Chapter 1: Installing a Linux Server

In This Chapter

- **Getting ready to install Linux**
- **Installing Linux**
- **Adding additional packages after installation**

This chapter presents the procedures that you need to follow to install Linux on a server computer. The specific details provided are specifically for Fedora 7, a free Linux distribution from Red Hat. However, installing other distributions of Linux is similar, so you won't have any trouble adapting these procedures if you're using a different distribution.

Planning a Linux Server Installation

Before you begin the installation program, you need to make a number of preliminary decisions. The following sections describe the decisions that you need to make before you install Linux.

Checking system requirements

Before you install Linux, you should make sure that the computer meets the minimum requirements. Although the minimum requirements for Linux are considerably less than for the latest Windows or NetWare server operating systems, you can't run Linux on an abacus. The following paragraphs summarize the minimum capabilities you need.

- **A Pentium-based computer.** Even a slow 100 MHz system will run some builds of Linux, although performance will be slow. The minimum recommended for Fedora Core is a 200 MHz Pentium.
- **64MB of RAM or more.** Actually, 128MB or more is better, but Linux can make do with less.
- **A hard drive with enough free space to hold the packages that you need to install.** The kernel itself needs about 850MB. If you choose not to install a graphical user interface, you can install a full-featured server in about 1.5GB. If you install everything, you need about 5GB.

- **A CD-ROM drive is almost a must, and it's helpful if the computer can boot from the CD.** If the computer doesn't have a CD, you can install over a network. If your computer can't boot from the CD, you can create a boot diskette from which to boot the computer.
- **Just about any video card and monitor combination.** You don't need anything fancy for a server. In fact, fancy video cards often lead to hardware compatibility issues. Stick to a basic video card.
- **A mouse is very helpful.** If you're converting an old junker computer to a Linux server and you've lost the mouse (that seems to happen a lot), pick one up at your local office supply store. A cheap one costs only about $15.
- **A network card.**

Choosing a distribution

Because the *kernel* (that is, the core operating functions) of the Linux operating system is free, several companies have created their own *distributions* of Linux, which include the Linux operating system along with a bundle of packages, such as administration tools, Web servers, and other useful utilities, as well as printed documentation. These distributions are inexpensive — ranging from $25 to $150 — and are well worth the small cost.

The following are some of the more popular Linux distributions:

- **Fedora** is one of the popular Linux distributions. At one time, Fedora was an inexpensive distribution offered by Red Hat. But Red Hat recently changed its distribution strategy by announcing that its inexpensive distribution would become a community project known as *Fedora,* so that it could focus on its more expensive Enterprise editions. As a result, you can't purchase Fedora, but you can download it free from `http://fedoraproject.com`. You can also obtain it by purchasing any of several books on Fedora that include the Fedora distribution on DVD or CD-ROM.

  All the examples in this book are based on Fedora 8.
- **Mandriva Linux** is another popular Linux distribution, one that is often recommended as the easiest for first-time Linux users to install. This distribution was formerly known as *Mandrake Linux.* Go to `www.mandriva.com` for more information.
- **Ubuntu** is a Linux distribution that has gained popularity in recent years. It focuses on ease of use. For more information, go to `www.ubuntu.com`.
- **SUSE** (pronounced *SOO-zuh,* like the name of the famous composer of marches) is a popular Linux distribution sponsored by Novell. You can find more information at `www.suse.com`.

- **Slackware**, one of the oldest Linux distributions, is still popular — especially among Linux old-timers. A full installation of Slackware gives you all the tools that you need to set up a network or Internet server. See `www.slackware.com` for more information.

There are, of course, many other distributions of Linux available, including Knoppix (`www.knoppix.net`), Debian (`www.debian.org`), and Xandros Desktop (`www.xandros.com`). If you want, you can search a comprehensive database of Linux distributions at `www.linux.org/dist`.

All distributions of Linux include the same core components — the Linux kernel, an X Server, popular windows managers such as GNOME and KDE, compilers, Internet programs such as Apache, Sendmail, and so on. However, not all Linux distributions are created equal. In particular, the manufacturer of each distribution creates its own installation and configuration programs to install and configure Linux.

The installation program is what makes or breaks a Linux distribution. All the distributions I list in this section have easy-to-use installation programs that automatically detect the hardware that is present on your computer and configure Linux to work with that hardware, thus eliminating most — if not all — manual configuration chores. The installation programs also let you select the Linux packages that you want to install and let you set up one or more user accounts besides the root account.

Figuring out how you'll boot during installation

Before you can install Linux, you must have a working operating system in place so that you can boot the Linux installation program. There are two common ways to boot your computer to install Linux:

- If the computer has a bootable CD-ROM drive, you can boot the computer from the Linux distribution CD. To find out whether this technique will work, just put the Linux distribution CD-ROM in the drive and restart the computer. If the computer doesn't boot from the CD-ROM, don't despair. The problem may be that the computer's BIOS configuration isn't set to allow the computer to boot from the CD-ROM drive. Check the computer's BIOS configuration to see whether this is the problem.
- If the computer can't boot from the CD-ROM drive, you can create a bootable floppy disk. To do that, insert the CD-ROM into the CD drive on a Windows computer and then run the program that creates a bootable Linux disk. For Fedora, this program is called `rawrite.exe`. If you have access to a working Linux system, you can also use it to create a boot disk.

I can't see my C: drive!

Linux and Windows have a completely different method of referring to your computer's hard drives and partitions. The differences can take some getting used to for experienced Windows users.

Windows uses a separate letter for each drive and partition on your system. For example, if you have a single drive formatted into three partitions, Windows identifies the partitions as drives C:, D:, and E:. Each of these drives has its own root directory, which can, in turn, contain additional directories used to organize your files. As far as Windows is concerned, drives C:, D:, and E: are completely separate drives, even though the drives are actually just partitions on a single drive.

Linux doesn't use drive letters. Instead, Linux combines all the drives and partitions into a single directory hierarchy. In Linux, one of the partitions is designated as the *root* partition. The root partition is roughly analogous to the root directory of the C: drive on a Windows system. Then, the other partitions can be *mounted* on the root partition and treated as if they were directories on the root partition. For example, you may designate the first partition as the root partition and then mount the second partition as `/user` and the third partition as `/var`. Then, any files stored in the `/user` directory would actually be stored in the second partition, and files stored in the `/var` directory would be stored in the third partition.

The directory to which a drive mounts is called the drive's *mount point.*

Notice that Linux uses regular forward slash characters (`/`) to separate directory names rather than the backward slash characters (`\`) used by Windows. Typing backslashes instead of regular slashes is one of the most common mistakes made by new Linux users.

While I'm on the subject, Linux uses a different convention for naming files, too. In Windows, filenames end in a three-letter extension that is separated from the rest of the filename by a period. The extension is used to indicate the file type. For example, files that end in `.exe` are program files, but files that end in `.doc` are word-processing documents.

Linux doesn't use file extensions, but periods are often used in Linux filenames to separate different parts of the name — and the last part often indicates the file type. For example, `ldap.conf` and `pine.conf` are both configuration files.

Thinking about multiboot

Linux comes with a boot loader program called *GRUB* that lets you choose from several installed operating systems when you start your computer. GRUB makes it possible to keep your existing Windows system on a computer and install Linux into a separate partition. Then, each time you start the computer, you can decide whether to start Windows or Linux.

I'm not a big fan of having multiple operating systems on one computer. If the computer is going to be a production server, you're not going to need to reboot the computer into Windows anyway. However, installing Linux into a separate partition while keeping your Windows system intact may be a viable alternative if you want to experiment with Linux before you commit to it.

Planning your partitions

Linux handles partitions a little differently than Windows. The Windows operating system installs itself into a single partition. However, Linux installations typically require three or more hard drive partitions:

- **A boot partition:** This should be small — 16MB is recommended. The boot partition contains the operating system kernel and is required to start Linux properly on some computers.
- **A swap partition:** This should be about twice the size of your computer's RAM. For example, if the computer has 256MB of RAM, allocate a 512MB swap partition. Linux uses this partition as an extension of your computer's RAM.
- **A root partition:** In most cases, this uses up the remaining free space on the drive. The root partition contains all the files and data used by your Linux system.

You can also create additional partitions if you want. The installation program includes a disk-partitioning feature that lets you set up your drive partitions and indicate the mount point for each partition. The installation program can make a recommendation for partitioning your drives that will be appropriate in most situations. (For more information about drive partitions, see the sidebar, "I can't see my C: drive!" earlier in this chapter.)

Deciding your TCP/IP configuration

Before you install the operating system, you should have a plan for how you will implement TCP/IP on the network. Here are some of the things you need to decide or find out:

- What is the public IP subnet address and mask for your network?
- What is the domain name for the network?
- What is the host name for the server?
- Will the server obtain its address from DHCP?
- Will the server have a static IP address? If so, what?
- Will the server be a DHCP server?
- What is the Default Gateway for the server? (That is, what is the IP address of the network's Internet router?)
- Will the server be a DNS server?

If the server will host TCP/IP servers (such as DHCP or DNS), you'll probably want to assign the server a static IP address.

For more information about planning your TCP/IP configuration, see Book IV.

Installing Fedora 7

Now that you've planned your installation and prepared the computer, you're ready to actually install Linux. The following procedure describes the steps you must follow to install Fedora 7 on a computer that has a bootable DVD-ROM drive.

1. **Insert the Fedora 7 CD in the DVD drive and restart the computer.**

   The computer boots from the DVD drive and displays a Linux boot prompt, which looks like this:

   ```
   Boot:
   ```

   If you don't have the installation DVD, download the DVD images from `http://www.fedoraproject.com`. Then, use DVD burning software to create a DVD from the image.

2. **Press Enter.**

   The computer starts Linux from the installation disk. The screen shown in Figure 1-1 soon appears.

   This screen gives you several options for starting the installation. The most common is to simply press Enter.

3. **Press Enter.**

   Now a bunch of text messages fly by your screen as Linux starts up. Eventually, the screen shown in Figure 1-2 appears, offering to test the CD media you're installing from to make sure you have downloaded and burned the CD images correctly.

Figure 1-1: Selecting an installation option.

Figure 1-2: Testing the CD media.

4. **Press tab, and then press Enter to skip the test.**

   Still more text messages fly by, but soon Fedora switches into graphics mode and displays the Welcome to Fedora Core screen, as shown in Figure 1-3.

Figure 1-3: Welcome to Fedora.

5. **Click Next.**

   The Language Selection screen appears, offering quite a few language choices, as shown in Figure 1-4.

6. **Choose your language, and then click Next.**

   The Keyboard Configuration screen appears. It lets you choose from about 55 different keyboard styles.

7. **Choose your keyboard type and then click Next.**

   Next, Fedora warns you that it is about to wipe out any existing data on your hard disk.

8. **Click Yes.**

   The screen shown in Figure 1-5 is displayed.

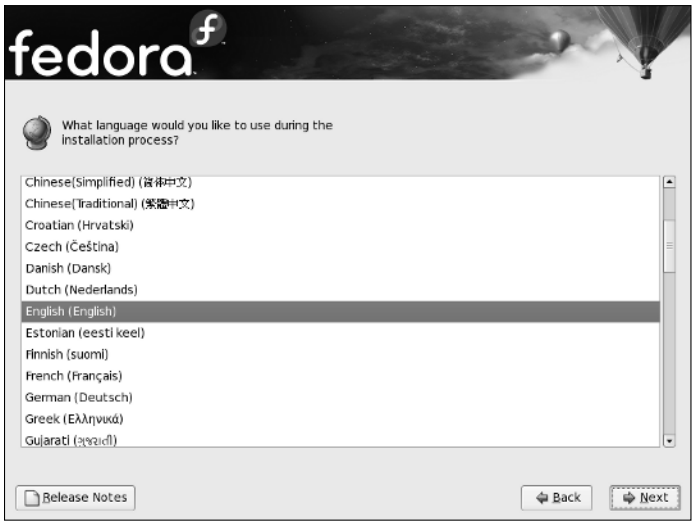

Figure 1-4: Choosing a language.

Figure 1-5: Partitioning the disk.

Virtual consoles and the installation program

Linux is inherently a command line oriented operating system. Graphical user interfaces — including the installation program's GUI — are provided by an optional component called *X Window System*. However, while you're working with the graphical user interface of the installation program, Linux keeps several additional command line consoles open. Normally, you don't need to use every one of these consoles during installation. However, if something goes wrong during installation, these consoles may be useful.

The following list describes the consoles:

- **Console 1: The Installation dialog box.** This is the main installation console. You see it when Setup first starts. After the graphical user interface takes over, it's hidden in the background. You can call it up by pressing Ctrl+Alt+F1.
- **Console 2: Shell prompt.** This console provides you with a shell prompt, from which you can enter Linux commands. If you need to do something manually during installation, you can do it from this console. The keyboard shortcut is Ctrl+Alt+F2.
- **Console 3: Install log.** This console lists messages generated by the installation program. You can get to it by pressing Ctrl+Alt+F3.
- **Console 4: System log.** This console displays system-related messages. You can get to it by pressing Ctrl+Alt+F4.
- **Console 5: Other messages.** Still more messages may appear in this console, which you can open by pressing Ctrl+Alt+F5.
- **Console 6: X graphical display.** This is the console where the graphical user interface of the installation program is displayed. If you use a Ctrl+Alt keyboard combination to view any of the other logs, press Ctrl+Alt+F7 to return to the installation GUI.

9. **Click Next. Then, when asked if you are sure, click Yes.**

   Now the Network Configuration screen appears, as shown in Figure 1-6. This screen lists each network adapter detected in the server along with the adapter's configuration information. By default, the installation program assumes that this server will use DHCP to obtain its configuration information. If that's the case, skip ahead to Step 15.

10. **Click the Edit button and manually configure the network information, and then click OK.**

    When you click the Edit button, the dialog box shown in Figure 1-7 appears. To use this dialog box to configure the server's network information, first check Manual Configuration. Then, enter the IP address and netmask that you want to use for the server and click OK. When you're returned to the Network Configuration screen, you need to enter the following information:

- **Host name:** Enter the host name to use for the computer.
- **Gateway:** Type the IP address of the router that you connect to for your Internet connection.
- **DNS servers:** Enter up to three IP addresses for your DNS servers.

Figure 1-6: Network options.

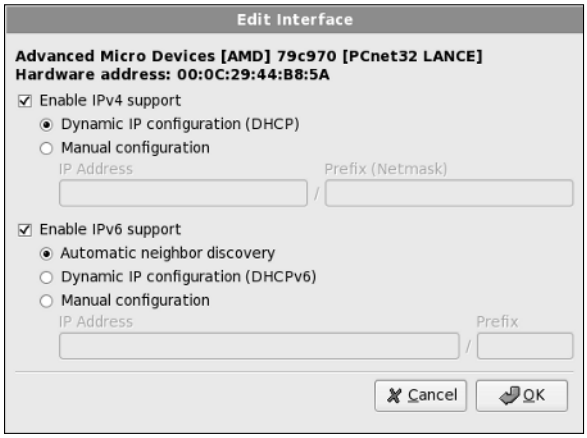

Figure 1-7: The Edit Interface dialog box.

11. Click Next.

The Time Zone Selection screen appears, as shown in Figure 1-8. On this screen is a map of the world with dots representing about 500 different locations throughout the world.

12. Click the location that's closest to you and then click Next.

Next, the Set Root Password screen appears, as shown in Figure 1-9. This screen lets you enter the all-important root account password. It's vital that this account be protected by a strong password, so choose a good one. Write down the password somewhere and store it in a secure location away from the computer.

Figure 1-8: Choose a time zone.

Figure 1-9: Setting the root password.

Don't lose the root password! If you do, you'll be in a world of hurt.

13. **Type the root account password twice, and then click Next.**

    Next, the installation program displays the screen shown in Figure 1-10, which lets you choose the optional features you want to install.

14. **Select the Web Server and Customize Now options, then click Next.**

    The screen shown in Figure 1-11 appears. This screen allows you to further customize the packages to be installed.

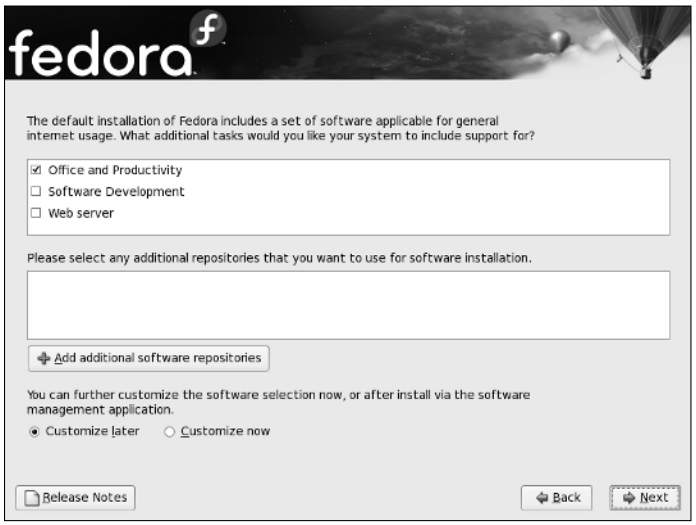

Figure 1-10: Choosing optional features.

Figure 1-11: Selecting additional packages.

15. **Click Servers.**

    The list of optional server packages appears, as shown in Figure 1-12.

16. **Select the server packages you want to install, and then click Next.**

    When you click Next, the installation program does some double-checking to make sure that none of the packages you have chosen depend on other packages you have not chosen. If it finds such a dependency, it adds the dependent package so that your system will function properly.

    Next, the screen shown in Figure 1-13 appears. You have now reached the moment of truth.

Figure 1-12: Selecting optional server packages.

17. **Take a deep breath and click Next.**

    The installation program installs Linux on your system. This will take awhile — maybe a long while — so now would be a good time to grab a book or take a nap.

    When the installation finishes, the screen shown in Figure 1-14 is shown. Pat yourself on the back for your ingenuity and perseverance.

18. **Remove the installation disk from the drive and then click Reboot.**

    The system is rebooted. Installation is done!

Figure 1-13: The Moment of Truth.

Figure 1-14: Congratulations!

Using the Setup Agent

When Fedora restarts the first time after completing the installation program, it launches a handy feature called the *Setup Agent,* as shown in Figure 1-15. (The Setup Agent runs only if you installed a GUI.) The Setup Agent resembles the installation program, but it asks a few questions that the installation program forgot to ask.

Figure 1-15: The Setup Agent.

When the Setup Agent starts, follow these steps to see it through to completion:

1. **On the Welcome screen, click Forward to get started.**

   The Setup Agent displays the License Agreement, as if after going through the previous 18 steps to install Fedora, you're now going to decide you don't agree to their terms. It is useless to resist.

2. **Select the Yes, I Agree Blah Blah Blah option, and then click Forward.**

   The Setup Agent next displays the Firewall options, which let you specify how you want the built-in firewall to be configured. The firewall can be configured to allow or block access to various services, such as FTP or e-mail. See Figure 1-16.

3. **Select the services you want to enable, and then click Forward.**

   The default services are adequate for most users. However, you should peruse this list and enable any additional services you might need.

4. **Click Forward.**

   The Setup Agent now asks you to set the date and time.

5. **Select the correct date and time, and then click Forward.**

   Now the Setup Agent asks if you want to submit details about your hardware configuration as part of an effort to improve Linux's support for various hardware devices.

6. **Click Send Profile or Do Not Send Profile, and then click Forward.**

The Setup Agent asks you to create a user account so that you don't have to access the system by using the root account.

7. **Type a name and password for the user account and then click Finish.**

   You have to type the password twice to verify that you typed it correctly.

That's all there is. Your Linux system is now set up and ready to go.

Figure 1-16: Configuring the firewall.

Installing Additional Packages

No matter how carefully you think things through when you install Linux, you're bound to discover that you wish you had installed some package that you didn't think you'd need. So you're faced with the prospect of figuring out how to install additional packages after you already have Linux up and running.

Fortunately, Fedora includes a package manager called *Pirut* that makes it easy to install additional packages. Just follow these steps:

1. **Choose Applications➪Add/Remove Software.**

   You'll be prompted for the Root account's password.

2. **Enter the Root account's password, then click OK.**

   The Package Manager program comes to life and displays the window shown in Figure 1-17.

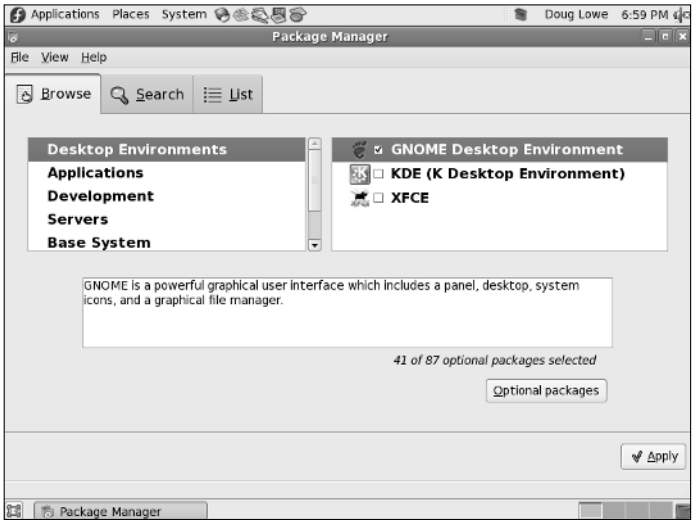

Figure 1-17: The Package Manager.

3. **Select the package or packages you want to add.**

   You can add an entire group of packages, or you can click the Optional Packages button to display a dialog box that lets you add selected packages from a group. Note that most of the groups include some packages that aren't selected by default when you select the group. As a result, you should click Optional Packages to make sure that the specific package in which you're interested is selected.

4. **Click Apply.**

   Be patient while the Package Manager determines which packages need to be upgraded. When it's done, the Package Manager displays a window listing the packages that will be installed.

5. **Click Continue.**

   The packages are installed. If asked, you may need to insert one of the distribution discs.

   When the packages have been installed, the Package Installation Complete page appears, announcing that the packages have been installed successfully.

6. **Click Finish.**

   The Package Manager closes.