



Getting Everything Up and Running

This chapter guides you through setting up all the essential components of your Ubuntu installation. This includes hardware configuration, as well as setting up e-mail. It covers the postinstallation steps necessary to get your system up and running efficiently.

Like all modern Linux distributions, Ubuntu is practically automated when it comes to setting up key hardware and software components. Key software will work from the start, and most hardware will be automatically configured. However, you might need to tweak a few settings to make everything work correctly. Read on to learn more.

Ubuntu Hardware Support

The age-old criticism that the Linux operating system lags behind Windows in terms of hardware support is long dead. The majority of add-ins, such as digital cameras and printers, will all work with Ubuntu immediately, with little, if any, configuration.

In fact, most underlying PC hardware is preconfigured during installation without your knowledge and without requiring further work. Both your graphics and sound cards should work without a hitch, for example. In addition, nearly all USB and FireWire devices you plug in after installation will be supported.

Ubuntu doesn't support a few hardware items. Generally, it's a black or white situation: Ubuntu either works with a piece of hardware or it doesn't.

The types of hardware that Ubuntu doesn't support tend to be esoteric devices that rely on custom software provided by the hardware manufacturer. It's also sometimes the case that brand-new models of hardware won't work with Ubuntu because support has yet to be added. However, as soon as a new piece of hardware comes out, work is usually undertaken to ensure that Linux is made compatible with it. This is especially true of hardware such as printers and scanners, and it's one more reason why you should regularly update your system online, as explained in Chapter 9.

■ **Tip** Before you buy a new piece of hardware, why not ask the salesperson if it runs under Linux? You can only hope that the salesperson knows or can find out for you. Also, compatibility with Linux is often listed on the hardware box or at the manufacturer's web site (even if you sometimes need to search through the FAQ section to find out about it!).

Unfortunately, unlike with Windows, it's rare to find Linux drivers on the CD that comes with the hardware. Even if you do find a Linux driver supplied, chances are that it will work with only certain versions of Linux, such as Red Hat or SUSE Linux. There are also some drivers that are usable but imperfect or lack features that are available in their Windows counterparts. At the time of this writing, Ubuntu has yet to gain the kind of momentum where manufacturers specifically produce drivers for it, but this may change in the future. At least Dell, Everex, Asus, and Shuttle are now bundling Linux with their product offerings. Other OEMs may soon follow suit.

■ **Note** It's possible to use a program called *alien* to convert software installation packages designed for other distributions into Ubuntu installation files. Doing so isn't very complicated but may not work very well with driver files because of the subtle differences in where system files are stored across different Linux distributions. You can find more information about *alien* at <http://kitenet.net/~joey/code/alien/>. It's contained within the Ubuntu software repositories and can be downloaded using the Synaptic Package Manager, as explained Chapter 28.

Proprietary vs. Open-Source Drivers

As discussed earlier in this book, Linux is an open-source operating system. This means that the source code underlying Linux programs is available for study and even reuse. This is a good thing when it comes to hardware drivers, because bugs in the code can be spotted and repaired by anyone with an interest in doing so. If you consider that a bug in a graphics driver could mean your PC crashes every five minutes, the value of such an approach is abundantly clear.

Unfortunately, some hardware manufacturers don't like to disclose how their hardware works, because they want to protect their trade secrets. This makes it impossible for them to release open-source drivers, because such drivers would expose exactly how the hardware operates. Because such companies are aware of the fact that growing numbers of people use Linux, they release *proprietary drivers*, whose source code is not made publicly available.

Aside from ethical issues surrounding not being able to study the source code, the biggest issue with proprietary drivers relates to bug fixing. To use a proprietary driver is to

be at the mercy of the hardware manufacturer's own development and release schedule. If the driver has a serious bug, you'll either have to work around it or put up with troubling issues until the manufacturer offers an update. A few years ago, a proprietary driver for a 3D graphics card stopped any computer it was installed on from going into hibernation mode (that is, suspending to disk). Those using the drivers had to wait months until the fix was released.

Despite this and although the folks behind Ubuntu strongly support open-source software, they realize proprietary drivers need to be used in certain situations. For example, it's impossible to use the 3D graphics elements of some graphics cards unless you have a proprietary driver, and this means that desktop visual effects will be unavailable to users who happen to have hardware that isn't currently fully supported by open-source drivers.

Because of this, Ubuntu automatically installs Wi-Fi proprietary drivers by default if no open-source alternative exists (or if the open-source version is not yet good enough). It also offers the opportunity to easily install some proprietary graphics card drivers if they provide more functionality than the open-source versions.

Note Linux sees hardware in a technical way, rather than in the way humans do. If you attach something like a USB CD-R/RW drive, Linux will recognize the drive hardware and attempt to make it work. It won't try to find a driver for that specific make and model of CD-R/RW drive. Thus, Linux is able to work with a wide range of hardware, because a lot of hardware is actually very similar on a technical level, despite the differences in case design, model names, and even prices!

WHAT HARDWARE WORKS?

The question of what hardware works under Ubuntu is one that's not easily answered. However, you can take a look at <http://wiki.ubuntu.com/HardwareSupport> to see if your hardware is listed. This is an informal list created by the Ubuntu community, and it's not comprehensive (which is to say that there may be hardware that works fine that isn't mentioned). Nor is the list guaranteed to be 100% accurate. But it's certainly worth a look.

A search engine like Google is your best friend if the Ubuntu hardware list doesn't help. Simply search for the brand and model of your hardware and add "Ubuntu" to the search string. This should return results, usually from the Ubuntu forums (<http://ubuntuforums.org>) or blogs, written by those who have found a way to make that type of hardware work.

Installing Device Manager

When using Windows, you might have come across Device Manager, the handy tool that lists your PC's hardware. Ubuntu offers a similar piece of software, as shown in Figure 8-1, but it isn't installed by default.

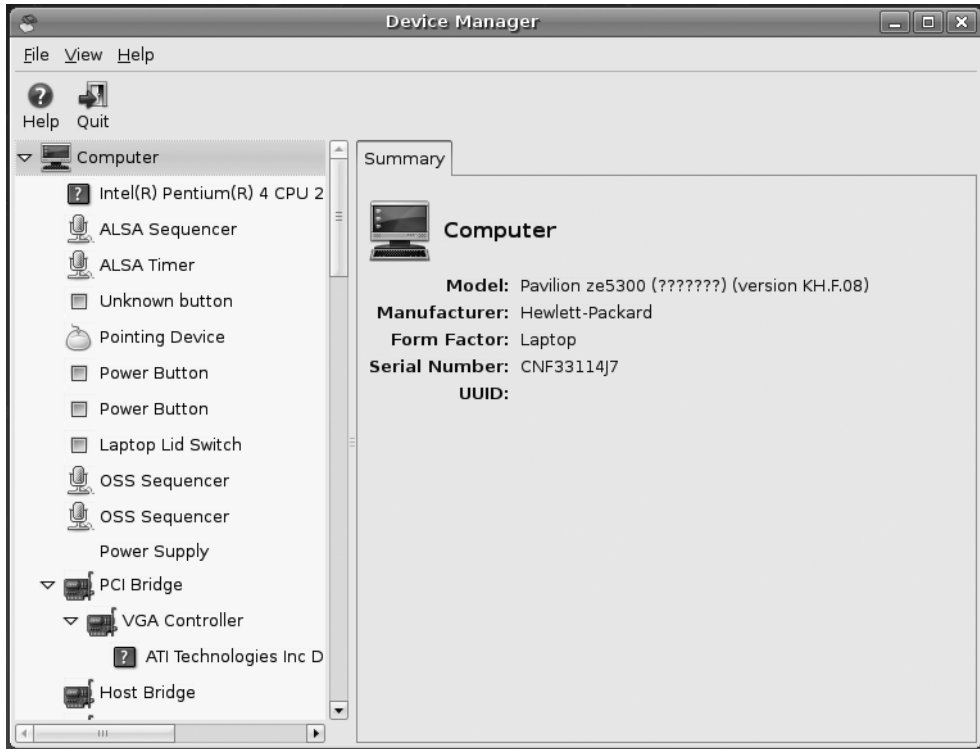


Figure 8-1. *Ubuntu's Device Manager program can display just about everything you need to know about attached hardware.*

After you can connect to the Internet (following the instructions in the “Getting Online” section of this chapter), you can install Device Manager using the Synaptic Package Manager (see the “Installing Software” section of this chapter), as follows:

1. Select System ► Administration ► Synaptic Package Manager.
2. Click the Search button on the toolbar, and then type `gnome-device-manager` in the Search field. Click the Search button.
3. Click the program's entry in the list of results. Select to mark it for installation (don't worry if a dialog box appears telling you additional software needs to be installed).
4. Click Apply on the toolbar.

If your computer is not yet online, you'll need to use a computer that is online (perhaps another computer, or Windows XP if you dual-boot) to download the software, and then copy it across to your Ubuntu computer for installation. To download the software, visit the following two addresses in your browser. You will be prompted to download a file after typing each address:

```
http://us.archive.ubuntu.com/ubuntu/pool/universe/g/gnome-device-manager/  
gnome-device-manager_0.2-1_i386.deb
```

```
http://us.archive.ubuntu.com/ubuntu/pool/universe/g/gnome-device-manager/  
libgnome-device-manager0_0.2-1_i386.deb
```

After the files are downloaded, copy them to the desktop on your Ubuntu machine, using a floppy disk or maybe a USB memory stick. Then open a command-prompt window on the Ubuntu computer by clicking Applications ► Accessories ► Terminal. In the terminal window, type the following, hitting Enter after each line:

```
cd ~/Desktop  
sudo dpkg -i libgnome-device-manager0_0.2-1_i386.deb  
sudo dpkg -i gnome-device-manager_0.2-1_i386.deb
```

After you've installed Device Manager, you can open it by selecting Applications ► System Tools ► Device Manager. You'll need to click View ► Device Properties to ensure Device Manager adds the useful Properties tab.

You should be aware of a few important differences between the Windows and Ubuntu versions of Device Manager. Though the aim of Ubuntu's Device Manager is to manage hardware devices, the project is still in its infancy and can only provide hardware information as of the time of writing. On the other hand, Ubuntu's list is far more comprehensive than that in Windows. In Ubuntu, Device Manager thoroughly probes the hardware to discover its capabilities.

Perhaps the biggest difference, however, is that just because a piece of hardware is listed within Ubuntu's Device Manager, it doesn't mean that the hardware is configured to work with Ubuntu. In fact, it doesn't even imply that the hardware will *ever* work under Ubuntu. Device Manager's list is simply the result of probing devices attached to the various system buses (PCI, AGP, USB, and so on) and reporting the data.

Nonetheless, Device Manager is the best starting place if you find that a certain piece of hardware isn't working. If a piece of hardware is listed, then it proves, if nothing else, that the system recognizes that the hardware is attached. For example, later in this chapter, I'll describe how you can use Device Manager to discover crucial details about wireless network devices, which we will then use to install drivers.

How to Configure Ubuntu

Unlike some versions of Linux, Ubuntu doesn't rely on a centralized configuration software package. Instead it uses smaller programs to configure hardware. For example, to configure the network, you'll use the NetworkManager program, and printers are configured using a separate printer configuration program. Because using some of the configuration software involves reconfiguring your entire system, doing so requires administrator privileges. Therefore, you'll be prompted for your login password each time you use some of

the programs. In some cases, after you've made changes, you'll need to click the Apply button to put the changes into effect. When you've finished configuration, simply close the program window by clicking the Close button.

Note For five minutes after you enter your password, Ubuntu remembers it, so if you open the same application or another that requires administrator privileges within that amount of time, you won't be prompted.

Along with the individual configuration programs, you may also need to use the command line and install software to get your system up and running. We'll take a quick look at how you can do both, before proceeding with the instructions for getting online.

Using the Command Line

For some configuration steps, we will ask you to open a terminal window. This will give you access to the command-line prompt, by which you can issue commands directly to Ubuntu. The Linux command-line prompt is a little like MS-DOS, which you might have used in the early days of Windows, except it's a lot more powerful. As with DOS, you should press Enter after typing each command. Nearly all the commands affect your system, so they will require you to enter your password when prompted.

We explain all about the command-line prompt in Part 4 of this book, beginning with Chapter 13, but for the moment, you should bear in mind the following points:

- Check the command once you've typed it to ensure it reads as is printed on the page. Even a stray space in the command could cause havoc.
- Don't be tempted to experiment at the prompt at this stage of your Linux learning curve. This is especially true should you use administrator powers, which you'll be doing for nearly all the commands.

To open a terminal window, click Applications ► Accessories ► Terminal. After you've finished entering the commands and they have completed, simply close the program window.

Installing Software

Throughout this chapter and in other chapters in this book, we might ask that you install software packages using Ubuntu's software configuration tool, the Synaptic Package Manager. Some software packages might be installed from the DVD-ROM disc, so you'll need to keep that handy, but the majority will be automatically downloaded from online repositories once you've configured your computer to go online.

We explain all about software installation in Chapter 28 of this book, but here's a brief primer on what to do:

- To open the Synaptic Package Manager, click System ► Administration ► Synaptic Package Manager. Because you're reconfiguring your system, you'll need to enter your login password when prompted.
- Every time you use the Synaptic Package Manager, you should click the Reload button, at the left side of the toolbar running across the top of the screen. This will grab the most up-to-date list of software from the online servers.
- To search for software, click the Search button on the toolbar, and type the name into the Search field of the dialog box. Then click the dialog box's Search button.
- To install a software package, click the check box alongside it in the list of results, and click Mark for Installation on the menu that pops up. Sometimes you might be informed that extra software packages need to be installed. This is fine, and they will automatically be added to the list.
- When you've finished making your choices, click the Apply button on the main toolbar. Click Apply once more in the dialog box that appears to confirm your choices.
- When installation has finished, click the Close button in the dialog box, and close the Synaptic Package Manager.

GETTING HELP FROM THE COMMUNITY

Configuring hardware is one area where the value of the Ubuntu community becomes very apparent. If you run into a problem, it's unlikely your situation will be unique. Others will probably have encountered the same problem and may have figured out a solution. If so, they may have posted it online. If nothing else, you might find sufficient clues to be able to solve the problem by yourself. Sharing information in this way is part of the spirit of Ubuntu and also Linux.

We've tried to provide complete guides to most hardware configuration in this chapter, but if you run into problems, your first port of call should be the Ubuntu forums, at www.ubuntuforums.org. This is the central meeting place for the Ubuntu community. You can search through existing forum postings or start your own thread asking for help. We explain a little more about the protocols of asking for help in Appendix C of this book.

Also worth visiting in times of trouble is the community-written wiki, which can be found at <https://help.ubuntu.com/community>. Here, you'll find a range of guides to help configure various aspects of Ubuntu. A *wiki* is a form of web site that anyone can edit or contribute to. The idea is that it's constructed by its readers.

We also recommend taking a look at the Ubuntu Guide, at <http://ubuntuguide.org>, which is also community-written. The Ubuntu Guide can be very concise, and often expects a relatively high degree of technical knowledge, but it is also very comprehensive.

Finally, don't forget that you're a member of the community, too. If you encounter and subsequently solve a configuration problem, share the solution with others. You can do this by editing the Ubuntu wiki or posting to the forums.

Getting Online

Getting online is vital in our modern Internet age, and Ubuntu caters to all the standard ways of doing so. Linux was built from the ground up to be an online operating system and is based on Unix, which pioneered the concept of networking computers together to share data back in the 1970s. However, none of this is to say that getting online with Ubuntu is difficult! In fact, it's very easy.

Regardless of whether you use a modem, standard Ethernet network device, or wireless network device, the same program, NetworkManager, is used to configure your network settings under Ubuntu. Support for many makes and models of equipment is built in, so in most cases, all you need to do is enter a few configuration details.

Note Linux actually runs around 60% of the computers that make the Internet work! Whenever you visit a web site, there's a strong chance that it's run using Linux. As your Linux skills increase, you'll eventually get to a stage where you, too, can run your own Internet servers. It sounds difficult, but can be quite easy.

Using NetworkManager

NetworkManager lets users easily manage both wireless (also known as Wi-Fi) and wired connections, such as Ethernet connections. It sits in the notification area at the top right of the desktop (look for the icon of two screens inset against each other) and automatically detects any wireless networks that are in range, as well as if you're currently plugged into a wired network.

Clicking the NetworkManager icon will show a list of networks that have been detected. By selecting the entry in the list, you can then connect to the network, and you'll be prompted to configure WEP/WPA protection, if applicable.

Caution On our test system, which attempted to connect to a 3Com ADSL Wireless 11g Firewall Router, we were prompted for the *wrong kind* of wireless protection (we were asked for a 128-bit WEP key rather than a 64-bit key). In other words, it pays to check that you're being prompted for the right thing, and to select the correct option if you're not. Failure to do so might result in frustration!

Following this, the NetworkManager icon will display the signal strength of the connection for as long as you're connected. By clicking it, you'll be able to see at a glance what network you're connected to. If you want to switch networks, just click the NetworkManager icon and select a different network in the list.

Tip By right-clicking the NetworkManager icon, you can opt to completely disable your network hardware if you wish.

NetworkManager settings persist across reboots, provided the network that was last configured is in range. This means that NetworkManager is ideal for all kinds of wireless network users, from those who frequently switch between different networks (that is, mobile workers) to those who just use a single wireless network connection, such as that provided by a wireless network broadband router in a home/small office environment. NetworkManager will also let you switch to a wired (Ethernet) connection, if and when you attach one to your computer.

NetworkManager works in two modes: roaming and manual. Roaming mode is the default and works as we've just described: NetworkManager will automatically detect networks and the type of connection. In manual mode, you can opt to manually supply details, such as the IP address and gateway, or the name of the wireless base station, which might be necessary if your base station doesn't broadcast its name or if you need to connect to a specialized setup. However, for most users, roaming mode will suffice, and you won't need to bother with manual mode.

Configuring an Ethernet Network Device

Ethernet is one of the oldest and most established network technologies. When we talk of Ethernet, we refer to wired networks—all the computers on the network are connected by cabling to a central hub or router. (The other form of networking technology, which works without wires, is covered in the next section.)

You might go online via Ethernet in a variety of situations. If you have DSL or cable broadband service at your home or workplace, for example, you might use a DSL router that has a number of Ethernet ports. Your computer will then connect to this router via an Ethernet cable.

If you're running Ubuntu on a PC in an office environment, it's likely that you will connect to the local area network using Ethernet. This lets your computer communicate with other computers, as well as with shared printers. In some offices in which an Internet connection is provided, this connection might also allow you to go online.

In most cases, NetworkManager's roaming mode will sense a wired Ethernet connection and automatically connect using the Dynamic Host Control Protocol (DHCP). This means that your computer receives its IP address, gateway, subnet mask, and Domain Name System (DNS) addresses automatically. All routers manufactured today are set up to automatically use DHCP out of the box.

Tip If a DHCP server is not available, Ubuntu will attempt to set up a network automatically using the Zeroconf (or Zero Configuration Networking) system, just like Microsoft Windows systems. (Microsoft refers to this as Automatic Private IP Addressing, but it's also known as *link-local*.) In other words, if a bunch of computers plug into a hub or router on an ad hoc basis, without being configured and without a DHCP server operating, they will be able to network with each other. To make this work, each computer randomly assigns itself a unique IP address that starts with 169.254 with a subnet mask of 255.255.0.0.

If you need to manually specify network details such as IP and router addresses, perhaps because you work in an office environment with nonstandard systems, start by speaking to your system administrator or technical support person to determine the settings you need. Ask the administrator for your IP address, DNS server addresses (there are usually two or three of these), your subnet mask, and the router address (sometimes referred to as the gateway address). The settings you will get from your system administrator will usually be in the form of a series of four numbers separated by dots, something like 192.168.0.233. After you have this information, follow these steps:

1. Click the NetworkManager icon in the notification area, and then select Manual Configuration.
2. Click the Unlock button in the dialog box that appears. Supply your password when prompted, and then click the Authenticate button.

3. Find your network device in the list. It should be referred to as Wired Connection. Click its entry, and then click Properties.
4. In the dialog box that appears, uncheck the Enable Roaming Mode check box. This overrides NetworkManager's capability to automatically manage the device and allows you to manually configure the device. In the Configuration drop-down list, make sure Static IP Address is highlighted. In the IP Address, Subnet Mask, and Gateway Address text boxes, fill in the relevant details. Figure 8-2 shows an example of these settings. Click OK after filling in the information.

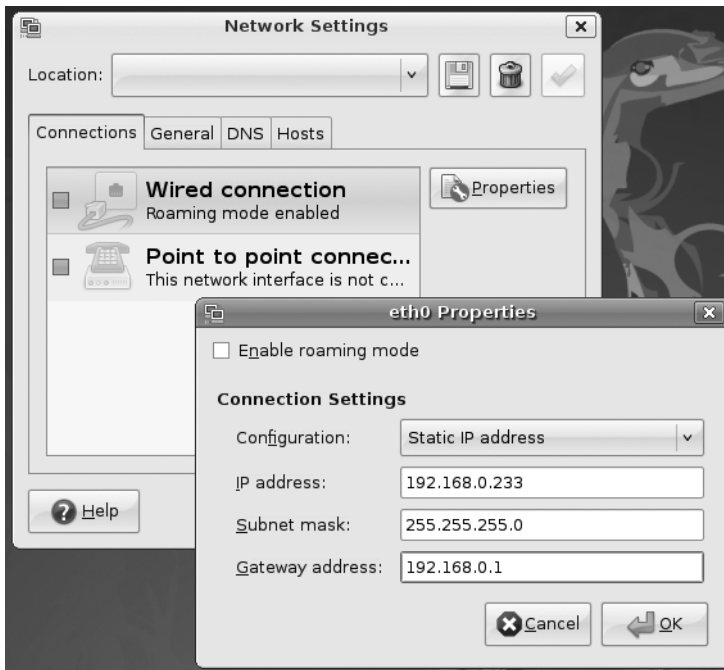


Figure 8-2. *Ubuntu will automatically work with DHCP networks, or you can define a static IP address.*

5. Click the DNS tab in the Network Settings dialog box.
6. Click the Add button, and then type the first DNS address. Press Enter when you've finished. Click Add again, and enter the second DNS address, if you have been given one, and then enter a third if you were given one.

Tip If you're using a static IP address with a router, such as that provided by a DSL modem, the DNS address will probably be the same as the router/gateway address.

7. Click the Close button.

Your network connection should now work. If you find it isn't working, try rebooting. However, if your system administrator mentioned that a proxy must also be configured, you'll also need to follow the instructions in the "Working with a Proxy Server" section later in this chapter.

Connecting to a Wireless Network

A wireless (Wi-Fi) network is, as its name suggests, a network that does away with cabling and uses radio frequencies to communicate. It's more common for notebooks and hand-held computers to use wireless connections, but some desktop computers also do. Indeed, it's increasingly the case that many workplaces are switching to wireless networking, eschewing old-fashioned, cable-based networking.

Note Slowly but surely, Wi-Fi is replacing wired Ethernet networks, but there are many situations in which Wi-Fi networks are impractical or simply undesirable. For example, the metal infrastructure in some buildings means the signal becomes unreliable. Wi-Fi is also considered too insecure for some companies. The Wi-Fi signal often spreads to the street outside the building. Although such transmissions are nearly always secured, Wi-Fi security implementations have been broken, although WPA2 is considered secure right now. Ethernet might be considered old technology, but trying to steal data from physical cables is an order of magnitude more difficult, to the point of being practically impossible.

Notebooks and PDAs typically use built-in wireless network devices, with an invisible antenna built into the case. However, some notebooks might use PCMCIA cards, which will have an external square antenna, and some desktop computers might use PCI-based wireless cards, which have external rubber/plastic antennas, in the style of old cell phones.

Ubuntu includes support for most wireless network devices. However, it's possible to use Windows wireless network device drivers for unsupported hardware. Also, sometimes Ubuntu appears to support a wireless network device, in that it identifies it and lets you configure it, but you might find that it simply doesn't work (or works very badly, perhaps with an intermittent connection). In this situation, you can also try installing Windows drivers. See the "Installing Windows Wireless Network Device Drivers" section later in this chapter for details.

Note Ubuntu is rare in the Linux world in that it uses some proprietary (closed source) wireless device drivers by default. Ubuntu is, after all, an open-source operating system and is committed to the goals of open-source software. The use of proprietary drivers is a necessary evil because not all devices have open-source drivers right now, and not all open-source drivers support all the functions you might be used to (typically they might not support the WPA functionality of your Wi-Fi device, for example). The use of proprietary drivers is only a stopgap measure, and it's hoped that open-source driver development will catch up, making proprietary drivers redundant.

Connecting to a wireless network device is easy with NetworkManager. Just click the NetworkManager icon, and you will see the available Wi-Fi networks in the Wireless Network list. Networks protected with WEP/WPA will have an icon of a padlock. Those that are “open” will not have this icon.

You might see many Wi-Fi networks listed, depending on your location. The wireless base stations are identified by their Service Set Identifier (SSID) or sometimes ESSID, with *E* standing for Extended.

If the SSID you would like to connect to is not listed by NetworkManager, it could mean that your wireless base station isn't set to broadcast its SSID or, worse, Ubuntu's Wi-Fi drivers aren't functioning correctly. If it's the former, all you need to do is right-click the NetworkManager icon and select Connect to Other Wireless Network. Then, in the new dialog box, type the SSID under Network Name, set Wireless Security to none or the appropriate security type, fill in the other information depending on the type of wireless security you selected, and click Connect. If it's the latter, you may need to use a Windows driver, as described in the next section.

Tip If you are not offered any wireless networks at all, ensure the wireless hardware is switched on. Some notebooks have a keyboard combination to turn it off to save battery power. Additionally, try right-clicking the NetworkManager icon and ensuring that the wireless networking hardware is activated.

To connect to a Wi-Fi network, select the wireless base station you wish to connect to in the list. If it isn't protected by WEP/WPA, you will be connected to it automatically.

If the Wi-Fi network you wish to connect to is protected with WEP or WPA, a dialog box will appear, prompting you for the password/passphrase, as shown in Figure 8-3. In the Wireless Security field, make sure the correct type of security for the wireless network is selected—don't assume it's automatically correct! By default, the password/passphrase is obfuscated by circle characters so that anyone looking over your shoulder can't see what you're typing. If it helps (and if your shoulder is clear!), check the Show Password box. This can really handy when you're typing a particularly long passphrase.

Note WEP keys come in either hexadecimal (hex) or plain text (passphrase) varieties. Hex keys look similar to this in their 128-bit form: CB4C4189B1861E19BC9A9BDA59. In their 64-bit form, they will be shorter and may look similar to 4D9ED51E23. A passphrase will take the form of a single short sentence. In home and office environments, WPA networks are usually protected with passphrases. In larger corporate or academic environments, you might find the network is protected with a WPA certificate.

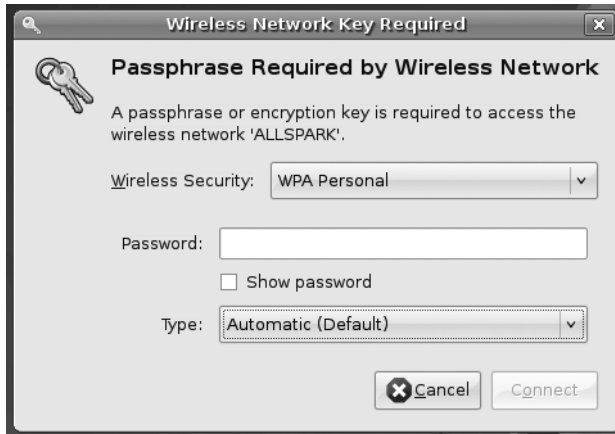


Figure 8-3. *Ubuntu is able to join WPA-protected wireless networks.*

When you're finished, click the Connect button. You should see the NetworkManager icon start to animate as the program attempts to connect and find an IP address. After a few seconds, when the animation finishes and the icon switches to display signal bars, you should find yourself online.

If your computer doesn't seem to connect, try rebooting. If the hardware doesn't work after this, it might be that the drivers Ubuntu installed by default are incompatible with your network device. In this case, you can try using a Windows wireless network device driver, as described in the next section.

Should you find yourself in the unusual situation of needing to specify the IP address, subnet mask, and gateway for a wireless connection, you can do so using the manual configuration mode of NetworkManager, as outlined in the "Configuring an Ethernet Network Device" section earlier in this chapter. Simply follow the instructions in that section, but select the Wireless Connection entry in the list, rather than Wired Connection. In the dialog box that appears, you'll see additional areas where you can enter your SSID and WEP/WPA protection details.

WEP VS. WPA

Some wireless networks are protected using either the Wired Equivalency Privacy (WEP) or Wi-Fi Protected Access (WPA) systems. WPA is effectively an updated version of WEP and offers stronger protection. There are actually two versions of WPA: WPA and WPA2. WPA2 is newer and corrected several security flaws in WPA. Both work in roughly the same way.

WEP and WPA encrypt the data being transmitted on the network, the idea being that it cannot be stolen by crackers with special equipment. Also, people can't join the wireless network unless they know the encryption key, which is basically an access code. This prevents unauthorized people from accessing the network.

Of the two, you should ideally configure your Wi-Fi base station to use WPA, because, sadly, WEP can be compromised within five minutes using easily available software. However, the situation isn't quite so clear-cut for some Ubuntu users. Not all of Ubuntu's built-in Wi-Fi drivers support WPA. Some might claim to support it, but you might find they don't work reliably. Unfortunately, the only way you will be able to find out if this is the case for you is to try to configure your network device and see what happens.

If you fall into the camp of not having good WPA support on your Ubuntu PC (and only a small percentage of users will), you might find WEP is your only reliable option, and you might therefore need to reconfigure your base station to use it. Our experience has shown that WEP has a very high success rate under Ubuntu. However, sometimes 128-bit WEP won't work on some troublesome Wi-Fi devices, and you might need to switch your network to 64-bit WEP instead.

WEP is a compromise in security terms, but try to remain realistic when considering your immediate environment. If your wireless network is within your home, is it likely that the couple living next door will have the know-how to crack a wireless network connection? Are they likely to want to do so?

On the other hand, if you live in an apartment block with several other computer-literate people, or if you work in an office, the risk might be considerably higher. Some people suggest that breaking into wireless networks is almost a sport for certain individuals. If this is the case, and you feel you simply can't use WEP, consider installing Windows drivers using NdisWrapper, as explained in this chapter.

But whatever the case, bear in mind that confidential Internet connections, such as those for banking and shopping sites, are independently protected using a separate technology. See the sidebar titled "Secure Connections on the Net" later in this chapter for details.

Installing Windows Wireless Network Device Drivers

NdisWrapper is effectively an open-source driver (technically described as a *kernel module*) that allows Linux to use standard Windows XP drivers for wireless network devices. You might describe NdisWrapper as being a translation layer between the Linux kernel and the Windows drivers, which can be installed using NdisWrapper's configuration tools.

You should only use NdisWrapper in one of two situations:

- Your wireless network hardware simply isn't recognized by Ubuntu, which is to say, all you see when you click the NetworkManager icon is a Manual Configuration option; you don't see any wireless networks listed. Of course, you should first ensure that the wireless hardware in your computer is actually switched on—some notebooks offer the facility to deactivate it to save battery life.
- Your network hardware is recognized by Ubuntu but fails to work correctly or adequately when you configure it. Perhaps it is unable to associate with wireless base stations, for example, or maybe you can't connect to WPA-enabled base stations and consider WEP too insecure for your surroundings. If this is the case, in addition to installing NdisWrapper, you'll need to undertake an additional step in order to blacklist the existing Ubuntu driver.

Using NdisWrapper is relatively simple and just a handful of commands are required. However, getting hold of the necessary Windows driver files is harder work because, unfortunately, NdisWrapper isn't designed to work with the usual method of driver distribution: .exe files. Instead, NdisWrapper needs the specific .inf and .sys files that constitute the driver—effectively, the Windows system files. These are contained within the .exe file and must be manually extracted.

Note Sometimes drivers are distributed as .zip files, in which case the relevant files are easy to get at. Keep your fingers crossed that this will be the case for your particular hardware!

NdisWrapper is far from perfect. Not all wireless devices have been proven to work with it, and it's not necessarily the case that a driver available for Windows will work under Linux. Sometimes trial and error is required. Annoyingly, Windows drivers sometimes appear to work but then prove unreliable. Some might stop working. Some might even crash your system. The best plan is simply to give it a try.

Tip NdisWrapper gets better and better with every new release. This is why it's a good idea to update your system on a regular basis, as described in Chapter 9.

In the instructions in this section, we explain how to make an Atheros AR5008 wireless network device that's built into an Apple MacBook work under Ubuntu using NdisWrapper. The instructions remain essentially the same for all types of wireless network hardware. However, some specific details, such as download addresses, will obviously differ.

First, you'll need to install the NdisWrapper software, and then you can install the necessary Windows drivers. These steps will make your wireless network device available under Ubuntu. Then you can follow the instructions in the previous section to connect to that wireless network.

Installing the NdisWrapper Configuration Tools

NdisWrapper consists of two components: a kernel module and configuration tools. The kernel module comes as part of the default kernel package, so is installed by default, but you will need to download and install the configuration tools manually. To do so, using another computer that is already online (or by switching to Windows XP if you dual-boot), visit the following addresses using a web browser:

```
http://us.archive.ubuntu.com/ubuntu/pool/main/n/ndiswrapper/  
ndiswrapper-utils-1.9_1.50-1ubuntu1_i386.deb
```

```
http://us.archive.ubuntu.com/ubuntu/pool/main/n/ndiswrapper/  
ndiswrapper-common_1.50-1ubuntu1_all.deb
```

```
http://us.archive.ubuntu.com/ubuntu/pool/main/n/ndisgtk/ndisgtk_0.8.3-1_i386.deb
```

You'll be prompted to download these files. Save the files to a floppy disk or USB memory stick, or burn them to a blank CD-R/RW disk. Then, on the Ubuntu computer, copy the downloaded files to the desktop.

Next, open a terminal window (Applications ► Accessories ► Terminal), and type the following, which will install the new software:

```
cd ~/Desktop  
sudo dpkg -i ndis*
```

You'll need to enter your password when prompted. When the commands have finished, and you see the command prompt again, close the terminal window.

Installing the Windows XP Drivers

Once the NdisWrapper configuration software is installed, you can install the Windows XP wireless network device drivers. There are several parts to the procedure:

- Identify the wireless network hardware, and then source the appropriate Windows driver.
- Extract the necessary .sys and .inf files from the driver archive (and possibly .bin files, although this is rare).
- You may need to blacklist the built-in Ubuntu driver, so that NdisWrapper can associate with the hardware.
- Use the NdisWrapper configuration tool to install the Windows driver.

These steps are covered in the following sections. You will need another computer that's already online to download some files and check the NdisWrapper web site for information. If your computer dual-boots, you can use your Windows setup to do this.

Identifying Your Wireless Network Hardware and Sourcing Drivers

To identify the wireless network hardware for use with NdisWrapper, it's necessary to discover two pieces of information: the make and model of the hardware and the PCI ID number. The former is the make and model of the hardware, as identified by Ubuntu as a result of system probing, rather than what's quoted on the packaging for the wireless network device or in its documentation. These details discovered by Ubuntu will usually relate to the manufacturer of the underlying components, rather than the company that manufactured the hardware. The PCI ID is two four-digit hexadecimal numbers used by your computer to identify the device internally. The same PCI ID numbering system is used by both Windows and Ubuntu, which is why it's so useful in this instance.

You can find both the PCI ID and the make/model information using the Device Manager tool. Follow the instructions in the "Installing Device Manager" section earlier in this chapter if you haven't already installed this program. Then follow these steps:

1. Select Applications ► System Tools ► Device Manager. In the left column, find the entry that reads Network Controller, Networking Wireless Control Interface, or WLAN Interface. You might also look for USB Interface, PCI Bridge, or 802.11 to exhaust your search. Then look at the corresponding summary in the right column, where you'll find the make and model of the hardware listed under the Vendor and Model headings. If no useful details are listed, you might need to click the parent entry in the list. On one test system, we found the WLAN Interface entry, but saw the make and model details only after we clicked the Ethernet Controller parent entry in the list on the left.
2. Write down the make and model shown in Device Manager. For example, on a test notebook containing an Atheros wireless network device, the make and model read "AR5418 802.11abgn Wireless PCI Express Adapter." Remember that these details don't relate to those listed in the instruction manual or computer packaging (our notebook's specification lists the hardware simply as "Built-in AirPort Extreme Wi-Fi"). This is because Ubuntu is identifying the hardware generically, reading information from its component hardware.
3. Click the Properties tab of Device Manager (if this isn't visible, click View ► Device Properties) and look through the information there for a line that begins `info.udi`. Look at the end of the line, and make a note of the two sets of characters that are separated by an underscore and preceded by `pci_`. Look at Figure 8-4 for an example taken from our test machine. Yours may differ, but the line should always end with `pci_` and then the digits. If it doesn't, you have selected the wrong entry in the list of devices on the left. Try examining a different entry, such as the parent of the entry in the list.

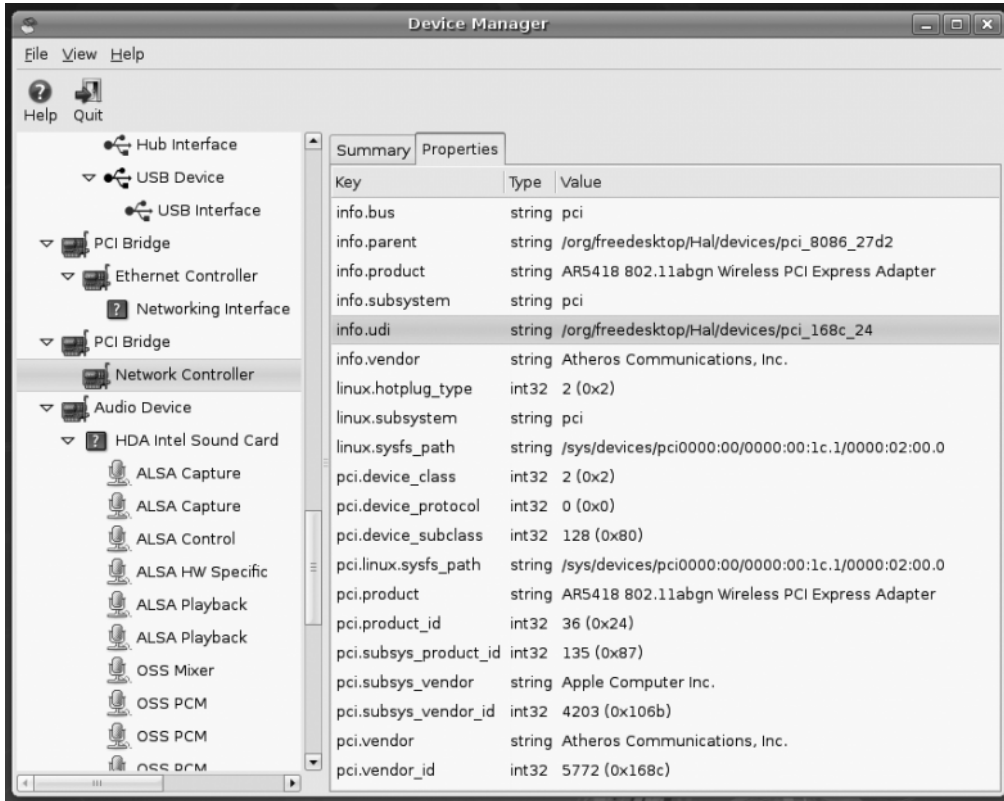


Figure 8-4. Find the PCI ID of your wireless network hardware by looking at the end of the `info.udi` line.

- Write down the characters following `pci_` at the end of the `info.udi` line. Written alongside each other, the two sets of digits that are separated by an underscore form the all-important *PCI ID number*. In written form, they're usually separated by a colon. If either of the sets of letters or numbers is less than four characters long, simply add zeros before them in order to make four characters. For example, in Figure 8-4, the end of the `info.udi` line reads `168c_24`. We add two zeros before 24, making a complete PCI ID of `168c:0024`. On another test PC, the end of the line read `168c_13`. Adding two zeros before the 13 gives a PCI ID of `168c:0013`.
- Using another computer that's able to go online, visit <http://ndiswrapper.sourceforge.net/>. On the main menu, click Documents/Wiki, and then click the List of Cards Known to Work link. This is a community-generated listing of the wireless network devices that have been proven to work with NdisWrapper.

Tip The URL in step 5 was correct as this book went to press. If you find it no longer accurate, search Google using “NdisWrapper list” as a search term.

6. The “known to work” cards are grouped in alphabetical order. Select the appropriate list based on the card manufacturer’s name. (Remember to use the name you discovered using Device Manager in steps 1 and 2, and *not* the official name in the computer’s manual or packaging.)
7. Using the search function of your browser (Ctrl+F within Firefox), look for the PCI ID number you noted earlier, in the format described in step 4. For the example in Figure 8-4, we would search for 168c:0024. In the list, look to match the following things, presented in order of importance:
 - The PCI ID
 - The model name of the wireless hardware, as reported by Device Manager (listed on the Summary tab)
 - The manufacturer and model of the notebook, as mentioned on its case or within its documentation

It’s likely many entries in the list may match your PCI ID, so search until you find the one that best matches the model of the hardware. If there are *still* many matches, search until you find an entry that matches the manufacturer and model of the notebook. You might not be lucky enough to find an exact match for the notebook manufacturer and model, however, and you might need to select the most likely choice. Use your common sense and judgment. If your notebook is manufactured by Asus, for example, but you can’t find the drivers for the exact model, then choose drivers for another Asus model.

Caution Watch out for any mention of x86_64 in the description of the driver file. This indicates the entry in the list relates to 64-bit Linux. The version of Ubuntu supplied with this book is 32-bit. If you encounter an entry relating to x86_64, keep searching.

8. Look within the entry in the list for a direct link to the driver file. Sometimes this isn’t given, and a manufacturer web site address will be mentioned, which you can visit and navigate through to the driver download section (usually under the Support section within the web site). Download the Windows XP driver release.

Extracting the Driver Components

Once the drivers are downloaded, you'll need to extract the .sys and .inf file relevant to your wireless network hardware. These are all that NdisWrapper needs, and the rest of the driver files can be discarded. However, extracting the files can be hard to do, because often they're contained within an .exe file. (Most driver .exe files are actually self-extracting archive files.) Additionally, the driver file might contain drivers for several different models of hardware, and it's necessary to identify the particular driver .inf file relevant to your wireless network device.

If the driver you've downloaded is a .zip file, then your task will probably be much easier. Simply double-click the downloaded .zip file to look within it for the directory containing the actual driver files.

If the driver is an .exe file, it's necessary to extract the files within it. With any luck you might be able to do this using an archive tool like WinZip (www.winzip.com), assuming that you've downloaded the file using Windows. Simply open the archive using the File ► Open menu option within WinZip. You may have to select All Files from the File Type drop-down list in order for the .exe file to show up in the file list. However, if you're using Windows, we recommend an open-source and free of charge program called Universal Extractor, which can be downloaded from www.legroom.net/software/unixextract. This program can extract files from virtually every kind of archive, including most driver installation files. Once it is installed, simply right-click the installation .exe file, and select UniExtract to Subdir. This will then create a new folder in the same directory as the downloaded file, containing the contents of the installer file.

Once you've extracted the files within your downloaded driver file, look for the files you need. It's likely those driver files will be contained in a folder called something like Driver or named after the operating system, like Win_XP. Once you've found the relevant directory, look for .inf, .sys, and .bin files (although you may not find any .bin files; they're used in only a handful of drivers). You can ignore any other files, such as .cab and .cat files. Click and drag the .inf, .sys, and .bin files to a separate folder.

The task now is to find the .inf file for your hardware. If there's more than one, you'll need to search each until you find the one you need. You need to look for text that corresponds to the PCI ID you noted earlier. Open the first .inf file in a text editor (double-clicking will do this in Windows), and using the search tool, search for the first part of the PCI ID, as discovered earlier. For the example in Figure 8-4, we would search for 168c. If you don't find it within the file, move on to the next .inf file, and search again. When you get a search match, it will probably be in a long line of text and to the right of the text VEN_. Then look further along that line to see if the second part of the PCI ID is mentioned, probably to the right of text that reads DEV_. In the case of the driver file we downloaded for the example, the entire line within the .inf file read as follows (the two component PCI ID parts are shown in bold):

```
%ATHER.DeviceDesc.0023% = ATHER_DEV_0023.ndi, PCI\VEN_168C&DEV_0024
```

If you find both component parts of the PCI ID in the line, as in this example, then you’ve found the `.inf` file you need. (In fact, you’ll probably find *many* lines matching what you need, which is fine.)

You must now transfer the `.inf` file, along with the `.sys` and `.bin` files (if any `.bin` files were included with the driver) to the computer on which you want to install the drivers. This can be done by putting them onto a floppy disk, by burning them onto CD, or by using a USB memory stick. Create a new directory called `driver` on the desktop and save them there.

Your procedure from this point depends on if Ubuntu recognized your wireless networking device when you first booted but was unable to make it work correctly. If it did then you will need to blacklist the built-in driver, so that `NdisWrapper` can associate with the hardware. If the device wasn’t recognized, you can skip straight to the “Using `NdisWrapper` to Install the Drivers” section.

Blacklisting Existing Drivers

To blacklist the existing built-in driver that didn’t work with your wireless device, you need to find out the name of the kernel module and then add it to the `/etc/modprobe.d/blacklist` file. Here are the steps:

1. Open Device Manager (System ► Administration ► Device Manager), and select the entry in the list for your wireless network device. This is the one you discovered in steps 1 and 2 earlier, in the “Identifying Your Wireless Network Hardware and Sourcing Drivers” section.
2. Click the Properties tab (if this isn’t visible, click View ► Device Properties), and look for the line that begins `info.linux.driver`. Then look in the value column, and make a note of what’s there. For example, on our test notebooks, the value column read `rt2500usb`. Close Device Manager.
3. Open a terminal window (Applications ► Accessories ► Terminal). Type the following to open the `blacklist` configuration file in the Gedit text editor:

```
gksu gedit /etc/modprobe.d/blacklist
```

4. At the bottom of the file, type the following on a new line:

```
blacklist modulename
```

Replace *modulename* with the name of the module you discovered earlier. For example, on our test system, we typed the following (as shown in Figure 8-5):

```
blacklist rt2500usb
```

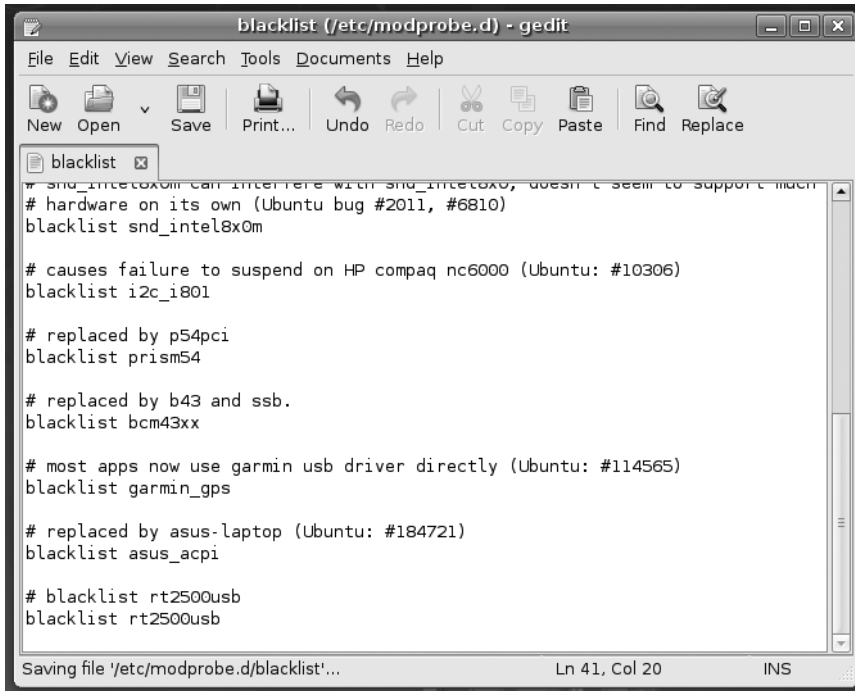


Figure 8-5. To stop Ubuntu from loading its own drivers, you'll need to blacklist the module.

5. Save the file, and then reboot your computer.

You should now find that the wireless network device is no longer visible when you click the NetworkManager icon, and all you see is a Manual Configuration option. This is good, because it means the hardware no longer has a driver attached, and you can now tell NdisWrapper to use the hardware.

Using NdisWrapper to Install the Drivers

On the Ubuntu computer on which you wish to install the drivers, you should now have the .inf file from the previous steps, plus the .sys and possibly .bin files that constitute the driver. You should have copied these files from the removable storage device into a new folder on your desktop named driver.

Note If you've used a USB memory stick to transfer the files, it should appear automatically on the desktop as soon as it's inserted. When you've finished with it, right-click the desktop icon, and select Unmount. You must do this before physically removing any kind of USB memory device, as explained later in this chapter.

To install the driver using NdisWrapper, follow these instructions:

1. Click System ► Administration ► Windows Wireless Drivers. Enter your password when prompted.
2. Click the Install New Driver button.
3. The Install Driver dialog box appears, prompting you to select the .inf file for your wireless device. Click the Location drop-down list to open a file browsing dialog box.
4. Navigate to the .inf file you copied to your system, which you have placed in the driver folder on your desktop. Double-click the desktop folder, and then double-click the driver folder listed in the right column. Select the .inf file you copied in the driver folder and then click the Open button.
5. Back in the Install Driver dialog box, click the Install button.
6. At this point, you should see the driver listed at the left column of the Wireless Network Drivers dialog box. It specifies the name of the driver installed and whether the hardware is installed. If it says the hardware isn't installed, you've probably selected the wrong .inf file, or might be using the wrong driver file. Return to the previous sections and try to get an alternative Windows driver.
7. No reboot is necessary and your wireless network card should work immediately. To test if the driver works, click the NetworkManager icon and see if there are wireless networks listed. If it works, click Close to exit the Wireless Network Drivers dialog box.

Following this, you should find the network device is available for configuration. Follow the earlier instructions for connecting to a wireless network.

Removing NdisWrapper Drivers

As mentioned earlier, although NdisWrapper can solve a lot of headaches with nonworking wireless hardware, it isn't perfect. You might find that the Windows driver you install simply doesn't work. In such a case, you can download a different version of the driver and try again. But first you'll need to remove the existing driver.

Select Click System ► Administration ► Windows Wireless Drivers and enter your password when prompted. In the Windows Network Drivers dialog box, select the driver you want to remove in the left column and click Remove Driver. Click Yes when prompted to confirm the removal. Click Close to exit the tool.

SECURE CONNECTIONS ON THE NET

For home users, the use of online banking services involves the transfer of confidential data. So is this a good reason to use the strongest form of wireless network encryption with your broadband router? No it isn't. In fact, it makes no difference.

This is because the transfer of confidential or financial data across the Web—to and from online banking sites, for example—is nearly always protected by Secure Socket Layer (SSL) HTTP. This works across any type of network connection, including wireless and Ethernet, regardless of whether the connection has its own protection.

You can tell you're browsing a site that's using SSL because the address will begin with `https`. Additionally, most browsers display a padlock symbol at the bottom of the screen (the Firefox browser will also turn the background of the address bar yellow). Accessing such sites should be safe, even if your wireless network connection is "open," which is to say it isn't protected with either WEP or WPA.

Similarly, although online shopping sites might not use SSL while you're browsing, when it's time to pay, they always use SSL. This ensures your credit card details are encrypted. If the store doesn't adopt an `https://` address when you click to visit the virtual checkout, you shouldn't shop there!

So do you even need WEP or WPA protection if you simply use your wireless connection to browse the Internet? Yes. In addition to the risk of unauthorized users hopping onto your connection if it isn't protected, some web mail services transfer your username and password "in the clear," which is to say without using SSL. This means your information could be picked up by an eavesdropper. In the case of Hotmail and Yahoo Mail, you can select secure login, but it isn't activated by default. Google Mail appears to use SSL all the time for login, but after this, your e-mail messages are transmitted across the Internet in the clear and, in theory, anyone, anywhere can eavesdrop.

Using Dial-Up Telephone Modems

In our world of high-speed broadband connections, we sometimes forget that a sizable minority of people use telephone dial-up to connect to an ISP.

For such people, Ubuntu offers good and bad news. The good news is that the Ubuntu software repository includes fuss-free software that can be used to configure connections and dial-up with the click of a mouse. The bad news is that, taken as a whole, Ubuntu support for dial-up modems isn't very strong.

If your modem is external and connects to the serial port, then there's a very good chance Ubuntu will work fine with it. However, if the modem connects to the USB port, is built into your computer, or is provided on a PCMCIA card, then Ubuntu support is less certain. This is because many modems need additional and specialized configuration. See the sidebar titled "Winmodems."

There's no quick way to find out if your modem is supported, other than to follow the instructions in this section and attempt to use it. To follow the instructions, you'll need access to a computer that's already online to download a software package. If you dual-boot with Windows, you can use it to download the software.

To configure your modem once the software is downloaded, you will need three pieces of information: the telephone number you should use to dial up, your username, and your password for your ISP (*not* your Ubuntu login username and password!).

WINMODEMS

Some years ago, hardware manufacturers realized that they could produce dial-up modems more cheaply if they shifted the hard work of decoding the signal onto the computer's operating system. With the work off-loaded, the modem's circuitry could contain fewer and simpler components, thus saving money.

For this to work, a special hardware driver was needed that effectively works as a middleman, handing the decoding work to the computer's CPU. Unlike with other hardware drivers, these modem drivers aren't around simply to make the hardware work with the operating system. Effectively, the drivers for such modems are a separate piece of software within themselves.

Because of their need for this special driver software, which usually runs only on Windows, the modems are known as *winmodems*.

As you might anticipate, using the modems under Linux presents many problems, chief among them being that Windows and Linux are two separate operating systems and, generally speaking, are incompatible. Although solutions exist and the problems aren't insurmountable, setting up a winmodem under Linux often involves quite a lot of additional configuration.

There are many types of winmodems, all of which need to be configured in different ways. An excellent web site exists that provides both step-by-step information and the necessary software. Using a computer that can get online, visit <http://linmodems.org>. Additionally, the user-friendly guide at <http://linmodems.technion.ac.il/first.html> might also be of help. As always, searching the Ubuntu forums (www.ubuntuforums.org) and specifying the make and model of your modem is also a good idea, because it's almost certain that at least one other person will have tried to make the modem work under Ubuntu.

Here are the steps necessary to configure a modem to dial up. You should ensure that your modem is plugged into the phone socket and is powered up. These instructions involve downloading the GNOME PPP dial-up tool, which will handle your dial-up requests.

1. Using another computer that's already online (or by switching to Windows if you dual-boot), visit the following address using a web browser. You'll be prompted to download a file. Save the file to a floppy disk or USB memory stick, or burn it to a blank CD-R/RW disk. This is necessary because you'll need to transfer the file to your Ubuntu computer.

```
http://us.archive.ubuntu.com/ubuntu/pool/universe/g/gnome-ppp/  
gnome-ppp_0.3.23-1_i386.deb
```

2. On the Ubuntu computer, copy the downloaded file to the desktop.

3. Open a terminal window (Applications ► Accessories ► Terminal), and type the following:

```
sudo dpkg -i Desktop/gnome-ppp_0.3.23-1_i386.deb
```

You'll need to enter your password when prompted.

4. You'll find GNOME PPP on the Applications ► Internet menu. When the program starts, click the Setup button.
5. In the Setup window, click the Detect button. This will probe your modem and change GNOME PPP's configuration settings to match. Once probing is complete, remove the check from Wait for Dialtone, but don't change any other settings on the Modem tab.
6. Click the Options tab. Put a check alongside Dock in Notification Area. Then click the Close button.
7. In the Username, Password, and Phone Number fields, enter the relevant details, as illustrated in Figure 8-6. Remember that you should enter your dial-up username and password here, and not your Ubuntu username and password! Don't forget to add any additional numbers to the front of the phone number if it's necessary to deactivate call waiting or similar services on your phone line. It's also wise to put a check in the Remember Password box, so you won't be prompted for your password each time you dial up.



Figure 8-6. GNOME PPP can be used to connect to the Internet if you use a dial-up modem.

8. Click the Connect button to dial up. Once you're connected, you'll see a new icon appear in the notification area. When you want to disconnect, right-click this icon and select the relevant option.

Following the initial setup, it makes sense to create a desktop shortcut for GNOME PPP. This can be done by clicking and dragging the icon from the menu to a convenient spot.

Working with a Proxy Server

Some networks in offices require that you use a web proxy (often referred to as an HTTP proxy). A *proxy* is a server computer that provides additional security by providing a single portal to all web pages. It also helps speed up Internet access by storing frequently accessed pages. This means that if ten people request the same web page, there's no need to get the same ten pieces of data from the Internet. The proxy computer can send them its own copies.

You'll need to speak to your system administrator to see if your office uses a proxy. If it does, your administrator will most likely give you an address, which may take the form of a web address (a URL) or an IP address. Once you have this information, follow these steps to configure the proxy:

1. Open Network Proxy Preferences (System ► Preferences ► Network Proxy).
2. On the Proxy Configuration tab, choose one of the three types of proxy configuration:
 - Direct Internet Connection is basically not using a proxy at all when accessing the Internet.
 - Manual Proxy Configuration enables you to set the proxy servers and respective ports for HTTP proxy, Secure HTTP proxy, FTP proxy, and Socks host. You can fill in this information based on the settings you received from your system administrator. If you were provided with one proxy for Internet access, check Use the Same Proxy for All Protocols and fill in the details for the HTTP proxy and port. If your proxy uses authentication, click the Details button. In the HTTP Proxy Details dialog box, check Use Authentication, and then supply the username and password. Click the Close button.
 - Automatic Proxy Configuration allows you to enter the link (URL) to discover the proxy settings in your office.
3. On the Advanced Configuration tab, you can set the list of sites that will bypass the proxy. By default, any site hosted on your computer is bypassed. You can add and remove sites as well. You normally add intranet (internal) web sites to this list.
4. Click the Close button after you're finished making changes to the proxy settings.

Tip Some ISPs run proxy servers, too. However, unlike proxies in offices, it's normally up to you whether you choose to use them. You might find that using a proxy speeds up your connection, especially when you access popular sites, so it's worth trying out. To find out if your ISP offers a proxy, visit its technical support web pages or phone its technical support line.

ADDITIONAL NOTEBOOK CONFIGURATION

Generally speaking, a notebook computer will not need any configuration above and beyond what's outlined in this chapter. For example, if you have a wireless network card, you can simply follow the instructions in the “Connecting to a Wireless Network” section.

You might also want to make use of the GNOME CPU Frequency Scaling Monitor. If you have a compatible CPU in your notebook (or even some desktop PCs), this tool lets you adjust the speed of the chip to save power. Most modern mobile-oriented CPUs support this function. Unfortunately, because of the possibility of crackers using it to slow down your system, the applet is considered a security risk. Before you use it, you must reconfigure your system to allow it to work.

Open a terminal window (Applications ► Accessories ► Terminal), and type `sudo dpkg-reconfigure gnome-applets`. You'll then be asked if you want to set `suid root` for the `cpufreq-selector` applet. Select Yes using the arrow keys, and press Enter. Reboot your computer, and then right-click a blank spot on the panel at the top of the screen. Click Add to Panel and, in the dialog box that appears, scroll down to the System & Hardware heading. Click the CPU Frequency Scaling Monitor icon, and click the Add button. To alter your CPU frequency, click the applet, and choose the clock speed setting you desire.

Configuring Power-Saving Features

Ubuntu includes a number of features that can utilize the power-saving features of your computer, including switching off the monitor after a set period of inactivity and placing the computer into standby mode, whereby only the RAM subsystem is kept powered. However, some quick configuration is necessary to set up the system just the way you want it.

Tip If your computer has a CPU that can adjust its clock speed on the fly, such as a mobile processor, Intel Core Duo, Intel Pentium M, AMD Turion, or AMD chip with the PowerNow! function, Ubuntu will automatically install software that will make this work. This software will run in the background. To see a live view showing the speed of your processor, right-click the panel, select Add to Panel, and choose the CPU Frequency Scaling Monitor under the System & Hardware heading. Note that to manually control the speed of the processor, you might need to undertake the steps described in the “Additional Notebook Configuration” sidebar. If you find that the computer subsequently crashes when you attempt to scale the processor speed, use the Synaptic Package Manager to install `cpufreqd`. This should fix the issue. As always, updating online might also provide a cure.

Using Power-Management Preferences

Depending on the degree to which your computer supports power-saving functionality, Ubuntu will let you configure your display to go into standby mode after a certain amount

of time and will also allow you to configure your notebook to enter sleep (standby) mode. In addition, if you use a notebook computer, Ubuntu might let you configure additional aspects of your computer, such as the display brightness. These functions are controlled using the Power Management applet. To start this, click System ► Preferences ► Power Management. If Ubuntu is installed on a notebook computer, you'll see three tabs in the program window: On AC Power, On Battery Power, and General. If Ubuntu is installed on a desktop computer, you'll see just the On AC Power and General tabs.

Note Not all PCs are created equal when it comes to power-saving features. Some support more functionality than others. In addition, Ubuntu is compatible with most but not all power-management systems, and it might not be able to support certain power-management functionality on your system, even if such functionality normally works under Windows.

Notebooks have the additional tab because it's possible to define two separate power management profiles: one for when the computer is plugged in and one for running on battery power. This makes sense, because you might never want your display to switch off when connected to an outlet, but it's advisable that it should deactivate within, say, 15 minutes of inactivity if the computer is running on battery power to extend the life of the battery.

The three tabs of the Power Management applet are explained in the following sections.

On AC Power

If your computer is a desktop PC without a battery, you'll see two options under the On AC Power tab: Put Computer to Sleep When Inactive For and Put Display to Sleep When Inactive For. By clicking and dragging the sliders for these options, you can control the amount of time before each feature kicks in. By dragging each to the far right, you can set a value of Never, which will deactivate that feature.

Note The sleep mode can be to either suspend to RAM (that is, standby) or hibernate. You can set this under the General tab, as discussed in a moment.

If your computer is a notebook computer, you'll see some extra options. Depending on the technology used in your computer, you might see a Set Display Brightness To slider, which you can use to set the brightness of the screen when the power is connected. Whenever AC power is connected, the display brightness will be changed to match this setting.

You may see a When Laptop Lid Is Closed option, with a drop-down list. As it suggests, this will control what happens when the notebook is closed. Depending on the hardware

contained in your computer, you might have the choice of doing nothing, blanking the screen, suspending the computer (shutting down all systems but RAM), hibernating (suspending RAM to disk and turning off the notebook) and shutting down the computer. However, not all computers support each of these modes, so the choices you see might vary.

Additionally, you may see a Dim Display When Idle check box, which you can check to conserve power by dimming the screen when your system is idle.

On Battery Power

The options under the On Battery Power tab, which will be present only on a notebook computer, are largely the same as those under the On AC Power tab, as you can see in Figure 8-7. These settings come into operation the instant the main power is disconnected from your notebook and the battery kicks in.

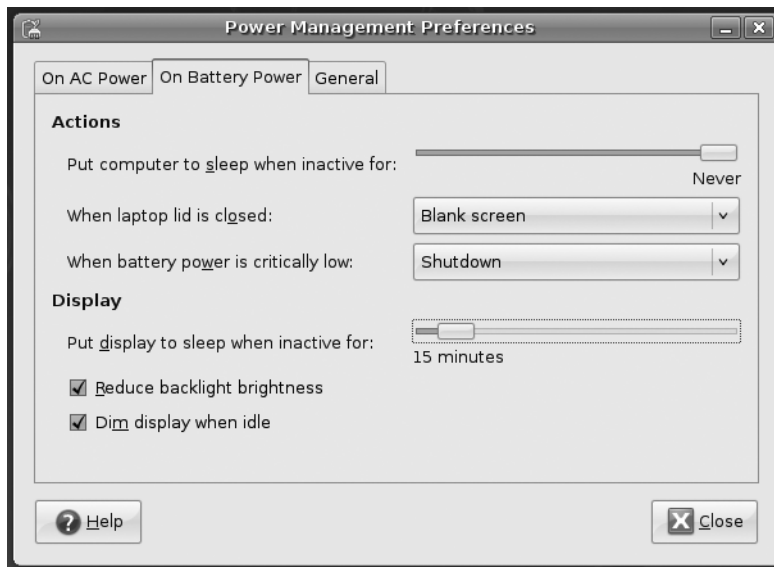


Figure 8-7. Notebook users can define an additional power profile that will kick in when the battery is in use.

An extra option appears as the last item in the Actions section: When Battery Power is Critically Low. Here, you can opt to automatically suspend, hibernate, or shut down the notebook when the battery power is nearly gone.

The check boxes at the bottom of the Display section could help save battery power considerably. You may check the Reduce Backlight Brightness option, which as it suggests, sets backlight brightness to a lower setting when you run on battery power. As with On AC Power, the Dim Display When Idle option may also be available for battery power.

Caution Be aware that sleep mode requires a little battery power to work and will eventually drain your battery, especially if it's already on its last legs!

General

Under the General tab, you have options to customize button actions and notifications. These settings persist whether the computer is on AC or battery power.

In the Actions section, you can set what happens when the power button is pressed once the computer is active. Effectively, this controls whether or not pressing the button when Ubuntu is running should shut down the computer, suspend it, or hibernate it. You can select Ask Me, which will cause the standard Quit dialog box to appear (that is, the same dialog that appears if you click System ► Quit). You can also customize the action for the suspend button. The available actions are to do nothing, suspend, and hibernate. Hibernate will write the contents of RAM to the hard disk and then shut down the computer. Suspend will shut down most systems of the computer except for the RAM, which will be kept active. Then, when you press a key or move the mouse, the computer will wake up almost instantly as the subsystems are reactivated.

Caution Hibernate doesn't work on all systems. The best plan is to test it by selecting System ► Quit and selecting Hibernate. Even if Hibernate appears to work, there are reports of it being unreliable. Some users report that their computer occasionally fails to wake up, causing a loss of data. Therefore, you should always save any open files before using the hibernate function or before leaving your computer unattended for any period in which hibernate mode might kick in automatically.

The General tab also lets you select whether the power icon is visible in the notification area. If you're using a notebook, you can display the icon only when the battery is nearly drained, when your battery is charging or discharging, or regardless of the battery state. Desktop PC users can choose not to display the power icon, which makes sense. The most fuss-free option is perhaps Only Display an Icon When Charging or Discharging, which is selected by default.

Finally, there's also an extra option you can check to play sounds when error events occur.

Tip Clicking the power icon in the notification area lets you quickly hibernate or suspend the computer. Just select the entry from the menu that appears.

Spinning Down the Hard Disk

All modern hard disks come with the ability to spin down their motors to save energy. Then, when data is requested, the motors spin up again. There may be a slight delay while this happens, and some people dislike using disk spin-down because of this. However, on a notebook, it can lead to a substantial increase in battery life. On a desktop system, it's worth considering, because over the lifetime of a computer, it can save a lot of electricity (and therefore money!).

The spin-down settings are contained in the `/etc/hdparm.conf` file, which you'll need to edit by hand. Follow these steps to adjust the spin-down settings:

1. Open a terminal window (Applications ► Accessories ► Terminal) and type the following:
2. Click Search ► Find, and in the box, type `spindown_time`.
3. Click the Find button. You should find that a line in the file is now highlighted. Close the Search dialog box.
4. Change the line to remove the hash mark from the beginning, so it reads like this:

```
spindown_time = 24
```

You can alter the value to anything you want. Each time unit is five seconds, so 24 equates to 120 seconds (24×5 seconds) or 2 minutes. To set a time of 20 minutes, enter 240 (240×5 seconds). If you specify a number above 240, the time units are increased to 30 minutes. In other words, a value of 241 will equate to 30 minutes, a value of 242 will equate to 60 minutes, and so on.

5. When you've finished, save the file.
6. Reboot for the settings to take effect.

POWER SAVING: IS IT WORTH IT?

An average computer draws anywhere between 100 to 1,000 watts of power. An average incandescent light bulb draws around 150 watts of power, so you can see that, relatively speaking, computers are low power consumers compared to many household devices. However, it's still worth considering employing power-saving techniques. You might not save yourself a lot of money, but if you switch on power saving, and your neighbor does too, and her neighbor does, then the cumulative effect will add up, and we can all contribute less toward global warming.

Try to avoid leaving your computer turned on overnight or when you're away from it for long periods. As well as saving power, switching off your computer will avoid wear and tear on its components. Although the CPU can work 24×7 without trouble, it's cooled by a fan that's a simple mechanical device. There are other fans in your computer too, such as the graphics card fan and case fan. Each of these will eventually wear out. If your graphics card fan stops working, the card itself will overheat and might burn out. The same is true of the CPU fan. However, by shutting down your computer overnight, you can effectively double the life of the fans and radically reduce the risk of catastrophic failure. Isn't that worth considering?

Adding a Printer

Most people have a printer nowadays, and Ubuntu supports a wide variety of models—everything from laser printers to color ink-jet models, and even some of the very old dot-matrix printers.

If you work in an office environment, you might be expected to access a shared printer. Sharing a printer is usually achieved by connecting the device directly to the network. The printer itself normally has special built-in hardware to allow this to happen. Alternatively, the printer might be plugged into a Windows computer, such as a Windows server (or even simply someone's desktop PC), and shared so that other users can access it, a setup that is known as *Windows printer sharing*. Ubuntu will work with network printers of both types.

Configuring a Local Printer

A *local printer* is one that's directly connected to your computer, normally via USB. Any printer you attach to your computer will be configured by Ubuntu automatically and ready to use immediately, as shown in Figure 8-8.

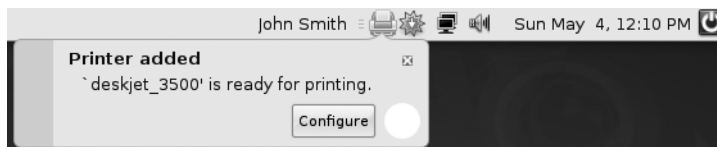


Figure 8-8. The local printer is automatically configured when you connect the printer to the computer and then turn it on.

However, if the printer malfunctions when printing, such as churning out paper when a print job is sent to it, printing garbage, or not working at all, you can attempt to configure it yourself. To set up a local printer, follow these instructions:

1. Click **System ► Administration ► Printing**. In the Printer Configuration window, click the **New Printer** button. You'll see the message "Searching for Printers." This might take a few moments to work through.
2. In the New Printer dialog box, you need to select which printer to configure. The printers that Ubuntu detected are listed under **Devices**. Click the printer you want to use, and then click the **Forward** button to continue. You'll see the message "Searching for Drivers."
3. Select the printer manufacturer. By default, Ubuntu selects the manufacturer that best fits your printer, but you can select another manufacturer from the list. Alternatively, you can provide the PostScript Printer Description (PPD) file if the built-in drivers cannot operate your printer. When you've finished, click **Forward**.

Tip You can find PPD files on the CD that came with your printer or download them. OpenPrinting (www.linux-foundation.org/en/OpenPrinting) and Adobe (www.adobe.com/products/printerdrivers/winppd.html) offer many printer drivers for download.

4. Ubuntu again selects the detected model and corresponding driver for your printer, but you can change these selections. If you find the default driver simply doesn't work correctly, try a similar but different model. Select the appropriate model in the **Model** list in the left column, and then select the appropriate driver for your printer from the **Drivers** list in the right column. Click the **Forward** button to continue.
5. You'll be invited to give the printer a name. The default should be OK. You can fill in the **Description** and **Location** fields if you want, but these are necessary only if you intend to share the printer across a network. Click **Apply** when you've finished.

Tip Sharing your printer on the network so that other computers can use it is simple: open the Printer Configuration window (**System ► Administration ► Printers**), select **Server Settings** in the list on the left, and put a check in the **Share Published Printers Connected to This System** box on the right. Then click the **Apply** button.

Once installation has finished, the printer will then appear in the Printer Configuration window, as shown in Figure 8-9. To see whether it's working correctly, select the printer under **Local Printers** in the left column, and then click the **Print Test Page** button on the **Settings** tab on the right side of the window.

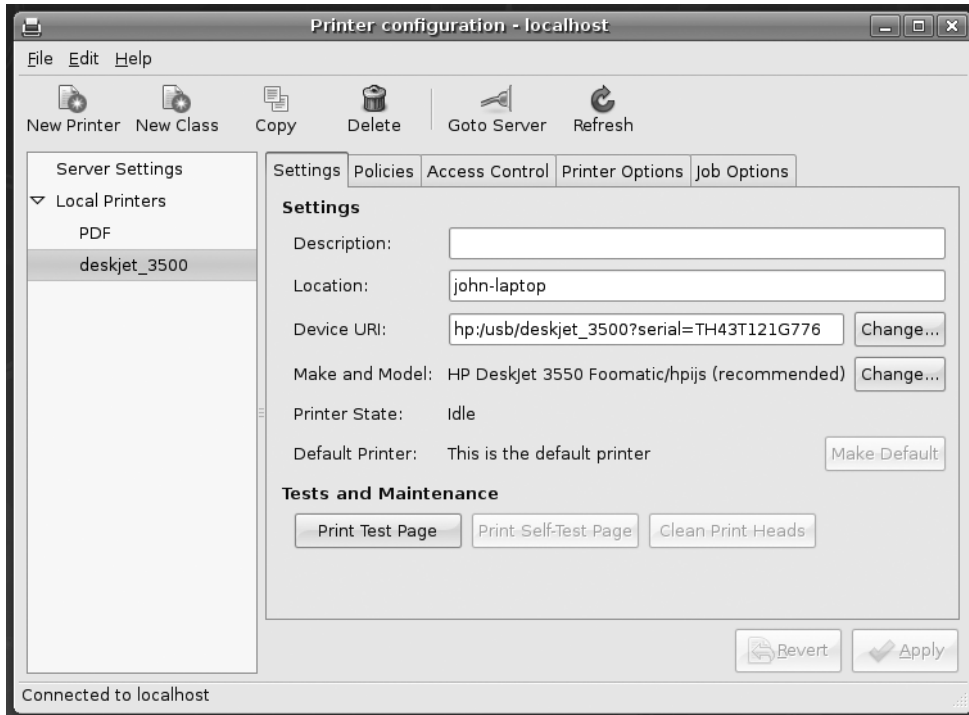


Figure 8-9. Once the printer is configured, it appears in the tree list on the left column of the *Printer Configuration* window.

If the printer is installed correctly, you should find yourself with a test page showing color gradations.

If the printer hasn't been installed correctly, it either won't work at all or will start spewing out page after page of junk text. If this is the case, click **Cancel Tests** (where the **Print Test Page** button used to be), and then turn off the printer. Delete the printer driver by selecting the printer in the list on the left and clicking the **Delete** button at the top of the *Printer Configuration* window. Then repeat the installation steps, this time trying different settings.

Configuring a Network Printer

A network printer is one that is not directly connected to any computer. Instead, it connects to the network via an Ethernet cable. In this way, all computers in the office will be able to use it. If the network printer is directly connected to a computer, it will probably be shared via Windows/SMB. In this case, follow the instructions in the next section.

Some printers have the required server hardware built in, but others might use a special print server module that attaches to the printer's USB or parallel printer port. Ubuntu can work with both types of hardware.

Ubuntu is compatible with Unix (LPD), HP JetDirect, and Internet Printing Protocol (IPP) server types. These are the most ubiquitous types currently in use for stand-alone printer servers.

Before beginning, you'll need to find out the printer's network address and, if relevant, the queue name or the port number. You should be able to find out these details by speaking to your network administrator or the person who configured the printer.

Follow these steps to configure a network printer:

1. Click System ► Administration ► Printing. In the Printer Configuration window, click the New Printer button.

Tip You can add as many printers as you want. You could configure a local printer (that is, one attached to your computer), and then configure a network printer.

2. In the Devices list of the New Printer dialog box, select the type of shared printer you want to connect to. If you're unsure of which to choose, try Internet Printing Protocol (IPP). If you wish to connect to a Hewlett Packard (HP) printer with an HP print server attached, select AppSocket/HP JetDirect. (You could also choose LPD/LPR Host or Printer, but this has long been replaced by IPP.)
3. In the Host field, enter the network address of the printer. In the case of HP JetDirect, the default port number should work, unless you have been specifically told to enter a different number. Depending on which server option you chose, you may also need to enter the queue name. If it's IPP, you need to provide the host and printer queue, but Ubuntu makes it easy to set this up. Just type the network address in the Host field, and then click Find Queue. The IPP Browser dialog box will pop up and display a list of printer queues. Select a printer queue, and then click OK. Ubuntu will update the entries in the Host and Queue fields automatically. Click the Verify button to check if you can access the printer with the updated settings. Should it fail, try changing the Host field to the host's IP address (ask your system administrator for this information if you don't have it). Once you have the correct settings, click Forward.
4. As prompted, choose the printer manufacturer, printer model and driver, and printer name, just as if you were configuring a local printer. See steps 3, 4, and 5 in the previous section for guidance. Click the Apply button after you've made your selections.
5. When the printer is installed, select the printer from the list in the Printer Configuration window, and then click Print Test Page.

If the printer doesn't work, it's likely that you set the wrong server type. Try an alternative type; if you chose IPP the first time, try App Socket/HP JetDirect the second time. Many print servers can emulate a variety of modes, so trying a different setting may work.

If the printer starts spewing out page after page of text, it's likely that you selected an incorrect printer driver. Cancel the job at the printer by clicking Cancel Tests. Next, select the printer in the list on the left and click the Delete button at the top of the window to remove the printer. Then repeat the installation steps, this time trying an alternative driver.

Configuring a Windows/SMB Shared Printer

A Windows (or SMB) printer is one that's directly connected to a computer, and then made available across the network via the network sharing function of the operating system. Effectively, the computer acts as the printer server. Often, in corporate environments, such printers are attached to server computers, but an individual may share the printer attached to a workstation.

In a home situation, a Windows/SMB share is an excellent and inexpensive way of sharing a printer among many computers. The printer is attached to one PC, and, as long as that computer is switched on, the printer will be available to the other computers in the household.

Assuming that the printer has been correctly set up to be shared on the host computer, connecting to a Windows/SMB printer share is easy. In fact, you may find that Ubuntu finds the printer in the background and sets it up automatically! If you find the printer is available when you choose to print from an application, try it out and see if it works.

However, more likely, you'll need to add it manually. Follow these steps to set up a Windows/SMB shared printer:

1. Click System ► Administration ► Printing. In the Printer Configuration window, click the New Printer button.
2. In the Devices list, select Windows Printer via SAMBA.
3. Click the Browse button to probe the network to see if any printer shares are available. More than one might appear, so navigate through the printer shares until you find the desired printer, as shown in Figure 8-10. Select the printer and click the OK button. If you cannot find the printer share listed in the SMB Browser dialog box, you may need to enter the details in the `smb://` field manually. This entry will probably take the form of the address followed by the printer name (for example, `officepc/epson`). Speak to your system administrator or the individual in charge of the shared printer to find out what these are.

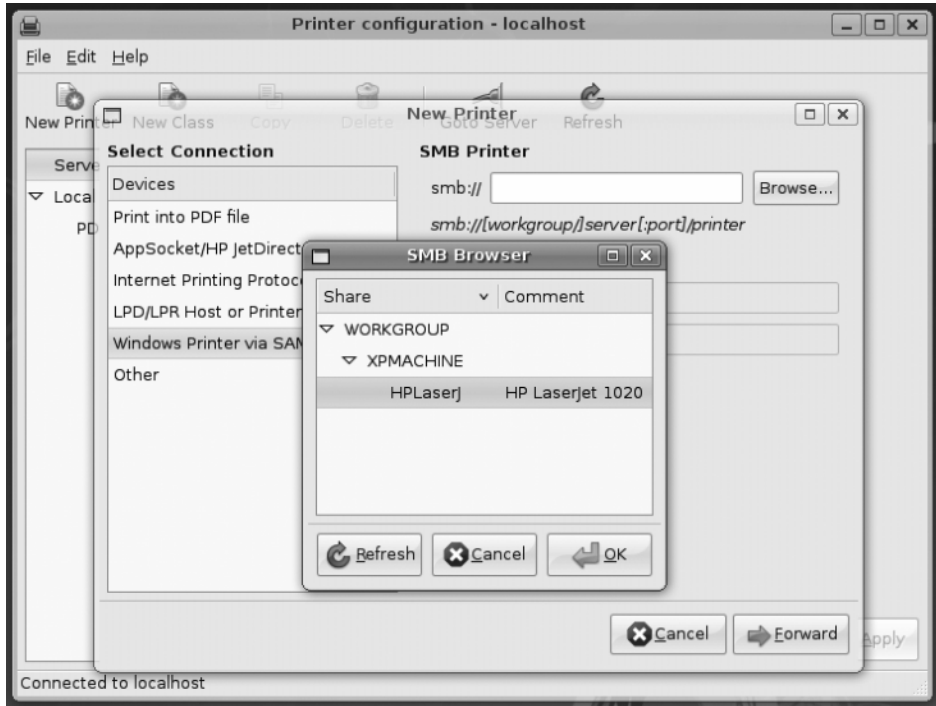


Figure 8-10. *Ubuntu should be able to automatically detect any Windows or SMB shared printers on your network.*

4. Click the Verify button to check if the printer is accessible. If it succeeds, skip to step 6. If it fails, you may need to supply the username and password to access the shared printer, as described next.
5. Check the Authentication Required check box. In the Username and Password fields, type the username and password required to access the shared printer. These can be the login details of any user of the computer or, if the shared computer and printer are configured for Guest access, you can try typing Guest for the username and leaving the Password field blank. Once the details have been filled in, click Forward.
6. As prompted, choose the printer manufacturer, model, driver, and name, just as if you were configuring a local printer. See steps 3, 4, and 5 in the “Configuring a Local Printer” section for guidance. Click the Apply button after you’ve made your selections.
7. When the printer is installed, select the printer from the list in the Printer Configuration window, and then click Print Test Page.

If the printer makes a noise as if to start printing but then decides not to, you might need to change a setting on the Windows machine. Click Start ► Printers and Faxes, and then right-click the shared printer's icon. Select Properties and click the Ports tab in the Properties window. Remove the check in the Enable Bidirectional Support box, and then click OK. Then restart both the Windows and Ubuntu computers.

If the printer starts spewing out page after page of text instead of the test page, it's likely that you selected an incorrect printer driver. Cancel the job at the printer by clicking Cancel Tests. Next, select the printer in the list and click the Delete button at the top of the Printer Configuration window to remove the printer. Then repeat the installation steps, this time trying an alternative driver.

Administering a Printer

Like Windows, Ubuntu uses the concepts of print queues to handle printing. When you print from an application, the print job is actually held in the print queue. If the queue is empty, then the job is printed immediately. If there are already jobs waiting to be printed, or if a print job is already in progress, then the new job is added to the queue.

Tip If you have more than one printer installed (maybe you have a printer attached to your PC but also print to a network printer), you can set one as a default, which will automatically be chosen whenever you choose to print. Simply click System ► Preferences ► Default Printer. Then select the printer from the list, click the Set Default button, and close the program window.

When you print a document, the Document Print Status icon appears in the notification area (it looks like a printer). Double-click the icon to view the jobs waiting to be printed, if any. Right-clicking a job displays a context menu that lets you cancel, pause, and resume the job.

When you attempt to print from applications, Ubuntu will display a unified printer interface, as you might be used to in Windows. You will find similarities when you print in Gedit, GIMP, and Firefox. The only exception is OpenOffice.org, which offers its own simplified print dialog box.

Most applications that use the unified print dialog box will provide additional unique options related to that particular application. For example, GIMP offers quality settings useful for printing high-resolution photographs, and Gedit offers functions related to basic text printing.

Ensure you select your printer in the list on the left of the print dialog box (on the General tab) in order to see all the available options.

Using Digital Cameras, MP3 Players, and USB Memory Sticks

Removable storage is the term applied to peripherals that you might attach to your computer that contain their own storage. Examples include USB memory sticks, external hard drives, MP3 players, digital cameras, and photographic memory card readers. You might also find some devices like mobile phones are treated as removable storage devices when you attach them directly to your computer.

When you attach any removable storage device, Ubuntu does the following:

- Displays an icon on the desktop, which you can double-click to view the removable storage device contents.
- Adds an icon to Nautilus's Computer view, which can be accessed by clicking Places ► Computer (or Go ► Computer in a currently open Nautilus window). As with the desktop icon, double-clicking this will display the contents of the removable storage device. The Computer view is a good way to see at a glance all removable storage devices attached to your computer.
- If the removable storage device contains digital images (if it's a digital camera, for example), and you view the contents using a Nautilus window, an orange bar will appear across the top of the window, alongside a button asking if you want to import the images to the F-spot photo library program. You'll learn more about this in Chapter 20, which provides a concise guide to cataloging and manipulating your digital images.

The contents of the removable storage device will be accessible in exactly the same way as any other files on your system. You should be able to copy, delete, and create files on the device, provided the device isn't read-only (if the read-only switch isn't set on a USB memory stick, for example). If the device contains MP3 tunes, you should be able to double-click them to play them, provided the playback codecs are installed (see Chapter 18).

However, a very important rule must be followed when you've finished with removable storage devices under Ubuntu: the device must be *unmounted* before you physically remove it. This applies also to memory cards that are inserted into a card reader—before removing any card from the card reader, it must be unmounted.

This is quite simple to do. Just right-click the icon on the desktop or within the Computer window and select Unmount Volume. Make sure that you save and close any files that you may have been working on before you do so, or you may see an error message. You'll need to close any Nautilus windows that might have been browsing the storage device too.

If you've used the command line to manipulate files on the removable storage device, remember to close any running programs in the terminal window. You'll also need to switch out of the removable storage device directory before you'll be allowed to unmount it (alternatively, you can simply close the terminal window).

Following this, you can safely physically remove the card or unattach the device. Reinserting it will make it available once again.

Caution Be very careful not to remove a memory card from a card reader while you're writing or reading from it on your PC. This will most likely damage the card irreparably. At the very least, it will wipe the contents of the card, so you'll lose your photographs.

Configuring a Scanner

Although scanners have fallen out of favor recently with the advent of digital photography, they're vital for getting nondigital photos and old documents onto your PC.

A lot of flatbed scanners can be made to work under Ubuntu, but not all types are supported. You can check the list of currently supported scanners by visiting www.sane-project.org. Additional models are added to the list all the time, and this is another reason to make sure your system is completely up-to-date (see Chapter 9 and Appendix D; the former explains how to update your system software, while the latter describes how to update to the latest version of Ubuntu).

The best test of whether your scanner is supported under Ubuntu is simply to see if it will work. Scanning within Ubuntu is handled by the XSane utility. This is a stand-alone program that operates like the TWAIN drivers that you might have used under Windows.

Tip XSane is even capable of optical character recognition! Simply use the Synaptic Package Manager to download and install the gocr program. Then, after you scan an image, in the viewer window, select File ► OCR - Save As Text.

To configure a scanner and scan images, follow these steps:

1. Select Applications ► Graphics ► XSane Image Scanner. On startup, the program will attempt to detect your scanner. If it finds a compatible model, XSane will start. If the scanner isn't recognized, a dialog box will appear telling you so.
2. XSane consists of a handful of windows, including the main program window, the Standard Options dialog, the Histogram window, and the Preview window. You can close the Standard Options and Histogram windows for the moment and concentrate on the main XSane program window, which should be similar in appearance to the TWAIN scanner drivers you might have used under Windows.

3. At the top of the window is the automatic document feeder option, where you can set the number of pages in the feeder to scan in one sitting. If your scanner does not have an automatic document feeder, you can do this manually by changing the paper yourself immediately after the previous paper has been scanned.
4. Beside the automatic document feeder option is the XSane mode drop-down list. Here, you can select from a variety of scanning modes, such as those to scan documents for faxing. However, in most cases, the Save setting is best. This lets you preview your scans and then save them to disk if you're happy with them.
5. Beneath this is the filename field. Here you should type the filename you wish to use for the scanned file. XSane can save in a variety of file formats, and it detects which you want to use from the file extension you choose. For example, typing `picture.jpg` will cause the picture to be saved as a JPEG image. Typing `picture.tif` will cause the image to be saved as a TIFF file.
6. Beneath the filename field, on the left, is the filename number count. This is used if you wish to scan many images in succession—a number is added to the end of the filename, and this control configures the increment. A setting of +1 is fine.
7. Beneath the filename field, and to the right, is the type drop-down list, by which you can force a certain file type to be used when saving files. However, leaving this at the default By Ext is best. This means that, as mentioned previously, you can define the type of image saved by the filename extension.
8. Next down is the color/monochrome drop-down list. Here, you can select to scan Lineart (binary), Gray (grayscale), Halftone, or Color. If you select anything other than Lineart, additional sliders will appear to let you control the gamma, brightness, and contrast of the scanned image, in that order. In addition, several other buttons will appear at the bottom of the program window, all of which you can leave at default settings. Remember that hovering the mouse cursor over each will explain what it does.
9. Next is the source medium type drop-down list. Here you can specify the type of medium you are scanning—whether it's a full-color picture, a slide/transparency, or a negative. For normal operations, select Full Color Range.
10. Next is the dots per inch (DPI) setting. Generally speaking, 300 DPI is acceptable for scanned photos, while 150 DPI will be acceptable for artwork such as diagrams.
11. To scan a preview, click the Acquire Preview button within the preview window. The results should be something similar to what's shown in Figure 8-11.

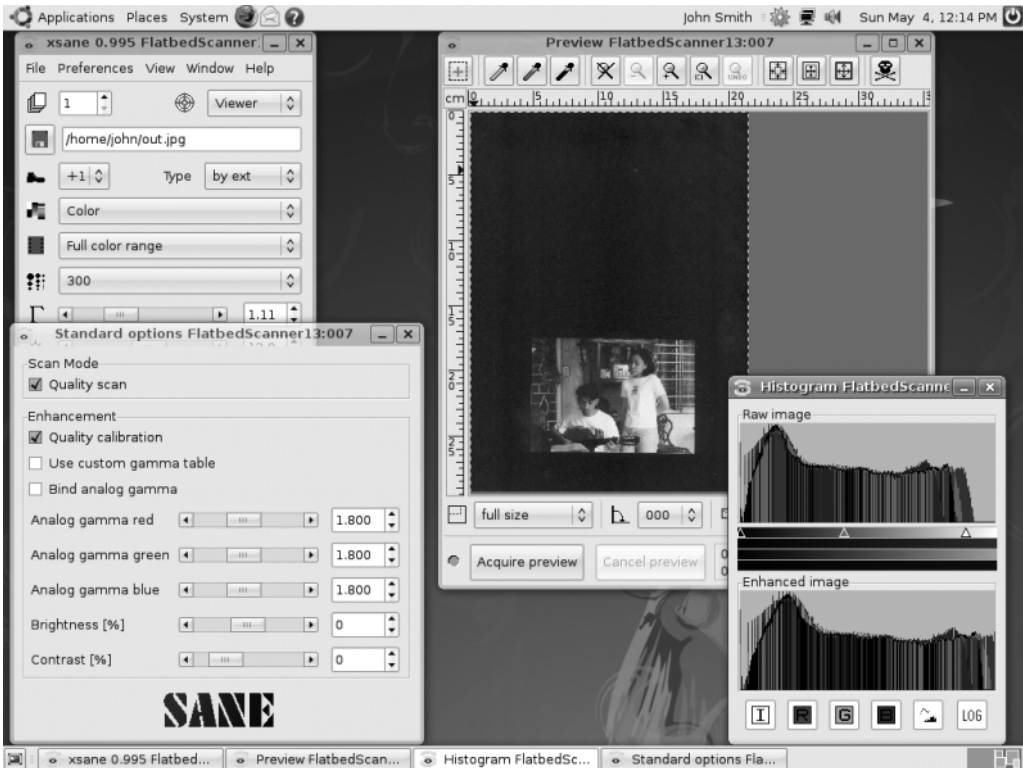


Figure 8-11. The XSane program works a little like TWAIN drivers under Windows and makes scanning easy.

12. When the preview scan has finished, you can adjust the brightness/contrast settings using the sliders in the XSane program window (assuming you selected color scanning earlier). You should also click and drag to crop the image in the preview window, if XSane doesn't do so automatically.
13. When you're satisfied with the preview, click the Scan button in the main XSane program window. The image will then be scanned at your chosen resolution and saved to your /home directory, using the filename you specified earlier.

Installing 3D Drivers and Activating Desktop Visual Effects

The modern trend is for operating systems to incorporate flashy graphical effects into ordinary desktop functions. For example, when windows are minimized in Windows Vista, they physically shrink and fade down to the taskbar. Under Mac OS X, program

windows appear to be “poured” into the Dock when minimized. In Windows Vista, when you press Alt+Tab to switch through open programs, the program windows are previewed vertically in a graphical arrangement, and you can flick through them, rather like searching through a card index. These effects are achieved using the 3D processing power of the computer’s graphics card, even though the effects aren’t necessarily 3D in nature.

Note On a technical level, the technique is known as *compositing*. What you see on the screen is first drawn in the graphics card memory and then transferred to the screen, rather than everything simply being drawn directly onto the screen.

Ubuntu includes similar desktop visual effects, courtesy of a system called Compiz Fusion (www.compiz-fusion.org). However, all desktop visual effect systems have a couple requirements, and these apply to Ubuntu as well:

- For desktop effects to work, your graphics card (or motherboard graphics chipset) must be comparatively recent. Examples include the ATI Radeon, nVidia GeForce, and Intel GMA product lines. Most graphics cards manufactured within the last two or three years with a graphics processing unit (GPU) should be adequate, and very recent models definitely will work.
- The correct graphics drivers must be installed. Some of Ubuntu’s built-in graphics drivers lack the necessary 3D functionality to support desktop effects. Currently, Intel GMA and some ATI Radeon graphics cards are supported by default because Intel and ATI provide open-source 3D-capable drivers. For other hardware, including nVidia cards, you will need to manually install a proprietary driver, which is not difficult to do.

Note You only need to install the proprietary driver if you wish to utilize desktop visual effects. Ubuntu includes a default 2D graphics driver that provides excellent functionality for everyday desktop use.

Some proprietary 3D graphics drivers are provided under Ubuntu, but *only* if open-source equivalents are missing. It is hoped that open-source drivers will one day replace the need for proprietary drivers.

So do you actually need to install new drivers? If you find that desktop effects are working, then the correct drivers are already installed. A good way to test this is to hold down Ctrl+Alt and then tap the left or right arrow key. This will switch to the next virtual desktop. If the entire desktop physically slides out of the way, then desktop effects are activated. If the desktop remains static and a small dialog box appears in the center of the screen to let you choose a virtual desktop, then desktop effects are not activated.

A utility called Hardware Drivers lets you manage proprietary drivers for your graphics card. This should appear in the notification area automatically immediately after installation if your hardware requires proprietary drivers.

Follow these instructions to activate the proprietary graphics driver:

1. Click the Hardware Drivers icon to run the Hardware Drivers program. If it's not visible, click System ► Administration ► Hardware Drivers.
2. Supply your password in the authorization dialog box and click OK.
3. In the Hardware Drivers window, check the Enabled box beside your graphics card device driver.
4. A dialog box appears, asking you to confirm that you want to enable the driver. It explains that enabling the driver enables visual effects on your desktop. Click the Enable button.
5. The Summary dialog box appears to tell you what new software will be installed. Click the Apply button.
6. The driver will be downloaded and installed. Then the Changes Applied dialog box will appear to tell you that the changes are completed. Click the Close button.
7. In the Hardware Drivers window, click the Close button.
8. You need to restart the computer so that Ubuntu will use the new driver. Select System ► Quit, and then click Restart.

Once the new graphics driver is installed, desktop visual effects should start working immediately. If you experience seemingly random system-wide crashes or freezing after installing a 3D graphics driver, consider reverting to your old setup by using the Hardware Drivers program (System ► Administration ► Hardware Drivers) to disable the new driver. Unfortunately, in a small minority of cases, the proprietary driver can prove buggy.

■ Tip On one of our test PCs, containing an nVidia GeForce 6600 graphics card, the Hardware Drivers program didn't install the new driver as it should. This is probably a bug that might be fixed by the time you read this, but we got around it by manually installing the driver. The procedure is to open the Synaptic Package Manager (System ► Administration ► Synaptic Package Manager), search for the `nvidia-glx` new package, and mark it for installation. Then reboot. When the system is up and running again, start Hardware Drivers, and once again put a check in the box alongside the graphics driver. If there's already a check there, remove it and put it in again. Upon a second reboot, desktop visual effects should become operational.

Two modes of operation are available for desktop visual effects: Normal and Extra. Normal is the default and provides a good subset of the available effects: menus fade into view, program windows shrink when minimized, and so on. Extra provides a lot more effects, some of them rather extreme, such as wobbling when you click and move a window, and windows appearing to explode to the corners of the screen when maximized. To switch between the two settings, right-click the desktop, select Change Desktop Background, and then click the Visual Effects tab in the dialog box that appears.

Configuring Bluetooth

Bluetooth is the short-range networking facility that allows various items of hardware to work with each other wirelessly. You can use Bluetooth for everything from file transfers between a mobile phone and computer to employing a wireless keyboard or mouse with your desktop computer.

For Bluetooth to work, both devices need to have Bluetooth support. Many mobile phones come with Bluetooth nowadays, as do an increasing number of notebook computers. It's also possible to buy very inexpensive Bluetooth USB adapters.

Bluetooth support is built into Ubuntu and should activate automatically if Bluetooth hardware is present on your PC. You will know if this is the case because a Bluetooth icon will appear in the notification area. This is used to administer all Bluetooth devices that you might want to connect to your computer.

Pairing Bluetooth Devices

When two pieces of Bluetooth-compatible hardware need to communicate on a regular basis, they can pair together, a process also known as *pairing* or *bonding*. This means that they trust each other, so you don't need to authorize every attempt at communication between the devices. Indeed, some devices won't communicate unless they're paired in this way.

Pairing is very simple in practice and works on the principle of a shared personal ID number (PIN). The first Bluetooth device generates the PIN, and then asks the second Bluetooth device to confirm it. Once the user has typed in the PIN, the devices are paired. Pairing is easily accomplished under Ubuntu and doesn't require any additional software.

As an example, the following are the steps for bonding a Nokia 6680 phone to an Ubuntu PC. Bonding for devices without a user interface, such as keyboards, is handled differently, as explained in the "Using a Bluetooth Keyboard or Mouse" section a little later in the chapter.

1. Ensure the Ubuntu PC is visible, which is to say that other Bluetooth devices can detect it. Right-click the Bluetooth icon in the notification area, click Preferences, and make sure that the radio button alongside Visible and Connectable for Other Devices is selected. Click Close.
2. It's easiest to initiate pairing on the device you want to connect to the PC, which should then autosense the PC's Bluetooth connection. You will need to discover how to do this on your particular Bluetooth device. On the Nokia 6680, we opened the menu and selected Connections ► Bluetooth. Then we pressed the right arrow key to select Paired Devices and selected Options ► New Paired Device ► More Devices. This made the phone autosense the Ubuntu PC, which was identified by its hostname, followed by -0. You might remember that the hostname was autogenerated during installation of Ubuntu. It is normally your username followed by desktop. In our case, the Ubuntu PC was identified as ubuntu-desktop-0.
3. The Nokia 6680 then prompted us to create a PIN. You may find that some devices simply show a random PIN that you should write down. After entering our PIN on the phone, a comment box popped up on the Ubuntu computer, notifying us of a pairing request between Ubuntu and the mobile phone, as shown in Figure 8-12.

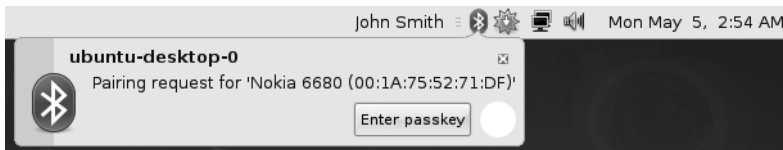


Figure 8-12. *A pairing request is easily accomplished through the Bluetooth applet.*

4. We clicked the Enter Passkey button in the comment box and were prompted to input the same PIN we set earlier on the phone. We typed the same PIN and pressed OK. Following this, the two devices were paired.

If you subsequently wish to remove the pairing, right-click the Bluetooth icon and select Preferences. In the list of Bonded Devices at the bottom of the dialog box, select the entry for your Bluetooth device and click the Delete button. Don't forget to remove the pairing on the Bluetooth device, too.

Transferring Files Between Bluetooth Devices

If you own a Bluetooth-equipped camera phone, you might be used to transferring pictures to your computer using Bluetooth. It's by far the easiest way of getting pictures off the phone and avoids the need for USB cables or card readers. To transfer files via Bluetooth, you can use the Bluetooth applet.

Note Some phones refuse to transfer files unless the phone and computer are paired, so follow the instructions in the previous section first. Phones like the Nokia 6680 don't need pairing for file transfer, although each transfer will need to be confirmed manually.

Sending Files to a Ubuntu PC

Follow these steps to send files from a Bluetooth device to your PC:

1. Right-click the Bluetooth icon in the notification area and select Preferences. In the Bluetooth Preferences dialog box, click the General tab. Check Receive Files from Remote Devices. A bubble will appear that says that Ubuntu is ready to receive incoming files. Click Close in the Bluetooth Preferences dialog box.
2. On the Bluetooth device from which you wish to send the file, start the file transfer. On the Nokia 6680, we selected the file and clicked Send ► Via Bluetooth.
3. A dialog box may appear on the Ubuntu computer asking you to confirm that you want to receive the file. Click OK. Once the file is received, the file will be copied to the desktop folder.

Sending Files from a Ubuntu PC to Another Device

There are two ways to send files to another Bluetooth device from your Ubuntu PC. The first is to use the Bluetooth applet. The second is to right-click the file in question and select Send To. The second method is useful if you wish to send many files at once, and you will have the option of automatically zipping the files into a single archive (but bear in mind that the Bluetooth device receiving the file will need to be able to subsequently unarchive the file).

Using the Bluetooth Applet

Follow these steps to use the Bluetooth applet to send files:

1. Right-click the Bluetooth icon in the navigation area and click Send File.
2. In the Choose Files to Send dialog box, navigate to the file you want to send and click Open.
3. In the Select Device dialog box, select the target Bluetooth device and click the Connect button.
4. The target Bluetooth device might prompt you to accept or deny a file transfer request from Ubuntu. Choose to accept it.
5. After the file has been received by the Bluetooth device, click Close.

Using the Send To Option

To use the Send To option on the context menu to send one or more files, follow these steps:

1. Either right-click an individual file or select several files and click one of them. Right-click and select Send To.
2. In the Send As drop-down list of the dialog box that appears, select Bluetooth (OBEX Push). In the Send To drop-down list, ensure that your Bluetooth device is selected.
3. If you're sending several files, you can put a check in the Send Packed In check box. This will create a new single .zip archive and add the files to it automatically. Otherwise, each file will simply be sent one after the other.
4. Click the Send button. You may be prompted to authorize receipt of the files on the Bluetooth device, so do so. Bear in mind that transfer of many files may take some time because Bluetooth is not a particularly speedy form of data transfer.
5. Once the file transfer is complete, click the Close button.

Using a Bluetooth Keyboard or Mouse

Your Bluetooth-equipped keyboard or mouse may work automatically under Ubuntu. However, if not, you may need to pair it to your PC, as follows:

1. Before you can pair your keyboard or mouse with Ubuntu, you must edit a system configuration file. Open a terminal window (Applications ► Accessories ► Terminal) and type the following, which will open the file in the text editor:


```
gksu gedit /etc/default/bluetooth
```
2. In the document that appears, look for the line that reads `HIDD_ENABLED=0` and change the 0 to a 1, so it reads `HIDD_ENABLED=1`. Then save the file and quit Gedit.
3. Ensure the Ubuntu PC is set to be discoverable. Right-click the Bluetooth icon in the notification area, click Preferences, and make sure that the radio button alongside Visible and Connectable for Other Devices is selected. Click Close.
4. Switch your keyboard or mouse to discoverable mode. Read the instructions for your device to find out how this is done. On an iGo Stowaway keyboard we used during testing, this involved pressing the Ctrl+blue Fn+green Fn keys simultaneously.

5. While you're reading the manual, find out if the device has a default passkey. Mice almost certainly will (and it's nearly always 0000), but keyboards might require you to type one manually when it comes to the pairing request.
6. Right-click the Bluetooth icon and select Preferences. In the Bluetooth Preferences dialog box, click the Services tab. Ensure there is a check alongside Input Service in the list, and then click the Input Services entry in the list so that it is selected. Click the Add button at the bottom of the dialog box.
7. You should find that your keyboard/or mouse is detected automatically and appears in the list below the Select Device heading (if not, ensure that it is still in discoverable mode, and hasn't switched itself off). Click the entry for the keyboard or mouse, and then click the Connect button.
8. A comment box should pop up on the Ubuntu computer, notifying you of a pairing request between Ubuntu and the keyboard or mouse (similar to Figure 8-12). Click the Enter Passkey button.
9. What happens next depends on whether you're trying to connect a keyboard or mouse (bear in mind that the process of pairing quickly times out on the Ubuntu computer, so you need to complete the following steps without hesitation).
 - In the case of a mouse, enter the passkey that you read earlier in the manual for the mouse. As mentioned, this is usually 0000. Once you click OK, the mouse should be paired and should start working.
 - Some keyboards also use a default passkey of 0000, and, if so, you can enter that, and the keyboard should be paired. However, some Bluetooth keyboards might require you to enter a passkey created on the computer. In the Authentication Request dialog box on the Ubuntu PC, type a random four-digit passkey—something like 1234 (although for security reasons, you might want to choose something that's slightly less easy to guess). Click OK. On the Bluetooth keyboard, type the same number and hit Enter. Following this, you should find the keyboard is paired with the computer and will work.
10. Click Close in the Bluetooth Preferences dialog box.

If you find the keyboard or mouse does not work after a reboot, try turning it on and off again. If that doesn't work, deactivate the Bluetooth functionality on the PC, perhaps by momentarily unplugging the Bluetooth dongle or, on a notebook, using the relevant keyboard combination to turn off and on again the Bluetooth system.

Configuring Sound Cards

Generally speaking, your sound card shouldn't require any additional configuration and should work immediately after you install Ubuntu. The icon for the volume control applet is located at the top right of the Ubuntu desktop, and it offers a quick way to control the master volume.

However, if your sound card offers more than stereo output, such as multiple-speaker surround sound, then it might be necessary to take some simple steps to allow full control of the hardware:

1. Right-click the volume control icon (the one that looks like a speaker), and select Open Volume Control.
2. In the dialog box that appears, click Edit, and then click Preferences.
3. The Volume Control Preferences dialog box appears, as shown in Figure 8-13. Select the sliders that you wish to be visible. For example, on a desktop computer that has 5.1 surround sound, we were able to add a slider for the center and back speakers. On a notebook that has a sound card featuring pseudo-surround sound, we could add a control to alter the intensity of the effect.

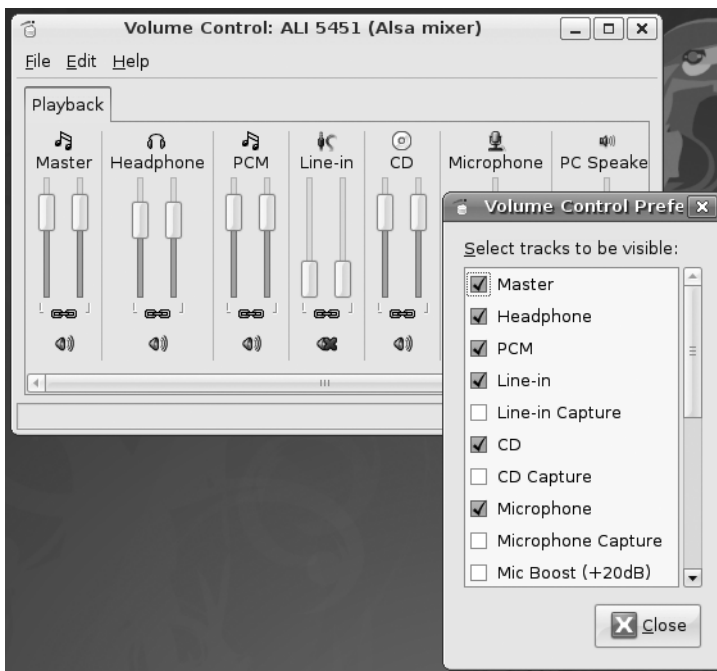


Figure 8-13. You can add sliders to control all aspects of your sound card's output.

4. When you've finished, click the Close button. The new controls should then be visible in the Volume Control window.

Configuring E-Mail and Instant Messaging

Being online is all about staying in touch, and Ubuntu is no slouch in this regard. Ubuntu offers a full-featured e-mail program, called Evolution, as well as an instant messaging client called Pidgin.

Unlike similar instant messaging clients, Pidgin supports a wide variety of Internet chat protocols, such as AIM/ICQ, MSN, Yahoo, Jabber, and IRC. This means you can chat with friends and colleagues on different networks using this one program.

Evolution is able to work with both IMAP and the popular POP3 mail servers offered by ISPs and used within corporate environments. Additionally, it can work with the Microsoft Exchange protocol used by offices running the Outlook mail program and also Novell GroupWise. We'll look at the specifics of using Evolution in Chapter 27. Here, you'll learn how to configure the e-mail client to receive and send mail.

Configuring E-Mail Access

Before starting, you'll need to find out the addresses of the mail servers you intend to use. In the case of POP3 and IMAP mail accounts, you'll need to know the incoming and outgoing server addresses (outgoing may be referred to as SMTP). In the case of Microsoft Exchange, you'll need to know the OWA URL and, optionally, the Active Directory/Global Address List server. With Novell GroupWare, you'll simply need to know the server name. You'll also need to know your username and password details for the incoming and possibly outgoing mail servers.

After gathering the necessary information, follow these steps to configure Evolution:

1. Start the Evolution e-mail client by clicking its icon at the top of the screen, to the right of the menus. Alternatively, you can select Applications ► Office ► Evolution Mail and Calendar.
2. When Evolution starts for the first time, you'll be invited to enter your configuration details via a wizard. Click the Forward button.
3. The next screen offers an option to restore Evolution settings from backup. This is a convenient option for migrating accounts from one Evolution client to another. Since this is your first time using Evolution, you can simply ignore this option by clicking the Forward button.

4. You are asked for your name and the e-mail address you wish to use within Evolution. These are what will appear in outgoing messages. Beneath this is a check box that you should leave checked if you want the account you're about to create to be the default account. In nearly all situations, this will be the correct choice. You can also fill in the Reply-To and Organization information if you wish, but these fields can be left blank. They're not normally displayed by most e-mail clients. Click the Forward button to continue.
5. The next screen asks for details of the receiving (incoming) mail server that you want to use, as shown in Figure 8-14. First, select the server type from the drop-down list. If you don't know which option to go with, select POP. This is by far the most common type of incoming mail server currently in use.

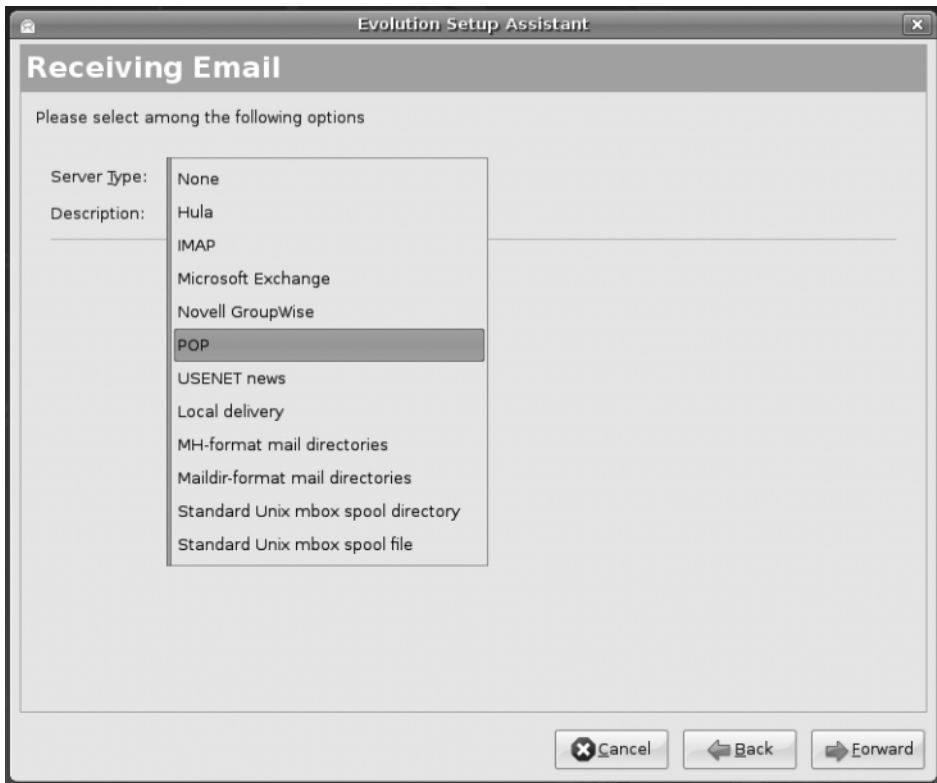


Figure 8-14. *Evolution can work with a variety of mail servers, including POP3, Microsoft Exchange, and IMAP.*

6. Additional configuration fields will appear when you make the selection of server type. Enter the server address and username in the relevant fields. Click Check for Supported Types to find out what kind of authentication security, if any, your mail server uses. Following this, you should find the details are filled in automatically. Click Forward to continue.
7. You might need to enter your mail password, depending on which server type you chose. In some cases, you'll need to type this later when you download your mail for the first time. Click Forward to continue.
8. You're given the chance to choose between various additional options, such as how often you want Evolution to check for new mail or if you want to delete mail from the server after it has been downloaded. Unless you have been told otherwise or have special requirements, it should be okay to leave the default settings as they are. If you use a Microsoft Exchange server, you may need to enter the Active Directory/Global Address List server details here. Click Forward to continue.
9. Depending on the server type you chose, you might now need to fill in the outgoing (SMTP) server address. Type this into the Server field. If your SMTP server requires authentication, put a check in the relevant box, and then enter your username. Once again, you can click the Check for Supported Types button to automatically fill in the authentication details. Click Forward to continue.
10. You're invited to enter a name for the account. This is the account name you will see when you use Evolution. The default is your e-mail address, but you can type something more memorable if you wish. Click Forward to continue.
11. Finally, choose your location, which will have the effect of automatically defining your time zone. This will ensure that e-mail messages are correctly time-stamped. You can choose your location from the Selection drop-down list (choose the nearest large city in your time zone), or click your location on the map. As during initial installation of Ubuntu, the map will zoom in when you click continents, to let you more precisely click the place you live. Click Forward to continue, and then click the Apply button to finish the wizard.

As noted earlier, Chapter 27 includes a full run-through of Evolution's main functions.

Setting Up Instant Messaging

Instant messaging is a way of chatting with other people in real time. It's as if you were having a phone conversation, but you're typing instead of speaking. You can talk to one other person or a whole group of people and sometimes share files with them.

The instant messaging program under Ubuntu, Pidgin, offers the same functions and works in an almost identical way to programs that you might have used under Windows. It supports virtually all the popular chat standards, such as ICQ/AOL, Google Talk, Yahoo, and MSN (Hotmail/Passport). It assumes that you already have an account with each service, which will likely be the case if you've used instant messaging programs under Windows. You can have as many accounts as you wish and can select the one you want to use when you log in.

To transfer your instant messaging account over to Pidgin, you just need your screen name and password. As with other instant messaging clients, you'll be able to choose an on-screen alias.

Follow these steps to set up Pidgin:

1. Start Pidgin by clicking Applications ► Internet ► Pidgin Internet Messenger. When the program starts for the first time, it will automatically open the Accounts dialog box, although it might be behind the main login window. If so, click to bring it to the front of the desktop.
2. In the Accounts dialog box, click the Add button and, in the window that appears, select the account type you want to set up from the Protocol drop-down list.
3. Enter your screen name, password, and alias details, as required.
4. If you don't want to type your password each time you run Pidgin, check Remember Password. However, be aware that someone else using the computer could abuse your account.
5. You can put a check in the New Mail Notifications box if you want to be notified of any mail sent to you via the address registered with your instant messaging service.
6. If you want to use a buddy icon (the icon that others will see when they connect to you), click the Open button and browse to a picture.
7. If you wish to connect to a specific instant messaging server or if your network uses a proxy, click the Advanced tab and enter the details accordingly. In most cases, you won't need to do this.
8. When you've finished, click the Save button.
9. Pidgin will attempt to connect to the chat service. In the main Pidgin window, you should be able to see your chat contacts. Close the Accounts window.

After this, you should find the program works just like any other instant messaging program. You can double-click each contact in your list to start a conversation. To sign off, right-click the icon in the notification area, and then select the Change Status option from

the menu, as shown in Figure 8-15. To add another account, click Accounts ► Manage, click the Add button in the Accounts window, and then follow the preceding step-by-step instructions.

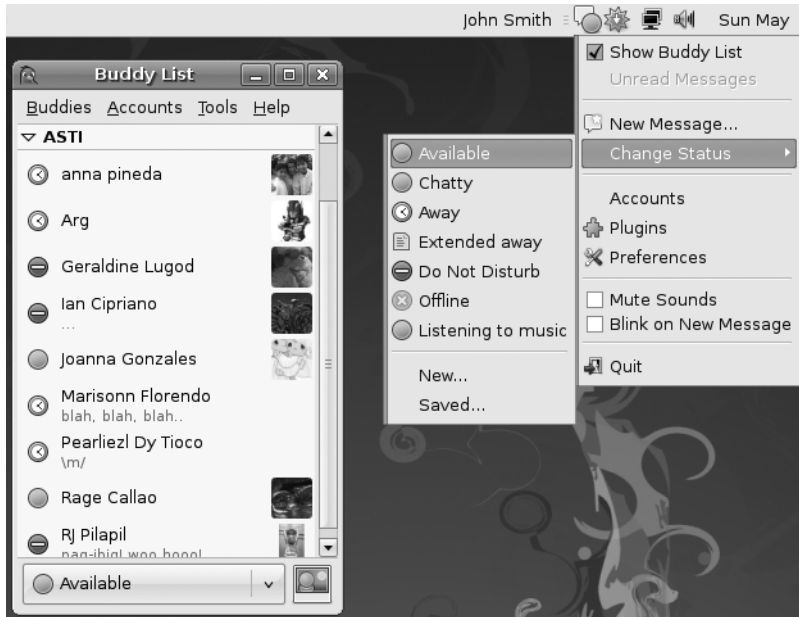


Figure 8-15. You can control Pidgin by right-clicking its notification area icon.

Summary

In this chapter, you learned how to set up just about every piece of hardware you might have attached to your computer. Additionally, we looked at configuring various software components that are vital for Ubuntu's correct functioning.

We stepped through getting online with Ubuntu (including joining a wireless network), configuring e-mail, adding a printer, connecting to a digital camera, configuring a 3D graphics card, and much more.

In Chapter 9, we move on to look at how you can ensure that your system is secure and protected.