Making the Net work for you

I N T E R N E T

You've seen it in the news and you've read about it in the papers, but what exactly is the Internet and just how can you join the fabled Information Superhighway? This month, *PC Direct* helps you join the estimated 20 million people currently using the Internet – all you need is a modem, a connection to an Internet service, our four-page guide and a great deal of perseverance.

The Internet's current fame is far from a case of overnight stardom. In 1969 a US Defence department, the Defense Advanced Research Projects Agency (Darpa), needed a method of transferring military research information quickly between researchers based at different sites. The answer was DarpaNet, which originally consisted of just four computers on a network. By 1972 the network had grown to 37 nodes, and had become known as ArpaNet. Its users were no longer just transferring military research data, they were talking to each other too because they had private mail accounts on the system. The network continued to grow and its uses became ever more diverse.

In 1983 a separate network called Mil-Net was created to enable the sensitive military research to continue. In 1984 the US National Science Foundation (NSF) created five supercomputer centres whose resources were to be accessible by any educational facility that required them. The NSF had planned to use ArpaNet for this, but red tape put an end to that. Eventually, they took the matter into their own hands and NFSNet was born. This new network was operated by schools and universities which were connected to each other on a regional basis, with at least one site in every region having a direct connection to a supercomputing centre. Therefore, all sites had access to the supercomputing centres by passing information along a route of sites.

NASA, the US Health Department and the US Energy Department were among those that realised the potential of this new communications medium and joined the bandwagon, which by now was rolling away with nobody at the reins. The result

was that ArpaNet, NFSNet and all the other nets have joined together to form what is known today as the Internet.

The Internet is a network of sites and, reflecting its heritage, these sites may be educational, military, scientific, commercial and so on. Each site is a network in itself, either a local area network (Lan) or a wide area network (Wan), the only difference being the geographical size of each network. All these sites are connected to the Internet, and to each other, by various means which include standard telephone lines, dedicated leased lines and even satellite and microwave links.

To enable the variety of computer platforms and operating systems that are used by these networks to talk to each other, a standard protocol is required. In the case of the Internet this is Transmission Control Protocol/Internet Protocol (TCP/IP), which was developed as an open protocol by Darpa and is implemented across the different platforms.

The networks that form the Internet are connected by routing computers which need to know how best to transmit packets of data over different parts of the network. IP takes care of addressing the packets to ensure that a router knows where to send the data when it receives it. However, these packets are restricted in size – less than 1,500 characters in length – and can get lost or damaged in the delivery process. Because of this TCP is used to break down the packets into smaller chunks, and place them in sequence in an addressed data envelope, which in turn is placed in an IP envelope for transmission. At the destination the envelope is opened and the data reassembled by TCP.

GETTING CONNECTED

To get connected to the Internet you need a service provider – a physical link to the Internet. You could lease a dedicated line and set up a router, which tends to be the expensive way; alternatively, you can use the services of someone who has already invested time and money in the network. You pay a company a fee and in return you get an Internet connection using your tele-

Going places

Just to get you started on your Internet travels, here is a list of some interesting, useful and diverse sites for you to visit.

FTP

Subject	ftp to	path
biological research	ftp.bio indiana.edu	/archive.doc
book reviews	csn.org	/pub/alt.books. reviews
the economy, research papers and statistics	netec.mcc. ac.uk	/pub/netec/
literary classics in electronic format	nic.funet.fi	/pub/doc/ literary/etext/
Nato press releases	ftp.spies.com	/gov/nato/
photography	moink. nmsu.edu	/rec.photo/
the scientist: an online version of the science professional's newspaper	ds.internic.net	/pub/ the-scientist/
Windows software	ftp.cica. indiana.edu	/pub/pc/win3/

GOPHER

subject	site
Internet resources	gopher.internic.net
National Science Foundation	gopher.nsf.gov
Whole Earth Review articles	gopher.well.sf.ca.us
request sounds or songs in computer formats	athena.sdsu.edu 71
natural history	nmnhgoph.si.edu
interesting and unusual documents	wiretap.spies.com

WORLD WIDE WEB

subject	addresses
A 'virtual' World's Fair: tour the exhibits from around the globe	http://sunsite.unc.edu/ expo.ticket_office.html
Ethernet information	http://wwwhost.ots.utexas. edu/ethernet/ ethernet-home.html
BBC Networking Club	http://www.bbcnc.org.uk

phone line by way of serial line IP (SLIP) or point-to-point protocol (PPP) software. The service provider will offer you technical help in setting up your software, allowing you to get you up and running with the minimum of fuss. There is a growing number of such providers in the UK, and Internet access isn't as expensive as you may think. See *Contacts*, page 420, for service providers that offer access to the Internet.

The most common use of the Internet is, without a doubt, electronic mail. But E-mail needn't be confined to text, as it is quite possible to send binary files by this method. Indeed, gigabytes of binary files are sent via the Internet every day. To do this the binary file must first be converted into text, using a UUencoder (Unix to Unix) so that it can be sent by E-mail without losing data. On receipt the file then has to be UUdecoded before it can be executed by the recipient. Programs that automate this conversion process are readily available on the Internet.

For E-mail to navigate the Internet there needs to be a standardised format of mail addressing. An Internet address is composed of a name followed by a domain. Taking our address – pcdirect@cix.compulink.co.uk – as an example, 'pcdirect' is our name and refers to us and us alone, and everything else after the @ character forms the domain. A domain simply refers to exactly where your mailbox is situated, and is divided into a top level domain and various subdomains. The top level domain usually denotes the country of origin; in our address this is the 'uk' at the far right of the address. Other country codes include 'us' for the United States, 'fr' for France and 'au' for Australia.

However, sometimes this top level domain is organisational, and you might find domain codes such as com (commercial), edu (educational), gov (government), mil (military), org (other organisations) and net (network resources).

The subdomains in our address are 'cix' and 'compulink' and these refer to the host name and service provider, respectively. So reading the address from right to left, you can see the possible choice of recipient is cut down from 30 million to just one.

Even the BBC has discovered the Internet and WWW. This is the home page of the BBC Networking Club
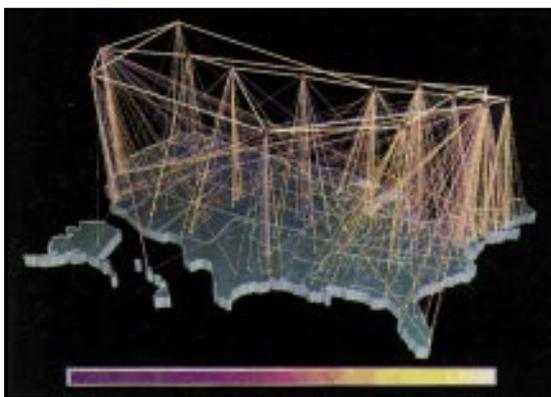
A map of the Internet, downloaded from the Net itself. This image can be found at ftp.eff.org

Sending mail instantly across the globe isn't the only thing that the Internet can offer. There are a great many tools and services available that can open up a whole new world of information.

TELNET

Telnet is a remote login application for the Internet. This allows you to login to another computer which you can then operate from your own machine. What you can actually do with the remote computer depends on the level of access you have, but common uses would be file retrieval

using file transfer protocol (FTP), or searching for information using a Gopher. Telnet can be used to save money on phone bills; for example, if you have an account with The Well (a large conferencing system based in San Francisco) you can connect to the service by telnetting over the Internet, paying only a local call rate because your service provider is local to you. You can then access all the services of The Well as if you had dialled it directly.

Using Telnet is simplicity itself, and merely involves using the syntax `Telnet <hostname>`. So, to Telnet to The Well you would type `telnet well.sf.ca.us`

Some networks will offer access to a particular service only, and will specify a port address which you can Telnet to in order to get that access. An example of this is the Discworld Multi User Game which is sited at `mud.compulink.co.uk 4242` and is the only part of the Cix service open to non-members. To get here you have to specify the port number as part of the address, as follows: `telnet mud.compulink.co.uk 4242`

FTP AND ARCHIE

There are thousands of gigabytes of files stored across the Internet including programs for all computer platforms and shareware for every possible application, and these files are available to anyone connected to the Internet. Most shareware programs can be found on the Internet long before they reach the shareware libraries and dealers, simply because most of the people who write them are on the Internet. No more waiting for days, sometimes weeks, for a disk to arrive in the post after you order it; with the Internet you can retrieve the programs that you want almost instantly.

There are two options open to you for downloading files: the first is to connect to a site that offers what is known as Anonymous FTP. This is a site which holds a directory which is open to anyone. Freely downloadable files are kept in the /pub▶

(public) directory as a rule, and from there you can explore all the different categories and see what takes your fancy. However, if you have a particular file you are after and know the filename, you can get an Internet application to track it down for you. This is where Archie comes into play. Archie will search through an index of over three million files and report back to you all the Anonymous FTP sites where it can be found, saving both time and money.

To use Archie you need to connect to an Archie server. In the UK there is a reliable server to be found at doc.ic.ac.uk and the proper syntax to connect to this is `telnet archie.doc.ic.ac.uk`

Once you are connected, use `archie` as your login. There is no password required. You can get help on all the commands available to you by typing `help`, but to get started all you really need to do is set the pager so that you can read the results of your search, and set your terminal type (for this example we are using the common vt100 terminal type). To do this, type `set pager set term vt100`. You can now ask Archie about the file you are searching for using the command `prog <filename>`

Archie will return a list of 'hits', giving details where the file can be found. As the report can be quite lengthy, you may wish to mail it to yourself as an E-mail document, for which you would type `mail <your full E-mail address>`

You can also use Archie by E-mail. Send a message to archie@doc.ic.ac.uk leaving the subject line blank, or you can use this for your own reference if you prefer, but including the text `open prog <filename> quit` in the body of the message. The Archie server will then send you a report listing the ftp sites by mail.

Once you have found a site to get the file from, you will need to connect to that site to be able to transfer it. There are hundreds of sites which offer Anonymous FTP. Internet etiquette (sometimes referred to as Netiquette) suggests you use the site which is nearest to you geographically.

To connect to an ftp site you use the syntax `ftp <sitename>`. To connect to a site at ftp.nau.edu, for example, you would type

`ftp ftp.nau.edu`. Once connected you will be prompted for a login, to which you should respond `anonymous`

You will then be prompted for a password, and this should be your full E-mail address. This is a courtesy so that the remote site can keep track of the people who are using its services. In our case the password would be pcdirect@cix.compulink.co.uk. All being well you should now be connected and will get the ftp prompt which should look like this: `ftp>`

If you want advice on using the commands from here just type `help` and you will get a full listing of commands. To see where you are just use the `dir` command, and you can then navigate using the `cd` command. You should look for a directory called /pub as this is where files available for Anonymous FTP are usually stored. When you find a directory containing a file you would like to transfer, you first need to ensure that the transfer mode is correct. This can be either Ascii or binary; most sites default to Ascii. If you are downloading any non-text files you should set the transfer mode to binary by typing `binary`

Once you have done this, you can initiate the download of your desired file by typing `get <filename>`

Once the transfer is complete you will be back at the `ftp>` prompt from where you can terminate the session by typing `quit`. It is possible to get files by E-mail as well, using an ftp server. The file is requested by E-mail and is sent as an E-mail message where the binary code of the program has been converted to Ascii (or UUencoded). To be able to use the program you will then have to convert it back to binary, or UUdecode it. There is a good ftpserver at doc.ic.ac.uk and to use this you should send E-mail to ftpmail@doc.ic.ac.uk

To get the file jupiter.gif which is to be found at jplinfo.jpl.nasa.gov in the directory path of images, you would put the following text in the body of the message:

```
open jplinfo.jpl.nasa.gov anonymous
  <your E-mail address>
binary chdir images
  get jupiter.gif
quit
```

GOPHER IT

Gopher is an application designed to help you navigate through Internet resources efficiently by using a simple menu structure. You tell it what subject you are seeking information on, and it goes off and searches the Internet for documents on that subject. When it finds something that is of interest you can read it, download it, or send it to an E-mail address.

To access Gopher you need a Gopher client, which many service providers now offer. If you have a client available you just need to type `gopher` and take it from there, but if not you will need to connect to a public Gopher.

To connect to a public Gopher site use the syntax `telnet <gopher site>`, for example, to connect to the Gopher at gopher.sunet.se you would type `telnet gopher.sunet.se`, and when prompted for a login you respond with `gopher`.

You are now in the Gopher and it really is just a case of making choices from the menu and travelling the world. You can get help from the Gopher itself by choosing the appropriate menu item.

WORLD WIDE WEB

The World Wide Web, also known as W3 or WWW, is the next big thing to hit the Internet, and it's already revolutionising the way in which information is accessed and presented. Many users are saying that, given a couple of years, the WWW could become the world's largest source of information, leaving the British Library and the US Library of Congress behind.

WWW is a hypertext-based information tool, allowing the user to explore a seemingly never-ending web of electronically stored information. The WWW was developed by CERN, the European Particle

Contacts

Name	Phone	E-mail address	Costs
Cix	081-390 8446	cixadmin@cix. compulink.co.uk	Registration fee of £25 £3.20 per hour Monday to Friday 8am to 5pm £2.40 per hour all other times
Demon Internet	081-349 0063	internet@demon.net	Registration fee of £12 £10 per month
The Direct Connection	081-317 0100	helpdesk@dircon.co.uk	Registration fee of £7.50 Standard Account £10 per month Enhanced Account £20 per month
EUNet (GB)	0227-475497	n/a	From £95 per quarter
IBM PC User Group	081-863 1191	info@ibmpcug.co.uk	Registration fee from £7.50 Connection charges from £3.50 per month
Pipex	0223-250120	pipex@pipex.net	Connection rates vary according to account type

Physics Laboratory in Geneva, in an attempt to try and organise the information on the Internet.

Of the many WWW Browsers now available, Mosaic running under Windows or Unix seems to be becoming a favourite with many users as it lets you travel through vast amounts of data by taking links from within each page. For example, if you were reading about the money market you could just click on the words Wall Street to be transported off to more information about that subject.

It's not only text which is available and active, though, but graphics and sound as well. You need special browser software to take full advantage of the WWW, but if you just want a quick introduction to what it's all about you can Telnet to a character-based server and have a look around.

To connect to a text-based World Wide Web server use the syntax `telnet <WWW server>`. There is such a server at the home of the Web, info.cern.ch, – to connect type `telnet info.cern.ch`.

USENET

If you can imagine a worldwide conferencing system with thousands of discussion groups covering every conceivable subject matter, you have imagined UseNet. Although it tends to be US-centric, it is truly global and there is a growing amount of contributions from Europe. UseNet consists of thousands of newsgroups, each of which covers a different subject.

The newsgroups have a hierarchy of eight main categories which help to identify the subject area. These categories are: alt (alternative newsgroups), which covers humour, controversy and just about anything else; comp, which concerns computer related matters; news, where you will find news announcements; rec, where you can expect to find discussions on recreational and hobbies; sci contains scientific discussions; soc, which deals with sociology; talk, where you will find chatter and general debate; and finally misc, the home of categories that don't fit anywhere else.

There are other smaller hierarchies, which include bionet, dealing with biological matters, biz, where you can read product announcements, and even relcom, created for Russian language groups.

To participate in UseNet you need Newsreader software, which is readily available from the Internet or from your service provider. Newsreader will let you subscribe to the newsgroups that interest you, download new messages in an organised format and post messages yourself.

MAILING LISTS

Similar in concept to UseNet, mailing lists are discussion groups on specific subjects. However, the contributions to, and distribution of, the discussion is done by E-mail. No special software is needed, and anyone with the means to send mail over the Internet can take part. Mailing lists can attract a very high volume of traffic, so be prepared to receive a large amount of E-mail should you join more than the odd one or two.

There are two common methods of joining a mailing list, and which one you will need to use depends on how the particular list you are interested in is administered. Firstly you may be asked to send an E-mail request to the list administration address, which is the same as the list name but with a suffix of -request. All mail sent to this address is treated as a subscription request and nothing is posted to the list from this source. A typical subscription address, in this case to join the anmi-l animation mailing list, would be anmi-l-request@rmcs.cranfield.ac.uk

The second method of joining is to write to a listserv address. A listserv is just a software system that maintains a mailing list on BitNet. There are many hundreds of mailing lists which are maintained by listserv, so you need to identify the particular one you wish to join, and this is done by including a string in the message body. To subscribe to the anaesthesiology mailing list at ubvm.bitnet you would send E-mail addressed to listserv@ubvm.bitnet

Leaving the subject header blank, you would include the following text in the body of the message: `subscribe anest-l <your full name>`. Remember that it is your full name which is required and not your E-mail address as is the case with other requests.

The most important thing to remember when you are looking at the Internet is that this isn't just a piece of state-of-the-art hardware or software; it has its foibles, it can be infuriating at times, but for every disadvantage there are a hundred advantages. The Internet allows you immediate access to almost any piece of information ever typed into a computer, and if you can't find it there are 20 million Internetters out there who might be able to help. Welcome to the Global Village.