

Peer pressure

Peer-to-peer applications aren't just about illegally swapping the latest tracks, accidentally downloading viruses or being targeted by hackers. P2P technology is set to revolutionise the way you communicate, share data and think about some of the big questions of science. Simon Munk rides the next wave of file sharing

The pace of IT innovation is staggering: a hot new website, technological trend or must-have application seems to come along every few seconds. So sometimes it's difficult to spot a genuine change in the middle of the storm.

Only with hindsight do we notice that suddenly all teenagers are text messaging, everyone's got a digital camera and you don't need to explain what an MP3 is anymore. Right now, we're in the middle of another electronic leap forward. And again, you'd be forgiven for missing it.

To you, P2P (peer-to-peer) most likely means illegally swapping music files. But exchanging obscure Travis b-sides is only the tip of the iceberg of what file sharing can become. Think of P2P as helping make the internet less of a static arena controlled by gigantic portals and more of an active, collective space where you, your friends and colleagues call the shots. Rather than everyone talking to one or two websites, we all talk to each other.

PC Advisor is here to keep you abreast of the coming P2P wave - we show you how, tell you what for and, most importantly, point out where next.

No server required

Whatis.com defines P2P as "a communications model in which each party has the same capabilities and either party can initiate a

communication session. Other models with which it might be contrasted include the client/server model". In other words, peer-to-peer cuts out the server that stores all the information and instead your computer talks to other PCs on a network - all on an equal footing.

This is what makes P2P technology potentially radical. There's no need for a big central company using expensive server power. Instead, peer-to-peer relies on our communications technology linking up lots of small, reasonably powered machines to create something more capable than a server ever was.

Because of this, networks should be more reliable, perhaps even quicker. And if one machine goes down, it doesn't mean the whole system's offline.

Peer-to-peer communication is also much closer to the way we work now. Very few of us bother with a central resource when we can just phone a friend. These two elements together suggest P2P is already changing the way some people use IT.

Major players

The majority of P2P traffic is the sharing of music and video files. The area is dominated by Napster-like networks that all do the same thing. You share a group of files on your hard drive with other users and they do likewise. Traditionally this was

mainly music but, with more people signing up to broadband, services have expanded to include entire movies and commercial programs copied from CDs.

The idea remains the same whatever you store and share: others can see and copy from your directories, but not alter them. And with everyone on the network able to see thousands, if not millions, of other users' shared directories, the number and range of files available is vast.

A search-engine-like front end means you type in the movie, song title or whatever you're looking for. This will generate a list of all the matching files found on systems within a certain number of links from your PC. When you ask for a specific file, your request is passed from user to user and results are then sent back to you.

The following is a list of the biggest players in this classic file-sharing area:

- **Kazaa Media Desktop** This bills itself as the world's number one P2P application. It's user-friendly and has powerful abilities to search for all types of files, but Kazaa is one of the worst offenders for putting spyware and adware on to your PC (see *File sharing made safe* on page 95).
- **Kazaa Lite K++** The makers of Kazaa are currently trying to shut down anyone hosting the download for this application. It allows you to

Where to go

Berklee Shares:
www.berkleeshares.com
BigChampagne:
www.bigchampagne.com
BitTorrent:
bitconjurer.org/bittorrent
Colligo: www.colligo.com
eDonkey 2000:
www.edonkey2000.com
eMule: www.emule-project.net
Folding@home:
www.stanford.edu/group/pande
group/folding
Freenet: freenetproject.org
Friendster: www.friendster.com
Gomez Peer Community:
peer.gomez.com
JXTA Search: search.jxta.org
Kazaa: www.kazaa.com
P2PQ: www.p2pq.net
PinPost: www.pinpost.com
Plaxo: www.plaxo.com
Screensaver Lifesaver:
www.chem.ox.ac.uk/curecancer.html
Seti@home:
setiathome.ssl.berkeley.edu
Skype: www.skype.com
SoulSeek: www.slsknet.org
Waste: waste.sourceforge.net
WinMX: www.winmx.com
Wolfpack:
www.darpa.mil/ato/programs/
wolfpack.htm

connect to the same network but without any of the dodgy spyware technology.

- **WinMX** With its millions of members, as with Kazaa, almost any file you can think of is available here and there's no built-in spyware or adware. On the down side, again like Kazaa, WinMX's huge base means there are lengthy queues for the more popular files.
- **eDonkey 2000** With over a million regular users, this is a vast network that originally seemed to host mainly movies - now it handles everything. But the main program is overshadowed by the simpler, faster and adware-free eMule - one of the world's biggest peer-to-peer file-sharing clients.

Up and coming

As already mentioned, peer-to-peer isn't just about sharing music and video files. There are many other exciting applications already up, running and available for you to get to grips with:

- **Seti@home** This program demonstrates the power of distributed, decentred processing. Its job is to analyse data collected from a radio telescope at Arecibo, Puerto Rico, and look for evidence of extraterrestrial life. The amount of information to sift through for very weak signals in space is huge. So rather than use an expensive supercomputer, the Seti@home project has attracted nearly five million home users who each analyse minute amounts of work. These units are small enough to run as a screensaver - whenever a Seti@home user leaves their computer alone for a few minutes, it scans radio signals.

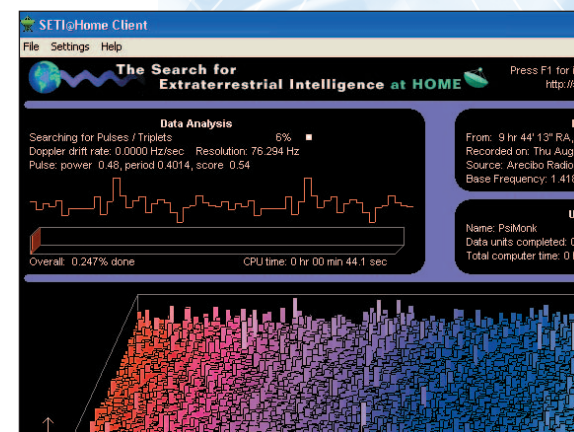
This application is more powerful than the fastest supercomputer, currently averaging around 60 teraflops, says company director, David Anderson. The same approach is now being applied to cancer research (Screensaver Lifesaver) and an Alzheimer's cure (Folding@home) among others.

- **Friendster** This application uses a P2P approach for social networking. You sign up and connect to other real-life friends. Then your network expands to include their friends and your friends' friends (up to five steps from you).

"I have 26 friends in my Friendster list, that results in 358,677 people in my immediate network," says Mark Ellwood, a New York-based Friendster. "It's for networking, socialising and dating."

The key idea is there's a much greater sense of trust in setting up a date with a friend of a friend than with a complete stranger. Friendsters can see the links between each other and even check in with the friends that link them to get a better idea of their compatibility.

- **Skype** P2P voice-over-IP - or in plain English, telephone calls through the internet. This system routes your



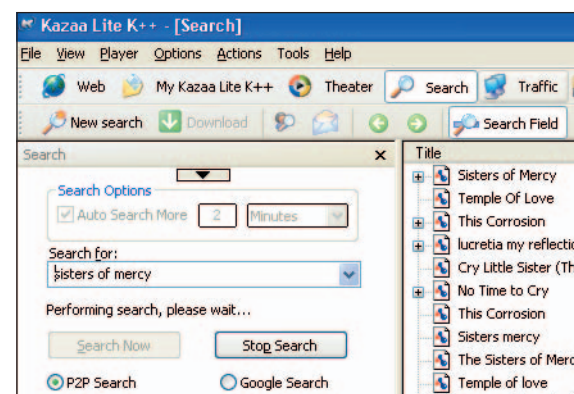
↑ **Participate in the scientific experiment by running a free program that downloads and analyses radio telescope data**

call from one user to the next until your voice reaches your similarly Skype-equipped recipient.

In between you and your talking partner, the call is encrypted so no one can listen in. And because you're only connecting via the web, calls are charged as normal internet time, even if they're long distance. Unlike other voice-over-IP telephony, Skype promises quality the same as regular phone calls. Over 3.5 million people have downloaded it already.

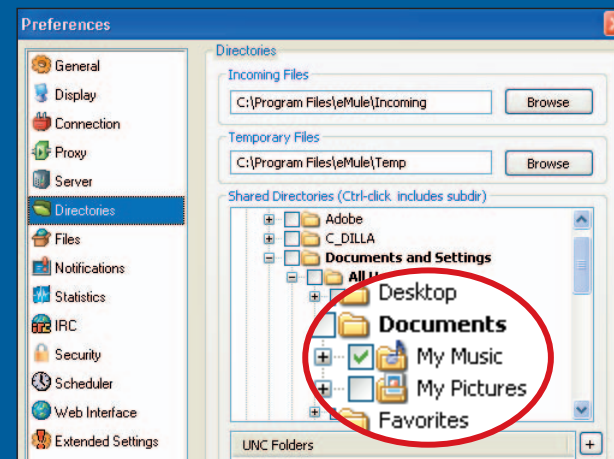
- **Plaxo** This contact management software integrates neatly into your Outlook address book and monitors other Plaxo users' details within it. If a Plaxo user you know moves or changes email address, you are automatically updated. And the catch? Not everyone uses Plaxo or even Outlook.
- **Berklee Shares** Going in the opposite direction to the rest of the music industry is this music teaching school program. Berklee Shares is the upshot of the prestigious Berklee College of Music, taking the view that sharing material is good.

↓ **Kazaa is built with an abundance of privacy features to keep away prying eyes**



File sharing made easy

- 1 **Download and install** Ensure you've downloaded the application from the correct site (see *Where to go* on page 94). Due to the popularity of file-sharing applications (and their reputation), unscrupulous websites often pretend to be the home page for an application, instead offering you a download that dials a premium phoneline or redirects you to a site with adult content



- 3 **Downloading files from others** All file-sharing programs have a search facility. Type in what you're looking for (see *Still haven't found what you're looking for?* on page 96). Results may then take several minutes to be returned. In SoulSeek (shown right), greyed-out files are those that already have a queue of people waiting to download, those in black are available immediately.

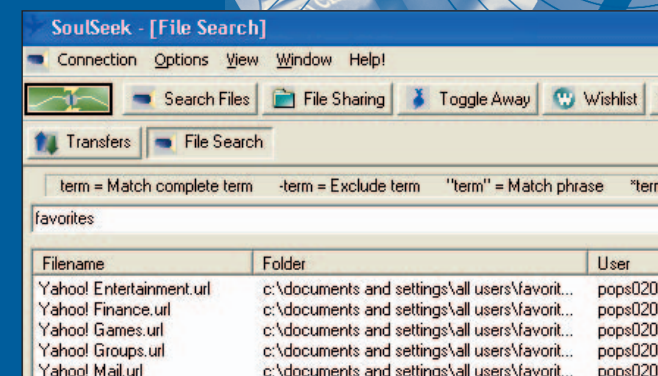
In other programs, such as eMule, the lighter blue file, the more users have it and the easier and quicker it should be to download. Files you select to download will appear on your Transfer list. Depending on your internet connection, and the connection of the person you're downloading from, transfers to your download folder may take some time. Most file-sharing programs give you an indication of the connection speed of the machine you're copying from

This website ensures that potential students are aware of course options. It's an online database of music and production lessons, licensed to be shared and passed around on the internet for non-commercial purposes.

- **Freenet** An anonymous, decentralised way of storing and retrieving information.

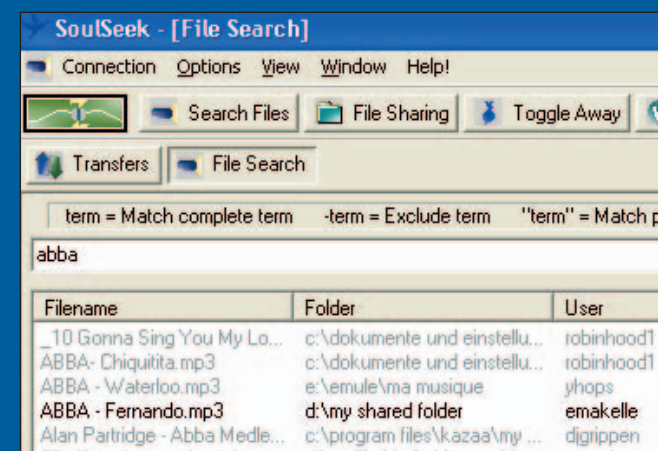
Freenet is designed to preserve free speech, particularly in countries where oppressive regimes would seek to ban it.

Each user stores a quantity of data on their hard drive and gives an amount of internet bandwidth to Freenet. What's on their hard drives is private - it's encrypted and can only be retrieved by someone who



- 2 **What to share** Only share files you're happy to let anyone see. Here, the user has set their My Music folder as the sole item to be shared. All file-sharing programs require you to specify two directories - the one that you download files from others to, and the one that others can see (and copy files from). The location of the latter is crucial - any files or folders in it will be available to anyone to copy from. In eMule's case, you must hit the Ctrl key while clicking on a directory in order to share subdirectories.

Don't share any folders that hold files of a personal or sensitive nature. You wouldn't want strangers to see your tax returns, internet passwords or email address book, for instance. For this reason, sharing the entire contents of your My Documents folder or all of your C drive is generally a very bad idea



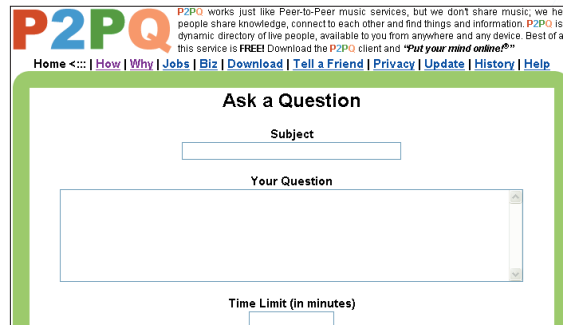
Freenet is designed to preserve free speech, particularly in countries where oppressive regimes would seek to ban it

Still haven't found what you're looking for?

Just like using search engines, there's a knack to getting what you want from file-sharing applications. Here are our tips:

- **Master the logic** Most file-sharing programs use the same type of logic algorithms as Google. So a minus sign (-) in front of a term means to exclude it, while quotes around a phrase mean use that exact phrase and so on.
- **Filter Type** any mainstream band name in to a file-sharing search and you'll be bombarded. Try searching for specific track names, adding 'live' to the search if you want concert audio plus the album name if you have it. Then pick the fastest connection possible.
- **Try and try again** It might take several attempts to get what you want. You may be stuck downloading a file from a slow connection or the user you are downloading from has suddenly gone offline. If so, try again later. It could be that you're searching at a time when not many users are connected.
- **Chat** Many file-sharing applications run forums inside the program. Often these are arranged by music genre but either way they're a great place to pick up tips on file sharing etiquette, making sure your settings are correct and even flagging up new files you might be interested in.

Not all P2P technology is designed for millions. Waste is aimed at small teams - groups of friends or scattered colleagues in a larger company



→ P2PQ provides a dynamic, live directory of people, available to you from anywhere and any device. Best of all, this service is free

has the right keycode. The idea is that you can store a document in Freenet and no one will know you've put it there, no one can read it without the code and no one can destroy it without disabling a vast swathe of the huge Freenet network.

The more popular a document is, in terms of accesses to it, the more machines it will be copied to, ensuring it can't be destroyed. Over two million users are online, with plenty registered in areas such as China and the Middle East.

• **BigChampagne** As Berklee Shares shows, the music industry isn't entirely against file sharing.

BigChampagne is a market research firm for large music companies. It offers chart information, trend analysis and forecasting - all based on activity on Kazaa and other file-sharing platforms.

Activity is monitored for spotting user trends and download frequency. This reveals what users are really up to, not what they say they're up to, in, for example, a survey.

• **Waste** Not all P2P technology is designed for millions. Waste is aimed at small teams - groups of friends or scattered colleagues in a larger company. It's a secure network that requires individuals to have web connections rather than servers, network architecture and so on.

The new wave

Clearly peer-to-peer programs already go way beyond simply sharing music and video files. But where does the technology go next?

• **BitTorrent** As the size of files shared commonly increases (from small MP3s to big movies to massive

File sharing and the law

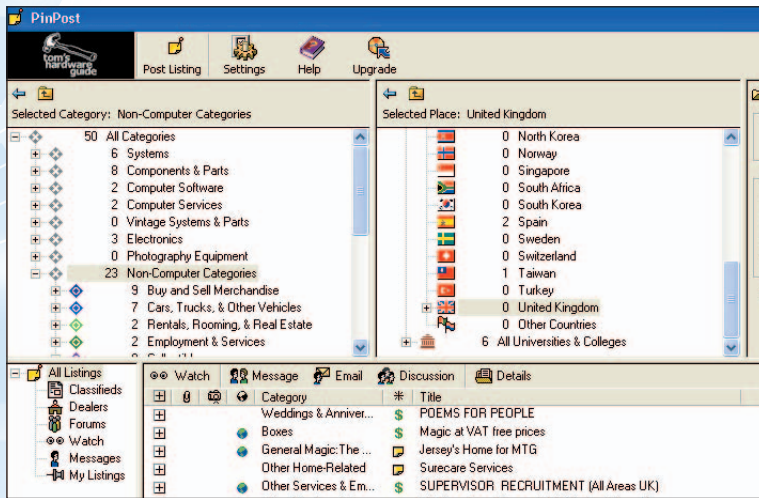
Since October, the new Copyright and Related Rights Regulations 2003 laws offer updated protection to copyrighted works shared over the internet. It's one of the toughest pieces of copyright legislation in the world and is based on the EU Copyright Directive. But what does it mean to you? Joanne Brook, partner in the Intellectual Property and Technology department at legal firm Manches, explains...

• **What is legal to download?** "Assume material is copyrighted and shouldn't be downloaded from a peer-to-peer network, or shared with others, unless it expressly says otherwise. There is a common belief that if something's on a file-sharing network it's okay to download, but 95 percent of material shouldn't be there."

• **What are the penalties if you're caught?** "The Recording Industry Association of America is very hot on file sharing. It's going after individuals, with fines ranging so far from \$750 to \$250,000."

Since we spoke to Joanne Brook, UK industry watchdogs have started talking about emulating this approach (see page 22 of the News section in our Spring 04 issue). Speaking speculatively, Brook says: "The law is very specific - damages can be awarded and even a prison sentence, although this is very unlikely."

• **How tough is the law?** It has been argued that the new law will even prevent owners of albums from copying the contents to their MP3 jukeboxes. "The regulation was drafted to close particular loopholes. If I downloaded my Abba album to my iPod, I doubt I'd legally have an issue as I own the original album. But if I then shared the iPod files with others, over the internet or directly, that would be an issue."



applications), this peer-to-peer network might have the answer. It works by creating a 'swarm' of people from whom you download small chunks of a much larger file. The more people in your swarm (the more users on the network), the faster it theoretically gets. The system should cope well with bigger file sizes too.

• **P2PQ** Like Friendster, this P2P program relies on real, not automated, connections to people. It's a search engine of human knowledge. Questions are routed out to those who have specified their knowledgeable areas. You indicate how long you're willing to wait for a response.

• **Gomez Peer Community** This is one of several attempts to take the 'distributed computing' model that Seti@home pioneered and turn it into profit for both the company and you, the computer owner. While your PC is logged on to the system and idle, it works on Gomez-set computing problems for businesses. Each hour it does that, you get paid a fraction of a dollar.

Currently, distributed computing may not earn you enough to pay for the electricity your system uses. But there is clearly a move to recognise that, outside charitable work, most people would expect some payment for their computer's time.

• **Colligo** Peer-to-peer networking is going mobile. Moving beyond the desktop PC, many PDAs and laptops are now enabled with Wi-Fi cards. Colligo works by networking together Wi-Fi devices, without a server,

allowing users to share files wirelessly, even if they're far from a hotspot.

The next step that's widely predicted in the P2P community is full networking through chaining. In other words, your PDA could connect to someone else's and both of you could then link up to a third person's broadband-enabled PC. All three of you would then share internet bandwidth peer-to-peer. One example could be cars networking with each other while on a motorway.

• **PinPost** eBay goes peer-to-peer. Cutting out the middle-man, this allows internet buyers and sellers to make direct contact and to search for localised sales. The catch? It's still rather under populated compared to even your local car-boot sale.

• **Wolfpack** These are pods that the US Department of Defense is developing. When dropped on to a battlefield they can do two things: jam all enemy cellular and other communications within half a mile of each pod and then create a peer-to-peer network that can link any soldiers on the battlefield back to the nearest base. It can also relay any enemy signals received. The military's enthusiasm over peer-to-peer is a sign the technology really has arrived. ☒

↑ PinPost gives you access to a huge database of listings, conveniently organised for ease-of-use. Post your old computer for sale or browse for a used car

File sharing made safe

Senior manager Kevin Hogan from security response group Symantec gives some pointers for online P2P security.

• **What are you sharing?** "Configuration is the most important issue. File-sharing applications ask you to define what folders you share. Search on any for root C drives - you'll see a lot of them," says Hogan. "That's where high-profile cases of people obtaining things like payroll information come from."

• **What are you downloading?** If you download a virus-infected file from someone else's PC then your machine can become infected too. An MP3 file can't be used to infect your PC, nor can a video file, although a Word document can. The same is true of any other office application file that can run macros (sets of preprogrammed keystrokes or commands).

"Some viruses can masquerade as MP3s," says Hogan, though this is rare. More likely are files named something like 'innocuous.mp3.exe'. At first glance they look like MP3 files but aren't anything of the sort. "Use up-to-date antivirus software and a dash of common sense."

A few viruses and worms are designed to propagate specifically over peer-to-peer networks. But these can be dealt with in the same way.

• **Who's downloading from you?** Any user copying a file from your PC, if they're computer literate enough and malicious, can discover your IP address. "It's like someone knowing your home address - they can use it for all sorts of things." Consider avoiding this, particularly if you use broadband, by utilising a 'proxy' server. These are available as an option within most file-sharing applications and mean you're not directly connected to anyone viewing your files.

• **Who's watching you?** Some file-sharing applications install adware or spyware on your machine. These programs are designed to pass information, culled from your PC, back to program makers. "While these are mostly annoying it is useful to know what they're looking at," adds Hogan. Check the end-user licence before you install. Occasionally, spyware can be malicious. In early 2002 one download from several networks, including Kazaa, featured a Trojan file that monitored which sites users visited and posted the information to another website. It also opened a security hole on users' systems by allowing automatic executable downloads.

• **What about your firewall?** "It's a good idea to ensure controls are in place, such as blocking the right ports using a firewall." But file-sharing apps go to great lengths to circumvent firewall security. If you use file-sharing applications you must take other precautions, as outlined here.