

# Internet and The World Wide Web

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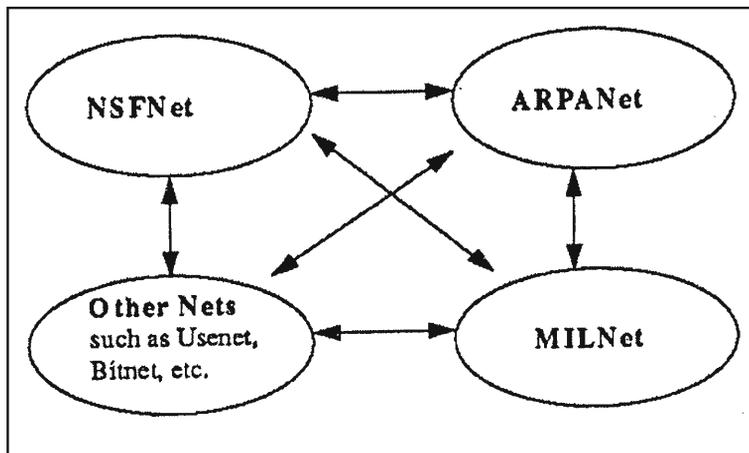
This article presents a brief introduction to the various features available on the Internet. Different applications available on the Net are divided into types of services and a brief description of each is provided. There is of course much more available on the Net. Much of the information needed to understand and further explore the Net is available on line. This article provides a starting point for further *surfing*.

## Introduction

With an estimated thousand to fifteen hundred new users joining the Internet each month, it is not a surprise that the Internet has become a household term in much of the world. The fantastic growth of the Net - more than doubling in size every six months is both exciting and sobering. Many predict that in only a few years, Internet connectivity will be available by right, in much the same way as having access to a telephone is now considered a basic necessity of life. People all around the world are communicating via electronic mail. Yet few have a precise idea as to what Internet is and what they can do with it. The sheer size of the Net can be overwhelming. This article gives a brief introduction to Internet and the various services available through it.

## What is Internet: Historical Development

The term Internet stands for InterNetwork systems. It got its start in 1969 when the United States government funded an experiment known as the Advanced Research Projects Agency NETwork (ARPANET) for research in electronic communication. In the 1970's, ARPA developed a set of rules, called



**Figure 1** Internet: A Network of Networks.

protocols, that facilitated this communication. Before the close of the decade, centres all over the world were connected to this network. During the 1980's, ARPANet joined the MILNet (the military network) and some other networks, and Internet was born. Thus, Internet is a network of networks (*Figure 1*). There is no commercial enterprise supporting the Internet effort. It is completely maintained by individual and organizational volunteers. So who pays for it? The old rule for when things are confusing is *follow the money*. This does not hold in the case of the Internet. No one pays for it. Instead, everyone pays for their part. The NSF paid for NSFNET. NASA paid for the NASA science Internet. The Clinton-Gore administration has pledged substantial amounts of funding for the development of the information superhighway. Today, there are several large backbones spanning all continents that carry the Internet traffic around the world (See *Box 2*). The Indian initiative for providing a network is described in *Box 1*.

#### **Box 1 . ERNET - Education and Research Community Network**

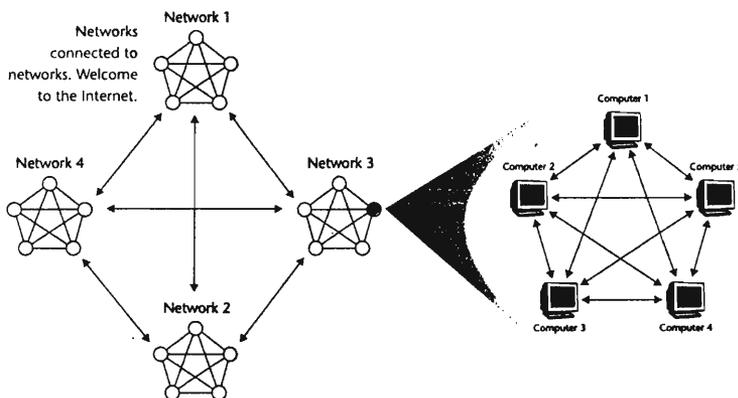
ERNET is a project of the Department of Electronics (DoE), Government of India, assisted by the United Nations Development Programme (UNDP). This project started in 1986 with nodal centres at the Dept of Electronics (in Delhi), 5 IITs (except Guwahati), IISc, and National Centre for Software Technology (NCST in Mumbai). ERNET is intended for use by academic and R&D organizations. Over 200 academic and R&D groups exchange electronic mail (Email) with each other using ERNET. Over 8000 scientists and technologists have access to ERNET facilities. International access is provided using a leased line from NCST, Mumbai to USA. ERNET provides the whole range of internet services. However, the exact services available at an organization depend on the type of connectivity it has.

## Box 2. What is a Network?

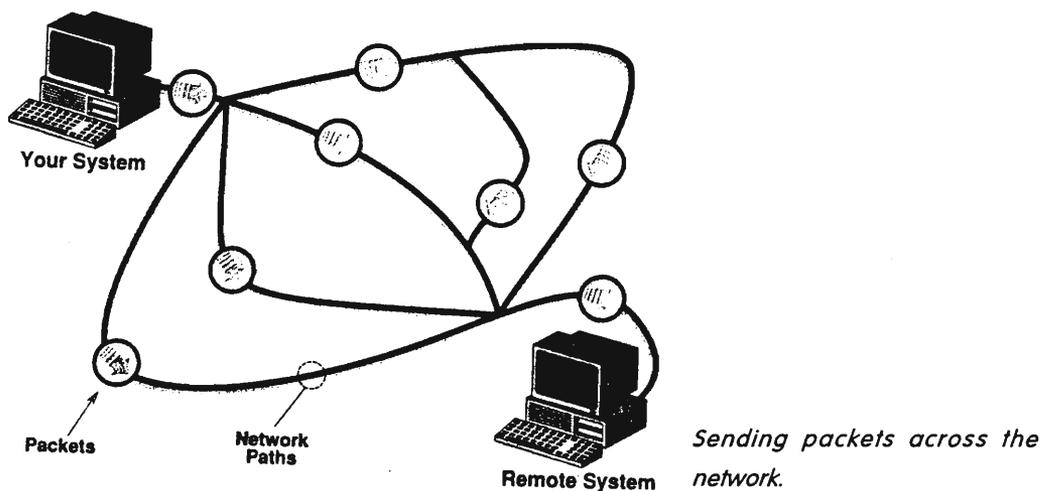
The term network refers to two or more computers connected together. The two most important reasons to form networks are:

- to allow human beings to communicate.
- to share resources.

A Local Area Network (LAN) is a network in which computers are connected directly, usually by some type of cable. When we connect LANs together, it is called a wide area network(WAN). Most wide area networks are connected via telephone lines, although a variety of other technologies, such as satellite links, are used as well.

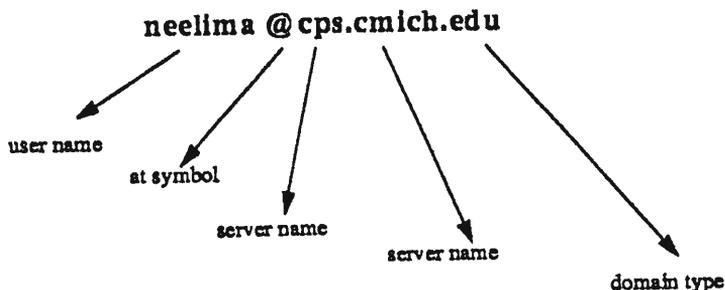


Messages travelling from computer to computer are segmented into pieces called packets which can then be routed over the communicating media.



### Box 3. Electronic Mail Addresses

To send a message on the internet by electronic mail, you must know the address of the recipient. Here is a typical address



Every internet address has four parts

neelima	my user name
@	at symbol on keyboard
cps	my computer science department server
cmich	Central Michigan University server
edu	denoting an educational institution

There are several different types of domains. For example, gov stands for US government sites. com stands for commercial sites. Addresses can also end with country codes, such as in for India, no for Norway etc. Thus the address

president@whitehouse.gov

will get your message to the president of the United States.

## What You Can Do on the Internet

A brief introduction to some of the facilities available on the Internet is presented in the following paragraphs.

### Electronic Mail (e-mail): Communicating with others

The desire to communicate is the reason for the existence of network systems. People have always wanted to correspond with each other in the fastest way possible. Electronic mail is without



#### Box 4. Email/Internet Access for Individuals

Currently Videsh Sanchar Nigam Ltd (VSNL) of the Department of Telecommunications is the sole internet connectivity provider for individuals. For students there is a concessional annual rental of Rs 500 per year. However, for those who do not need interactive access to the Internet, there are a number of private Electronic Mail service providers.

doubt the most widely used Internet service. Every system (other than dedicated routers—machines that make the computer connections and such) supports some sort of mail service.

The essence of electronic mail is the concept of an address, that is, an electronic mailbox. This is a storage area that holds incoming email messages until the user has time to read them. Each system has some available software that manages this storage area, gives messages to users, fills in headers for outgoing messages and does other utility work. Popular examples of e-mail management software include *Pine* and *Eudora* (see *Box 3*). Access to email for individuals in India is described in *Box 4*.

Current electronic mail systems provide services that permit complex communication and interaction. For example, e-mail can be used to:

- send a single message to many recipients
- send a message that includes text, voice, video and graphics
- send a message to which a computer program can respond

#### File Transfer Protocol (ftp): Downloading files

Information is stored on thousands of computers all around the world in their own file systems. There are pictures, sound, text, computer programs and more, all available to anyone who knows how to get to it. The Internet has a program for transferring files from the remote computer to your own computer. This program is called *file transfer protocol* or simply *ftp*. The ftp program will connect your computer with the remote host computer and allow you to search through their directory and select a file for transfer. Many of these computers recognize a special account called anonymous. For this reason, ftp is often referred to as anonymous ftp. However, you do need to know the address of

**Box 5. A Sample ftp Session**

Getting file sag-paneer from the directory pub/rec.food.recipes/curries at the site ftp.neosoft.com

```
neelima $ ftp ftp.neosoft.com
```

```
Connected to www.neosoft.com.
```

```
220 shockwave.neosoft.com FTP server (Version wu-2.4(1) Thu Oct 19 19:49:25 PDT 1995) ready.
```

```
Name (ftp.neosoft.com:neelima): anonymous
```

```
331 Guest login ok, send your complete e-mail address as password.
```

```
Password:
```

```
230-  \Welcome!\ This is Shockwave.NeoSoft.COM, the NeoSoft webserver!!
```

```
230-
```

```
230-If your FTP client crashes or hangs shortly after login, please try
```

```
230-using a dash (-) as the first character of your password. This will
```

```
230-turn off the informational messages that could crash your FTP client.
```

```
230-
```

```
230-The local time here in Houston, Texas is Fri Oct 18 08:19:40 1996
```

```
230-You are user 40 out of a possible 100 anonymous users.
```

```
230-
```

```
230 Guest login ok, access restrictions apply.
```

```
ftp> cd pub/rec.food.recipes/curries
```

```
250 CWD command successful.
```

```
ftp> get sag-paneer
```

```
200 PORT command successful.
```

```
150 Opening ASCII mode data connection for sag-paneer (2722 bytes).
```

```
226 Transfer complete.
```

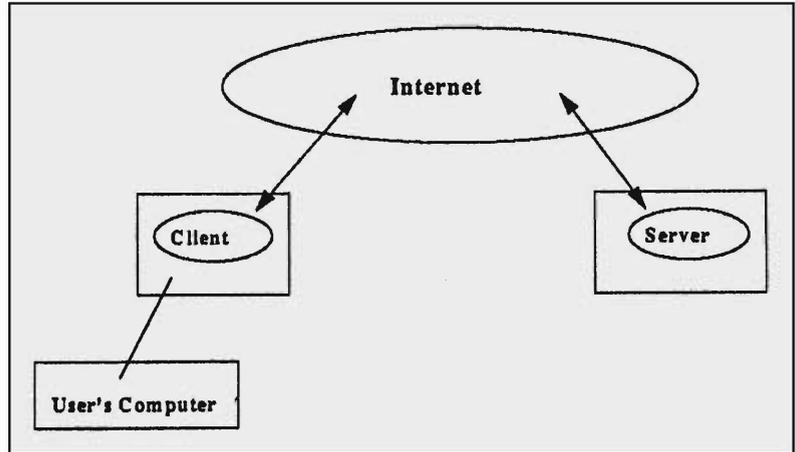
```
local: sag-paneer remote: sag-paneer
```

```
2791 bytes received in 1.3 seconds (2.1 Kbytes/s)
```

```
ftp> quit
```



**Figure 2** Accessing computers via internet.



the host computer and have some idea of the kind of information stored there. Many available directories supply such addresses and the information is also available on the Net itself (see *Box 5*).

### **TelNet: Accessing Other Computers**

One of the most important protocols of the Internet is telnet, also referred to as remote login. It gives the user the opportunity to be on one computer system and do work on another, which may be across the street or thousands of miles away. The computer requesting a service is called the client and the computer providing the service is called the server. Both are connected to each other via the Internet (*Figure 2*).

Distance no longer dictates the costs involved in creating connections. Telnetting gives us the ability to work with colleagues around the world, search library card catalogs, play games in real time, use the power of supercomputers to run programs, or read full textbook articles.

### **Gopher, Veronica, Archie: Searching for Information**

One of the greatest challenges for an explorer on the Internet is

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### Box 6. What's in a Name?

Where do they get these names for the popular software programs? Most of the programmers who invent some new useful piece of software are master's or doctoral students at various universities. Computer Science students as others of their age, have their frivolous moments and use the names as tongue in cheek commentaries on what they are doing. For example, there is a search tool called Archie which searches through ftp archives. Archie is short for archives and was NOT named after the comic book character. Veronica was designed to search through Gopher directories and titles. It is said that Veronica is an acronym formed from Very Easy Rodent-Oriented Netwide Index to Computerized Archives. But it is hard to miss the connection with Archie, Veronica's best friend. Jughead soon followed. The name Yahoo! is supposed to stand for Yet Another Hierarchical Official Oracle, but its inventors Filo and Yang, graduate students at Stanford University when they invented it, insist they selected the name because they considered themselves yahoos: coarse or brutish persons. One of the hottest languages on the scene today is named Java after the coffee because the inventors liked drinking it.

to find the information needed from the millions of files available. Since no person or organization is in charge of the Internet, there is no master list of all of its resources. Finding the data you want can be time consuming. Thus, it is not surprising that enterprising adventurers on the Internet decided to make it easier for themselves by writing software to facilitate the hunt.

In keeping with the academic community spirit found on the Internet, most of the search tools are made available to everyone free of charge. One of the earliest such tools is *Gopher*, which was created by a team at the University of Minnesota in 1991. This is a menu oriented interface that operates in a very comfortable and intuitive manner. Since then, many other institutions have developed their own Gophers.

Other search tools include *Veronica*, which allows a user to search cyberspace by a keyword. *Archie* is a tool that allows you to locate a file quickly even if you do not know the name of the ftp site where the file may be located. *Wide Area Information Server* (WAIS) allows you to search large bodies of text (see *Box 6*).



WWW works with a software program called browser. The browser gives the computer system the ability to display hypertext documents, identify hypertext links and retrieve linked files.

## Netnews: Discussing Ideas and Opinions

*Usenet* is a worldwide network of computers that exchanges news articles among its users. Usenet is not the Internet; it is a separate network with a link into the Internet. It covers a wide variety of topics ranging from questions and answers on various subjects to jokes and recipes. Conceptually, the electronic board service fills the same role for Internet users that conventional bulletin boards fill in everyday life – it allows individuals to post notices that others can read. Each newsgroup has a distinct name that describes the topic of the articles in the group. Because this is a *free-for-all* forum, pranksters can take advantage of the system to create fake groups or to post false or injurious messages. *Flame wars* – angry arguments over a particular topic are common on the net.

## Browsing the World Wide Web: Jumping From Place to Place

One of the chief complaints about the Internet is that it is too difficult to use for those who aren't very comfortable with technical information. As an approach to answering the problem, efforts were made to incorporate the idea of hypertext – cross referencing information by just having to *point-and-click* on one item to go to another – into a more friendly interface to the Internet. The end result of this work, what many people now use as their introduction to cyberspace, is the *World Wide Web* (WWW). This is fast becoming the largest source of network traffic around the world. WWW is a mechanism that links together information stored on many computers. In essence, WWW allows the references in a document on one computer to refer to text, sound or graphics on another computer. WWW works with a software program called browser. The browser gives the computer system the ability to display hypertext documents, identify hypertext links and retrieve linked files. Browsers may be text or graphic based. The graphic user interface (GUI) browser is very useful for cruising the Web. Two of the

**Box 7. World Wide Web Terminology**

Modern computer systems have the capability to deliver information in a variety of ways, such as graphics, sound, video clips, animation, and of course, regular text. On the Internet, this multimedia capability is available in a form called *Hypermedia*.

Hypermedia is accessed through the use of *Hypertext Link*, which is a special software pointer that points to the location of the computer on which the hypermedia is stored. To cause a picture stored on a computer in New York to display on a computer in Mumbai, the user in Mumbai need merely to click on the hyperlink pointing to the picture.

The collection of hypertext links throughout the Internet creates an interconnected network of links, called the World Wide Web (WWW). Each computer within the web that can be referenced by hypertext links is called a Web site. Pictures or other hypermedia are stored in files called documents or Web pages. Each page has its own unique address called the URL (Universal Resource Locator.) All the Web pages are written in a special language called HyperText Markup Language (HTML.) The file transfer on the web follows a special set of rules called HyperText Transfer Protocol (HTTP.) This is why most pages have addresses beginning with HTTP.

more popular GUI browsers are Mosaic and Netscape. All commercial Internet access providers also give their users some form of GUI browsers. The popularity of browsing WWW has reached such a peak that thousands of commercial enterprises maintain a location (called a home page) on the Web. For example, all major cities in the USA, Europe and Asia have their own home page which provides tourist information. Most airlines, auto companies, computer manufacturers, to mention a few, maintain their own home page. More and more software is being written on a daily basis to explore the Web. It is estimated that fifteen hundred new users per month are getting on the Internet via the Web. Weekly magazines, such as *Newsweek*, now have a section which gives its readers a collection of addresses of interesting and amusing sites (see *Box 7*).

**Other Services**

It would be impossible to narrate the total list of services available on the Internet in a few pages. To name but a few of the other



## Suggested Reading

- ◆ H Hahn and R Stout. *The Internet: Complete Reference*. McGraw Hill, 1994.
- ◆ M Clark. *Cultural Treasures on the Internet*. PTR Publishers, 1995.
- ◆ D E Comer. *The Internet Book*. Prentice Hall, 1995.
- ◆ D Busche and A Satterlee. *Adventures on the Internet*. Boyd and Fraser, 1996.
- ◆ B P Kehoe. *Zen and the Art of the Internet*. PTR Publishers, 1996.
- ◆ E Kroll. *The Whole Internet: User's Guide and Catalog*. O'Reilly Publishers, 1996.

services available, LISTSEV allows users to receive information on topics of interest on a regular basis. Internet Relay Chat (IRC) allows groups of users to chat interactively in real time and WWW.

## Ethics and Security Issues

Internet is a free society. Is it then fair and reasonable for its travellers to do what they please, go wherever they want, and use whatever they desire? Some people argue to the contrary. Ethical and security concerns about the Internet are growing because we don't seem to know how the Internet will evolve in the future. Even though researchers and scholars who frequent the Internet like their freedom of expression and scientific inquiry, recent events have caused Internet travellers, law related agencies, and the US federal government to consider ways to curb impersonators, pirates, hackers and other improper users. Issues such as re-use of information, freedom of speech, security of transactions, commercial use of the net, are being heatedly discussed in courts, academia and on the Internet itself. It appears that a firm conclusion will not be found in the near future.

## The Future of the InterNet

As the Internet grows exponentially, several things can be noted. The fastest growth area is in small business and individual users. Thus, there is an increasing market for commercial Internet access providers. Right behind commercialization comes privatization. Telephone, cable and computer companies are exploring means to take advantage of the lucrative growing market. The organization for International standards has just finished designing standards for protocols: the set of rules that govern communication. We are quickly moving from an era where the network itself was a project to an era where the network is a tool being used for real projects.

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