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Letter to Kathy Heberer regarding the Southeastern Law Librarian, October 24, 1990

Alfred Lewis

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October 24, 1990

Kathy Herber
SEALL Newsletter Editor
Rumberger Kirk
P.O. Box 1873
Orlando, FL 32802

Dear Editor:

If you are in agreement, I would like to do a regular column for your chapter newsletter entitled "Telecommunications". Enclosed are drafts of articles I would submit for the first three issues. The questions posed in the first article give a pretty good idea of the topics I would be covering.
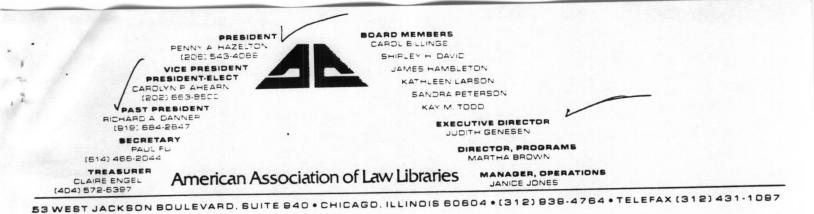
As has been reported in the AALL Newsletter, last spring I started an e-mail conference for law librarians on the Internet network. In a short time we have grown to approximately 90 members from the U.S., Canada, and one member so far from overseas. So, there is considerable interest in the subject. Through this column, I would like to promote even greater awareness and knowledge of telecommunications concepts and possibilities.

I originally made this proposal to the AALL Newsletter. The enclosed letter from President Hazelton explains their situation at this time.

I would be very pleased if you would run my column in your newsletter. If you wish to do so, please send me your publication schedule and deadlines. For each issue, I could supply you with a final printed draft (the enclosed drafts will require minor updating) and a file on diskette. Please tell me whether you would want the files in ASCII, WordPerfect 4.2, or WordPerfect 5.X and any other requirments you might have.

I look forward to hearing from you.

Sincerely,

Alfred J. Lewis
Associate Law Librarian

Tim — what do you think? I'm leaning no — he's not a chapter member Kathy

American Association of Law Libraries

October 12, 1990

Alfred J. Lewis
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Dear Al:

Thank you for your letter of September 19, 1990 regarding your proposed column for the AALL newsletter on Telecommunications. You have not received a response from Mary Sworsky for several reasons. First, the AALL Advisory Committee on the LLJ and AALL Newsletter is in the process of drafting guidelines for new columns and other material for the newsletter. We thought those guidelines would be finished, but they are not and so they did not offer any help to Mary in trying to determine whether she could accept your kind offer. Secondly, the newsletter is 24% over budget at the present time mainly because of additional pages. Two new columns were approved at the committee meeting in Minneapolis in June, but we simply haven't budgeted for additional new columns in 1990/91. Unfortunately, we need to hold down the spiraling cost of the newsletter during this year as we are trying to balance our budget in a responsible manner. Our budget planning for 1991/92 will begin in May of 1991. These two problems made it difficult for Mary Sworsky to know what to tell you about adding the column.

Mary has shared your proposal with the Advisory Committee, chaired by Nancy Carol Carter, for their consideration. In the meantime, may I suggest that you regularly send your columns to all of the Chapter and SIS newsletter editors? Often these letters are desperate for good material to publish. At last count, these newsletter reach 1200 law librarians who are not members of AALL. I enclose the most recent list of newsletter editors I have.

I found your articles interesting and informative. I am sorry the AALL Newsletter does not have the space to carry your column at this time (to add 1 page, we must, of course, add 4). This situation certainly points out our need to plan our newsletter budget more flexibly so we can be responsive to new columns and ideas.

Alfred J. Lewis - 2

    With your permission, I would like to send your three column
series to the <u>LLOPS-Cited</u> editor here in Seattle for publication.
Please let me know if I may do so.

    I realize this is not the solution you requested, but hope you
understand the situation. Thank you for your excellent idea. I look
forward to reading your articles.

                              Sincerely yours,

                              Penny A. Hazelton
                              Law Librarian
                              Professor of Law

PAH/klv
Enclosure

cc: Judy Genesen
     Mary Sworsky
     Nancy Carol Carter
     Dick Danner

<<< Column #1 of a series entitled "Telecommunications" August, 1990>>>

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Telecommunications and Law Librarians

In the 1970's and 80's, law librarians had to educate themselves about automation. In the 90's and beyond we shall have to educate ourselves about telecommunications. The world is getting electronically connected at an accelerating pace. Technological developments, notably in fiber optics, microwave and satellite transmission; the development of international telecommunications standards; and probably a host of commercia, political, and social factors are propelling this revolution. In the past decade, the personal computer has given us personal power and freed us from hardwire links to mainframes and minis. The trend now is to get linked up again, but this time on a more equal and far reaching basis.

Librarians are a focal group in this sweeping change because it is information that is being moved through all these communication channels. And, moving information from source to user is what we have always done. Now we must keep on top of the new ways information is being packaged and transmitted. Law librarians, with close links to the commercial, academic, and governmental worlds, are especially close to the action.

This column will attempt to explain and report on the issues in telecommunications that broadly affect the library world. The issues are many. We have recently learned to talk about LANs, but what about WANs and MANs? What are Bitnet and Internet? What is the National Science Foundation Net backbone which is being used by commercial as well as educational and research organizations? The National High-Performance Technology Act would establish a National Research and Education Network. How would this affect us? EDUCOM has been pursuing the cause of education and telecommunications in American universities for over twenty years. Are we familiar with its activities? What are all those national and international standards authorities (ITU, CCITT, ANSI, ISO, EIA, etc.)? What is OSI, TCP/IP, ISDN, Z39.50, X.500, RS-232-C, etc.? What is the International Telecommunications Satellite Cooperative (Intelsat) and how does it operate? To what extent are computer viruses a problem in the transmission of data? How are libraries involved in the world of sysops and electronic bulletin board services? What is the structure of today's public switched networks (regional bells, MCI, AT&T, Sprint, etc.) and public data networks (Tymnet and SprintNet, etc.)? What services are they offering today and

tomorrow? What has happened since the AT&T divestiture? How does traditional phone service (telephony) work? What are leased lines, voice mail, e-mail, cellular phones, audiotex, videotex, and other new services? Will the new mega-broadband networks allow transmission of video and even motion-video images?

Synchronous and asynchronous, serial and parallel, local and host, bps and baud, parity and no parity, server and client?, what do they mean? Your keyboard connects to your PC, your PC connects to your modem, your modem connects to a phone line, the phone line connects to another modem, that modem connects to a host computer, the host connects to a local network, the local network gateways to a .... How does all this happen?

We are not going to become experts on all this. We can, however, become more familiar with telecommunications. We can gradually accept its concepts and terminology as a part of our world. We can relieve anxiety by educating ourselves at a pace we are reasonably comfortable with. And, most of all, we can assert ourselves as being information specialists with a working knowledge of telecommunications.

Public Data Networks (PDNs)

In this first column, along with the call to arms, it was felt that a little substance was also in order. Perhaps law librarians introduction into the wider world of telecommunications came when we first started our LEXIS and WESTLAW terminals and noticed that they were dialing into something called Tymnet or Telenet (now called SprintNet). These commercial enterprises are the leading United States "public data networks" (PDNs). PDNs in other countries include: Datapac in Canada, Transpac in France, PSS in the United Kingdom, and Euronet which links cities in Europe, England and Ireland. Telenet started in 1975 and is currently a subsidiary of U.S. Sprint. Tymnet started in 1977 and since 1989 has been owned by British Telecom. Public data networks, unlike the public switched network (phone system), are designed for computer to computer communication. Data is transmitted digitally using "packet switching" technology.

Consider the problem of how you can connect stations in a telecommunications network. In the earliest days of the telephone, every instrument was connected to every other instrument. Later on the switched network came into being. Your phone link is to the local Bell switching station ("central office") or PBX (private branch exchange). If the number is outside the local area, the call is then routed through other switching stations to its ultimate destination. The problem with this system is that you require a complete, actual circuit to yourself during the time of your conversation. Packet switching

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makes more efficient use of circuits. It breaks a digital message into even size "packets". PDNs follow the X.25 international standard which specifies that each packet contain 128 bits. If a packet does not contain 128 bits (the last packet, for instance), it is padded out with extra bits to the full 128. Each packet has a "header" which contains the destination address, the source address, the packet number and other information. Computers on the network constantly monitor the status of its all its links. Packets can be "interleaved". That means that packets from different messages coming from different sources can be collected at any one node (station) on the network and sent forward using whatever route is available at the time. The several packets from your one message may arrive at their destination via different routes and at different times (generally within microseconds). Computers at the destination site reassemble the packets into a complete message. The network node computers are often called "packet assembler/disassemblers" or PADs. All of this is "transparent" (you don't see it) to you when you are searching LEXIS or WESTLAW. You have been using a "virtual circuit" as opposed to an actual unbroken single circuit in a switched network.

The efficiency of this technology allows for substantially lower rates than long distance phone. The rates in most areas are under two dollars an hour. The downside to packet switching is that delays are inherent. Packets are collected at nodes as a matter of course and, if all circuits are busy, the PADs will have to hold them longer than usual. We have all run into this when using LEXIS or WESTLAW during peak periods.

SprintNet and Tymnet have nodes in hundreds of U. S. cities. and also provide connections to networks all over the world. You can check in the appendices of the LEXIS Session Software or Westchek binders for a list of the phone numbers for U.S. cities. These nodes are connected by high speed data lines. When your communications software uses your regular telephone system to dial into a local node of Tymnet or SprintNet, a modem at the node automatically answers with a high pitch scream. Your modem screams back. This barbaric exchange is called an "electronic handshake". The handshake allows the two modems to agree or disagree on such parameters as speed of transmission, byte size, and error checking protocol. Then your modem generally sends the word "CONNECT" to your monitor. After your communications software sends some preliminary information to the node, it then asks to be connected to LEXIS in Miamisburg, Ohio or WESTLAW in Eagan, Minnesota.

For further information, dial Tymnet at 800-872-7654 or SprintNet at 800-336-0437. You can ask for literature describing their services. You can also get free online information about their services by dialing the local node and following the instructions below.

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Tymnet specifies line settings of 8 data bits, 1 stop bit, and no parity. I have found that TTY terminal emulation works best. After the first series of garbage characters comes across you screen hit the "enter" key; then when it asks for terminal identifier, enter "TTY", finally, at the accented a (á) enter "information". You may have to go into half duplex if you want to get your keyboard entries to echo to your screen.

SprintNet specifies line settings of 7 data bits, 1 stop bit and even parity. I have found that vt102 terminal emulation works. After the modems exchange carrier signals ("electronic handshake"), you will get a blank screen. Hit enter twice if your SprintNet number operates at 1200 bps. Hit @ and then hit enter if it operates at 2400 bps. When it asks for type of terminal, enter "vt102". It then will respond with the @ symbol. Enter "mail". For information about their domestic services, enter "phones" for user name. Enter "phones" again for password. For information about their international services, enter "intl/associates" for user name and "intl" for password. You may have to go into half duplex if you want to get your keyboard entries to echo to your screen.

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The Research Wide Area Networks

Introduction

Everyone has heard about LANs. Well, there are also WANs or wide area networks. Back in the 60's, the federal government sponsored the pioneering development of data networks. These networks linked defense research and military facilities throughout the United States. One of the primary purposes was to give access to supercomputing facilities to academic researchers working under government grants. The networks also allowed researchers to exchange files, send messages, and greatly facilitated joint projects. Gradually, the academic world was able to extend the use of such facilities to activities other than defense research. Commercial wide area data networks such as SprintNet and Tymnet also got their start from these early government sponsored networks.

This column and the next will discuss the inner workings of BITNET and INTERNET, the two primary research WANs. Some institutions are also connected to a third network, called UUCP (Unix to Unix Copy). UUCP has a rather primitive routing system which requires that your address to the sendee indicate every host along the route. (A "host" is a computer directly connected to a network. It sends, receives, and routs network traffic.) UUCP only connects hosts using the UNIX operating system and tends to be used more by techies. It did, however, initiate a great, freewheeling, international e-mail conferencing system called "Usenet" with discussion groups ranging from the grossly popular to the sublime. Usenet is now separate from UUCP and any Unix host on the Internet can elect to store the Usenet files. The local Usenet site at University of California at Davis, for example, receives 11 megabytes of new information each day. Old files are removed after 7 days.

The research networks have proven to be essential in conducting big science. For example, physicists stationed around the world have done work on the basic nature of matter on particle accelerators located in Europe and the U.S. Electronic communication on these networks have allowed them to efficiently coordinate their efforts. When a rare supernova appeared in Chile, it only took a matter of hours to set up an international monitoring program with experts using BITNET in the United States and Asia and EARN in Europe. Networks have made it possible to

assemble and make readily available all current information on a topic in one place. Oftentimes "publication" in the dynamic scientific fields means getting data and text stored on one of the research networks databases. This facility and this attitude is now beginning to reach other disciplines.

We will explore BITNET and the INTERNET in some detail. What we cannot do, however, is give detailed instructions for how you can access these networks. Your initial steps will depend on you local situation. You need to get to know whoever handles networking at your campus or office. All academic campuses are hosts on at least one of these networks. They will generally have a network supervisor or electronic postmaster who can advise you. You will need to open an account with one of the campus computers and you will be given a password. Finally, you will have to learn the local e-mail software. Most costs are absorbed by the central campus. Wide area academic telecommunications is regarded as a general campus service, like the central library.

There are also commercial gateways into the research networks. Compuserv definitely does, Tymnet and ABANet say they soon will. Some states are organizing intrastate networks that will connect to the research networks and also allow access by commercial and industrial organizations (e.g., the regional Bell systems). California Education and Research Federation Network (CERFNet) is an example. The point is, if you are connected to any data network, check to see if it gateways into BITNET or the INTERNET.

All of you will have e-mail, but you may not have access to some of the other services available on the research networks. E-mail, however, is the biggest benefit of network access. It will give you quick, cheap, informal access to respondents all over the world. It will also allow you to send a single message to groups of people at the same time through the use of electronic conferences or "mail reflectors". "law-lib" is an example of such a conference.

BITNET

History.   BITNET (meaning, "Because It's Time Network") was founded in 1981 partly because of the policy restraints on using the defense research network, ARPANET. It began with a leased line connecting the City University of New York with Yale University. BITNET evolved from a small cooperative network of IBM computers centered at CUNY to a worldwide network of over 500 members linking nearly 3,000 computers in public and private educational and research centers. It is the largest academic network. The name BITNET refers not only to the combined U.S. and Mexican network, but also to NetNorth in Canada and the European Academic Research Network (EARN). All three combine to

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form one logical network which also has links to Japan, Korea, Singapore, Taiwan, Hong Kong, Argentina, Brazil, Chile, Columbia, Israel, Saudi Arabia, and the Ivory Coast. BITNET also gateways to other networks including the INTERNET.

In 1984, it received a $2 million grant from IBM. In 1986, member institutions approved a charter and adopted a membership fee structure that made it self supporting. In 1988 it cost each member institution around $25,000. In 1989, BITNET and CSNET (Computer Science Network) merged to become CREN (Corporation for Research and Education Networking). The network currently continues to be called BITNET. Full merging of the two networks is scheduled for 1991. BITNET is administered by EDUCOM, a non profit consortium of educational institutions devoted to the advancement of information technology in education. BITNET uses IBM protocols (rules for how data is packaged, addressed and transmitted) rather than the more universal protocols of the INTERNET. CREN will be adopting the INTERNET protocols and will become part of that "network of networks".

Application Programs.   There are three basic applications (programs that users employ directly) on BITNET:

- Message allows users to send one line messages interactively with other users or services on BITNET.

- File Transfer allows users to send (upload) or receive (download) files to or from other users or computers on BITNET.

- Electronic Mail allows users to send messages to other users or computers on the network. It differs from "message" because it is not interactive and there is no restriction on length. The message is stored at the computer on which the addressee has an account.

Sending an interactive message or using a file transfer command require that you be on an IBM computer that is a host on BITNET. This is not the situation for many people. Many of us get into BITNET indirectly through LANS, campus-wide networks, Compuserv, MCI Mail, etc. or have accounts on VAX rather than IBM computers.

Activities.   Activities on BITNET (as opposed to application programs described above) include e-mail, file servers, special interest discussion groups, and electronic journals. You can participate in all of these activities by just using BITNET's electronic mail application.

E-Mail.   How you send an e-mail message through BITNET will depend on your local mail software. As far as the network

is concerned, all you need to know is the respondent's BITNET address (e.g., jdoe@baylor.bitnet). Typically the software will prompt you for the addressee ("To:"), the "Subject", and then the text of your message. Many e-mail packages are pretty primitive when compared to word processors. You may have to hit <enter> at the end of each line and you will only be able to correct text on the current line. On the other hand, people are pretty forgiving on the networks about typos, spelling, punctuation, and "oops I messed up this message entirely - please ignore - I'm going to resend it". If you want to write long, carefully written messages it is often possible to do it on your word processor, upload it to your local BITNET node computer and then, with escape codes, incorporate it into the e-mail software. Again, you will have to check with your network specialist for specifics.

File Servers.   File servers are computers on the network that store informational files that you can have sent to you by using one of BITNET,s applications, namely by sending an interactive message, a file transfer command, or an e-mail message. The most important file server on BITNET is called BITNIC (BITNET Network Information Center). It is located at the EDUCOM headquarters in Washington D.C. The computer itself is called LISTSERV. The address is:

LISTSERV@BITNIC.BITNET

To get a directory of the information in LISTSERV, send an e-mail message to the above address, leave the "subject" line blank, and enter the following two lines of text:

index
help

The files in the directory can be retrieved using the "get" command To obtain three useful files for beginners: again, send an e-mail message to the above address, leave the "subject" line blank, and enter the following three line of text:

get bitnet userhelp
get bitnet servers
get articles index

For a "list of lists", follow the above instructions and enter the following line of text:

list global

The last item is a 20 page list of discussion groups and electronic newsletters available for subscription.

Discussion Groups. There are hundreds of discussion groups on

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topics ranging from technical and science groups to social sciences, liberal arts, religion, ethics and current events.

The Public Access Computer Systems Forum (PACS-L) started in the summer of 1989 to exchange information about computers and systems that libraries offer to their patrons. It now has over a thousand subscribers from more than twenty countries and discusses almost anything dealing with networks or automation and libraries. To subscribe, send an e-mail message to:

listserv@uhupvm1.bitnet

Leave the "subject" line blank. Enter the following command as the first line of text:

subscribe PACS-L your firstname lastname

When you subscribe, you will get instructions for accessing the conference index and archives and for sending communications to the conference. Be prepared for a lot of messages each day. You can remove your name from the list if it gets to be too much.

Electronic Journals.   You can also subscribe to "electronic journals" on BITNET. NETMONTH, for example will keep you up with what is going on in BITNET. To subscribe send an e-mail message to:

listserv@bitnic.bitnet

Leave the "subject" line blank. Enter the following command as the first line of text:

SUBscribe BITNEWS yourname.

Protocols.   BITNET is called a "store and forward" network which means that information originating from a computer that is connected BITNET (called a "node") may be received and forwarded by several intermediate nodes before it reaches its destination node. BITNET uses an older and slower transmission protocol (rules for how data is packaged, addressed and transmitted) called IBM Network Job Entry/Network Job Interface (NJE/NJI). BITNET nodes are generally connected by leased telephone lines running at 9600 kbs. It is gradually incorporating other protocols in its system, notably TCP/IP (see Internet discussion in the next column) that will allow for faster traffic on higher bandwith circuits.

<<< Column #3 of a series entitled "Telecommunications" August, 1990>>>

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The INTERNET

What Does "INTERNET" Mean?   "Internet" can mean three things. With a small "i" it means any network that connects other networks. With a capital "I", it means a collection of federal, military, regional and local networks at universities and research centers connected by a backbone network called NSFNET. Finally it can mean the suite of protocols developed by the INTERNET members (more specifically called TCP/IP). This suite of protocols has been adopted by networks all over the world including many LANs.

Genesis.   "In the beginning there was the ARPANET..." So starts The Hitchhikers Guide to the Internet by Ed Krol. ARPANET was set up by the Department of Defense Advanced Research Projects Administration in 1969 as a wide area experimental network connecting hosts (computers that can send and receive network traffic) and terminal servers (computers that can perform special tasks like printing, or in this case, supply files from its database). It was the world's first packet switched network and led directly to the creation of Telenet and all the other commercial packet switched networks.

As local and regional networks became more pervasive, many ARPANET hosts became gateways to these networks. A set of rules was developed called Internet Protocol (IP) to allow network interoperation. Over time other nationwide networks such as NASA and NSFNET became interoperative because of adoption of IP. The INTERNET is a hodge podge. It grew up from a handful of special purpose networks to over 100 today. In the beginning, government agencies sought specialized network services and functions to meet their needs. There was much emphasis on security and reliability. Universities focused their efforts on local campus and regional networks. Different networks used different protocols.

Today, the whole system is tied together by the adoption of a uniform suite of protocols. TCP/IP refers to 2 of the main protocols. TCP means Transmission Control Protocol which breaks data up into "datagrams" (packets). IP means Internet Protocol which, as noted above, provides for the routing of datagrams between networks. Each datagram contains the destination address. Another important protocol is SMT, Simple Mail Transfer, which controls electronic mail.

Topology   The Internet is a collection of networks or, as it is sometimes called, a "logical network". It comprises over 200,000 computers on nearly 2,000 networks. These networks include: ARPANET (soon to be called DRI for Defense Research Internet), NSFNET (National Science Foundation), NASA Science Network (NSN), Computer Science Network (CSNET), regional networks listed below, local networks at university and research institutions and a number of military networks.

For many years ARPANET served as the major network of the INTERNET with its then state of the art backbone of 56 kbps lines. The NSFNET now serves as the backbone and its lines run at 1.b mbps (called "T-1" lines). They will soon increase to 45 mbps (T-3). The backbone serves the national supercomputing centers and also ties in all of the regional and other research networks in the United States.

NSFNET started in 1985 as a backbone to connect the six national supercomputing centers. It also adopted TCP/IP that year. In 1986 it became the backbone to link all of the networks that are part of the INTERNET. The INTERNET is a three tiered hierarchy, with campus networks at the lowest level, regional and supercomputing networks at midlevel, and NSFNET and other national networks operating at the top level. The midlevel networks operate at 56 kbps and comprise the following:

BARRNET	Bay Area Regional Research Network
CERFNET	California Education & Research Federation Network
CICNET	Committee on Institutional Cooperation Network (upper Midwest)
CSnet	Computer Science Network
JVNCNET	John von Neumann Supercomputer Center Regional Network
LOS NETTOS	Greater Los Angeles Area Network
MERIT	Michigan Educational Research Network
MIDNET	Midwest Network
MRNET	Minnesota Regional Network
NCSANET	National Center for Supercomputing Applications Network
NEARNET	New England Academic and Research Network
NORTHWESTNET	Northwestern States Network
NYSERNET	New York State Education and Research Network
OARNET	Ohio Academic Resources Network
PREPNET	Pennsylvania Research & Economic Partnership Network
PSCNET	Pittsburgh Supercomputing Center Network
SDSCNET	San Diego Supercomputer Center Network
SESQUINET	Texas Sesquicentennial Network
SURANET	Southeastern Universities Research

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              Association Network
THENET        Texas Higher Education Network
USAN          NCAR's University Satellite Network
VRnet         Virginia Research Network
WESTNET       Mountain States Network
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Governance: NICs & NOCs   INTERNET governance is a
confederacy. Management and information services on the INTERNET
are divided among many networks. Information Sciences Institute
(ISI) does much of the standardization work. SRI International
provides the principal information services for the INTERNET by
operating the Network Information Center (NIC). Other entities
provide information services for CSNET and NSFNET.

Each network, including NSFNET, ARPANET, and the regional
networks has its own operations center, typically called a NOC.

File Transfer Protocol (FTP) There are three INTERNET protocol
applications that are of most interest to the average user: FTP,
TELNET, and Electronic mail. FTP (File Transfer Protocol) allows
you to transfer files from a remote host to your local host.
Several hosts on the INTERNET have user information files which
can be downloaded to your local INTERNET host via "anonymous
FTP". These hosts addresses include:

```
NSFNET Network Information Services:     nis,nsf.net
NSFNET Network Services Center:          nnsc.nsf.net
CSNET Services:                          sh.cs.net
DDN NIC:                                 nic,ddn.mil
```

For example, to obtain an introductory document called
"Internet.txt", get directly on to you local INTERNET host and:

1.   Enter: **ftp nis.nsf.net**
2.   Remote host will say you are logged in
3.   At the prompt 'Enter command', enter: **cd resources**
4.   After a response from remote host, enter: **dir**
5.   Remote host will respond with a list of files
6.   Enter: **get internet.txt** (or whatever file/s you want)
7.   Remote host will transmit file to your local host
8.   When transfer is complete, enter: **quit** to leave remote
      host

The Hitchhiker's Guide to the Internet, mentioned above is
available from nic.ddn.mil. The file is named rfc:rfc1118.txt.
Some of these files have many sections that are more technical
than the average user would wish. Unfortunately, it is probably
impossible to write a completely non-technical guide to any of
the networks that says very much. "Rfc", incidentally, means
"request for comments". Rfcs are official documents used to

propose, explain, discuss, or promulgate protocols, history, and architecture of the INTERNET.

An anonymous ftp of special interest to law librarians is the availability of U.S. Supreme Court opinions from Case Western Reserve University. It is called project "Hermes" and it is an attempt to make these opinions more readily available to the public at no charge. Get on your local INTERNET host and send the following:

At local host prompt, enter:	**ftp.cwru.edu**
At "name", enter:	**anonymous**
At "password", enter:	**guest**
At "ftp>" prompt, enter:	**cd**
At "(remote-directory)", enter:	**hermes**
At "ftp>" prompt, enter:	**cd**
At "(remote-directory)", enter:	**ascii**
At "ftp>" prompt, enter:	**dir**

You then will get a list of the supreme court opinions available. "O" means majority opinion; "C" means concurring opinion; "D" means dissenting opinion; and "S" means syllabus. "filt" means that the printing and other codes have been filtered out to give you a pure ASCII file. To get an opinion and then sign off:

At "ftp>" prompt, enter:	**get 89-645.O.filt** (for example)
After file transfer, enter:	**quit**

The present file contains everything dumped from the last two weeks of the 89-90 term. It will be interesting to see the system operate on a current basis starting with the October 1990 term. Files can also be obtained by electronic bulletin board. Dial Cleveland Free Net at 216-368-3888. For further questions, contact Tom Grudner at 216-368-2733.

TELNET   TELNET allows a user to log onto a remote host in real time as if you were hardwire connected. Using the telnet command, you can log onto the online public catalogs of nearly thirty university library systems. For example, to log onto the University of California online catalog, get onto your local INTERNET host and issue the command:

telnet melvyl.ucop.edu

There is a file on BITNET that lists the OPACS available on the INTERNET. Send an electronic mail message to:

listser@unmvm.bitnet

Leave the "subject" line blank. Enter the following command in

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the body of the message:

get internet library

If you have an RLIN account number, you can also log in from your PC and modem. First log on to your local INTERNET host, then enter the following:

At local host prompt, enter: telnet rlg.stanford.edu
At "account", enter: (your RLIN account number)
At "password", enter: (your password)
At "command", enter: call rlin (cat)
At "?" (RLIN prompt), enter: sel fil bks or sel fil ser, or sho inf or logoff, or other RLIN command.

"sho inf" will give you information on RLIN commands.

Electronic Mail   Electronic mail allows a user to send messages to one a more users on other hosts. Addressing is simple if no gateways (links between networks) are involved. The pattern is:

user@domain

"User" is your local electronic mailbox name, for example "jdoe". "Domain" is the local host computer name, for example "utexas", followed by a period and a three letter extension that represents one of the INTERNET top level domains.

The top level domains are:

COM (commercial organizations)
EDU (educational organizations)
GOV (civilian governmental organizations)
MIL (Department of Defense)
NET (network administrative organizations)
ORG (other organizations)

A typical mail address might read:

jdoe@utexas.edu

This is called the domain naming systems and is hierarchical going up from left to right. Another wrinkle is that jdoe@utexas.edu is really called an "alias". At the system level, the INTERNET uses numeric addresses that are made up of four parts separated by periods, for example:

128.83.1.33

When a user sends an electronic mail message over the INTERNET, a "name server" checks the domain address to get the actual "IP" address (e.g., 128.83.1.33). Sometimes you will see these IP (Internet protocol) addresses on mail.

When you are sending mail between networks, the addressing gets more complex because you may have to indicate gateways and deal with different addressing schemes on other networks. For example, I have found that I have more success in reaching the BITNET Network Information Center by going through a gateway instead of going directly from my host. I use the following address:

listserv%bitnic.bitnet@cornellc.cit.cornell.edu

which means that the message will first go to a gateway at Cornell University. From there, every thing to the right of the @ is dropped, the % is changed to @ and the message is sent to:

listserv@bitnic.bitnet

This all seems complicated. And, it is. But it is wonderful because it works. People from universities and research organizations throughout the world have jerry rigged a system that works despite all the technical and administrative obstacles. Electronic mail is the one network application that operates between virtually all research and commercial networks. Working out the details of addressing is at the heart of this world-wide electronic mail interoperability. Someday all networks will subscribe to the newly developed X.400 international addressing standard and things will be simpler. Meanwhile, get to know your local electronic mail postmaster or network administrator real well.

You can also send electronic mail to and from the INTERNET from Compuserve and MCI Mail, BITNET and, no doubt, many other networks.

Computer Conferences.   These are also called: "discussion groups", "alias lists", "mail reflectors", "electronic mailing lists" and other names. The most descriptive name is mail reflector. Mail reflectors are computer programs that can be loaded on any INTERNET host. The programs handle two kinds of messages, each with their own address. The first kind of message will add your name to an e-mail address list that the program maintains. The second kind of message will be "reflected" to all people on the list. For example, law librarians have a computer conference that is maintained on an INTERNET host on the campus of the University of California at Davis. To get on the list you address a message to:

law-lib-request@ucdavis.edu

Only the address is critical. It does not matter what you enter
for subject or body. (It is appreciated, however, if you enter
your name and library in the body.). Thereafter, to send a
message to the group, address it to:

       law-lib@ucdavis.edu

There are thousands of computer conferences on the research
networks. They give far-flung people a cheap, quick, informal
way to communicate with colleagues. "Networking" becomes more
than a buzzword.