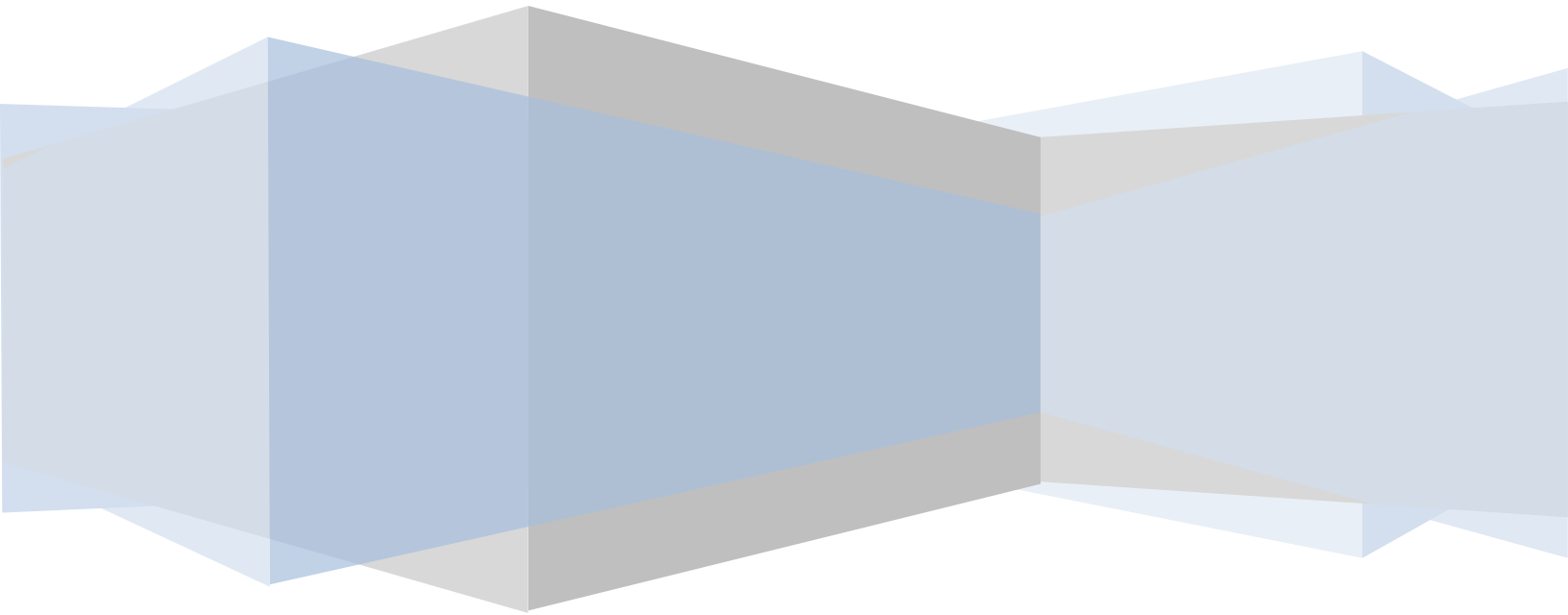
Fedora

Essentials

Fedora 13 Essentials



Fedora 13 Essentials – First Edition

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Chapter 1. About Fedora 13 Essentials

Fedora (which, up until release 7, was known as Fedora Core) is the ideal choice for those looking for a Linux distribution that always contains the latest and greatest open source technology.

The Fedora distribution is always sure to contain the newest graphics effects combined with early access to the enterprise class tools that are being developed as the foundation of the next release of Red Hat Enterprise Linux. For these reasons, Fedora is one of the most exciting of all the currently available Linux distributions.

Fedora 13 Essentials is a book designed to provide detailed information on the use and administration of version 13 of the Fedora distribution. For beginners, the book covers the basics of installation, configuring the desktop environment, resolving screen resolution issues and configuring the email client to send and receive email messages via web based services such as GMail. Installation topics such as dual booting with Microsoft Windows and configuring wireless networking are covered together with all important security topics such as configuring a firewall.

For the experienced user, topics such as configuring email and web servers, Xen and KVM virtualization, Secure Shell (SSH), remote desktop access and file sharing are covered in detail to provide a thorough overview of this popular, cutting edge operating system.

Chapter 2. Performing a Fedora 13 Installation

In terms of installing and running Fedora, a number of options are available. This chapter will discuss the various approaches to installing and running Fedora before working through the steps involved in performing a clean disk installation.

2.1 The Fedora Live CD

In order to try out Fedora without performing an installation the *Fedora Live CD* is an ideal option. In this situation, the operating system is booted and subsequently runs from a CDROM. As such no changes are made to any disk drives contained within the system.

Whilst this is a good option for quickly trying out Fedora it is not a long term solution. The Live CD distribution, for example, runs slower than an installation to a hard drive, has limited physical storage space and any user data or configuration changes saved during the live session are lost when the system is shutdown or rebooted.

2.2 Fedora Installation Options

Having tried the Fedora Live CD it is clearly going to be necessary to install Fedora to a hard drive in order to make full and realistic use of the operating system. Fedora can either be installed such that it takes up an entire hard disk (removing any existing operating systems in the process) or in a dual boot environment whereby it co-exists on a hard disk with another operating system such as Windows. The goal of this chapter is to introduce the concept of installing to hard disk dedicated entirely to Fedora. For details on performing a dual-boot installation, refer to the chapter entitled Installing Fedora 13 on a Windows System (Dual booting).

A third option, not discussed so far, involves running Fedora inside a virtual environment such as VMware or VirtualBox. This approach allows Fedora to run in parallel with a host operating system such as Windows. Once the virtual machine has been configured (details of which can be found in the documentation of your chosen virtualization product) the Fedora installation process is largely unchanged from the steps outlined in the remainder of this chapter.

2.3 Obtaining Fedora

The first step in the installation process is to obtain the Fedora installation media in a format suitable for installing on a hard disk. The easiest way to achieve this is to boot the Fedora Live CD and perform the configuration and installation from the live session. Live CD support was introduced in Fedora beginning with the release of Fedora 7. The latest Fedora Live CD images can be downloaded from the Fedora project web site:

http://fedoraproject.org/get-fedora

The download image is approximately 650Mb in size so a broadband internet connection is recommended and sufficient disk space on the target system required.

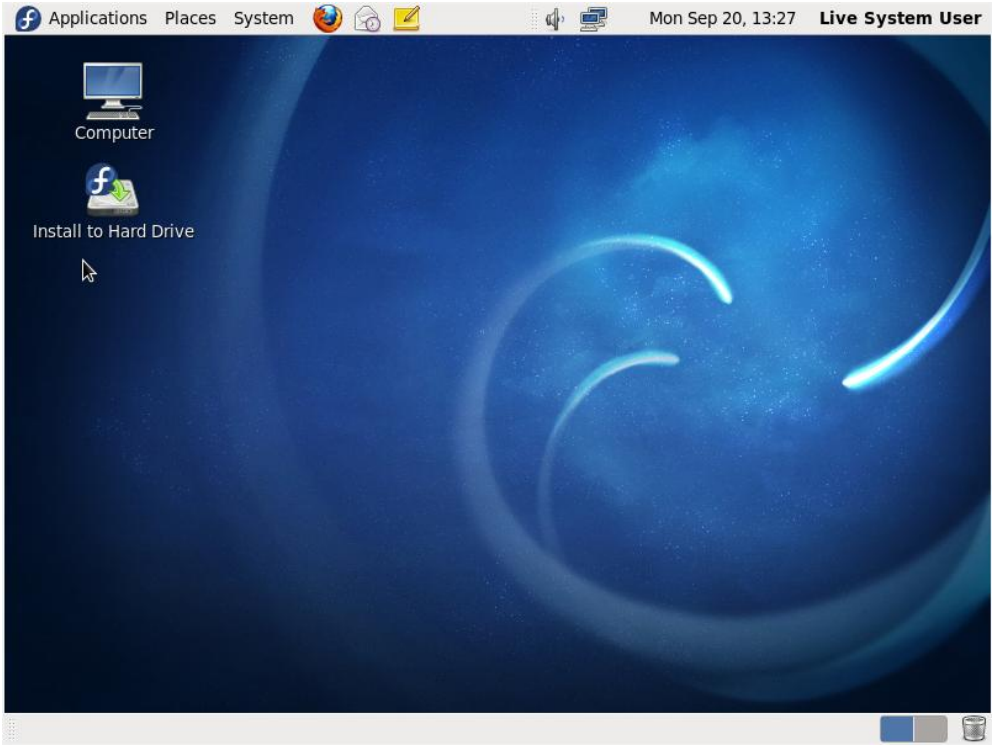
The Live CD images are listed under *Fedora 13 Desktop Edition Installable Live CD*. The default download is for 32-bit systems. To access images for 64-bit systems click on the *More download options* link. If you are unsure of the architecture of your computer hardware, check with the manufacturer for clarification. If you are still unsure, or wish to get started quickly it is worth knowing that the 32-bit version of Fedora will also run on 64-bit systems, though the same cannot be said of running the 64-bit version on a 32-bit computer.

There are two predominant desktop environments on Linux, namely KDE and GNOME. Given that the default desktop environment on Fedora is the GNOME desktop this will be the desktop covered in the remainder of this book. Once you have downloaded the appropriate image for your hardware and choice of desktop, burn the image onto a CDROM. Check the documentation for your preferred CD writing software for steps on how to write an ISO image file to a CD if you do not already know how to do this.

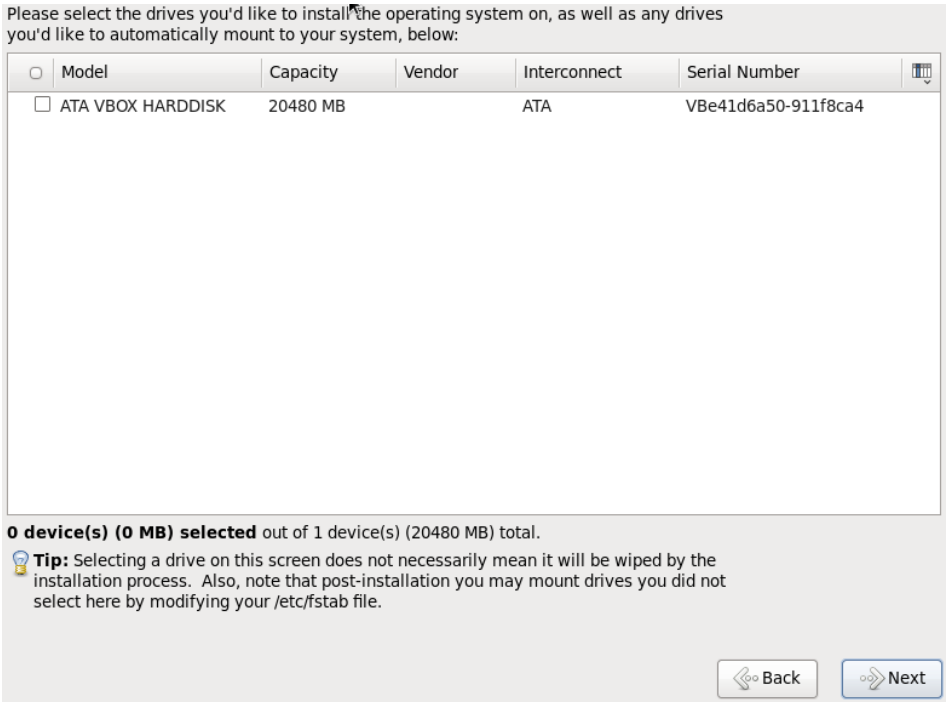
2.4 Beginning the Installation Process

Place the Fedora Live CD into the CD drive of your system and reboot. If the system fails to boot from the CDROM, you will need to change the boot order in your system BIOS. To do this reboot again. Early in the boot process the BIOS will display a message indicating which key should be pressed to enter Setup. Press the key indicated so that the BIOS Setup menu appears. Navigate the menu system until you find the setting which indicates the boot order used by the BIOS. Change the order so that the drive containing the Fedora Live CDROM is listed before the hard disk drive, then exit and save the settings. Reboot once more and you should find that Fedora loads from the CDROM.

Once Fedora has loaded you will be presented with the Fedora login screen with the option to perform an automatic login pre-selected. If you take no action, Fedora will log you in after 60 seconds. If you prefer not to wait, click on the *Login* button to initiate the login sequence. Either way, Fedora will present you with the desktop screen similar to the one illustrated in the following figure:



To initiate the installation process, double click on the *Install to Hard Drive* icon located on the Fedora desktop. Once the installer has launched, make appropriate selections for keyboard layout and storage devices (unless you plan to use a Storage Area Network device, the Basic option is recommended). The installer will subsequently scan the hardware and provide a list of detected disk drives:



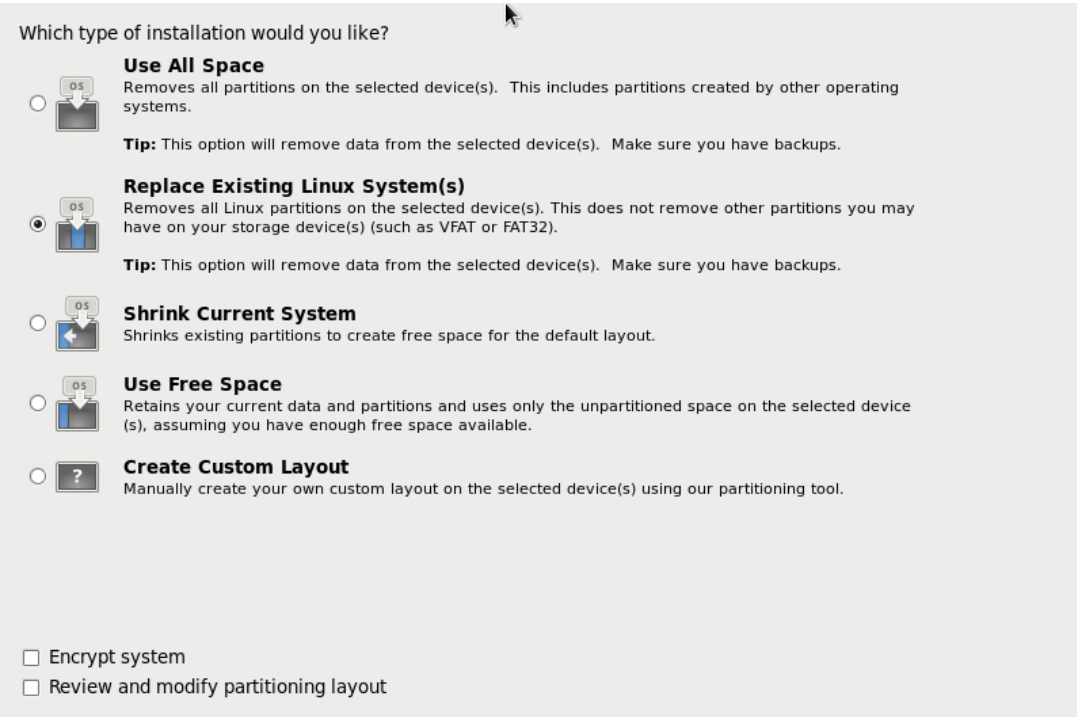
From this screen, select the disk drive onto which Fedora is to be installed and click the *Next* button.

On the following screens enter the machine name, time zone and root password (the password that will be used when performing privileged administrative tasks on the system after installation).

Once these settings have been configured, the drive partitioning screen will appear.

2.5 Making Partition Decisions

The installer screen responsible for configuring the basic partition layout of the target hard disk drive appears as illustrated in the following figure:



A number of options are provided for allocating space for the installation of Fedora:

- **Use All Space** - The entire disk drive will be assigned to the Fedora operating system installation. Any pre-existing partitions, together with any existing operating systems and associated data files contained therein will be deleted to make room for Fedora. This option should only be used if you are absolutely sure you no longer need anything that is currently stored on that disk, or have already backed up all user files.

- **Replace existing Linux System(s)** - If the drive was previously configured to support a Windows/Linux dual boot environment or was devoted entirely to another Linux installation, this option may be selected to instruct the installer to delete the pre-existing Linux partition and replace it with Fedora. Once again, it is important to backup any user data that may still be needed.

- **Shrink Current system** - Allows an existing partition to be reduced in size to make room on the drive for the Fedora installation. More details on this option are provided in a later chapter entitled Installing Fedora 13 on a Windows System (Dual booting).

- **Use Free Space** - If the current partitions on the drive do not take up the entire disk space available, any unallocated space may be assigned to the Fedora installation using this option.

- **Create Custom Layout** - When selected, this option displays the disk partitioning tool allowing each partition on the disk to be manually configured. Unless you have experience with low level disk partitioning this option is not recommended.

Other options presented on this screen include the ability to have the contents of the disk drive encrypted and to review the partitioning information prior to committing to the selected disk space allocation.

On this screen, make a selection based on your requirements. If, for example, the entire disk is to be used for Fedora, select the *Use All Space* option. In order to implement a dual boot configuration, refer to Installing Fedora 13 on a Windows System (Dual booting).

Click *Next* to continue with the installation process. The installer will format the selected space ready for the installation of Fedora and begin copying files to the partition.

Once the installation completes, shutdown the Live CD Fedora session using the *System -> Shutdown..* menu option and eject the Fedora Live CD from the drive. Restart the system and wait while the system boots.

2.6 Final Configuration Steps

In order to complete the installation process, select the boot menu option to start the Fedora operating system. After the system has started, the Fedora Setup Agent will appear with a welcome message. Using the *Forward* button, read the license information, create a user account for yourself and verify the date and time. If you would like the date and time of your Fedora system to be synchronized which an external Network Time Protocol server, select the *Synchronize date and time over network* option before proceeding to the *Hardware Profile* screen. If you feel like helping out the Fedora Project team with future development priorities, select the option to send a copy of your hardware profile, keeping in mind that if you choose to do so your system will send additional profiles once a month. Click *Finish* to exit the setup agent and log in using your newly created account credentials.

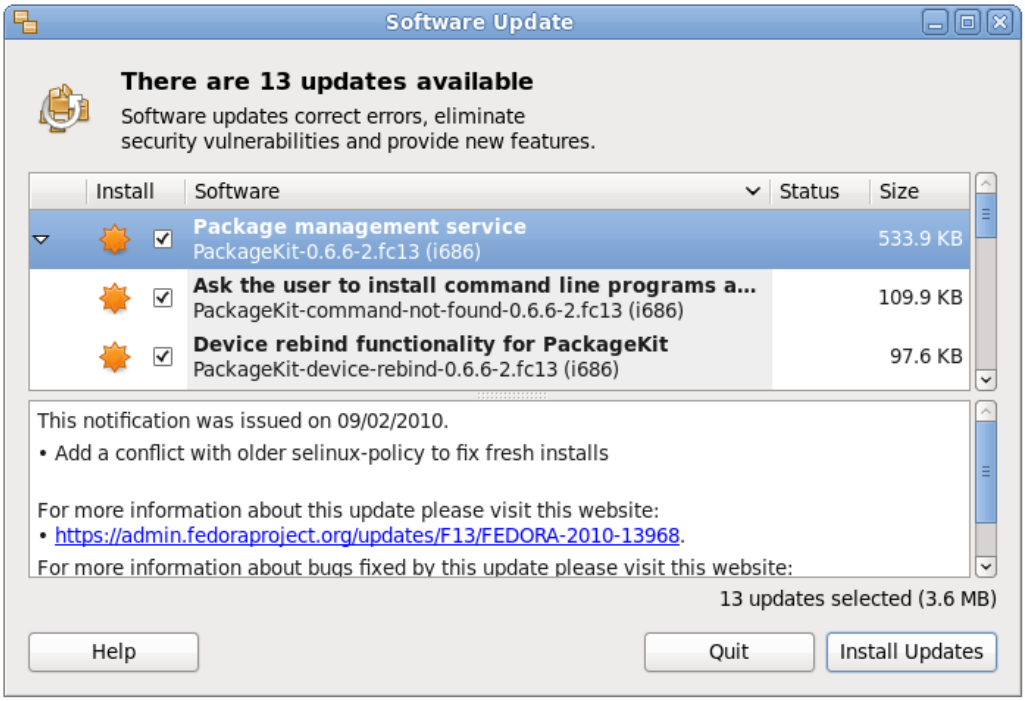
2.7 Installing Updates

As with most operating systems today, the each particular release of Fedora Linux distribution continues to evolve after it has been released to the public. This generally takes the form of bug fixes and security updates and, occasionally, new features that may be downloaded over the internet and installed on your system.

Best practices dictate that the first step after installing Fedora is to make sure any available updates are applied to the system. This can be achieved either through the desktop environment or via the command-line prompt in a Terminal window.

The Fedora desktop environment places an indicator in the top desktop panel to notify the user that updates are available to be applied to the system. This indicator takes the form of an orange star. Moving the mouse pointer over this icon will display a message indicating the number of updates that are currently available for the system as illustrated in the following figure:

Clicking on update notification icon invokes the software update window containing a list of the available updates together with references to more detailed information on each one:



Clicking the *Install Updates* button will begin the update process which consists of resolving package dependencies, downloading and installation of the updates. The duration of the update process will depend on the number and size of updates available combined with the speed of the internet connection to which the Fedora system is connected.

The latest updates may also be applied from within terminal window (*Applications -> System Tools -> Terminal*) using the *yum* command:

```
su -
```

```
yum update
```

Upon execution, the yum tool will provide a list of packages that are available for update and prompt to perform the update.

Once the update is complete the installation is essentially finished and Fedora is ready for use.

Chapter 3. Installing Fedora 13 on a Windows System (Dual booting)

Fedora, just like most Linux distributions, will happily co-exist on a hard disk drive with just about any version of Windows up to and including Windows 7. This is a concept known as *dual-booting*. Essentially, when you power up your PC you will be presented with a menu providing the option to boot either Fedora or Windows. Obviously you can only run one operating system at a time, but it is worth noting that the files on the Windows partition of your disk drive will be available to you from Fedora regardless of whether your Windows partition was formatted using NTFS, FAT16 or FAT32.

This installation method involves shrinking the size of the existing Windows partition to accommodate the installation of Fedora. Recent Fedora releases have provided the option to automatically shrink existing disk partitions during the installation process. It is also possible to pre-shrink an existing partition before starting the installation process. In this chapter both approaches will be covered in detail.

3.1 Downloading the Fedora Live CD

The first step in the installation process is to obtain the Fedora installation media in a format suitable for installing on a hard disk which already contains a Windows installation. The easiest way to achieve this is to boot the Fedora Live CD and perform the configuration and installation from the live session. Live CD support was introduced in Fedora beginning with the release of Fedora 7. The latest Fedora Live CD images can be downloaded from the Fedora project web site:

http://fedoraproject.org/get-fedora

The download image is approximately 650Mb in size so a broadband internet connection is recommended and sufficient disk space on the target system required.

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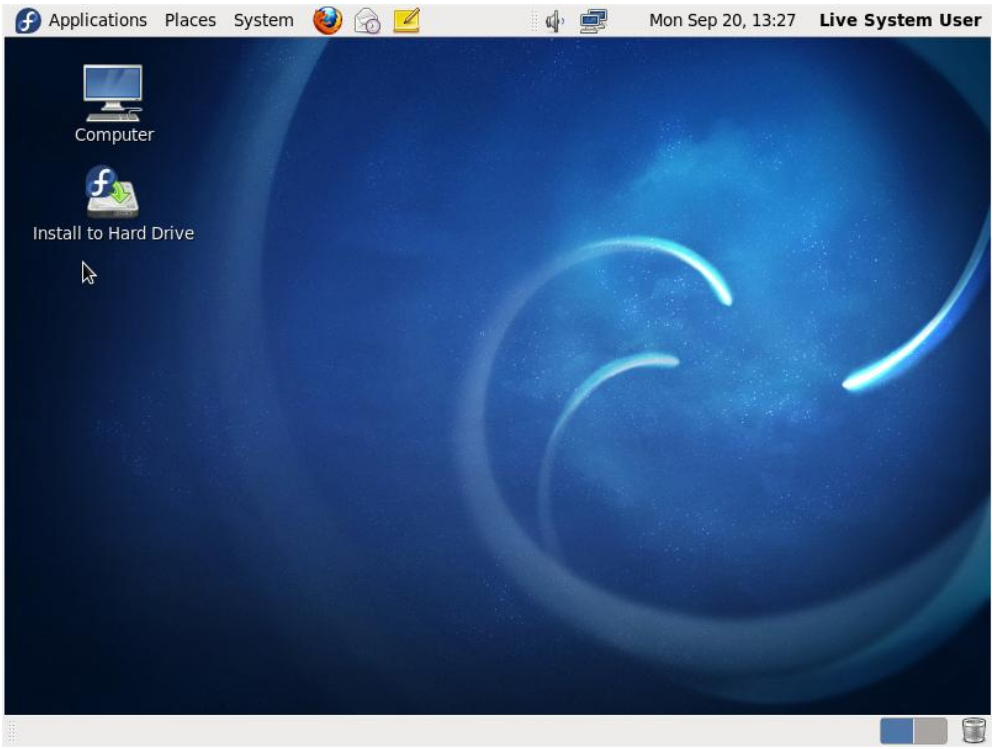
There are two predominant desktop environments on Linux, namely KDE and GNOME. Given that the default desktop environment on Fedora is the GNOME desktop this will be the desktop

covered in the remainder of this book. Once you have downloaded the appropriate image for your hardware and choice of desktop, burn the image onto a CDROM. Check the documentation for your preferred CD writing software for steps on how to write an ISO image file to a CD if you do not already know how to do this.

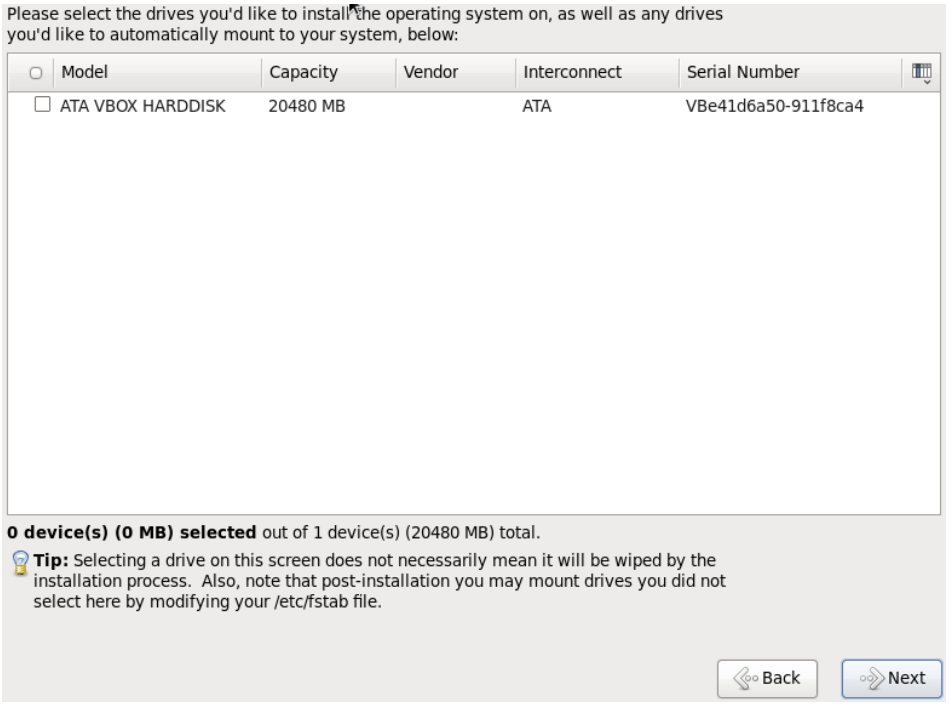
3.2 Beginning the Dual Boot Installation Process

Place the Fedora Live CD into the CD drive of your Windows system and reboot. If the system loads Windows again you will need to change the boot order in your system BIOS. To do this reboot again. Early in the boot process the BIOS will display a message indicating which key should be pressed to enter Setup. Press the key indicated so that the BIOS Setup menu appears. Navigate the menu system until you find the setting that indicates the boot order used by the BIOS. Change the order so that the drive containing the Fedora Live CDROM is listed before the hard disk drive, then exit and save the settings. Reboot once more and you should find that Fedora loads from the CDROM.

Once Fedora has loaded you will be presented with the Fedora login screen with the option to perform an automatic login pre-selected. If you take no action, Fedora will log you in after 60 seconds. If you prefer not to wait, click on the *Login* button to initiate the login sequence. Either way, Fedora will present you with the desktop screen similar to the one illustrated in the following figure:



To initiate the installation process, double click on the *Install to Hard Drive* icon located on the Fedora desktop. Once the installer has launched, make appropriate selections for keyboard layout and storage devices (unless you plan to use a Storage Area Network device, the Basic option is recommended). The installer will subsequently scan the hardware and provide a list of detected disk drives:



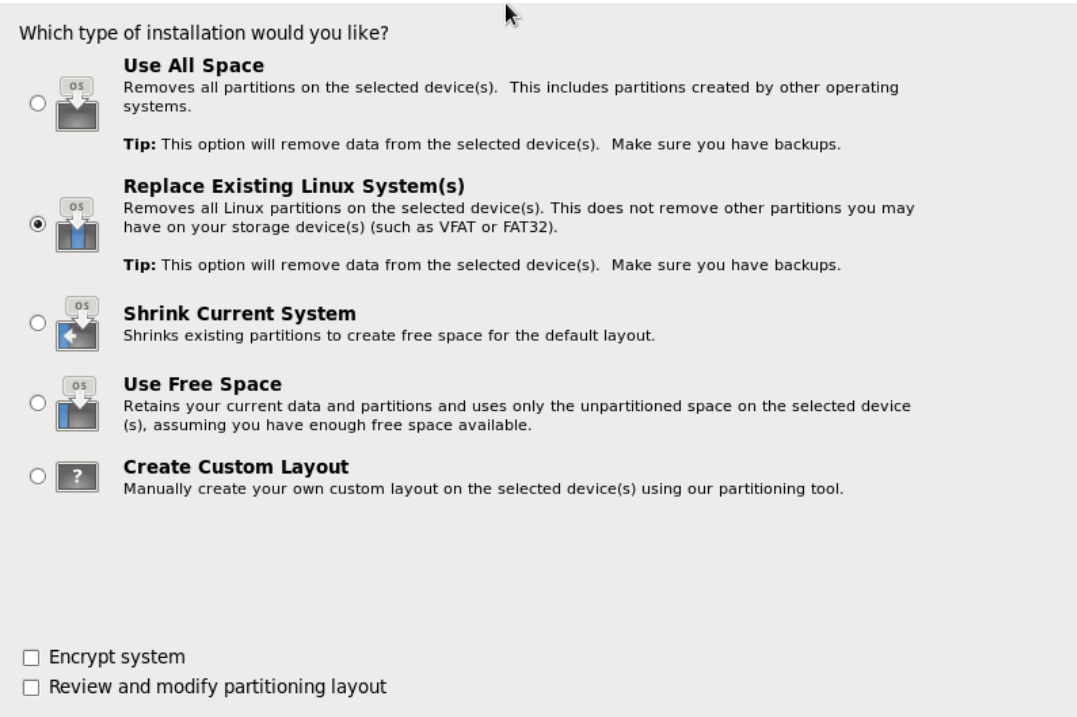
From this screen, select the disk drive onto which Fedora is to be installed and click the *Next* button.

On the following screens enter the machine name, time zone and root password (the password that will be used when performing privileged administrative tasks on the system after installation). On the time zone screen, be sure to unset the *System clock uses UTC* option to avoid conflicts when Windows adjusts the hardware clock.

Once these settings have been configured, the drive partitioning screen will appear. At this point, the partition used by the incumbent Windows installation is ready to be resized to accommodate Fedora.

3.3 Resizing the Windows Partition

The installer screen responsible for configuring the basic partition layout of the target hard disk drive appears as illustrated in the following figure:



A number of options are provided for allocating space for the installation of Fedora:

- **Use All Space** - The entire disk drive will be assigned to the Fedora operating system installation. Any pre-existing partitions, together with any existing operating systems and associated data files contained therein will be deleted to make room for Fedora. This option should only be used if you are absolutely sure you no longer need anything that is currently stored on that disk, or have already backed up all user files.

- **Replace existing Linux System(s)** - If the drive was previously configured to support a Windows/Linux dual boot environment or was devoted entirely to another Linux installation, this option may be selected to instruct the installer to delete the pre-existing Linux partition and replace it with Fedora. Once again, it is important to backup any user data that may still be needed.

- **Shrink Current system** - Allows an existing partition to be reduced in size to make room on the drive for the Fedora installation. More details on this option are provided later in this chapter.

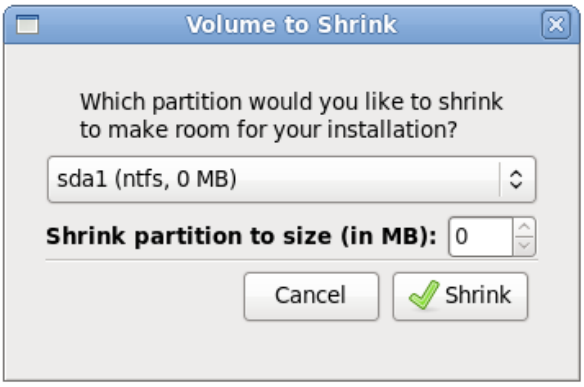
- **Use Free Space** - If the current partitions on the drive do not take up the entire disk space available, any unallocated space may be assigned to the Fedora installation using this option.

- **Create Custom Layout** - When selected, this option displays the disk partitioning tool allowing each partition on the disk to be manually configured. Unless you have experience with low level disk partitioning this option is not recommended.

Other options presented on this screen include the ability to have the contents of the disk drive encrypted and to review the partitioning information prior to committing to the select disk space allocation.

3.4 Shrinking the Existing Windows Partition

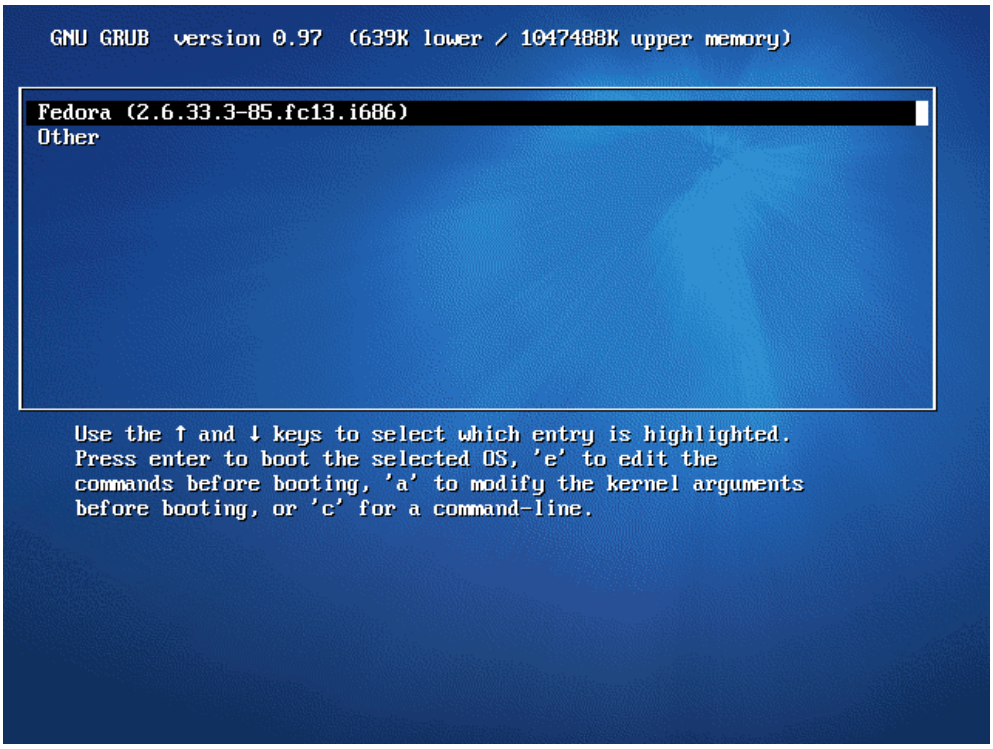
To create a dual boot environment, the existing Windows partition will need to be reduced in size to make room for Fedora to be installed on the hard disk drive. To achieve this, begin by selecting the *Shrink Current System* option followed by the *Next* button. The installer will subsequently display the *Volume to Shrink* dialog as illustrated in the following figure:



Within this dialog, select the partition to shrink from the drop down menu, followed by the target size of the partition that is to be reduced. Note that to allow sufficient room for the Fedora installation, a minimum of 5GB is recommended (equivalent to 5120MB). Once the partition and reduction amount have been entered, click on the *Shrink* button to initiate the partition modification. The installer will display a dialog seeking confirmation that you wish to proceed. Clicking the *Write changes to disk* button will commit the change. Once the resize process has completed, select the *Use free space* option and click *Next* to continue with the installation process.

The installer will format the unallocated space ready for the installation of Fedora and begin copying files to the partition.

Once the installation completes, shutdown the Live CD Fedora session using the *System -> Shutdown* menu option and eject the Fedora Live CD from the drive. Restart the system and note that a countdown message appears. Press any key at this point to enter the boot menu which will appear as follows:



This menu provides the option of booting either "Fedora" or "Other". In this instance, selecting "Other" will boot your original Windows installation. In a later section we will cover the steps to modify this menu to change the boot default and rename the "Other" menu option to something more descriptive. Before we do that, however, we first need to finish the last phases of the installation and setup process.

3.5 Final Configuration Steps

In order to complete the installation process, select the boot menu option to start the Fedora operating system. After the system has started, the Fedora Setup Agent will appear with a welcome message. Using the *Forward* button, read the license information, create a user account for yourself and verify the date and time. If you would like the date and time of your Fedora system to be synchronized which an external Network Time Protocol server, select the *Synchronize date and time over network* option before proceeding to the *Hardware Profile* screen. If you feel like helping out the Fedora Project team with future development priorities, select the option to send a copy of your hardware profile, keeping in mind that if you choose to do so your system will send additional profiles once a month. Click *Finish* to exit the setup agent and log in using your newly created account credentials.

3.6 Installing Updates

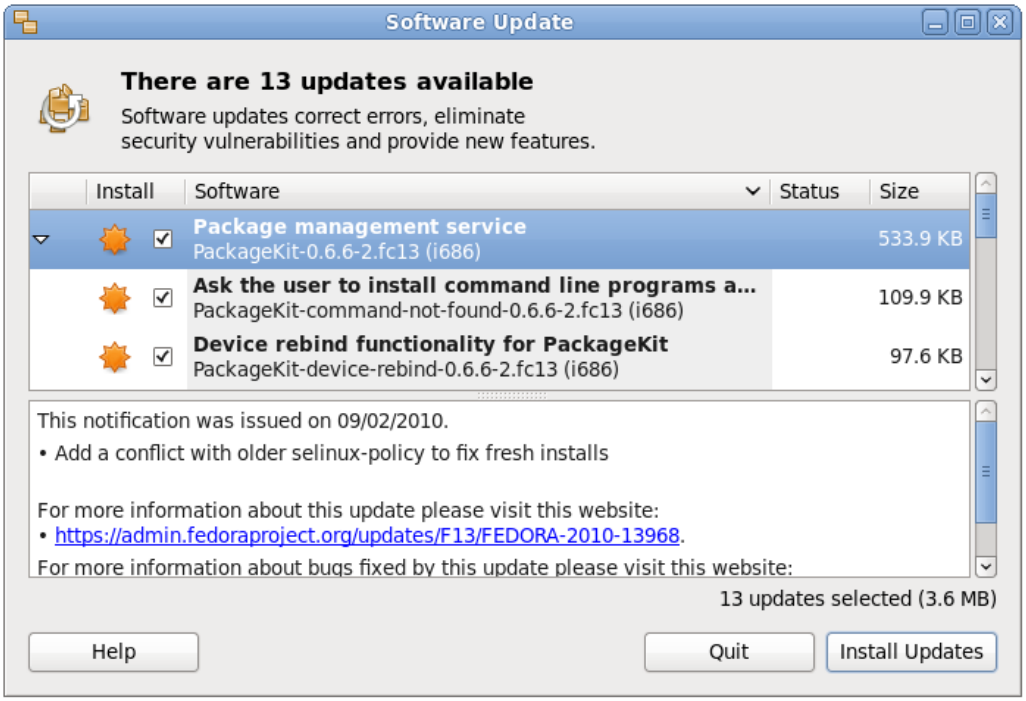
As with most operating systems today, the each particular release of Fedora Linux distribution continues to evolve after it has been released to the public. This generally takes the form of bug

fixes and security updates and, occasionally, new features that may be downloaded over the internet and installed on your system.

Best practices dictate that the first step after installing Fedora is to make sure any available updates are applied to the system. This can be achieved either through the desktop environment or via the command-line prompt in a Terminal window.

The Fedora desktop environment places an indicator in the top desktop panel to notify the user that updates are available to be applied to the system. This indicator takes the form of an orange star. Moving the mouse pointer over this icon will display a message indicating the number of updates that are currently available for the system as illustrated in the following figure:

Clicking on update notification icon invokes the software update window containing a list of the available updates together with references to more detailed information on each one:



Clicking the *Install Updates* button will begin the update process which consists of resolving package dependencies, downloading and installing the updates. The duration of the update

process will depend on the number and size of updates available combined with the speed of the internet connection to which the Fedora system is connected.

The latest updates may also be applied from within terminal window (*Applications -> System Tools -> Terminal*) using the *yum* command:

```
su -
yum update
```

Upon execution, the yum tool will provide a list of packages that are available for update and prompt to perform the update.

3.7 Editing the Fedora Boot Menu

Once you have logged into the system and the desktop is visible the next step is to configure the boot menu so that it lists the alternate operating system as *Windows* instead of *Other.* The boot menu configuration settings are stored in the */boot/grub/menu.lst* file. This file may be edited in a terminal window (*Applications -> System Tools -> Terminal*) as follows:

```
su -
gedit /boot/grub/menu.lst
```

When prompted by the *su* command to enter a password be sure to enter the root password created during the installation process, not the password you created for your user account during the setup agent configuration steps.

The contents of a typical *menu.lst* file is listed below:

```
# grub.conf generated by anaconda
#
# Note that you do not have to rerun grub after making changes to this file
# NOTICE:  You have a /boot partition.  This means that
#          all kernel and initrd paths are relative to /boot/, eg.
#          root (hd0,2)
#          kernel /vmlinuz-version ro root=/dev/mapper/vg_fedora13-lv_root
#          initrd /initrd-[generic-]version.img
#boot=/dev/sda
default=0
timeout=5
```

```
splashimage=(hd0,2)/grub/splash.xpm.gz
hiddenmenu
title Fedora (2.6.33.3-85.fc13.i686)
        root (hd0,2)
        kernel /vmlinuz-2.6.33.3-85.fc13.i686 ro
root=/dev/mapper/vg_fedora13-lv_root rd_LVM_LV=vg_fedora13/lv_root
rd_LVM_LV=vg_fedora13/lv_swap rd_NO_LUKS rd_NO_MD rd_NO_DM LANG=en_US.UTF-8
SYSFONT=latarcyrheb-sun16 KEYBOARDTYPE=pc KEYTABLE=us rhgb quiet
        initrd /initramfs-2.6.33.3-85.fc13.i686.img
title Other
        rootnoverify (hd0,0)
        chainloader +1
```

The above *menu.lst* file contains options to boot from two operating systems. The Fedora section of the configuration is as follows:

```
title Fedora (2.6.33.3-85.fc13.i686)
        root (hd0,2)
        kernel /vmlinuz-2.6.33.3-85.fc13.i686 ro
root=/dev/mapper/vg_fedora13-lv_root rd_LVM_LV=vg_fedora13/lv_root
rd_LVM_LV=vg_fedora13/lv_swap rd_NO_LUKS rd_NO_MD rd_NO_DM LANG=en_US.UTF-8
SYSFONT=latarcyrheb-sun16 KEYBOARDTYPE=pc KEYTABLE=us rhgb quiet
        initrd /initramfs-2.6.33.3-85.fc13.i686.img
```

The Windows section of the configuration is:

```
title Other
        rootnoverify (hd0,0)
        chainloader +1
```

The *default=0* line indicates that the first entry in the file is to be default operating systems (in other words, the operating system that will boot by default if the user does not intervene during the boot phase). The *timeout=5* specifies the number of seconds the boot screen is displayed before the default operating system is automatically booted.

To configure the system to boot Windows by default simply change this line so that it reads as follows:

```
default=1
```

To increase the timeout before the default operating system boots, change the timeout value (in this case to 20 seconds):

```
timeout=20
```

The final task in our dual boot configuration process is to name the Windows boot option to something more descriptive than "Other". To achieve this, simply change the "Other" line as follows:

```
title Windows
```

Note that the title value can be anything you choose. Below is the entire *menu.lst* file with the above modifications made:

```
# grub.conf generated by anaconda
#
# Note that you do not have to rerun grub after making changes to this file
# NOTICE:  You have a /boot partition.  This means that
#          all kernel and initrd paths are relative to /boot/, eg.
#          root (hd0,2)
#          kernel /vmlinuz-version ro root=/dev/mapper/vg_fedora13-lv_root
#          initrd /initrd-[generic-]version.img
#boot=/dev/sda
default=1
timeout=20
splashimage=(hd0,2)/grub/splash.xpm.gz
hiddenmenu
title Fedora (2.6.33.3-85.fc13.i686)
        root (hd0,2)
        kernel /vmlinuz-2.6.33.3-85.fc13.i686 ro
root=/dev/mapper/vg_fedora13-lv_root rd_LVM_LV=vg_fedora13/lv_root
rd_LVM_LV=vg_fedora13/lv_swap rd_NO_LUKS rd_NO_MD rd_NO_DM LANG=en_US.UTF-8
SYSFONT=latarcyrheb-sun16 KEYBOARDTYPE=pc KEYTABLE=us rhgb quiet
        initrd /initramfs-2.6.33.3-85.fc13.i686.img
title Windows
```

```
        rootnoverify (hd0,0)
        chainloader +1
```

The next time the system is rebooted, the boot screen will wait 20 seconds before auto-booting. If no keys are pressed the system will now boot Windows by default, instead of Fedora. If the user does intervene and display the boot menu, the Windows option is now titled "Windows" and not "Other".

3.8 Accessing the Windows Partition from Fedora

When running Fedora in a dual boot configuration it is possible to access files located on the Windows partition. This can be achieved using the file browser, or by manually mounting the partition from the command-line.

To access the Windows partition from the browser, select the *Places -> Computer* desktop menu item. This will display a window containing a list of devices attached to the system. Amongst the listed devices will be an icon for the hard disk drive containing the Windows partition. To mount this partition, double click on the disk drive and enter the root password if prompted to do so. A new window will subsequently appear listing contents of the top level directory of the Windows partition. It should now be possible to navigate throughout the partition and access any files contained therein. In addition, a new shortcut will appear on the desktop containing a disk drive icon. Double clicking on this icon will provide access to the contents of the Windows partition.

Another option is to manually mount the Windows partition. The first step is to create a directory to use as the mount point. In this example we will create a directory called */windows* from the terminal window (*Applications -> System Tools -> Terminal*):

```
su -
mkdir /windows
```

When prompted for a password by the *su* command, enter the root password specified during the Fedora installation process. Next, we need to run the mount command (still as super user and assuming the Windows partition is /dev/sda2 and NTFS format - this may be different on your system):

```
mount /dev/sda2 /windows
```

Under some circumstances you may get a message that the Windows partition needs to be checked. If so, either reboot into Windows again, or force the mount:

```
mount /dev/sda2 /windows -o force
```

To automate the mount each time the system is booted, simply add the mount line to the */etc/fstab* file:

```
/dev/sda2 /windows ntfs defaults 0 0
```

To unmount the Windows file system at any time:

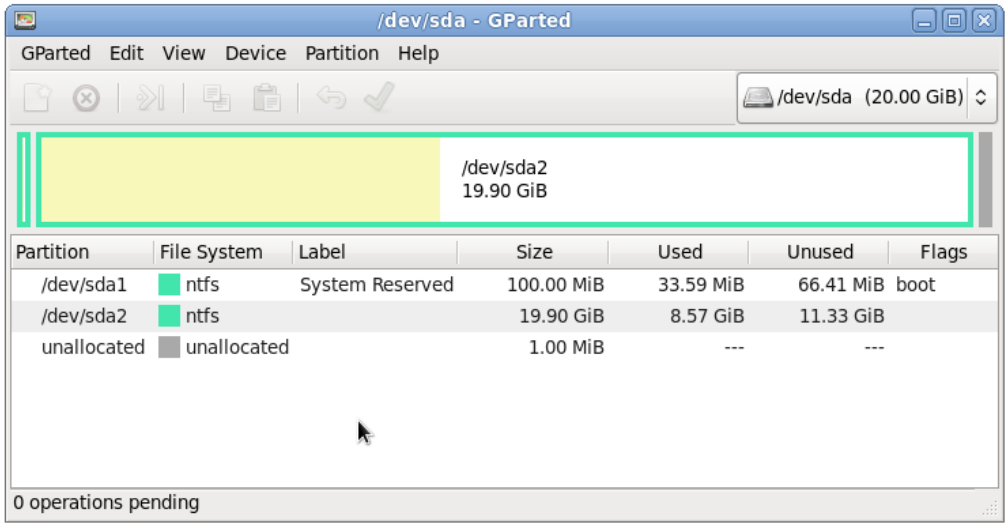
```
umount /windows
```

3.9 Manually Partitioning the Disk for Windows/Fedora

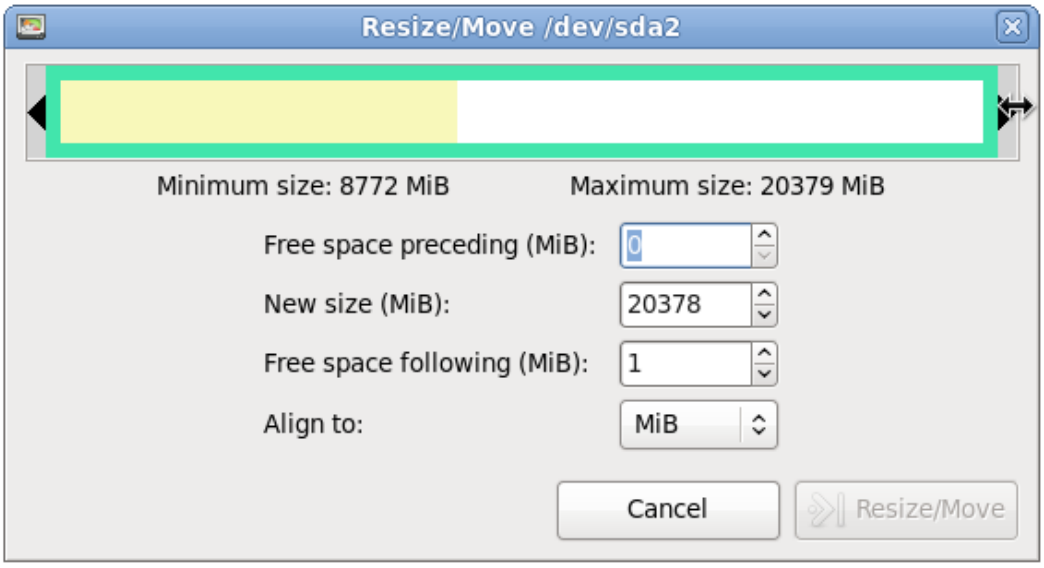
Before moving on to the next chapter we will quickly look at the steps involved in manually resizing a Windows partition to make room for Fedora in advance of running the installer. The reason for including this information is that it can be helpful to understand what happens behind the scenes of the installer and also to provide an alternative mechanism should the installer fail to perform the resize operation.

Linux includes a powerful disk partitioning tool called *GParted* which will need to be installed before it can be used in the Fedora Live CD system. To perform the installation, select the *System-> Administration -> Add Remove Software* menu option and wait for the application to start and populate the package list. Enter *GParted* into the text field, click *Find* and wait for the package to appear in the list. Click the check box next to the *Gnome Partition Editor* package name and initiate the installation by clicking on the *Apply* button.

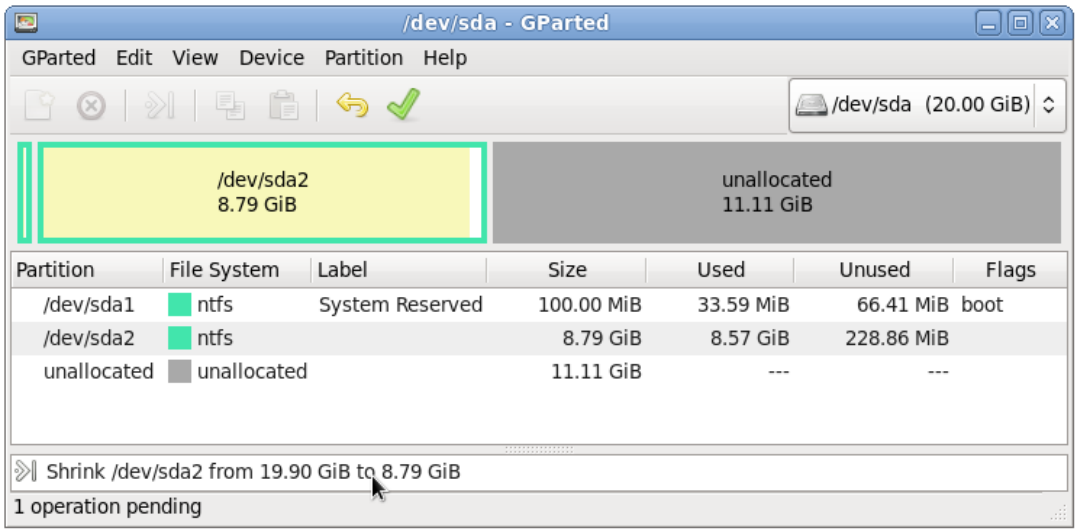
Once the installation is complete, launch *GParted* by clicking on the *Applications* desktop menu and from the *System Tools* sub-menu select *GParted Partition Editor*. After loading, the *GParted* main screen will appear displaying a graphical representation of the current disk partition layout:



The above *GParted* session shows a Windows NTFS formatted partition which is taking up most of the available disk space. In order to make space for a Fedora installation the next step is to resize the *non-System Reserved* Windows NTFS partition. The objective is to reduce the size of this Windows partition from the current size of 19.9GB to 9GB. This will create approximately 10GB of unused space for the Fedora installation. Right click on the NTFS partition in the *GParted* window and select the *Resize/Move* option from the resulting menu to invoke the *Resize/Move* dialog:



Change the *New Size* field to 9000 MiB and click on the *Resize/Move* button at the bottom of the dialog. The Resize action will then appear in the *Pending* panel at the bottom of the main GParted screen and the new space will be displayed in the graphical representation of the disk as *unallocated* space:



To commit the resize click on the *Apply* button in the toolbar (the button with the green check mark) and confirm the resize in the subsequent warning dialog. The *Apply pending operation* dialog will appear and display the progress of the resize. Once the resize is completed successfully, close the dialog and exit *GParted*.

The disk is now partitioned with the existing Windows installation and unallocated space suitable for the installation of Fedora. Launch the installer as outlined in Performing a Fedora 13 Installation and select the *Use Free Space* option when prompted for partitioning information.

In the next chapter we will look at the steps necessary to remove a Windows partition from a dual boot configuration and assign that partition to Fedora.

Chapter 4. Allocating a Windows Disk Partition to Fedora

In the previous chapter we looked at how to install Fedora on the same disk as Windows. This so called "dual boot" configuration allows the user to have both operating systems installed on a single disk drive with the option to boot one or the other when the system is powered on. Performing this type of installation was covered in Installing Fedora 13 on a Windows System (Dual booting).

This chapter is intended for users who have decided they like Fedora enough to delete Windows entirely from the disk, and use the resulting space for Linux. In the following sections we will work through this process step by step.

4.1 Deleting the Windows Partitions from the Disk

The first step in freeing up any Windows partitions for use by Fedora is to delete those partitions. Before doing so, however, it is imperative that any data you need to keep is backed up from both the Windows and Fedora partitions. Having done that, it is safe to proceed with this chapter.

In order to remove the Windows partition we first need to identify it using the fdisk tool which should be run in a terminal window (*Applications -> System Tools -> Terminal*) with root privileges:

```
$ su -
# fdisk -l

Disk /dev/sda: 21.5 GB, 21474836480 bytes
255 heads, 63 sectors/track, 2610 cylinders
Units = cylinders of 16065 * 512 = 8225280 bytes
Sector size (logical/physical): 512 bytes / 512 bytes
I/O size (minimum/optimal): 512 bytes / 512 bytes
Disk identifier: 0x1cd668b6

   Device Boot      Start         End      Blocks   Id  System
/dev/sda1   *           1          13      102400    7  HPFS/NTFS
Partition 1 does not end on cylinder boundary.
/dev/sda2              13        1161     9216000    7  HPFS/NTFS
/dev/sda3            1161        1224      512000   83  Linux
/dev/sda4            1224        2611    11140096    5  Extended
```

```
/dev/sda5            1225        2611    11139072   8e  Linux LVM

Disk /dev/dm-0: 9294 MB, 9294577664 bytes
255 heads, 63 sectors/track, 1130 cylinders
Units = cylinders of 16065 * 512 = 8225280 bytes
Sector size (logical/physical): 512 bytes / 512 bytes
I/O size (minimum/optimal): 512 bytes / 512 bytes
Disk identifier: 0x00000000
```

In the above example output the system contains one physical disk drive referenced by device name */dev/sda*. On that disk drive are five partitions accessed via the device names */dev/sda1* through */dev/sda5* respectively. Based on the values in the *System* column, there are two NTFS partitions. The first is very small and marked as bootable so clearly contains the Windows boot record. The second, much larger, NTFS partition is the one containing the Windows operating system and user data that we plan to remove. Note that a FAT partition also indicates the presence of a Windows installation. Make a note of the *Start* and *End* addresses of the main Windows partition as these will be needed when we recreate a new Linux partition in the freed space.

To remove the partition, start the fdisk tool using the device name of the disk containing the partition (/dev/sda in this instance):

```
# fdisk /dev/sda

The number of cylinders for this disk is set to 2610.
There is nothing wrong with that, but this is larger than 1024,
and could in certain setups cause problems with:
1) software that runs at boot time (e.g., old versions of LILO)
2) booting and partitioning software from other OSs
   (e.g., DOS FDISK, OS/2 FDISK)

Command (m for help):
```

At the command prompt, delete the main Windows partition (which is partition 2 on our example system):

```
Command (m for help): d
```

```
Partition number (1-5): 2

Command (m for help):
```

Now that we have deleted the Windows partition we now need to create the new Fedora partition in the vacated disk space. The partition number must match the number of a removed partition (in this case 2) and is going to be a *primary* partition. It will also be necessary to enter the *Start* and *End* values of the partition exactly as they were reported for the old partitions:

```
Command (m for help): n
Command action
   l   logical (5 or over)
   p   primary partition (1-4)
p
Selected partition 2
First cylinder (13-2610, default 13):
Using default value 13
Last cylinder, +cylinders or +size{K,M,G} (13-1160, default 1160):
Using default value 1160

Command (m for help):
```

Having made these changes the next step is to check that the settings are correct:

```
Command (m for help): p

Disk /dev/sda: 21.5 GB, 21474836480 bytes
255 heads, 63 sectors/track, 2610 cylinders
Units = cylinders of 16065 * 512 = 8225280 bytes
Sector size (logical/physical): 512 bytes / 512 bytes
I/O size (minimum/optimal): 512 bytes / 512 bytes
Disk identifier: 0x1cd668b6

   Device Boot      Start         End      Blocks   Id  System
/dev/sda1   *           1          13      102400    7  HPFS/NTFS
Partition 1 does not end on cylinder boundary.
```

```
/dev/sda2              13        1160     9214276   83  Linux
/dev/sda3            1161        1224      512000   83  Linux
/dev/sda4            1224        2611    11140096    5  Extended
/dev/sda5            1225        2611    11139072   8e  Linux LVM
```

To commit the changes we now need to write the new partition information to disk and quit from the fdisk tool:

```
Command (m for help): w
The partition table has been altered!

Calling ioctl() to re-read partition table.

WARNING: Re-reading the partition table failed with error 16: Device or
resource busy.
The kernel still uses the old table.
The new table will be used at the next reboot.
Syncing disks.
```

If you see a warning similar to the one indicated in the above output you will need to reboot your Fedora system to be sure the new partition table information is picked up by the system kernel before proceeding.

4.2 Formatting the Unallocated Disk Partition

In order to make the new partition suitable for use by Fedora, it needs to have a file system created on it. The default file system type for the current release of Fedora is ext4. Creation of the file system is performed using the mkfs command as follows:

```
# mkfs -t ext4 /dev/sda2
mke2fs 1.41.10 (10-Feb-2009)
Filesystem label=
OS type: Linux
Block size=4096 (log=2)
Fragment size=4096 (log=2)
Stride=0 blocks, Stripe width=0 blocks
575952 inodes, 2303569 blocks
```