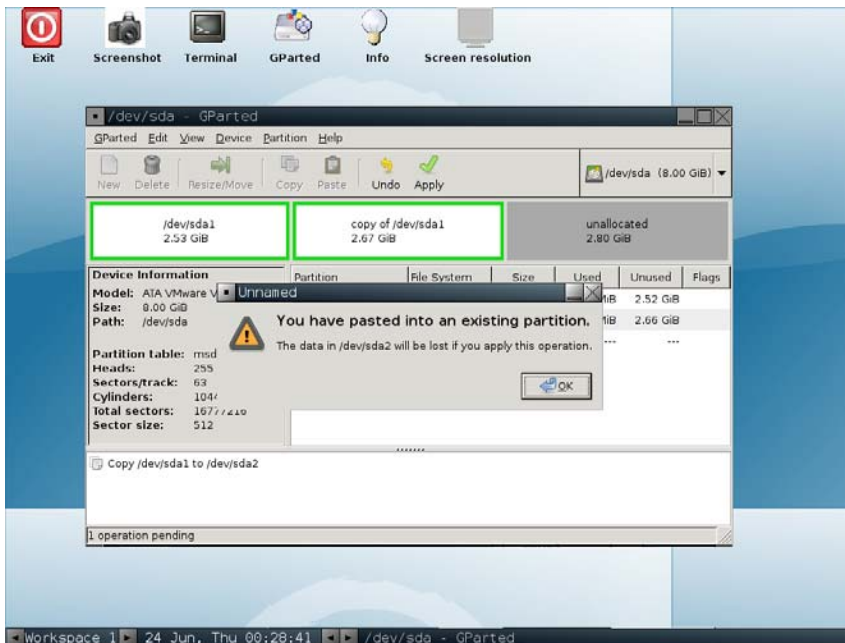
IMPORTANT: You <u>can</u> paste over an existing partition (whether it's formatted or unformatted). A warning is shown that you will lose all of that partition's data. So paste with caution. Press *Paste* and then *Apply*.

3.15 Format Partition

After you have created a partition (regardless of formatting it or not) you can format it to the file system you like. First, select the partition you want to format. Then, click on Partition->Format to. A list of the supported file systems appears. Click on the desired one and then click on *Apply*.
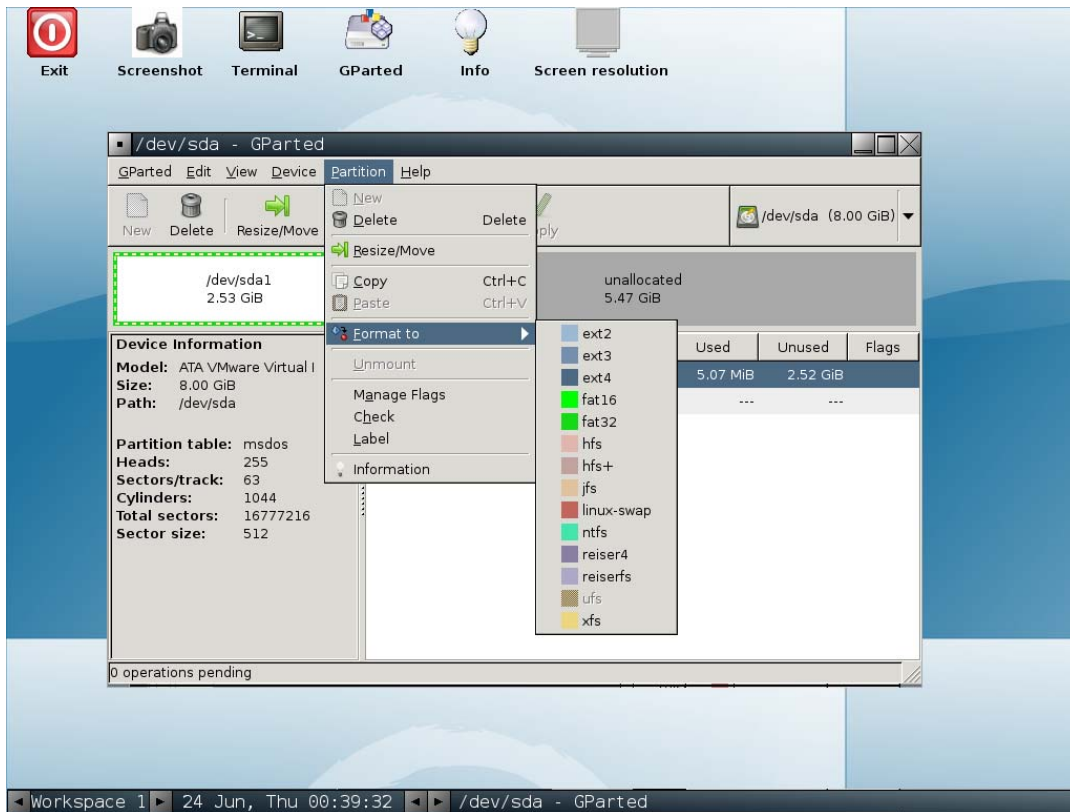
3.16 Unmount Partition

If you have mounted a partition to a specific mount point, you can unmount it by clicking on Partition->Unmount. Please refer to 3.21 for an online guide on mounting partitions in GParted.

3.17 Manage Flags

Selecting a partition and then clicking on Partition->Manage Flags, brings up a dialog window with flags and checkboxes. These are functions supported by the partition, like if the partition is bootable, if it is hidden etc. You can change those here. Bear in mind that some functions are not supported by some partitions.
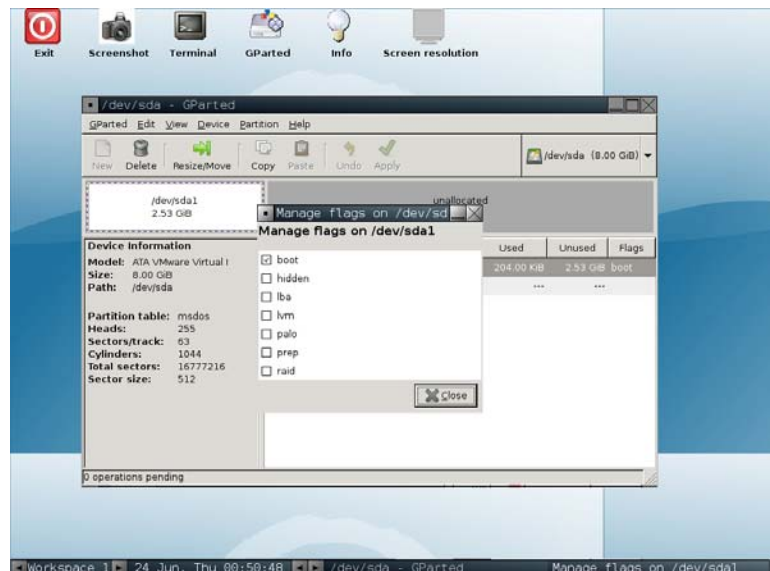
3.18 Check and Repair File System

Selecting a partition and then clicking on Partition->Check, sends in pending mode the check and repair partition errors operation. Click on *Apply* to have the partition's file system analyzed, checked for errors and repaired if errors are found.

3.19 Label Partition

Selecting a partition and then clicking on Partition->Label, opens a dialog window asking to name your partition. You could also do that when creating the partition, but if you missed it or didn't want to do it then, you can label your partition from this option. You cannot label every partition, because some file systems don't support labeling.
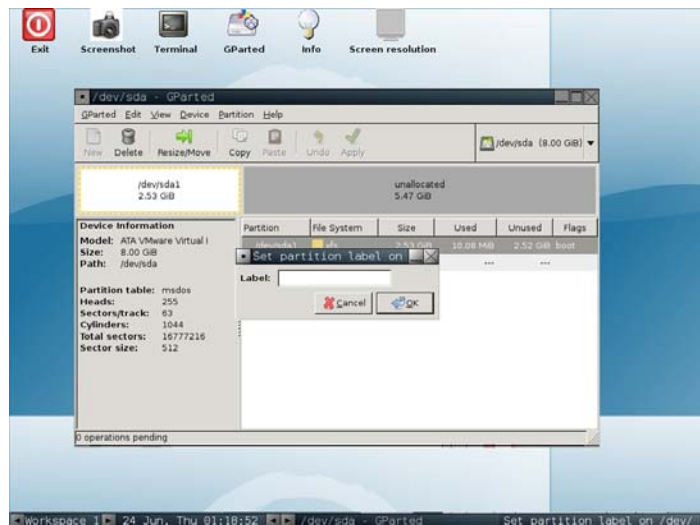
3.20 Take a Screenshot of the Desktop or an Active Window
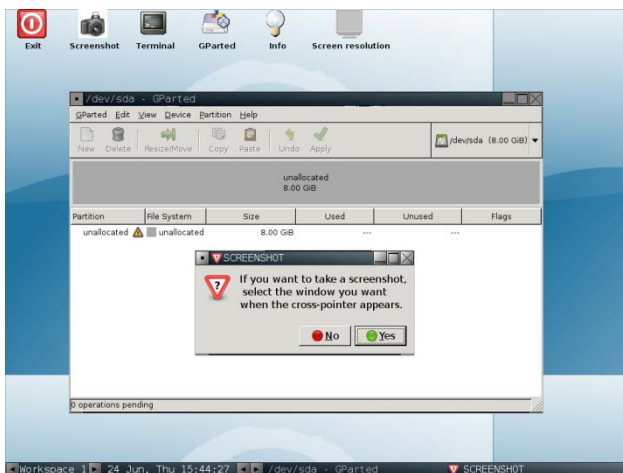
Clicking on *Screenshot* on the desktop, opens a dialog window which informs you that after clicking *Yes*, a cross-pointer appears and you select the window you want to print-screen.

When the cross-hair appears, you can click on any active window to take its screenshot, or click somewhere in the desktop's wallpaper for a general desktop screenshot.

A preview of the screenshot is displayed, and a pop-up message informs you that your screenshot has been saved as gparted.jpeg under /root. For saving screenshots to a device, please refer to 3.21.
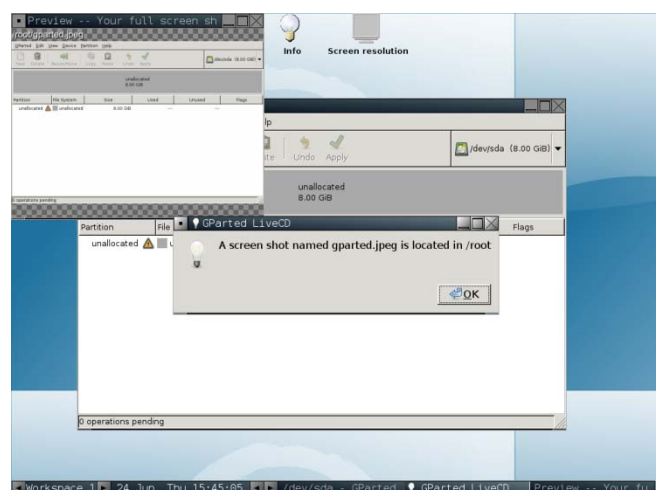
## 3.21 Terminal & Mount Partitions and Save Screenshots to a Device

Apart from the main GParted window, you can also launch a command line utility by clicking on *Terminal*.

This is useful for more advanced operations, or if some operations cannot be performed in the main GParted window. The supported shell is bash. For example, you can mount a partition to a mount point in the system. This can be done only through Terminal. It is also used for copying your saved screenshots from the system's virtual drive to a hard disk or USB flash drive. There is a comprehensive guide on

```
root@debian:~# mount /dev/sdd1 /tmp/usb
root@debian:~# cd /root
root@debian:/root# dir
gparted.jpeg  gparted-livecd-packages.txt  resize-windows.txt
root@debian:/root# cp gparted.jpeg /tmp/usb/
root@debian:/root# cd //tmp/usb/
root@debian://tmp/usb# dir
gparted.jpeg  other\ stuff
root@debian://tmp/usb# mv gparted.jpeg gparted1.jpeg
root@debian://tmp/usb# di
bash: di: command not found
root@debian://tmp/usb# dir
gparted1.jpeg  other\ stuff
root@debian://tmp/usb#
```

how to do this online: http://gparted.sourceforge.net/larry/tips/save_details.htm

3.22 Information

Clicking on *Info* brings up a dialog window, on which you can select the *List of packages* or *Windows Information*. The first option opens Terminal and presents you with a list of packages and libraries installed in GParted. You quit by pressing *q*. The second option opens *resize-windows.txt* in Terminal, which shows you some things you should be careful of when resizing Windows XP and Windows Vista partitions. You quit by pressing *q*.
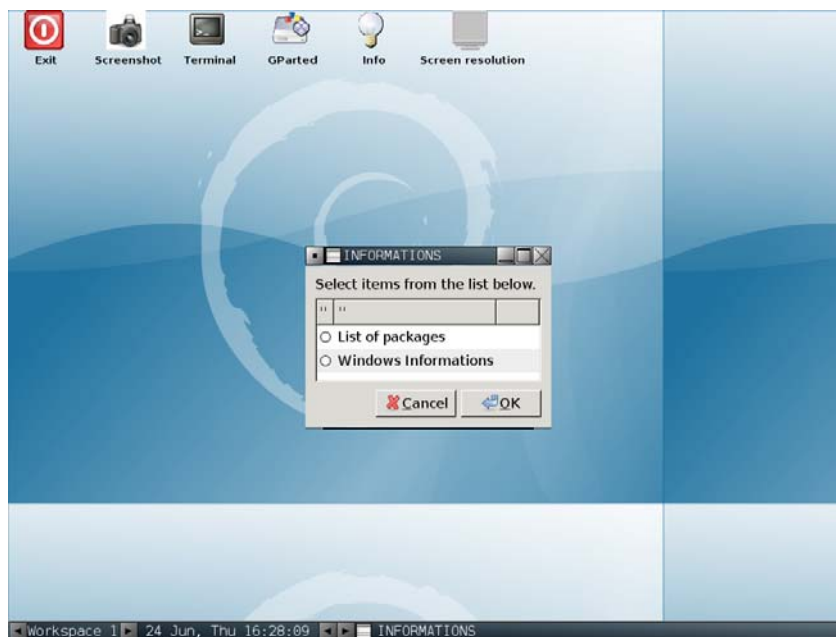
3.23 Screen Resolution Changer

Clicking on *Screen resolution* brings up a window with monitor resolution options. Here you can select the resolution that best fits your monitor. You can also rotate your view, change layout if you have multiple monitors etc.
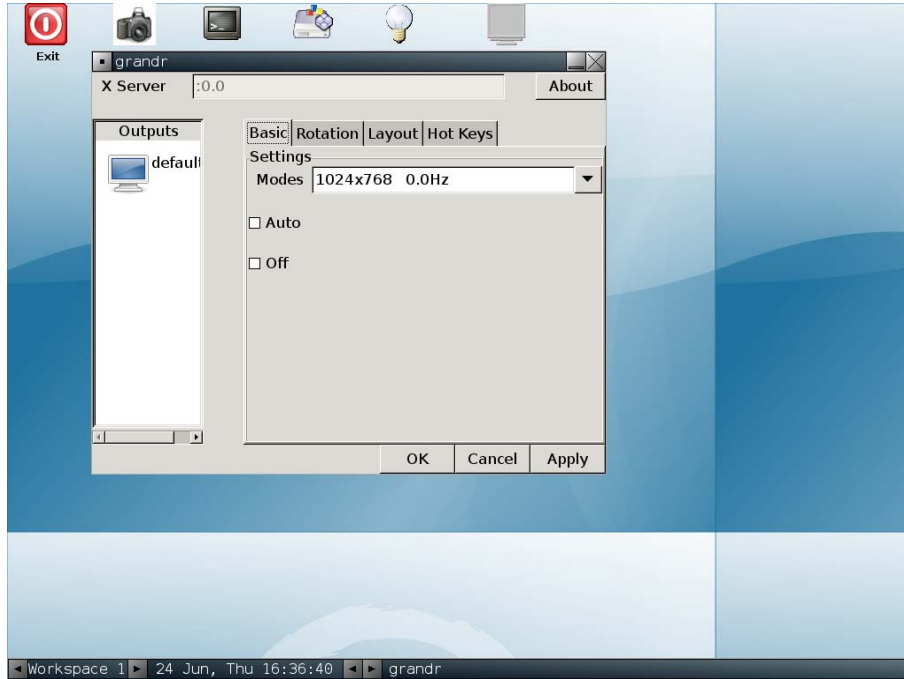
3.24 Date and Time

Date and time is displayed on the desktop's taskbar. These settings are read from the computer's BIOS.
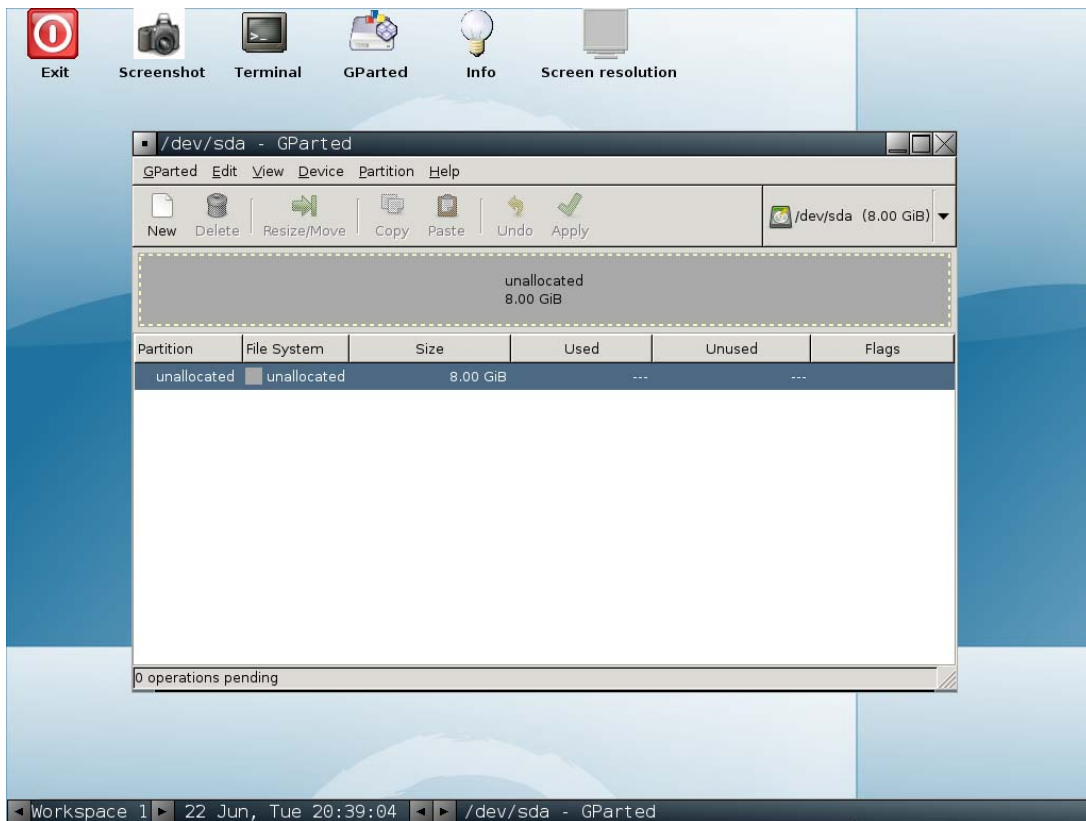
4. External Interface Requirements

4.1 User Interfaces

- Main Menu

This is the first screen of the program that the user sees, and the part where most of the operations take place.

On the top, there is the menu bar with each option (GParted, Edit, View, Device, Partition) corresponding to a set of actions you can perform on a disk. Under that, is a bar which contains the most common functions of the program.
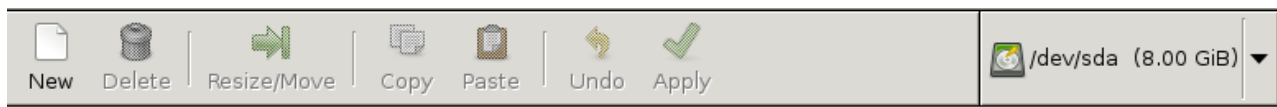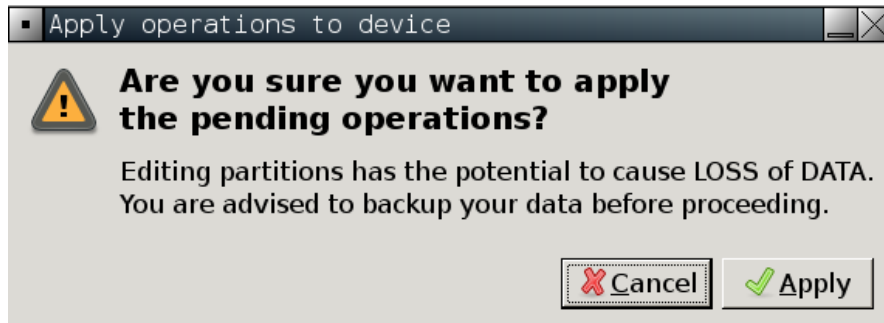

Then the selected drive's partitions are presented in both graphical and detailed mode.
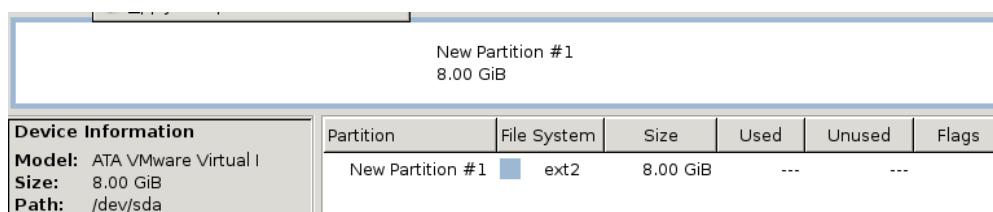
- Cancel and Apply

Every time you try to edit in any way, any partition, a confirmation dialog appears which warns about the potential of data loss. You can either click *Cancel* or *Apply*.

- Pasting into an existing partition

You can copy a partition, and then paste it on another existing one, whether it is formatted or not. This of course leads to loss of data. If that's fine, click *OK* on the warning window that is being displayed.
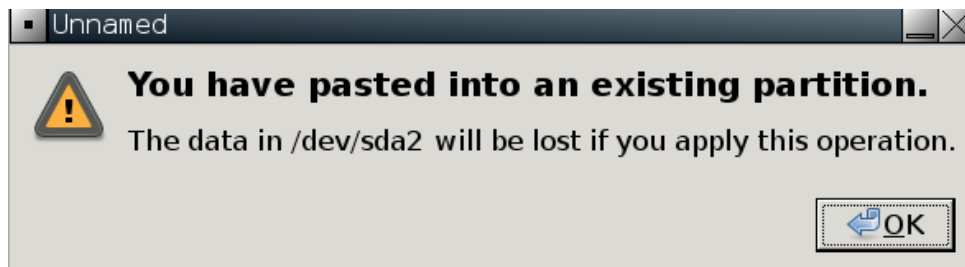
- Quitting GParted

You can exit GParted at any time you wish, by clicking on *Exit* on the upper left corner of the desktop. You can select *Reboot, Shutdown,* or *Logout*. Make your choice and click *OK*.
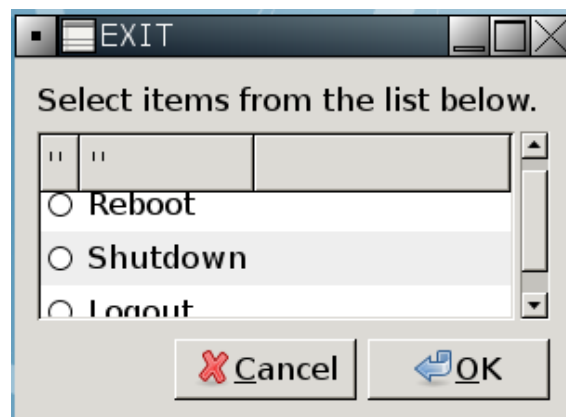
4.2 Hardware Interfaces

For the GParted Live to run, you will need a PC (regardless of its operating system, it can be Windows or Linux) or Mac, with or without an operating system. Since it is not a resource hungry program, it will run on most systems without a problem. A CD/DVD drive is necessary for the application to boot, or at least one USB port if you plan to use the USB version of GParted Live. Lastly, a functional standard keyboard and mouse is required.

Supported device types:
- Hard disks
- USB Flash drives
- External hard drives (USB – eSATA enclosures etc.)
- IDE, SATA, RAID controllers and attached devices

4.3 Software Interfaces

As it has already been stated, GParted Live runs on every system, so it doesn't need any specific software from the user's side. However, GParted depends on some libraries and tools for its function. These packages are already pre-included in the .iso image file you downloaded from GParted's website. Please refer to 2.7 for more details on that matter.
Before booting with GParted Live, you have to download the image file and then burn it to a cd. So, you need a cd/dvd burning suite compatible with your operating system.

4.4 Communications Interfaces

Although network or Internet communication is not obvious, it is available. You can configure your network adapter to work with GParted by typing in the Terminal: *dhclient eth0*. You can also use the *ifconfig* and *route* commands. Please remember to edit */etc/resolve.conf* accordingly. This enables you to update and add new packages to GParted. *apt-get update* and *apt-get install <package name>* are the corresponding commands.

5. Other Nonfunctional Requirements

5.1 Performance Requirements

As it has already been mentioned, GParted is not a resource hog and will run on almost every computer. Its functions and features are not computationally intensive. It does not require a powerful processor or graphics card, much RAM, or disk space, for both the install and Live version, and the program loads and runs fairly quick. The only real requirement is a CD/DVD drive or a USB port that is working properly.

5.2 Safety Requirements

As it is stated with many warnings in the program, data loss is a serious possibility, if you are not careful, backup your data and/or use the program with extreme caution. It is obvious that when you deal with partition changes, you could lose all your data by human or application error. GParted comes with absolute no warranty and cannot be made responsible for any loss of data.

5.3 Security Requirements

GParted Live does not deal with any security or privacy issues, as it does not run from within an operating system. Every user has administrator rights and full access which are given from the start of the program, as you are logged in as *root*.

5.4 Software Quality Attributes

The application provides a quite friendly user interface with its operations accessible from the menu bar and the main toolbar. An average or casual user should not find any problem using the program to perform at least its main functions.
Interoperability is guaranteed since this program runs on both Mac and PC (Linux, Windows or other operating system).

5.5 Other Requirements

Taken from the website's disclaimer:

GParted is free software.
You have the freedom to run, copy, distribute, study, change, and improve GParted.
You do not have to pay money to use GParted.
GParted is distributed under the GNU General Public License version 2 or (at your option) any later version.