INFORMATION SYSTEMS SERVICES

Overview of the Internet

An introduction to the Internet, Internet concepts, the programs necessary to use the Internet and how to connect to the Internet.

AUTHOR: Information Systems Services

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Contents

Format Conventions

In this document the following format conventions are used:

Commands that you must type in are shown in **bold Courier** font.	`WIN31`
Menu items are given in a **Bold, Arial** font.	**Windows Applications**
Keys that you press are enclosed in angle brackets.	**<Enter>**

Feedback

If you notice any mistakes in this document please contact the Information Officer. Email should be sent to the address **info-officer@leeds.ac.uk**

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Introduction

There has been a lot of talk in the press about the "Information Superhighway". People talk about "cruising the net", "surfing in Cyberspace" and a number of other largely meaningless and highly jargonised phrases. But for many people, even some computer users, it is still a thing shrouded in mystery and, to an extent, suspicion.

Unfortunately, getting access to this 'Internet' isn't that obvious. There are some difficult concepts to overcome, often some obstructive hardware to grapple with. Consequently many who have managed to conquer their fear and lack of knowledge when they first came to computing now find themselves in exactly the same situation again facing the world of international computing.

This document has been compiled to help such people. In preparing this overview extensive use has been made of a particular document, details of which are on the back page. The aim of this document is to explain:

What is the Internet?

A brief explanation of physically what it is and how it came about.

What can I do with the Internet?

To whet your appetite. Also, because the Internet is best described from a functional point of view ("What do I want to do") rather than from a list of available software and what it does.

How do I get connected to the Internet

Having whet your appetite, this is how you actually get on.

This document will not explain how to use any of the software programs involved when using the Internet, otherwise it would be huge. Many of those programs are documented separately in other ISS documentation and so may be explored separately.

If you want a more detailed introduction to the Internet there are some recommendations in the Appendix.

What is the Internet?

To explain what the Internet is, we'll start from the bottom up.

What is a Network?

Most of the time, PC users work on their own with their PC connected to nothing more exciting than a printer. However, it has always been possible to connect two PCs with a piece of wire so that they can communicate – usually just to transfer files.
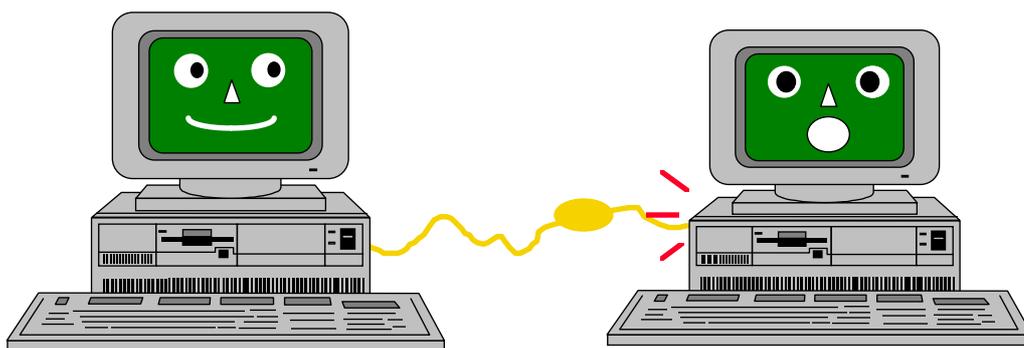
This, in essence, is all a network is – two or more computers connected by a physical piece of wire. The connection between the two computers is then managed and operated by some special software.

Local Area Networks

It makes sense, most often for financial reasons but also for others, to network groups of computers where they share a common workload. Networking computers means that the people using them can share files easily, send each other messages and share each other's printers. This idea has developed into Local Area Networks (LANs). Nowadays most organisations have a local area network. LANs can be as small as just one shared office or as large as a whole city.
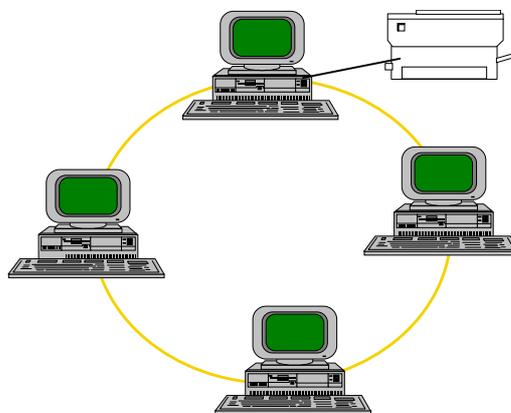
Wide Area Networks

In some cases an organisation is spread over a large area, and you do not have the easy concentration of computing to provide a LAN for. In this instance computers may be connected by a Wide Area Network (WAN). The difference between a WAN and a LAN is partly one of scale (although this is relative) but also relates to the technology. With a LAN you will typically get a fast network that can network PC file servers. With a WAN the network will often be much slower and will usually involve some mainframe computer as the server rather than a PC.

Combinations of Networks
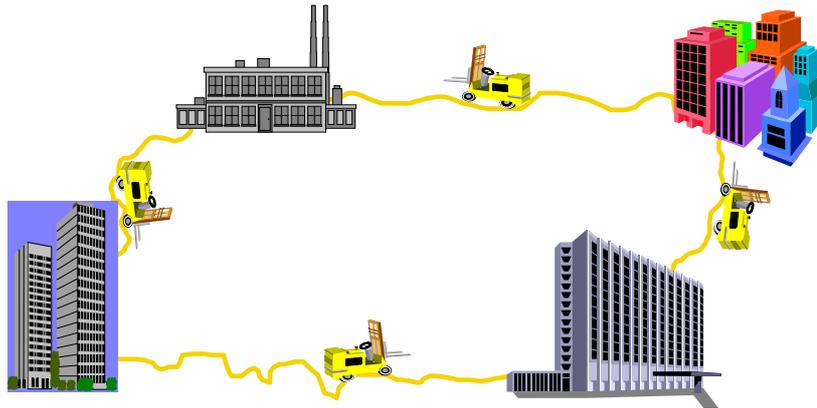
LANs and WANs are not mutually exclusive. In fact they combine very well together. Many organisations now have both, where a WAN has been created by connecting up a series of LANs. A good example of this is the Academic Community. Every University has its own LAN providing email, printing, file sharing and other facilities. Then every University is connected to the Joint Academic Network (JANET) which is a WAN running the length of the country. Through JANET someone in Leeds can log into a mainframe computer in Southampton.

The Internet

If you take the principle of small, locally-managed, networks connected up to form a larger network, which in turn is connected up to form a larger network, and so on, you get some idea of what the Internet is. Physically it is just a collection of LANs and WANs that have been connected up at a national and international level.

The Internet is more than this, however. It not only is the physical wire, but also how information is sent from one computer to another. Take the example of making a road journey. If you are sending someone in a car to go somewhere, you can do one of two things:

- give them precise written details of how to get to their destination. As they have no other means of finding their way they will have to stick to your instructions even if they can see roadworks ahead.

- give them a map and let them find their own way. If roadworks, or some other blockage occurs then the person can either read the map and work out a fresh route, or else follow the diversion signs.

Originally information on networks followed the first method – it was given precise instructions on how to reach its destination. However, if there was a hold-up, say a computer was switched off, the information was also held up until the hold-up cleared.

Now information is more intelligent and can work out its own route, so if there is a hold-up it will try and get through some other way. It's all rather clever, and was invented by the American Defence Industry who asked "If someone dropped a very large bomb on our computer network, would it still function?". The intelligent information transfer – a mechanism called the Internetworking Protocol (hence "Internet") – means now that it can.

What do you do with the Internet?

Talk to other people

A traveller was very impressed by a hotel in Hong Kong. Upon arrival at the hotel from the airport, he checked in, and went to his room. When the TV was switched on there was a message waiting for him on the TV screen.

This system is available to everyone who uses the Internet. To get on to the Internet you have to have an identification unique to you called your *username*. Everyone who connects to the Internet has a username, and if you have their username and the name of the machine they log into you can send a message to that username and they will receive it when they next log in. This system is called *Electronic Mail* or *email* for short.

The basic concepts behind email parallel those of regular mail. You send mail to people at their particular addresses. In turn, they write to you at your email address. You can subscribe to the electronic equivalent of magazines and newspapers. If you have email you will almost certainly get electronic junk mail (or spam) as well.

Email has two distinct advantages over regular mail. The most obvious is speed. Instead of several days, your message can reach the other side of the world in hours, minutes or even seconds. The other advantage is that once you master the basics, you'll be able to use email to access databases and file libraries as well as transfer files and programs.

Email also has advantages over the telephone. You send your message when it's convenient for you. Your recipients respond at their convenience. No more frustration whilst you phone someone who's out, then they phone you back whilst you're out. And while a phone call across the country or around the world can quickly result in huge phone bills, email lets you exchange vast amounts of mail for only a few pennies – even if the other person is on the other side of the earth.

Email is your connection to help – your Net lifeline. The Net can sometimes seem a frustrating place! No matter how hard you try, no matter where you look, you just might not be able to find the answer to whatever is causing you problems. But when you know how to use email, help is often just a few keystrokes away: you can ask your system administrator or a friend for help in an email message.

Even if you use the Internet for no other purpose, email makes getting a connection worthwhile all by itself. Very quickly you'll find yourself writing to friends who are on the Internet, contacting colleagues interested in similar professional areas all round the world, discussing politics and asking for advice on how to use some of the software on your computer. It is very powerful and incredibly cheap.

Many-to-Many Discussions

Mailing Lists

Mailing Lists can be used to share information via email with people who have a common interest.

An electronic mailing list is quite similar to a postal mailing list in that it is a method of distributing the same information to lots of different people. Mailing lists are typically used to discuss work with colleagues at other Universities, share news, collaborate on projects and publications, announce jobs and conferences and keep in touch with current developments in your subject area.

In order to get information from an email mailing list you need to subscribe – that is, you need to ask that your name be added to the list. Other people can then send information to you and others on the mailing list simply by posting a message to a single email address. These messages are then automatically forwarded on to all members of the list.

How Do You Find Mailing Lists?

There are a number of different services you can use for finding out about what mailing lists exist, and how you can join them.

The National Academic Mailing List Service (JISCmail) is based at the Information Technology Department, Rutherford Appleton Laboratory. It hosts a wide number of different mailing lists for the academic community in the UK. This service was formerly known as Mailbase at the University of Newcastle. To explore the mailing lists hosted by JISCmail you can connect to their home page on the web: http://www.jiscmail.ac.uk
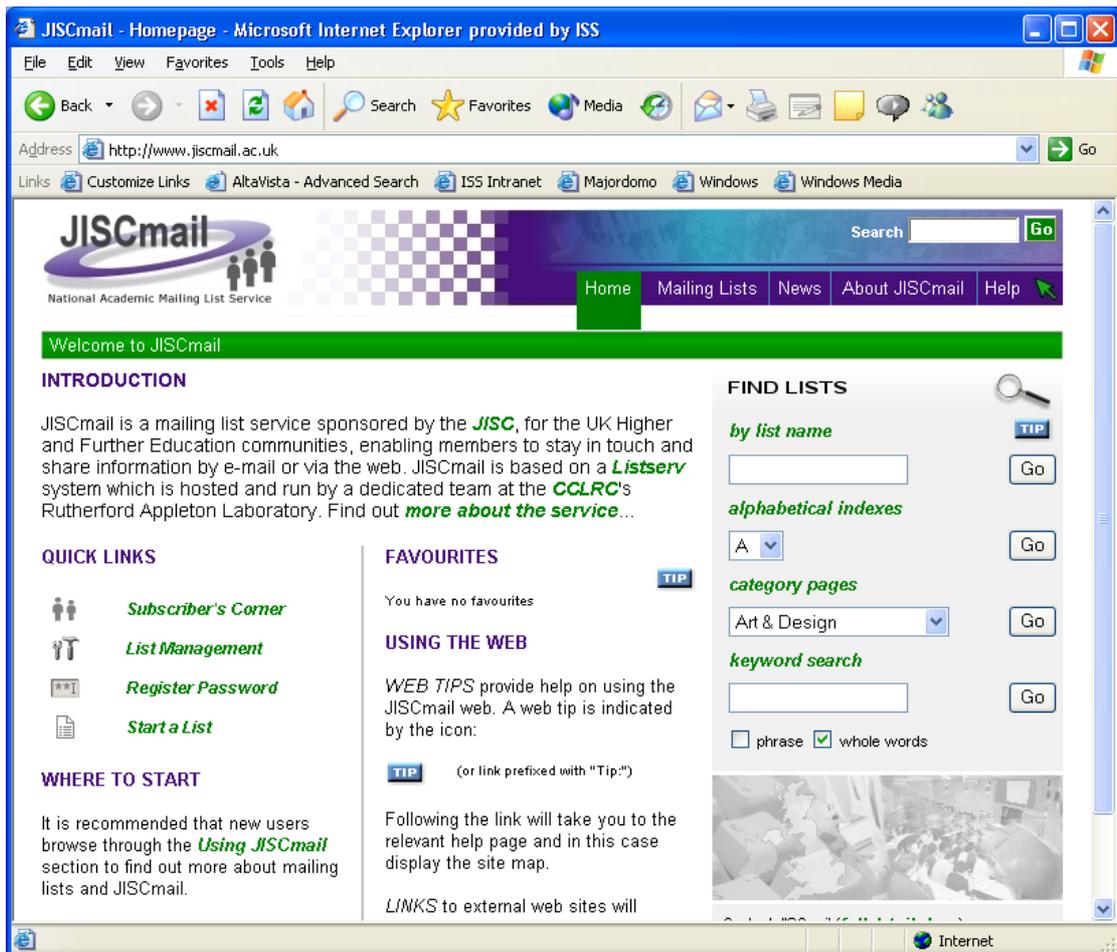
JISCmail Website

To search for a list about a subject of interest, type a word (or words) into the **keyword search** box shown on the right of the screen, or select a category of list from the **category pages** dropdown box. Browse through the lists and find a list which looks as though it may be of interest to you. You can find out more about the mailing list by clicking on the appropriate links on screen.

Additional help on using JISCmail mailing lists is available on the web at `http://www.jiscmail.ac.uk/help/using/index.htm`

Newsgroups

A newsgroup is a discussion area on the Internet. Newsgroups are a public area (a little like a noticeboard) where people can post information on a variety of topics, and discuss their interests with other people.

Newsgroups are organised into subjects. They are also organised by type – for example: news; rec (recreation); soc (society); sci (science); comp (computers) and so forth (there are many more). Users can post to existing newsgroups, respond to previous posts, and create new newsgroups.

You can use Google Groups http://groups.google.com to search the recent archives of most newsgroups or to post your own messages to newsgroups.

You can search Google by typing a search word into the box which appears on screen.

You can also use Google to browse through a list of newsgroups that are available. Choose a subject from the list at the bottom of the home page, or click on **Browse complete list of groups**. This will enable you to browse through the hierarchies of groups that are available.

The World Wide Web (WWW or W3)

Originally developed as a resource for physicists, the web today is fast becoming the Main Street of cyberspace. You'll find interesting characters wandering around, museums and galleries to visit, schools to teach you new skills, even restaurants (some of which will deliver real food in response to email). You name it, chances are somebody's created a web server about it. Growing numbers of people have their own personal web 'pages' where they let the world know what they're interested in.

The web has exploded in popularity for two reasons. One is that it is fairly easy to use. But what really sets the web apart is hyperlinks. To understand hyperlinks, think of an encyclopaedia. As you read an article on, say, Africa, your eye is drawn to a picture of an elephant. You want to learn more about the animal, so you get out the "E" volume and look up "elephant" and start reading. The Windows help system works in exactly this way, as do many CD-Rom encyclopaedias.

Hyperlinks are the online equivalent of this browsing process. Tim Berners-Lee, who developed the original web model, came up with a simple language that lets somebody developing a web document embed pointers to related resources. When you then call up that document, you'll see some words in a different colour or otherwise highlighted. By moving your cursor to one of those words and then hitting enter (or clicking on it with your mouse, depending on your interface) you will call up the linked document.

These hyperlinks are easy to create so anybody can put together a web resource that can become a central clearing house of information on virtually any topic, linking documents that could be physically stored in dozens of locations around the world. The language that Tim Berners-Lee developed is a version of the markup language, SGML (Standardised General Markup Language), which he called HTML (HyperText Markup Language). HTML is a proper formatting language but it is relatively easy to learn. What is even better, though, is that most of the main Word Processing software companies are now providing HTML converters so that you can create the documents in, say, Microsoft Word and then save them as HTML to put into your web server.

Clients and Servers

One of the concepts that you will have to get your brain around whilst working on the Internet is the idea of *client-server*. Most software on the Internet works on this principle, so it is worth taking some time to explain it.

The client-server model of computing is a common one in networking. It consists essentially of two computers: the client and the server. The client is intelligent, is the one initiating the action and is where the control lies. The server is less intelligent but is there to provide a service on demand. Typically the server is a very large computer that can handle several clients all at once.
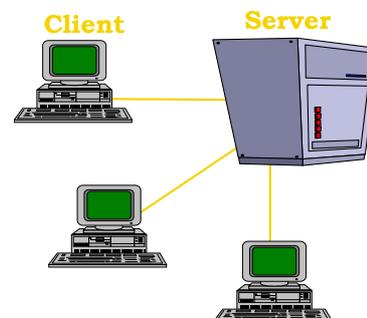
In terms of the Internet, you are almost always the client. You are the one who wants to initiate the transfer of files, the sending of messages, the querying of a database. Every other computer you connect to will be a server. Now in some cases the roles can be reversed, but those are rare and are too advanced for this document.

The thing about client-server is that it is software-specific. For instance, if I wanted to copy a file from an Internet computer, I would run a program called FTP (File Transfer Protocol). For it to work, I must run the *client ftp* on my computer and the computer I wish to copy the file from must be running the *server ftp*. That means that when I ask my ftp software to transfer the file, the client ftp software can then talk to the server ftp software and ask for the file. If I wasn't running the client ftp then I couldn't do the asking (self-evidently), and if the server computer wasn't running server ftp then it wouldn't understand what the client ftp software was saying.

The reason this is important is because most software on the Internet relies on this client-server model. All the following programs require you to run the client part on your PC or Macintosh, but you will only be able to use on computers running the server part.

- ftp
- email
- newsgroups
- web

Consequently, you will hear people talking about mail clients (which is the program you use to actually type your mail message), web servers (the box that actually holds the HTML information and services web requests) and web clients, or *browsers* (such as Internet Explorer or Netscape).

How Do I Get On?

There are essentially two types of access to the Internet – direct access or dial-in access. We will only look at direct access in this document.

Direct access is available to people whose employers have connected their own computers to the Internet. A good example is our own academic community. Every University has its own local area network. All the separate local area networks are connected together by a Wide Area Network we call JANET. The JANET network is then connected on to the Internet. Consequently anyone who has access to their University network also has access directly out to JANET and the Internet beyond. To connect you must have a computer with a network card and software that allows your computer to 'talk' to your local network.

For staff and students at the University of Leeds, access to the Internet is provided through both our PC-based systems and through various UNIX-based systems. Both systems have a variety of software for using the Internet, including email software and web browsing software.

In ISS clusters Internet Explorer is available to browse the web, and students are provided with a webmail interface (http://webmail.leeds.ac.uk) to access their email. The recommended email client for staff is Microsoft Outlook, and an web front-end is provided at http://outlook.leeds.ac.uk

Internet Jargon Terms

Like any community, the Net has developed its own language. What follows is a glossary of some of the more common abbreviations, words and phrases you are likely to encounter.

ASCII

Has two meanings. ASCII (American Standard Code for Information Interchange) is a universal computer code for English letters and characters. Computers store all information as binary numbers. In ASCII, the letter "A" is stored as 01000001, whether the computer is made by IBM, Apple or Commodore. ASCII also refers to a method, or protocol, for copying files from one computer to another over a network, in which neither computer checks for any errors that might have been caused by static or other problems.

Backbone

A high-speed network that connects several powerful computers. In the U.S., the backbone of the Internet is often considered the *NSFNet* (see entry), a government-funded link between a handful of supercomputer sites across the country.

Baud

The speed at which modems transfer data. One baud is roughly equal to one bit per second. It takes eight bits to make up one letter or character. Modems rarely transfer data at exactly the same speed as their listed baud rate because of static or computer problems. More expensive modems use systems, such as Microcom Network Protocol (MNP), which can correct for these errors or which 'compress' data to speed up transmission.

Bookmark

A web file that lets you quickly connect to a site.

Bounce

What your email does when it cannot get to its recipient – it bounces back to you – unless it goes off into the ether, never to be found again.

Browser

A *client* program that allows users to read *hypertext* documents on the *World Wide Web*, and navigate between them. Examples are Netscape Navigator, and Microsoft Internet Explorer.

Bulletin board

A computerised version of the bulletin boards found in shops and other public places, where people can leave messages and advertise things they want to buy or sell.

Chat room

A real-time electronic forum; a virtual room where visitors can meet others and share ideas on a particular subject.

Client

The computer that requests files or services. The computer that provides services is called the *server*.

Daemon

An otherwise harmless UNIX program that normally works out of sight of the user. On the Internet, you'll most likely encounter it only when your email is not delivered to your recipient – you'll get back your original message plus an ugly message from a 'mailer' daemon.

Domain

An *Internet* address in alphabetic form. Domain names must have at least 2 parts: the part on the left which names the organization, and the part on the right which identifies the

highest subdomain, such as the country or the type of organisation. "leeds.ac.uk" leeds is the organisation and ac.uk identifies it as an eductional institution in the UK.

subdomain name	usual meaning
.ac	university etc in UK
.co	business in UK
.com	business in US or Canada
.edu	university etc in US
.gov	government site anywhere
.org	charity or similar

Down When a public-access site runs into technical trouble, and you can no longer gain access to it, it's down.

Download Copy a file from a host system to your computer. There are several different methods, or protocols, for downloading files, most of which periodically check the file as it is being copied to ensure no information is inadvertently destroyed or damaged during the process. Some, such as XMODEM, only let you download one file at a time. Others, such as batch-YMODEM and ZMODEM, let you type in the names of several files at once, which are then automatically downloaded.

Email Electronic mail – a way to send a private message to somebody else on the Net. Used as both noun and verb.

Emoticon A typed picture of a facial expression, used in email and when communicating on the *Internet*, to indicate emotion. E.g., this represents a smiling face :-) Often called a *smiley*.

FAQ Frequently Asked Questions. A compilation of answers to these. Many Usenet newsgroups have these files, which are posted once a month or so for beginners.

Flame An angry message on a *newsgroup* or mailing list, often a personal attack instead of a remark relevant to the subject under discussion. Also, to post such a message.

Flame war A heated argument in a newsgroup or other public electronic forum, often resulting in personal insults and other angry remarks that are off the subject.

Finger An Internet program that lets you get some bit of information about another user, provided they have first created a .plan file.

Freeware Software that doesn't cost anything.

FTP File Transfer Protocol. A system for transferring files across the Net.

GIF Graphic Interchange Format. A format developed in the mid-1980s by CompuServe for use in photo-quality graphics images. Now commonly used everywhere online.

Hacker	On the Net, unlike among the general public, this is not a bad person; it is simply somebody who enjoys stretching hardware and software to their limits, seeing just what they can get their computers to do. What many people call hackers, net.denizens refer to as "crackers".
Hostname	Also host name. The unique name that identifies a computer on a network. On the *Internet*, the host name is in the form "comp.xyz.net"; if there is only one Internet site the host name is the same as the *domain* name. However, one computer can have more than one host name if it hosts more than one Internet site (for example, "home.xyz.net" and "comp.xyz.net"); in that case "comp" and "home" are host names and "xyz.net" is the domain name.
Hotlink	For *WWW* surfers, the same as a *hyperlink*.
HTML	HyperText Markup Language. The language used to create *World Wide Web* pages, with *hyperlinks* and markup for text formatting (different heading styles, bold, italic, numbered lists, insertion of images, etc.).
HTTP	HyperText Transfer Protocol. The protocol most often used to transfer information from *World Wide Web servers* to *browsers*, which is why web addresses begin with http://. Also called Hypertext Transport Protocol.
Hyperlink	A link in an *HTML* document that leads to another site, or another place within the same document. Hyperlinks are usually underlined or shown in a different colour from the surrounding text. Sometimes hyperlinks are pictures.
Internet	This worldwide information highway is comprised of thousands of interconnected computer networks, and reaches millions of people in many different countries. The Internet was originally developed for the United States military, and then became used for government, academic and commercial research and communications. Now available to anyone with a PC, *ISP*, *modem* and *browser*.
Internet Service Provider	Often abbreviated to ISP. A company which provides *Internet* access, nowadays often for free.
Log in/log on	Connect to a host system or public-access site.
Log out/log off	Disconnect from a host system.
Lurk	Read messages in a Usenet newsgroup without ever saying anything.
Modem	A device that connects computers to each other for sending communications via the telephone lines. The modem modulates the digital data of computers into analogue signals to send over the telephone lines, then demodulates back into digital signals to be read by the computer on the other end; thus the name "modem" for modulator/demodulator. Modems are used for sending and receiving email, connecting to *bulletin board* systems, and *surfing* the *Internet*.
Mailing list	Essentially a conference in which messages are delivered right to your mailbox, instead of to a Usenet newsgroup. You get on these by sending a message to a specific email address, which is often that of a computer that automates the process.

Net, the	Common shortening of *Internet.*
Netiquette	The rules of etiquette on the *Internet.*
Network	A communications system that links two or more computers. It can be as simple as a cable strung between two computers a few feet apart or as complex as hundreds of thousands of computers around the world linked through fibre optic cables, phone lines and satellites.
Newsgroup	A discussion group on the *Internet* which is focused on a particular topic. Discussion takes place by posting messages for everyone to read, having online conversations, and sending email messages to individuals or the group. There are thousands of newsgroups on different subjects.
Offline	When your computer is not connected to a host system or the Net, you are offline.
Online	When your computer is connected to an online service, bulletin-board system or public-access site.
Ping	A program that can trace the route a message takes.
Post	To compose a message for a Usenet newsgroup and then send it out for others to see.
Postmaster	The person to contact at a particular site to ask for information about the site or complain about one of his/her user's behaviour.
Prompt	When the host system asks you to do something and waits for you to respond. For example, if you see "login:" it means type your username.
Search engine	A program on the *Internet* that allows users to search for files and information. For example, Google, AltaVista.
Server	The computer that supplies files or services. The computer that requests services is called the *client.* The client may request file transfer, remote logins, printing, or other available services.
Shareware	Software that is freely available on the Net. If you like and use the software, you should send in the fee requested by the author, whose name and address will be found in a file distributed with the software.
Snail mail	Mail that comes through a slot in your front door or a box mounted outside your house.
Smiley	See *emoticon.*
Spamming	The practice of sending copies of a message to many different *newsgroups,* with no regard to whether the subject matter is appropriate; or sending the same message by email to large numbers of people indiscriminately. Sometimes spams are advertisements. Spamming is considered bad *netiquette* and very unethical because it not only wastes everyone's time, but also costs money. The sender of the messages does not pay the cost; it is paid by the sites of the recipient and others on the route.

The term is believed to originate from a "Monty Python's Flying Circus" sketch about a canteen which sold only dishes consisting mostly of Spam.

Surfing   Used by analogy to describe the ease with which an expert user can use the waves of information flowing around the *Internet* to get where s/he wants. The term became popular in the early 1990s as access to the Internet became more widespread and tools such as *browsers* made its use simpler and more pleasant.

Sysadmin   The system administrator; the person who runs a host system or public-access site.

Sysop   A system operator. Somebody who runs a bulletin-board system.

TCP/IP   Transmission Control Protocol/Internet Protocol. The particular system for transferring information over a computer network that is at the heart of the Internet.

Telnet   A program that lets you connect to other computers on the Internet.

Upload   Copy a file from your computer to a host system.

URL   Uniform Resource Locator (formerly Universal Resource Locator). An *Internet* address which tells a *browser* where to find an Internet resource. For example, the URL for the ISS is http://www.leeds.ac.uk/iss/

It is usually pronounced 'ewe are ell' rather than 'erl'.

Usenet   Users' Network. A giant public *bulletin board* system on the *Internet* for news and electronic mail. Usenet was started in 1979 by students in the USA. It now has over 12,000 discussion areas which cover every imaginable topic are read by millions of people all over the world.

User name   On most host systems, when you connect you are asked to supply a one-word username. This can usually be any combination of letters and numbers.

Website   Also Web site. Any computer on the *Internet* running a *World Wide Web server* process. A particular website is identified by the *hostname* part of a *URL*. Multiple hostnames may actually map to the same computer

World Wide Web   A hypermedia-based system for browsing *Internet* sites. It is named the web because it is made of many sites linked together; users can travel from one site to another by clicking on *hyperlinks*. Text, graphics, sound, and video can all be accessed with browsers like Mosaic, Netscape, or Internet Explorer.

An Englishman called Tim Berners-Lee invented the World Wide Web in 1989 while working at CERN, the European Particle Physics Laboratory.

WWW   The common written abbreviation for *World Wide Web*.

Appendix – More Information

ISS produces many documents to help you get started with applications on the ISS desktop. These include a range of documents on authoring HTML, using Outlook and webmail, and other topics related to the Internet. For more information visit:

http://www.leeds.ac.uk/iss/documentation/www.html

http://www.leeds.ac.uk/iss/documentation/email.html

ISS also runs a number of training courses (for staff and research postgraduate students only) including:

- Introduction to the Internet

- Outlook courses

- Web authoring using Macromedia Dreamweaver

Any good bookshop will also have a wide range of Internet-related books.