Navigating the Internet: A Beginning

by George H. Brett II

"Independence of space and time is the single most valuable service and product we can provide humankind."

— N. Negroponte, *Scientific American*, 9/91

"The most profound technologies are those that disappear. They weave themselves into the fabric of everyday life until they are indistinguishable from it."

— M. Weiser, *Scientific American*, 9/91

I have worked with individuals who had extensive knowledge about what the Internet is, what networks can do, and/or what the technical specifications of the hardware and software were. Yet often these persons were lost when it came to finding and using resources available on the network. They could not navigate the giant network of networks, known as the Internet. The Internet connects over 750,000 computers together and is growing daily.

Finding your way around the Internet requires some help frommaps, guides, and colleagues. This paper will describe one method of how one can move from the familiar to the unknown in the world of computer networking. The following steps are suggested: (1) investigate and use paper-based resources, (2) become familiar with the computing resources you have at your desktop, (3) begin using electronic mail (email), and (4) branch out using interactive Internetworking services and resources.

Print Media Resources

"How'd I learn to swim? Why my Daddy just threw me in the water. And that was that." — anon.

There is some value to learning by doing. But people can learn even more when they have a well-developed background knowledge. Printed media is still one of the most accessible ways for us to get that knowledge. The following are items I consider to be basic reading. A more extensive bibliography is given at the end of the paper.

John Quarterman's *The Matrix: Computer Networks and Conferencing Systems Worldwide* is one of the most popular books in the field of network support. It contains extensive information about each of the major networks. This bright yellow book provides a history of networks, discusses accepted practices when using networks, and tells how to do various things, such as sending electronic mail via the Internet.

Tracy LaQuey developed a thick manual that was distributed within the University of Texas system. Her *Users' Directory of Computer Networks* from Digital Press can be compared to the white and yellow pages of a telephone book. This volume has listings of all the known computers, their addresses, and contact people at the sites. Also, there is good background on the selected networks.

!%@: : a Directory of Electronic Mail Addressing and Networks from Donalyn and Frey is now in its second edition. This is more of a road map than a phone book. Many different networks require arcane symbols to route a piece of electronic mail (email) from point A to point Z. With this book I have been able to help a professor of geography send email from Raleigh, NC to Rio de Janeiro, Brazil.

Books are helpful, but in order to get more up-to-date information we rely on journals and other periodicals. There is no lack of magazines about computers and technology in the popular press, such as *Byte*, *PC World*, *InfoWorld*, and *ComputerWorld*. Also, professional or discipline-specific journals are beginning to give more field-appropriate information about networked information. It is a good idea to keep an eye open for theme–oriented or special issues. For example, *Scientific American* recently dedicated an issue to "Computers and Networks" (Sept 1991).

Resources on Your Desktop: Your personal workstation

"A clean desk is the sign of a warped mind." — seen on a novelty sign

Before you venture out onto the network, it is advisable to know how to use your desktop computer well and how to organize the contents of your hard disk. How well do you access information on your desktop? Many of us just buy a new, larger hard disk when we run out of space. A question I would ask you is "Can you find that memo or paper you wrote last year, and the notes that went with it, on your hard disk?" Many of us would have a hard time or at least would have to spend a long time digging through directories or floppy disks. How can we cope with this? One of the usual outcomes from email and other network–related activities is increased volume of files and text to be stored on your hard disk. This can create a serious problem for the user who is not prepared for the flood of information.

A new breed of applications has been designed to help these problems, basically through two types of programs. Some were

initially designed to assist with the maintenance of hard disks. These programs usually help you keep track of directory names and disk speed and to create electronic indices of all the information on your hard disk. The other type of application is written specifically to search for data buried within files on the hard disk.

An example of the first type is Lotus' *Magellan*, for MS DOS computers, which can be used to maintain your hard disk. In addition, *Magellan* can build a variety of different indices to permit you to work with your information base in a way that is useful and easy to do. For example, you might create an index for each major research project on which you are working. Or you might just keep one very large index which includes all the files in all of the directories on your disk. When you want to know where the report on xylophones is you would begin a query by hitting the appropriate function key, typing the word you are looking for (xylophone), and wait for the program to search the index for the term. *Magellan* does three important things to assist you in your search. First, it ranks the files found by order of the probability that your term is found. So, a 99% would indicate that this term is in that file whereas a 40% would not be so promising. Second, once you choose the file you want to inspect, *Magellan* will allow you to open the file and look at the context in which the term is used. So, you might find your xylophone among items in a price list, which is not what you wanted. Third, after you find the right file, *Magellan* will permit you to launch the application that is associated with the file. Say you were looking at a word processing file: *Magellan* would then launch the word processing application so you could edit the file.

Gopher is the name of a program that was designed to locate text in files. Unlike *Magellan*, *Gopher* does not build indices of all the files on the disk. Instead, it looks into each of the files that you indicate by directory or specific name. One of the strengths of a program like this is that the search capacities are usually more extensive. *Gopher* will allow you to perform boolean searches, using connectors such as "and," "or," "not," and proximity. Proximity parameters can be used when searching terms that should be closely related to each other. For example, a name being within two lines of a city would help identify an address.

These types of applications are very important to know about before beginning to navigate the network.

There is more information available at our fingertips during a walk in the woods than in any computer system, yet people find a walk among trees relaxing and computers frustrating.

— M. Weiser,
Scientific American, *9/91*

Electronic Mail

Electronic mail, or "email," continues to be the best and most basic introduction to network computing. The ability to compose, send and receive messages via computer demonstrates various aspects of networked information. One uses the local computing resources to compose and prepare the message which may even include sound or images. Then the network is used to transmit the electronic mail to the receiver. At the other end the recipient of the package can check his or her mailbox whenever they wish. Then, if necessary, a return message can be edited and sent. Independence from time is one of the most useful aspect of email. For example, correspondents from different time zones can collaborate without regard for the time differences.

In order to get started you will need several things: a personal computer with telecommunication software and hardware, an email account on a computer system (e.g. local mainframe, CompuServe), an ID, and the email addresses of your electronic correspondents. A terminal connected to a host computer can usually be used in place of the personal computer with telecommunication software and hardware. The email account is most likely an account on a campus or departmental computer which is registered with the Internet.

Once you begin exchanging email you will gain confidence and branch out into other activities. There are a variety of activities that take place on the Internet through email. One of the most widely used applications is the mailing list, or "listserv".

The listserv is an electronic newsletter or network forum. Mailing lists focus on a particular subject or interest area. For example, I am working with the Coalition for Networked Information in the working group on directories. We have created a mailing list, CNIDIR-L, where we can continue discussion we have begun at various national meetings. In fact, because this list is open to the public, we can involve many more people in our work than just those who attended a meeting.

Mailing lists, known as moderated lists, can be controlled by an editor. An advantage of the moderated list is that it permits the moderator to collect and assemble messages into coherent groupings. Moderated lists can function in a manner similar to scholarly journals that use the process of peer review. However, unlike print journals, the time to publication is not months nor years, but hours or days.

There is one other function of electronic mail that is not well known. This is the batch mode of computing. Certain systems permit a user to send email that will actually do different applications. For example, some systems support database queries of large indices. Other systems will permit a remote user to request file transfer to be delivered to their local computer.

Interactive networking

"Cyberspace. A consensual hallucination experienced daily by billions of legitimate operators, in every nation, by children being taught mathematical concepts... A graphic representation of data abstracted from the banks of every computer in the human system. Unthinkable complexity. Lines of light ranged in the nonspace of the mind, clusters and constellations of data."

— William Gibson, *Neuromancer*

After learning to manage your local system and to send and receive electronic communications via the Internet, you may have a sense that there must be more. There is. This is the interactive world of the Internet.

At this point one truly begins navigating the network. A number of different applications will help in these electronic voyages. Currently the Internet that most of us use adheres to the TCP/IP protocol. This protocol is a collection of programs that are needed to permit computers to communicate successfully over the networks. In fact TCP/IP stands for Transmission Control

Program/Internet Protocol. The major TCP/IP programs illustrate the types of applications that are done on the network: terminal emulation, file transfer, mail transfer, and news transfer.

Remote terminal login is supported by the program "telnet" which can be found as a stand alone application or within other telecommunication packages. *NCSA Telnet* is perhaps the best-known stand alone version. *Telnet* permits you to log onto a remote computer to use its resources as long as you have permission to do so. This is how many of the supercomputers are used. An account is created for the researcher on the supercomputer. From then on, wherever that person is, as long as he or she has access to a personal computer or terminal with access to the Internet, he or she can use the supercomputer resources.

Not everyone needs the ability to run programs on remote computers. Many times what is necessary is the transfer of data from one point to another. The Internet file transfer program is known as FTP (File Transfer Protocol). FTP is used to move files from system to system or from the personal workstation to other computer systems. If you have an account on the two systems you wish to work with, you can log onto each with your ID and then transfer files to and from the permitted working spaces. Another method known as "anonymous FTP" permits users without accounts on the computer where the files reside to transfer files to and from remote computers. To do an anonymous FTP session, you would log onto the remote computer as 'anonymous' and type 'anonymous' or give your email address as the password. Once on the system you will be restricted to the files you are allowed to access. Anonymous FTP is used by many users as one of the primary means for acquiring public domain software and shareware from the network.

As mentioned earlier in this paper, the files at your personal workstation are likely to increase as you use the Internet. Once you discover how to use anonymous FTP, this will be more likely. It is worth a warning at this point. There are many millions of bytes of data and programs archived all around the network. In fact many of the individual files and programs available are very large. Keep this in mind when you download to your personal workstation. Not everyone has forty or fifty megabytes of local storage available. If you plan to download files to floppy diskettes be aware of what the limits are. An 800 kilobyte file will not fit on a 360 kilobyte diskette without special file compression software.

Where are we going from here?

In hopes of making networking more acceptable to end users, organizations are trying to make the systems easier to use. In recent years the use of menus has become common. A menu system presents you with a screen of choices and letters or numbers that are used to select the specific function that you require. Recently the move has been towards the graphical user interface (GUI), also known as windows. In a window environment a user can use a pointing device such as a mouse to make selections. Once the selection has been made then the program completes whatever action is necessary.

There are a growing number of host computers that provide the user with an easy-to-use menu to navigate networked information. One of the most popular is 'libtel,' which began on computers that used the Unix operating system. This menu can be seen in use on the electronic bulletin board service (bbs) offered by UNC-Chapel Hill's Office of Information Technology. This bbs is accessible from the Internet by using the command: telnet bbs.oit.unc.edu. Follow the instructions given on the screen. Once you arrive at the main menu you can select the number for other services. This will take you to a screen that lists many of the states and other choices. From this point the bbs will telnet you to those other resources which include libraries, NSF grants information database, weather database, and more.

In addition to programs that are available on the host computer we are seeing improvements with "client" programs located on your personal workstation. The Wide Area Information Server (WAIS) from Thinking Machines, Inc., is one such program. This client software has been written for a number of different personal workstations. It is designed to permit the user to ask questions of databases that are out on the Internet. There are three basic components to the client: source, question, and response. The source list contains the electronic addresses and other information about the databases that you wish to query. The question list contains questions which are repeatedly asked. The response area is part of the individual question. In the response area you will see those files which meet the criteria of your question. Thus, WAIS permits you to build a personal reference library of questions and resources for you desktop.

More products like 'libtel' and WAIS will become available in the future. These advances will come from various sources. Software and hardware manufacturers are creating new products that make greater use of the network for productivity. Individual organizations are focusing on the needs of their constituents and creating tools for networked information. Often these tools can be useful to other groups outside the original environment.

An important organization in the development of such "client" tools is the Coalition of Networked Information (CNI). CNI was formed by CAUSE, EDUCOM, and the Association of Research Libraries to "explore the promise of high performance computers and advanced networks for enriching scholarship and enhancing intellectual productivity..." (CNI First Year (March, 1990-June, 1991) Report). Libraries interested in participating in the development of tools to allow users to utilize more effectively network resources should consider becoming involved in CNI.

A Closing Thought

"Most important, ubiquitous computers will help overcome the problem of information overload. There is more information available at our fingertips during a walk in the woods than in any computer system, yet people find a walk among trees relaxing and computers frustrating. Machines that fit the human environment instead of forcing humans to enter theirs will make using computers as refreshing as taking a walk in the woods."

— M. Weiser, *Scientific American*, 9/91

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