ANALYSIS OF THE PROGRAM ANALYSIS AND EVALUATION DIRECTORATE LIBRARY'S SPACE REQUIREMENTS AND TECHNOLOGICAL MODERNIZATION OPTIONS

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This report was prepared for the United States Army Recruiting and Doctrine Command at Fort Knox, Kentucky. It analyzes the operation of the existing Technical Support Office (library) facility and makes recommendations for the design of the new facility and technological improvements to the local area network. The recommendations made in the report were intended to make the work of researchers more efficient and productive in supporting the mission of the command.

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PREFACE

This study was prepared under an interagency funds transfer agreement between the Library of Congress Federal Research Division and the United States Department of the Army Recruiting and Doctrine Command Programs Analysis and Evaluation Directorate, Ft. Knox, Kentucky. The report analyzes the operation of the existing Technical Support Office (library) facility and makes recommendations for the design of the new facility and technological improvements to the Local Area Network. The recommendations should make the work of Directorate Operations Researchers more efficient and productive in supporting the mission of the Command.

KEY JUDGMENTS

◆ The mission of the RCPAE Directorate is to advise USAREC on recruiting and advertising strategies for the All-Volunteer Force, including its Reserve Component. The staff performs recruiting zone analysis, conducts focus groups, and processes statistical data and vital statistics that could affect the recruiting function of the U.S. Army. The Technical Support Office's information resources must be upgraded to assist more efficiently the Directorate's Operations Researchers.

◆ Operations Researchers at RCPAE Directorate are required to respond quickly to queries and must have access to the most current information. The resources of the Technical Support Office (TSO) must be available immediately to researchers: analysts cannot afford to spend their time looking through paper documents. The Technical Support Office staff and Operations Researchers must have the support of the latest technology, including dial-up capability and online search services, with access at their own workstations. The Directorate will decide which database services are most pertinent to fulfilling its mission.

◆ The new, permanent TSO facility should be equipped with a compact shelving unit for its collections. Compact shelving makes the most efficient use of the limited space allotted to the new library. Workstations in the facility should be positioned to take maximum advantage of the natural light available.

◆ The nonsupervisory staff position in the Technical Support Office should be reclassified from Series GS-301, Information Management Specialist, to GS-1410, Technical Information Specialist/Librarian. The GS-1410 position description more accurately reflects the skills, knowledge, and abilities, and the duties and responsibilities of the position.

◆ The existing LAN is not sufficient for 40 simultaneous users performing statistical processing and report writing. A new network operating system (NOS) has been selected that will be able to meet these criteria, and include all the necessary software to fully integrate USAREC into the Internet. The NOS should link recruiters in the field with operations researchers at Ft. Knox, making all communications more direct and improving efficiency in the Command.

◆ A document imaging and electronic filing system should be installed to make all documents in the Directorate collections available to Operations Researchers online at their workstations. Optical storage technology (CD-WORM or rewritable compact disks) with library unit (CD jukebox) should be added to serve as the archive for these electronically converted documents and as backup for the entire system.

◆ The implementation of technological recommendations can occur in three stages:
1. Installation of a new network operating system;
2. Operation of the document imaging system with electronic filing system;
3. Addition of optical storage technology.

◆ Cost efficiency will be achieved by converting to the electronic environment. Comparing the costs of paper *versus* floppy disc transmittal *versus* the increasingly common CD-ROM *versus* the Internet will demonstrate the effectiveness of electronic communications and digital storage. The electronic conversion will facilitate the conservation of limited space for the library and improve operating efficiency when responding to the requests of operations researchers, other commands of the Army, and recruiters in the field. The cost of maintaining electronic files is much lower than that associated with preserving and maintaining print-on-paper collections. One trend identified by the Library of Congress is that the amount of electronic information arriving in the workplace will continue to increase. Having the technological capability to meet this condition will raise the ability of RCPAE Directorate to fulfill its mission to the Command and the Army.

I. INTRODUCTION

> The vast majority of today's library users will be participants in our twenty-first century society. All prognostications imply that this will be an information-rich society in which a basic survival skill will be the ability to locate, evaluate and use information in the place it is needed, at the time it is needed, and in the format in which it is needed.[1]

Libraries, the word conjures images of quiet and solitude, and aisle after aisle and shelf after shelf of books. Those images can still be realized in many library environments, but they are changing fast. The demand for time-sensitive information and the ability to provide it through automation and its electronic environment are transforming the traditional library into an information center. This new appellation is not merely a sleight-of-hand shift in terminology, but a profound shift in emphasis.

We are in the midst of three concurrent revolutions: the computer revolution, the information revolution, and the communications revolution. These revolutions, when combined, are as sweeping and traumatic as was the Industrial Revolution. Society as it exists today would collapse in a matter of hours should computers, [automated] information [retrieval] and communications suddenly disappear.[2] Libraries are the integrators of these three revolutions. In times of general fiscal austerity and budget contraction, cuts in funding for libraries must be weighed against the demands for the information and knowledge resources that permit an agency to perform its mission.

Upon completion of his own survey of the Library's impressive and diverse collections, the Librarian of Congress mandated that the institution "get the champagne out of the bottle" and create the "library without walls."[3] His vision has been to make the holdings of the Library available to the Congress, the research community, and the American people in order to comply with its mission to serve those patrons. On a smaller scale, all libraries are faced with a similar challenge to serve their patrons. They must make their own collections as well

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[1]Gerald G. Hodges, Library-use instruction: the librarian's challenge and responsibility. *Catholic Library World*, 53, November 1981, 176.

[2]John Corbin, "The Education of Librarians in an Age of Information Technology"; in Computing, Electronic Publishing and Information Technology. (New York: Howarth Press, 1988), 77.

[3]Annual Report of the Librarian of Congress for the Fiscal Year Ending September 30, 1988 (Washington: Library of Congress, 1989, ix-x.

as the wealth and diversity of information available in libraries around the world, accessible to their patrons through online searching. The Technical Support Office (TSO) of the United States Army Recruiting Command (USAREC) Program Analysis and Evaluation (RCPAE) Directorate is also faced with this issue.

The Library of Congress Federal Research Division was contracted to analyze the RCPAE library's space requirements and offer technological modernization options for the Directorate. The representative of the Federal Research Division of the Library of Congress visited the facility and met with the information specialists in the Technical Support Office (TSO), the commanding officer of the Directorate, and its staff members. The findings are presented below. The introduction to the study will present a brief overview of the changes occurring in libraries today and the impact of technology on the ability to serve library patrons. The following pages will describe the current RCPAE facility in terms of space allocation and facility design and offer an analysis of the library's patrons and their needs, analyze current technological capabilities and staffing, and make recommendations to the Directorate for the future facility's design, staff support, and technological upgrades to aid USAREC in fulfilling its mission to serve the United States Army and the nation.

Libraries as Information Resource Centers.

Libraries are changing, but not all libraries are changing at the same rate because the demands of their patrons are not identical. Research and academic libraries serve to supply scholars with the legacy of human knowledge, and, therefore, the rich store of materials (books, bound serials, manuscripts, and prints and photographs) must be available to the researcher, a library function that will never disappear. These libraries use technology to maintain collections, locate materials in their libraries, and provide resources to assist researchers in using the collections. They also use technology to access other library online collections. Some libraries serve patrons having different needs and must meet another category of demands, including accessing the most current, up-to-the-minute information wherever in the world it may be housed so that researchers may respond to time-sensitive requests. These facilities must be equipped with the latest technology, dial-up capability, online search services, and highly skilled, trained information specialists.

The increasing use of electronic publishing (including electronic journals), electronic-mail systems, networks (such as the Worldwide Internet and its follow-on generation the National Research and Education Network, NREN), online databases, and constantly improving scanning

systems coupled with pattern recognition programs for automatic document filing and indexing, have served to transform some types of libraries from book and paper repositories into electronic information resource centers. The digitization of information and its transferrability into an expanding variety of formats portends a "library without walls," a state that some types of research facilities can achieve in the near-term. Paper won't disappear, but paperless media will soak up ever more of our time. Paul Saffo, a research fellow at the Institute for the Future in Menlo Park, California, has written "we will eventually become paperless the same way we once became horseless. Horses are still around, but they are ridden by hobbyists, not commuters.... Now it is cheaper to store information electronically. Paper has become an interface--an increasingly transient disposable medium for viewing electronically compiled information. We are entering a future where information is reduced to paper only when we're ready to read it, and then the paper is promptly recycled."[4] This vision of the future information resource center is achievable at the RCPAE Directorate.

The Impact of Technology on the Modern and Future Library.

In confronting the task of analyzing the facility design, facility function, staffing, patron demands, and staffing requirements for the RCPAE Directorate TSO, one should relate to the Command the four fundamental trends identified by the Library of Congress in its "Study of Future Space Needs for the Book Collections:"

1) The increasing importance of knowledge-based workers in the United States for successful competition in the global economy.

The mission of the United States Army Recruiting Command is to recruit candidates for the Army who can perform at the highest competitive level and can use the technically sophisticated equipment now employed in the Army. Clearly, the importance of knowledge-based soldiers cannot be underestimated if the Armed Forces are to maintain the nation's security. The Army represents the ultimate in global competition. Recruiters in the field must have the most current and accurate information from their recruiting zones and the best-directed advertising campaigns to attract the most desirable recruits.

2) The library materials (data/information) available to the public and demand for that information in libraries will continue to increase.

If the Operations Researchers at the RCPAE Directorate are to meet their mission to

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[4]Paul Saffo, "The Electronic Future Is Upon Us," *The New York Times*, June 7, 1992, F13.

support USAREC goals, they must have access to all the information necessary to provide the analysis demanded by Army and civilian leadership in a timely fashion. The amount of that information is increasing exponentially.

3) The use of electronic formats in publishing is increasing.

More and more information is arriving in the workplace in electronic formats. Electronic mail services, instant communications links, and global connections are becoming commonplace. The RCPAE Directorate must take advantage of these electronic formats in order to respond to time-sensitive queries. One safe prediction may be made: electronic data storage, manipulation, and delivery are here to stay. The demand for speed and efficiency of information retrieval and delivery will not lessen. As David Penniman has written, "a library is essentially a labor-intensive institution because information transfer relies in large part on human-to-human communication. Finding methods for making this process more efficient and effective is the real challenge facing librarians today."[5]

4) Improvements in overall computer capabilities (speed, miniaturization, and multi-tasking), together with the development of information networks and increasing access to that information will intensify in the years ahead.

The explosion of information sources has been coupled with an explosion of technological advances. Computers work faster, are smaller and more complex than in the past, and all forecasts indicate even faster advances in all three of these attributes. No matter the hardware chosen today, the data must be in a format that permits transfer to the newest technological advance that awaits next year and the years beyond.

These will be powerful trends during the coming decades. Each of these trends will have an impact on the Technical Support Office's ability to meet the requirements of analysts and researchers and support the goals of the Command. Particularly important are the increasing use of electronic formats and the development of more complex information networks that provide access to that information.

The cutting edge of microcomputers and networks has put society into a world of distributed systems. Microcomputers are forcing libraries, schools, businesses, and government to decentralize. Decentralization of an information center means that researchers on a local area network (LAN) can access information from their own workstations, depending on the sophistication of the network and the willingness of the institution to bear the financial costs associated with these network services. As the Recruiting Command begins to take full

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[5]W. David Penniman, "Tomorrow's Library Today," *Special Libraries*, Summer 1987, 196.

advantage of modern technology to communicate directly with its recruiters in the field, the analysts and researchers in the RCPAE Directorate must be able to access quickly the most current data available to serve the recruiters and the Command's mission.

II. ANALYSIS OF THE TECHNICAL SUPPORT OFFICE

The Program Analysis and Evaluation Directorate advises the Recruiting Command on recruiting and advertising strategies for the All-Volunteer Force, including its Reserve component. The Directorate staff performs recruiting zone analysis, conducts focus groups to ascertain public perceptions of the United States Army, and processes statistical data from the United States Census Bureau, including high school graduation rates and dropout rates, crime statistics, and other vital statistics that could affect the recruiting function of the United States Army. What began as support for market research has now grown to support a staff of approximately 50 operations researchers and demographers who perform market research, publish ten to twelve studies per year, and write decision papers (the so-called "Blue Tops") for the Commanding General.

The Technical Support Office is charged with maintaining the library facility, housing the Directorate's collections (copies of studies done for the research department, the archival collection of the "Recruiter Journal," reference volumes, Research and Studies Division files and professional books, storage of USAREC's Total Quality Management collection and Command Group's selected professional reading books, and all PAE briefing papers and disks), providing the Local Area Network (LAN) server (a microcomputer with 80386 CPU), and access to selected online data services. Collection growth requires an additional three feet of shelf space per year. Copies of all studies funded by USAREC and the Directorate are sent to the Defense Technical Information Center (DTIC) at Cameron Station, Alexandria, Virginia.

The Current Technical Support Office Facility

The current temporary site at Ft. Knox occupies 364 square feet of floor space (which includes the server unit and desk, nine-track tape reader, information specialist workstation and desk, as well as small patron reading area) and 360 linear feet of shelving space. There is also a 104-square-foot storage room housing unpacked boxes of files and other materials moved from the former location at Ft. Sheridan, Illinois. The permanent site for the Technical Support Office (the expected move date is December 1994) will consist of 720 square feet and a 200-

square-foot storage room. The renovated building housing the Recruiting Command will be fully equipped with automatic temperature and humidity controls to assist in preservation of library materials.

The information specialist in the Technical Support Office can perform searches using a few online database services. TSO has an account with the Defense Technical Information Center (**DTIC**) and can perform searches on the proprietary Defense RDT&E Online System (**DROLS**). (See Appendix B for a more complete description of **DTIC** database services.)

The Technical Support Office does not need to subscribe to all database services itself. **ERIC**, a database of bibliographic information on materials on education maintained by the Educational Resources Information Center is available at the Ft. Knox Armor Library. It covers materials that have appeared since 1966 and is updated monthly. It is also available through DIALOG subscription. RCPAE/TSO does not subscribe to the On Line Computer Library Center (**OCLC**), but it is available at the Post Library. (See Appendix B for a more complete description of these database services.) The Technical Support Office is currently evaluating **DIALOG** for possible subscription.

Internet is available through the PROFS Gateway at Ft. Knox. The Internet is an international collaboration of more than 5,000 computer networks in 35 countries serving over one million researchers and scholars in universities, government research facilities, and private industrial laboratories, as well as private citizens. The network began as a research project on the interconnection of packet communication networks sponsored by the U.S. Defense Advanced Research Projects Agency (**DARPA**). A more complete discussion of Internet will be found below.

The Future RCPAE Library Facility

This report will make no recommendations for the design features of the current facility because of its temporary nature. However, several suggestions are in order for the new, permanent facility. The room designated for TSO in the new, permanent facility is rectangular in shape, with windows located along one long wall. There are two doors, one an entrance from the main corridor and another into the storage area. A modular office for the information specialist has been designed for placement near the entrance.

The facility will house four PC workstations, one of which will double as server for the LAN. Ideally, each of those workstations will receive 30 square feet of floor space (to include the PC, printer, and additional peripherals). The computer workstations should be placed facing

the entrance, preferably along the window wall (avoiding any interfering glare) to take advantage of the natural lighting, which is better than artificial light. Natural light will penetrate 20 feet into the room, so it is advisable to take full advantage of the windows. Workstations should not be positioned to face against a wall. Because people feel vulnerable with their backs to the traffic flow, they will tend to crane their necks to observe who is passing behind them, precipitating neck strain and poor posture. The PC workstations can be modular, with two stations per module. Electric power can be run to the units via powerpoles. If the workstations are placed along the window wall, power can be accessed through hollow moldings along the wall (a "chair rail") or floor moldings (see Fig. 1).

Shelving units should be placed at the 90-degree orientation to make the most efficient use of the limited space available. A 90-degree orientation yields more shelf space than zero-degree or 45-degree orientation (see Fig. 2). Because of the nature of the facility's limited space allocation and the inexorable increase in library collections, this report recommends the installation of compact shelving.

Movable compact shelving provides a successful, permanent answer to the storage and preservation problems afflicting many libraries. The advantages of such shelving greatly outweigh its minor disadvantages. Compact shelving maximizes collection storage space, usually doubling storage capacity by eliminating the aisles between each range of shelving. A number of ranges use one "moving" aisle. The ranges move on tracks, singly or several ranges at once. Installations are either electrical or mechanical assist; the costs for electrical are substantially higher than those for mechanical. If installation of compact shelving is under consideration, the load-bearing weight of the floor has to be carefully evaluated. The Technical Support Office staff has directed the engineers of the new facility to reinforce the flooring to prepare for installation of compact shelving units. The floor must be able to support at least 300 pounds per square foot, live load. Because the library will continue to collect paper copies for the near future, storage of hard copy will also need to be reassessed. A more complete discussion of optical storage systems will be found below.

Patrons of the Technical Support Office

In addition to the physical layout of the library facility and the function of TSO within the RCPAE Directorate, this report must consider the patrons of the facility. Who are they? How do they use the facility? What services do they require from the information specialist? How can their demands best be met in order to make the most efficient use of their time? How do the researchers view the facility and its function within the Directorate as they strive to meet

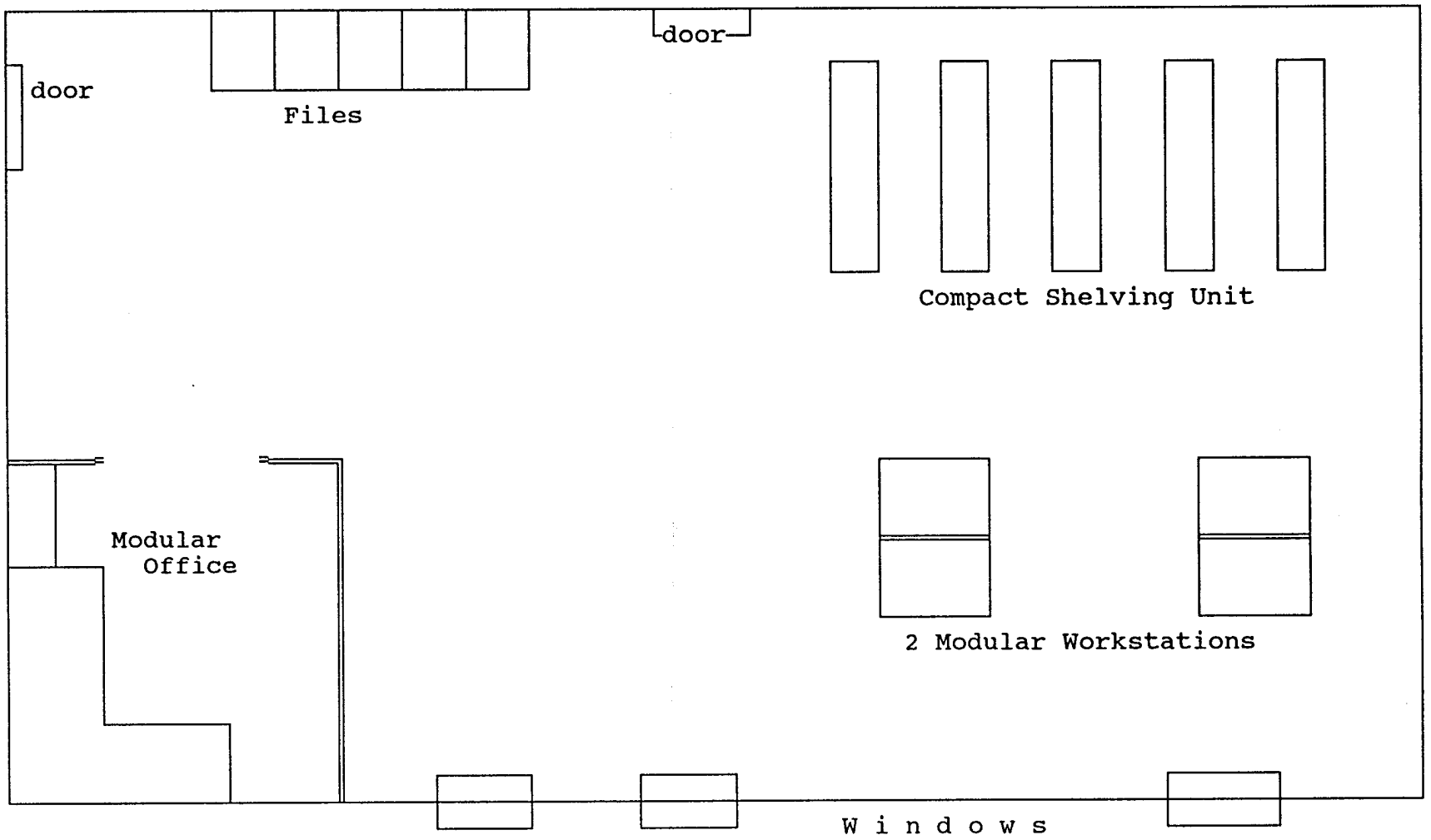
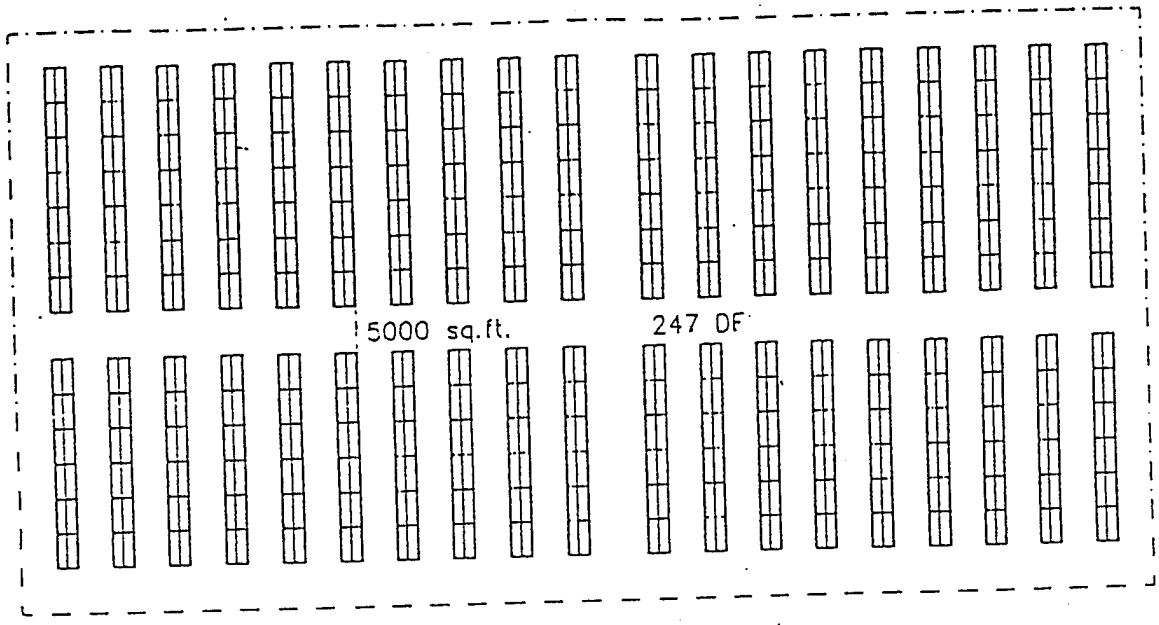

door
Files
door
Compact Shelving Unit
Modular
Office
2 Modular Workstations
W i n d o w s

Fig. 2 Shelving Orientation



ORIENTATION

90 degree

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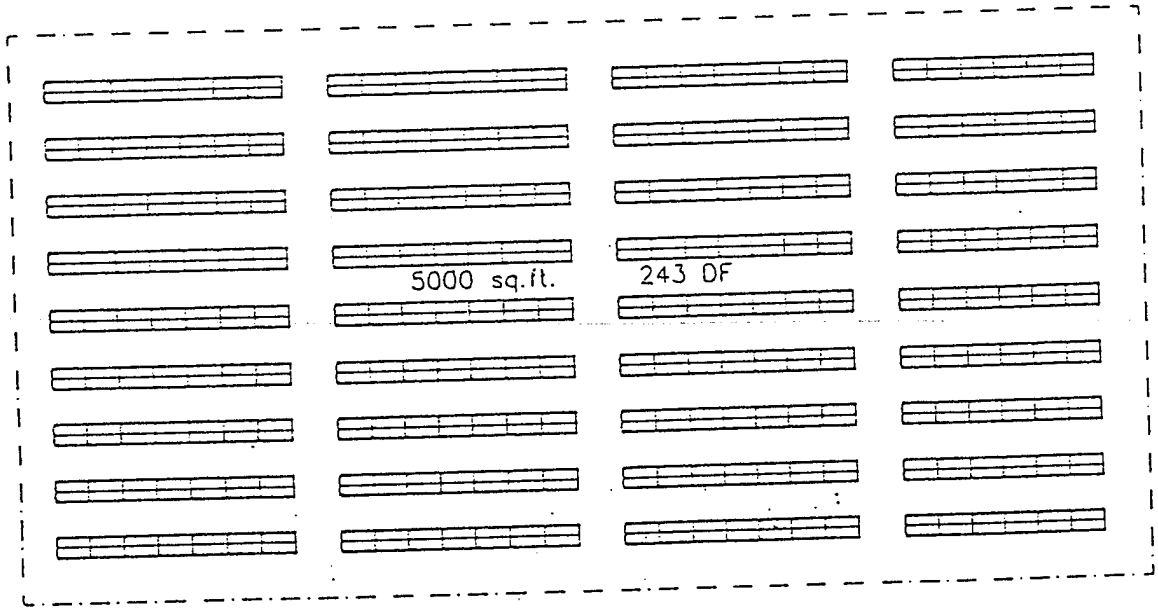
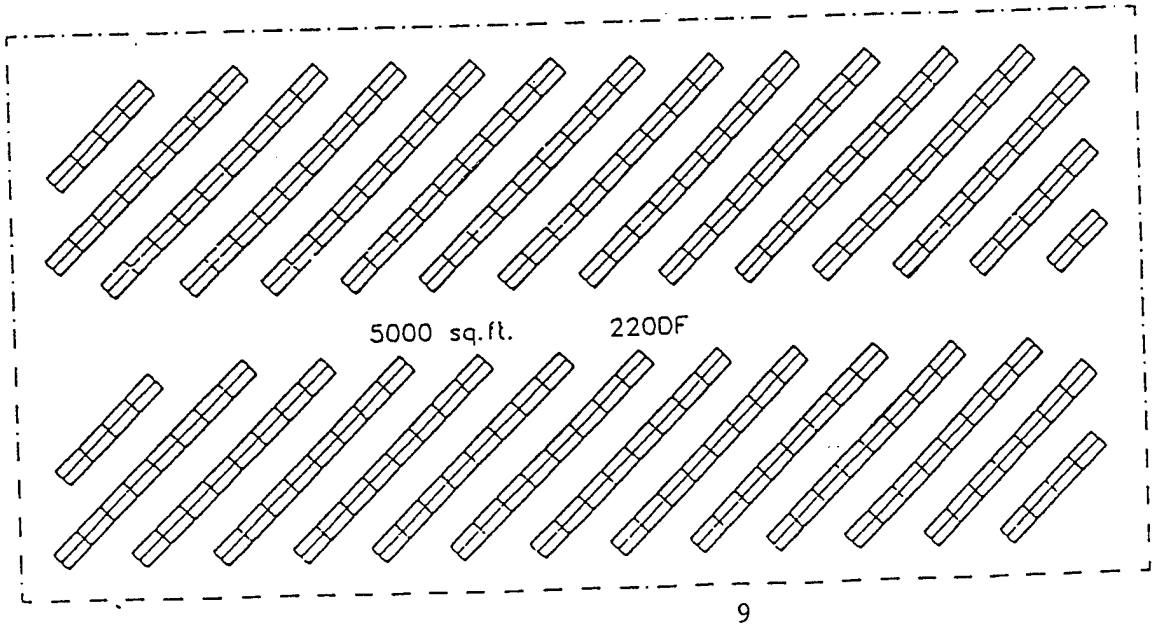
$= 0.049$



0 degree

$\frac{243\ DF}{5000\ sq.ft.} =$

$= 0.0485$



45 degree

$\frac{220\ DF}{5000\ sq.ft.} =$

$= 0.044$

their goals of timely and accurate responses to queries?

The Technical Support Office serves as the information resource center for the Directorate, which consists of researchers, analysts, and demographers who must respond rapidly to requests from the Recruiting Command, Directorate, and other Commands of the Army. Patrons of the facility include USAREC researchers and other Commands of the Army (for example, Defense Manpower, DCS Personnel, Army Reserves, West Point, TRADOC, etc.). In order to save valuable time and more properly engage the talents of the information specialist in TSO, the in-house researchers need to be able to perform online data searches at their own desks using their PCs and visit the office only for specialized information searches, archival material, and specific information that they cannot access and retrieve independently.

The researchers at USAREC frequently must respond to queries within one hour. They have little time to search paper copies. Existing paper documents should be scanned and indexed, making them electronically searchable. Researchers need access to database services, for example, NEXIS and DIALOG, that deliver current press reports from newspapers, magazines, newsletters, speeches by leading government and business leaders and educators. Researchers are frequently called upon to verify "facts" in speeches or articles that have been brought to the attention of political or military leaders. These library patrons are often required to perform trend analysis as well.

The Technical Support Office is not a place of research or a "traditional" library environment. Rather, it is an office where researchers come to ask the information specialist to go out into the world of information to find the answers to their queries. In order to make this office more efficient and productive, that searching should be performed in the electronic environment. Recent types of requests include:

- crime statistics for high school youth, for example, the percentage of crimes committed with handguns, the number of drug arrests, and conviction rates for high school age youth within the recruiting zones;

- expenditures in R&D budgets by major corporations, the "Fortune 500" companies, in relation to various manpower studies;

- Bureau of the Census data, such as population shifts, high school data concerning graduation rates in various recruiting zones with the purpose of determining focus groups and advertising campaigns;

- data analysis in the recruiting markets in order to position recruiters in the field;

- demographic statistical breakdown by minority group in the population at large and in the Army specifically (a recent example concerned the possibility of a disproportionate number of minority casualties in Operation Desert Storm);

- trends analysis, such as the current societal perception of the chance for future success in the Army, whether job skill/training or college education can determine the best opportunity, whether the Army is relevant to the future, that is, whether there is career potential in the Army);

- the issue of national service and its effect on Army recruiting;

- the relationship between the current unemployment figures and Veterans' data and how many veterans are using the GI Bill and College Fund;

- the attrition rate from the regular Army and its effects on the Reserves and its five-year recruiting plan and how the Reserves will be used in a down-sized army when budgetary constraints won't permit large standing forces.

These kinds of requests demand immediate access to information wherever in the world it can be found.

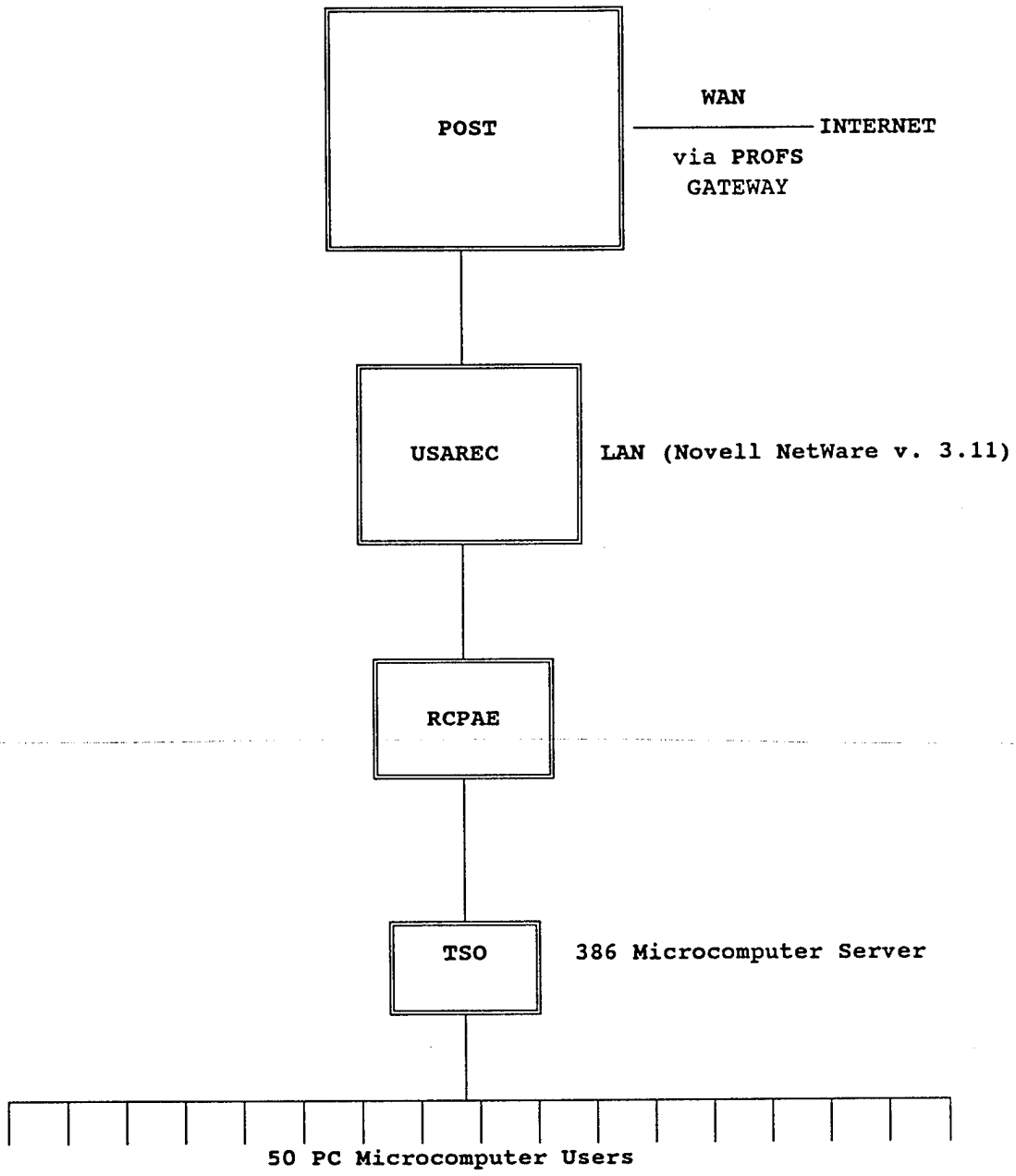
Researchers in the RCPAE Directorate clearly need access to current data from a variety of sources in order to respond to questions that arise concerning the recruiting plan for the Army. These sources should include the Bureau of the Census, Bureau of Labor Statistics, Department of Education, other military services, RAND Corporation studies, and the current press, and public opinion polling data. These sources are available through dial-up services that, with the appropriate technology, can be accessed from each researcher's workstation computer.

Current technological capabilities

What are the current technological capabilities of the library and how do information specialists use them to respond to requests? The existing automation system has been organized around AT&T's "StarLAN" with TSO having the 80386 microcomputer server. However, USAREC has decided to change its LAN to Novell version 3.11 and is currently in the process of installing that network operating system. A discussion of that system's features and capabilities is found below. Figure 3 depicts the simplified LAN architecture. There are approximately 50 microcomputers connected to the LAN, all PCs with 80386 processor, from 105 to 240 MB HDD, 16 MB RAM, and from 1 to 3 expansion ports. Most of the PCs are loaded with WordPerfect, Lotus 1-2-3, DBase, Aldus Persuasion, a mapping package, and a graphics package. The current LAN is a 10M bps ethernet, with RJ11 connector.

Researchers come to TSO for assistance in their searches. The information specialist can find a paper copy of a document in the library, search on the ROPER polling database, potentially use DIALOG (if a subscription is sustained), and use the telephone to

THE LOCAL AREA NETWORK (LAN) AT FT. KNOX



Microcomputers:
386 CPU
105-240 MB HDD
16 MB RAM
1-3 Expansion Ports

Software:
WordPerfect
Lotus 1-2-3
DBase
Aldus Persuasion
Mapping and Graphics

locate other sources of information that may exist in the information marketplace. This tedious procedure wastes precious time: the time of the researcher who is attempting to respond as quickly as possible to a query, and the time of the information specialist who could be serving several patrons at once if databases were available to all researchers at their respective workstations. The current operation violates Gerald Hodges' dictum, cited at the beginning of this report, concerning the need for the ability of library users to locate, evaluate, and use information in the place it is needed, at the time it is needed, and in the format in which it is needed.

The AT&T **StarLAN**, a CSMA/CD 802.3 baseband LAN, was designed to take advantage of already installed wiring, such as some types of telephone wire found in most existing buildings. **StarLAN** uses the concept of hubs, serving closets, and four-wire unshielded twisted pairs for connectivity. Maximum distance varies depending on the type of topology used, but can exceed 1600 feet. The maximum number of workstations supplied by it may exceed 1200. The staff researchers have complained that the LAN is insufficient for their needs because with up to 40 simultaneous users the system is easily overwhelmed and shuts down, particularly during the statistical processing that operations researchers must perform on a regular basis. Star-type topologies can suffer from delay that can occur under heavy traffic conditions. Requests for service may be blocked at the switch in a PBX, and the throughput is dependent on the internal bus capacity of the central node. Although the failure of one station does not affect the rest of the network, if the central node fails, the entire network fails.[6] Any of these shortcomings could be affecting the service received by the RCPAE Directorate.

Technical Support Office Staff

Two staff members are currently assigned to the Technical Support Office, one of which is supervisory. The nonsupervisory staff position is currently classified as occupational code 301, Information Management Specialist. The analyst from the Federal Research Division of the Library of Congress has reviewed 1) the duties and responsibilities and 2) skills, knowledge, and abilities needed to fill the position and recommends reclassification from the current occupational code to 1410, Technical Information Specialist/Reference Librarian. The 1410 series more accurately reflects the position's duties and responsibilities. The technical

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[6]Barbara Callahan, "An Overview of Local Area Networks," Datapro (Delran, New Jersey: McGraw-Hill, May 1991), Section 7210, 5.

information specialist would provide reference support to analytical elements of the Directorate and would be responsible for managing the procurement, storage, control, retrieval, and dissemination of assorted graphic and textual materials in support of Directorate programs. The technical information specialist would maintain an intimate knowledge of on-going Directorate programs and would have the responsibility for maintaining the library facility, its physical collection, and its electronic technology. Fulfilling these duties requires knowledge of advanced research tools (techniques of online searching, database information retrieval, file transfer protocols, computer hardware and software) and the skill to use them so that the incumbent can assist the Directorate in meeting its mission in a timely manner.

The technical information specialist must also keep abreast of the latest information resources and make recommendations for subscribing to these services and cancelling others that may no longer be productive. In addition, the technical information specialist would advise users on system capabilities, assist in database management, and provide technical support for end-users. Given the nature of the queries from operations researchers, the specialist cannot be content to follow the procedures for Inter-Library Loan in order to obtain hard copy of the source in question, but must be able to access the information immediately wherever in the world it may be located. The position of Technical Information Specialist/Reference Librarian GS-1410-11 more accurately reflects the knowledge, skills, and abilities required to support the Directorate in fulfilling its mission to the Command than does the information management specialist. (See Appendix A for a sample position description.)

III. THE FUTURE PLAN FOR THE TECHNICAL SUPPORT OFFICE

The goals of the RCPAE Directorate should be to improve its efficiency and productivity through the use of online searching by all operations researchers at their computer workstations, improve communications through computer conferencing and direct connection to Army recruiters in the field, and lower costs by creating its own focus groups and conducting its own surveys, thereby eliminating the need to hire private contractors for this tasking. The implementation of these goals will involve the creation of a new, more powerful LAN, based on the IBM RS/6000 minicomputer employing NetWare 3.11 by Novell, a network operating system (NOS), (options and specifications to be presented below), within a homogeneous PC environment of up to 40 simultaneous users operating on 80386-CPU microcomputers that support "Windows" and incorporates TCP/IP protocols, developed to link dissimilar communications systems across large networks. TCP packages information for transmission

and reassembles the received packets. IP handles the routing and transmission of data. TCP/IP is the Internet protocol.

The Worldwide Internet

The Internet was born about 20 years ago, as the ARPAnet (Advanced Research Projects Administration Network), an experimental network designed to support military research. In the ARPAnet model, communication always occurs between a source and a destination computer because the rationale for the network was to maintain communications in the event of a nuclear blast. It was assumed that no one computer was reliable. To send a message on the network, a computer only had to put its data in an envelope, called an Internet Protocol (IP) packet, and "address" the packet properly. Every computer on the network could talk with any other computer. Today, the Internet offers a wide range of services, such as electronic mail, bulletin boards, file transfer, remote login, index programs, and so on. To get the complete set of services, one must have a TCP/IP-style connection. (See Appendix C for a list of services available on Internet.) With this connection, the computer knows how to contact every computer service on the network, although it will need special software to use some of them.

In the network's early days, when the number of users was small, the existence of various fetch files on the network was communicated through interpersonal networking. Today, because the network is so vast and the number of users is in the millions, finding information that is known to exist is one of the biggest problems on the Internet. New software has been developed to eliminate this difficulty. **Archie** is a system that allows searching various indexes for files available on public servers on the Internet. It is the place to begin searching for programs, data, or text files. **Archie** currently indexes about 1200 servers and 2.1 million files. The searcher asks it to find filenames containing a certain search string or suggest files whose description contains a certain word. **Archie** returns the actual filenames that meet the search criteria and the name of the servers containing those files. To use **Archie**, one must choose an **Archie** server. The following table shows a list of **Archie** servers and suggested areas for use. **Archie** is a reliable and useful tool for wandering the Internet and searching for available files.[7]

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[7]This discussion of client/server software comes from Ed Krol, The Whole Internet. User's Guide and Catalog. (Sebastopol, California, O'Reilly and Associates 1992), 155-168, 189-226.

Table 1. Available Archie Servers

Name	Suggested Usage Area
archie.rutgers.edu	Northeastern United States
archie.sura.net	Southeastern United States
archie.unl.edu	Western United States
archie.ans.net	Sites connected to the ANS network*
archie.mcgill.ca	Canada
archie.au	Australia and the Pacific Basin
archie.funet.fi	Europe
archie.doc.ic.ac.uk	United Kingdom

*ANS is one of the Internet Service Providers.

This report recommends that RCPAE be linked to the Internet using **Gopher**, a tool that allows a user to browse and access remote data. A **Gopher** server functions like a librarian, creating a card catalog subject index and offering users hierarchical menus of available information. The data to which a menu option points actually can be located on a remote system. To access the **Gopher** system, one needs a gopher client program. The special client software must be installed on a computer that is on the Internet. There are free gopher clients for most computers: UNIX, Macintosh, IBM/PC, X Windows, VAX/VMS, VM/CMS, and others. The gopher client will choose an appropriate utility for dealing with the resource selected, whatever it is, allowing one to speak to it in a screen oriented, menu-driven fashion.

Another tool available for use on Internet is the Wide Area Information Server (**WAIS**) which allows the searching of indexed material. **WAIS** integrates internal information, for example, word processing documents, letters, and reports, in a free-form database that users query. Through **WAIS**, a user can search through Internet archives of indexed material looking for articles containing groups of words. It is a tool for working with collections of data or databases. **WAIS** has been compared to private libraries devoted to a particular topic.[8] Like **Gopher, WAIS** allows a researcher to find and access resources on the network without regard for where they really reside. In **Gopher**, the searcher locates resources by looking through a sequence of menus. **WAIS** does the same thing, but it does the searching. Once the researcher tells it what is wanted, it tries to find the material needed. In order to use **WAIS**, the computer in use must run an installed WAIS client program.

[8]Krol, 211.

The report also recommends the use of a Network Operating System or File Management System capable of creating, transmitting, and importing color graphics from remote as well as in-house locations, for example, **Oracle7** (to be discussed in greater detail below). Report graphics are more meaningful when the color can be retained in transmission. RCPAE generates many such color charts and graphs in its studies and also must retrieve data in that form. A data compression feature is also necessary because color graphics consume large amounts of memory space.

Using their own computers, operations researchers in the RCPAE Directorate will be able to access all database services to which USAREC subscribes and all services available on the Internet (provided the requisite software/serverware has been installed). The Internet offers an impressive array of services at virtually no cost (fees are assessed when downloading specific files, but searching the Internet and using the network to communicate worldwide is free of charge). In addition, using the Internet to the limit of its capabilities will link USAREC and the RCPAE Directorate to the world. All network software (including Banyan "Vines," Novell "NetWare," Windows "LAN Manager") are compatible with the Internet TCP/IP protocol. The utility of this service is clear. Because the Internet does not offer all online database services needed by the Directorate, TSO may need to subscribe to those data services which it deems most pertinent to the mission. If RCPAE determines that the Internet is appropriate for use, Technical Support Office staff will need specialized training to be able to take full advantage of the network. (See Appendix B for a partial list of database services and their availability.)

Local Area Network (LAN) and Its Installation at RCPAE Directorate

The current **StarLAN** has been judged inadequate for the needs of operations researchers. It is easily overwhelmed by the sheer numbers of users and complexity of their computations and statistical processing. There are numerous alternative LANs that can be selected to replace the existing network, but before doing so it is important to consider organizational requirements. The planning process includes defining the objectives, describing the system, and determining the communications needs.[9]

Below, we shall consider the cost *v* benefits of LAN operations and the improved efficiency of a work environment served by a LAN that is properly designed for an

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[9]William Stallings, "LAN Selection," The Business Guide to Local Area Networks. (Boston: Howard W. Sams and Company, 1990), 291-309.

organization's needs. USAREC has made a decision to purchase its network software package since the Library of Congress analyst first visited the site for this study.

Table 2. Some Key Management Goals

Management Concern	Desired Goals
Timeliness	*Reduce preparation delays* *Reduce distribution delays*
Responsiveness	*Reduce "telephone tag"* *Improve query response time*
Convenience	*Improve information input/output methods*
Efficient use of resources	*Increase office automation system usage* *Improve training* *Reduce user resistance*

Mainframe computers offered centralized data processing to the workplace environment. The staff members needing computer services were connected to the central mainframe by so-called "dumb terminals" that were relatively easy to use but, when the computer was down for servicing or "crashed," all work stopped. This computer environment changed with the introduction of the PC in the early 1980's. The workplace became decentralized or the home of "distributed systems." Individuals could control their own computing needs because their processing was performed independently of the computer center's mainframe or minicomputer. However, a condition opposite to that of the centralized system then obtained: staff members were isolated. While their work no longer depended on the computer center's functions, they could not pool their resources without physically copying disks and transferring data between office PC's. Some type of network for PCs was needed and local area network (LAN) software was the result.

A network is first a communications system that links computers and computer resources. One of the goals of network computing is to make it as easy to connect with another network resource as it is to call another person over the telephone. Networks minimize distance and communications problems and give users access to information anywhere on the network. A link to a network does not reduce a personal computer's capabilities; instead they are enhanced when connected to a network.[10] A LAN that can network dozens of computers equals a minicomputer in computing power; a LAN that can network hundreds of PC's equals a respectable mainframe in computing power. The cost of establishing this communications

[10]This discussion is taken, in part, from Tom Sheldon, NetWare 386: The Complete Reference. (Berkeley, CA: Osborne McGraw-Hill, 1990), 8-10.

network has dropped considerably over time. A network designer in the 1960's found a long-distance line cost $10 per hour and he/she could squeeze 10K bits/second through that line (using a 9600 bps modem). The "bit-per-buck" rate was 1K bits/buck-second. In the 1980's, a LAN designer found that LAN cable cost $1080 and could be amortized over three years ($360/year or $1/day or $1.25/hour for an 8-hour day). If 10m bits are squeezed through that line in one second (on an ethernet cable), the bit-per-buck rate is 80m bits/buck-second.

The most common reasons for establishing a communications network are:

- program and file sharing
- network resource sharing
- economic expansion of the PC base
- ability to use network software
- e mail
- creation of work groups
- centralized management
- security
- access to other operating systems

Program and file sharing Networkable versions of many popular software packages can be purchased at considerable cost savings when compared to buying individually licensed copies. The program and its data can be stored on the file server for access by any network user.

Network resource sharing Network resources include printers, plotters, storage devices, and even other computing systems such as minicomputers and mainframes. These resources are easily shared through networks.

Expansion of the PC base Networks provide an economical way to expand the number of computers in an organization by using inexpensive diskless workstations that use the server's filing system instead of a built-in filing system. Through resource sharing, printers and other devices can be used by several users instead of only the user at the attached computer.

Ability to use network software A new class of *groupware* is becoming available, designed for groups of users who have a need to interact with each other over the network.

Electronic mail Electronic mail is used to send messages or documents to users or groups of users on the network. Meetings can be arranged and schedules can be managed.

Creation of work groups Groups of users may work in a department or be assigned to a special project. Network software allows groups of users to be assigned special directories and resources not accessible by other users and messages can be sent to group members by referencing the group name.

Centralized management Because most of the resources of a network are centered around the server, management becomes easy. Backups and file system optimization can be

handled in one location.

Security Diskless workstations can be used to prevent sensitive data from being downloaded to disk. Managers can prevent users from working outside their own assigned directories and login restrictions can be applied.

Access to other operating systems Workstations can connect with computing systems that use different operating systems. Apple Macintosh and OS/2 users can connect to the same network server and share files and resources in the same manner as DOS users.

One of the big differences between LANs and minicomputers or mainframes is the role of the central computer. In minicomputer/mainframe networks, this computer runs the applications programs. In LANs, this computer is a dedicated file librarian. It doesn't run applications, it passes information back and forth with an application running on a workstation computer. Because the file server's job is so specialized it can become very good at passing information. PC-based LAN file servers typically retrieve and store data faster than a minicomputer or mainframe trying to act like a filer server.

The objectives for the installation or modification of the network must relate to the information products and goals of the organization. The categories of management concern in a research institution include timeliness, responsiveness, convenience, and the efficient use of resources (see Table 2). Each of these goals is applicable to the organization of the Directorate and will influence the choice of a network operating system. For example, improving response time to Command patrons and communicating directly with recruiters in the field are goals of the new LAN installation. Improving responsiveness will reduce "telephone tag" among researchers. The efficient use of resources within the Directorate will reduce costs. Making direct links to recruiters in the field possible will improve contact, achieve better recruiter positioning, and make more effective use of the automation system.

Table 3 lists some system requirements that RCPAE Directorate staff noted in meetings with the Library of Congress analyst. Once the appropriate LAN has been selected and installed, the staff will use it more fully than they do the present system and improve their efficiency and productivity.

Table 3. SYSTEM REQUIREMENTS FOR RCPAE DIRECTORATE

Produce documents locally
Access or download data from organizational databases
Edit and revise documents easily
Transfer documents among offices within and outside the organization
Perform interactive file queries by office users
Send and receive messages electronically
Produce compound documents (text, spreadsheets, and graphics)
Using conferencing (by computer and telephone) capability
Improving output presentation and producing letter quality documents
Transfer word processing skills across offices
Send and receive documents by facsimile
Integrated, easy-to-use automation systems
Streamline paper handling

Network Operating Systems

How to proceed in upgrading the search capabilities for the operations researchers rests on the selection of the network operating system (NOS). If the IBM RS/6000 is chosen as the minicomputer for the client/server network, then the network software package must be compatible with the hardware. Considering the connection of up to 50 microcomputers into the network and the amount of statistical processing performed by the operations researchers, the installation should have a 32-Bit processor, a minimum of eight I/O channels and four data busses. Whatever the hardware choice, it should have modular capability: if eight I/O channels are initially ordered, then a future expansion to twelve should not require scrapping the entire minicomputer to accommodate the added I/O channels. Three possible software packages for this choice are "NetWare 3.11" or the new "4.0" by Novell," "Vines Version 5.50" by Banyan, and "LAN Manager 2.2" by Microsoft. The Library of Congress has

firsthand experience with these network systems.[11]

Novell NetWare Network Operating System

Strengths

◆ New enterprise-capable system at top of the line-- NetWare 4.0 --introduces long-awaited directory services.

◆ SFT III product allows server mirroring, gives NetWare high availability necessary for On-Line Transaction Processing (OLTP) and similar tasks.

◆ Acquisition of UNIX Systems Laboratories, if approved, could provide strong foundation for building client/server systems, future NetWare growth.

◆ Broad support for most communications applications--NetWare to TCP/IP, NetWare to SNA, etc.

Limitations

◆ Lack of protected memory, virtual paging, preemptive scheduling NetWare core-- all considered prerequisites of modern operating systems.

◆ Minimal support for de facto standard NDIS drivers. Novell uses its own ODI adapter card drivers.

Analysis

Novell has been bolstering its advantage in the NOS market share by beefing up almost all of its key secondary network service products: NetWare for SSA, the LAN WorkPlace TCP/IP product line, and the software-based Multiprotocol Router. The three key elements for Novell are the core NetWare NOS, UNIX, and secondary network service elements; each has a bearing on the future of networking. Most analysts believe that the network operating system business will eventually metamorphose into the business of providing networking services. Companies that supply complete network operating systems today will soon be providing only networking services -- software that runs on top of a standard O/S platform (any of several flavors of UNIX, with a dash of Windows NT), over a common transport (probably TCP/IP, but with an increasing number of OSI-derived transports), and allows that standard O/S to do

[11]The comparison of these NOSs is summarized from Datapro, a publication of McGraw-Hill, This publication is updated on a regular basis and consists of four volumes dedicated to various automation topics.

all of the things that a NOS is expected to do.[12] Novell's future lies with network services and enterprise-wide NOS. The Library of Congress Congressional Research Service has installed Netware and recommends using a 486 CPU in the server with minimum 8 MB RAM (12-16 MB RAM preferred).

NetWare and TCP/IP

Novell has announced LAN WorkGroup, a server-based implementation of its popular and widely acclaimed LAN WorkPlace TCP/IP software. Available in packages for 5, 10, 20, 50, 100, and 250 users, LAN WorkGroup allows concurrent access to both NetWare and UNIX servers. Concentrating cross-platform connectivity on the server allows easier installation and management. A new version of the standalone LAN WorkPlace software, Version 4.1, adds support for laptop computers using the Serial Line Interface Protocol (SLIP), Point-to-Point Protocol (PPP), and Hayes-compatible modem drivers. LAN WorkPlace has won top awards for the best TCP/IP functionality on the PC platform and NetWare Access Server, which is the most popular software-based, dial-in communications server available.

Banyan Virtual Networking System (VINES)

Overview

The purpose of the network, to quote the company statement of direction, is "to simplify the use and management of distributed networks." Banyan targets companies for large WAN installations, focusing on pushing LANs closer to the world of mainstream large-system data processing.

Strengths

- Management of multiple file servers is easy.
- Can support up to ten printers on one file server.
- Excellent performance with multiuser database management products.
- Good built-in electronic mail system with ties to StreeTalk, their global naming scheme.
- Unlimited number of concurrent users on one server.

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[12]Much of this discussion and this citation come from John Krick, "Novell NetWare Network Operating Systems," Datapro (Delran, New Jersey: McGraw-Hill, 1993), Section 3575, 1-11.

- Unlimited number of open files.
- Automatic administrator alerts and warnings regarding system performance.

Limitations

- Does not support duplicate concurrent hard disks and/or controllers, which would allow the system to continue operating normally when one disk/controller fails.
- Maximum number of hard disks supported per file serve is two (660MB each); greater disk storage available on CNS systems.
- UNIX foundation imposes some performance penalties.
- Workstation RAM requirements to access LAN are large at 112KB.
- Does not support full Apple Filing Protocol connectivity to Apple products.

Analysis

Banyan VINES is a UNIX-based operating system primarily known for its multiserver networking features. It is renowned for its capability to support a large number of nodes and geographically supported servers. VINES is easier to install than LAN Manager or NetWare, with setup process almost completely self-contained. It is, therefore, also easy to maintain. VINES tailors its management features after those found in traditional UNIX systems. There is no mouse use and no windows or pull-down menus. Commands are entered at the command prompt or selected from basic menus.

Most of the popular third-party applications, such as WordPerfect, Lotus, and Oracle, are VINES-compatible. StreeTalk is a distributed database that translates logical names into physical internet addresses. Changes to the database are automatically replicated across the network, making it easier for system administrators to move resources from server to server. Novell and Microsoft have not yet introduced a Global Naming Scheme (GNS) as advanced as Banyan's. GNSs will continue to increase in importance as wide area networks proliferate.[13]

Because VINES runs on top of UNIX, it can run multiple tasks for multiple users. VINES supports symmetric multiprocessing (SMP), an innovative feature that allows the NOS to utilize the full power of its hardware, significantly increasing speed and performance. VINES supports an unlimited number of open files and concurrent users on one server. VINES simplifies the design of networks that serve thousands of users, connected by StreeTalk global

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[13]This analysis is derived from Katherine Wollerman and Richard Scruggs, "Choosing a NOS: Banyan, Microsoft, and Novell," Datapro (Delran, New Jersey: McGraw-Hill, 1992), Section 5020, 1-10.

naming and directory services, and linked by integrated gateway, bridge, and router software. VINES 4.11 includes an enhanced version of VINES SMP that adds the AT&T StarServer E to the list of SMP servers supported by VINES. Other additions include enhanced support for more LAN adapters; administrator-forced logout; remote booting and enhanced StreeTalk Directory Assistance; OS/2 NETBIOS support for application sharing between DOS and OS/2 users. New wide area communications features include X.29 Dial-in, allowing multiple PCs to dial into a VINES 4.11 server over a single X.25 connection. The Library of Congress uses VINES as its LAN and recommends using a microcomputer with 486 CPU running at 66 MHz, 8 MB RAM minimum and 16 MB RAM strongly recommended, with HDD having 1 GB mass storage. Automation specialists at LC have noted significant degradation with less than 16 MB RAM. The Library of Congress specialists also recommend a tape back-up system and note that VINES must run on a Banyan-certified platform.

A limitation to Banyan is its small size. Managers are concerned that smaller firms like Banyan may not survive in the competitive market. To assuage such fears, Banyan formed an alliance with AT&T in 1991, giving the firm more clout in the value-added reseller and distribution channel. The alliance allows resellers already authorized to sell either Banyan VINES or AT&T StarGroup products to sell both. A recent alliance with Compaq should also give Banyan more credibility in the NOS marketplace. According to Datapro analysts, "VINES is a solid choice for users with large or wide area networking needs. The many built-in features, such as mainframe and minicomputer connectivity and StreeTalk global naming service, make VINES a good choice for large networks."[14]

Microsoft LAN Manager

Overview

Microsoft designed LAN Manager NOS as an OS/2 application. It consists of a mouse-oriented, point-and-shoot interface. Its key features include managing multiple servers and fast file copying.

Strengths

- Global naming scheme uses domain server concept.
- Direct queries to mainframe.
- Sophisticated client/server applications.

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[14]Ibid. 3.

- OS/2 client peer-service feature.
- Only NOS with auto-reconnect feature that re-establishes severed communications with workstations when the file server comes back on-line.
- Mouse-based point-and-click operation.

Limitations

- Expensive client support beyond ten days ($2,495 for ten incidents within one year).
- Client software and servers consume a great deal of RAM.
- No direct server-to-server bridging.
- Problems supporting large numbers of users.
- No Macintosh support.

Analysis

Despite its early lack of acceptance, LAN Manager is considered a strong contender in the NOS race. Based on the OS/2 operating system, LAN Manager provides good performance for small-to-medium-sized networks. Security features include password encryption and file protection. LAN Manager is equipped with helpful administrative features; for example, in the event of a server failure, an auto-reconnect feature re-establishes broken communications ties with workstations as soon as the server comes back on-line. Installation has a major drawback -- hardware requirements for LAN Manager are higher than for other NOSs because it requires OS/2. Another limiting factor is that two servers on separate network segments cannot share files or transfer information without a third-party bridge.

Through various network testing, LAN Manager has been found to be best for small- to medium-sized networks. When the capability to handle various data loads was tested, LAN Manager kept the pace with the competition when loads were light. When the data load was increased to simulate the load of 16 users on 300 workstations, LAN Manager's performance suffered. A major flaw is the need for RAM. For a 386 or 486 server, 6MB of RAM is required, and Microsoft recommends 9MB.

WINDOWS NT Advanced Server

A few words should be added concerning this new, forthcoming product from Microsoft, Inc. Windows NT Advanced Server, scheduled for release in late 1993, is a superset of NT that will include Macintosh support, Remote Access Server (RAS) support, and

additional management options. Windows NT Advanced Server is a new platform. According to Eric Harper, "If security is important to you, or if you are a Windows 3.1 "power user" who commonly runs several applications at the same time, you'll probably benefit from NT."[15] Hardware requirements include a minimum 386/25 MHz microcomputer with 8 MB RAM (actually, according to the early beta-release it was 12 MB RAM), running on ARC-compatible, RISC-based computers with 16MB RAM, and requiring a hard disk drive with 66MB of free space.

Windows NT allows the user to choose file allocation table (FAT) partition or NT file system (NTFS) partition. In order to take full advantage of NT's security features the user must run NT and its applications on NTFS partition. For UNIX connectivity, Windows NT provides utilities such as File Transfer Protocol and Telnet. Analysts at Datapro have said, "a small NT server costs as little as $3,000. A good NT server will cost $5,000 to $6,000, one that supports DOS, Windows, Macintoshes, and OS/2 via LAN Manager and with TCP/IP, you've got UNIX. NT is a competitor to UNIX, working on the same RISC base. But it will also run all DOS applications. With NT, the applications that now run on the RISC-based LAN will be far cheaper...Prices will go down and volume will go way up. We are on the edge of the most major changes in the computer industry in the past 15 years."[16]

Table 4. ***Windows NT Advanced Server Features***

Performance	It is a 32-bit, scalable OS with symmetric multiprocessing. It accesses up to 4GB of protected virtual memory and terabytes of disk storage.
Security	Department of Defense C2-level security.
Reliability	Transaction-based file system, RAID 5, integrated UPS monitoring, and tape-backup software.
Management	Performance Monitor and other utilities. It is also SNMP- and NetView-compatible.
Open Access	Runs DOS, Windows 3.1, POSIX-compliant, OS/2 (character-based), and native NT 32-bit applications. Supports IPX/SPX and and TCP/IP.
Supports	Windows Sockets, Named Pipes, NetBIOS, Network Dynamic Data Exchange (NetDDE), IBM's data-link control (DLC) for host connectivity, and remote procedure calls (RPCs) compatible with the Open Software Foundation Distributed Computing Environment (OSF/DCE).
Add-ons	Services for Macintosh, Remote Access Service, Microsoft SQL Server, and Microsoft SNA Server.

[15]Eric Harper, *LAN Times*, 10, No. 13, July 13, 1993, front cover.

[16]Ibid., 56.

NetWare v. 3.11

USAREC has made the decision to install Novell NetWare v. 3.11. NetWare 3.11 is a true server operating system designed specifically for Intel 80386 or 80486 microprocessors. Performance is increased two to three times over previous versions of the operating system. The goal of network computing is to provide transparent access to the data and resources of any computing system from any other system. The key is to use the existing network as a platform to build these new integrated services. Transparency is made difficult by conflicting hardware and software standards, different media and protocol standards. Novell supports media independence and has *open protocol technology*. NetWare runs over 30 different types of networks on more than 100 different network adapters. NetWare is compatible with every major network card and every major manufacturer's hardware, including IBM's Token-Ring, AT&T's StarLAN, and many Ethernet-style networks. Another feature is NetWare's ability to allow different workstations to run different versions of DOS all at the same time.

NetWare 3.11 requires a network server system, workstations (each workstation computer must be equipped with network adapter), network interface cards, and connecting cable. The server must be an Intel 80386- or 80486-based system with minimum of 2 MB of RAM, but more memory will probably be required, depending on the number of users and other network requirements. Workstations can be MS DOS-compatible systems (IBM PCs, XTs and ATs), OS/2 systems (all models of the IBM PS/2 family of computers), UNIX, and Apple Macintosh systems (including Macintosh SEs, Pluses and 512Ks, and all models of the Macintosh II family). The type of network cards used depends on the cabling system, topology, and cable access method.[17]

Servers should be high-performance systems using advanced bus technology, such as IBM's Micro Channel Architecture (MCA), or the Extended Industry Standard Architecture (EISA). MCA and EISA systems can use 32-bit network interface cards (Novell recommends the NE3200 for EISA servers) and disk controller boards to significantly improve the performance of the server. The *System Executive* is the main component of NetWare, allocating memory, granting access to files, and scheduling tasks. It is a full 32-bit operating system automatically allocating memory to network services as they are needed. The *Dynamic Resource Configuration* feature ensures that every major network operation is allocated the

[17]This discussion of 3.11 specifications comes from Novell publication number 1006 and Tom Sheldon, Novell NetWare 386: The Complete Reference, (Berkeley, CA: Osborne-McGraw Hill, 1990), 67-69.

Table 5. NetWare v. 3.11 Specifications

Logical users supported server	1000
Concurrent open files per server	100,000
Concurrent TTS transactions	25,000
Volumes per file server	64
Logical drives per volume	32
Directory entries per volume	2,097,152
Maximum file size	4GB
Maximum theoretical storage capacity	32TB
Maximum theoretical RAM memory	4GB
Cache buffers	Dynamic

correct amount of memory within the memory limitations of the system. The server need not be brought down to change these options. NetWare 3.11 has an expandable architecture that allows additional software modules to be added to the network while the server is running. Third-party products such as applications, drivers, and utilities become a part of the NOS. These modules are known as *NetWare Loadable Modules* (NLM).

Current and future versions of NetWare include a protocol independent structure known as the open data-link interface that allows different protocols such as IPX/SPX, AppleTalk, TCP/IP, SNA, and the OSI stack to be loaded and unloaded on the network server as needed. The network can be integrated into a multivendor network with ease due to its protocol independence. NetWare also provides an internal router feature that allows a NetWare server to connect with up to 16 different networks, making them appear as one logical network. A bridge to other networks can be established internally in the server or in an external bridge.

NetWare 3.11 includes all the software necessary to install and operate the network server and to connect as many as 1000 DOS, OS/2 or MS Windows workstations to the network. The central component is the real-time network operating system, which allocates memory, grants access to the network file system and schedules tasks for every part of the system. Designed around the 32-bit 80386 and 80486 environments, the real-time operating system provides the foundation for NetWare's speed and reliability. Unlike other NOSs that run on top of a general purpose operating system, NetWare accesses the server CPU directly, operating faster and more efficiently, and solving the timesharing problem.

Version 3.11 has brought **System Fault Tolerant NetWare** down from the top-of-the-line NetWare versions to all 3.11 users. SFT NetWare reduces the possibility of file or data loss on the network. It also provides redundant directory structures in the file allocation tables

(where the server keeps track of where a file and data are located on the hard drive) to protect against a possible hard drive failure. SFT Mirroring provides duplication of the entire hard disk on a second redundant hard drive in the same server box. Should the main drive fail, the second drive will automatically take over without losing important data. The system will send a message to the system administrator indicating a server failure. This feature brings the network an additional level of protection. SFT Duplexing duplicates almost the entire server, having a tandem device with an additional coprocessor board, cable unit, and drive controllers, as well as the hard drive. In the event of a crash, there would be minimal loss of data because the main server would send redundant data down a cable to a duplex unit. The **Transaction Tracking System** preserves database veracity if a program, a user PC workstation, or the file server crashes before a data save is completed. It automatically rolls back or aborts database changes to the previous point of operation whenever a major system failure or disk crash occurs.

File Management System. Relational Database Management System (RDBMS)

In 1979, Oracle Corporation delivered the world's first commercial relational database management system that is highly portable and function-rich and the first product based on the Structured Query Language (SQL). What made Oracle so appealing was that its developers took an experimental DBMS concept and turned it into the first commercially available DBMS of its time. The concept centered around the data structure -- relational. To achieve ease-of-mobility through data files with established relationships, the RDBMS used a new development language called SQL. Portability has been a key element in Oracle's success: any Oracle program can be transported from any platform to another, usually without any modification. It can be installed on a variety of hardware platforms ranging in size from the Macintosh and IBM-oriented PC to the large IBM, or compatible, MVS mainframe. In addition to supplying all the standard RDBMS features and functions, Oracle can be structured to provide client/server capabilities. Oracle Corporation has also introduced Oracle Server for NetWare 386, the first third-party SQL database server available for NetWare 386.

In order to address the needs of the various PC and workstation platforms and configurations that Oracle supports, the vendor makes available specific Oracle offerings. The microcomputer versions of Oracle are complete source representations of the mainframe and minicomputer versions. A hierarchy of products addresses the 286, 386, and 486 microprocessor lines and a wide range of UNIX machines. A Macintosh version is also

available. The client/server version supports the UNIX workstation environments, including the RISC/6000 workstation. The Oracle Server version contains a multiuser RDBMS kernel. Oracle Server also contains SQL*Net with LAN support. It connects a PC over a LAN to other PCs running Oracle Tools or Oracle PC. TCP/IP is handled under Protocol B under UNIX. SQL*Graph is an interactive graphics generation package that automatically creates full-color pie, bar, line, and scatter charts from data extracted from the Oracle database. The user can query, update, modify, and perform mathematical operations on information stored anywhere in the graphics database. Oracle*Mail is a portable electronic mail system designed to provide office-wide automation. It lets users communicate across heterogeneous computers and networks.

Oracle can be installed on over 80 different hardware platforms. Most UNIX workstation or mainframe environments are supported, including IBM's AIX running on the mainframe or the RISC/6000 base. Most IBM and compatible PCs and the Macintosh microcomputer are supported at the PC level. In most environments, Oracle requires at least 1.6M bytes of main memory and a hard disk storage device. No other special system features are required. Total static Oracle disk space requirements are about 15M bytes.

Oracle7 is a cooperative-server technology that allows Information Systems (IS) to easily deploy, integrate and maintain database applications on an enterprise-wide basis. Client/server computing implies processing a database application on multiple computers. The client exploits the cost/performance of the workstation to process the user-interface and the application logic. This allows the server to concentrate on data-intensive operations. The two sides are connected by a network, allowing any client access to any server. Cooperative-server technology means that IS can now easily deploy, integrate, and maintain database applications across the enterprise. SQL*Net (Oracle's network connectivity product) provides automatic, multi-protocol interchange capabilities that extend the reach of the cooperative-server across previously incompatible networks. For example, an application running on a TCP/IP network may seek access to data located on a mainframe, a Novell network or any major systems vendor network. In such cases, SQL*Net transparently translates the protocols. This process eliminates the need for expensive hardware-based internetwork bridges or protocol routers. SQL*Net 2.0 also takes advantage of the redundancy found in most enterprise networks to provide automatic alternative network routing. In this environment, if the primary network is down, SQL*Net attempts to make the connection through an alternative network.[18]

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[18]Richard A. Skrinde, "Cooperative-Server, an Enterprise Solution," *Network Computing*, Supplement, May 1993, 69-76.

Document Imaging and Automatic Indexing

Operations researchers and technical support personnel in TSO indicated that the paper documents in the information center should be converted to electronic format and made available on the LAN. This report recommends the installation of "PixTex/EFS" by Excalibur Technologies for the document imaging and automatic indexing system for the RCPAE Directorate LAN. "PixTex/EFS" is the most advanced system currently on the market for electronic filing because of its pattern recognition system and its fuzzy searching capability. The use of fuzzy searching means that the matching need not be exact. Word-based searching systems require exact matches. "PixTex/EFS" supports TCP/IP, the Internet protocol, so documents can be sent anywhere RCPAE wants to transmit them (i.e., to recruiters in the field). The system allows graphics transport into other presentations from documents in Excalibur. Both "Scanworks" and "Calera" OCR are supported in Excalibur's system. (See sample wire diagrams.) In addition, Excalibur and Oracle are integrated and with both systems in operation, the file management system is more complete and user-friendly. There is a client licensing feature.

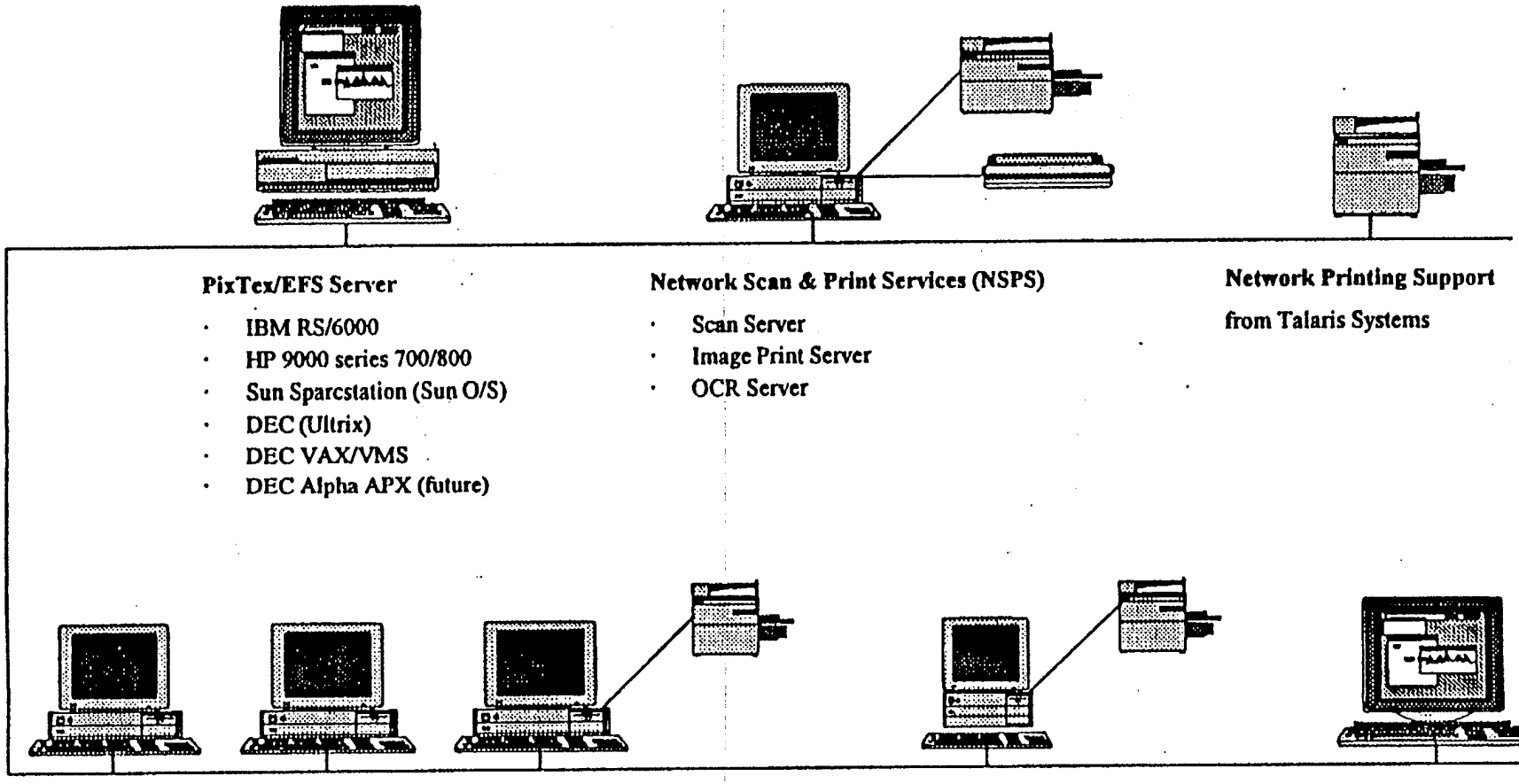
The products of Excalibur Technologies Corporation are based on adaptive pattern recognition technology that allows users to store and retrieve information based upon its content. Pattern recognition provides for high-speed, accurate, and flexible access to many kinds of information, including text, image, video, signal, and tabular data. The company offers a full range of text and image retrieval application software products that will run on all major workstation platforms including Sun Microsystems, IBM, Novell, Microsoft Windows, and Macintosh.

PixTex/EFS Electronic Filing System is a commercially available document management and control system for use on VAX/VMS and UNIX operating systems. This software system allows users to collect electronic text and images from computer disks, scanners or facsimile machines, then automatically index and file the information in a graphical user interface replica of a physical file room. In 1992, Excalibur signed agreements that team its imaging systems with databases from Informix and Oracle.

Pattern recognition allows high-speed, automatic indexing of data as it is entered into the system. The data are, essentially, automatically indexed and there is no need to pre-process data manually. "PixTex/EFS" employs a graphical user interface that allows users to create file cabinets, drawers, and folders organized in one or more electronic file rooms. Text and image documents can be managed with point-and-click ease, using a mouse and cursor.

PixTex/EFS Electronic Filing System

Sample Configuration



PixTex/EFS Server

- IBM RS/6000
- HP 9000 series 700/800
- Sun Sparcstation (Sun O/S)
- DEC (Ultrix)
- DEC VAX/VMS
- DEC Alpha APX (future)

Network Scan & Print Services (NSPS)

- Scan Server
- Image Print Server
- OCR Server

Network Printing Support from Talaris Systems

PixTex/EFS Client for MS-Windows

- DECnet or TCP/IP access to EFS Server
- Local printing support

PixTex/EFS Client for Macintosh

- TCP/IP or DECnet access to EFS server

X-Windos/Motif support

PixTex/EFS Electronic Filing System supports numerous scanners, printers, OCR devices and optical storage media . Database support is available for Oracle, Informix, Ingres, Rdb/VMS or Ultrix/SQL, depending upon platform.

Please call your local Excalibur Technologies representative at or contact a Certified Excalibur Distributor for details specific to your environment.

Fig. 4

Sample C[illegible]figuration #4

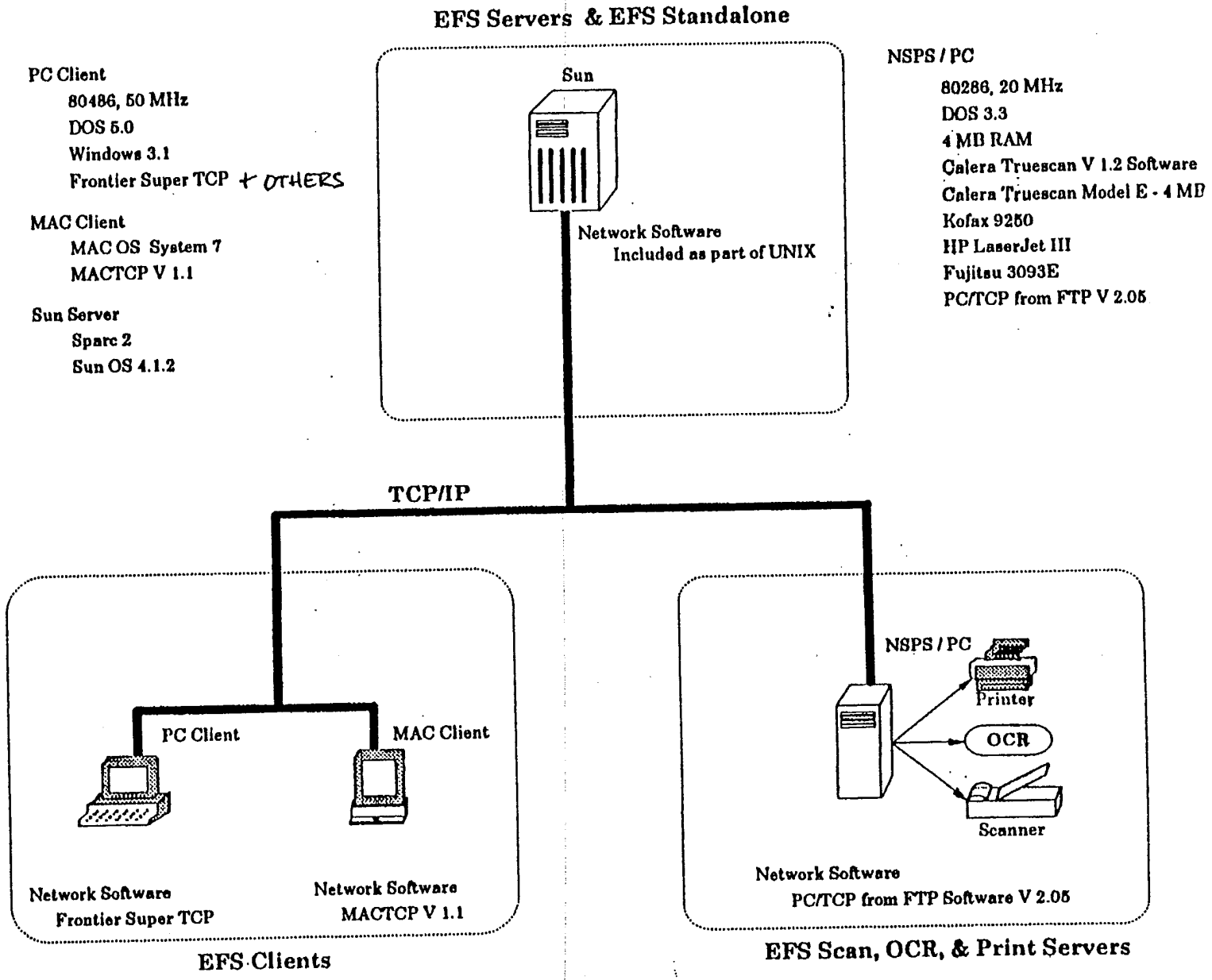


Fig. 5

Optical character recognition is a mission-critical process for most document imaging problems, particularly those that include back-filing of existing paper documents. But even the most advanced OCR technology, working on high quality paper documents, cannot deliver 100 percent accuracy. Consequently, OCR processing errors represent one of the most difficult challenges to successful implementation of document imaging systems. "PixTex/EFS" is the only document imaging solution to overcome the challenge of OCR processing errors. The adaptive pattern recognition engine allows EFS to accurately search raw OCR-processed text with no need for correction, clean-up, or re-keying. As documents are scanned into EFS, text files and their associated image files are automatically linked, and a full-content index is automatically created by the pattern recognition processor. Additionally, documents can be catalogued into a database using a set of user-defined database fields.

Paper documents are input by scanning. Electronic documents can be input from magnetic and optical disk, tape, and modem. Automatic full-content indexing is achieved with Excalibur's pattern recognition engine. Fuzzy searching enables searchers to find documents even if their name and file location are unknown. With Excalibur, a user can find what he/she is looking for even if it is spelled incorrectly, misfiled it, or forgot what it was called. EFS is the only document imaging software that indexes information without costly and time-consuming set-up and pre-processing of text. EFS offers content-based retrieval on the full text of documents, direct access via file room icons, database-style queries, keyword searches on full text, names, and labels, and Boolean searches on full text.

Given the requirements of the Directorate, this report recommends installation of the Excalibur "PixTex/EFS" Electronic Filing System to accomplish the document conversion, automatic indexing, and full text and graphics retrieval and transmission. Using this system, RCPAE will be able to convert its existing paper documents to electronic, computer-searchable format, and make them available to all operations researchers via the LAN and all recruiters or other interested parties via the Internet.

Software Considerations

Not all operations researchers and staff in RCPAE Directorate are DOS users. Some staff members use Macintosh. The inability of these incompatible operating systems to communicate has been a problem in network environments. Recently, Adobe Systems Inc. has released **Acrobat**, a software package that allows computers that have never before been on speaking terms to share documents, pictures, graphics, and a wealth of other data electronically.

Acrobat lets documents cross all computer boundaries, including brand of machine, operating system, display screen, originating program, colors, and even typefaces. The significant feature of Adobe's new software is that the documents will look the same, including graphics and pictures, on every screen and will print out exactly the same. **Acrobat** could eliminate much of the wasted paper in a workplace by allowing a document from one operating system to be electronically transmitted to any other machine, edited, and returned to the originator without the intermediate step of printing.[19]

Optical Storage Technology

Write-once disks are ideal for archiving information because they cannot be erased or overwritten. If a document imaging system (like PixTex/EFS) is used to process paper documents for input into an electronic, searchable format, then permanent archival storage of the electronic documents is achieved through the creation of write-once disks. WORM is best for archiving since it produces an indelible record that cannot be altered; holes are actually burned into the disk by laser. Rewritable drives, best for temporary storage applications, combine magnetic and optical properties and can be erased indefinitely. These disks can provide computer backup, in which the rewritable disks take the place of a tape library. These disks are less vulnerable to physical and electromagnetic corruption than tapes.

Like other types of optical drivers, write-once disks hold huge amounts of data, the equivalent of many filing cabinets of paper or rolls of microfilm. Write-once disks are rugged enough and light enough to be swapped quickly by jukeboxes. Write-once disks also have a long archival life--up to 100 years. One disadvantage is inherent in the design, namely the slow rate of information retrieval. Despite access times of about 60 ms on the fastest drives, write-once disks are still much slower than high-capacity magnetic hard disk drives.

Many Japanese electronics companies, including Hitachi, Mitsubishi, Matsushita, Pioneer, Ricoh, Sony, and Toshiba, market a write-once drive. Domestic vendors include Cherokee, specializing in rugged drives, Literal, LMS (a joint venture of Control Data and Philips), Maxoptics (owned by Maxtor), Optimem, and Shugart.

Sony is the most prominent maker of optical storage. Besides marketing, mastering, and replicating CD-ROMs, Sony is a key source of 5.25-inch and 12-inch write-once disks. It manufactures write-once media, for which it projects an archival life of 100 years, the longest

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[19]John Markoff, "Market Place," *New York Times*, Tuesday, May 25, 1993, D8.

of any vendor.

Pioneer's write-once drive (the DD-5101) provides long-life archival storage with fast data access in an expandable system. The multi-function model DE-S7001 provides archival and rewritable storage on a single medium in a reliable, expandable unit.

Ricoh is the market leader in the write-once optical disk market. The RS-9100H is extremely durable because air flow inside the drive is contained by clear plastic sheets that separate the heads from other drive components. The twin write-once drive--the RS-8200HH -- is compact (easily placed above or beneath a PC) and provides easy copying between cartridges. Ricoh's disk library unit--the RJ-5330E--holds 56 magneto-optical disks for a total storage capacity of 33 GB. Ricoh's rewritable optical disk drive controller surpasses industry standards for average access time (37 milliseconds). Ricoh's years of experience in write-once and rewritable technology have earned it a solid reputation as a reliable supplier of optical storage products. Its rewritable drives support the latest ISO format, making it compatible with a variety of media from different manufacturers. Though its drive prices are slightly higher than competitors, Ricoh provides better performance in most cases. The drives are especially popular with imaging system vendors.

If the Directorate pursues its expressed plan to operate a document imaging system in order to make its studies and reports available to operations researchers and recruiters through the LAN, then a CD-WORM drive and storage unit will be the logical follow-on installation in order to preserve the electronic documents. For purely archival purposes, a write-once disk system will be sufficient. If the Directorate decides to use magneto-optical system as the computer backup system in place of magnetic tape, then a multi-function drive (write-once and rewritable) would be desirable.

The Cost v Benefit for LAN and Information Technologies Upgrades

In the short-term, the cost for upgrading the LAN and related information technology systems will be found in the purchase of the network operating system software. Because RCPAE already has microcomputers equipped with 80386 CPUs, the installation of NetWare v. 3.11 should not immediately involve additional costly upgrades. Communications costs for networks are down from some years ago and, following the pattern of other information-related technologies, will probably continue to drop. There will be no cost savings to be found in staffing positions in the Directorate: no positions are being eliminated with the installation of the LAN. Cost savings will be found, however, in improved efficiency in using Directorate

resources and more productive use of staff time through:

- online searching by all researchers
- better use of technical information specialist resources through specialized, better directed searching
- cost savings in the use of Directorate in-field focus groups and surveys to replace costly contract services
- centralized management of LAN operations
- work groups that are easily established and monitored
- resources (e.g. printers, storage devices) that can be shared.

Additional benefits will be realized through improved communications among staff members at Ft. Knox and with recruiters in the field. Because timely response to queries is a paramount responsibility for Directorate analysts, the ability to perform online searches and communicate electronically with information resource centers will improve mission performance and enhance the Directorate's performance within the Command and the Army.

The Technical Support Office will realize benefits from conversion to electronic formats through more efficient use of library space (digital storage consumes a fraction of the space that paper requires) and more effective use of staff time: maintenance of electronic files requires significantly less time than shelving and re-shelving books and periodicals. Print-on-paper collections have the associated preservation problems (acid paper deterioration, low-temperature storage, proper humidity requirements) that will be reduced with electronic files. While long-term preservation of digital media is an unknown at this stage, once in digital format the materials can be monitored for degradation and copied. Digital formats require significantly less storage space as well. The space allocated to the new library facility is limited. Libraries of all sizes perpetually experience storage problems (recall that one of the trends cited above concerns a forecast for increasing amounts of information in the future). The combination of the compact shelving installation and electronic document storage will help ease the pressure for more space in the future. The Library of Congress estimates that during the period 2001 to 2025, approximately six million volumes will be added to its general collections, an increase of 34 percent. It is further estimated that 50 to 80 percent of that increase will be in digital format and that of the 17,624,000 pieces currently held, perhaps 10 to 20 percent, or 1.7 to 3.5 million pieces, will have been converted to digital format. Considering the Library's projected remote storage costs of $0.83 per item for print-on-paper materials, if 5 million pieces are in digital format by the year 2025, that equals a savings of $4.15 million dollars in off-site storage

costs (in year 2000 dollars when the facility is to be constructed).[20] While RCPAE's Technical Support Office does not face storage problems of the magnitude of the Library of Congress, it is evident that cost savings are to be realized for every library facility when print-on-paper formats are converted to digital. In addition, trend analysis has shown that more and more electronic information is arriving in the workplace. The TSO must be able to deal with this information to make it readily accessible to operations researchers.

The greatest improvement in staff efficiency will come with the ability of individual analysts to conduct their own regular online searches, permitting the TSO staff to concentrate time on those searches requiring specialized expertise. With training and experience in the intricacies of Internet searching and the use of other online database services, the staff of the Technical Support Office will be able to use its time most productively for the Directorate.

IV. PROJECTED PHASES FOR TECHNOLOGICAL UPGRADES

I. Installation of the LAN

This phase would involve installation of the new network. The network selected would include the requisite number of I/O channels in order to accomplish the required statistical processing and 50 microcomputer users on the network. The Technical Support Office server will be upgraded to a 486 CPU and additional memory installed in order to accommodate the network load and heavier staff use. The necessary client software for full accessibility to the Internet (Gopher and WAIS) would also be installed in this phase because all networks should have TCP/IP compatibility. A tape backup system would be added at this time.

II. Document Imaging System

The second phase of the upgrade would include the addition of the document imaging system. This hardware will make it possible for all hard copy documents in the TSO to be converted to electronic format. Once in the electronic environment, the documents can be searchable by operations researchers at their computer workstations or, using Internet File Transfer Protocol (FTP), retrievable by recruiters in the field. Newly created documents would

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[20]Edward A D'Alessandro and David L. Osborne, "Committee on the Study of Future Space Needs for Book Collections," A Report prepared for the Associate Librarian of Congress for Constituent Services, January 1992, p. 60.

be made available on this system, eliminating the need for paper copies unless specifically requested.

III. Optical Storage Installation

In this third and final phase of the modernization plan, an optical storage system would be installed to archive the documents converted from hard copy in the TSO and new documents that need not be printed at all. Once created in RCPAE, these documents would be written to compact disk and made available in the electronic filing system, thereby avoiding the production of paper documents unless a specific request for paper were made. The conversion to an electronic environment should produce a significant reduction in the amount of paper in the Directorate. This installation would include a compact disk library unit (jukebox) for data storage. A decision could be made at this time concerning the need to replace the magnetic tape backup system with a rewritable disk installation.

V. CONCLUSIONS AND RECOMMENDATIONS

Libraries are in a state of transition that reflects the concurrent revolutions occurring in computers, information, and communications. While many library institutions continue to fit the traditional model, many more are rapidly become information resource centers that tap the vast store of information worldwide through online computer searching and tools like the Internet, and transmit that information instantaneously to patrons. The Technical Support Office must modernize its operations, upgrade its technological capabilities, and become more closely integrated with recruiters in the field so that the RCPAE Directorate can fulfill its missions to the Recruiting Command and the U.S. Army more effectively and economically.

TSO will support the Directorate's operations researchers better through an improved LAN that will not shut down when up to 40 simultaneous users perform statistical processing and search online databases. The operations researchers should be able to perform these online data searches at their own workstations, allowing the technical information specialist to pursue more complex searches, keep abreast of the newest information services, and provide research assistance more efficiently throughout the Directorate. In that regard, this report recommends a change in job classification for the nonsupervisory position in TSO from GS-301 (Information Management Specialist) to GS-1410 (Technical Information Specialist/Reference Librarian), a classification that more accurately reflects the duties of this position.

The design of the new, permanent facility should reflect the advantages of the site, namely the natural lighting and shape of the room. Patron work areas (so-called "living edge" or "study edge") should be positioned along the outer window wall to use natural light. Installation of compact shelving and orientation of shelving units at 90 degrees will maximize the limited available space. The modular computer workstations should be placed facing the traffic flow in order to reduce user neck and back strain.

Because operations researchers need rapid search, retrieval, and transmittal of USAREC documents (including the "Blue Tops"), reports and studies in paper copy should be converted to digital format. An automatic filing and indexing system like Excalibur's "PixTex/EFS" will perform this function at state-of-the-art level. Its OCR function and fuzzy searching capability will make USAREC RCPAE Directorate documents instantly available to operations researchers. Electronic back-up can be provided through the installation of an optical storage system. When coupled with an improved network package, analysts will be able to support the mission of the Command more efficiently.

This report recommends selection of a network and appropriate software that will permit

operations researchers to communicate directly with the recruiters in the field, search for and retrieve USAREC documents electronically at their workstations, pass documents for reading and editing between operating systems, search online databases to which the Directorate subscribes, and wander the Internet to search out information wherever in the world it may reside. Four network packages that the Library of Congress uses have been reviewed in this report. The new "Windows NT" advanced server platform is also considered. Because it has not yet been released commercially, any "hands-on" analysis of "Windows NT" is not possible. Technical staff in the RCPAE Directorate will be able to make the necessary decision based on information provided here. The Internet offers a vast array of services and information at virtually no cost to the user. When its next generation, NREN, becomes a reality in the not-too-distant future, services will be greater and data will be transmitted even more rapidly. The global village is becoming smaller, and USAREC should become a more active participant in the world of information.

The USAREC mission to recruit qualified volunteers for the United States Army can be enhanced by the Program Analysis and Evaluation Directorate's goals of rapid and direct communications with recruiters in the field, improved response time to information queries, and access to the most up-to-date data available. These goals will be achieved through the installation of an improved LAN and full Internet use when combined with the requisite software.

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APPENDIX A

SAMPLE POSITION DESCRIPTION

Technical Information Specialist/Reference Librarian, GS-1410-11

Supervision Received

The Technical Information Specialist/Reference Librarian works under the general supervision of the Head, Technical Support Office. Daily and routine tasks are performed independently. The incumbent operates freely in responding to requirements from analysts and operations researchers. Policy and procedural changes are discussed with the Head, Technical Support Office, who keeps incumbent informed of program changes. Work is evaluated for quality and timeliness of support rendered to analysts.

Major Duties

The position is in the Technical Support Office. The Technical Information Specialist/Reference Librarian provides reference support to analytical elements of the Directorate and is responsible for managing the procurement, storage, control, retrieval, and dissemination of assorted graphic and textual materials in support of Directorate programs.

1. Incumbent maintains an intimate knowledge of on-going Directorate programs, confers with Head, Technical Support Office, and operations researchers on new assignments and developments to resolve matters peculiar to a specific subject or area. Has extensive knowledge of library collections. Applies professional judgment in the selection of materials.

2. Maintains an informal but comprehensive referral service for the research staff, using bibliographic tools of the collections, catalogs, publications reviews, on-line databases, etc. Uses human relations skills, tact, and flexibility in providing research assistance.

3. Maintains the in-house Directorate Reference Library, recommending purchases for it and controlling access to it.

4. Advises, directs, and provides on-the-job training to new analysts of the Directorate on reference materials and resources available in the library.

5. By personal contact, establishes and maintains liaison with appropriate agencies and public and academic libraries in the area to assure maximum accessibility of materials and information of value or interest to Directorate programs.

6. Recommends methods for attaining current and projected Directorate objectives in data processing; works closely with management and professional staff to ensure adequacy of hardware and software specifications. Provides technical support for end-users by judging appropriate commercial databases and services to meet the changing requirements of Directorate programs.

APPENDIX B

ONLINE DATABASE SERVICES

COMMITTEE VOTES Contains information on legislation voted upon by full, joint, and select committees of the U.S. Congress. Includes title, bill number, type (e.g. House Council Resolution, House Joint Resolution, House Resolution, House Bill, Senate Bill), Congressional Record number, session number, bill sponsor, chamber of voting committee or subcommittee (House or Senate), committee or subcommittee name, vote and amendment sponsors, a brief description of the vote topic, and vote results by committee, by party, by member, and by state. Information is obtained from committee meeting transcripts. The database covers the 101st Congress (1989) to date with daily updating within five to seven days following activity in Congress. The service is available through Mead Data Central, Inc (as a NEXIS database).

DTIC MATRIS and DGIS The DTIC Manpower and Training Research Information System is an automated online DoD R&D management support database providing a centralized source of unclassified information on planned, ongoing, and recently completed research within the Manpower, Personnel, Training, Simulation, Human Factors, and Safety technology areas. Data sources include summaries and reports from the many R&D laboratories and field activities, as well as MPTS budget documents, such as Congressional Descriptive Summaries. MATRIS provides policy makers, program planners, laboratory managers, and researchers with descriptive and funding data in four Congressional Categories: Manpower and Personnel (MP), Education and Training (ET), Simulation and Training Devices (ST), and Human Factors Engineering (HF). MATRIS services and products are available to registered users of DTIC.

DTIC has various databases available to subscribers, including the Manpower and Training Research Information System (MATRIS) Database, an automated online DoD R&D management support database providing a centralized source of unclassified information on planned, ongoing, and recently completed research within the Manpower, Personnel, Training, Simulation, Human Factors, and Safety technology areas. The Department of Defense Gateway Information System (DGIS), one of DTIC's newest developments, offers access to more than 1,000 unclassified commercial and government databases. DGIS easily connects the user to information resources by offering a vendor from a menu screen; then, upon selection, DGIS automatically dials the phone number and supplies user account information, and logs into the system. DGIS saves time by enabling the user to search multiple databases simultaneously. The search results can be saved by the download feature, which allows users to create their own DGIS files. Post-processing commands permit the merging of results from two or more databases, eliminating duplicate citations. Other commands allow users to review, sort, index, and correlate the data.

ECONOMIC BULLETIN BOARD The Economic Bulletin Board is an on-line source for current economic and trade information from the U.S. Government. Data include the latest statistical releases from the Bureau of Economic Analysis, the Bureau of the Census, the Bureau of Labor Statistics, the Federal Reserve Board, Department of the Treasury, and other Federal agencies. The EBB gives regular access to government reports, for example: U.S. Gross National Product and National Income Accounts, The Employment Situation, Personal Income Statistics, Consumer and Producer Price Indexes, Daily Treasury Statement, Economic Indicators, and many more. EBB files are continually updated and are available within a short time of their official release times. One may search for files among the following general topics: Summaries of Current Economic Conditions, National Income and Product Accounts, Major Economic Indicators, Price and Productivity Data, Foreign Trade Data, Industry Statistics, Employment Data, Special Studies and Reports, Regional Economic Statistics,

Current Business Statistics, Miscellaneous Files. In addition, the EBB provides helpful bulletins, including a calendar of release dates for major federal data programs, and a utilities system to tailor the presentation of on-screen information. A free, limited-access service is available to those who would like to get acquainted with the EBB before subscribing, Call the EBB and type GUEST when prompted for a User ID. Guest users may not download actual files, but are encouraged to read bulletins, including several sample files. The EBB will be coming to Internet in the very near future. It will be available for telnet access via the Internet.

EMPLOYMENT AND EARNINGS The Employment and Earnings database contains approximately 29,000 time series on employment, hours of work, and earnings for the United States. It includes data for about 500 industries at national, state, and local levels including over 200 major labor areas, Standard Metropolitan Statistical Areas, the Virgin Islands, Puerto Rico, and the District of Columbia. Major areas covered are number of employees, average hourly earnings of production workers, average weekly hours of production workers, and average weekly earnings of production workers. Data are collected and compiled from mail questionnaires by BLS, in cooperation with state agencies. The series are based on payroll reports from a sample of establishments employing over 30 million non-agricultural wage and salary workers. The data are produced by the U.S. Department of Labor, Bureau of Labor Statistics and available on General Electric Information Services (GEIS). The time span covered varies by series, but generally 20 years of annual data and 10 years of monthly and quarterly data are available. For a lower cost alternative, see the "Economic Bulletin Board" above.

ERIC The database contains over 700,000 citations, with abstracts, to both the journal and report literature in the field of education and education-related areas. Journal literature corresponds to Current Index to Journals in Education. Report literature corresponds to Resources in Education. Subjects covered include career, adult, vocational, technical, and teacher education; education of the handicapped, disadvantaged, and gifted; early childhood education; junior colleges and higher education; reading and communication skills; languages and linguistics; education management; counseling and personnel services; library and information science; information resources; urban education; rural education and small schools; science, mathematics and environment; social studies and social sciences; and tests, measurement, and evaluation. The database is in English and covers English-language materials. It covers primarily the United States. The database is also available on CD-ROM, magnetic tape, and the Internet.

FEDERAL RESEARCH IN PROGRESS This database, produced by National Technical Information Service (NTIS), contains descriptions of and references to research in progress and recently completed research sponsored primarily by federal government agencies. It covers basic and applied research in all areas of the life, physical, social, behavioral, and engineering sciences. All records include title, principal investigator, performing organization, and sponsoring organization. Records from the Computer Retrieval of Information on Scientific Projects system, provided by U.S. National Institutes of Health (NIH) comprise 60 to 70 percent of the database. Other contributing agencies include the U.S. Department of Agriculture, Department of Energy, NASA, National Institute of Standards and Technology, National Science Foundation, and others. The service is available through DIALOG and is updated monthly.

MEAD DATA CENTRAL INC. Provider of Lexis and Nexis Databases. Nexis contains several news and information publications that may be of interest to RCPAE: *The Washington*

Post, *Financial Times*, "Forbes," "Fortune," Gannett News Service, Heritage Foundation Reports, *The Los Angeles Times*, MacNeil/Lehrer Newshour, *The New York Times*, *San Francisco Chronicle*, *The Seattle Times*, "US News/World Report," *Wall Street Journal*, and *The Washington Times*.

OCLC Produced by the OCLC Online Computer Library Center. OCLC contains cataloging information for books, serials, manuscripts, sound records, audiovisual materials, maps, music scores, and computer-readable files published worldwide. On the standard OCLC service, subscribers use the OCLC Cataloging Subsystem to identify existing cataloging records.

Public Opinion Online Contains over 140,000 questions and responses from public opinion surveys conducted throughout the United States. Polls cover politics, government, public institutions, business, social issues and attitudes, and consumer issues and preferences. Includes such topics as alcohol, crime, education, the elderly, energy, environment, ethics, family, finances, health, housing, minorities, nuclear defense, presidency, religion, science, sex, spending, taxes, television, transportation, war, women, and work. Each record includes text of a single survey question, survey results, organization conducting the survey, subject category, text of question, interview method, number of respondents, etc. Users can retrieve all questions from a particular survey by searching for organization and date of survey. Sources include surveys conducted by such organizations as Gallup, Harris, Roper, Hart, Teeter, Market Opinion Research, AP/Media General, television networks, and major newspapers and magazines. This database is available through DIALOG Information Services.

RAND Corporation Reports are not available in full text through any on-line data service. The reports are indexed and available in summary through the National Technical Information Service (NTIS) and ERIC (see above). The classified reports are available through DTIC DROLS (see above).

APPENDIX C

INTERNET RESOURCES

LC MARVEL (Library of Congress Machine-Assisted Realization of the Virtual Electronic Library) is a simple-to use online gateway to worldwide Internet offerings as well as a source of electronic information about the Library of Congress. (See accompanying information.) Two menu items, "The U.S. Congress" and "Federal Government Information," focus on Internet tools of particular interest to the Congress, for example, congressional directories, searchable committee assignments, the full text of Government Accounting Office reports, the U.S. Constitution, and Supreme Court decisions. Librarians will benefit from easy access to online public library catalogs worldwide in addition to the Library of Congress LOCIS system. The Copyright Office has also made the full text of its circulars and form letters available through LC MARVEL.

Since LC MARVEL uses Gopher software, it is most easily accessed by using a Gopher client. Clients are available for use with DOS, OS/2, Windows, Macintosh, and many other workstations.

The following pages contain information concerning various Internet capabilities and services. The list is not complete because services and databases are being added to the Internet constantly. These pages serve only as samples of the diversity of information available on the Internet. In addition, the following services may be of specific interest to the RCPAE Directorate and can be found on the Internet:[21]

Compression and Archival Software Summary
PC Magazine
UNIX Manual
UNIX Booklist
UNIX Reference Card
WAIS Software Search Sources
ERIC Digests Archive
CARL (Colorado Association of Research Libraries)
Internet Accessible Library Catalogs and Databases
Library Catalogs Accessible Through telnet
Library of Congress Records
RLIN (Research Libraries Information Network)
Internet Mail Guide
CIA World Factbook
Concise Oxford Dictionary
Oxford Dictionary of Quotations

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[21]These resources are taken from Ed Krol, The Whole Internet, O'Reilly & Associates, Sebastopol, California, 1992, 285-331.

LC MARVEL

LIBRARY OF CONGRESS
MACHINE-ASSISTED REALIZATION OF THE VIRTUAL ELECTRONIC LIBRARY

What is LC MARVEL?

LC MARVEL is a Campus-Wide Information System that combines the vast collection of information available about the Library with easy access to diverse electronic resources over the Internet. Its goal is to serve the staff of LC, the U.S. Congress, and constituents throughout the world. It is available on the Internet and uses the Gopher software from the University of Minnesota. Since information offered by the system will be viewed by both staff members and users outside of the Library from workstations with varying ranges of characteristics and capabilities, the format of documents on LC MARVEL will, for the most part, adhere to the "lowest common denominator" -- plain ASCII text. In some cases files will be listed that are not in ASCII format *(i.e., graphic images and computer software programs)* which can be saved, but not viewed through LC MARVEL. In the near future, it may be possible to view images and more richly formatted text.

Availability and How to Connect

LC MARVEL became publicly available over the Internet on July 9, 1993. To access it, telnet to **marvel.loc.gov** and login as **marvel**. This will connect you to the "generic" telnet Gopher client. Initially, only 15 ports will be available to LC staff and Congress for direct telnet connection. However, it is also possible to connect to LC MARVEL using PC-based Gopher client software, or from other Gopher servers by pointing to **marvel.loc.gov, port 2070** *(the 15 user limit does not apply to client access).*

Main Menu

The Main Menu of LC MARVEL consists of the following selections:

1. About LC MARVEL (Please Read First)
2. Library of Congress: Facilities, Activities, and Services
3. Research and Reference
4. Library of Congress Online Systems
5. The U.S. Congress
6. Federal Government Information
7. Services to Libraries and Publishers
8. Copyright
9. Employee Information
10. The Global Electronic Library (by Subject)
11. Other Internet Resources
12. What's New on LC MARVEL

Reporting Comments and Problems

Since LC MARVEL will be under construction for several months, the LC MARVEL Design Team is interested in hearing your comments and reports of any technical problems that may occur. Please send Internet mail to:

lcmarvel@seq1.loc.gov

Who Can Access LC Marvel?

Any LC staff member whose workstation is on the Library's Token Ring network or who has a mail account on the Sequent minicomputer can access LC MARVEL. They must also have TCP/IP software, which varies depending on the operating system you use *(DOS, OS/2, UNIX, or Macintosh)*, installed on their workstation. When using the DOS version of TCP/IP software *(PC/TCP for DOS)* from a machine on the Library's Token Ring, use the following commands to TELNET to LC MARVEL

Type **ibmtr** *<Enter>*
Type **tn marvel** *<Enter>*

Once connected, a login prompt will be displayed. Login as **marvel**. When accessing LC MARVEL from the Sequent, begin by connecting to the Sequent and login. From the Sequent % prompt, use the following command:

Type **telnet marvel** *<Enter>*

Once connected, login as **marvel**. From OS/2 *(for all versions below 2.0)* begin by opening an OS/2 window. From the system prompt:

Type **telnet marvel** *<Enter>*

After connecting, login as **marvel**. Once finished working with LC MARVEL: 1) from DOS, use the command **inet unload** to close out the TCP/IP software prior to executing any other applications; 2) from the Sequent, use the **logout** command to disconnect; and 3) from OS/2, close the OS/2 window. Currently no direct dial-up *(modem)* access is available to LC MARVEL.

Where to Get Gopher Client Software

LC staff who are on the Library's Token Ring will want to acquire and load a Gopher Client on their workstation to guarantee easy and unrestricted access to LC MARVEL. Gopher Clients for the DOS and OS/2 operating systems are available via "anonymous" FTP from the Sequent. They are located in the directory:

/pub/IUG/gopher.clients

The DOS Gopher Clients come with README files that instruct the user on setup and configuration of the software. The OS/2 client is in a single file *(GOPH104.EXE)* which is a "self-extracting .ZIP file". In either case, you must set the transfer to BINARY mode prior to using the GET command to receive the software onto your computer. Once connected to the Sequent, type BIN to change to binary mode.

Walk-up Access to LC MARVEL at the Library

If users are not connected to the Library's Token Ring Network and do not have a Sequent account, and want to try LC MARVEL, walk-up terminals are available in the Madison Building in the following locations:

- **Newspaper and Current Periodicals Reading Room (LM-133).** *The walk-up machine has the DOS-based Gopher client.*
- **The Information Center (IC) of ITS (LM-G51).** *The workstation is numbered W36R in the IC has a menu allowing the user to choose to use the generic TELNET client or the DOS-based Gopher client.*
- **National Demonstration Lab (Madison Atrium).** *Available soon.*

Walk-up stations are not currently available in the Adams and Jefferson Buildings.

Xref: nextsrv1 comp.misc:20037 biz.comp.services:672 news.answers:7823
Path:
nextsrv1!uunet!psgrain!xenitec!news.kei.com!sol.ctr.columbia.edu!math.ohio-state
.edu!uwm.edu!csd4.csd.uwm.edu!yanoff
From: yanoff@csd4.csd.uwm.edu (Scott A. Yanoff)
Newsgroups:
alt.internet.services,comp.misc,biz.comp.services,alt.bbs.internet,news.answers
Subject: Updated Internet Services List
Followup-To: poster
Date: 3 Jun 1993 14:47:51 GMT
Organization: University of Wisconsin - Milwaukee, WI
Lines: 542
Approved: news-answers-request@MIT.Edu
Message-ID: <1ul2unINNa0e@uwm.edu>
NNTP-Posting-Host: 129.89.7.4
Summary: +FingerFun(drink machines), +Almanac(via finger), +SFI BBS, +Gophers
(INFOSLUG and NCSU), +Scrabble, +GO.

Archive-name: internet-services/list

* SPECIAL INTERNET CONNECTIONS: Last Update: 6/3/93 *
* Compiled By: Scott Yanoff - yanoff@csd4.csd.uwm.edu *
* A + by an entry designates new entries/changes to the list since last update
*

* Finger yanoff@csd4.csd.uwm.edu to find ways to receive this list!

** Congratulations to Ed Krol on the success of his book, the best-selling "The Whole Internet", availble from O'Reilly & Associates. You can order books from ORA or ask to receive their new catalog, just call: 1-800-998-9938. Also, you can now order VIA EMAIL from them, just send your email address to: order@ora.com and they will send you a catalog and/or an application. They're the best books around on UNIX, Internet, and X!

-Agricultural Info., Family Issues, Food & Nutrition, and Environment
telnet psupen.psu.edu or telnet 128.118.36.5
PENpages (Login: Enter your two-letter state abbrev.)
telnet caticsuf.csufresno.edu or telnet 129.8.100.15
CSU Freso ATI-NET (Login: super)
telnet eureka.clemson.edu or telnet 130.127.8.3
CUFAN (Clemson U Forestry & Ag. Net.) (Login: PUBLIC)
ftp ftp.sura.net (get file pub/nic/agricultural.list,
it contains agricultural email lists & services.)
offers: Agricultural info (livestock reports, current market prices, etc.)

+Almanac (Daily) finger almanac@halcyon.halcyon.com
offers: Notable birthdays, events in history, and planetary events.

-Almanac mail servers mail almanac@esusda.gov or mail almanac@ecn.purdue.edu
mail almanac@oes.orst.edu or mail almanac@ces.ncsu.edu
mail almanac@silo.ucdavis.edu
offers: USDA market news, articles about the use of computer in agricultural science, and Extension Computing Technology Newsletters.
In body of letter: send guide Other commands: send catalog

-Am. Philos. Assoc. telnet atl.calstate.edu or telnet 130.150.102.33
offers: BBS for APA. (Login: apa)

-Amateur Radio mail info@arrl.org (Also see Ham Radio below)
offers: Ascii files about Amateur Radio and electronics.
In Body of letter: help, info, send <filename> or quit (ie send prospect)

-Archie telnet archie.au or 139.130.4.6 (Aussie)
telnet archie.univie.ac.at or 131.130.1.23 (Austria)
telnet archie.funet.fi or 128.214.6.102 (Finland)
telnet archie.th-darmstadt.de or 130.83.128.111 (Ger.)
telnet archie.kuis.kyoto-u.ac.jp or 130.54.20.1 (Japan)
telnet archie.sogang.ac.kr or 163.239.1.11 (Korea)
telnet archie.nz or 130.195.9.4 (New Zealand)
telnet archie.luth.se or telnet 130.240.18.4 (Sweden)
telnet archie.ncu.edu.tw or telnet 140.115.19.24 (TWN)
telnet archie.doc.ic.ac.uk or 146.169.11.3 (UK/Ireland)
telnet archie.sura.net or 128.167.254.194 (USA [MD])
telnet archie.unl.edu or 129.93.1.14 (USA [NE])
telnet archie.ans.net or 147.225.1.10 (USA [NY])
telnet archie.rutgers.edu or 128.6.18.15 (USA [NJ])
offers: Searches all ftp sites for any program you want. (Login: archie)

-Archie Mail Servers mail archie@<INSERT ONE OF ABOVE ADDRESSES HERE>
Subject: help Offers: alterative Archie access to those w/o ftp or telnet.

-CARL telnet pac.carl.org or 192.54.81.128
offers: Online database, book reviews, magazine fax delivery service.

-Darthmouth Library telnet library.dartmouth.edu or 129.170.16.11
offers: Divine Comedy and reviews. (connect dante)
Read/Find passages in the King James Bible (select file bible)
Read/Find passages in Shakespeare's plays (select file s plays)
Read/Find passages in Shakespeare's sonnets (select file s sonnets)

-DataBase Via Finger finger help@dir.su.oz.au
offers: Query databases on internet, newsgroups, etc via the finger command.

-DUATS telnet duat.gtefsd.com or telnet 131.131.7.105
telnet duats.gtefsd.com or telnet 131.131.7.106
offers: Aviation weather, flight planning. (Login: <last name>)
The first address is for certified pilots, the second for uncertified.

*EDUCATION----------
-FEDIX telnet fedix.fie.com or telnet 192.111.228.33
offers: info. on scholarships, minority assistance, etc. (login: fedix)

-MicroMUSE telnet michael.ai.mit.edu or telnet 18.43.0.177
offers: Educational Multi-User Simulated Environment. (Login: guest).

-MOLIS telnet fedix.fie.com or telnet 192.111.228.33
offers: Minority Online Information Service. (Login: molis)

-Nat'l Education BBS telnet nebbs.nersc.gov or telnet 128.55.160.162
offers: A limited-access system for NESP educators. (Login: guest)

-Newton telnet newton.dep.anl.gov or telnet 130.202.92.50
offers: BBS for those teaching/studying sci., CS, math. (Login: cocotext)

-Fileserver via Email mail jal@uiuc.edu
offers: Humor, ASCII, etc. At begining of line in message: Filesend: help

-Finger through Telnet telnet site 79 (example: telnet csd4.csd.uwm.edu 79)
"site" is the place you are fingering. Once connected, type the username.

-Freenet telnet freenet-in-[a,b,c].cwru.edu or 129.22.8.38
telnet yfn.ysu.edu or 192.55.234.27 (Login: visitor)
offers: USA Today Headline News, Sports, etc...

-FTP Mail mail ftpmail@decwrl.dec.com
Subject:(hit return) Body-of-letter: help (return) quit Offers:ftp via email
mail ftpmail@grasp.insa-lyon.fr
Body-of-letter: help. Please, European users only.
mail bitftp@pucc.princeton.edu
mail BITFTP@DEARN or to BITFTP@vm.gmd.de (Europe only)
Body-of-letter: help or ftplist for a list of anon. ftp sites.

-FTP Sites/Archives ftp ocf.berkeley.edu or ftp 128.32.184.254
offers: Docs, 5 puritytests, the Bible, Dec. of Ind, lyrics..cd /pub/Library
ftp wuarchive.wustl.edu or ftp sunset.cse.nau.edu
offers: Gifs, Sights, & Sounds! ftp sounds.sdsu.edu for the sounds archive.
ftp ftp.uu.net
offers: You name it, it's here!

ftp archive.umich.edu or sumex-aim.stanford.edu
offers: Software for MS-Dos computers, Mac, Amiga, Apple2, Apollo...
ftp oak.oakland.edu
offers: A huge software archive for PCs and UNIX.
ftp ftp.sura.net
offers: How-to's about internet(how to email, ftp, telnet, etc.) in /pub/nic
ftp cathouse.aiss.uiuc.edu
offers: All the text/humor files you'd want (tv, sex..) cd misc/fun/humor

*GAMES/RECRETATIONAL/FUN----------

-Backgammon Servers telnet ouzo.rog.rwth-aachen.de 8765
offers: Play Backgammon! (Login: guest) Also telnet 134.130.130.46 8765

-Chat Clients ftp ftp.santafe.edu (4M Chat Service: cd pub/misc)
ftp csd4.csd.uwm.edu (ICB Chat Service: cd pub/tjk)
ftp cs.bu.edu (IRC Chat Service: cd /irc/clients)
Get chat client program from ftp sites, compile program (make) and execute.

-Chess Server telnet aragorn.andrew.cmu.edu 5000 or 128.2.35.185 5000
offers: Play/watch real-time chess w/ human opponents. Type 'help' for help

-Cookie Server telnet astro.temple.edu 12345 or telnet 129.32.1.100
offers: Funny quote or saying everytime you telnet there.

-Diplomacy mail judge@morrolan.eff.org or judge@dipvax.dsto.gov.au
mail judge@shrike.und.ac.za or judge@u.washington.edu
offers: Play the Avalon Hill game Diplomacy via email. Body-of-letter: help
Note: No new games are forming on the u.washington Judge, but substitute players are still needed.

+Fingers for Fun finger coke@cmu.edu also finger drink@drink.csh.rit.edu
finger info or graph@drink.csh.rit.edu
+finger coke@gu.uwa.edu.au
offers: Status of drink and candy machines for fun.

+GO Server telnet hellspark.wharton.upenn.edu 6969 or 128.91.11.53
telnet ftp.pasteur.fr 6969 or 157.99.64.2 6969
offers: Join others and play a game of GO.(Login/Password: choose your own)

-IRC Telnet Client telnet hastur.cc.edu or telnet 140.104.9.69
?telnet bradenville.andrew.cmu.edu or telnet 128.2.54.2
offers: Internet Relay Chat. (Login: irc) (See Chat Clients above)

+Scrabble telnet 134.53.14.112 7777
offers: The popular Milton Bradley board game.

-Trade Wars telnet harmony.cern.ch 2002 or 128.141.237.19 2002
offers: Play the online multiplayer game on Trade Wars World BBS.

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*GEOPHYSICAL/GEOGRAPHICAL/GEOLOGICAL----------

-Earthquake Info. finger quake@geophys.washington.edu or 128.95.16.50
telnet geophys.washington.edu (Login/password: quake)
offers: Recent quake info (location, time, magnitude, etc.)

-Geographic Server telnet martini.eecs.umich.edu 3000 or 141.212.99.9 3000
offers: Info by city or area code (Population, Lat./Long., Elevation, etc).

-Global Land Info Sys telnet glis.cr.usgs.gov or telnet 152.61.192.54
offers:Land use maps of U.S., graphs/data of geological info.(Login: guest)

-Gopher telnet consultant.micro.umn.edu or telnet 134.84.132.4
telnet gopher.msu.edu or telnet 35.8.2.61
+telnet twosocks.ces.ncsu.edu or telnet 152.1.45.21
telnet cat.ohiolink.edu or telnet 130.108.120.25
telnet ENVIROLINK.hss.cmu.edu (password: envirolink)
telnet wsuaix.csc.wsu.edu / 134.121.1.40(Logn: wsuinfo)
telnet arx.adp.wisc.edu (Login: wiscinfo)
+telnet scilibx.ucsc.edu or 128.114.143.4 (INFOSLUG)
telnet sunsite.unc.edu or telnet 152.2.22.81
telnet gopher.uiuc.edu or telnet 128.174.33.160
telnet panda.uiowa.edu or telnet 128.255.40.201
telnet grits.valdosta.peachnet.edu or 131.144.8.206
telnet gopher.virginia.edu or 128.143.22.36(logn: gwis)
telnet gopher.ORA.com or telnet 140.186.65.25
telnet finfo.tu-graz.ac.at or 129.27.2.4 (Login: info)
telnet info.anu.edu.au or telnet 150.203.84.20 (Aussie)
telnet nstn.ns.ca or 137.186.128.11 (login: fred)
telnet tolten.puc.cl or telnet 146.155.1.16 (Chile)
telnet gopher.denet.dk or telnet 129.142.6.66 (Denmark)
telnet gopher.th-darmstadt.de or telnet 130.83.55.75
telnet ecnet.ec or telnet 157.100.45.2
telnet ecosys.drdr.virginia.edu or 128.143.86.233
telnet gopher.isnet.is or telnet 130.208.165.63
telnet siam.mi.cnr.it or telnet 155.253.1.40 (Italy)
telnet sunic.sunet.se or telnet 192.36.125.2 (Sweden)
telnet gopher.chalmers.se or 129.16.221.40 (Sweden)
telnet info.brad.ac.uk or 143.53.2.5 (login: info)
Offers: access to other services, gophers, documents, etc. (Login: gopher)

-Ham Radio Callbooks telnet callsign.cs.buffalo.edu 2000 / 128.205.32.2 2000

telnet ham.njit.edu 2000 or telnet 128.235.1.10 2000
offers: National ham radio call-sign callbook. (See Amateur Radio above)

-History Databases telnet ukanaix.cc.ukans.edu or telnet 129.237.1.30
offers: History databases (Login: history) and CIS info (Login: ex-ussr)

-HP Calculator BBS telnet hpcvbbs.cv.hp.com or telnet 15.255.72.16
offers: BBS for HP Calc. users, with chat mode. (Login: new)

-Hpcwire telnet hpcwire.ans.net or telnet 147.225.1.51
offers: Excellent menu-driven information searches. (Login: hpcwire)

-Hytelnet Server telnet access.usask.ca or telnet 128.233.3.1
telnet info.anu.edu.au or telnet 150.203.84.20(library)
offers: univ. & library catalogues around the world. (Login: hytelnet)

-INFO - Rutgers CWIS telnet info.rutgers.edu or telnet 128.6.26.25
offers: (Dictionary, Thesurus, Quotations Database) Recommend select LIBRARY

-Internet Resrce Guide ftp nnsc.nsf.net
offers: compressed/tar'd list of net resources in /resource-guide.txt.tar.Z

-InterNIC telnet rs.internic.net or telnet 198.41.0.5
offers: Gopher, WAIS, Whois, finger, TONS of Internet info, book orders, etc

-Iowa Politcl. Stk Mkt telnet ipsm.biz.uiowa.edu or 128.255.44.2
offers: Buy & sell shares in political candidates. (Non profit research proj)

-IP Address Resolver mail resolve@cs.widener.edu
mail dns@grasp.insa-lyon.fr (body of letter: help)
usage: in body-of-letter: site <address here> Mails you IP address of site.

-ISAAC telnet isaac.engr.washington.edu or 128.95.32.61
offers: Info. System for Advanced Academic Computing, for IBM users.

*LAW----------

-Gopher LAW Servers telnet fatty.LAW.cornell.edu or telnet 132.236.108.5
telnet gopher.LAW.csuohio.edu or telnet 137.148.22.51

-Law Library telnet liberty.uc.wlu.edu or telnet 137.113.10.35
ftp sulaw.law.su.oz.au (cd /pub/law)
offers: Law libraries and legal research. (Login: lawlib)
Offers copies of laws for each state/computer laws, and more!

-LawNet telnet sparc-1.law.columbia.edu or telnet 128.59.176.78
offers: Law/Judicial info and catalogs access. (Login: lawnet)

-Supreme Court Rulings ftp ftp.cwru.edu
offers: ASCII files of Supreme Court rulings in directory /hermes

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-Library Catalogs ftp dla.ucop.edu (pub/internet/libcat-guide)
offers: "Library Catalogs on the Internet: Strategies for Selection and Use" document (how, but not where; also get one of the following).
ftp ftp.unt.edu (library/libraries.txt)
offers: "Accessing Bibliographic Databases" document.
ftp ariel.unm.edu (library/internet.library)
offers: "Internet-Accessible Catalogs and Databases" document.

-Library of Congress telnet locis.loc.gov or telnet 140.147.254.3
offers: Library of Congress Information System (LOCIS) Offers access to lib. of congress, legislative info, and copyright info.

-LIBS telnet nessie.cc.wwu.edu or telnet 140.160.240.11
telnet info.anu.edu.au or telnet 150.203.84.20
offers: Access to nearly all online services seen in this list.(Login: LIBS)

-List of Lists ftp ftp.nisc.sri.com or ftp 192.33.33.22
offers: List of interest groups/email lists in /netinfo/interest-groups.

*MEDICAL/HEALTH----------

-CancerNet mail cancernet@icicb.nci.nih.gov / gopher gopher.nih.gov
offers: Cancer info. statements thru email. Body-of-letter:help or spanish

-CHAT telnet debra.dgbt.doc.ca or telnet 142.92.36.15
offers:Interactive AIDS & Epilepsy docs,simulated conversation(Login: chat)

-Educational Tech Net telnet etnet.nlm.nih.gov or telnet 130.14.10.123
offers:Forums and discussion groups on medical tech. and edu.(Login: etnet)

?FDA BBS telnet fdabbs.fda.gov or telnet 150.148.8.48
offers: FDA bbs (News releases, Aids info, consumer info...) (Login: bbs)

-Genetics Bank mail gene-server@bchs.uh.edu
mail retrieve@ncbi.nlm.nih.gov
mail blast@ncbi.nlm.nih.gov
Subject: help Offers: genetic database/nucleic acid/protein sequence.

-Handicap/Med. Site ftp handicap.shel.isc-br.com or ftp 129.189.4.184
offers: anonymous ftp of software and medical info.

-Monochrome telnet mono.city.ac.uk or telnet 138.40.17.1
offers: Multi-user messaging system (w/ chat) (Login/Password: mono)

*MUSIC----------

-Billboard Charts finger buckmr@rpi.edu
offers: U.S. Top Pop singles for the week.

-Guitar Chords/TAB ftp ftp.nevada.edu or ftp 131.216.1.11
offers: Tablature/Chords for guitar in /pub/guitar. Also at ftp.uu.net

-Lyric/Music Server ftp ftp.uwp.edu or ftp ftp.iastate.edu (in /pub/lyrics)
offers: Lyrics, chords/tablature, and music pictures. (/pub/music/...)

-Music Newsletter mail listserv@vm.marist.edu (internet) or
mail listserv@marist (bitnet)
Body-of-letter: SUBSCRIBE UPNEWS <your full name> Offers: Reviews, intviews

-Rock/Metl Lyric Quiz finger gim@139.133.202.141 or gim@139.133.202.142
offers: Finger for Rock/Metal Lyrics Quiz. Recommend pipe through more.

-Sid's Music Server mail mwilkenf@silver.ucs.indiana.edu
Subject: BOOTHELP Offers: Lists of rare live recordings, cd's for sale.

-Used Music Server mail Used-Music-Server@cs.ucsb.edu w/ subject: help
offers: Users can buy/sell/trade CDs/LPs/Tapes or subscribe to the list.

-Music List of Lists mail mlol-request@wariat.org (music list of lists)

-News Mail Servers mail [newsgroup]@cs.utexas.edu
offers: Post to Usenet news via email. (eg. [newsgroup] = alt-bbs)

-NICOL telnet nisc.jvnc.net or telnet 128.121.50.7
offers:Access to internet resources, Elec. Publishing Service (Login: nicol)

-NICOLAS telnet dftnic.gsfc.nasa.gov or telnet 128.183.10.3
offers: Network Info. Center On-Line Aid System (Login: dftnic)

-Nielsen TV Ratings finger normg@halcyon.halcyon.com
offers: Weekly TV ratings according to the Nielsen rating system.

-NNTP News Servers telnet quip.eecs.umich.edu 119 or 141.212.99.8 119
telnet vaxc.cc.monash.edu.au 119 or 130.194.1.23 119
telnet suntan.ec.usf.edu 119 or 131.247.10.40 119
telnet munnari.oz.au 119 or 128.250.1.21 119 (AUSSIE)

telnet etl.go.jp 119 or 192.31.197.33 119 (JAPAN)
telnet telnet news.fu-berlin.de 119 (GERMANY)
offers: Telnetable access to post to the Usenet news.

-Oracle mail oracle@cs.indiana.edu w/ subject: help
offers: The Usenet Oracle answers all your questions!

-OSS-IS ftp soaf1.ssa.gov
mail info@soaf1.ssa.gov with "send index" as your msg.
offers: Many FAQ's, ftp lists, library and service lists, gov't documents.

-Project Gutenberg ftp mrcnext.cso.uiuc.edu or ftp 128.174.201.12
offers: Many books in print and almanac files. cd pub/etext

-Public-Access Unix telnet nyx.cs.du.edu or 130.253.192.68
offers: Free account, with access to various UNIX features. (login: new)

-Public-Access Unix telnet hermes.merit.edu or telnet 35.1.48.150
telnet m-net.ann-arbor.mi.us or telnet 35.208.17.4
(Which host: um-m-net Enter 'g' for guest. login: newuser)

-Queer Resource Dir. ftp nifty.andrew.cmu.edu
offers: AIDS info/gay rights info. Recommen get file: README (cd pub/QRD)

-QUERRI telnet isn.rdns.iastate.edu or telnet 129.186.99.13
offers: Questions on Univ. Extension. Regional Research Info (Login: querri)

-Recipe Archives ftp gatekeeper.dec.com (cd pub/recipes)
ftp mthvax.cs.miami.edu (cd pub/recipes)
offers: Anonymous ftp site for MANY food recipes.

*SCIENCE/MATH----------
-E-Math telnet e-math.ams.com or 130.44.1.100
offers:Am. Math. Soc. bbs w/ software and reviews. (Login/Password: e-math)

-NetLib mail netlib@ornl.gov or mail netlib@uunet.uu.net
offers:Math (usually Fortran) programs via email Body-of-letter: send index
-Nuclear Data Center telnet bnlnd2.dne.bnl.gov or telnet 130.199.112.132
offers: National nuclear data. (Login: nndc)

-StatLib Server mail statlib@lib.stat.cmu.edu
Mail with line: send index. Offers:Prgms, Datasets, etc. for statisticians.

-STIS telnet stis.nsf.gov or 128.150.195.40
offers: Science & Technology Information System. (Login: public)

-SERVICES telnet wugate.wustl.edu or telnet 128.252.120.1
offers: Access to nearly every listed service! (Login: services)

+SFI BBS telnet bbs.santafe.edu or 192.12.12.6 (login: bbs)
offers: Research BBS provides access to info. on Complex Systems.

*SOFTWARE/Information SERVERS----------
-Info/Software Server telnet rusinfo.rus.uni-stuttgart.de or 129.69.1.12
offers: journals, unix stuff, recipes, online cookbook, etc. login: info

-Software Server(ASK) telnet askhp.ask.uni-karlsruhe.de or 129.13.200.33
offers: On-line software search. (Login/password: ask)

-ZIB Electronic Libr. telnet elib.zib-berlin.de or telnet 130.73.108.11
offers: Library of software, links to other libraries. (Login: elib)
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*SPACE/ASTRONOMY----------
-Lunar/Planet Instit. telnet lpi.jsc.nasa.gov or telnet 192.101.147.11
offers: Resources on Geology, Geophys, Astron., Astrophys. (Login: lpi)

-NASA Headline News finger nasanews@space.mit.edu
offers: Daily press releases from NASA.

-NASA SpaceLink telnet spacelink.msfc.nasa.gov or telnet 192.149.89.61
offers: Latest NASA news, including shuttle launches and satellite updates.

-NED telnet ned.ipac.caltech.edu or telnet 134.4.10.118
offers: NASA Extragalactic Database. Bibbliographies, info. (Login: ned)

-NODIS telnet nssdc.gsfc.nasa.gov or telnet 128.183.36.25
telnet nssdca.gsfc.nasa.gov or telnet 128.183.36.23
offers:Menu-driven access to Nat'l Space Science Data Center (Login: nodis)

-SpaceMet telnet spacemet.phast.umass.edu or 128.119.50.48
offers: Science/space bbs about space exploration w/ info from NASA.

-SDDAS telnet espsun.space.swri.edu 540 or 129.162.150.99 540
offers: SW Research Data Display & Analysis Center.
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*SPORTS----------
-Baseball Scores finger jtchern@sandstorm.berkeley.edu
offers: Mail subscription available soon!

-Sports Schedules NBA: telnet culine.colorado.edu 859 / 128.138.129.83 859
NHL: telnet culine.colorado.edu 860 / 128.138.129.83 860
MLB: telnet culine.colorado.edu 862 / 128.138.129.83 862
NFL: telnet culine.colorado.edu 863 / 128.138.129.83 863
offers: Sports schedules on-line. help for help, return for today's games.

-Stock Market Report telnet a2i.rahul.net or telnet 192.160.13.1
offers: Public access unix for a fee, market report is free! (Login: guest)

-Travel Info. Library ftp ccu.umanitoba.ca or ftp 130.179.16.8
offers: Travelogues, guides, FAQs. cd to the directory: /pub/rec-travel

-UMD Info Database telnet info.umd.edu or telnet 128.8.10.29
offers: Info. docs on many subjects, incl. Supr. Crt Decisions (Login: info)

-UNC BBS telnet launchpad.unc.edu or telnet 152.2.22.80
offers: Access to Library of Congress & nationwide libs (Login: launch)

*USER LOOKUP SERVICES/WHOIS SERVICES----------
-Mail Srvr/Usr Lookup mail mail-server@rtfm.mit.edu
in body of mail message: send usenet-addresses/[name searching for]

-Netfind User Lookup telnet bruno.cs.colorado.edu or telnet 128.138.243.151
telnet mudhoney.micro.umn.edu or telnet 134.84.132.7
telnet redmont.cis.uab.edu or telnet 138.26.64.4
telnet netfind.oc.com or telnet 192.82.215.92
telnet archie.au or telnet 139.130.4.6
telnet malloco.ing.puc.cl or telnet 146.155.1.43
telnet nic.uakom.cs or telnet 192.108.131.12
telnet lincoln.technet.sg or telnet 192.169.33.6
telnet monolith.cc.ic.ac.uk or telnet 155.198.5.3
telnet dino.conicit.ve or telnet 150.188.1.10
offers: Given a name and org./school, finds a user for you (login: netfind)

-Whois Service List ftp sipb.mit.edu (pub/whois/whois-servers.list)
offers: List of "whois" servers.

-Whois Services telnet rs.internic.net or telnet 198.41.0.5
mail service@rs.internic.net (w/ subject: help OR
send RFC-xxxx.TXT, with xxxx being the RFC number)
telnet cnri.reston.va.us 185 (Knowbot Info Serv.)
offers: Way to find internet address given a keyword. To access type: whois

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-UUCP map entries by mail: mail dns@grasp.insa-lyon.fr (body: help)

usage: in body-of-letter: uucp uucp_site Mails you UUCP map entry

-WAIStation telnet quake.think.com or telnet 192.31.181.1
telnet SWAIS.CWIS.UCI.EDU or 128.200.15.2
telnet sunsite.unc.edu or telnet 152.2.22.81
telnet nnsc.nsf.net or 128.89.1.178 (Login: wais)
telnet info.funet.fi or 128.214.6.100 (Login: info)
offers: Wide Area Info. Service. (Login: swais)

*WEATHER/ATMOSPHERIC/OCEANIC----------
-Auroral/Solar Report finger aurora@xi.uleth.ca or finger aurora@142.66.3.29
finger solar@xi.uleth.ca or finger solar@142.66.3.29
finger daily@xi.uleth.ca or finger daily@142.66.3.29
offers: Auroral activity warnings/watches/sightings, updated hourly.
Solar = 3-Hourly solar & Geophysical report, daily is the daily one

-NOAA telnet nodc.nodc.noaa.gov or telnet 140.90.235.10
offers: Nat'l Oceanic and Atmos. Admin. Lots of data! (Login: NOAADIR)

-Oceanic Info. Center telnet delocn.udel.edu or telnet 128.175.24.1
(Login: info)

-Tropicl Strm Forecst finger forecast@typhoon.atmos.colostate.edu
offers: Seasonal forecast for Atl. Ocn. Also: finger forecast@129.82.107.24

-Weather Service telnet downwind.sprl.umich.edu 3000 or 141.212.196.177
offers: City/State forecasts, ski conditions, earthquake reports, etc.

-Weather Maps ftp vmd.cso.uiuc.edu
offers: Surface analysis & current infrared weather maps GIFs. (cd wx)

-Webster Dict. Servers telnet cs.indiana.edu 2627 or 129.79.254.191 2627
telnet chem.ucsd.edu or 132.239.68.1 (login: webster)
offers: Dictionary/Spelling service. Type "HELP" for info. (ALL CAPS!)

-White House Releases mail Clinton-Info@Campaign92.Org with the subject: Help
offers: Subscribe to White House press releases (news, speeches, etc.)

-World-Wide Web telnet www.njit.edu or telnet 128.235.163.2 (USA [NJ])
telnet FATTY.LAW.CORNELL.EDU or telnet 132.236.108.5
telnet info.cern.ch or telnet 128.141.201.74 (SWISS)
telnet vms.huji.ac.il or telnet 128.139.4.3 (ISRAEL)
telnet ukanaix.cc.ukans.edu or 129.237.1.30 (USA[KA])
offers: Access to various documents, lists, and services. (Login: www)

* NOTE: NO LOGIN NAMES OR PASSWORDS ARE REQUIRED UNLESS STATED OTHERWISE! *
NOTE: FOR FTP SITES, LOGIN AS anonymous, Password is your email address.
* (C) 1993. No CHANGES are to be made to this document without the author's written consent. Reproduction/distribution without my permission IS ALLOWABLE so long as this document is left fully intact.

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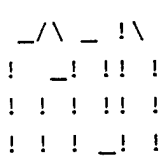

Milwaukee, WI - A Great Place On a Great Lake

Computing Services Division - MAINFRAME CONSULTING

yanoff@csd4.csd.uwm.edu

Newsgroups: comp.internet.library
Path:
nextsrv1!uunet!s850.mwc.edu!uvaarpa!caen!nigel.msen.com!yale.edu!xlink.net!howland.reston.ans.net!darwin.sura.net!sgiblab!adagio.panasonic.com!chorus.mei!oskgate0.mei!wnoc-kyo!sh.wide!sfc-keio-news!takefuji
From: takefuji@sfc.keio.ac.jp (Yoshiyasu Takefuji)
Subject: Text-search software inquiry
Sender: news@sfc.keio.ac.jp
Organization: Keio University Shonan Fujisawa Campus.
Date: Thu, 10 Jun 1993 02:33:44 GMT

From: howitt@radburn.jvnc.net (Doran Howitt)
Date: Tue, 08 Jun 93 20:33:12 EDT
Subject: Text-search software inquiry

Investigation of Advanced Text-Search Software

I'm participating in the design of an advanced text-searching application. We want to base it on one of the commercially available text-search "engines." While WAIS is one candidate for the engine, we want to evaluate other programs and understand their strengths and weaknesses in comparison to WAIS.

Thus I'd like to hear from others knowledgeable about the products listed below. I'd be happy to summarize the input I receive and e-mail it to interested parties or to any suggested newsgroup. I'm not necessarily monitoring the newsgroup that you see this on, so please e-mail your comments to me at: howitt@radburn.jvnc.net

We're interested in systems that provide what I call "beyond Boolean" capabilities. We would NOT be satisfied with traditional plain-vanilla Boolean searching as implemented in Folio Views, Lotus Magellan, Basis Plus, BRS/Search, Fulcrum Ful/Text, Henco Synchrony, and many others. The advanced features we're looking for might encompass one or more of these:

- Ranking or scoring of search results;
- Quorum searching;
- Weighting;
- Fuzzy searching;
- Phoneme searching;
- Morpheme searching;
- Natural Language query;
- Query by example.

Following are products I've identified that offer such capabilities. (I'd appreciate hearing about any other products that belong on the list.)

Advanced Text-Search Software (capabilities "beyond Boolean")

(Company Name - Product Name)

Ardilog - Naturel
AskSam Systems - AskSam
Caere - PageKeeper
Conquest Software - Conquest
Excalibur - Savvy/TRS
Information Access Systems - Integrated Text Management System
NDX - Creatabase
Personal Library Software - Personal Librarian
Third Eye Software - Elixir
Thunderstone - Metamorph
Verity - Topic
WAIS Inc. - WAIS
Zylab - Zyindex (ver. 5.0)

These programs use a mix of search techniques/algorithms including statistical, vector-space, and linguistic. Within each of those three categories there are many variations. We're especially interested in understanding what the programs are really doing when they evaluate a query.

In other words, we don't particulary want to use anybody's black box. In my experience, each approach has strengths and weaknesses, depending on the application. What query techniques have you found to be useful, or not useful? What combination of techniques is especially good? For what applications?

There probably aren't easy answers to all this, but I look forward to corresponding about these issues with others involved in this sort of thing.

howitt@radburn.jvnc.net
Doran Howitt, Managing Partner
The Radburn Group
PO Box 1130, Fair Lawn, NJ 07410-8130 USA
Tel. 201-796-6151

Newsgroups: alt.internet.services,alt.answers,news.answers
Path: nextsrv1!uunet!haven.umd.edu!darwin.sura.net!sgiblab!a2i!news
From: savetz@rahul.net (Kevin Savetz)
Subject: Internet Services Frequently Asked Questions & Answers (FAQ)
Sender: news@rahul.net (Usenet News)
Reply-To: savetz@rahul.net
Organization: a2i network
Date: Mon, 5 Jul 1993 10:00:09 GMT

Archive-name: internet-services/faq
Last-Modified: 1993/7/2
Version: 1.0

INTERNET SERVICES FREQUENTLY ASKED QUESTIONS AND ANSWERS

Version 1.0 - 2 July, 1993

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*** CHANGES IN THIS VERSION:
2.1: E-mail: Added Express Access
2.2: telnet: Added Express Access
2.3: Contact: Added Express Access
3.3: BBSes: Added info about NIXPUB.
3.4: Internet Books: Added Internet Primer for Information Professionals. Updated info on Internet Compantion, Zen, Internet: Getting Started, Whole Internet.

*** HOW AM I DRIVING?
This document is new and in transition. If you notice that a frequently asked question is missing, please send it (and the answer!) to the editor for inclusion in this article.

Text in [square brackets] indicates unanswered questions and problems in this document. If you know the answer or have a comment, e-mail the editor. Please help me out and send it answers to some unanswered questions - for this FAQ, the best answers are _brief_ ones followed by information on where to go for more detailed information.

[What questions should be here but aren't?]
[1. What are mailing lists? What is a listserver, etc?]
[2. How big is the Internet?]
[Does anyone want to do either of these?]

[I have info for: "How do I access the Federal Register?" Gotta add it to the FAQ.]

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1.3: What is Usenet?
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1.6: What is Alex/Archie/Gopher/Hytelnet/Netfind/Prospero/
Veronica/WAIS/WHOIS/WWW/X.500?
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3.2: Is there a list of all the Internet services?
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3.5: How do I get information about the Internet online?

SECTION 0: THE BASICS
*** 0.1: WHAT IS THE PURPOSE OF THIS DOCUMENT?
The Internet Services Frequently Asked Questions and Answers List (FAQ) is intended to help reduce the number of often asked questions that appear on the newsgroup "alt.internet.services". It helps users with questions by providing instant access to their answers; it helps other readers of the newsgroup, who will have to read fewer of the questions they see over and over again; it helps everyone by (hopefully) reducing bandwidth.

This document should help you find answers to frequently asked questions. Usually, the answers are already available on the Net in one or more detailed documents. In these cases, this document will tell the reader where to find the information in question. Thus, when possible, this document will only point you to another document - that one may have the information you need, or it may point you somewhere else. (This may seem annoying at first, but offers multiple benefits. First, it reduces duplicated work. Second, it increases your chances of finding the most current, reliable information. Most importantly, it shows _how_ to find the information you need rather than simply giving you answers. "Teach a man to fish...")

This FAQ is purely a volunteer effort. Although every effort has been made to insure that answers are as accurate as possible, no guarantee is implied or intended. The editor and contributors have developed this FAQ as a service to Usenet. We hope you find it useful.

Please send your corrections, questions, and comments to the editor, Kevin Savetz, at "savetz@rahul.net" (Internet) or "savetz" (America Online.) Please indicate what version of this document you are referring to.

This file is posted weekly to the newsgroup "alt.internet.services" (on the 5th, 12th, 19th and 26th of each month) and posted twice monthly to "news.answers" and "alt.answers" (on the 5th and 19th.) It is also available via anonymous FTP:
rtfm.mit.edu:/pub/usenet/news.answers/internet-services/faq

This means to use FTP to open a connection to "rtfm.mit.edu", login as "anonymous", and use your e-mail address as the password. Then, "cd" to the directory "/pub/usenet/news.answers/internet-services" and get the file "faq". This notation is used when appropriate throughout this document. [If I did it right, users of WWW (I think) should be able to point-and-shoot to get listed documents. Someone tell me if it works!]

If you do not have FTP access, you can obtain it via email by sending an email message to "mail-server@rtfm.mit.edu" with a line in the body of the message reading "send usenet/news.answers/internet-services/faq". A program at that address will read your mail, process your request, and reply with mail containing the FAQ.

*** 0.2: WHAT IS ALT.INTERNET.SERVICES?
The following is excerpted from Scott McMahn's (mcmahan@cs.unca.edu) "Welcome to alt.internet.services" charter. [Where on the Net is the full charter available?]

The newsgroup "alt.internet.services" was created to handle information about services available on the Internet, for people who have Internet accounts and want to explore beyond their local computers, to take advantage of the wealth of information and services on the net.

Services for discussion include:
* things you can telnet to (weather, databases, library catalogs...)
* things you can FTP (pictures, sounds, programs, data...)
* clients/servers (like MUDs, IRC, Archie...)

"alt.internet.services" isn't for:
* discussion of utility programs like telnet, FTP, mail, and uudecode.
* basic new user questions.
* pleas for Internet access. (Use alt.internet.access.wanted for this.)

This is *NOT* alt.internet.help, alt.internet.access.wanted, or alt.internet.new-users. Before asking a question here:
* Ask someone locally! Try the guy siting next to you, your professor, or the system administrator. 9 times out of 10 you

won't have to post your question.
* Read the Usenet groups "news.newusers.questions" and "news.announce.newusers".
* Look through your .newsrc file for a more appropriate group. Questions about mail can go to "comp.mail.misc". Questions about access can go to "alt.internet.access.wanted". And so on. alt.internet.services is *not* some kind of default group to go to if you can't find any others.
* Ask yourself: Is this question about a service I can access through the Internet? If so, post.

*** 0.3: I'M NEW TO THE INTERNET. WHERE DO I START?
Welcome to the wonderful world of the Internet. Although this document may answer some of your basic questions, the Usenet newsgroup "alt.internet.services" isn't the place for questions like "How do I use telnet on my system?" or "How do I send electronic mail?" If you have access to the Usenet, read the newsgroups "news.newusers.questions" and "news.answers". If you have access to FTP, get copies of the introduction to the Internet documents mentioned at the end of this file. If you have access to users around you, ask them to show you the basics.

For a comprehensive overview of what the Internet is, how it works and the future of the Internet, read "FYI: What is the Internet?" (This file is available via anonymous FTP, and is listed in the final section of this document.)

Section 1: What is...

*** 1.1: WHAT IS TELNET?
Telnet is a program that allows you to login to another computer to run software there. Typically, you login either to access a "shell" command environment or some other utility, like a weather server or game. To telnet to a computer, you need to know it's name. This can either be in words, like "steer.sdsu.edu" or as a numeric address, like "130.191.1.11". Some services require you to connect to a specific "port" on the remote computer. Type the port number, if there is one, after the Internet address. (For example, "telnet nri.reston.va.us 185".) For more information, anonymous FTP to
ftp.sura.net:/pub/nic/network.service.guides
ftp.sura.net:/pub/nic/how.to.telnet.guide

*** 1.2: WHAT IS ANONYMOUS FTP?
FTP stands for file transfer protocol. FTP allows you to copy files from a remote computer to your local host. Thousands of sites provide anonymous FTP service, allowing you to download everything from online books, to satellite pictures of the weather, to public-domain utilities and games for your personal computer.

Unless your computer is directly connected to the Internet (that is, if you are connected through an intermediary remote host) software for use on your home computer needs to be FTPed to your local host, then downloaded to your PC using Xmodem, Zmodem, Kermit or some other system -- a two-step process.)

There is an FTP primer (and lots of other good information) in the "alt.bbs.internet" FAQ, which is posted periodically on "alt.bbs.internet" and "news.answers".

The following files are available on the Net to teach the basics of FTP. If you don't know how to use FTP to receive them, try asking someone else at your site.
For more information, use anonymous FTP to get
ftp.sura.net:/pub/nic/network.service.guides/how.to.ftp.guide

The document "FYI: Searching for Treasure" (listed at the end of this file) lists some of the best FTP sites to find Macintosh, IBM, UNIX, virus-related and other software.

*** 1.3: WHAT IS USENET?
The Usenet is a global bulletin board, of sorts, in which millions of people exchange public information on every conceivable topic. For more, FTP to:
rtfm.mit.edu:/pub/usenet/news.answers/what-is-usenet/part1.Z
The file is also posted regularly to the Usenet newsgroup "news.answers.newusers".

*** 1.4: WHAT IS FINGER?
Finger is a program that returns information about a registered user on a computer. Typing "finger" alone will show the users logged into the system you are using. "finger @host.domain.foo" will show you who's currently using some other computer. Certain computers have variations on finger support, where "finger ron" will show info on ron at your site, and "finger ron@hal.gnu.ai.mit.edu" will show you all the Rons with accounts on a certain computer at MIT. Note that some finger programs don't take arguments, some will accept only a userid (the exact login name of a user,) and still others will search using a first or last name. If your system has manual pages installed, type "man finger" for more information. If your system has Internet access but not finger, there are several freely distributable versions, including GNU finger and BSD finger.

*** 1.5: WHAT IS IRC?
IRC is the Internet Relay Chat, a service where users can "talk" via typing to people around the world. See Scott Yanoff's "Internet Services" list for public IRC servers, or find out if your own system has the server installed. There are newsgroups specifically devoted to IRC, including:

alt.irc	Internet Relay Chat material.
alt.irc.bot	Discussion of creating irc bots.
alt.irc.ircii	Discussion of the IRC II client program.
alt.irc.recovery	For those recovering from IRC addiction.
alt.irc.corruption	Is nowhere safe?
alt.irc.corruption.log.log.log	Discussions of corrupted loggers.
alt.irc.sleaze	Internet Relay Chat flamage.
alt.irc.sleaze.mark	More Internet Relay Chat flamage.

For more information, anonymous FTP to:

cs.bu.edu:/irc/support/tutorial*

*** 1.6: WHAT IS ALEX/ARCHIE/GOPHER/HYTELNET/NETFIND/PROSPERO/VERONICA/
WAIS/WHOIS/WWW/X.500?
These are all part of a new generation of network information resources. For complete information, check John December's "internet-tools" list, available via anonymous FTP to
ftp.rpi.edu:/pub/communications/internet-tools
That document will point you to detailed information about each of these services.

Scott Yanoff's "Internet Services List" list will tell you how to access these services. Most feature on-line help and information.

*** 1.7: WHAT IS MUD/MUSH/MOO/MUCK/DUM/MUSE (etc.)?
These are multi-user, text based, virtual reality games. According to the MUD FAQ: "A MUD (Multi-User Dungeon) is a computer program which users can log into and explore. Each user takes control of a computerized persona/avatar/incarnation/character. You can walk around, chat with other characters, explore dangerous monster-infested areas, solve puzzles, and even create your very own rooms, descriptions and items." There are an astounding number of variations on the MUD theme. Please see rec.games.mud for more information about them -- there are several very good FAQ postings there that detail MUDs, MUD clients and servers, and offer a complete, current MUD-list.

The most recent versions of the MUD FAQs are archived as:
ftp.math.okstate.edu:/pub/muds/misc/mud-faq/*
rtfm.mit.edu:/pub/usenet/alt.mud/*
[rec.games.mud]:_FAQ_#2_3:_MUD_Clients_and_Servers
[rec.games.mud]:_FAQ_#3_3:_RWHO_and__mudwho_
[rec.games.mud]:_FAQ_#1_3:_MUDs_and_MUDding

A few of the newsgroups out there related to muds:

rec.games.mud.announce	Informational articles about MUDs. (Moderated)
rec.games.mud.diku	All about DikuMuds.
rec.games.mud.lp	Discussions of LPMUD
rec.games.mud.misc	Various aspects of multiuser computer games.
rec.games.mud.tiny	Discussion of Tiny muds, IE MUSH, MUSE and MOO
alt.mud.bsx	BSX VR system.
alt.mud.german	For German-speaking MUD-er's.
rec.games.mud.admin	Administrative issues of multiuser dungeons.

SECTION 2: HOW DO I...?
*** 2.1: HOW DO I SEND ELECTRONIC MAIL FROM THE INTERNET TO ANOTHER NETWORK?
To learn the basics of e-mail on the Internet, FTP to:
ftp.sura.net:/pub/nic/network.service.guides/how.to.email.guide

In the best of worlds, our "global village" of electronic mail would be linked by one main street. Alas, it is actually composed of hundreds of small networks linked using "gateways." One main street is the Internet, but jutting off of it are dozens of side roads leading to other networks. It's always simplest to send mail to a recipient on the same

online service as yourself - say, from your America Online account to another - but sometimes you may need to send mail to someone who doesn't have an account on the system you use. While it's usually possible to mail from one network to another, you need to know the right route to navigate. In order to send any mail, you need to know the online service your recipient uses, and her name (or username) on that service.

For a more complete listing of how to send mail from any random network to any other random network, read the "Inter-Network Mail Guide" edited by Scott Yanoff (formerly edited by John J. Chew.) It also tells how to mail from networks other than the Internet - which is beyond the scope of this document. You can fetch this guide by anonymous FTP in either:
FTP.MsState.Edu:/pub/docs/internetwork-mail-guide
ariel.unm.edu:/library/network.guide

AMERICA ONLINE: "user@aol.com" Use all lower case and remove spaces. For example, "savetz@aol.com". Mail to America Online users can't be too long - it is limited to 27Kb if the recipient is a Mac/Windows/Apple II user, or 8Kb if s/he uses the DOS-based PC/AOL software. Funky characters are replaced with spaces: use printable ASCII only.

APPLELINK: "user@applelink.apple.com"

AT&T MAIL: "user@attmail.com"

BITNET: "user@host.BITNET" (Note that the bitnet hostname is not necessarily the same as the Internet host name.) If this fails, try directing your mail through a gateway such as "cunyvm.cuny.edu", "pucc.princeton.edu", or "wuvmd.wustl.edu". The address would be as follows: "user%domain.BITNET@pucc.princeton.edu" (or cunyvm or wuvmd). This should help those with SMTP servers that are not quite up to date.

BIX: "user@bix.com"

BMUG: "First.Last@bmug.fidonet.org"

COMPUSERVE: "userid@compuserve.com". Use the numeric CompuServe identification number, but use a period instead of a comma to separate the number sets. For example, to send mail to CompuServe user 17770,101 - mail to "177770.101@compuserve.com".

CONNECT: "user@dcjcon.das.net"

DELPHI: "user@delphi.com"

EXPRESS ACCESS: "user@<systemname>.digex.net"

FIDONET: "firstname.lastname@point.node.net.zone.fidonet.org". To send mail to a FidoNet user, you not only need the name, but the exact FidoNet address s/he uses. FidoNet addresses are broken down into zones, net, nodes, and points. To send to John Doe, who uses point 1 of node 2, which is in net 3 of zone 4 - you would send your mail to "john.doe@p1.f2.n3.z4.fidonet.org".

GENIE: "user@genie.geis.com" where "user" is their mail address. If a user tells you their mail address is "xyz12345" or something similar, it isn't. It usually looks like "A.BEEBER42" where A is their first initial, BEEBER is their last name, and 42 is a number distinguishing them from all other A.BEEBER's. As of July 1, 1993, GEnie's fees for sending and receiving Internet email to the Internet will be removed and all customers will have access to the gateway without need to sign up for it. Until July 1, only users who have requested Internet mail can send and receive it.

INSTITUTE FOR GLOBAL COMMUNICATIONS (IGC, or "PEACENET"): "user@igc.org"

INTERNET: send mail to "user@domain", where user is the recipient's login name, and domain is the full name and location of the computer where s/he receives e-mail. Examples are "savetz@rahul.net" and "an017@cleveland.freenet.edu".

MCI MAIL: send your mail to "user@mcimail.com". "User" can be a numeric identification, or first and last names separated with an underline. (E.g. "10101@mcimail.com" or "john_doe@mcimail.com".)

WELL: "user@well.sf.ca.us"

PANIX: "user@panix.com"

PC LINK: "user@aol.com". Incoming mail is limited to 27K. (There is no pclink.com domain. All mail to the America Online, Inc. owned systems goes to aol.com.)

PRODIGY: Prodigy has been promising network mail for months, but hasn't delivered it yet. So currently, Prodigy users are cut off from mail to the outside world. Perhaps by the end of the year, Prodigy users will be able to send and receive mail to and from other networks. They do have a network server, prodigy.com, but it doesn't do anything useful.

QLINK: Q-Link, a Commodore 64/128-based service offered by America Online, Inc., is not on the Internet for technical reasons.

*** 2.2: HOW DO I ACCESS OTHER SYSTEMS FROM THE INTERNET?
AMERICA ONLINE: You can't use AOL from the Internet due to the special graphics software.

BIX: telnet "x25.bix.com". At the "username" prompt, enter "bix".

COMPUSERVE: CompuServe is accessible from the Internet through the Merit system, but it is quite expensive. CompuServe does not distinguish logins from MERIT from other SprintNet logins. Merit is a service local to Michigan residents so all connections will be Eastern Standard Time regardless of where in the world you access Merit from. Pricing for using Merit: From 7PM - 8AM EST: $1.70/hour. From 8AM - 7PM EST: $11.70/hour. These prices are in addition to your normal CompuServe prices. The billing is all be handled by CompuServe. For further info about this service, contact : CompuServe (1-800-848-8199), SprintNet (1-800-877-5045), or Merit, Inc.: (1-313-764-9430).

DELPHI: telnet delphi.com

DIALOG: telnet dialog.com

EXPRESS ACCESS: telnet <systemname>.digex.net

GENIE: They don't provide for logging in from the Internet, citing "security issues."

INSTITUTE FOR GLOBAL COMMUNICATION (IGC, or "PEACENET"): telnet igc.org

MCI MAIL: Cannot be accessed via the Internet. The only way users can currently access MCI mail is by dialing in via SprintNet/Tymnet or MCI Mail's own numbers. A tech support rep said that letting people check their MCI mail accounts from Internet isn't a high priority for now.

NEXIS/LEXIS: telnet lexis.meaddata.com or telnet 192.73.216.20 or telnet 192.73.216.21. terminal type = .vt100a If characters do not echo back, set your terminal to "local" echo or "half duplex." You can also connect through Merit.

PANIX: telnet panix.com

PC LINK: Can't be accessed due to the special graphics software.

PRODIGY: Can't be accessed due to the special graphics software.

QLINK: Q-Link, a Commodore 64/128-based service offered by America Online, Inc., is not on the Internet for technical reasons.

WELL: telnet well.sf.ca.us

*** 2.3: HOW DO I CONTACT A SERVICE PROVIDER?
AMERICA ONLINE: (800) 827-6364 voice
CONNECT: (408) 973-0110 voice
COMPUSERVE: (800) 848-8990 voice
DELPHI: (800) 544-4005 voice
DIALOG: (800) 334-2564 voice
DOW JONES NEWS/RETRIEVAL: (800) 522-3567 voice
EXPRESS ACCESS: (800) 546-2010 voice
GENIE: (800) 638-9636 voice
INSTITUTE FOR GLOCAL COMMUNICATIONS: (415) 923-0220 voice
NEXIS/LEXIS: (800) 227-9597 voice. Government Customers: 513-865-7223
MCI MAIL: (800) 444-6245 voice
PANIX: (212) 877-4854 voice. E-mail: info@panix.com
PC-LINK (800) 827-8532 voice.
PRODIGY: New account information (800) 766-3449 voice
Membership services (800) 759-8000 voice
WELL: (415) 332-4335) voice. E-mail: support@well.sf.ca.us

*** 2.4: HOW DO I FIND OUT SOMEONE'S E-MAIL ADDRESS?
With so many computer systems and users in the world, it is impossible to keep a complete "white pages" of the Internet. The problem is

compounded because people come and go from the net all the time. (Students are notorious for this.) Storing and updating that much information would be an impossible, daunting task.

But, it's not impossible to find people on the net. Programs exist that, given some amount of information about your associate, can help you track down his or her e-mail address. These tools include Netfind, X.500, rtfm's usenet-addresses search, and WHOIS. The more information you know about your associate - name, place of business or school, and so on - the better your chances are.

For a very complete answer to this question, read: "FAQ: How to find people's E-mail addresses", available from mail-server@rtfm.mit.edu by sending "send usenet/news.answers/finding-addresses". This document is posted regularly to the Usenet group "news.answers".

There is another long document specifically for finding college students' e-mail addresses. It is also posted to "news.answers". It's available by anonymous FTP on "a.gp.cs.cmu.edub" as:
/afs/cs.cmu.edu/user/mkant/Public/Email/college-email-1.text
/afs/cs.cmu.edu/user/mkant/Public/Email/college-email-2.text
/afs/cs.cmu.edu/user/mkant/Public/Email/college-email-3.text

*** 2.5: HOW DO I GET A NAME RESOLVED?
There should be a name resolver on your system. On UNIX, look for a program called "nslookup". Failing that, send an electronic message to "resolve@cs.widener.edu". In the body of the message, include a line like "site foo.bar.baz", where foo.bar.baz is the name of the site in question. You'll receive a mail message with the IP (Internet Protocol) address for the site.

*** 2.6: HOW DO I SEND E-MAIL TO THE WHITE HOUSE?
The official Party Line: "The White House e-mail system is under construction. This is a new project and suffers from all of the problems common to a startup operation. The Communications office is currently working on defining what this system will do, as well as trying to come up with equipment and staffing to make sure that it works. E-mail messages are currently being printed out and responses are being sent out via US Mail.

"Nobody wants this new venture to work more than the staff that has devoted so many hours to getting it up and running. But much time and effort will be required before the system is truly interactive. In the mean time, they will need a little patience from the electronic community. If you send a message to the White House, please include a US Post office address for replies."

On the Internet, send to any one of:
president@whitehouse.gov or vide.president@whitehouse.gov
75300.3115@compuserve.com
clintonpz@aol.com

*** 2.7: HOW DO I ACCESS AN ONLINE ENCYCLOPEDIA?
The following is courtesy of Thomas Dowling (tdowling@u.washington.edu):

There are indeed encyclopedias on the net, but they all (all that I can find, anyway) are closed systems which require a password or some other form of user authentication. The reason for this is about what you'd expect: the companies that make encyclopedias are in business to stay in business, and you don't stay in business by giving away your product.

So when an institution installs an online encyclopedia, they usually sign a license agreement limiting online use to that institution's members; for universities, that's usually currently enrolled students, staff, and faculty. For public libraries, that's usually library card holders. Check if you think your own institution's encyclopedia is available to the net at large; some institutions enforce their license agreements in ways that are fairly transparent to their users.

If you can't find an online encyclopedia that's available to you, try the following:

Ask your own library to make sure they don't have one.
Use the encyclopedias on CompuServe, Prodigy, AOL, etc.
Use a (gasp!) regular, hardbound encyclopedia.

*** 2.8: HOW DO I GET STOCK MARKET INFORMATION?
Scott Yanoff's "Internet Services" list tells you how, but this question comes up so often its worth mentioning here. If you use a terminal with VT100, ANSI, or some other full-screen terminal emulation, "telnet rahul.net" and log on as "guest". Request the full-screen guest menu; request system information; request the market report. Note that this system, a2i Communications, sells full UNIX accounts with Internet access - the stock service is a feature for guests and paying users, and isn't guaranteed to be reliable.

People keep asking where to find historical stock information. As far as I know, this isn't available on the Net.

*** 2.9: HOW DO I ACCESS THE LIBRARY OF CONGRESS?
Telnet to "locis.loc.gov". You'll see a menu that will connect you to the Library of Congress, Federal Legislation, Copyright Information, Foreign Law and other info.

SECTION 3: I NEED INFORMATION ABOUT...
*** 3.1: WHERE CAN I GET INTERNET ACCESS IN MY AREA?
Check out PDIAL, a list of public access service providers offering dialup access to Internet connections. PDIAL lists both free and pay services all around the world. The PDIAL list is posted semi-regularly to alt.internet.access.wanted, alt.bbs.lists, ba.internet, and news.answers.

To receive PDIAL via e-mail, send mail with a subject line of "Send PDIAL" to "info-deli-server@netcom.com". To receive future editions as they are published, send email with the subject "Subscribe PDIAL" to the same address. The most recent PDIAL is also available by sending mail with a message body of "send usenet/news.answers/pdial" to "mail-server@rtfm.mit.edu". To get PDIAL via FTP:
ftp.netcom.com:/pub/info-deli/public-access/pdial

rtfm.mit.edu:/pub/usenet/alt.internet.access.wanted/P_D_I_A_L_(P)

For more information about service providers and getting on the Internet, read "FYI: Searching for Treasure" (FTP info at the end of this document.)

Another list of service providers, and tips on getting Internet access, is provided in the "alt.bbs.internet" FAQ, available via FTP as rtfm.mit.edu:/pub/usenet/news.answers/inet-bbs-faq.Z

If you are a college student or faculty, check with your campus computer center to learn about the online facilities available to you. Many schools offer free accounts to students and staff.

Next, turn to the Usenet community for assistance. Find out if there is a local newsgroup for your area or state. For instance, Columbus, Ohio users can check on the "oh.general" and "cmh.general" newsgroups. Many other areas have regional newsgroups. Ask the locals questions about the area - who better to know the answers?

If all else fails, post your plea on the Usenet newsgroup "alt.internet.access.wanted". Note that such requests aren't looked kindly upon if posted elsewhere.

*** 3.3: I NEED A BBS (ON THE INTERNET OR IN MY AREA)!
This is covered extensively in the "alt.bbs.internet" FAQ, available on the Usenet group "alt.bbs.internet" or via FTP as rtfm.mit.edu:/pub/usenet/news.answers/inet-bbs-faq.Z

Also look for information on the Usenet newsgroups "alt.internet.access.wanted" and "alt.internet.services". Get the PDIAL list, mentioned at the end of this document.

Also available is NIXPUB, a listing of freely accessible UNIX systems. It is posted regularily to the Usenet newsgroups "comp.misc", "comp.bbs.misc", and "alt.bbs". It is available via anonymous FTP as:
vfl.paramax.com:/pub/pubnet/nixpub.long
vfl.paramax.com:/pub/pubnet/nixpub.short
Or, you can receive it via e-mail. Send mail to "nixpub@access.digex.com" (subject/message body unimportant.)

Also, for BBS information for your area code or specific interest, FTP to:
wuarchive.wustl.edu:/mirrors/msdos/bbslists

*** 3.4: IS THERE A LIST OF ALL INTERNET SERVICES?
No. There are just too many computers and too many services for anyone to accurately maintain a complete list. However, Scott Yanoff edits a great list of Internet services: the "Special Internet Connections List" is updated monthly and is posted periodically to alt.internet.services and elsewhere. His list is a comprehensive as any list could ever be. It includes everything from where to FTP pictures from space, how to find agricultural information, public UNIX, online books and dictionaries, you name it. Check this list before posting the question "Where can I

get <whatever> online?" - chances are, it's in there. Finger "yanoff@csd4.csd.uwm.edu" to find ways to receive this list.

There's also John December's "internet-cmc" list, which serves as a pointer to a slew of resources. Its purpose is to list pointers to information describing the Internet, computer networks, and issues related to computer-mediated communication. It points to Internet documents for new users, comprehensive Internet guides, as well as specialized and technical information (for instance, Internet growth studies, maps, and statistics.) It also lists electronic journals and tons of other good things. (FTP info at the end of this document.)

Also, check out the Internet Resource Guide: this is an excellent guide to major resources available on the network. Includes chapters on Computational Resources, Library Catalogs, Archives, White Pages, Networks, Network Information Centers, and Miscellaneous. (FTP info at the end of this document.)

*** 3.5: WHAT'S A GOOD BOOK TO READ FOR MORE INFORMATION ABOUT THE INTERNET?
(All prices in U.S. dollars.)
"The Internet Companion, A Beginner's Guide To Global Networking" by Tracy LaQuey with Jeanne C. Ryer (Addison-Wesley Publishing.) The Companion includes a detailed history of the Internet, a discussion on "netiquette" (network etiquette), and how to find resources on the net. Useful for the computer-literate Internet novice. ISBN: 0-201-62224-6. 1993. $10.95.

"Internet: Getting Started." Franklin F. Kuo, Series Editor. SRI Internet Information Services, PTR Prentice Hall. Published by PTR Prentice Hall, New Jersey. Explains how to join the Internet, the various types of Internet access, and procedures for obtaining a unique IP address and domain name. An extensive list of Internet access providers of all types is provided, including access outside of the United States. The guide explains many concepts essential to the Internet, such as the Domain Name System, IP addressing, protocols, and electronic mail. ISBN: 0-13-327933-2. 1993. Paperback, 360 pages. $28.00.

"Internet: Mailing Lists 1993 Edition." Franklin F. Kuo, Series Editor. SRI Internet Information Services. Published by PTR Prentice Hall, New Jersey. ISBN: 0-13-327941-3. Copyright 1993. Paperback, 356 pages. (Note that a current "list of lists" is also available online, both via Usenet and FTP. See the next section.)

"The Internet Passport: NorthWestNet's Guide to Our World Online". This is published by NorthWestNet and the Nortwest Academic Computing Consortium, Inc. It is 516 pages and covers everything from net etiquette to supercomputers; very comprehensive. It costs $39.95 but schools and not-for-profit organizations can buy it for $19.95 plus shipping. NorthWestNet, 15400 SE 30th Place, Suite 202, Bellevue, WA 98007. (206) 562-3000.

"Internet Primer for Information Professionals: A Basic Guide to

Internet Networking Technology". By Elizabeth Lang and Craig Summerhill, Meckler Publishing. ISBN: 0-88736-831-X. 1993. $37.50.

"The Whole Internet User's Guide and Catalog" by Ed Krol (published by O'Reilly & Associates.) This book covers the basic utilities used to access the network and then guides users through the Internet's "databases of databases" to access the millions of files and thousands of archives available. It includes a resource index that covers a broad selection of approximately 300 important resources available on the Internet. ISBN: 1-56592-025-2. 1992. 400 pages. $24.95.

"Zen & the Art of Internet" by Brendan Kehoe. Published by Prentice Hall. This guide should give you a reference to consult if you're curious about what can be done with the Internet. It also presents the fundamental topics that are all too often assumed and considered trivial by many network users. It covers the basic utilities and information reaching other networks. An earlier, much less comprehensive version is available via FTP; see below. ISBN: 0-13-010778-6. 112 pages. 1993. $22.00.

In August, McGraw-Hill will release "The Internet Guide for New Users," by Daniel P Dern. Along with the obligatory topics such as telnet, FTP, and Archie, the book suggests how to get an Internet account and teaches enough UNIX to survive on the net.

*** 3.4: HOW DO I GET INFORMATION ABOUT THE INTERNET ONLINE?
Once you have an account, several good texts are available via FTP:

"FYI: New Internet User Questions" (RFC-1325) is FTPable as:
nic.merit.edu:/documents/fyi/fyi_04.txt

"FYI: Experienced Internet User Questions" (RFC-1207) is FTPable as:
nic.merit.edu:/documents/fyi/fyi_07.txt
This file is dated February 1991, and some of the information may be out of date. Many of the Q&As are of a technical nature. Covers the Domain Name System, SLIP & PPP, network management, routing and the like.

"FYI: Searching for Treasure" is FTPable as:
nic.merit.edu:/documents/fyi/fyi_10.txt
This document (dated January 1993) presents some of the "gold nuggets" of information and file repositories on the network. Very useful.

"FYI: Internet Users' Glossary" (RFC-1392) is FTPable as:
nic.merit.edu:/documents/fyi/fyi_18.txt
This is a comprehensive glossary concentrating mostly on terms specific to the Internet.

"FYI: What is the Internet?" is FTPable as:
nic.merit.edu:/documents/fyi/fyi_20.txt
This comprehensive paper covers the Internet's definition, history, administration, protocols, financing, and current issues such as growth, commercialization, and privatization. (May 1993.)

"The Hitchhiker's Guide to the Internet" (RFC-1118) will interest users

who are more into the technical bits of the Internet. This document, also written by Ed Krol, explains how Internet addresses work and discusses issues such as trust and carrying capacity of the Internet. It is pretty much out of date, but people keep asking for it. The "Guide," as well as other useful texts for new users, is available at wuarchive.wustl.edu:/mirrors/EFF/internet-info/*

"Internet Basics" is available by FTP as:
nnsc.nsf.net:/nsfnet/internet-basics.eric-digest

"Internet-cmc list", by John December, is a pointer to a slew of resources. Its purpose is to list pointers to information describing the Internet, computer networks, and issues related to computer-mediated communication. It points to Internet documents for new users, comprehensive Internet guides, as well as specialized and technical information (for instance, Internet growth studies, maps, and statistics.) It also lists electronic journals and tons of other good things. It is available via anonymous FTP as:
ftp.rpi.edu:/pub/communications/internet.cmc

"The Internet Companion" a beginner's guide to the net, is available by FTP. This is part 1 of the Tracy LaQuey book mentioned in the previous section.
world.std.com:/OBS/The.Internet.Companion

"Internet Resource Guide" is an excellent guide to major resources available on the network. Includes chapters on Computational Resources, Library Catalogs, Archives, White Pages, Networks, Network Information Centers, and Miscellaneous.
nnsc.nsf.net:/resource-guide/resource-guide.txt.tar.Z
nnsc.nsf.net:/resource-guide/resource-guide.ps.tar.Z

"Internet Services Frequently Asked Questions and Answers". That's the file you're looking at now. For the most recent version, FTP to:
rtfm.mit.edu:/pub/usenet/news.answers/internet-services/faq
or send an email message to "mail-server@rtfm.mit.edu" with a line in the body of the message reading "send usenet/news.answers/internet-services/faq".

"Internet-tools list", by John December, contains information about a variety of network tools and information resources (such as Archie, Gopher, Netfind, WWW and so on.) It is available at:
ftp.rpi.edu:/pub/communications/internet-tools

"List of Lists". For a list of some of the currently available electronic mail mailing lists, FTP to:
nisc.sri.com:/netinfo/interest-groups
To be notified of future additions to the list, send mail to interest-groups-request@nisc.sri.com.

"PDIAL", a list of public access service providers offering dialup access to Internet connections. PDIAL is posted semi-regularly to alt.internet.access.wanted, alt.bbs.lists, and news.answers. To receive PDIAL via e-mail, send mail with a subject line of "Send PDIAL" to

"info-deli-server@netcom.com". To get it, FTP to either:
ftp.netcom.com:/pub/info-deli/public-access/pdial
rtfm.mit.edu:/pub/usenet/alt.internet.access.wanted/P_D_I_A_L_(P)

"Special Internet Connections List", edited by Scott Yanoff, is updated monthly and is posted periodically to alt.internet.services and elsewhere. It includes everything from where to FTP pictures from space, how to find agricultural information, public UNIX, online books and dictionaries, you name it. Check this list before posting the question "Where can I get <whatever> online?" - chances are, it's in there. Finger "yanoff@csd4.csd.uwm.edu" to find ways to receive this list.

"Surfing the Internet" is available as:
nysernet.org:/pub/guides/surfing.2.0.2.txt

"Zen and the Art of Internet" is the first edition of Kehoe's Book, detailed above. The book is much longer, updated and improved over this online version. It is available as:
world.std.com:/obi/Internet/zen-1.0/zen-1.0.txt.Z
ftp.uu.net:/doc/internet/zen-1.0.txt.Z

If you have Usenet access, read some of the many newsgroups for new users and frequently asked questions: "news.answers", "comp.answers" and "news.newusers.questions".

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