The University of Southern Mississippi
The Aquila Digital Community

Faculty Publications

7-1-1994

Computer Network Resources for Economists

William L. Goffe
University of Southern Mississippi

Follow this and additional works at: http://aquila.usm.edu/fac_pubs

Part of the Political Science Commons

Computer Network Resources for Economists

William L. Goffe

The Internet, the large and very rapidly expanding computer network, is revolutionizing research. In some areas of physics, journals are now seen only as archives, and keeping current requires reading electronic "papers" over the Internet (Taubes, 1993). In molecular biology, many journals require authors of papers on sequenced genes to submit their data to gene libraries on the Internet (Cinkosky et al., 1991). Seismologists use the Internet to disseminate analyses of earthquakes rapidly (Powell, 1993) and the American Mathematical Society runs an electronic preprint service on it. The Internet is clearly the premier academic and research (and increasingly commercial) network,[1] and it is seen as the prototype, if not the precursor, of the much discussed "information superhighway."

Resources for economists are rapidly being introduced. They include BibEc, a database with bibliographical information on some 35,000 economics working papers; the Luxembourg Income Study, which contains some 66 household surveys on economic and demographic variables from 21 countries; the U.S. Bureau of Labor Statistics LABSTAT database, with thousands of time series, the U.S. Department of Commerce's Economic Bulletin Board, which

---

[1] The Internet has surpassed Bitnet, an academic network devoted primarily to electronic mail, due to the Internet's superior coverage, speed and functionality. While the number of Bitnet nodes was stagnant in 1990 and has declined since ("CREN-Only BITNET Members and Nodes," 1993), the Internet's growth has continued unabated. In fact, initial plans are being made to move Bitnet to the Internet (Conklin, 1993). In the meantime, as shown in the text to follow, electronic mail easily traverses the two networks.

■ *William L. Goffe is Assistant Professor of Economics, Department of Economics and International Business, University of Southern Mississippi, Hattiesburg, Mississippi. His e-mail address is bgoffe@whale.st.usm.edu.*

has 700 macro time series; EconData, another macro database with a simpler interface with U.S. macro data and International Financial Statistics data from the IMF (though permission from the IMF is required to use it); recent corporate filings with the SEC; detailed Federal Reserve data; U.S. Department of Agriculture data; Penn World data; and the Survey of Consumer Finance (both from the NBER). There are even electronic working paper archives.

The Internet has been quite useful for me. When I teach, the Economic Bulletin Board (EBB) provides the latest macro figures, and EconData easily generates long time series for handouts that illustrate postwar macro history. When I have changed jobs, the file transfer protocol FTP easily copies my computer files across the country. Most of my professional correspondence is through electronic mail; in fact, most of this paper was researched using it (as the number of acknowledgements attests). I also use the Internet to distribute computer code from a recent article of mine in the *Journal of Econometrics* — sending it out via e-mail takes just a few seconds, and it is in several on-line libraries where researchers can easily find it. For a paper I'm writing on the structure of neural nets, a mathematician in Singapore was a great help; we communicated via electronic mail and "met" on a Usenet newsgroup devoted to neural nets. Members of another Usenet newsgroup on bike touring were very useful in planning recent tours in Brittany and Hawaii.

The programs (or protocols) that access the Internet take some effort to learn, but they are certainly within the grasp of the computer literate. After all, since the Internet has an estimated 15 million users (Markoff, November 3, 1993), it simply can't be that hard.

The major difficulty stems from the Internet's very nature: since it spans many different computer systems, the programs and the users must bridge them. Further, the entities funding the networks making up the Internet have, until quite recently, concentrated on building networks, rather than creating resources, cataloging them, or developing tools to find or easily retrieve them (Gopher and the World Wide Web are two tools that are recent and notable exceptions). This has led to a rather surprising culture where volunteers such as programmers, librarians, government agencies, and research organizations have filled parts of this void. Unfortunately, this somewhat haphazard organization makes finding resources difficult, but on the other hand they are generally freely available (all the resources listed here are free). More organized and commercial efforts have recently begun, but they have yet to bear much fruit.

However, once some basic concepts are understood, the programs can be learned as needed. It would be very wise to supplement this very succinct guide with local documentation and perhaps even a class (offered by many university computing centers), since details of the many different computer systems on the Internet cannot be covered here. In addition, many books have appeared since 1992; of the sixteen I have seen at major bookstores, I recommend Krol (1994), Gilster (1993), Dern (1994), Hahn and Stout (1994), and Kent (1994). Finally,

as with most computer programs, a bit of experimentation, with good documentation at your elbow, is the best teacher.

The next section describes the different types of Internet connections. The following section, along with an Appendix, offers a minimal set of directions for the programs that access the Internet: electronic mail; Telnet for remote logon; FTP for file transfer; and Gopher and World Wide Web for file transfer as well as reading and searching for information. The next section contains an abridged listing of Internet resources for economists (a complete and continually updated version can be obtained from the Internet; directions are provided in the text that follows). Roughly following Krol, the following conventions are used: Internet protocols contain at least one capital letter, bold type represents user typed input and Internet host names, italics denote file names, directory names and user-supplied variables, and special characters are enclosed in double quotes.

Connecting to the Internet

Before describing how to connect to the Internet, it is worthwhile to describe the concept of a protocol, a key to understanding and using the Internet. Protocols are standards, implemented as programs, on each of the millions of Internet computers that coordinate their operations. Some are very basic and are never seen by the typical user. For instance, a pair of protocols known as TCP/IP transmits collections of bits, known as packets, between computers on the Internet, called "hosts." Higher level protocols use TCP/IP to accomplish tasks such as electronic mail, logging onto remote hosts with the Telnet protocol, transferring files with FTP (file transfer protocol), and easily viewing and transferring files with Gopher, or World Wide Web. Each of these protocols will later be described in more detail.

The easiest way to connect to the Internet is to belong to an organization which offers it: most universities, some government organizations, and an increasing number of businesses. As an alternative, many service providers sell Internet connections. Their services range from connecting individuals, using a phone line and a modem, to connecting large organizations with thousands of computers using dedicated, high speed leased lines (in fact, universities and other large organizations use the latter). The books recommended above list many service providers. Marine et al. (1994) and Estrada (1993) list more, and discuss issues of interest to buyers of Internet services.

There are two types of connections to the Internet from the desktop. Both involve communications software, and sometimes an expansion card inside the computer, but the difference in functionality is great. The most useful is a direct connection, where a computer runs the Internet protocols and is a "member" of the Internet. Such a machine is known as an Internet "host," and there are currently more than two million worldwide. PCs and Macs can be

hosts,[2] as can mainframes and almost any other sort of computer. These hosts usually connect to the Internet through a local area network (or "LAN") which links computers on a floor or in a building. Common LANs are Ethernet, Token Ring, and Novell LAN. The LAN then connects to campus and larger networks making up the Internet. Direct connections are possible, but much less common, with a modem and phone line with either the SLIP or PPP protocols. The speed of a direct connection is substantially slower than with a LAN, but it is quite suitable for home use. Most current modem's theoretical top speed is roughly 7 Kbytes/s (seven thousand bytes, or characters, per second) with one quarter of that being quite respectable, while a very common LAN, Ethernet, has a theoretical top speed of 1,250 Kbytes/s, with typical rates in the mid to low 100 Kbytes/s. Speeds going out from a LAN to the Internet vary greatly; I have seen rates from 1 to 40 Kbytes/s, with 10 Kbytes/s being typical. Direct connections through phone lines currently start at about $30 per month; a LAN expansion card for a PC or Mac currently runs approximately $100, and the total cost of a LAN and connecting it to the Internet can run to hundreds of dollars per machine.

With a direct connection on a LAN, you can quickly transfer files with any of the millions of Internet hosts directly to or from the one on your desk with the file transfer protocol FTP. You can also use the Telnet protocol to directly logon to those hosts and access resources such as card catalogs. If you have a direct connection with a modem and phone line, the only loss will be speed.

The second method, an indirect connection, is common for PCs and Macs. Terminal emulation software and usually a "serial" line through a hard wired connection links them to an Internet host, often a mainframe.[3] The PC or Mac is not a host and does not run any Internet protocols. Serial line speeds are much slower than with LANs; their top speed is usually 1.2 or 2.4 Kbytes/s. Besides slower speed, more work is involved in using this sort of Internet connection. Transferring a file from a remote host to your desktop is a two–step process: first the file is transferred to your local host over the Internet with FTP, then it is transferred with your terminal emulation software over the serial line to your desktop. Logging onto other Internet hosts is also a two–step process: first you logon to your local host through your terminal emulation software, then you use the Telnet protocol to logon to the remote host.

A direct connection with a LAN is quicker and easier to use (some new protocols, such as World Wide Web, almost require it for optimal use), and for institutions it is well worth the expense of setting up a LAN connection to the Internet. Many universities are doing so. Local documentation is the simplest way of determining your type of Internet connection.

To use a remote computer, or "host," on the Internet, it must be identified. This is done through host "addresses" and host "names." Each host is

---

[2] PC hosts often use NCSA Telnet; Window hosts use WinQVT, Cello, NCSA Telnet for Windows or PC/TCP; OS/2 uses TCP/IP; and Macs might use NCSA Telnet for Macintosh.
[3] Such PCs typically use Procomm, Crosstalk, Kermit, Carbon Copy, PC Anywhere, SmartCom or Hyperaccess, while Macs might use White Knight, ZTerm, MacTerminal or Microphone.

identified by a unique address, composed of four numbers separated by periods. Each number ranges from 0 to 255, so a host might be identified as 128.29.0.101. For ease of use, each host also has a unique name, and the Domain Name System, another Internet protocol, translates these host names, used as inputs to protocols, to addresses used internally by protocols. Most protocols accept addresses as inputs, but it is best to use host names since addresses change as networks change. Names are hierarchical: reading from the left, they identify a specific host, then larger and larger domains, or groupings of computers, each separated by a period. For instance, I often use **whale.st.usm.edu**. The host is **whale** (host names are often fanciful), in the Science and Technology Center (**st**), at the University of Southern Mississippi (**usm**), which is an educational institution (**edu**). The rightmost, or top level, domain is generally either a non-U.S. country (denoted in the host country's language, of course, so Germany is **de**) or some broad classification in the United States. Besides **edu**, some other common U.S. top level domains are **gov** for government entities, **com** for commercial sites, and **org** for other types of organizations.

Internet Protocols

Electronic mail is a protocol that may be known to many readers. Logging onto remote hosts, like a card catalog, is accomplished with the Telnet protocol. Transferring files between two computers uses the file transfer protocol, FTP. A typical use of FTP might be to retrieve data from the macro database EconData. The Gopher and World Wide Web protocols allow one to view and retrieve files. For example, Gopher connects Internet users to the job listings from *The Chronicle of Higher Education*, the working paper bibliographical database BibEc, and the Economic Bulletin Board. The Appendix goes beyond this section to offer additional technical and hands-on information about Telnet, FTP, Gopher, and World Wide Web.

Electronic Mail

For many economists, electronic mail, or e-mail, may be the most useful Internet protocol. It is superior to faxing because the recipient receives an electronic document that can be manipulated in a computer, not a picture of a document that must be retyped or scanned before it can be used. Not only does e-mail connect individuals, it also connects groups with common interests through mailing lists.

E-mail differs from postal mail (sometimes called "snail-mail" by network cognoscenti) in several respects. First, it is less formal—first names are typically used. Second, it is much quicker, since delivery usually takes just a few minutes. Third, e-mail may be less secure because most travels unencrypted. While very few people have the ability to intercept and read your e-mail, until encryption becomes standard, a good rule of thumb is to avoid e-mail that would

embarrass you if it became public. The most frequent form of embarrassment is misdirected mail: this most commonly occurs when one intends to send mail to one person and it accidently goes to a mailing list.

Many different e-mail programs are used on the Internet, so only general directions are given in this paper. Local resources are very important here; for instance, a few systems deviate slightly from the e-mail address scheme described below. However, most mail systems are menu driven and many simply have the name MAIL. In general, they require the recipient's e-mail address and the subject of the letter—it is best to be descriptive as possible here. From that point, one types in the letter, or retrieves a previously written file. At the bottom of the letter a short "signature" should list your e-mail address and perhaps other ways to contact you. After the letter is done, a command sends it on its way.

Undeliverable e-mail is returned. Analysis of the "header" of the returned e-mail will reveal a few lines of somewhat cryptic diagnostic messages that usually describe the problem. The most common difficulty is a wrong address.

E-mail addresses are based on the recipient's host and their userid (user identification). The userid comes first, then an '@', then the recipient's host. For instance, to send e-mail to me, one would use **bgoffe@whale.st.usm.edu**, where my userid is **bgoffe** and my host is **whale.st.usm.edu**. To send e-mail to the President of the United States, use **president@whitehouse.gov**.

Internet e-mail serves as a common denominator between different networks and electronic services, such as CompuServe and Prodigy. While the book references listed above describe e-mail to and from many sources, Yanoff (1994a) provides a frequently updated and exhaustive list. Perhaps the most common destination for non-Internet academic mail is Bitnet.[4]

Currently, there is no Internet-wide directory of users, although there are many limited ones and work is proceeding on a complete one. Thus, it is easiest to find a potential recipient's host and userid by other means. You should also see if they check their e-mail regularly.

Standard Internet e-mail only accepts text (or ASCII) characters. Thus, one cannot e-mail non-text (or binary) files, such as programs and most word processing files, via standard Internet e-mail. However, collaborators can e-mail programs and word processing files to each other over the Internet with one of two approaches. One is the new e-mail standard MIME (Multipurpose Internet Mail Extension). If MIME isn't available, the program UUENCODE can be used to convert a binary file to text suitable for standard Internet mailers, and the companion program UUDECODE converts the text back to binary. In my on-line resource guide—which the Appendix describes how to access—there are directions for obtaining UUENCODE and UUDECODE.

---

[4]From Bitnet to the Internet, you should be able to use the Internet address (if not, complain to your system administrator). From the Internet to Bitnet, the address will take the form **userid@node.bitnet**, where "node" is a one-word Bitnet host name.

Since e-mail does not contain voice or sight clues, as phone calls or meetings do, misinterpretations are surprisingly common. When sending e-mail to strangers, it is prudent to be polite. This advice is doubly important with e-mail destined for groups, such as mailing lists and Usenet, a distributed discussion system. Otherwise, misunderstandings easily develop, and aggravating and unproductive "flame wars" full of insults easily erupt. Something about e-mail allows people to write things they wouldn't dream of saying in person. For instance, after posting information to the Usenet newsgroup misc. invest on a computer-based trading experiment funded by the NSF, I was told that it was "one of the most profoundly ignorant postings I've seen in quite a while" and that it appeared to be a "scam and a fraud." Further, mailing lists and especially Usenet have evolved a culture, so consider reading them a bit first. Since a mailing list may have hundreds of readers, and a Usenet newsgroup may have tens of thousands, it is important to follow certain social conventions, known as "netiquette," to help them operate smoothly and efficiently. They include: When responding to a previous post, quote accordingly, but judiciously. Consider replying directly if you think no one else will be interested. Watch your temper; e-mail sometimes makes tempers flare. Subscribe and unsubscribe correctly to mailing lists. Don't type in all capital letters. And use a meaningful subject line.

The two ways of organizing group discussions are though mailing lists and Usenet. In a mailing list, e-mail is sent to one address, where software automatically resends it to all list subscribers (some lists are "moderated" by a human, meaning that postings must be approved for distribution). Thus, to discuss a topic with all subscribers of a mailing list, you send mail to one site, which then distributes it. When joining or leaving a mailing list, remember that such requests are *not* sent to the list, and thus to all subscribers, but to the software or the person managing the list. Sending such e-mail to the list is poor form.

Usenet, on the other hand, is a discussion system with several million users reading and writing in several thousand enormously diverse newsgroups, with daily traffic of roughly 50 megabytes. Most universities carry Usenet and the software that accesses it. The resource section catalogs mailing lists and newsgroups for economists. In both, like a newspaper or other periodical, much of the material may be of little interest, but occasionally something very useful pops up. Thus, be prepared for a substantial volume of low-interest material.

E-mail and Usenet create what some label "virtual communities:" groups of widely separated individuals who share common interests. Many of the most active economics mailing lists are composed of those who have no local colleagues in their field.

Telnet and FTP

Telnet lets one log onto a remote host, even one across the world, from your local host. This might not seem useful without an account on the remote computer, but many Internet resources, such as card catalogs, the Iowa

Electronic Markets, and BibEc are available without one. The Telnet program is available on all Internet hosts and almost always operates in the same way.

FTP (File Transfer Protocol) unfortunately may be the most complicated protocol, which stems from the variety of systems FTP traverses. Resources for economists available through it include the well-integrated source of U.S. macro data EconData and the Penn World Trade Tables from the NBER. These resources are among some 1500 "anonymous" FTP sites containing roughly 150 gigabytes of data and programs (roughly 600 times the capacity of the typical new PC's 250 megabyte drive) in 2.2 million files for public retrieval (Emtage, 1993). Like Telnet, all Internet hosts have the FTP program and it almost always operates in the same way.

Gopher and World Wide Web

Gopher is a new, increasingly popular, and easy-to-use Internet protocol that transfers files and looks up information. For instance, "Academe This Week" (the free electronic version of *The Chronicle of Higher Education*) and the EBB (a U.S. macro database), are available through Gopher. Gopher was designed at the University of Minnesota, whose mascot is the Golden Gophers, to "go for" information on that campus, and its simple interface allows users to "burrow" easily through the Internet. By the end of 1993, some 4,800 Gopher "servers" with information for public access lived on the Internet (Foster, 1994).

Users contact these Gopher servers in one of two ways: through Gopher "client" programs that run on your local host (unlike Telnet and FTP, they operate differently on different types of hosts), or through Telneting to a host that offers Gopher service. Yanoff (1994b) lists these sites (most use the logon **gopher**). The former communicate directly with Gopher servers and are faster, require fewer network resources, and best exploit the server and the user interface on the local host. Client software is available for almost any type of host; it may be available locally and can even be FTPed.

The World Wide Web (often just called "the Web") is the most advanced, and paradoxically, easiest to use Internet protocol. First, since it subsumes many other protocols, the only additional software many will need is an e-mail program. More importantly, it can view specially designed documents (which may include pictures and sound) spread across the Internet in seamless webs. The documents are connected through "hypertext" links; that is, one might be reading a short description of the Civil War, and the name Lincoln is highlighted, indicating a link to a document describing him. By simply pressing the enter key, one can read this document, which may be located on another machine. The on-line versions of *Encyclopedia Britannica* (McHenry, 1994) and *The Wall Street Journal* (Markoff, 1994) will use Mosaic, which is the leading "browser" or viewer for World Wide Web documents. There is little wonder then, when Mosaic is hailed as a "killer application" for the Internet (Markoff, December 8, 1993). That is, it is "an applications program so different and obviously useful that it can create a new industry from scratch."

While there are currently few Web resources for economists, they are sure to grow. Already, Mosaic can be used to view fully formatted working papers from the Working Paper Archive. As this is being written, a Web version of my guide "Resources for Economists on the Internet" is being developed with the assistance of Bob Parks and Hal Varian. By using it, one can read about a resource, then directly connect to that resource through its hypertext link.

Internet Resources for Economists

This section is a heavily abridged version from Goffe ("Resources for Economists on the Internet"). That document, located on the Internet, is frequently updated, so it should be checked for the latest and most complete information. The Appendix contains an example of how to retrieve it.

Resources on the Internet are located by uniform resource locators, known as URLs. Formally, they start with "URL = ⟨", and end with "⟩", but often these parts are left off as understood (I have kept them in the References to avoid any possible confusion with the rest of a citation). There are three elements in a URL: the protocol to access that resource (often, you can use more than one, so a resource may have more than one URL), the host, and the location of the resource on that host. A "://" separates the protocol and host, while a "/" begins the location of the data on the host. Protocols include Telnet, FTP (the "anonymous" version, described in the Appendix, is the default), Gopher, and World Wide Web (which is denoted by http; the others just use the name of the protocol).

For example, my guide "Resources for Economists on the Internet," has one URL ftp://rtfm.mit.edu/pub/usenet/sci.econ.research/econ-resources faq (its other URLs list its other locations). This means that the document is available via anonymous FTP from the host **rtfm.mit.edu** in the file *econ-resources-faq*, from the directory */pub/usenet/sci.econ.research*. For the URL gopher://una.hh.lib.umich.edu/ ebb, use Gopher to connect to the host **una.hh.lib.umich.edu**, and then move to the *ebb* directory (in URLs for Gophers, digits sometimes appear; this information is not very useful for people and has not been used here).[5]

The resources are very succinctly described here, moving from mailing lists to Usenet news groups, through data resources, to descriptions of working paper archives, bibliographic services, especially useful Gophers, and more.

---

[5]For several types of resources, there is additional information. For Telnet resources, any userid precedes the host and ends with a "@" (note the accidental similarity to an e-mail address), and any password follows the host name and is preceded by a ":". If a specific port on a host for any resource is required, it follows the host name and begins with a ":". For e-mail resources, any text required in the subject line follows the host and a ":". Finally, to avoid possible confusion with hyphens, URLs should not be hyphenated when they exceed one line.

Later in this paper, Table 4 lists the URLs for locating these resources; note that many resources have several URLs because they can be explored with a variety of protocols. In general, Gopher is preferred, but unfortunately it is not always available.

Mailing Lists

Some of the lists appearing in Tables 1 and 2 have little volume. They may have been organized in haste with little thought given to establishing sufficient volume, so don't be discouraged with this technology if you see little traffic. On the other hand, some lists are quite active, so be prepared for significant traffic (some have the option of receiving mail once a day in a "digest"). For convenience, both Bitnet and Internet addresses are listed. See my on-line guide for an unabridged and current listing.

Table 1
Listserv Mailing Lists

Political Economy[a]
  Pol-Econ@shsu.edu
Research in Economic Education
  econed-1@utdallas.bitnet
  (or @vm.utdallas.edu)
The Electronic Journal of Finance
  finance@templevm.bitnet (or @vm.temple.edu)
Workshop on Information Systems Economics
  wise@uicvm.bitnet (or @uicvm.cc.uic.edu)
Post-Keynesian Thought
  pkt@csf.colorado.edu.
Community and Rural Economic Development Interests
  ruraldev@ksuvm.bitnet (or @ksuvm.ksu.edu)
Labor Economics
  labor@shsu.bitnet (or @shsu.edu)
Feminist Economics Discussion List
  femecon-l@bucknell.edu.
SAS Public Access Consortium (deals with Census data)
  saspac-l@umslvma.bitnet
  (or @umslvma.umsl.edu)
MEMSNET (Mineral Economics and Mgmt Society)
  memsnet@uabdpo.bitnet
  (or @uabdpo.dpo.uab.edu)

List of the Society of Computational Economics
  csemlist@hasara11.bitnet
Discussion of Teaching and Research in Economic History
  econhist@miamiu.bitnet
  (or @miamiu.acs.muohio.edu)
Economic Nonlinear Dynamics List
  nonlin-1@nihlist.bitnet (or @list.nih.gov)
Eastern Europe Business Network
  e-europe@pucc.bitnet
  (or @pucc.princeton.edu)
International Trade
  trade@csf.colorado.edu.
Economic Problems in Less Developed Countries
  economy@uottawa.bitnet
  (or @acadvm1.uottawa.ca)
Regional Science Information Exchange
  regsc-l@wvnvm.bitnet
SAS Discussion
  sas-l@uga.bitnet (or @uga.cc.uga.edu)

[a]Messages from Usenet's sci.econ.research are "gatewayed" to here and it is possible to receive the list in one large mailing (a "digest") each day.

Table 2
Other Mailing Lists

List and address	Software
Local Economic Development	majordomo
econ-dev@csn.org	
International Political Economy	mailserv
ipe@csf.colorado.edu	
CTI Centre for Computing in Economics	mailbase
cti-econ@mailbase.ac.uk	
Economic History E-mail Conference	mailbase
history-econ@mailbase.ac.uk	
Experimental Economics	mailbase
economics-experimental@mailbase.ac.uk	
Discussion on the transition in Eastern Europe & former Soviet Union.	mailbase
east-west-research@mailbase.ac.uk	
Discussion of issues related to law and economics.	mailbase
law-economics@mailbase.ac.uk	
Discussion on the economics and management of education.	mailbase
educ-econ@mailbase.ac.uk	
Discussion for those who use quantitative techniques in health econ.	mailbase
health-econometrics@mailbase.ac.uk	
Teaching of Economics	Internet Style
tch-econ@vaxl.elon.edu	
Caribbean Economy	Internet Style
caribbean-economy@vela.acs.oakland.edu	
Gauss Software Package	Internet Style
gaussians@uclink.berkeley.edu	
PEN-L Progressive Economists Network	listproc
pen-l@bobby.ecst.csuchico.edu	
RISKNet–Discussion of Risk and Insurance Issues	listproc
RISKnet@mcfeeley.cc.utexas.edu	
Econlaw–An economic analysis of law	listproc
econlaw@gmu.edu	
Forensic Economics	listproc
forensiceconomics-1@acc.wuacc.edu	

Financial Economics Network
This organization runs a number of lists and other resources devoted to topics in financial economics. See my on-line guide, or contact either Wayne Marr of Clemson University (marrm@clemson.clemson.edu) or John Trimble of Washington State University (trimble@vancouver.wsu.edu) for further information.

The most common software for running a mailing list is listserv (see Table 1). One subscribes and unsubscribes to a list run by listserv by sending e-mail to a userid called listserv, which is actually a program. Such e-mail should *not* be sent to the list itself, which sends it to all list members. For example, to subscribe to the list Pol-Econ, send e-mail to **listserv@shsu.edu**. In the body of your e-mail message, write the one-line message **subscribe Pol-Econ** *your name*, where *your name* is your first and last name. To cancel a subscription, use the

command **signoff** *list*, where *list* is the name of the list, in e-mail sent to a listserv. Help on these and other commands can be obtained by sending a one–line message **help**. In all cases you will receive an acknowledgement. Finally, e-mail for the list members is sent to **Pol-Econ@shsu.edu**, for example. The listserv software will relay it to all list members.

Another program that organizes mailing lists is majordomo (see Table 2). Commands for subscribing and unsubscribing are identical to those used with a listserv, except that your name is not given on the subscription line, and commands are sent to the userid **majordomo**.

Another type of mailing list software is mailserv, which uses the same basic commands as majordomo, but they are sent to the userid **mailserv**.

One subscribes to a list run by mailbase with the command **join** *list your name*, and cancels a subscription with **leave** *list*. Listproc uses the same basic commands as listserv, but mail is sent to **listproc** rather than **listserv**.

With Internet style mailing lists, requests are sent to the human list maintainer. The suffix-*request* is added to the list name for e-mail destined for the maintainer.

Usenet Newsgroups

In many ways, Usenet has its own culture and the new user is wise to read carefully before posting messages. The newsgroups news.announce.newusers and news.newusers.questions are for them. Since it runs on a variety of systems, consult your local site for information on how to access it. The general references listed above also cover it. A list of Usenet groups for economists appears in Table 3.

Table 3
Usenet Newsgroups for Economists

Newsgroups	*Topic*
comp.soft-sys.spss	SPSS
comp.soft-sys.shazam	Shazam
comp.soft-sys.sas	SAS
sci.stat.edu	Statistics and Education
sci.stat.math	Statistics and Math
sci.stat.consult	Statistics and Consulting
sci.math.stat	Statistics Discussion
sci.op-research	Operations Research
sci.econ.research	Research in Economics (Moderated)
sci.econ	Discussions in Economics (often dominated by current political economy questions; a good place for economic education if you're patient)

Economic Bulletin Board (EBB)

This service is an outgrowth of a dial-up bulletin board offered by the U.S. Department of Commerce. It contains files from the Departments of Commerce, Labor and Treasury, the Federal Reserve, and other agencies. The EBB is currently offered on the Internet in two places. The first is a for-fee Telnet interface to the EBB at the Department of Commerce (not described here), and the second is the University of Michigan Library Gopher, which downloads files daily from the Department of Commerce. Information on file formats and the system in general can be found under the heading "Current Business Statistics" and "EBB and Agency Information and misc. files." It is very useful for checking current numbers for classroom use.

EconData

This database, collected by INFORUM, contains a wide variety of aggregate data and places it in a common format. They also provide a display and simple data analysis program for the data. Data includes the National Income and Product Accounts, balance of payments, flow of funds, CPI, PPI, the Penn World Tables, IMF and World Bank Data (permission required by the issuer), blue pages from the *Survey of Current Business*, and state and local data including employment, earnings, gross state products, and state personal income. The data can be output to ASCII. For introductory information, see *Instruction/contents.doc* and *Instructions/guide.doc*.

U.S. Bureau of Labor Statistics (LABSTAT)

This site offers very detailed data in areas too numerous to mention here. Besides historical data, news releases are available. All data is in the *pub* directory, which contains a further three directories: *doc* (documents), *news.release* (new releases), and *time.series* (archival data). For a short introduction, see the README file in the *pub* directory, while information on how archival data is stored is in the *overview.doc* file in the doc directory.

U.S. Federal Reserve System

To paraphrase from the README file for this information, this data is from PC disks made available by the Fed and placed on the Internet by the Internet Multicasting Service, which helps run EDGAR, another resource. The data includes extensive and detailed information on flow of funds, industrial production and capacity utilization, reserves of depository institutions, weekly series on assets and liabilities of large commercial banks, interest rates, money stock, and miscellaneous data.

Luxembourg Income Study

This project brings together 66 household surveys from 21 countries into a common database to make studies of international economic comparisons easier. To maintain confidentiality and restrictions on use, the data remains on the host computer in Luxembourg and researchers run jobs remotely. Users

Table 4
Some URLs for Economic Resources

Economic Bulletin Board (EBB)
telnet://gopher@una.hh.lib.umich.edu/Social   Science   Resources/Economics/Economic
Bulletin Board
gopher://una.hh.lib.umich.edu/ebb
EconData
telnet://gopher@info.umd.edu/Educational Resources/Economic Data
gopher://info.umd.edu/Educational Resources/Economic Data
ftp://info.umd.edu/info/EconData
U.S. Bureau of Labor Statistics (LABSTAT)
ftp://stats.bls.gov
Information (on Internet access): labstat.helpdesk@bls.gov
Information (on data issues): see the contact.doc in /pub/doc
U.S. Federal Reserve System
ftp://town.hall.org/other/fed   gopher://town.hall.org
Luxembourg Income Study
Information: Tim Smeeding (smeeding@suvm.bitnet) and Caroline de Tombeur
(eplisjr@luxcep11.bitnet)
EDGAR
ftp://town.hall.org/edgar   http://www.town.hall.org
Information: edgar-interest@town.hall.org (mailing list on edgar; to subscribe to it, send
e-mail to:edgar-interest-request@town.hall.org)
U.S. Department of Agriculture Economic Research Service
telnet://usda@usda.mannlib.cornell.edu   gopher://usda.mannlib.cornell.edu
ftp://usda.mannlib.cornell.edu/usda
Information: Oya Y. Rieger (oy1@cornell.edu)
NetEc
telnet://netec@netec.mcc.ac.uk:netec   gopher://netec.mcc.ac.uk
ftp://netec.mcc.ac.uk   email://netec@uts.mcc.ac.uk
Working Paper Archive (WPA)
telnet://gopher@econwpa.wustl.edu   gopher://econwpa.wustl.edu
email://econ-wp@econwpa.wustl.edu:help   http://econwpa.wustl.edu/Welcome.html
Journal of Business and Economic Statistics Archive
ftp://raphael.acpub.duke.edu/jbes
Economics Gopher at Sam Houston State University
gopher://niord.shsu.edu/Economics
Economic History Server Operated by the Cliometric Society
telnet://gopher@cs.muohio.edu   gopher://cs.muohio.edu
Information: administrator@cs.muohio.edu
National Bureau of Economic Research Gopher
telnet://gopher@nber.harvard.edu   gopher://nber.harvard.edu
ftp://nber.harvard.edu/pub/nber
Academe This Week
gopher://chronicle.merit.edu
University and Research Library Card Catalogs
ftp://ftp.utdallas.edu/pub/staff/billy/libguide
gopher://gopher.utdallas.edu/Library On-Line Catalogs/Catalogs Listed by Location
Iowa Electronic Markets
telnet://iem.biz.uiowa.edu
ftp://umaxc.weeg.uiowa.edu/pub/iem/trman.text (Trader's Manual)
ftp://umaxc.weeg.uiowa.edu/pub/iem/q & a.txt (Short Introduction)
email://iem@scout-po.biz.uiowa.edu (Trader's Manual will be returned)

must register. Information is available from Tim Smeeding (smeeding@suvm.bitnet) and Caroline de Tombeur (eplisjr@luxcep11.bitnet).

EDGAR

This database contains SEC filings from U.S. corporations. Eventually, all 15,000 companies that file with the SEC will file into EDGAR, although only about 3,000 corporations had been scheduled to file into EDGAR by the end of 1993. It does not contain data for years prior to 1994, current paper or non-public filings. Be sure to read the file *general.txt* in the main directory for the latest information. For FTP access, the files *form.idx* and *company.idx* in the main directory list the filings. The first is ordered by the type of filing, and the second by the company (both contain the same information, just in different order). Entries in both of these files list the file in the *data1* directory with the relevant filing.

U.S. Department of Agriculture Economic Research Service

This project is jointly sponsored by the Mann Library of Cornell University and the Economic Research Service of the U.S. Department of Agriculture. It contains more than 140 data sets, with more due to be added, covering a very wide range of agricultural topics. They are mostly in Lotus 1-2-3. WK1 format (thus, if you transfer them with FTP, be sure to use the binary mode). Gopher is the preferred connection method.

NetEc

This Gopher, run by Thomas Krichel, has two parts: BibEc, a bibliography of working papers in economics, and WoPEc, an electronic collection of working papers (Fethy Mili enters the information). BibEc includes some 35,000 entries from about 250 different working papers series, including major universities and research institutions. Coverage dates from at least 1988 and searches can be made by keywords. WoPEc is a collection of working papers, which can be retrieved electronically. All are Unix compressed PostScript files (with the proper software and printer, these can be used by PCs or Macs).

Working Paper Archive (WPA)

This electronic archive of working papers is run by Larry Blume of Cornell University and Bob Parks of the Economics Department of Washington University at St. Louis. This archive is best accessed through Gopher, although e-mail and FTP access is possible as well. Papers are grouped in 21 subject areas with abstracts and different methods of searching for papers are available. Papers may be submitted in any format via e-mail and binary files can be submitted via FTP. The next-to-last entry on econ-wp's menu is the Gopher of the Economics Department of Washington University at St. Louis, which contains a wealth of useful material.

Journal Archives

The *Journal of Business and Economic Statistics* appears to have the first archive site for data and programs used in publications of an economics journal on the Internet.

Economics Gopher at Sam Houston State University

This Gopher, run by George Greenwade, contains a variety of material useful for teaching and research. Further, it contains extensive connections to data sources and in particular to all other known economics Gophers. As a result, it is *the* Gopher one should search first. It also includes a list of economists and their e-mail addresses. Finally, it has a very extensive collection of TeX information.

Economic History Server Operated by the Cliometric Society

The Cliometric Society sponsors this Gopher, which contains a wide variety of information and data for economic historians.

National Bureau of Economic Research Gopher

Currently, this Gopher contains several items of interest; the Penn World Trade Tables (including an Excell program to manipulate them), the Survey of Consumer Finance, other data, and a list of NBER working papers and reprints. The latter is also available at BibEc. Note that not all data is available by both FTP and Gopher.

Academe This Week

This is the electronic version of *The Chronicle of Higher Education*. Perhaps the most useful item is the full listings of all job advertisements from the *Chronicle*, but it also summarizes the articles in the print version.

University Library Card Catalogs

The most current list of research libraries accessible (usually meaning their card catalogs) over the Internet is maintained by Billy Barron and his collaborators, which lists more than 700 libraries. Many libraries can be reached by Gopher, typically under a title like "Libraries." The first URL appearing in Table 4 points to a directory that contains the list of libraries, while the second allows one to connect to them directly.

Iowa Electronic Markets

This service is run by the Accounting and Economics Departments of the University of Iowa. It consists of electronic markets that trade contracts with small amounts of actual money based on future economic and financial data, and on the outcome of political contests. These markets open and close based on topics of current interest; for instance, there was a market on the passage of NAFTA. In the past, these departments ran the well known 1992 Iowa Political Stock Market, which traded contracts based on the outcome of the 1992 presidential election.

Conclusion

This paper lists a number of resources for economics on the Internet. Yet, our profession lags behind others. While there are sure to be advances—in particular, the future for further federal on-line data seems bright—let me make several suggestions:

First, our profession should use the wealth of existing resources already on the Internet.

Second, e-mail addresses should be used wherever possible on publications and working papers.

Third, use of the existing working paper archives, WPA and WoPEc, should be greatly expanded. They permit the rapid dissemination of research at low cost. Physicists have proved the benefits of this approach. It would be useful to have NBER working papers available in this way.

Fourth, journals should follow the lead of the *Journal of Business and Economic Statistics* in setting up or designating anonymous FTP sites for data and programs used in publications. Such sites are easily run on standard PCs, and data could easily be transferred to any type of computer on the Internet. This would encourage replication and would lighten the load on authors for requests for data and programs. Replication should be encouraged and the Internet is a tool that could easily make this possible.

Finally, the AEA and other organizations should consider a proactive position on networking, as have other professional societies, such as the American Mathematical Society, IEEE and SIAM. One possibility is an on-line version of the AEA Directory, such as run by the American Mathematical Society. An on-line version of *Job Openings for Economists* would also be quite useful. Again, the American Mathematical Society runs one for their profession, and all listings from *The Chronicle of Higher Education* are found in their Gopher, *Academe This Week*. Perhaps a method of putting the bibliographic material from the *Journal of Economic Literature* on-line could be found. The key issue is not technical, but economic, involving how the costs of running such a service might be recovered.

Appendix
Internet Protocols

Remote Logon: Telnet

Generally, to connect to a remote host, issue the command **telnet** *host*. When establishing the connection, Telnet will usually list "escape keys" that allow you to send commands to Telnet during the session (the most valuable command is **close** which terminates the session; this is useful if the remote host

hangs). When the connection is established, you'll be at the logon screen of the remote host. At this point, the exit command for the remote system is often given—a good thing to remember. Also at this point, you may be asked for your terminal type. Outside the IBM mainframe world, vt100 is by far the most common; in fact, it is often assumed. Finally you may need to supply a userid and perhaps even a password for some telnet resources; be sure you have them handy (if needed, these are supplied in the resource section). When you logoff the remote host, you will be returned to your local host.

Finally, it should be noted that Telnet comes in two varieties: one for communicating with IBM mainframes running the MVS or VM/CMS operating systems (most IBM mainframes run one of these) and another one for everything else (these two systems communicate very differently with their terminals). IBMs use a 3270-style terminal, and almost everything else uses at least a vt100 terminal, or an advanced version of it. It is uncommon to run into 3270-style Telnet outside of card catalogs or logging onto your own account on IBM mainframes.[6]

File Transfers: FTP

Appendix Table 1 lists a few essential FTP commands, and Appendix Table 2 contains an example using many of them. Most anonymous FTP sites run the Unix operating system (the operating system is often stated at logon time, though not all Unix systems use the term Unix), so it is helpful to know its conventions. With Unix, case matters in both commands and file names; that is, a file named *README* is not the same as *readme*, and the command **DIR** is not equivalent to **dir**. File names may be long and "."s have no special significance (in DOS, for instance, **dir read*** will not find a file named *readme.1st*, while the corresponding Unix command, **ls read***, will). Directories are separated by "/," not "\," as in DOS. When files are listed, a "d" in the first column denotes a directory, and a "-" denotes a file. The name of the file or directory is in the last column, preceded by the creation time, creation date, and size in bytes.

To start an FTP session with a remote host, most systems use the command **ftp** *host*. Once connected, FTP will ask for your userid and password. With anonymous FTP sites, use **anonymous** for your userid (many sites accept the easier to type **ftp**) and then you'll usually be requested to provide your e-mail address or ident (identity). Use your *userid@host*; sometimes just *userid@* works

---

[6]While it is possible to Telnet to an IBM system running MVS or VM/CMS with a vt100 terminal type, it is best to use a version of Telnet designed for their special keys. Many systems carry such a version of Telnet; it is usually invoked by **tn3270** *host*. Unfortunately, it can be difficult to know if you need this; if the logon screen mentions VM, CMS or MVS, or if logging on with **telnet** fails, try **tn3270**. Finally, it can be maddening to Telnet from an IBM mainframe to a host that is not. Key strokes on 3270 terminals are not transmitted until a return or a function key is pressed, but other systems process every key stroke. Thus, if a remote system requests you to press the space bar, cursor key, or any lettered key, you must follow it with a return when Telneting from an IBM mainframe host.

Appendix Table 1
FTP Commands

Command	Meaning
dir [*path*] [*local*]	lists files on remote machine; default is the current directory, can list files for any directory by using *path*; on some systems, can copy file listing to the local machine by using *local* (must include *path*)
cd *dir* | ..	move from the current directory to a directory named *dir* (use entire name if not a child directory), or to the parent directory by ..
pwd	lists the current directory ("print working directory")
get *remote file* [*local name*]	copies *remote file* from the remote system to the local system and optionally gives it the name *local name* on the local system (may be restricted on anonymous FTP sites)
put *local file* [*remote name*]	copies *local file* from the local system and places it on the remote system and optionally gives it the name *remote name* (may be restricted on anonymous FTP sites)
help [*command*]	list all FTP commands; with *command*, gives a one-line description of *command*
user *userid*	tells remote system your userid (a few systems don't prompt for *userid*)
binary	changes to binary from ascii transfer mode
ascii	changes to ascii from binary transfer mode
quit	exits remote system and FTP

Notation:
[ ] denotes an option (brackets never typed)
abc|*xyz* means choose *abc* or *xyz*
italics denote a variable supplied by the user
bold means to type as is
path means the description from the current to the desired directory (note that . denotes the current directory and .. denotes the parent directory)

and FTP fills in the host. From this point, the commands in Appendix Table 1 can be used. On most anonymous FTP sites, data for public access is located in the *pub* directory. FTP usually responds to commands with many comments.

Navigating the many files and directories on an anonymous FTP site is made easier by reading *index*, *README* (or similarly named files), and *ls-lR* files, which list all the contents of the FTP site (the Unix command **ls -lR** lists all files in all subdirectories).

Files can be transferred in two modes. The first mode, ascii, performs any needed translation between the text coding methods on different systems (for instance, IBM mainframes store text differently than everything else, and ascii mode makes the translation). The second mode, binary, sometimes more appropriately called image, copies the file bit by bit. It is appropriate for all non-text files, such as programs, word processing, or compressed files. The

Appendix Table 2
FTP Example–Retrieving My Resource Guide

```
D:\ >ftp rtfm.mit.edu
Connected to BLOOM-PICAYUNE.MIT.EDU.
220 rtfm ftpd (wu-2.lc(17) with built-in ls); bugs to ftp-bugs@rtfm.mit.edu
Name (rtfm.mit.edu): anonymous
331 Guest login ok, send your complete e-mail address as password.
Password:
230 Guest login ok, access restrictions apply.
ftp> cd pub/usenet/sci.econ.research
250 CWD command successful.
ftp > ascii
200 Type set to A.
ftp> get econ-resources-faq
200 PORT command successful.
150 Opening ASCII mode data connection for econ-resources-faq (79828
bytes).
226 Transfer complete.
local: econ-resources-faq remote: econ-resources-faq
81668 bytes received in 3.8 seconds (20 Kbytes/s)
ftp> quit
221 Goodbye.
D:\ >
```

form of these commands is shown in Appendix Table 1. Note that unlike file transfers by modem, error correction with FTP is automatic.

Appendix Table 2 demonstrates an FTP session: the current version of my resource guide is retrieved from one of its archive sites (recall this was a URL example). My typed commands are denoted with bold text and "D:\ >" is the host's (my PC) prompt. First, FTP is entered with a request for a connection to the remote host (**ftp rtfm.mit.edu**). I supply the userid **anonymous** and then my identity with my e-mail address (not shown when typed). After being allowed into the system, I move to the directory containing the file (**cd pub/usenet/sci.econ.research**). Next, I ask for the ascii transfer mode (**ascii**) since the file I'll copy is a text file (most documents are text files). I then copy it to my local host (**get econ-resources-faq**), exit FTP (**quit**), and am returned to my PC's prompt.

File name "extensions" often have special meanings. Files ending in *.txt* or *.text* denote text files, while *.ps* denotes a PostScript file. PostScript is the dominant page description language, so documents with almost any feature (such as equations, charts and graphics) can be depicted exactly. Many word processing programs can generate PostScript output and PostScript printers are fairly common.

Many extensions, such as *.Hqx, .Sit, .ZIP, .ZOO, .gz, .Z,* and *.tar* denote some sort of compression, which saves on storage and transfer time. Most platforms are dominated by a few types; for Macs, *.Hqx* and *.Sit* are common,

for PCs, *.ZIP* and *.ZOO* are frequent, and in the Unix world, *.Z, .gz,* and *.tar* are customary. While many decompression programs can be obtained locally, Lemson (1994) has an exhaustive list of anonymous FTP sites containing them. Many of these programs can be used across different platforms. Compressed files should always be transferred in binary mode.

Since searching the roughly 1500 anonymous FTP sites for a specific file is hardly practical, a system known as Archie has been developed for this purpose. The previously mentioned references describe it in detail.

Gopher

Gopher clients are generally started with the command **gopher** *host*, where *host* is the desired remote gopher server. As noted in the text, Gopher servers may be contacted either through Gopher "client" programs that run on your local host (unlike Telnet and FTP, they operate differently on different types of hosts), or through Telneting to a host that offers Gopher service.

Either way, the user is presented with a menu from the Gopher server. Each menu item will either be a resource, or a title of listings of other resources (a directory). One can either use a resource or move into a directory. Resources may be a file with information you can read, a Telnet session (say, to an electronic card catalog), a search index (to look for something), or another Gopher. With a Gopher client, files can be transferred directly to your local host, while with the Telnet interface, you'll usually be presented with the option of receiving the file via e-mail. Either is superior to FTP since one can easily view the file first.

Since the Telnet method will likely be tried first, its basics are described here. Numbered resources and directories are arranged vertically and the arrow on the left is moved to the desired entry by cursor keys or by typing the number of the resource or directory and pressing the enter key. A resource or directory is entered by pressing the enter key when the arrow is positioned next to it. Each resource or file is identified by a suffix: "/" denotes a directory, "." denotes a text file with readable information, "⟨?⟩" denotes a search index (usually to search the contents of files) and "⟨TEL⟩" denotes a Telnet session. One moves back up to the previous directory by a **u**, receives help on these and other commands by **?**, and quits Gopher with a **q**. Text files are displayed by a program Gopher calls. In it, one moves down a screen by pressing the space bar, up one screen by pressing **u**, searches for the character string *abc* with **/abc**, and obtains help with the display program with **h**. One quits this display program with a **q**, and after exiting, the option of receiving the file via e-mail will usually be presented.

While Gopher servers can be Gophered to directly with client software, one can also navigate between Gophers, or "Gopherspace" (the Telnet approach to using Gophers requires this method). Look for a resource in the top directory, or one of its subdirectories, titled something like "Other Gophers." Entering this resource leads to a geographically-organized hierarchy of Gophers (first by

continent, then by country, etc.), though there is usually an entry for servers that aren't obviously geographically based, like *Academe This Week*.

World Wide Web

The Web is viewed through "browsers;" for PCs, they include Mosaic and Cello (the former only for Macs), while Lynx and Mosaic are available for some other machines. As noted in the text, Mosaic and Cello can be used to examine working papers in the Working Paper Archive. Mosaic, Cello and Lynx can be obtained through the Internet and may be available locally.

References[7]

Cinkosky, Michael J., James W. Fickett, Paul Gilna and Christian Burks, "Electronic Data Publishing and GenBank," *Science*, May 31, 1991, *252*, 1273–77.

Conklin, Jim "The Future of CREN and BITNET," January 26, 1993, URL = ⟨ftp://bitnic.educom.edu/netinfo/cren.future⟩

"CREN-Only BITNET Members and Nodes," 1993, URL = ⟨ftp://bitnic.educom.edu/netinfo/cren.growth⟩

Dern, Daniel P., *The Internet Guide for New Users*. New York: McGraw Hill, 1994.

Emtage, Alan, (bajan@bunyip.com), personal communication, July, 1993.

Estrada, Susan, *Connecting to the Internet, an O'Reilly Buyer's Guide*. Sebastopol: O'Reilly and Associates, 1993.

Foster, Jill, ed., "A Status Report on Networked Information Retrieval: Tools and Groups," URL = ⟨ftp://internet-drafts/draft-ietf-nir-status-report-03.txt⟩, March 1994.

Gilster, Paul, *The Internet Navigator*. New York: John Wiley and Sons, 1993.

Goffe, William L., "Resources for Economists on the Internet," URL = ⟨ftp://rtfm.mit.edu/pub/usenet/sci.econ.research/econ-resources-faq⟩, URL = ⟨gopher://econwpa.wustl.edu/ ***Internet Resources for Economists***⟩, URL = ⟨gopher://niord.shsu.edu/Economics (SHSU Network Access Initiative Project)/Resources for Economists on the Internet (B. Goffee)⟩

Hahn, Harley, and Rick Stout, *The Internet Complete Reference*. New York: Osborne McGraw-Hill, 1994.

Kent, Peter, *The Complete Idiot's Guide to the Internet*. Indianapolis: Alpha Books, 1994.

Krol, Ed, *The Whole Internet User's Guide and Catalog*, second edition. Sebastopol: O'Reilly and Associates, 1994.

Lemson, David, (lemson@uiuc.edu), "File Compression, Archiving, and Text ↔ Binary Formats," 1994, URL = ⟨ftp://ftp.cso.uiuc.edu/doc/pcnet/compression⟩.

McHenry, Robert, Editor in Chief, Encyclopedia Britannica (editor@eb.com), posted on mailing list net-happendings@is.internic.net, February 7, 1994.

Marine, April, et al., *Internet: Getting Started*, updated edition. Englewood Cliffs: PTR Prentice Hall, 1994.

Markoff, John, "Traffic Jams Already on the Information Highway," *New York Times* (national edition), November 3, 1993, *CXLIII* no. 49504, p. A1.

Markoff, John, "A Free and Simple Computer Link," *New York Times* (national edition), December 8, 1993, CXLIII no. 49539, p. C1.

Markoff, John, "Curtain's Rising on a Third Generation of On-Line Services," *New York Times* (national edition), January 30, 1994, CXLIII no. 49592, p. 10, Section 3.

Powell, Corey S., "Fast Moves; Instant Earthquakes Analysis May Beat the Waves," *Scientific American*, August 1993, *269*, 22–24.

Taubes, Gary, "Publication by Electronic Mail Takes Physics by Storm," *Science*, February 26, 1993, *259*, 1246–48.

Yanoff, Scott, (yanoff@csd4.csd.uwm.edu) "Inter-Network Mail Guide," 1994a, URL = ⟨ftp://csd4.csd.uwm.edu/pub/internet-work-mail-guide⟩

Yanoff, Scott, (yanoff@csd4.csd.uwm.edu) "Internet Services List," 1994b, URL = ⟨ftp://csd4.csd.uwm.edu/pub/inet.services.txt⟩

---

[7]The resource section contains a description of Uniform Resource Locators (URLs) used here to reference information on the Internet.