

APPENDIX 7 INFORMATION TECHNOLOGY

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INTRODUCTION

Today we are frequently reminded of the old saying that “information is power.” We are also often told that we live in “The Information Age.” Assuming that both of these statements are true, it would be easy to expect that everyone should be empowered by now since there is an enormous amount of information on tap. However, in reality, such information is useless if we cannot gain access to the parts we need in an orderly and efficient fashion. Even though the information may be readily available *now*, if we cannot find it or do not know how to get it, then we are at a disadvantage. To take advantage of “The Information Age,” we need to know how and where to “hook up” and get the information that we need.

There are many ways that information is exchanged: verbally, visually, mechanically, electronically, and digitally. While we are familiar with many of these ways – especially verbal and visual – and use them everyday, the newest and fastest growing means of exchange is electronic. Frankly, this method has caught many by surprise.

As it exists today, digital information exchange (communication) is made possible by electronic machines we call computers. Computers are capable of storing and rapidly processing huge quantities of data. The data-processing speeds and capabilities of these machines have grown almost exponentially in recent years. Likewise, the ability to instantly exchange information over long distances has grown tremendously.

The predominant tool permitting the instant exchange of information is the enormous worldwide network of linked computers commonly referred to as the Internet. The Internet, sometimes simply called “the net” for short, is an incredible tool for individuals, businesses, local governments – everyone – to use in quickly getting and sharing information sources such as documents, videos, audio recordings, music, photographs, news, financial transactions, software applications, and so forth.

DEFINITIONS OF TERMS

Computer network technology is changing very rapidly and new terms and acronyms are being added almost daily to our language making it sometimes difficult to understand what many information technology specialists are talking about.⁷⁶⁵ This rapid change in computer and network technology has also allowed us to enjoy many benefits. While the Internet is only about thirty-five (35) years old, it supports the information gathering and communication activities of hundreds of millions of individuals, businesses, and governments worldwide. It continues to expand at an explosive rate. With such a rapid growth rate, it is no wonder that much confusion exists about information technology terms and usage. Probably the most widespread confusion surrounds the popular and often conflicting usage of the terms *Internet*, *web*, and *e-mail*.

The *Internet* is the enormous worldwide network of computers connected using a common standard or protocol for communication. It consists primarily of hardware such as computers, servers, routers, and data lines (like fiber optic telephone line). *E-mail* and the *World Wide Web*,

⁷⁶⁵For this reason, a short glossary of information technology terms has been included at the end of this appendix section.

both enabled primarily through software applications, depend on the Internet's network infrastructure (hardware) to function. *E-mail* is simply a written message that is sent and received by computers. Since it is generally text-based or "type-written," it is very much like the old telegraph messages except that it is sent and received completely by computers using software instead of using human operators. The *World Wide Web*, usually referred to simply as "the web" or "online," is a vast world-wide system of multimedia (text, photographs, sounds, video, etc.) files and electronic resources linked together via specially coded "software" connections called *hypertext* or *hyperlinks*. The web is not the Internet. Instead, it relies on the Internet's infrastructure and is accessed through the Internet using special web browser software. The most popular web browser currently used is Microsoft's Internet Explorer. AOL Time Warner's Netscape Navigator is a distant second choice followed by other less commonly-used browsers include Mozilla, Opera, and Konqueror.

Estimating worldwide Internet usage is a very inexact process that gives at best "educated guesses." Nevertheless, it is estimated that in 1995 there were only around 20 million people worldwide using the Internet.⁷⁶⁶ In September 2003, Nielsen/NetRatings estimated that almost 420 million people had Internet access worldwide and over 250 million of these people were classified as active users of the Internet. Average monthly usage was 12 hours per person worldwide.⁷⁶⁷ Of these nearly half-billion potential users, Americans made up over 184 million of them with nearly 126 million classified as "active" users. Americans usage was also an average of 26 hours per month at home and 76 hours per month at work.⁷⁶⁸

Through extensive survey research conducted from 2000 to late 2003, the Pew Research Center estimates that on "an average day," about 66 million American adults "go online" which is over half of all with Internet access. Once online, 49% send e-mail, 31% use a search engine; 26% get news, 23% "surf the web" for fun, 20% check on the weather, 19% conduct research for their job, 19% do research before buying a product or service, 14% send an instant message, 13% look for political news and information, 13% get financial information, 12% check sports scores, 11% listen to music or watch a video clip, and 10% conduct school or similar research. Less than 10% of those online do the following on this "average" day: get information from a government website (9%); do their banking (9%); buy a product (5%); buy or make travel arrangements (4%); look for spiritual/religious information (4%); participate in an online auction (4%), gamble (1%); buy or sell stocks, bonds or mutual funds (1%); or buy groceries (1%).⁷⁶⁹

A BRIEF HISTORY OF THE INTERNET

The Internet as we know it today is very different from what was envisioned over three decades ago as a defensive U.S. computer network capable of surviving a nuclear attack. Work to

⁷⁶⁶NUA. "How Many Online?" [October 26, 2001] Available http://www.nua.ie/surveys/how_many_online/index.html, 2001.

⁷⁶⁷CyberAtlas. "Traffic Patterns: Global Usage, September 2003" [November 14, 2003] Available http://cyberatlas.internet.com/big_picture/traffic_patterns/article/0,,5931_3099471,00.html, 2003.

⁷⁶⁸CyberAtlas. "Traffic Patterns: September 2003 Internet Usage Stats" [November 14, 2003] Available http://cyberatlas.internet.com/big_picture/traffic_patterns/article/0,,5931_3096031,00.html, 2003.

⁷⁶⁹Pew Research Center. "Daily Internet Activities." [November 14, 2003] Available http://www.pewinternet.org/reports/chart.asp?img=Daily_Activities_11.7.03.htm, 2003.

produce such a stable computer network began in earnest in the late 1960s and early 1970s. To accomplish its purpose, the proposed network had to be linked in such a way that parts of it could be destroyed without bringing the whole system down. In other words, the network could not be totally dependent on any of its individual parts to function. The result of this military effort was the Advanced Research Projects Agency Network or ARPANet for short. It had no central control and was designed to reroute messages or parts of messages from computer to computer across any path available until the message was correctly delivered. To accomplish such a unique delivery system, technology allowing multiple communication paths instead of the conventional direct (dedicated line) connection had to be developed.⁷⁷⁰

The ARPANet originally had only four linked military research centers in 1969 but grew substantially over the next few years as other networks and research entities began to connect.⁷⁷¹ Making the ARPANet work required many technological innovations including the development and acceptance of standardized protocols or formats for hardware and software so they could “talk” to each other. Of course, there were also many obstacles to overcome as the network expanded to include more facilities.⁷⁷²

Building on the successes of the ARPANet, similar research networks were built elsewhere. Over time, many of the network administrators around the world saw benefit in linking the various networks together into one giant worldwide network. With the adoption of a common computer communication method or protocol called TCP/IP, it was possible to connect these different types of networks. Connecting such networks was referred to as *internetworking* and the resulting new “network of networks” was called the *internetwork* or the *internet*. Around 1980, this Internet – built on the original ARPANet backbone – was distinguished from the others with a capital “I” as if it were the only network.⁷⁷³

The military significance of the Internet gradually became overshadowed by academic and later commercial emphases as it expanded during the 1980s. On the American side, the Internet was eventually split into two networks with the military retaining their interests in the Defense Data Network (DDN). In fact, in 1990, the ARPANet was officially decommissioned and administration of the Internet’s non-military functions was transferred to the National Science Foundation (NSF).⁷⁷⁴

By 1990, the Internet began to lose its primarily technical and academic appearance and take on a new look. It became more “user-friendly” and within reach for non-technical people. It grew at an even faster rate as more connections were made available both at universities and through commercial access providers that began to appear throughout the nation. However, there were still many problems to overcome – particularly with the hardware and software needed to easily access and retrieve information. While there was great potential for the Internet, many of the existing tools for using these resources were not standardized, had software “bugs” or problems,

⁷⁷⁰Lucent Technologies. “The Internet in History.” [Online June 20, 1997] Available <http://www.lucent.com/internet/wp1.html>, 1997.

⁷⁷¹Ibid.

⁷⁷²Daniel P. Dern, *The Internet Guide for New Users*, (New York, NY: McGraw-Hill, 1994), p. 11-12.

⁷⁷³Ibid.

⁷⁷⁴Lucent Technologies. “The Internet in History.”

and were very difficult for non-technical people to use. This difficulty was especially hard to overcome for those using personal computers.⁷⁷⁵

However, work was being done to alleviate these problems and improve the Internet's functionality and "user interface" (or the appearance and functions displayed on the computer monitor). The most notable work was conducted at CERN (French abbreviation for European Nuclear Research Centre), a prominent European particle physics research facility near Geneva, Switzerland. There researchers developed a world-wide standard or protocol for accessing Internet data and information more effectively. The result was the *Hypertext Transmission Protocol (HTTP)* that gave birth to the World Wide Web in 1992.⁷⁷⁶

The first user interface for the World Wide Web ("the web" for short) was only text since graphical capabilities (i.e. pictures) were not yet incorporated. However, the next year, students working with the National Center for Supercomputer Applications (NCSA) at the University of Illinois developed the first true web browser – named Mosaic – which had a graphical, Windows-like user interface. It became an instant success and spread rapidly across college campuses and even into the corporate environment. Later, the creators of Mosaic turned their attention to a new endeavor and formed Netscape Communications Corporation, the makers of one of the most popular and widely used web browsers in the world.⁷⁷⁷

Now with hundreds of millions of Internet users around the world, around a trillion dollars in business to business and consumer online purchasing annually, and a phenomenal rate of growth, the impact of the Internet on the way we work and play has exceeded most of even the wildest expectations. However, the enormous quantity of e-mail, web "surfing" or browsing, online shopping, business to business transactions, research, and other functions being conducted on the Internet often takes a toll on its infrastructure causing net congestion, slow-downs, and temporary "black-outs" for some users as local access points fail momentarily. However, in spite of these temporary local and occasionally regional problems, the Internet as a whole continues to function and deliver the data that we have come to expect. Perhaps it is because the Internet was designed to survive a nuclear attack that it remains so versatile and functional today. Today, most people are confident that they can quickly access the information they seek, their e-mail will accurately reach its destination, and they can safely purchase goods and services using the Internet.⁷⁷⁸

INFORMATION TECHNOLOGY BENEFITS FOR LOCAL GOVERNMENTS

For local governments, probably the two most important benefits of the Internet are e-mail and web-based services. E-mail provides a very fast and economically-attractive communication tool. Distance is virtually irrelevant with e-mail. Whether the need is to convey information

⁷⁷⁵Ibid.

⁷⁷⁶Ibid.

⁷⁷⁷Ibid. Netscape Communications Corporation was later purchased by AOL prior to the AOL/Time Warner merger. Netscape Navigator is now a distant second to Microsoft's Internet Explorer web browser.

⁷⁷⁸Ibid and CyberAtlas. "B-to-B: B2B E-Commerce Headed for Trillions." [November 14, 2003] Available http://cyberatlas.internet.com/markets/b2b/article/0,,10091_986661,00.html, 2002.

within a single office or to another continent, there are no postage or long distance fees⁷⁷⁹ and delivery time is usually only seconds compared to hours or days with traditional courier-delivered mail (often pejoratively referred to as “snail mail” by e-mail users).

Similarly, the web provides local governments with many benefits such as millions of pages of current information, instant access to political and financial news and data, detailed price quotes and product descriptions, technical assistance resources, and even local entertainment and advertisement options. In addition to an enormous amount of business and commercial information, the web is host to a vast quantity of valuable government-oriented information such as research reports, census data, marketing surveys, and other forms of valuable data. The volume of such data is growing daily with more information being posted online as new web sites are created and existing ones enhanced. For example, the U.S. Census Bureau posts detailed census data online, the federal government posts income tax forms and publications online, and the many state legislatures make proposed legislation (bills) and their current status available online.⁷⁸⁰ Such information is often available in popular file formats for convenient downloading and usage in word processor and spreadsheet applications.

The web is also a great place to download “free” software;⁷⁸¹ security updates, upgrades, and patches or “bug fixes” for existing software; and demos of new and upcoming software or music releases. There are many search tools and sites for locating the telephone numbers, e-mail addresses, mailing addresses, and web sites of individuals, all levels of government, businesses, and non-profit organizations. Instant weather forecasts, worldwide news, financial data, and stock market quotes are examples of web-based services available at no charge (“free” due to advertiser support). Fee-based web sites and services enhance and extend many of these and other “free” features and services by allowing paid subscribers greater access.

Many local government associations such as the Mississippi Association of Supervisors (MAS), the Mississippi Municipal League (MML), the National Association of Counties (NACo), the National League of Cities (NLC), and the International City/County Management Association (ICMA) are on the web. The federal government and most state governments have very detailed web sites and many counties and municipalities have a strong web presence. At many of these sites, users will find helpful publications, government forms, tax information, schedules, telephone and e-mail contacts, and so forth.

To aid in sifting through and organizing this seemingly chaotic array of information, many web sites are designed around special web search tools called *search engines*. For example, Yahoo began as a small web site featuring a search engine. Many other web sites offer special directory listings, “yellow pages,” information links, and virtual “malls.” Also, many universities and public libraries create and host online lists of links to specialized web resources. The Center for Governmental Training & Technology (CGT) hosts and maintains such a listing at

⁷⁷⁹There may be a toll charge or flat rate fee for accessing the Internet through a local Internet Service Provider (ISP). If there is no local ISP, telephone access to a distant provider may entail long distance billing by the telephone company as well. Also, while many vendors offer “free” (advertiser supported) e-mail, certain fees such as for enhanced services or heavy usage may be charged by some providers.

⁷⁸⁰See Appendix 10 for a listing of government and government-related web sites.

⁷⁸¹See later section in this appendix about the liabilities associated with the unauthorized use of illegally-distributed copyrighted software. Many “free” web sites and software are supported in whole or in part via paid advertisements.

www.mslocalgovernment.org. It is regularly updated with a special emphasis on Mississippi's local governments.

Since computer hardware and software is continually changing, Internet tools for using e-mail and web browsing must change as well. Probably the best way to learn how to get connected to the Internet is to contact a regular and knowledgeable user or service provider. Many businesses such as local Internet Service Providers (ISPs) specialize in this type of service. It is wise, however, to "shop around," since prices, quality, and the services offered may vary greatly. Local government officials may also contact the CGT at 662-325-3141 for technical assistance in these matters. The CGT offers such assistance on a time-available basis to units of local government.

A WARNING ABOUT THE ABUSE OF INFORMATION TECHNOLOGY

Today's information technology, coupled with an Internet that knows no national or geographic borders, brings certain legal challenges to the forefront that did not exist a few years ago. In addition to the wealth of accurate and beneficial information available on the web, there is much information that is neither accurate nor beneficial. Sometimes what may be legally posted on a web site in one nation is illegal to download, use, or even view in the United States or in Mississippi.

A prime example of what may be legally (or in some cases illegally) posted in another area or nation but illegal to consume in this country is certain sexually explicit material such as child pornography. Local governments must be prepared to deal with potential legal issues caused by employees and citizens accessing the Internet on local government computers. Some courts have interpreted sexual harassment statutes to cover the viewing of pornography, sending sexually explicit e-mail, or engaging in similar activities with a computer. These activities can be construed as creating a hostile work environment and make one vulnerable to a lawsuit.

Other illegal activities sometimes found on the web includes bogus "press releases" or "informed sources" attempting to alter stock market prices, financial scams and so-called "pyramid schemes," tools for spreading computer viruses, and tricks for stealing personal information. In addition, there is much misinformation posted on the web. Since anyone can have a web site, web consumers must be very wary of unsubstantiated information. It is unwise to simply believe something without checking the source. Is it credible? If it sounds too good to be true, then it probably is not true.⁷⁸² Read the privacy policy and the fine print before committing to anything. Do not give your credit card number without first verifying the security of the browser and the web site to which you are accessing.⁷⁸³ (A properly secured web site is actually safer for transmitting personal information than using the telephone since the data transmitted, including the credit card numbers, are encrypted or scrambled for safety.)

There are some tools to assist in safeguarding yourself and your local governmental unit from Internet vulnerabilities. Web filtering software exists to help block or keep unauthorized material from being downloaded or viewed while online. Many software companies sell

⁷⁸²We cannot believe everything we see in print, on television, or hear on the radio. If we use the same basic principles to evaluate Internet sources as we do to evaluate these "traditional" sources, then we will easily avert most problems.

⁷⁸³Most web browsers have a "security button" or icon that can be accessed to find out if the connection between the browser and the web site being visited is secure (i.e. the information transmitted is encrypted (scrambled and "locked") for safety to make interception difficult).

“firewalls” and other security enhancements to guard personal information and ensure privacy while online. Often these packages have anti-virus software included to protect against computer viruses or anti-virus packages can be purchased as stand-alone products. While these products are very valuable and sometimes essential, as a minimum, everyone should regularly download and install the latest web browser “patches” or security updates to ensure that he has the most secure browser available.

Another older but still relatively new challenge in the area of information technology involves the unauthorized use of copyrighted software; i.e. software that was not legally obtained and licensed. A warning about the dangers and liabilities associated with duplicating and distributing copyrighted software is therefore in order. A clear understanding of this topic can help local government officials and their units of government take appropriate measures to avoid copyright infringement lawsuits.

As a general rule, just as it is illegal to make unauthorized duplications of copyrighted music (cassettes, CDs, etc.), movies, and books, it is also illegal to make unauthorized copies of software that has been copyrighted. Such unauthorized duplication and use of copyrighted software is commonly referred to as *software piracy* and constitutes stealing.⁷⁸⁴

Since 1964, the United States Copyright Office has registered software as a form of literary expression. Amendments to the Copyright Act in 1980 specifically mentioned computer programs as protected by copyright law.⁷⁸⁵ Federal copyright law automatically protects software from the moment it is created. Under Title 17, the Copyright Act gives the owner of the copyright “the exclusive right” to “reproduce the copyrighted work” and to “distribute copies” of the work (§ 106 of the *U.S. Code*). Section 501 states that “anyone who violates any of the exclusive rights of the copyright owner . . . is an infringer of the copyright.” Severe penalties for copyright violations are established in this section as well.⁷⁸⁶

The theft of software or *intellectual property* as it is sometimes called, constitutes a serious federal offense. A civil action for such a crime may result in an injunction, fines for actual damages, or statutory damages of up to \$100,000 per infraction while criminal penalties are punishable by fines up to \$250,000 and/or imprisonment up to five years.⁷⁸⁷

When a software application is purchased, typically the license (or right) to use it on *only one computer* is what is actually purchased. The software license, often called a *software license agreement*, is usually printed prominently on a sealed envelope or “shrink-wrap” covering containing the software. Software downloaded from the Internet usually displays the license agreement during installation. By breaking the seal or installing the software, the purchaser/user agrees to be bound by the terms of the software license agreement. The software publisher retains ownership of the software and the right to distribute additional copies. While it is very

⁷⁸⁴Software Publishers Association. “SPA Anti-Piracy.” *Software Use and the Law: A Guide for Individuals, Businesses, Educational Institutions, Bulletin Board Operators and User Groups. United States and Canadian Edition.* [Online July 8, 1997] Available <http://www.spa.org/piracy/sftuse.htm>, 1997.

⁷⁸⁵Ibid.

⁷⁸⁶Software Publishers Association. “SPA Anti-Piracy.” 1997.

⁷⁸⁷Business Software Alliance. *Software Piracy and U.S. Law.* [Online July 8, 1997] Available <http://www.bsa.org/piracy/piralaw.html>, n.d.

easy and inexpensive to make copies of software to “share” with others and use on many computers, one should be very careful to abide by the software license agreement to avoid breaking copyright laws.⁷⁸⁸

While the unauthorized duplication and distribution of copyrighted software is a clear violation of federal law and makes one vulnerable to lawsuits and other legal sanctions, other avenues for punishment exist as well. Individuals, organizations, businesses, or governments who pirate or use pirated software may be given notice to “pay up” and settle out-of-court or face a lawsuit. For example, the city of Philadelphia, Pennsylvania, paid \$121,000 to settle a non-adjudicated case of alleged software piracy by two city agencies against the products of three well-known computer companies. Philadelphia and the Business Software Alliance (BSA), an advocacy group representing the software industry, settled this incident which was billed as the “first public disclosure of a software piracy settlement with a government agency.” The BSA maintains a toll free software piracy hotline to solicit tips involving the use of unlicensed software.⁷⁸⁹ Similarly, another group, the Software Publishers Association (SPA), a division of the Software and Information Industry Association, has filed hundreds of actions against offending individuals and companies.⁷⁹⁰

Although some software licenses allow multiple copies to be made, most duplication is limited by the Copyright Act. The Copyright Act gives purchasers of the software license the right to load (install) the software onto a single computer and to make one backup copy “for archival purposes only” (§ 117) – often done as a safeguard in case the original media (CDs, disks, etc.) or downloaded files are damaged. Unless allowed by the software license, other uses of copies such as “sharing” them with friends or coworkers are prohibited. Any distribution of such copies is illegal and constitutes software piracy.⁷⁹¹

Unless special licensing agreements are made with permission granted from the software publisher,⁷⁹² federal law requires that separate licenses (or copies) of the software be purchased for each computer on which it is installed. Any other usage of copyrighted software is illegal and punishable – it makes no difference whether the software was downloaded from the Internet or purchased in any of the various media formats.⁷⁹³

When in doubt about a software license or its usage, contact the vendor where it was purchased or the publisher who owns the copyright. Other concerns or questions about software piracy or intellectual property copyrights may be addressed to the organizations listed below.

⁷⁸⁸It is common for businesses and governments to purchase several licenses for a particular software application and yet only receive one copy of the application. In these cases, it is legal to use this copy to install the application on as many computers as the license stipulates were purchased.

⁷⁸⁹Maria Seminerio. “Philly settles software piracy case.” *ZDNet News*. [Online through The PointCast Network] July 2, 1997.

⁷⁹⁰Software Publishers Association. “SPA Anti-Piracy.” 1997.

⁷⁹¹*Ibid*.

⁷⁹²Examples include site licenses, concurrent use agreements, and special network versions.

⁷⁹³Software Publishers Association. “SPA Anti-Piracy.” 1997.

<p>Business Software Alliance (BSA) 1150 18th Street, N.W., Suite 700 Washington, D.C. 20036</p> <p>888-NO-PIRACY (toll free) 202-872-5500 202-872-5501 (fax) www.bsa.org software@bsa.org</p>	<p>Software and Information Industry Association SPA Anti-Piracy Division 1090 Vermont Ave., NW, Sixth Floor Washington, DC 20005</p> <p>800-388-7478 (toll free) 202-289-7442 202-289-7097 (fax) www.siiia.net</p>
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A GLOSSARY OF INFORMATION TECHNOLOGY TERMS

Since there are so many new terms being developed to describe computers and information technology, it can get confusing keeping up with the acronyms and technical jargon. The following glossary is included as a tool for local government officials to aid in deciphering some of the most common technical words and expressions relating to the Internet today:

- 403 A web error code indicating that the access to the requested resource (usually web page) is forbidden since the one requesting it does not have the privileges needed to access it.
- 404 A commonly-seen web error code where the server reports to the web browser that it cannot find the web page being requested (often because it was moved or deleted). *See also* Server and Web browser.
- 503 A web error code indicating that the server is unable to process the request due to being too busy or some other problem on the Internet. When encountering this error code, it is best to wait a few minutes and then try again. *See also* Server and Internet.
- Active X A technology developed by Microsoft to compete with Sun Microsystem's Java programming language. It is a self-sufficient application that can be downloaded from the Internet by web browsers and run on personal computers using Windows and Macintosh operating systems. *See also* Java, Web browser, and OS.
- Adobe Acrobat A software application that allows complex documents to be created, viewed, and distributed on the Internet while still retaining their original formatting and look. Requires the Adobe Acrobat Reader "plug-in" to view the document in a web browser. Acrobat documents are often identified as *.pdf files*. *See also* Plug-in and Web browser.
- Analog Refers to a system of values based on a continuous scale with an infinite number of increments. For example, an analog watch has hands. When the second hand completes one revolution, it covers the entire area represented by one minute. While each segment of the minute can be represented as a fraction, it is difficult to determine precisely how much. On the other hand, a digital watch has no hands and only measures precise increments (seconds, tenths of a second, etc.) and cannot be used to determine the distance between increments. However, this type of watch

makes it is easy to precisely record time increments. *Compare with Digital. See also Modem.*

Applet	A small Java-language computer program that is embedded in a web page so that it can run on the computer that downloaded the web page. <i>See also Java.</i>
ARPANet	Advanced Research Projects Agency Network: The forerunner of the Internet that was developed in the late 1960s and early 1970s by the U.S. Department of Defense in an effort to develop a computer network that could survive a nuclear assault.
ASCII	American Standard Code for Information Interchange: Pronounced “as-key,” these plain text characters make up the world-wide standard for the 128 code numbers (7 digit numbers ranging from 0000000 through 1111111) that are used by computers to represent all the upper and lower-case Arabic letters, numbers, and punctuation.
Attachment	Any file linked to an e-mail message. <i>See also MIME.</i>
Bandwidth	Usually measured in bits-per-second, it refers to how much data can be transported through a connection such as a telephone line or cable connection. <i>See also Bit.</i>
Baud	A measurement of the speed of data transmission per second (such as through a modem) that was commonly used until the more accurate term <i>bps</i> (bits per second) replaced it. <i>See also Bps and Modem.</i>
Bit	The smallest piece of computer data consisting of either a single <i>one</i> or <i>zero</i> .
Bookmark	A web address (URL) that has been saved by the web browser to a special file so a user can quickly access the site again without having to remember or retype the address. Often called Favorites. <i>See also URL and Web browser.</i>
Bot	Short for robot, it is basically any type of automated software.
Bps	Bits-Per-Second: A measure of how many single basic units (bits) of data that can be transported (such as through a modem) in one second. <i>See also Bit and Modem.</i>
Browser	<i>See Web browser.</i>
BTW	A shorthand expression often used in e-mail, chat, and newsgroups that means “by the way.” <i>See also E-mail, Chat, and Newsgroup.</i>
Bug	A problem or glitch in a piece of computer hardware or software that makes it not work properly.
Byte	The set of bits, usually eight, that represents a single number, letter, or character. <i>See also Bit.</i>

Cable modem	A device used to provide Internet access over cable TV networks. Typically much faster than modems that use telephone lines. <i>See also</i> Modem.
Cache	A device or method for storing information such as previously visited web pages so that it can be quickly accessed later. There are many kinds of cache. Pronounced “cash.”
Cascading Style Sheets	A web programming technique that allow the author to control the style and layout of multiple web pages by just giving the commands once.
Chat	Real time (live) typed communication with another person or group of people (i.e. in a “chat room”) by computer. Messages or conversations typed by all parties involved are displayed on all participating individuals’ computer screens at the same time.
Chat room	A specific place or “virtual room” where live typed discussion can occur online without regard to geographic boundaries. Some chat rooms serve a single purpose or address a specific subject. Many are open to all and are accessed through a web browser. Others are private, requiring a password (and sometimes even specific software). <i>See also</i> Chat and Web browser.
Client	Computer software or hardware (e.g. the system you are using to browse the web) that is used to contact a server and accept information from it (the host). <i>See also</i> Server and Host.
Cookie	A small amount of information that is transferred from a server to the web browser of your computer as you access a particular web site. This information acts as a tool for collecting and storing specific information that might include names, user preferences, login information, or e-mail addresses of those who visit the Internet site. If that site is revisited, then the server may retrieve the cookie and the information it has collected. Cookies usually have expiration dates and are commonly used to strategically place advertisements and to allow access to certain web sites. <i>See also</i> Web browser and Server.
Crash	Experienced when the computer hardware or software “freezes” or does not respond to keyboard and/or mouse inputs. Sometimes pressing the “Control-Alternate-Delete” (Ctrl-Alt-Del) keys simultaneously will allow a recovery under Microsoft Windows systems, while other times pressing the reset button on the computer itself (may have to press the “power” button and hold for five seconds) is necessary to restart or reboot the system.
Cyberspace	A term that has come to depict the vast array of information resources available online through computer networks such as the Internet.
Digital	Refers to a system of coding numbers (digits) where all information the computer processes internally – text, data, software, etc. – is represented by a combination of the numbers one and zero. <i>Compare with</i> Analog.
Digital signature	A means to validate that an e-mail message or file actually belongs to a specific person and the message or contents have not been tampered with.

DNS	Domain Name System: The method by which “plain English” Internet addresses (URLs like <i>http://www.msstate.edu/</i>) are converted into numerical IP addresses so computers can read them and manage Internet transmissions. <i>See also</i> IP and URL.
Domain name	A unique identifier and registered URL (address) that identifies a specific Internet site. It has at least two (2) parts which are separated by a period such as <i>msstate.edu</i> . <i>See also</i> URL.
Download	To copy a file or online document from a host computer to your computer by means of FTP (often automatic on many web browsers) or some other electronic method. <i>See also</i> FTP and Host.
dpi	Dots Per Inch: A measure of the resolution (roughly equivalent to quality) in printers and scanners based on how many pixels (tiny “dots”) can fit into an inch of space. Generally speaking, the higher the number, the higher the resolution will be (i.e. the better the print or image quality).
DSL	Digital Subscriber Line: Working somewhat like a leased line, it allows a specially configured ordinary copper telephone line to obtain a much faster Internet connection than available with basic telephone service. <i>See also</i> Leased line.
E-mail	Electronic Mail: Generally text messages (can also be HTML encoded for multimedia effects) that are sent by computers to and from individuals or groups of people. It has become the most widely used application on the Internet. <i>See also</i> HTML.
Emoticon	Clusters of symbols and punctuation used to communicate non-verbal cues with a keyboard. To “read” them, one must look at them sideways. Some examples include :-) for smiling or :-(for frowning and so forth. <i>See also</i> Smiley.
Encryption	A protective method to enhance security and/or privacy for electronic transmissions (especially e-mail, financial transactions, and sensitive data transfers) done by “scrambling” or encoding the message in a way that only the intended recipient (the one with the “key” to unscramble the message) can decipher and use. <i>See also</i> SSL.
FAQ	Frequently Asked Questions: A document file that lists the most commonly asked questions and their answers about a particular subject or topic.
Favorites	<i>See</i> Bookmark.
Firewall	A special arrangement of hardware and/or software that for security purposes isolates an individual computer or a computer network from outside vulnerabilities. <i>See also</i> Network.
Flame	Can be used as a noun or verb to describe a heated and usually blistering personal attack done online (and often in a public forum such as a news-group). A response to a flame often incites a “flame war” as tensions

escalate and others join the fray. *See also* Chat, Netiquette, and Newsgroup.

Frame	Allows information displayed in a web browser to be divided into several different “windows” with separate viewing panes, often with scroll bars to view more within each frame. Viewing a web page using frames requires a frames-compatible web browser. <i>See also</i> Web browser.
Freeware	Copyrighted software that the author has given permission to download, share, and distribute without payment. However, it cannot be sold or modified in any way.
FTP	File Transfer Protocol: This is the standard used on the Internet for downloading or copying files between Internet sites or to a personal computer.
GIF	Graphic Interchange Format: A standard format used to store image files, particularly simple ones without much detail. GIF files are usually distinguished by a <i>.gif</i> filename extension. Usually pronounced “jif.” <i>Compare with</i> JPEG.
Gigabyte	A measure equal to 1,000 megabytes or exactly 1,073,741,824 bytes. <i>See also</i> Megabyte, Kilobyte, and Byte.
GUI	Graphical User Interface: A means for users to interact with their computers through icons and a pointing device such as a mouse instead of by simply typing text at a command line as in MS-DOS and Unix. Popular GUIs include Microsoft Windows and the Mac OS. <i>See also</i> OS.
Hit	A single request from a web browser to a server for a single item such as a web page or a web graphic. <i>See also</i> Web browser and Server.
Homepage or Home Page	The main or default web page among a collection of pages for a particular domain name.
Host	A computer or computer network that serves other computers and to which you can connect on the Internet. <i>See also</i> Server.
HTML	HyperText Markup Language: The English-based formatting commands used to write and specify how to display web pages with hypertext and other links in a web browser. <i>See also</i> Markup language.
HTTP	HyperText Transfer Protocol: The data link or protocol that directs the web browser to a specific site (domain name) and transmits hypertext web information, text, or multimedia data back to the user.
Hyperlink	A specially encoded image (graphic) or text (often underlined) that provides a link to another web location or file. <i>See also</i> Link.
Hypertext	A specially encoded word or series of text (often underlined) that provides a link to another document, file, or web location. <i>See also</i> Hyperlink and Link.
Icon	A small picture or image used to represent a function, an object, or

something else in a software application or a web page.

Image Map	A graphic on a web page that is set up with zones that can be “triggered” and activated by clicking. Once activated, these zones connect or hyperlink the user to another location. <i>See also</i> Hyperlink.
IMHO	A shorthand expression often used in e-mail, chat, and newsgroups that means “in my humble opinion.” <i>See also</i> E-mail, Chat, and Newsgroup.
Information Superhighway	A term popularized by former Vice President Al Gore to describe the vast array of information available online through the Internet.
Instant Messaging (IM)	A way for two users to type messages to each other back and forth in real time over the Internet. Popular IM applications are available through Yahoo, AOL, Microsoft, and ICQ.
Intellectual property	A product of the mind that has commercial value. It can be copyrighted and includes such things as music, software applications, literature, and art. In reference to computer software, the creator of a computer program owns the rights to the use and distribution of that program. Unauthorized copying or use is illegal under federal copyright law since software is considered a form of literary expression. <i>See also</i> Software license agreement and Software piracy.
Internet	An enormous, worldwide collection of inter-connected computer networks all using the TCP/IP communication protocol. It is an outgrowth of the ARPANet of the late 1960s and early 1970s. <i>See also</i> ARPANet and TCP/IP.
Intranet	A private (restricted-access) internal network that uses the same kind of communication protocols and software as is used to access the Internet. Often used by larger corporations. <i>See also</i> Internet.
IP	Internet Protocol: The global system of standards and numerical coding necessary for the Internet to function properly and transmit data accurately.
IP Address or IP Number	A unique address made up of a four part number separated by periods and sometimes called a “dotted quad” that is assigned to every single computer or device on the Internet. For example, 192.208.138.255 is an IP address. An IP address is in effect a personal identification number for a machine. <i>See also</i> IP.
ISP	Internet Service Provider: A company or institution that serves as a linkage point for Internet access. ISPs are usually fee-based, often use a dial-up or cable modem connection, and frequently offer other Internet services such as web page authoring, enhanced e-mail access, and web hosting. <i>See also</i> Modem.
Java	A programming language developed by Sun Microsystems that works on many different kinds of computers and is frequently used on the Internet for adding animation and other interactive functions to web pages. Small Java applications (called applets) can be encoded into the web page to

	“play back” on any web-enabled and Java-ready computer system. <i>See also</i> Applet.
JavaScript	A Java-based programming script designed by Sun Microsystems and Netscape Communications Corporation that can be added to HTML web pages to provide enhanced features and interactive functions. <i>See also</i> HTML and Java.
JPEG	Joint Photographic Experts Group: A common standard format used to store image files, particularly detailed images like photographs. JPEG files are usually distinguished by a <i>.jpg</i> filename extension. Pronounced “J-Peg.” <i>Compare with</i> GIF.
Kilobyte	A unit of computer memory or data storage capacity equal to 1,024 bytes. <i>See also</i> Byte.
LAN	Local Area Network: A type of computer network limited to a group of computers within close proximity (less than 500 yards) such as an office or small company. <i>See also</i> Network. <i>Compare with</i> Intranet.
Leased line	A high speed telephone line that is rented for exclusive use.
Link	A hypertext word or phrase or a hyperlinked graphic that if clicked once with the mouse will connect or “jump” the user to another web file or location as directed by the hypertext or hyperlink code. <i>See also</i> Hypertext and Hyperlink.
Linux	An open source operating system (OS) much like Unix but for personal computers. It was originally written by Linus Torvalds and is freely distributed and used worldwide. Pronounced “lih-nucks.” <i>See also</i> OS and open source.
Login	The non-secret name (not the password) that is used to access an account on a computer system or network. Also refers to the process of entering a computer system or network. <i>See also</i> Password and Network.
LOL	A shorthand term meaning “laugh out loud” that is often used in chat to show appreciation of something witty that was previously posted. <i>See also</i> Chat and ROFL.
Macro	A sequence of special commands used to automate complex or repetitive sequences and commonly used in word processing and spreadsheet applications. Macros typically perform pre-determined keystrokes, mouse actions, and menu commands.
MAPI	Messaging Application Programming Interface: Developed by Microsoft and other companies to enable Windows applications to access a variety of e-mail and related messaging systems. Pronounced “mappy.”
Markup language	A text-based coding system or set of symbols and rules used to structure, index, and link text files on the web. Examples include HTML and XML. <i>See also</i> HTML and XML.

Megabyte	A unit of computer memory or data storage capacity equal to 1,024 kilobytes or exactly 1,048,576 bytes. <i>See also</i> Kilobyte and Byte.
MIME	Multipurpose Internet Mail Extensions: The standard that is often used to send and receive non-text files as attachments in e-mail. The non-text file such as a video or audio file or a software application file has to be first encoded (converted to text that is usually unreadable) before it is sent and then decoded (converted from text back to its original format) when it is received so it can pass through standardized Internet e-mail messages. <i>See also</i> E-mail.
Modem	MOdulator, DEModulator: A hardware device or interface that allows computers to connect and transmit data to each other through conventional telephone systems. A modem converts a computer's digital data into different tones (sounds), signals, and complex mathematical formulas on the sending end and the modem on the receiving computer converts these tones, signals, and formulas back into digital data. Thus a modem makes it possible for the computer's digital system to use analog telephone lines to connect to other digital systems. <i>See also</i> Analog and Digital.
Multimedia	Containing several different forms of media such as sound, video, graphics, and text in a single entity.
Netiquette	From combining the words <i>net</i> and <i>etiquette</i> , it refers to a system of manners that defines what is proper and acceptable for online users, particularly those of newsgroups, chat, and e-mail. <i>See also</i> Chat, E-mail, Flame, and Newsgroup.
Netizen	From combining the words <i>net</i> and <i>citizen</i> , it denotes an individual who is responsible and knowledgeable of the Internet. <i>See also</i> Internet.
Network	Two or more computers connected together in a way that they can share resources.
Newsgroup	An informal discussion group formed around a common interest or topic. Members can post and review e-mail-like messages (using special news-reader software) that are automatically available to all group members. It can be likened to a bulletin board but on a worldwide scale.
Node	A single computer connected to any computer network. <i>See also</i> Network.
Open Source	Generally refers to any computer program whose programming code (source code) is freely made available for use. Often such programs are the result of broad public collaboration. (Most commercial or proprietary software makers usually do not make the source code available to users and only license the use of the application.) Popular examples include the Linux OS, the Mozilla web browser, and the MySQL database. <i>See also</i> source code, Linux, OS, and web browser.
OS	Operating System: The main software that must first be loaded or booted up to allow the computer to use other software applications such as a word

processor, spreadsheet, or game. OS examples include Microsoft Windows 98 and Windows XP, Linux, Mac OS X, and Unix.

Password	A secret code used to gain access to a restricted or protected (locked) system. A good password is easy for you to remember, difficult for anyone else to guess, and not actually a real word. When possible, it should contain letters (a mixture of capital and lowercase are even better) and numbers. Using keyboard symbols when possible makes it even more powerful. For example, something like <i>34xiwT5&</i> might be a good password if you can remember it. <i>See also</i> Login.
Patch	Software that is designed to correct a bug or problem or to make improvements to another software application. It must be installed “over” the flawed software.
Plug-in	A software application that may be added to a larger application to extend or add additional features or functions. For example, there are many plug-ins that allow web browsers to perform other specialized or enhanced functions. <i>See also</i> Web browser and Adobe Acrobat.
POP	Post Office Protocol: A standardized method for downloading e-mail from a server. <i>See also</i> Protocol, Download, E-mail, and Server.
Portal	A web site, usually commercially-oriented and featuring web services like search engines, “free” (advertiser supported) e-mail, special news, etc., that seeks to be an “on ramp” to the “Information Superhighway.” <i>See also</i> Search engine, E-mail, and Information Superhighway.
Protocol	A set of globally accepted standards or technical rules used for a specific electronic function such as communication between computers.
Public domain	Software that has no copyright restrictions or licensing fees. It can be freely distributed, copied, shared, and so forth. <i>Compare with</i> Freeware and Shareware.
ROFL	A shorthand term meaning “roll on the floor laughing” that is often used in chat to show enthusiastic appreciation of something witty that was previously posted. <i>See also</i> Chat and LOL.
Router	A special computer or software application located between two or more networks that “reads” the addresses on data packets and directs (routes) it to the proper path. <i>See also</i> Network.
Search engine	A web tool for finding specific Internet information matching the desired characteristics or topics.
Server	The host computer or software application that provides information to an Internet user’s computer. <i>See also</i> Host.
Shareware	Copyrighted software that is marketed as “try before you buy.” It is usually distributed via the Internet and downloaded by potential users who are honor-bound to pay for it if they use it beyond the specified free trial period. Some shareware has certain key features removed to encourage

buyers to purchase the fully functional version after the trial period has expired. *See also* Freeware and Public domain.

Shopping Cart	Special software that handles the financial transactions in retail web sites. Typically, this software collects customer information such as names; billing, shipping and e-mail addresses; items and quantity being purchased; and credit card or payment information. A receipt is usually e-mailed following the transaction.
Shout	To, in effect, “raise one’s voice” by using all capital letters in newsgroup posts, e-mail, or other online communications. According to netiquette, all capital letters should only be used when one is intending to shout. <i>See also</i> Chat, E-mail, Netiquette, and Newsgroup.
Smiley	A way to interject nonverbal cues or expressions into e-mail and online messages using letters and keyboard symbols. For example, :-) or :-(when viewed “sideways” represents a smile face and a frown, respectively. <i>See also</i> Emoticon.
SMTP	Simple Mail Transfer Protocol: Standard used to send and receive e-mail on the Internet. <i>See also</i> Protocol, E-mail, and Internet.
Software license agreement	A legal arrangement between the software copyright owner and the purchaser that stipulates the terms of usage that will be allowed for that software. Since the purchaser does not actually buy the software but instead buys a license to use a copy of the software, the purchaser is bound to follow this arrangement. <i>See also</i> Intellectual property and Software piracy.
Software Piracy	The illegal and unauthorized copying, distribution, or use of a computer program in a manner prohibited by copyright law or the software license agreement. <i>See also</i> Software license agreement.
Source code	Refers to the work or text commands (programming statements or set of instructions) that a programmer writes in developing a software application.
Spam	To send unwanted, inappropriate, or otherwise “junk” e-mail messages to individuals or often in bulk to groups. <i>See also</i> Newsgroup and Netiquette.
Spider	Sometimes called a web spider or simply a bot, this type of robot software explores web sites and follows their hyperlinks. The spider uses such exploration activities to create catalogs for use by search engines. <i>See also</i> Bot, Hyperlinks, and Search engine.
SSL	Secure Sockets Layer: A protocol developed by Netscape Communications Corporation to enable encrypted, authenticated transmissions to occur on the Internet. It is typically used in web communication that requires a high level of security, such as online business transactions, credit card purchases, and other sensitive transactions. <i>See also</i> Encryption.

Surf	Similar to quickly flipping channels on the television, it refers to the pursuit of “interesting stuff” on Internet; commonly referred to as “surfing the web.”
TCP/IP	Transmission Control Protocol/Internet Protocol: The main set of protocols that defines the Internet, ensures data accuracy, and enables connectivity to every operating system (OS) that implements this protocol. <i>See also</i> OS and IP.
Telnet	A set of user commands and a protocol for remotely accessing computers. Often used as a verb meaning to connect remotely. <i>See also</i> Protocol.
Terabyte	A unit of computer memory or data storage capacity equal to 1,024 gigabytes or approximately 1.1 trillion bytes (exactly 1,099,511,627,776 bytes). <i>See also</i> Gigabyte and Byte.
URL	Uniform Resource Locator: A standard way to address all Internet sites for FTP, the web, and other Internet applications. For example, the URL for accessing the Mississippi State University web site is <i>http://www.msstate.edu/</i> . <i>See also</i> FTP.
User interface	<i>See</i> GUI.
USB	Universal Serial Bus: A standardized port for simultaneously connecting many digital devices such as a mouse, keyboard, scanner, camera, and joystick to a computer and being able to use them all at once.
Uuencode/ Uudecode	Unix-to-Unix encoding: A popular software tool for encoding and decoding files for exchanging among computer network users. Many popular e-mail applications also provide it as a file attachment alternative to MIME. <i>See also</i> E-mail and MIME.
Virus	An application or series of commands (such as a macro) intentionally written to control another computer without the user’s consent. A virus often copies itself and sends these copies to others while it inflicts damage to the computers it infects. Damage includes things such as deleting files, posting annoying messages, draining resources, or destroying the computer’s internal records. These programs are often created to hide within another harmless-looking program or as e-mail attachments so they can perform the author’s malicious purpose.
Web browser	A software application such as Netscape Navigator or Microsoft Internet Explorer that allows users to navigate the web and access various Internet resources.
Webmaster	The person in charge of managing a web site. Sometimes called an Internet Systems Administrator.
WYSIWYG	An acronym that stands for <i>What You See Is What You Get</i> . Pronounced “wiz-E-wig,” it refers to software that makes the layout or formatting on your computer screen correspond to the way it will look on paper when printed.

World Wide Web	Sometimes called WWW, W3, but usually just “the web,” it is a global system of multimedia documents and resources linked through hypertext and other hyperlink connections. It is part of the Internet and is accessed through a web browser. <i>See also</i> Hypertext, Hyperlink, and Web browser.
XML	Extensible Markup Language: A system for defining specialized markup languages used to transmit specially formatted data. It is related to HTML but is not a true markup language – it is instead a language used to create other specialized languages. <i>Compare with</i> HTML. <i>See also</i> Markup language.
Zip file	A computer file that has been “compressed” to make it smaller and faster to download. An unzipping utility (software applications like PKZIP, WinZip, MacZip, or UnZip) is required to decompress such a file before it can be used. Most zipped files have a <i>.zip</i> filename extension.