chapter

1

Why Network Wirelessly?

In this chapter...

Wireless networking is one of the fastest growing computer tasks today—and with good reason. Networking your computers with wireless equipment is simple and makes your equipment more useful and portable.

Even if you barely move your equipment across your desk, you'll see the benefits of a wireless network. You no longer have to pull cables or hunt under your desk, usually in an unlit area, trying to find the right ports and cables.

If your office uses a wireless network, creating one at home makes even more sense. Walk in the door, and you are instantly online and able to connect to your other computers and printers—at home or at work.

And while it's true that wireless networking can be slightly more tricky to set up than other types of wired networks, we think you'll find it's worth the extra bit of time it takes. No other networking technology is so flexible and portable

Also exciting is the growth of public wireless access on the road. When you travel, you can connect to wireless networks at hotels, airport lounges, convention centers, and coffee shops, among other locations, and access a high-speed, wireless, connection to the Internet. More and more public access wireless networks are launched each day, and research firm IDC estimates the market will jump from $90 million in 2001 to $60 billion by 2006.

What Is Wireless Networking?

Wireless networking, for the purposes of this book, refers to connecting two or more computers to create a local area network (LAN) using radio transmitter/receivers (sometimes called transceivers). Figure 1.1 shows a wireless network adapter you can connect to a USB port on your computer.

The computers transmit data via radio waves, which allows the sharing of files, printers, and Internet access on every computer in the network. You can move the components of your wireless LAN without losing your connection to the network.

FIGURE 1.1   A wireless network adapter
from Linksys.

LANs, Not WANs

It's important that we distinguish your wireless LAN from other types of wireless networks. Wireless wide area networks (WANs) include cell phone networks, so when we talk about wireless networks we're talking about a home network that you can construct in an afternoon, not a cellular voice or data network, which is often called a wireless WAN.

Okay, so we've established the basic components of a wireless home network (LAN): two or more computers connected using wireless network adapters to share files, Internet access, and printers. Wireless networks might also contain other elements, including:
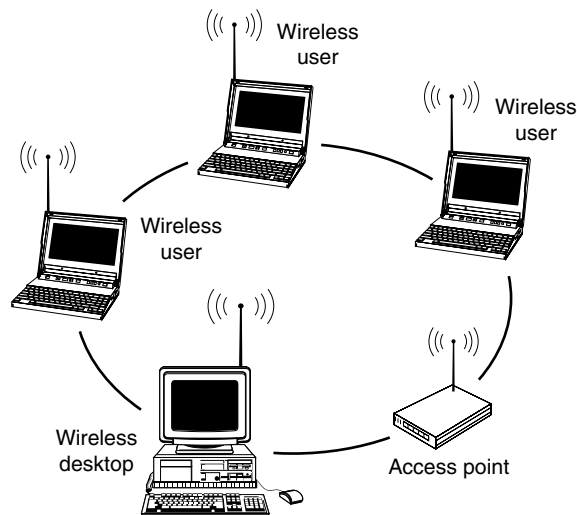
- A scanner, hard drive, or MP3 player shared over the LAN.
- Network hardware that has wires, including a cable modem or a device that connects wired computers together called a hub.

- An access point. This is an important piece of hardware, a wireless bridge that connects a wired network to a wireless network.
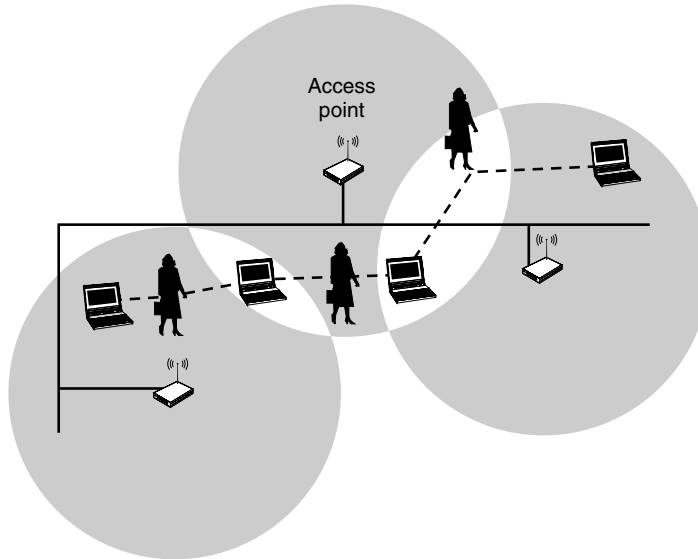
In Figure 1.2, we see the components of a simple wireless home network.

Each wireless network device you use creates a cell in which data can be transmitted and received. As you add wireless networking equipment, these cells interlock (Figure 1.3), providing greater distance over which the data is transferred, also called the equipment's *range*.

Later in the book we'll explain the different wireless technologies, called *standards*, and consider their benefits and drawbacks. For the most part we'll concentrate on one technology in this book. The most popular wireless networking technology (or standard for interoperability) is called **Wi-Fi,** or 802.11b. Wi-Fi equipment is great for sharing files, an Internet connection, and peripherals, such as a printer. Wi-Fi equipment is relatively inexpensive (about $80–100 per computer you want to connect).

FIGURE 1.2 Computers in a home can connect to each other using wireless network adapters (which include a built-in radio transmitter/receiver, called a transceiver, or sometimes simply a radio).

FIGURE 1.3   Users roam around an office, staying connected to their network without being tethered to wired technology.

Benefits of Wireless Networking

Wireless networking offers some benefits that are apparent (no wires) and some that you might not have considered. The most obvious is portability. In particular, if you set up a laptop for wireless networking, you can roam around your house or around a coffee shop. (Starbucks, for instance, plans to offer wireless networks for Internet access for all of its stores in the next few years.)

Moving Your Equipment at Will

It's true that a wireless network will allow you to surf the Internet by your pool, your fireplace, or anywhere else in your house (within about 150 feet, the range of most wireless equipment indoors; more details on that later). More commonly, though, you might find that wireless networking equipment allows you to move your desktop and laptop computers around the house or around your desk or across the room without unplugging cables.

If your office uses a wireless network, you can buy networking equipment for your home that is compatible with your office equipment. That means you can pack up for the day and take your computer home, knowing that when you walk in the door, you will instantly be connected to the Internet, printers, and the other computers in your home that you have connected to your home wireless network. No more plugging and unplugging a laptop from the network.

The convenience that wireless networking provides is obviously a good fit for laptops. But if you want to create a network quickly, and place the equipment wherever you want, without worrying about wires, a wireless network is really the way to go.

FIGURE 1.4   Boingo offers wireless Internet access to travelers with 802.11b network adapters.

Taking Wireless on the Road

More and more hotels, airport business centers, convention centers, and other businesses are setting up public wireless networks that will help you to access the Internet, at high speed, while you travel. An airline layover can be used to catch up on e-mail and surf the Web. You can turn typical downtime into something really useful, or at least more fun than catching a nap at the terminal.

Companies, including Boingo (Figure 1.4), Sputnik, and NetNearU, are working to create broadband access for travelers. Sometimes called visitor-based networks (VBNs), you can find Internet access when you travel at hotels, convention centers, and airports.

You can use your Web browser to search Boingo (www.boingo.com), for example, to find public wireless access points, or *hot spots*, before you begin your next trip.

Wireless Speed in the Real World

As we discuss various wireless networking technologies, we invariably discuss speed. All the technologies have a maximum speed in which they can transfer data. The data transfer rate is often referred to as bandwidth, or throughput. For instance, Fast Ethernet, a wired technology, can transfer data over cables at up to 100 megabits per second. 802.11a and 802.11g, the fastest current wireless standards, top out at 54 megabits per second. And 802.11b, the most popular standard, transfers data at 11 megabits per second. These speeds are the maximum rate at which data can travel. In the real world, however, wireless networking equipment is likely to offer something on the order of half these speeds.

Compatibility among Manufacturers

As we mentioned earlier, this book concentrates on Wi-Fi (also known as 802.11b) wireless networking equipment. You can purchase 802.11b wireless networking equipment from different manufacturers, and it should work together. I say *should* because a few 802.11b devices are

not compatible with the majority of 802.11b equipment. To ensure compatibility among manufacturers look for the Wi-Fi logo, which is displayed on equipment that has met the requirement set up by the Wireless Ethernet Compatibility Alliance (Figure 1.5). You can find out more information about the wireless standard at www.wi-fi.com.

FIGURE 1.5   The Wireless Ethernet Compatibility Alliance is a trade group that promotes 802.11b compatibility.

Importantly, 802.11b does not work with a newer, faster, and more expensive networking standard called **Wi-Fi5** (or 802.11a). Wi-Fi5 is, as you might have guessed, about five times as fast as Wi-Fi equipment. Wi-Fi5 can carry data at a maximum of 54 megabits per second, where Wi-Fi equipment has a maximum speed of 11 megabits per second. Figure 1.6 shows a Wi-Fi5 access point from Proxim. Even newer is 802.11g, which offers the same speeds as 802.11a and is thankfully, compatible with the older and more widely used 802.11b.

As seen in Figure 1.6, Wi-Fi5 (802.11a) equipment, such as this access point from Proxim, works at up to five times the speed of Wi-Fi (802.11b) wireless networking equipment.

FIGURE 1.6   Wi–Fi5 (802.11a) wireless network equipment.

All of the 802.11 standards offer plenty of speed for surfing the Web, printing documents, and listening to MP3 files. The bottom line is that you should make sure that your products are compatible (by asking the seller or vendor or by looking for the Wi-Fi logo). You'll then be able to purchase equipment from any vendor you choose.

Sharing Your Broadband Modem

The introduction of high-speed Internet access to a wide consumer audience is perhaps the most important new technology for home net-

works. The term *broadband* refers to fast Internet access technologies, such as cable and Digital Subscriber Line (DSL), which transmit data many times faster than an analog (56-kbps) modem.

Cable modems provide high-speed access, between 300 kilobits to 1.5 megabits per second, over regular TV cable lines. You can see a cable modem, from Linksys, in Figure 1.7. DSL connections provide similar speeds to that of cable over regular phone lines.

Both cable and DSL connections offer fast Internet access that will make your network much more useful. Connecting your wireless network to a broadband connection provides you with a fast link to the Internet without tethering your computer to your modem.

FIGURE 1.7   A cable modem provides much greater speed for connecting to the Internet than a 56-kilobits per second analog modem.

Broadband by Satellite

A less commonly used broadband technology is satellite Internet access, such as that provided by EchoStar (www.echostar.com) and DirecWay (www.direcway.com). Satellite Internet access is often a good option for those in rural areas who cannot get DSL or cable Internet access. Though this is a wireless technology, the companies that sell satellite Internet access provide little in the way of options for sharing Internet access among computers on a network.

Using a home network to share broadband Internet access provides three main benefits:
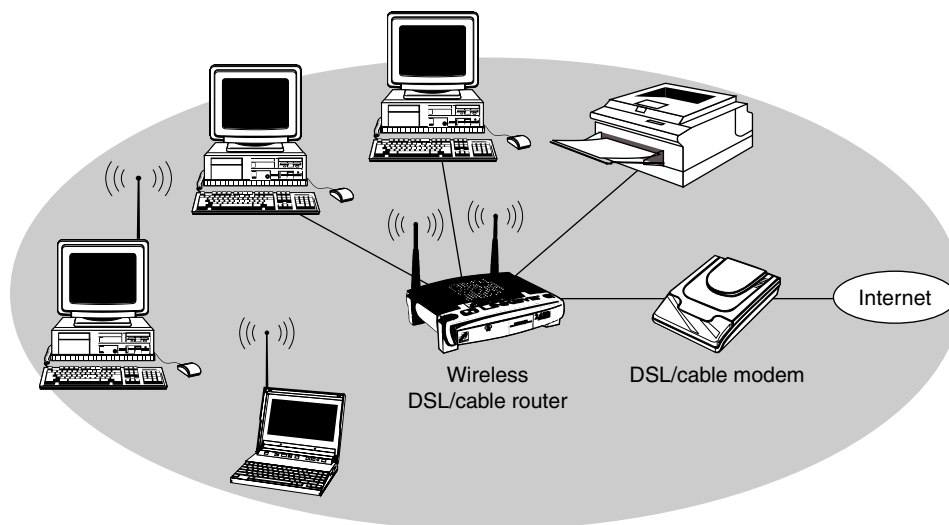
1. *You won't tie up your phone lines.* Broadband Internet connections do not require that you use your analog phone line to dial up to your Internet service provider.

2. *You get an "always-on" connection.* In most cases, broadband connections are "always-on" so that you don't need to dial in and enter your user name and password each time you want to access the Internet. You just launch your Web browser or e-mail software and get to work.

3. *Multiple computers can share the connection, simultaneously.* Each person in your home or office can browse Web pages, send e-mail, and download files at the same time. You can also set up your network to share an analog, 56-kbps modem, but when sharing Internet access, the faster the connection speed, the better.

These benefits aren't limited to wireless LANs. However, a wireless network connected to a broadband Internet connection offer greater flexibility than a wired network. And since you won't need to wire cable to create your network, you can get started sharing files, Internet access, and peripherals right away.
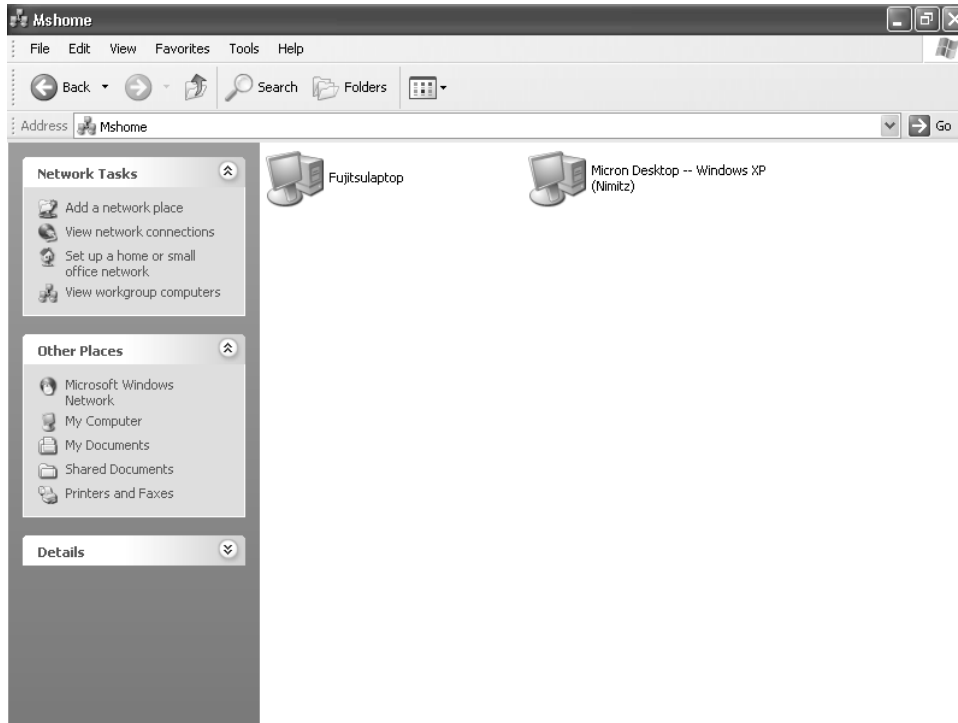
Sharing Printers and CD and Hard Drives

The capability to share peripherals is another good reason to set up a network. Any printer connected to a computer on your network can be shared by any other computer on the network. In addition, you can use a hardware device, called a printer server, to share a printer on your network without connecting the printer to a PC. Some wireless access points include a port on the back of the device for sharing a printer (see Figure 1.8).

When you set up your network, you can share any drive from any computer on the network. For instance, you can install a software program from a CD-ROM in a desktop computer on a wirelessly connected laptop elsewhere in your house. Or, from your desktop computer, you can access a file stored on the hard drive of a laptop. The files on the hard drive of a networked computer appear in a folder, just as they would on your local hard drive. You can see two shared computers on a network in Figure 1.9. Double-clicking a computer's icon will display all of its shared folders and peripherals, such as printers.

FIGURE 1.8   Some wireless access points allow you to connect multiple computers on your network wirelessly and includes a port for connecting (and sharing) a printer on your network.

FIGURE 1.9 Accessing files on a computer in your network is as simple as accessing a file on your computer's local hard drive.

You can also share peripherals including scanners, which require special software to use them over a network. UMAX, for example, sells network-ready scanners (not all scanners are made to be used over a network). On the multimedia front, you can purchase network-ready MP3 (audio file) players, such as those from Panasonic and Compaq, which act a bit like a digital jukebox. You can listen to your favorite music, in digital MP3 format, on any computer connected to your network.

After setting up your wireless network, you can generally get more for your money by sharing peripherals rather than buying new ones to connect to each computer. And transmitting data by radio waves beats carrying floppies and CD-ROMs around any day. Setting up a LAN to share files and peripheral access works the same way with a wireless or wired network, and the networking features of Windows make it all quite simple.

Summary

Before you jump into wireless networking, if you haven't already, there are a few questions you might want to ask.

> *Is your home or office right for a wireless network?* In most cases, the answer to this question will be 'yes' (or a qualified yes in a very large home). The range of wireless networking equipment is its greatest drawback. If your home or workspace is quite large, where your wireless networking equipment will be more than 150 feet apart from each other, you will need to consider mixing wired networking hardware and wireless networking hardware. See Chapter 4, which explains how to set up a hybrid network—one with wireless hardware *and* wired hardware (such as Ethernet, phoneline, or powerline networking equipment). Another option: You can add more wireless access points, which will extend the range of your network by another 150 feet indoors (or about twice that outside).

> *Do you really need wireless equipment?* If you simply want to connect two or three desktop computers in the same room, there's not much reason to set up a wireless network. In this case, you'll save money and time with a wired network. However, if just one of those computers is a laptop, and you'd like the ability to work on that computer from any spot in the house, wireless is a great option.

> *Are you willing to spend extra time setting up wireless equipment?* While wireless equipment is more flexible, and portable, than wired networking equipment, it takes more time to set up. That said, once your wireless equipment is up and running, you won't need to spend much time maintaining it. If you are interested in the flexibility of wireless, it's well worth the extra time for setup.

Even if you have never set up any kind of networking equipment, don't be intimidated. You'll quickly see how simple it is to connect your computers and begin sharing data wirelessly. In the next chapter, we look at how wireless networking works, get some jargon out of the way, and start planning a wireless LAN.