2

THE PEER-TO-PEER FILE SHARING NETWORKS

Between 1999 and 2001, Napster defined the entire world of peer-to-peer file sharing networks until lawsuits shut them down. Despite limiting trading only to audio files and forcing every user to access a central server to find the files they wanted (which allowed the authorities to shut down Napster just by shutting down this central server), Napster proved both the technical feasibility and popular acceptance of peer-to-peer file sharing networks for the masses.

While Napster (http://www.napster.com) has reincarnated itself as a legal, subscription-based file sharing service (see Chapter 16 for more information), the free-wheeling, rebellious spirit of file sharing lives on in a host of copycat networks struggling to define themselves in the void left by the original, free version of Napster (which was put out of business by lawsuits launched by the recording industry). With so many options available, there's sure to be one file sharing network that will appeal to you.

Behind every great fortune there is a crime.

—Honoré de Balzac

HOW FILE SHARING WORKS

The whole idea behind file sharing is to connect everyone in a network so that every computer can copy files from any other computer over the Internet. The types of files you share can be anything from programs and pictures to music and movies. If you can store it in a file, you can share it over a file sharing network.

To connect to one of the many file sharing networks available, you need a file sharing program. In technical terms, a file sharing program turns your computer into both a *client* and a *server*. As a client, your computer can search a file sharing network to find and copy files from any other computer on the network. As a server, your computer can provide files to anyone else on the network. Once you've installed a file sharing program on your computer, you're ready to start searching for files.

NOTE: Visit See What You Share on P2P (http://www.seewhatyoushare.com) for a look at what people share online: everything from ordinary pictures to police reports to military records listing individual soldier's home and cell phone numbers.

SEARCHING FOR A FILE

Searching for a file is like using a search engine on the Internet. At the simplest level, just type in a word or phrase that describes what you want to find, such as a song title or a musician's name, and the file sharing network returns a list of matching files, as shown in Figure 2-1.
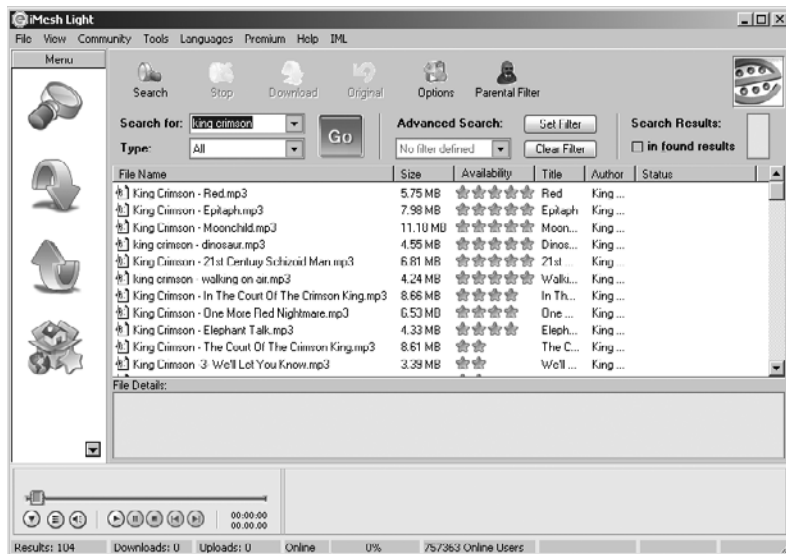
Figure 2-1

Searching for a file can be as simple as typing in a song or artist name.

Unfortunately, if you type in a song title or artist name, you're likely to get a long list of irrelevant files. For example, searching for the music group Heart will also turn up songs from recording artists like Black Heart and Brave Heart; songs with names like "Broken Heart" and "Atom Heart Mother"; and even videos like "Wild at Heart." To avoid this problem, file sharing programs let you limit your search to specific types of files, such as audio or video, as shown in Figure 2-2.
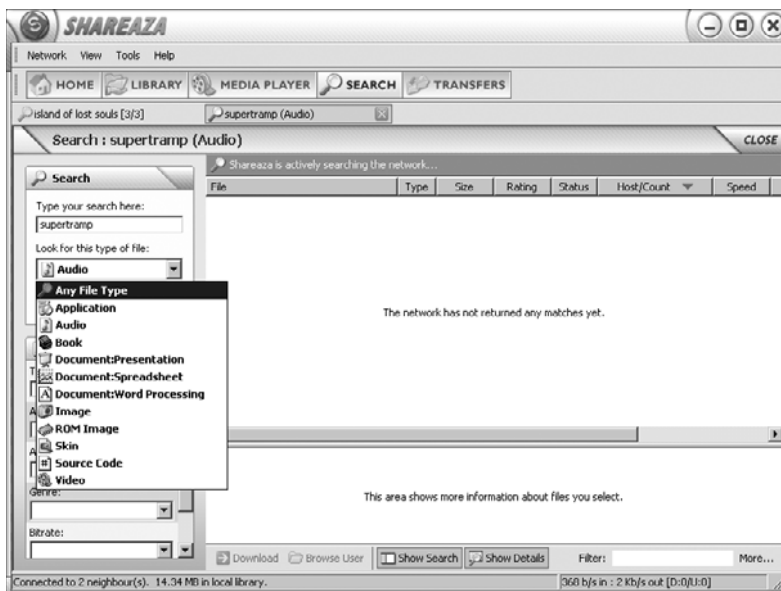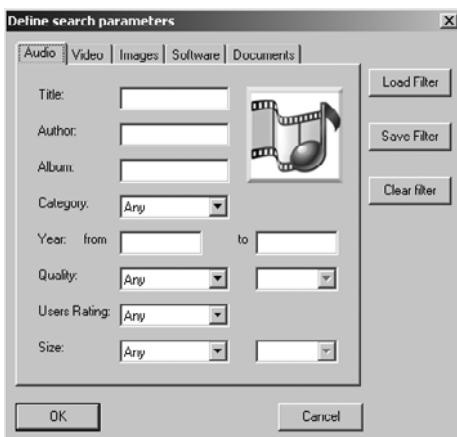
Figure 2-2

Many file sharing programs let you specify the type of file you want to search for, such as a program or an audio file.

Once you've identified the specific file types you want (audio, video, programs, and so on), you can enter more specific information, such as the name of the recording artist and a specific album, as shown in Figure 2-3.

Once your file sharing program displays a list of files that match your search criteria, you choose the files you want, and your computer starts transferring them across the network from some stranger's computer to yours.

That's the theory, anyway. The reality is that you may get cut off in the middle of a file transfer, especially if the person whose computer contains the file you want suddenly turns their computer off. Other times, you may get the file you want, only to find out that the file has been misnamed, so instead of seeing the latest *Star Wars* trailer, you've really downloaded a pornographic movie instead. Even worse, sometimes the file you get is exactly what you want, but the sound or video quality is so poor that it's practically useless. When downloading files, be prepared for a lot of frustration—but if you use a computer on a regular basis, you should already be used to that.

Figure 2-3

You can narrow your search criteria to specific details,
such as the names of recording artists and albums.

LINKING TO A FILE

Besides poor-quality files, misnamed files, and files that contain only part of
what you really want, you also have to worry about bogus files that the recording
industry plants on file sharing networks to frustrate anyone who uses them. To
avoid these problems, many file sharing networks now provide another way to
download files—*hash links*.

File sharing networks (several of which are discussed in "The Different
File Sharing Networks" section that follows) tend to support different types of
hash links:

ed2k links	eDonkey2000 network
.torrent links	BitTorrent network
Sig2dat links	FastTrack network
Magnet links	Gnutella network and newer versions of Kazaa

Basically, a hash link uses a file's contents and size to generate a mathemati-
cal result that uniquely identifies that particular file. Once someone calculates
this mathematical value for a file, they post a link to the file on a website. When
people visit that web page and click the hash link, the hash link loads up a file
sharing program and starts downloading the desired file.

Hash links offer two huge advantages to the file sharing community. First, listing hash links isn't illegal, because websites aren't offering any copyrighted information for downloading; they're just providing links to copyrighted files that someone else's computer may be holding. Second, hash links verify that you're getting the file you really want and not some misnamed or deliberately altered bogus file instead.

Many websites specialize in listing hash links for unique files, such as the following:

The Asia Cinema Forum (http://www.acfmovies.com)
Asian movies

IMAXmovies (http://www.imaxmovies.tk)
IMAX films

ShareTV (http://www.sharetv.net)
Old episodes from television shows, like *Six Feet Under* and *M*A*S*H*

ShareMonkey (http://www.sharemonkey.com)
Music, movies, video games, and software

Isoheaven (http://www.isoheaven.com)
Movies, television shows, and video games

To find more websites that offer hash links, visit one of the following hash link search engines:

FileDonkey   http://www.filedonkey.com

isoHunt   http://s1.isohunt.com

Whatabig   http://www.whatabig.com

So the next time you're searching for a file, you can search for a particular file by name or visit a website that lists hash links. But be quick about it. Despite the legal "gray area" in posting hash links, the government did step in and shut down one of the earliest and largest hash link websites called ShareReactor. Don't be too surprised if, by the time you get to a hash link website, the authorities have already shut it down.

THE DIFFERENT FILE SHARING NETWORKS

When it comes to file sharing, there are the networks themselves, and there are the programs that actually run on your computer (the client programs). A file sharing network is like a television network, while a client program is like a television that tunes in only to a particular network. Each file sharing network has its own dedicated client program; if you want to use the FastTrack file sharing network, you need to use the Kazaa client. The client is what you use to search for and download files from the file sharing network.

Because the file sharing networks don't share files among themselves, your chances of finding a particular file are much better if you tap into one of the larger networks or use multiple clients to tap into multiple networks. (Just don't run two client programs that use the same network, or you'll just be searching the same network twice.) Here are some of the more popular file sharing networks:

- Gnutella and Gnutella2 (G2)
- FastTrack
- eDonkey and Overnet
- DirectConnect
- MP2P

NOTE: Be careful when choosing a client program to tap into a file sharing network. Many client programs are free but come loaded with adware or spyware programs that may bombard you with pop-up ads or track your movements on the Internet.

## THE GNUTELLA AND GNUTELLA2 (G2) NETWORKS

Gnutella emerged shortly after the demise of the original Napster. Napster's fatal flaw was relying on a central server to connect computers together, as shown in Figure 2-4. By shutting down this central server, the authorities managed to shut down the entire Napster network.

To prevent this from happening again, Gnutella eliminated the central server and created a completely decentralized network where all computers on the network could communicate directly with each other, as shown in Figure 2-5. Unlike Napster, every computer on the Gnutella network can work independently, so shutting down one computer can never kill the entire network.
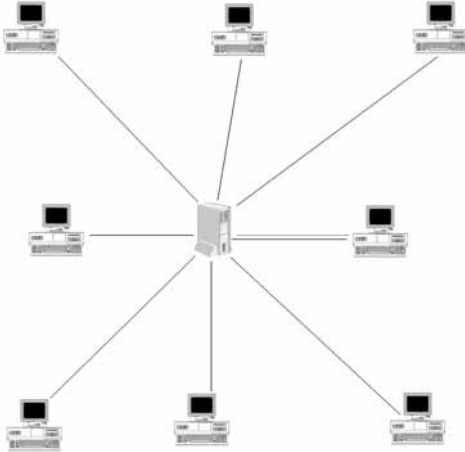
Figure 2-4

When searching on Napster, every file request first had to go through a central server, which could be shut down.
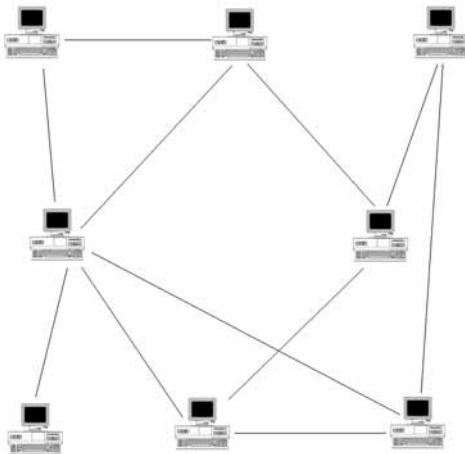
Figure 2-5

When searching on Gnutella, every file request goes through every computer connected to the Gnutella network. This makes it impossible for the authorities to shut down the entire network just by removing a single computer.

Gnutella improved upon Napster in another way. While Napster allowed people to share only music files with each other, Gnutella allows people to share all types of files, including music, videos, pictures, and programs.

Strangely enough, the Gnutella network owes part of its existence to the unwitting generosity of America Online, which purchased Nullsoft, publishers of the popular Winamp MP3 player. The programmers at Nullsoft examined Napster's flaws and created the Gnutella network as an alternative, which they named after a combination of GNU and Nutella, the chocolate-hazelnut spread.

When Nullsoft posted the source code to Gnutella on its website on March 14, 2000, America Online yanked the program within hours, but more than 10,000 people had already downloaded copies and spread them across the Internet. Other programmers studied the way Gnutella worked and created their own client programs to access the Gnutella network. By releasing the source code to Gnutella, Nullsoft's programmers ensured that the Gnutella network would continue to thrive and develop without the need for further intervention and support from the original programmers. As a result, more file sharing programs tap into the Gnutella network than any other file sharing network in the world.

Gnutella is one of the oldest, largest, and most popular of the file sharing networks, but searching it can be slow. When you request a file, your request goes through every computer connected to the Gnutella network, and they can number in the thousands. Still, many client programs tap into Gnutella for its vast library of file sharing offerings (see Figure 2-6). The following are some popular Gnutella client programs:

Morpheus	http://www.morpheus.com
BearShare	http://www.bearshare.com
Acquisition	http://www.acquisitionx.com
LimeWire	http://www.limewire.com
FreeWire	http://www.freewirep2p.com
Deepnet Explorer	http://www.deepnetexplorer.com
XoloX	http://www.xolox.nl

NOTE: *For a current list of Gnutella clients, visit http://www.gnutelliums.com or http://www.gnutella.com/connect.*
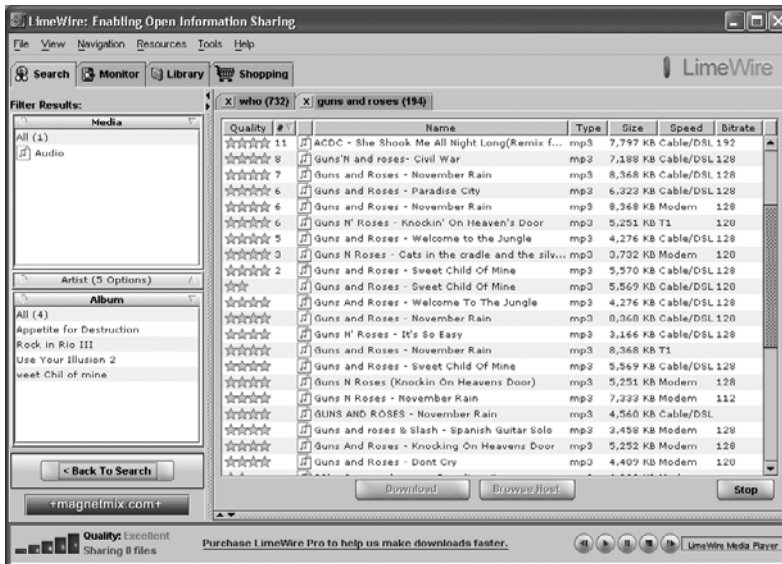
Figure 2-6

The LimeWire client is just one of many clients that can connect to the Gnutella network.

Once Gnutella had been running for a while, people began to notice some problems. The more computers that were connected to Gnutella, the slower file searches got, because every file request had to go through each computer. Having to constantly deal with file requests from other computers meant that each computer wasted much of its time processing requests.

To improve upon Gnutella, a programmer designed a new network, based on Gnutella, but dubbed Gnutella2 or G2 (http://www.gnutella2.com). Like the original Gnutella, Gnutella2 remains open source, so anyone can create a client to connect to Gnutella2. The latest version of Morpheus can now connect to both the original Gnutella and the newer Gnutella2 networks. The following clients can connect to both Gnutella and Gnutella2:

Kiwi Alpha	http://www.kiwialpha.com
Gnucleus	http://www.gnucleus.com
Shareaza	http://www.shareaza.com (also connects to BitTorrent and eDonkey2000)

THE FASTTRACK NETWORK

While Gnutella offers an open source network that allows anyone to connect, FastTrack is a closed, proprietary network that only a limited number of clients can access: Kazaa (in various versions), iMesh, and Grokster, as shown in Figure 2-7.
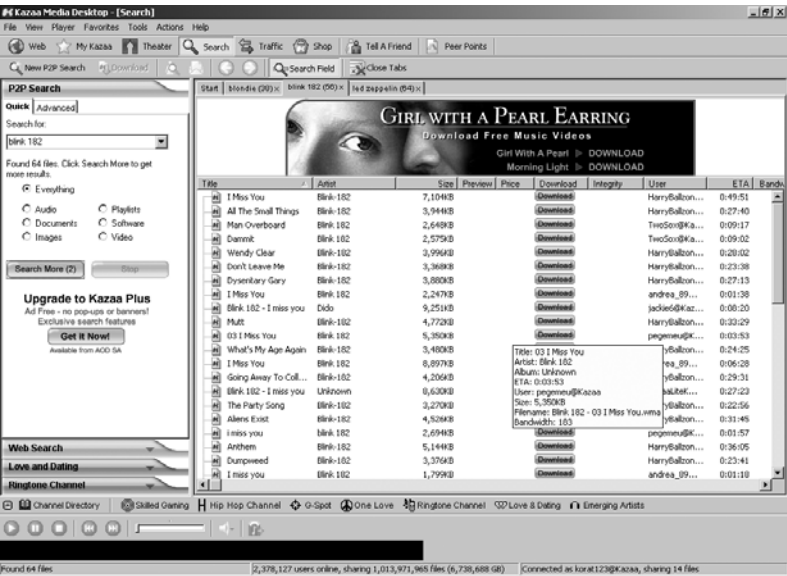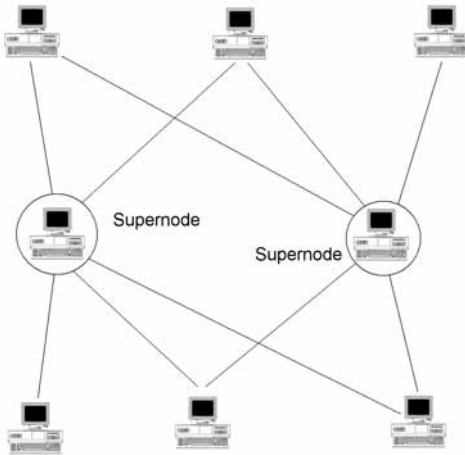
Figure 2-7

Kazaa is one of the most popular, and most sued, file sharing programs in the world.

A Dutch company, called Kazaa BV, created FastTrack shortly before the demise of the original Napster. Based partially on the open source Gnutella protocol, FastTrack improves upon Gnutella by speeding up file searching.

Rather than search every computer for a file like the Gnutella network does, FastTrack routes every file request through *Supernodes* (shown in Figure 2-8). Supernodes essentially divide the larger network into smaller ones, so searching occurs much more quickly—each Supernode only has to search part of the network. Once a Supernode finds your file, it connects you to that particular computer so you can download the file.

FastTrack also introduced two other innovations: the ability to resume interrupted downloads and the ability to download a file from multiple sources, both of which can prove especially useful for downloading massive files, such as full-length movies. Finally, FastTrack's protocol included encryption, which meant that if anyone wanted to create a client program to connect to FastTrack,

they had to pay a license fee. Upon its release, FastTrack quickly ran afoul of the recording industry, who successfully sued Kazaa BV. The company soon sold the rights to the FastTrack network to a collection of offshore companies, where the main investor was an Australian company called Sharman Networks.

Figure 2-8
FastTrack uses Supernodes, which divide a large network into
several smaller ones to speed up file searching.

Further problems occurred between FastTrack's new owners, Sharman Networks, and the file sharing client Morpheus. When Morpheus refused to pay the licensing fee to stay connected to FastTrack, Sharman Networks rewrote the encryption protocol, effectively shutting out millions of Morpheus users. In retaliation, Morpheus rewrote its client to connect to the Gnutella network instead.

As the most popular file sharing network, FastTrack's popularity has also made it the number one target of the recording industry. Not only does the recording industry prowl around the FastTrack network, ready to serve subpoenas to people sharing large numbers of files, but they also flood the FastTrack network with bogus files to discourage people from using FastTrack at all. If you use FastTrack, you're more likely to be sued by the recording industry than if you use a less popular file sharing network.

Despite these problems, the growing popularity of the FastTrack network means that you can probably find a file on this network that you might not find on any other network. Just be aware that the following "official" FastTrack clients come loaded with spyware that can replace your home web page and bombard you with a flurry of pop-up ads:

Kazaa	http://www.kazaa.com
Grokster	http://www.grokster.com
iMesh	http://www.imesh.com

For a while, anyone who wanted to connect to FastTrack without getting bombarded by pop-up ads used an unauthorized program dubbed Kazaa Lite. Kazaa Lite offered the same features as Kazaa, but without the intrusive *adware* and *spyware*. (Technically, adware just feeds your computer with a constant stream of advertisements, while spyware keeps track of websites you visit and secretly feeds this information to another computer without your knowledge.)

Naturally the copyright owner of Kazaa, Sharman Networks, wasn't too pleased with Kazaa Lite, because Kazaa Lite could still use FastTrack while avoiding the advertising that supports the network. Sharman Networks periodically changed the encryption method needed to connect to FastTrack, but with a little reprogramming, Kazaa Lite kept getting reconnected again. For Kazaa, which makes its money by allowing people to trade copyrighted files illegally, to threaten Kazaa Lite with violating their copyright to the FastTrack network seems just a little bit ironic.

To use Kazaa without the advertising, grab a copy of Diet K (http://www.dietk.com), a free add-on program that strips away the advertising embedded in Kazaa. While Sharman Networks can periodically change encryption methods to lock out Kazaa Lite users, they can't lock out anyone using Diet K, because they're still using Kazaa.

Two additional ad-free, unauthorized FastTrack clients are Mammoth (http://mammoth.sourceforge.net) and iMesh Light (http://www.imesh-light.com). While Mammoth is an open source project, iMesh Light is a version of iMesh but with the adware stripped away.

Because FastTrack remains proprietary, programmers have created an open source alternative dubbed OpenFT (http://gift.sourceforge.net). Despite their similarities, OpenFT is a separate file sharing network from FastTrack, so if you want the features of FastTrack but without the adware and spyware embedded in Kazaa, you might want to rely on OpenFT instead.

THE EDONKEY2000 AND OVERNET NETWORKS

Although Gnutella and FastTrack allow people to swap any type of file, the most popular files are usually music files that contain individual songs. While you can still find individual songs over the eDonkey2000 (often abbreviated as ed2k) and Overnet networks, you're much more likely to find files that contain movies, complete albums, video games, pirated software, and ISO disc images (which capture the contents of an entire CD in a single file), as shown in Figure 2-9.
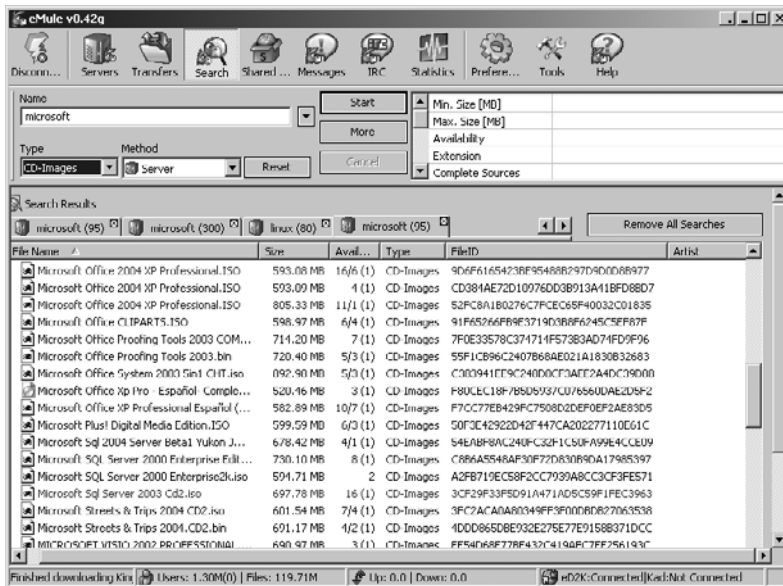
Figure 2-9

A quick search on the eDonkey network reveals plenty of CD images of popular Microsoft programs, including Office 2004, SQL Server, and Streets & Trips.

What makes both eDonkey and Overnet popular for sharing large files is their ability to download a file from multiple sources. By downloading a file from multiple sources, both eDonkey and Overnet ensure that if one computer with your desired file disconnects from the network, you can still download the rest of that same file right away from another computer.

To avoid the confusion caused by similarly named files, both networks examine the contents and size of each file and create a unique calculation known as a *hash checksum*. This checksum helps identify identical files that may appear on the network under different file names. That way you won't waste time downloading a movie like *The Matrix* only to find out that it's really a mis-named file of another movie called *Threat Matrix*.

To improve the sharing of large files, both eDonkey and Overnet allow you to start sharing a file before you've completely downloaded it. So if you're downloading a 400MB file, you can start sharing it as soon as you receive just part of that file. Anyone copying that file off your computer may receive their file at nearly the same time that you do without having to wait until you download the complete file first.

Despite their different names, the same people designed both the eDonkey and Overnet networks. The main difference is that eDonkey relies on a central server (much like the original Napster did) while Overnet does not.

Overnet can connect to both the Overnet and eDonkey networks. However, with eDonkey's growing popularity, Overnet's technology is gradually being phased into eDonkey.

Here are some popular client programs for accessing the eDonkey network:

OneMX	http://www.onemx.com
eMule	http://www.emule-project.net
eDonkey	http://www.edonkey2000.com

To access the Overnet network, just use the official Overnet client program (http://www.overnet.com).

THE DIRECTCONNECT NETWORK

Unlike the Gnutella and FastTrack networks, the DirectConnect network is more of a loose collection of central servers than a single unified network. Instead of sharing files among themselves, each server only shares files with people who connect directly to that particular server (hence the network's name). Figure 2-10 shows a list of servers as seen within the DC++ client.
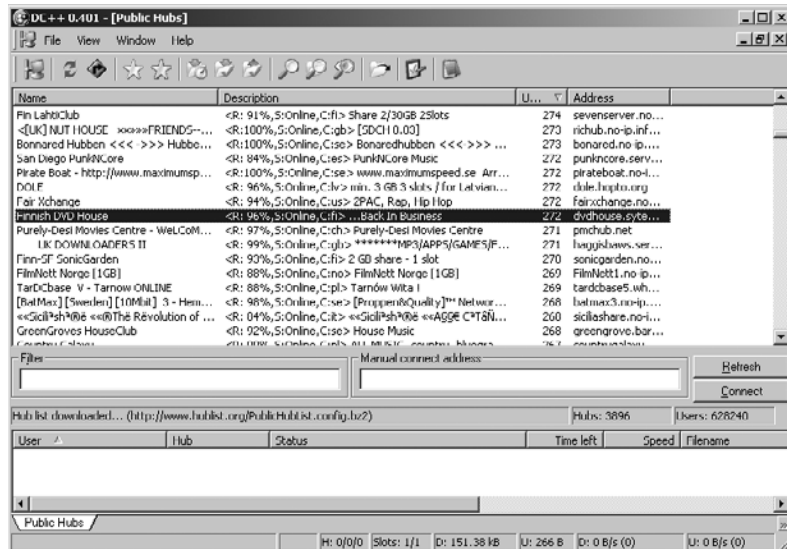
Figure 2-10
Before you can share files over the DirectConnect network, you must find a server that will grant you access to the network.

Each DirectConnect server runs more like a private clubhouse that sets its own rules for who can get access and what trading ratio you need to meet before you're allowed to download anything. Typically, most DirectConnect servers won't grant you access unless you agree to share a minimum volume of files, such as 10GB or 20GB. So before you can connect to a DirectConnect server and start sharing files, you must have a library of files to share.

By allowing anyone to create their own server, DirectConnect gives users the chance to specialize in certain types of files, such as jazz MP3 files or black-and-white, silent, full-length movies. Once you find a favorite server that provides the type of files you want, DirectConnect can be much easier to use than other types of networks. As a novice to DirectConnect, though, you'll have to spend some time browsing through different servers until you find the ones that you like best. Plus, you'll need to amass a collection of files to share, just to get access to any DirectConnect server.

Three programs for connecting to the DirectConnect network include:

DirectConnect	http://www.neo-modus.com
DC++	http://dcplusplus.sourceforge.net
DCGui	http://dcgui.berlios.de

THE MP2P NETWORK

While other networks offer video, program, and graphic files, the Manolito P2P (MP2P) network originally focused on nothing but MP3 music files. If all you want to find is music, then you'll find the Manolito network is a treasure trove for finding rare and bootleg music that you probably won't find anywhere else. Although people have recently started sharing other types of files besides music over this network, MP3 music files still dominate the file offerings.

While most file sharing networks have only one official client program, the MP2P network actually has three official clients, although Piolet (shown in Figure 2-11) doesn't come bogged down with adware like the other two clients, Blubster and Rockitnet:

Blubster	http://www.blubster.com
Piolet	http://www.piolet.com
Rockitnet	http://www.rockitnet.com
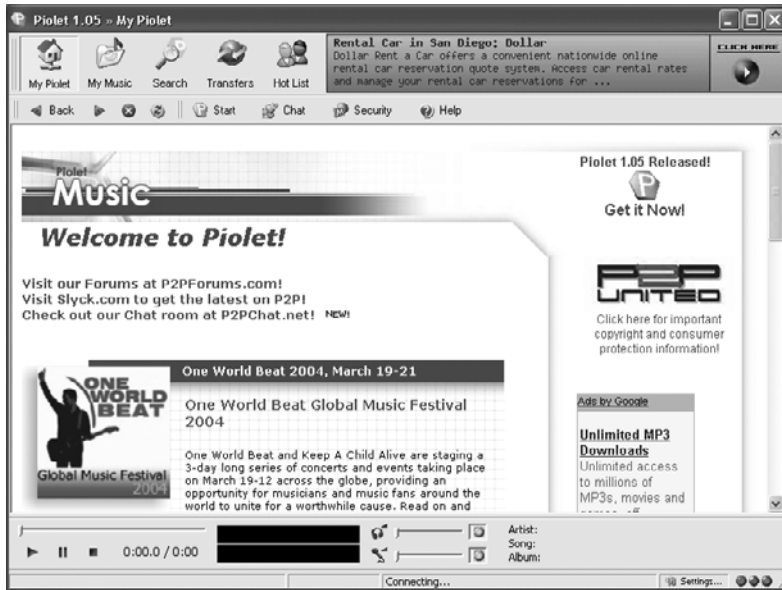
Figure 2-11

Piolet is advertiser-supported, but the ads only appear in a banner within the program; they're not embedded in hard-to-remove adware.

ADDITIONAL FILE SHARING FEATURES

With so many different client programs available to tap into the same file sharing networks, each client program may offer different features to entice people to use their program instead. Some client programs claim faster searching and downloading. Others include a built-in media player, so you can play your downloaded files immediately without having to load a separate media player, such as iTunes or Windows Media Player.

Other client programs offer parental controls to limit your kids from searching for specific words (and finding certain types of files to download, such as pornography), file shredders to destroy all traces of a downloaded file after you delete it (to prevent the authorities from examining your hard disk to see what copyrighted files you might have copied in the past), and proxy server access, so you can connect to a file sharing network through another computer (called a *proxy*) to help mask your IP address.

Some other popular features to look for in a client program include the absence of adware and spyware, the ability to access multiple file sharing networks, and anonymity while you are connected to a file sharing network.

ADWARE VS. FREEWARE

Creators of file sharing networks have a dilemma. On the one hand, they want to give their client programs away for free to encourage as many people as possible to use it and join. On the other hand, they also need to find a way to make a profit. So to compensate for giving away software for free, many companies create client programs that include *adware*, also known by the more insidious name *spyware*.

The idea is that when you install a free program such as a file sharing client program, you also agree to install the companion adware or spyware programs. By selling advertising, software companies can continue to give away their client programs for free and still make money. (Once you install adware/spyware on your computer, you may suddenly notice pop-up ads springing up on your screen whether you're using the file sharing network or not.)

To help you determine whether a particular client program comes embedded with adware or spyware, visit Spyware Info (http://www.spywareinfo. com/articles/p2p). Before installing a client program, browse its website to see if it reveals whether it's freeware or advertisement-sponsored. You can often detect adware/spyware in a client program during the installation program because a screen will pop up and ask if you agree to install and run a program to display ads, as shown in Figure 2-12.
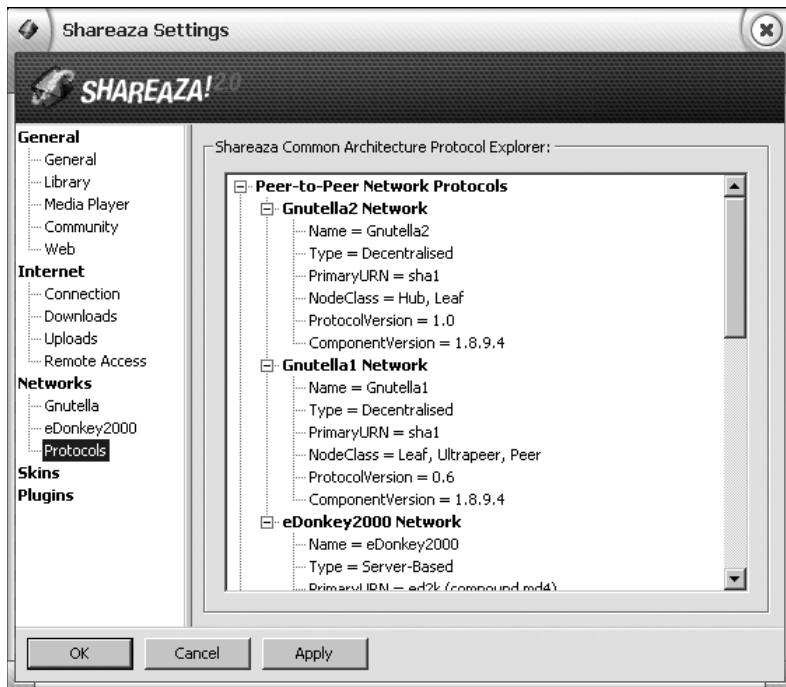

Figure 2-12
If a screen pops up and asks if you want to install additional software besides a client program for a network, chances are good that you'll be installing adware/spyware.

Most people accept adware/spyware as the price they need to pay for using a particular file sharing network, but now that you know you can find free client programs without adware/spyware, you should use those alternatives instead, unless you enjoy getting bombarded with pop-up ads whenever you use your computer.

MULTINETWORK ACCESS

Most client programs can connect to only one file sharing network, so if you can't find a particular file on one file sharing network, you often have to run a second or a third client program to access a different network. To avoid this inconvenience, a handful of client programs offer the ability to access multiple file sharing networks, as shown in Figure 2-13. This means you can use a single client program to search for a file, no matter which file sharing network it may be stored on.

Figure 2-13
Programs like Shareaza can connect to multiple file sharing networks,
such as Gnutella and eDonkey2000.

Here are some popular multinetwork client programs:

MLdonkey (http://www.nongnu.org/mldonkey)   Accesses Gnutella, Gnutella2, OpenNap, FastTrack, Overnet, and DirectConnect

giFT (http://sourceforge.net/projects/gift)   Accesses FastTrack, OpenFT, and Gnutella

Poisoned (http://gottsilla.net)   Accesses Gnutella, FastTrack, and OpenFT

iSwipe (http://www.hillmanminx.net/iswipe)   Accesses Gnutella, FastTrack, OpenNap, and OpenFT

Shareaza (http://www.shareaza.com)   Accesses Gnutella, Gnutella2, eDonkey2000, and BitTorrent

One problem with multinetwork client programs is that they may not offer all the features that a client program that is specifically designed for one file sharing network might offer. While not as well known as dedicated client programs like Kazaa or Morpheus, multinetwork client programs probably represent the future of file sharing clients, given their reach across multiple networks, which greatly increases the chance that you'll find the file you want.

ANONYMITY AND ENCRYPTION

File sharing by itself isn't illegal; it's what people trade that could be illegal. With the recording industry and government authorities cracking down on people trading copyrighted files, many client programs offer special anonymity and encryption features to mask your IP address so nobody can trace you. To ensure anonymity, these more specialized client programs rely on their own file sharing networks, which means that they aren't as popular, so the file selection isn't as great as the older, more established networks such as FastTrack or Gnutella.

Filetopia (http://www.filetopia.org), EarthStation 5 (http://www.es5.com), and Mnet (http://mnet.sourceforge.net) rely on encryption to keep others from detecting what types of files you may be trading, as shown in Figure 2-14. Encryption can mask either your IP address or the type of files you're sharing. Just remember that there is no such thing as true anonymity over the Internet; encryption makes users more difficult to identify, but not impossible.
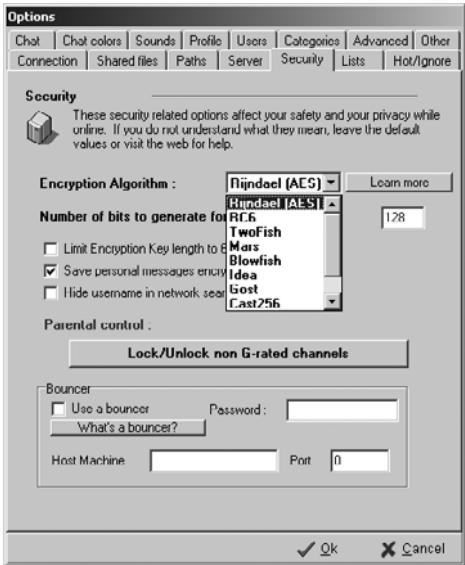
Figure 2-14
A program like Filetopia offers different ways to encrypt
your information from prying eyes.

SPECIALIZED FILE SHARING NETWORKS

In the computer world, nothing stays the same for long, and peer-to-peer tech-
nology is no different. Although FastTrack and Gnutella may be two popular file
sharing networks right now, there's no guarantee that another file sharing net-
work won't suddenly surge in popularity and push more established file sharing
networks into the background. So if you're the adventurous type who wants to
explore some of the smaller and newer file sharing networks, take some time to
experiment with the file sharing networks listed in this section.

UP-AND-COMING FILE SHARING NETWORKS

For an alternative file sharing network, take a peek at Soulseek (http://www.
slsknet.org), which specializes in sharing complete music albums. Soulseek
is completely free, and it doesn't secretly install adware on your computer. To
make money, the publishers of Soulseek offer a unique incentive: the more
money you donate, the closer you get to the front of the line when waiting to
download files.

BitTorrent (http://bitconjurer.org/bittorrent) specializes in distributing large files, such as full-length movies, to multiple people. Like an ordinary file sharing network, BitTorrent allows someone to post a large file for many different people to download. To speed up the downloading process, when multiple users download the same file, BitTorrent gives each user a different part of the file. Once everyone has downloaded a different part of the same file, BitTorrent redirects them to download the other parts of the file from other users. By spreading the file sharing process among multiple users, everyone can download a single large file quickly with less risk of getting cut off before they can download the entire file from a single computer.

Another programmer created MUTE (http://mute-net.sourceforge.net) after watching how ants scatter and regroup when disturbed, yet always manage to reach their final destination. MUTE applies the same theory as BitTorrent to file sharing. Instead of directly linking two computers to swap files, the MUTE network routes pieces of the files through several computers before they reach their destination. MUTE works much like spreading a message through a crowded room: if you give the message to seven people, and they spread the message to seven more, and so on, the message eventually reaches the right person.

In order for the recording industry to keep track of who's sending and receiving what file, they would have to monitor every single computer on the MUTE network, carefully tracing each piece of the file as it moves from computer to computer before reaching its final destination. MUTE remains optimized for smaller networks to preserve speed, but it shows how programmers are applying more sophisticated construction techniques to preserve user privacy.

Sometimes a client program starts out on an established network, but then decides to break away to form its own private network instead, whether for political or technical reasons. WinMX (http://www.winmx.com) originally connected to the OpenNap network, which was an open source version of the original Napster network. When the recording industry started shutting down OpenNap, WinMX slipped away, formed its own network, and continues to thrive to this day.

Ares (http://www.aresgalaxy.org) originally connected to the Gnutella network and then realized that Gnutella's technical limitations would also limit the future of Ares, so Ares broke away and created its own network, too. Some unique features that Ares offers include the ability to deal with interrupted file downloads (Ares just starts downloading the missing parts of a file rather than forcing you to download the whole thing over again) and multisource downloads (so you can download the file you want as quickly as possible).

BUILDING YOUR OWN NETWORK

Whether you use an old or a new file sharing network, there's always the danger that government authorities may be secretly monitoring your activities. While a handful of file sharing networks use encryption to hide the types of files you've shared, and proxy servers to mask your IP address, nothing is foolproof. So rather than risk trading files among any of these public file sharing networks, why not start a private file sharing network instead?

With a private file sharing network, you can control who can join and who can't, so you can swap files of any type within your trusted circle of friends and coworkers (without any possible snooping by government authorities or recording industry infiltrators).

If you already chat with friends through ICQ, you can use a program like ICQ File Share (http://www.npssoftware.com) to swap files with your ICQ chat buddies. If you don't use ICQ, try one of these instead:

BigSpeed	http://www.bigspeed.net
Aimini	http://www.aimini.com
HotP2P	http://playapp.com/hotp2p

Perhaps the most intriguing private file sharing network is one created by Nullsoft, the company that created the Gnutella file sharing network. Just like they did when they released Gnutella over the Internet, Nullsoft once again managed to irk its parent company, America Online, when it posted a program dubbed WASTE (http://grazzy.mjoelkbar.net/waste/mirror), which allows users to set up private file sharing networks with encrypted file transfers. Named after an underground postal system in the Thomas Pynchon novel *The Crying of Lot 49*, WASTE combined private file sharing networks with encryption. This combination pretty much ensured that even government authorities couldn't snoop on a WASTE network without a great deal of difficulty in locating the network in the first place, and then cracking the encryption once they found the network.

Not surprisingly, America Online quickly yanked WASTE off Nullsoft's website, but other programmers had already taken the WASTE source code and are likely to create alternatives and variations. Now if you visit Nullsoft's website, you'll see the following dire warning:

NOTICE OF UNAUTHORIZED SOFTWARE

An unauthorized copy of Nullsoft's copyrighted software was briefly posted on this website on or about Wednesday May 28, 2003. The software was identified as "WASTE" (the

Although you can find plenty of files on websites, FTP sites, and newsgroups, most people are likely to find file sharing networks easier and faster to use. To maximize your chances of finding a particular file, connect to the more popular file sharing networks along with some of the smaller, less popular ones, as well. Chances are good that the next time you want to find a certain file on the Internet, the first place you'll look will be through a file sharing network.