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ABSTRACT

The Internet is an international network linking hundreds of smaller computer networks in North America, Europe, and Asia. Using the Internet, computer users can connect to a variety of computers with little effort or expense. The potential for use by college faculty is enormous. The largest problem faced by most users is understanding what such networks can provide. Some of the services presently available on the Internet are explained. The three main services are remote login, which lets one log in to remote computers; file transfer, which allows the movement of files between computers; and electronic mail. Suggestions are given for using each of these features. The Internet provides the ability for faculty to communicate with colleagues around the world and to access information for classroom presentations or research. (Contains 17 references.) (SLD)

# Understanding the Internet

Diana Oblinger, Ph.D.

**The Institute for Academic Technology**
A program of the University of North Carolina at Chapel Hill

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## Overview

The Internet is an international network linking hundreds of smaller computer networks spanning North America, Europe and Asia. This vast interconnection of computers provides tremendous potential for information sharing. Using the Internet, computer users can connect to a variety of computers across the country or on other continents as quickly and easily as if they were in the next room, allowing easy access to vast resources from the desktop with little or no expense to the user. The largest problem faced by most newcomers to these networks is understanding what such networks can provide. This paper attempts to clarify some of the services presently available on the Internet. To that end, I have drawn upon the writings of various Internet experts, whose work I gratefully acknowledge.

## Gaining access to Internet

If you are affiliated with an academic institution, check with your computer center staff to see if your institution has access to the Internet. If your institution does not have Internet access, you may be able to establish an account with another college or university which offers Internet services. Either way, you will need to request a user identification code (ID) for your personal computer terminal.

## Establishing communication on Internet

The Internet is comprised of several, separately administered networks. These networks often contain a wide variety of computer systems, complex wiring patterns and a range of computer technologies. For these global networks to communicate with each other, each must understand the other's messages and respond in a fashion recognizable to other machines. This is accomplished by requiring that each computer on a network support a particular protocol--a common language for handling basic computer functions (such as

data transfer between networks). The Internet uses a protocol called TCP/IP, or Transmission Control Protocol/Internet Protocol.

## Services offered on the Internet

There are three main services provided by the Internet:

- remote login
- file transfer
- electronic mail

Remote login

A program called TELNET lets you login to remote computers. Remotes include computers located outside your school or any computer not directly wired to your system. An account can be created for you that allows access from any desktop computer linked to the Internet. With such access, instructors can locate a wide variety of materials with which to create classroom presentations, and researchers have almost unlimited resources at their fingertips.

One of the more popular uses of remote login is to access Online Public Access Catalogs (OPACs). You may use the information stored in these remote OPACs as a complement to your local library. In addition to book and serial holdings, many online library catalogs contain locally developed commercial databases. These databases range from major periodical and newspaper indexes to encyclopedias and dictionaries. Access to most commercial databases is restricted. Locally developed non-commercial databases containing indexes to local newspapers and regional statistics may also be available and open to outside users without restrictions.

In addition to more than 200 online library catalogs, the Internet also provides access to a growing number of campus-wide information systems. Information that may be available includes campus news and information, activities and events calendars, directories of services, organizations, and descriptions of the campus, academic programs and policies.

Additionally, some academic institutions have established specialized databases which may be accessed via the Internet (using TELNET). Some examples are:

- *PENpages*: Database of agricultural and nutritional information produced by Pennsylvania State University with support from other organizations. Information ranges from statistics to overviews of national agricultural news.
- *Dartmouth DANTE*: Supported by a grant from the National Endowment for the Humanities, this database includes 32 commentaries and the full text of Dante's "Divine Comedy."
- *Oceanic*: Reports from the World Ocean Circulation Experiment and the Span Physics Analysis Network are included, in addition to research ship schedules and bibliographic references.
- *Geographic Name Server*: Includes standardized information on population, latitude/ longitude and zip code for more than 150,000 cities.

- *Johns Hopkins Genetic Databases*: Several public databases provide data related to human genetics (e.g., human chromosome mapping, inherited disorders and traits).

Among the reasons you might find TELNET useful are:

- Researchers can identify new materials on a topic, in a collection that is stronger than the local collection, or one that is simply better represented online in a remote system.
- Remote systems may be available at hours when a local system is not, or when the local system is down temporarily.
- Researchers can sample other institutions' collections in preparation for research trips. While they are traveling, they may use TELNET to access their home system.
- Remote systems may have unique capabilities or features (keyword searching, indexed content notes, etc.) which can help identify materials available but not easily identifiable in the local system.
- Researchers in a specific subject area may find specialized resources not available elsewhere (e.g., University of Michigan's Meeman Archive on environmental journalism).
- Users can search readily available information in electronic form, providing more flexibility of use and easier access (e.g., full text of Shakespeare plays and sonnets at Dartmouth).
- Librarians can coordinate, and library users can benefit from, cooperative collection development.
- Users needing regional information may discover indexes or even full text of local newspapers or statistics.

TELNET operates in a client/server environment in which the computer you are using becomes a client, with TELNET negotiating the opening of a session on a remote computer (server). Both the client and the server must be able to accept TELNET's standard protocol (TCP/IP) before you can transfer commands and data between the two computers.

To open a TELNET session on your computer, the basic commands are simple. For example, to login, you type **TELNET <host>** or **TELNET <cr>** followed by **OPEN <host>** at the prompt. You will need to know either the machine domain name (for example, bbs.oit.unc.edu) or the machine Internet address (a series of numbers, such as 128.109.157.30). To find help, try typing **help** or **?** at the prompt. A list of commands available to you should then be displayed. Once you establish a remote session, all commands you type are sent to the server (remote host) for execution. The resulting data requests or computations are then sent and displayed on the client.

It is possible to maintain more than one Internet connection and/or search simultaneously. This allows you to search, then "cut-and-paste," information from multiple sources into a log which is available for later use. Once you have conducted a search on the Internet, you may want to save or print the results. If you are using a personal computer, you can "download" or bring a file into your computer for storage, or just print it.

File Transfer Protocol (FTP)

It is often useful and necessary to transfer files from one place to another. The Internet program known as file transfer protocol (FTP) is used to move files (whether they consist of software, pictures, text, graphics, sound or other information) between computers. You also may obtain directories, catalogs, bibliographies and other resources via FTP. For example, the Oxford Text Archive, a database of the full-text of books, plays, essays and poetry, makes its updated catalog of materials available with FTP. You may also acquire full-text of electronic journals and copies of software using FTP.

There are two types of FTP sites: anonymous and non-anonymous. Anonymous sites are accessed free of charge and do not require you to establish an account or to be assigned a login identification. Non-anonymous sites require that you contact the FTP system administrator to request an account. Many sites have criteria that you must meet to be assigned an account, such as belonging to a certain client group (faculty, for instance) and may charge for logging in and time of connection. Note that FTP sites are set up only to move information, so you cannot actually view files on the site. To view or manipulate files, you will have to transfer them to your system (using the **get <filename>** command) and open them with your choice of program (Word for Windows or ToolBook, for example).

On some FTP sites, particularly those that have been established for the purpose of collecting and sharing programs, you may add your files for others to access. The site administrator will have some method that allows you to add your file (using the **put <filename>** command) and, at the same time, protects the site from being invaded by computer viruses that might be transferred to the site.

Other sites, such as the IAT "Gandalf" site, are one-way sharers of information. In this instance, only the site administrator can add information, change the directory structure or revise the index.

To initiate an anonymous FTP session, you login to the remote computer as **anonymous**, then type **anonymous** (or give your e-mail address) as the password. When you gain access to the remote system, you can download public domain software, shareware or other information (such as text files).

Note that files placed on an FTP site do not negate the creator's copyright. If there is not an explicit copyright notice attached to the file, it is best to assume that the material is copyrighted and to request permission before using the material or creating derivative works. United States copyright law now conforms to the Geneva Convention rules which state that a copyright notice or registration is not required on a work--it is protected by copyright law as soon as it is in tangible form.

Electronic Mail

Electronic mail, or e-mail, is one of the simplest and most popular uses of computer networks. The ability to compose, send and receive messages via the computer demonstrates how valuable networked information can be. After you compose an electronic package (whether it contains text, sound and/or images) on your computer, you may transmit it to the receiver over the network. At the other end, the recipient of the package may check his/her "mailbox" at any time. Freedom from time restrictions

is one of the most useful aspects of e-mail, allowing correspondents from different regions to collaborate regardless of time zones or office hours.

Electronic mail has numerous applications, whether your primary mission is in research or teaching. Exchanging information with colleagues around the world, sending and receiving manuscripts for collaboration, editing or review are just a few of the uses of e-mail. Messages and files can be sent to users on the same network or through a specially created "gateway" to a different network.

It is also possible to send e-mail to more than one person at a time. Large mailing lists, called listservers, function as electronic discussion forums, allowing a working group of colleagues all over the world easily to keep in touch. These mailing lists are typically unmoderated. Moderated mailing lists, provide another category of e-mail service. The content of these lists can be controlled by an editor. One advantage of moderated lists is that they permit the user to collect and assemble messages into topic- or discipline-specific groupings. Moderated lists can even function in a manner similar to scholarly journals that use the process of peer review.

To use e-mail, you need an e-mail account or ID for your computer and the Internet address of the person with whom you want to communicate. You may also use a BITNET address (a part of the Internet popular among higher education users). A personal computer with a modem also can connect you to the Internet. An e-mail account is usually provided by your campus computer center or department and is registered with the Internet Colleagues around the country will have similar addresses. John Quarterman's "The Matrix," and Tracy LaQuey's "The User's Directory of Computer Networks" are two currently available books that list such addresses.

## Summary

The Internet provides the ability for faculty to communicate with colleagues around the world and to access information, regardless of its location, for use in creating classroom presentations or for research. The power of the Internet as a tool to enhance research and instruction is enormous. This document was designed to help those unfamiliar with the Internet become aware of its potential and encourage them to become collaborators on the Internet.

## The Author

Diana Oblinger is IBM program manager for the IAT. As such, she works as the intermediary between IBM Corporation and the Institute on setting direction and priorities for the IAT. Oblinger has held faculty appointments at Michigan State University and the University of Missouri-Columbia. During her tenure in higher education, she received several teaching and research awards. Prior to joining IBM in 1989, she was the Associate Dean of Academic Affairs at the University of Missouri-Columbia. She holds a Ph.D. in plant breeding and cytogenetics from Iowa State University.

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## About the Institute for Academic Technology

The IAT is a national institute working to place higher education at the forefront of academic technology development and implementation. Operated by the University of North Carolina at Chapel Hill and funded through a grant from the IBM Corporation, the IAT strives to facilitate widespread use of effective and affordable technologies in higher education. To that end, the IAT conducts a number of briefings, workshops and planning sessions to keep academics informed about available technologies and to help explore the use of technology on individual campuses. For more information, contact:

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