Getting Connected

By Claudia Lynch, Benchmarks Editor (as04@unt.edu)

According to an article in Tech Times, the Department of Information Resources newsletter (Vol. 5, No. 1, February 1993, p. 3), telecommuting may well be the way we work in the future. "Telecommuting is defined as working from a distant location using communication lines to transfer information to and from the main office. Employers who use telecommuting cite improved employee retention, increased productivity, and employee ability to contribute during pregnancies and convalescence as advantages to the program." The County of Los Angeles currently has 2,600 people participating in a telecommunicating pilot project, the largest in the nation.

If you use a modem to dial into the computing facilities at UNT, you are also involved in telecommuting. You may even be doing it on a regular basis as a part of your job. Welcome to the future!

Like any technological advance, there is a time lag between having the theoretical ability to do something and having things actually happen. UNT is at a crossroads in terms of networked-computer access for all faculty, staff, and students. Many people have it, but some still don't.

Some of the articles in this issue of Benchmarks discuss the history and future of networking and data communications here at UNT. Other articles are concerned with connecting to the outside world — the electronic global village.

Turn the page and discover the future of networked connectivity. It may be closer than you think...
UNT COMPUTING CENTER ORGANIZATION AND FACILITIES

Computing Center Support Services are available in the Information Sciences Building (ISB), Room 119; phone: (817) 565-2324 (TDD 1-800-RELAY-TX). The Computing Center consists of the following areas:

☑ Academic Computing Services:
  - Documentation Services
  - ISB 110 General Access Lab (817) 565-3048
  - Mainframe User Services
  - Research and Statistical Support Services
  - VAX/UNIX Systems (817) 565-4161

☑ Network & Microcomputer Services:
  - Data Communications
  - Microcomputer Application Support
  - Network Systems Support

☐ Administrative Computing:
  - Admissions Data Systems
  - Database/Central Programming Support
  - General Data Systems
  - NT/COM Fiscal Data Systems
  - NT/COM Payroll/Personnel Data Systems
  - Student Records Data Systems
  - Student Services Data Systems
  - Voice Response Applications

☐ Mainframe Technical Services:
  - IBM Operating Systems Software Support
  - Computer Operations

CONNECTING TO UNT COMPUTERS

Phone numbers for accessing UNT computing systems:
300-2400 BAUD: (817) 565-3300
300/2000 BAUD: (817) 565-3499
300-9600 BAUD: (817) 565-3461 HST protocol ONLY
300-2400 BAUD: D/FW METRO 792-4140

Area code 214 must dial 817 before the METRO #. Note: Dialing 1 before the area code will result in a long-distance charge.

<table>
<thead>
<tr>
<th>SYSTEM</th>
<th>SYSTEK/DENTON LINES (#)</th>
<th>METRO LINES (UNMODEMS-)</th>
<th>INTERNET (CUTCP, NCSA)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Academic Mainframe (MUSIC, CMS, Academic COM-PLETE)</td>
<td>CALL 3270</td>
<td>CONNECT VM3270</td>
<td>telnet 3270 vm.acs.unt.edu —OR—cutcp telnet vm3270.acs.unt.edu</td>
</tr>
<tr>
<td>VAX (VMS)</td>
<td>CALL DEC</td>
<td>CONNECT DEC</td>
<td>telnet vaxb.acs.unt.edu</td>
</tr>
<tr>
<td>Solbourne (UNIX)</td>
<td>CALL 900</td>
<td>CONNECT SOL</td>
<td>telnet solacs.unt.edu</td>
</tr>
<tr>
<td>Departmental Systems</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Computer Sciences (Ponder)</td>
<td>CALL 780</td>
<td>CONNECT PONDER</td>
<td>telnet ponder.csci.unt.edu</td>
</tr>
<tr>
<td>UNT Libraries' on-line catalog</td>
<td>CALL 3000</td>
<td>CONNECT LIBRARY</td>
<td>telnet library.unt.edu</td>
</tr>
</tbody>
</table>

To exit from the local phone lines, press <ESC> <RETURN>, and type DONE (at the # prompt), then press <RETURN>  <RETURN>. To exit from the metro lines, press <CTRL> <SHIFT> <D> then type DISCONNECT (at the UNMODEMS> prompt), then press <RETURN>. Exiting from telnet and TN3270 is dependent upon the package.
CUTCP uses <ALT> <X>.

HOURS FOR UNIVERSITY OF NORTH TEXAS COMPUTER ACCESS AREAS: Spring 1993

<table>
<thead>
<tr>
<th>Day of Week</th>
<th>Willis</th>
<th>BA</th>
<th>ISB 110</th>
<th>Chilton, Matthews, Music</th>
<th>GAB</th>
<th>Terrill, Wooten</th>
<th>ISB 205C</th>
<th>Lab Locations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Monday - Thursday</td>
<td>Open 24 hrs.</td>
<td>8 a.m. - 11:45 p.m.</td>
<td>7:30 a.m. - Midnight</td>
<td>8 a.m. - 10 p.m.</td>
<td>8 a.m. - Midnight</td>
<td>8 a.m. - 8 p.m.</td>
<td>Noon - 10 p.m.</td>
<td>☜ BA: 330, 332 ☜ Chilton: 255, 116 [Adaptive Lab] ☜ GAB: 330, 550 ☜ ISB: 110, 205C — grad. students only ☜ Matthews: 309 ☜ Music: 1007 ☜ Terrill: 247 ☜ Willis: 134 ☜ Wooten: 120</td>
</tr>
<tr>
<td>Friday</td>
<td>Open 24 hrs.</td>
<td>8 a.m. - 8 p.m.</td>
<td>7:30 a.m. - 9 p.m.</td>
<td>8 a.m. - 5 p.m.</td>
<td>8 a.m. - 5 p.m.</td>
<td>1 p.m. - 5 p.m.</td>
<td>10 a.m. - 5 p.m.</td>
<td></td>
</tr>
<tr>
<td>Saturday</td>
<td>Open 24 hrs.</td>
<td>8 a.m. - 8 p.m.</td>
<td>9 a.m. - 9 p.m.</td>
<td>10 a.m. - 5 p.m.</td>
<td>2-8 p.m.</td>
<td>Closed</td>
<td>10 a.m. - 5 p.m.</td>
<td></td>
</tr>
<tr>
<td>Sunday</td>
<td>Open 24 hrs.</td>
<td>Noon - 11:45 p.m.</td>
<td>1 p.m. - Midnight</td>
<td>Noon - 10 p.m.</td>
<td>2 p.m. - Midnight</td>
<td>2-8 p.m.</td>
<td>1-10 p.m.</td>
<td></td>
</tr>
</tbody>
</table>

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Computer Networking at UNT — An Historical Perspective

By Bill Bunin, Director of Network and Microcomputer Services (bunin@unt.edu)

In the last ten years the University of North Texas has been aggressively pursuing the use of computer networking to enhance the educational process and to streamline the administrative operations of the University. The development of networking at UNT can be divided into three levels:

1. Departmental and student lab networks, which link together workstations and servers.
2. Campus-wide networks, which link the various departmental and student lab networks together into a unified whole (as well as connecting terminals to host computers).
3. Wide area networks, which link the campus-wide network to various computing resources outside the University, including the Internet and BITNET.

Departmental and Student Lab Networks

UNT has been into networking since about 1982. With technology that was innovative for its time, UNT set up connections from computer labs to three VAX machines and the academic mainframe using Sytek modems. There were also over 100 connections from primarily administrative offices to the administrative mainframe using Sytek equipment and protocol converters (the latter functioning as remote control units). Microcomputers began to be networked together with the installation of the broadband system. (See campus-wide networks later in this article.)

Wiring Technology

Local area networking began to explode at UNT about 1988. Prior to this time, some networking had occurred using the broadband/CATV system as a base. (This is described later under campus-wide networks.) Beginning in 1988, numerous departments were able to install NetWare file servers attached to departmental networks through a grant from Novell. At that time the prevailing wiring topology was 10Base2 Ethernet, also known as ThinNet. 10Base2 is a linear bus topology with workstations "daisy-chained" together.

In general, the 10Base2 topology has been a cost-effective way of installing departmental networks. However, ThinNet has several shortcomings, including:

- Distance and station count limitations.
- Vulnerability of the entire network to failures involving one workstation or network connection.
- Difficulty of reconfiguring the network as workstations are added or deleted.
- Lack of support for modern network management systems.

For these and other reasons, the University opted to standardize on 10BaseT wiring for office environments. (See the diagram in the box on the left.) The IEEE 802.5 10BaseT standard calls for using unshielded twisted-pair cabling (telephone cable) wired in a star topology. At the center of the star is an intelligent communications concentrator. Each node has a direct connection to this concentrator. This type of topology has several advantages, including:

- Better isolation of error conditions.
- Greater flexibility for reconfiguring the network.
- Greater manageability.

10Base2 networks are still viable for open areas such as student computer laboratories or open office arrangements because some of the problems of wiring are alleviated.
Networking

Today the University has over 4,200 microcomputers on campus, over 2,000 of which are connected to the campus-wide network.

Building Wiring

In July of 1992, the Board of Regents funded a project to wire twenty buildings on campus with unshielded twisted pair (UTP) wiring to support 10BaseT Ethernet. Because of staffing limitations, the wiring installations will be done by outside contractors. The wiring of the first set of buildings for this project should begin approximately April 1. The project was delayed somewhat in order to ensure that the University would have an economical upgrade path for its data communications needs. UTP cable comes in different grades of quality. Recently vendors have been moving towards supporting 100 megarbit per second speeds over UTP wire. The wire previously used by the University for UTP installations was rated at 10 megarbit per second. All future installations will be done with the 100 megarbit per second grade of UTP wire.

Academic and Administrative Configurations

Today the University has over 4,200 microcomputers on campus, over 2,000 of which are connected to the campus-wide network. Of these, about half are 10BaseT installations and the other half 10Base2. These networks provide services to academic and administrative units and to student labs.

The first labs set up for student use were tailored to the needs of individual colleges and departments. Since 1991 the colleges have been cooperating to set up General Access Labs. There are now thirteen such labs throughout campus with over 350 machines. The machines in these labs have a common baseline set of applications available for use by any student at the University.

Campus-wide networks

At present the University is served by two campus-wide communications backbones. (See Diagram 2 on page 5.) A Broadband CATV system was completed in 1983. The bandwidth on this system is divided into channels which are then allocated to providing certain services. Today this system supports:

- The academic asynchronous network (otherwise known as the Sytek network after the original manufacturer of the devices used to drive communications on this network) to access the academic host machines.
- The administrative bisynchronous network which enables SNA traffic to the administrative mainframe from terminals and PCs with terminal emulation (conix) cards attached to terminal cluster controllers.
- The administrative asynchronous network using Sytek equipment and protocol converters.
- The IBM PC network which allows PCs to communicate using the IPX protocol supported by the NetWare operating system.
- The 10Broad24 network, which is a new technology installed for the first time in 1992. 10Broad24 allows Ethernet packets to be used on the broadband system, thus enabling IP as well as IPX. I will explain the importance of this later.
- Various video channels under the management of the Media Library and Center for Instructional Services.

By 1988 it had become apparent that the PCNet spectrum of the broadband system would not be adequate to handle the exploding demand for connecting these departmental networks, nor for the types of applications that were expected to come to market in subsequent years.

For one thing, PCNet does not support IP. This inhibits the use of Internet-standard applications such as Telnet, TN3270, and FTP, unless the user has an account on an IP-capable host and uses it in terminal mode. Because of the expanding dependence of academic institutions on the Internet, it did not seem advisable to tie all Internet access to host-based systems.

Further, PCNet operates at a speed of 2 megabits per second and has no provisions for traffic isolation. Ethernet operates at a speed of 10 megabits per second. Graphics-oriented applications such as imaging, multimedia, and interactive video demand speeds of 100 megabits or more. The problem of traffic isolation affects both security and load on the backbone, because all packets which are placed on the PCNet spectrum are broadcast throughout the entire CATV system.

The Fiber Optics Backbone

In 1989, the University began to install a campus-wide fiber optics backbone. This backbone positions the University to be able to support applications requiring bandwidth-intensive data communications. It also is configured in such a way as to provide some level of fault tolerance on the network and to minimize traffic among the communications hubs, thus increasing the capacity of the network overall.

Currently, the backbone uses the Ethernet protocol running at 10 megabits per second. Plans call for moving to 100 megabits per second within the next one to two years.

The use of 10Broad24 technology on the broadband system supplants the fiber backbone as we move toward the future. It is targeted for buildings that
Networking

do not have needs for high bandwidth (100 megabits per second) applications and which are not economical to reach with fiber.

Wide Area Networks

The University's primary wide area communications link is to the University of Texas at Dallas (UTD) via a dedicated T1 line. This line supports speeds of 1,544 megabits per second. UTD is connected to other Texas institutions as part of two wide area networks, the Texas Higher Education Network (THENet) and Sesquinet.

Benefits of the Link

UNT's wide area network link provides access to such wide area network services as the Internet and BITNET. In the near future, it will also enable users in administrative offices at UNT to access certain State of Texas systems in Austin.

The link to UTD is also used to provide Metro line access to UNT host systems through a dial-up facility located at the University of Texas at Arlington.

UNT also provides wide area links to the Texas College of Osteopathic Medicine and Texas Woman's University. These links allow these institutions access to resources at UNT and through UNT to the Internet.
Communications Projects in UNT’s Information Resources Strategic Plan

By Susan Pierce, Assistant to the Associate Vice President for Computing: Planning and Budgeting (pierce@unt.edu) and Bill Buntain, Director of Network and Microcomputer Services (buntain@unt.edu)

UNT recently prepared an Information Resources Strategic Plan for the Department of Information Resources of the State of Texas. This document articulates the primary objectives for the development of information resources at the University over the next five years. The section entitled Communications says that the University has a goal to “develop a seamless communication network that provides access to information, computing resources, and people within the University, throughout the country, and around the world from a single desktop workstation.”

While such a goal seems simple and straightforward, its implementation is not. It is, in fact, a daunting task. The table below outlines some of the projects identified as needed to accomplish this end and gives a brief idea of their status:

<table>
<thead>
<tr>
<th>Strategy</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>Objective: Provide communications infrastructure (physical wiring, communication equipment, etc.) for local and remote access.</td>
<td></td>
</tr>
<tr>
<td>Establish 10 megabit per second Ethernet as the University’s baseline network topology.</td>
<td>1. 29 buildings have been connected to the fiber optics backbone; another 7-10 will be connected this fiscal year.</td>
</tr>
<tr>
<td></td>
<td>2. 11 buildings have been wired with 10BaseT Ethernet; 17 more will be wired within the year, funding has been requested for 4 other buildings.</td>
</tr>
<tr>
<td></td>
<td>3. 2 buildings are serviced with 10Broad24 Ethernet (Ethernet over broadband); 5 more buildings are targeted for attachment by the end of fiscal year 1994.</td>
</tr>
<tr>
<td></td>
<td>4. Wireless networking alternatives will be evaluated for appropriate use at UNT.</td>
</tr>
<tr>
<td></td>
<td>See also the article on page 3, “Computer Networking at UNT — An Historical Background.”</td>
</tr>
<tr>
<td>Enhance dial-in access to University computer systems.</td>
<td>See the article on page 9, “Upgrade Plans For Computing Center Dial-Up Facilities.”</td>
</tr>
<tr>
<td>Provide network capacity for high-bandwidth services (such as video conferencing, multimedia, imaging, and other graphics-oriented applications).</td>
<td>1. Plans for migrating the electronics, which support communications among the hub sites on the fiber optics backbone, to support a minimum of 100 megabits per second, should be completed for inclusion in the Fiscal Year 1994 Prop-2 budget.</td>
</tr>
<tr>
<td></td>
<td>2. Videoconferencing services will be investigated and funded as appropriate.</td>
</tr>
<tr>
<td></td>
<td>3. High-speed connections to workstations will be addressed as needed.</td>
</tr>
</tbody>
</table>
## Networking

<table>
<thead>
<tr>
<th>Strategy</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Objective:</strong> Provide <em>appropriate</em> networked workstations to faculty and staff.</td>
<td>Over 4,200 microcomputers and other workstations are deployed throughout campus. The standard operating system and applications platforms for central support are being reevaluated to maximize functionality and minimize support requirements.</td>
</tr>
<tr>
<td>Acquire new, or upgrade existing, faculty/staff workstations.</td>
<td></td>
</tr>
<tr>
<td><strong>Objective:</strong> Provide electronic messaging services which interface with all (or most) UNT hardware/software platforms.</td>
<td>Computing Center staff is working with the Electronic Mail Task Force appointed by the Provost to identify appropriate architectures and platforms for implementing campus-wide electronic mail service for all faculty, staff, and students at UNT.</td>
</tr>
<tr>
<td>Provide electronic messaging services to all faculty, staff, and students.</td>
<td></td>
</tr>
<tr>
<td>Provide electronic forms capabilities.</td>
<td>There is a recognized need to move towards providing electronic forms capabilities. The Computing Center is looking at a variety of implementations in this relatively new software market.</td>
</tr>
<tr>
<td>Implement a Campus-Wide Information System (CWIS) that is easy to navigate and that can be efficiently updated by custodians of information.</td>
<td>Computing Center staff is working with the Library and other UNT units to implement Gopher as the basis for a CWIS. Gopher also provides easy access to on-line documents and computing resources, including those available on wide area networks.</td>
</tr>
<tr>
<td>Provide electronic conferencing capabilities.</td>
<td>Academic Computing is moving towards making the Usenet News service available as a bulletin board system from a variety of platforms, including PCs, Macintoshes, UNIX workstations, and terminals attached to than academic asynchronous (Syeke) network.</td>
</tr>
<tr>
<td>Investigate the addition of fax to the campus-wide mail system.</td>
<td>The emerging software category of groupware is being monitored for applicability to UNT.</td>
</tr>
<tr>
<td><strong>Objective:</strong> Simplify access to services through the network.</td>
<td>A project team recently initiated investigation of the viability of providing networked fax capabilities.</td>
</tr>
<tr>
<td>Migrate to an enterprise-wide model of file servers and services.</td>
<td>Planning is now underway to migrate to the NetWare 4.0 environment.</td>
</tr>
<tr>
<td>Improve means of accessing our administrative mainframe.</td>
<td>The Computing Center recently completed upgrading its SNA gateway to NetWare for SAA. This new gateway is an improvement in terms of capacity, performance, and reliability. The SNA gateway approach is a cost-effective alternative to using terminal emulation cards in PCs in conjunction with terminal cluster controllers. By the end of this fiscal year we anticipate deploying Macintosh and Windows clients for this gateway as well as the DOS client currently in use.</td>
</tr>
</tbody>
</table>
### Networking

<table>
<thead>
<tr>
<th>Strategy</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>Continue to support industry-standard network protocols.</td>
<td>UNT is under state mandate to move towards open systems in general, and GOSIP in particular.</td>
</tr>
<tr>
<td>Improve access to state-wide administrative systems.</td>
<td>The Computing Center recently acquired licenses to LAN Workplace for DOS and NetWare TN3270. These two programs allow administrative users to have on-line access to state systems running in Austin across the Texas Higher Education Network (THENet).</td>
</tr>
</tbody>
</table>

In addition to these projects, Network and Microcomputer Services is also working on several other projects of potentially great impact to the University. These include:

<table>
<thead>
<tr>
<th>Strategy</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>Attempting to improve coordination of software purchases, licensing compliance, and distribution.</td>
<td>1 Network and Microcomputer Services has been talking with Microsoft, Borland, Lotus, and WordPerfect about site license and volume purchase agreements. We also plan to pursue talking to vendors of network management utilities about such arrangements. Please let us know if you are aware of any other categories of software or vendors that having a site license/volume purchase agreement with would make a significant financial impact on the University.</td>
</tr>
<tr>
<td></td>
<td>2 We plan to investigate strategies to improve the University's position relative to software licensing compliance. This is somewhat related to the item above in that site licenses are easier to administer and comply with than individual license purchase arrangements.</td>
</tr>
<tr>
<td></td>
<td>3 In conjunction with the network managers, we will be investigating alternatives for automated software distribution.</td>
</tr>
<tr>
<td>Establishing a network operations center to proactively monitor the status of the University’s communications networks, including dialin and wide area links.</td>
<td>The Computing Center has acquired a license to Spectrum, Cabletron’s enterprise network management system. We are also evaluating problem tracking systems. These two tools should aid us in proactively monitoring the University’s networks, in managing the volume of requests for assistance we receive, and in coordinating our efforts with other units to resolve them.</td>
</tr>
</tbody>
</table>
Networking

<table>
<thead>
<tr>
<th>Strategy</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reviewing deployment of file servers and the support structure for distributed computing.</td>
<td>For the past two years the Computing Center has paid for upgrades to licenses of NetWare for the entire University. This expense has grown substantially. There is also substantial recognition that not all of the campus is served equally in terms of network services and support. As part of the migration to NetWare 4.0, the Computing Center plans to work with the Information Resource Council's Task Force on Communications Networks to formulate a plan for the distribution of network services and support to maximize support and minimize costs.</td>
</tr>
<tr>
<td>Standardizing the list of services available and setting up appropriate navigation tools for supported environments.</td>
<td>The De Facto Standards Committee of the IRC has developed a list of standard services to be available from all workstations attached to the network. The development of menus to navigate easily to these services was deferred pending release of NetWare 4.0 and its new menu system and pending the recommendations of the Electronic Mail Task Force regarding the future of WordPerfect Office at UNT.</td>
</tr>
</tbody>
</table>

Upgrade Plans for Computing Center Dial-Up Facilities

By Bill Buntain, Director of Network and Microcomputer Services (buntain@unt.edu)

One of the major projects currently active in Network and Microcomputer Services is the development of plans for adequate dial-up facilities to accommodate off-campus access to UNT systems. Over 85% of UNT's student population lives off-campus. This includes a large commuter population, particularly for advanced degree programs. In addition, there is much to be gained from providing access for faculty and staff to their desktop systems when they are not in the office, that is, when they are either at home or travelling to some remote location. A report by Forrester Research, Inc. states that among Fortune 1000 companies, the average number of remote connections needed is 315, and that by 1994, that number is expected to reach an average of 876.

Current Status

The University's current dial-up facilities are inadequate to meet the demand for services. The Computing Center provides dial-up capabilities only to host systems through a variety of modems and terminal servers of varying speed, functionality, and reliability. The matrix on the following page summarizes the current academic host dial-ups the Computing Center provides:
Networking

<table>
<thead>
<tr>
<th>Dial-In Lines</th>
<th>Modems</th>
<th>Terminal Servers</th>
<th># of Lines</th>
<th>Max Baud Rate</th>
<th>Acad Sytek Hosts</th>
<th>IP Hosts</th>
<th>LAT Hosts</th>
</tr>
</thead>
<tbody>
<tr>
<td>565-3499</td>
<td>Multitech</td>
<td>Agile SMux (Sytek PCU emulation)</td>
<td>16</td>
<td>1200</td>
<td>Y</td>
<td></td>
<td></td>
</tr>
<tr>
<td>565-3300</td>
<td>Multitech</td>
<td>Hughes LAN Systems</td>
<td>24</td>
<td>2400</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>565-3461</td>
<td>US Robotics</td>
<td>Agile SMux (Sytek PCU emulation)</td>
<td>8</td>
<td>9600</td>
<td>Y</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Metro lines</td>
<td>Multitech</td>
<td>Hughes LAN Systems</td>
<td>16</td>
<td>2400</td>
<td>Y</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- **Academic Sytek Hosts** — All hosts available through channels 1, 3, 5, 7, and 9 of the Sytek LAN. This includes the VAX, Solbourne, Ponder, academic mainframe, on-line library catalog, and Solo.

- **IP Hosts** — Any UNT host accessible via Internet protocol (IP), including the following: VAX, Solbourne, Ponder, academic mainframe, on-line library catalog, Solo, and numerous VMS and UNIX workstations throughout campus.

- **LAT Hosts** — Local Area Transport protocol, a DEC proprietary protocol that serves the same purpose as Telnet, but is faster and more efficient, largely because it multiplexes all traffic between the client terminal server and the host. The VAX is the only UNT LAT host.

There are no centrally supported dial-up facilities for access to NetWare LANs. The Computing Center did test the NetWare Access Server, but was not satisfied with its performance or reliability.

Some departments have moved to provide dial-in access to NetWare LANs on their own. Those departments that have done so have taken one of two strategies:

1. Putting internal modems in machines and possibly extra telephone lines for data in faculty and staff offices; or
2. Putting dedicated microcomputers with internal modems and Ethernet cards attached to the department’s local area network for general access.

**Deficiencies Of The Current Dial-Up Facilities**

The most evident shortcoming of the Computing Center’s dial-up facilities is that it provides no access to the University’s 54 NetWare LAN file servers from off-campus locations, even though NetWare LANs are the primary computing resource for the majority of computer users at UNT.

**Local dial-ups**

In addition, there are a number of concerns regarding the configuration of the local dial-up lines, including those listed below:

- Even though the Internet Protocol (IP) is the University’s strategic direction for accessing computing resources, only one-third of the dial-up lines currently in place support IP, and those are all at speeds below the current industry standard of 9600 baud (a unit measuring the modem’s signalling speed).
- There is an inconsistency among the lines as to which resources are accessible.
- There are an inadequate number of high-speed lines available. (All lines have a minimum baud rate of 300. When a modem connection is made, the modems on the two ends of the telephone line negotiate to find the highest speed supported by both modems.)
- Since the equipment on the various categories of lines differs, the behavior of that equipment also varies. Thus, the user interface and the types of errors seen by the users are not entirely consistent. This leads to some confusion.
The Computing Center has received many complaints about the reliability of its dial-up facilities. The Hughes terminal servers in use on the academic dial-up lines have proven to be unstable.

**Metro lines**

The communications path for the Metro lines has also proven over time to be unstable and unsupportable. For the past two and a half years this service has been provided by a complex network connecting the University of Texas at Arlington and the University of North Texas campuses. The Metro lines terminate at UTA. They are connected to the UNT campus via a series of Ethernet networks, T1 lines, microwave links, and Cisco routers. Portions of this communications network are part of the Texas Higher Education Network (TENet). Others are under the purview of Sesquinet. Thus, components of this network are managed by four different organizations—UTA, the UT System Office of Telecommunications Services (TENet), Rice University (Sesquinet), and UNT.

This configuration was selected because it was a low-cost alternative for providing dial-in access. However, it has also proven to be unstable and unmanageable. Despite the commitment of at least one-half of a full-time staff member's time, over the last two years, to track down and to correct causes of errors, users still experience loss of their sessions and testing by the Data Communications staff indicates that the route between UTA and UNT is still unstable. Factors contributing to this are:

- The complex nature of the configuration.
- The number of support organizations involved.
- The remote location of the network resources from local management.
- The lack of adequate management tools to diagnose the causes of communications problems.

**Departmental/individual Dial-Ups**

The approach taken by some departments to put modems in individual office machines or in dedicated dial-up access is also problematic in the following respects:

- There is a redundant and excessive expense for modems and telephone lines in cases where utilization is low;
- The dedicated machine solution is not very feasible, because it is not economical to buy machines in the quantities needed to support the level of demand being seen in the colleges;
- The departments typically do not have the resources to adequately manage the dial-up facility.

It is evident that the University could benefit from a centrally administered dial-in access facility. This would reduce redundant purchases of internal modems and microcomputers dedicated to the dial-in function.

**Local Network Dial-Up Alternatives**

There are two general alternatives for remote computing access to local area networks:

1. Remote control.
2. Remote node.

The remote control approach allows a user to take over the operation of a remote computer, including control of the screen and keyboard. When the computer being controlled is on a local area network, the user has effectively established a remote session on that network, executing processes on the remotely controlled machine. What passes across the telephone wire are keystrokes and screen images. All program and data access requests are processed locally to the LAN by the remotely controlled machine. Thus, in a character-based application, remote control software minimizes the amount of traffic on the telephone line.

The remote node approach establishes the user's remote workstation as a node on the network. It uses the workstation's asynchronous adapter to connect to the remote LAN via telephone wire. In this approach all processing takes place on the remote workstation. In the remote node approach, the software to be executed typically resides on the user's workstation. Executable files are usually large and loading them across the telephone line can be time-consuming. The remote node approach is frequently used for graphical user interfaces, because of the large amount of data which must be passed across the communications link for screen images.

Both remote control and remote node approaches can be further subdivided. The matrix on the following page shows a general taxonomy of dial-up solutions.
Taxonomy of Network Dial-Up Alternatives

Remote Control

<table>
<thead>
<tr>
<th>Typical implementation characteristics:</th>
<th>Description</th>
<th>Potential Use</th>
</tr>
</thead>
<tbody>
<tr>
<td>• User connects to processor on campus using remote control software.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Application software resides on campus network and runs on campus processor.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Remote control software passes keystrokes and screen images across the telephone line, minimizing traffic for character-based applications.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Category</th>
<th>Description</th>
<th>Potential Use</th>
</tr>
</thead>
<tbody>
<tr>
<td>Single user</td>
<td>Internal modem installed in microcomputer.</td>
<td>Not applicable to a centralized facility.</td>
</tr>
<tr>
<td>Multiuser hardware</td>
<td>Multiple microcomputer processors, each with a modem and LAN adapter, in a chassis.</td>
<td>Not of interest because hardware is too expensive and not reusuable for other purposes.</td>
</tr>
<tr>
<td>Multiuser software</td>
<td>Multitasking operating system on high-end microcomputer.</td>
<td>Could be used to provide dial-up facility equivalent to General Access Labs.</td>
</tr>
</tbody>
</table>

Remote Node

<table>
<thead>
<tr>
<th>Typical implementation characteristics:</th>
<th>Description</th>
<th>Potential Use</th>
</tr>
</thead>
<tbody>
<tr>
<td>• User appears a node on the network.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Applications reside and run on user’s workstation.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Data is passed between the remote node and the network as it would be with any node local to the network. This approach is frequently used with graphical user interfaces.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Category</th>
<th>Description</th>
<th>Potential Use</th>
</tr>
</thead>
<tbody>
<tr>
<td>Single user</td>
<td>LAN-attached modem</td>
<td>Not applicable for a centralized facility.</td>
</tr>
<tr>
<td>Multiuser</td>
<td>Communications server</td>
<td>UNIX workstations, Users of graphical user interfaces.</td>
</tr>
</tbody>
</table>

Some implementations blend the characteristics of multiple categories of solutions. For example, the NetWare Asynchronous Communications Server (NACS) supports modem pooling for both dial-in and dial-out functions. With it authorized faculty and staff users could access their workstations in their own office without the purchase of internal modems for their machines or the cost of an additional telephone line to their office. The NACS also supports inbound and outbound fax transmissions.

Evaluation in Progress

The Computing Center has ordered 32 modems capable of communicating at 14400 baud with industry-standard data compression and error correction algorithms. Once we have received these we will be evaluating products from the multiuser software remote control and multiuser remote node categories, as well as the NACS approach to asynchronous communications. In addition, we will be looking at the viability of upgrading and standardizing the local and Metro dial-up lines in terms of speed, data compression algorithms, error correction protocols, interface, and services provided. We will be reviewing the modems and terminal servers used in these configurations, and redesigning the Metro line route to increase its reliability and supportability. When the evaluation is completed we will be preparing a funding proposal to be advanced through the University's Information Resources Council.

If you have any questions or comments about the Computing Center's move to develop dial-up facilities, please feel free to contact me at 565-4802 (BUNTAI@UNT.EDU).
Networking

NSF Network Milestone

By Don Riley, University of Minnesota Acting Associate Provost with Special Responsibility for Computing & Information Systems on the Twin Cities Campus

This article appeared in the University of Minnesota Computer and Information Services Newsletter (Vol. 2, No. 8, February 1993). It has been slightly edited for inclusion in Benchmarks.

In December the National Science Foundation Network (NSFNET) completely switched to a much faster backbone. Since the NSF contributes roughly half of the cost of Internet access for educational institutions like ours, this is good news for over 700 colleges and universities and the more than one million computers that connect to the Internet. It is also particularly important for UNT, since as of March 1, we had 1,807 assigned IP (Internet Protocol) addresses (Internet nodes).

Below are excerpts from an article that appeared in CRN/NET, an electronic publication. Many who use the Internet to communicate with other people and gather information are unaware of its past and its potential growth. These excerpts will help fill that information void.

A New Networking Era

...the T-1 NSFNET passed into history today when the last router was moved to connect to the T-3 backbone service. As of 12:01 a.m. EST on Wednesday, December 2, the T-1 NSFNET backbone is no more — its circuits are turned off — marking the beginning of a new networking era.

T-3: 45 Megabits Per Second

When first implemented just over four years ago, the T-1 (1.5 Mbps) NSFNET backbone was state-of-the-art for the Internet, deploying new levels of speed and management. With improvements in routing technology, the Internet moved from an experimental service to a production commodity. Demands for higher speed services and increasing backbone traffic led to the T-3 (45 Mbps) backbone service implemented over the Advanced Network & Services, Inc. Network (ANSnet) that has replaced the older T-1 NSFNET technology. The growth of NSFNET promoted a global internetworking industry estimated as generating billions of dollars in annual revenues. Today the network’s backbone service carries data at the equivalent of 1,400 pages of single-spaced, typed text per second. This means the information in a 20-volume encyclopedia can be sent across the network in under 23 seconds!

With over 1,000 public and private research and educational institutions, NSFNET links an estimated 10 million users.

The NSFNET Connection

Today every major research, graduate, and four-year university is tied together through NSFNET, along with private and federal research institutions and industries. Over 700 colleges and universities are connected representing 80 percent of the nation's federally sponsored research. Further, NSFNET provides access to hundreds of high schools, libraries, community colleges, and smaller educational institutions. With over 1,000 public and private research and educational institutions, NSFNET links an estimated 10 million users. As the commercial Internet has grown, links are expanding between education and business communities which are promoted through expanding connectivity.

During November [1992], the network reached its first billion-packet-a-day-mark Network growth increases an average of 11 percent per month. The total number of connected networks grew from fewer than 200 to over 7,500, of which one-third are outside the United States. Today NSFNET makes it possible to reach educators and researchers in over 75 countries around the world. Recent surveys show over a million host computers are connected to the Internet, with an even greater number of individual users accessing those computers.

Continued on next page.
Getting Started on the Internet

By Dr. Philip Baczewski, Assistant Director of Academic Computing (ac12@umich.edu)

This article is a slightly edited and updated version of "The Network Connection" that appeared in the November/December 1991 issue of *Benchmarks* (Vol. 12, No. 9)

There is such a thing as too much information. You might say that the Internet illustrates this idea perfectly, once you go beyond utilizing just electronic mail. The network is so vast, that you can sometimes be overwhelmed by the number of services to the point of not knowing where to start. In past issues of *Benchmarks* we have announced a number of Internet services. Perhaps here it is appropriate to step back a bit and talk about the Internet in more general terms in order to categorize the types of services available as well as the access methods to those services. Hopefully, this article will provide you with a starting point to organize your Internet activity and perhaps help you evaluate which services are most important to your research, instruction, or learning.

Internet Services

For the sake of this discussion, I'd like to think of Internet services as falling into one of three categories:

1. Those related to file transfer using FTP (File Transfer Protocol).
2. Those accessible via an interactive Telnet session.
3. Services which utilize another protocol or a client/server model.

FTP is a capability of almost all computers which have access to the Internet. The FTP command or program allows you to establish an interactive file transfer session with a remote computer system on the Internet. FTP usually allows you to see a directory of files on the remote system, change directories, get a file from the remote system, or in some cases, put a file from your local system to the remote system's directory. Telnet is another staple of Internet activity.

Telnet is the program or command which allows you to establish an interactive session with a remote system. In other words, it allows you to log in to a remote system as if it were a local host. A number of Internet services can be accessed by "Telnetting" to an Internet host.

A number of other applications available for utilizing the Internet don't require you to establish an FTP or Telnet session. These programs will often retrieve and/or organize information, sometimes using a client/server model in which some processing of data occurs on both the local and remote hosts.

File Transfer Protocol (FTP)

The first of our three categories is fairly limited conceptually but perhaps the most widespread in practice (other than E-mail). Many Internet hosts implement a service called "Anonymous FTP" which allows anyone on the Internet to establish a file transfer session by using the user name, "anonymous." In most cases the files available are publicly distributed documents, shareware, or freely distributed software. Once you know how to accomplish an FTP file transfer, a world of sources opens up.
Since there are so many sites available for anonymous FTP, finding a program or document can be a daunting experience. Fortunately, a new Internet service has been made available which makes this process a bit easier. At this point, our discussion is getting a bit out of order to discuss a service which actually falls into categories two and three.

**Archie**

Archie is an "archive server;" it is a database containing names of files and the sites on the Internet where they are available for Anonymous FTP. You can telnet to archie.sura.net, log in as archie, and follow the instructions to query the archie database. There are also utilities on the VAX and Solbourne which employ a client/server architecture to search the database without your having to establish a telnet session. On either the VAX or Solbourne systems, you can receive a list of Anonymous FTP sites for a particular topic by typing archie topic, where topic is the name of a program or document.1

**Telnet to the World**

A number of universities are making various information services accessible via the Internet. The three most common types of services are

1. **On-line library card catalog systems.**
2. **Bulletin board systems (BBSs).**
3. **Campus-Wide Information Systems (CWIS).**

**On-Line Library Catalogs**

The availability of card catalogs is a natural progression from the automation of card catalogs within libraries. With other information systems, usefulness comes when your client population can access the system directly.

As systems were included in campus networks, it was a short step to making them available on the Internet. There are now over 350 library card catalogs, some as far away as Australia, accessible from the Internet, and that number is growing at a rapid pace.

**Documentation**

Billy Barron, the VAX/UNIX Systems Manager for Academic Computing Services has developed two documents that discuss accessing these various card catalogs. One, **Accessing On-line Bibliographic Databases in the North Texas Area** is available from the Computing Center (ISB 119) and can be referenced in all the General Access Labs. The other, **Accessing On-line Bibliographic Databases** is available via Anonymous FTP from ftp.unl.edu (129.120.1.1 — change to the library directory and get the aaaa.readme file for further information about the various document versions). It is also available in the General Access Labs for reference purposes, and for purchase in the University Store. (See related article on page 18.)2

**Bulletin Boards**

An increasing number of bulletin board systems are being made available via the Internet. Many of these were developed by various universities' computing support departments, while a number of publicly available "Free-Net" systems are beginning to appear around the country.

The Cleveland Free-Net system was the first of its kind and expansion of this concept is being promoted by an organization called the National Public Telecomputing Network. You may have heard of the Cleveland Free-Net in relation to Project Hermes, which makes available on-line the full text of recent Supreme Court decisions.3

There are more Internet BBSs than can be mentioned here, but if you are interested in using some of them you can monitor the USENET discussion group, alt.bbs.internet.4 A list of Internet BBS systems is posted there on a regular basis.

**Campus-Wide Information Systems**

Campus-Wide Information Systems (CWIS) are another service available through a Telnet connection. Like the on-line catalog systems, these are usually created to serve a particular campus and are then made available to other interested parties via the Internet.

CWISs usually use some type of menu-driven software to organize information relevant to a particular school. Items included might be the campus calendar, administrative procedures, or a university directory. If you are trying to find out such information about a university, their CWIS is probably a good place to look.

Princeton, Cornell, and the University of North Carolina have been leaders in making their systems available on the Internet as well as providing support for CWISs elsewhere, either by making their CWIS software available or by offering their systems as a model for other developments.

**Gopher**

One of the more popular programs used to maintain a CWIS is called Gopher (named for the mascot at the University of Minnesota, where the program was developed), Gopher programs are

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1 For more information on archie, see "Archie: A New Way to Get Information About Anonymous FTP Sites," in the October 1991 issue of *Benchmarks.*

2 For more information on accessing card catalog systems see "The Network Connection" in the October 1991 issue of *Benchmarks.*

3 For more information on Project Hermes see "U.S. Supreme Court Decisions Available On-line" in the February 1991 issue of *Benchmarks.*

4 Use AN/NEWS on the VAX and alt on the Solbourne to access USENET discussion groups.
also written to a standard which defines how data are stored and how they can be accessed.

This has enabled the development of Gopher client programs which can be run from a number of different types of computer systems (more about this later). The BITNET mailing list CWIS-L (bit.listserv.cwis-l on USENET) has much discussion about the management of CWISs, and is also a good source to find out about various systems around the U.S. A comprehensive list of systems is periodically posted to that discussion list.

Miscellany

A number of services are available, if not directly via the Internet, at least because of the Internet. In other words, you may or may not be establishing an Internet connection in order to utilize the service, but the service depends on an Internet connection at some point. One example is USENET news. Some USENET news reader programs maintain a database of USENET messages on the system where the news reader runs. Other programs are remote news readers; when you are reading news they actually use the network to transfer the text of messages that you wish to see. In either case, chances are that many of the posted messages were at some point transferred over the Internet long before you read them, even though USENET still remains in great use over UUCP networks.\footnote{UUCP stands for UNIX to UNIX CoPy and is a method of UNIX system networking which uses dial-up connections to transfer information.}

WAIS

Another class of programs used to access Internet services are those which employ a client/server architecture, such as the Archie program mentioned previously. Another relatively new service is Wide Area Information Servers or WAIS, a software technology being made available by Thinking Ma-

chines Corporation. WAIS “client” programs (via the waisssearch command) are installed on the VAX and Solbourne systems. They will allow you to enter search parameters and will then query WAIS server databases and, if any are found, return information on the topic you specified.\footnote{For more information on WAIS, see “WAIS Servers on the Internet” in the October 1991 issue of Benchmarks.} Such client/server applications do not require you to utilize the Telnet or FTP programs. Instead they require a specialized program to support their activities over the Internet. It is anticipated that the number of client/server applications running over the Internet will see dramatic growth over the next several years, especially as large-scale collections of on-line information become more prevalent and as the network grows to accommodate additional use.

Gopher, Again

Another client/server program which has recently contributed greatly to organizing and facilitating access to Internet services and information is Gopher.

While Gopher is frequently employed as a CWIS, its abilities go beyond the limits of a particular campus. Some of the information accessible via Gopher includes access to Internet libraries, access to on-line phone and mail directories, and access to on-line documents. Gopher clients have been written for many different systems.

All of the major central host systems at UNT have Gopher clients installed. (We are still in the testing stage right now.) To access Gopher, you can log on to a UNT host with your User-ID and then type Gopher. You would then see a menu of available services. You can also telnet to gopher.unt.edu or call 900 on the Sytek LAN and log in as gopher.

Since each client is tailored to the particular system on which it runs, the operation of the various clients may differ. The services available are generally the same, however. Clients exist for the DOS and Macintosh systems as well.

You can access both the PC and Macintosh clients in the ACS General Access Lab (ISB 110). They are easier to use and more powerful than the terminal-based client.

To run the PC client, chose gopher from the menu. To run it on the Macintosh, double click on the Gopher icon.\footnote{For more information about Gopher at UNT, see “UNT Gopher Academic Information Service,” in the June 1992 issue of Benchmarks.}

Summing it up

In your use of the Internet, it is important to decide on your objective and then select your method of access.

- If you want to log in to another system on the Internet, use Telnet.
- If you want to transfer a file, use FTP.
- If you are looking for a file or program on the Internet, try Archie.
- If you are wanting information on a particular university, check to see if they run a CWIS or BBS.
- If you need on-line information on a topic, try WAIS or Gopher.

The quest for information becomes manageable once the tools involved are better understood. Ideally, one day all of this functionality will be at your fingertips within a standard interface. I'd like to be able to enter a command like, “Connect me to a BBS where I can download the latest version of Kermit,” and without too much delay, then find myself with a connection to the appropriate computing system. In fact, the reality of that type command actually working may not be too far off. In the meantime, there's a lot of information out there; we just need to work a little harder to find it.
Take a Cruise on the Internet and Learn While You're Having Fun

By Claudia Lynch, Benchmarks Editor (as04@unt.edu)

If you've always wanted to learn more about the Internet but didn't really want to wade through a lot of documentation, take a cruise! Merit Information Services has produced a computer-based tutorial, "A Cruise of the Internet." It is designed for new as well as experienced Internet "navigators." The cruise will introduce you to Internet resources as diverse as supercomputing, minorities, multimedia, and even cooking. It will also provide information about the tools needed to access those resources, such as ftp, telnet, archie, Gopher, and WAIS.

Try it

The cruise is available for Macintosh, Macintosh II, LC, and Quadra computers. It is also available for Windows. A copy of the cruise can be found running on the Macintoshes in the ACS General Access Lab (ISB 110).

Get Your Own

If you want to get a copy to run on your own computer (see the article on page 14 of this issue for more information about anonymous FTP):

1. ftp to nic.merit.edu (On a Macintosh, use Fetch to connect. Alternatively, you can use any other software that does Anonymous FTP, but you will have to use BinHex, or StuffItLite to convert the .hqx file to a Mac executable form.)

2. At the user name: prompt type anonymous, at the password: prompt type guest.

3. Get the files.
   - If you want to get the Macintosh files, do the following:
     - change to the resources directory
     - get merit.cruise2.mac.readme
     - binary
     - get merit.cruise2.mac.hqx
   - If you want to get the Windows files, type the following commands:
     - cd /resources/
     - dir
     - get merit.cruise2.win.readme meritcrz.txt
     - binary
     - get merit.cruise2.win.exe meritcrz.exe

4. Read the "readme" files and follow the instructions.

System Requirements

Macintosh

The Cruise will run on any color Macintosh which is capable of displaying 256 colors. To run the tutorial you will need:

- A Macintosh II, LC or Quadra series computer.
- 8-bit color and any color monitor (12" minimum).
- System 6.0.5 or 7.x.
- Approximately 3 MB of disk space.
- 4 MB RAM is recommended.

Windows

The tutorial will run on any IBM-DOS or DOS-compatible computer which is equipped to display 256 colors at an aspect ratio of 640 x 480. Make sure you have:

- An IBM-DOS or DOS-compatible computer.
- XGA- or XGA-compatible adapter set to display 256 colors at 640 x 480.
- Microsoft Windows version 3.1 running in enhanced mode.
- Approximately 1.5 MB of disk space.
- 2 MB RAM minimum.

Further Information

According to Merit, you may copy and distribute the Cruise without charge. However, you must include the meritcrz.txt file with the Cruise and you may not charge any fees for the distribution of the Cruise.

For more information and/or comments send E-Mail to:
cruise2fbfeedback@merit.edu
Tour the Internet From Your Mac

By Claudia Lynch, Benchmarks Editor (as04@unt.edu)

You’ve taken the cruise (see article on page 17), now try a tour. The NSF Network Service Center (NNSC), a project of the Laboratories business unit of the Systems and Technologies Division, has developed a Tour of the Internet in HyperCard format for novice network users. According to the Internet Tour README file, “the stack has basic information including history, sample email, ftp, and telnet sessions, and a glossary. The Tour is intended to be a fun and easy way to learn about the Internet.”

Try It

A copy of the tour can be found running on the Macintoshes in the ACS General Access Lab (ISB 110). Go by and try it out.

System Requirements

If you want to get a copy of the tour for your own Macintosh, you will need:

- Macintosh system 6.0.5 or higher.
- HyperCard 2.
- The screen fonts:
  - Palatino 18, 14,12, and 10 (included with Macintosh system software).
  - Helvetica 14 and 12 (found in the HyperCard Fonts suitcase that comes with HyperCard).
  - Courier 12 (included with Macintosh system software).
- StuffIt 1.5.1 or StuffIt Classic.
- At least 1.5 MB disk space.

To Get the Files

There are two methods of transferring the Internet Tour over the Internet from NNSC to you.

1. Use FTP (See the article on page 14 this issue for more information about anonymous FTP):
   - ftp to nnscl.nsf.net (Use Fetch to connect. Alternatively, you can use any other software that does Anonymous FTP, but you will have to use StuffIt to convert the .hqx file to a Mac executable form.
   - At the user name: prompt type anonymous, at the password: prompt type guest.
   - Get the files:
     - change to the internet-tour directory (type cd internet-tour).
     - type ascii
     - type get Internet-Tour-readme

2. type binary
   - type:
     - get Internet-Tour4.0.2.sit.hqx

Send a mail message to info-server @nnscl.nsf.net The text of the message must be in the following format:

REQUEST: INTERNET-TOUR
TOPIC: INTERNET-TOUR
TOPIC: HELP
REQUEST: END

Read the “readme” file and follow the instructions.

Popular Library Guide Available for Purchase

Billy Barron’s popular guide, “Accessing On-Line Bibliographic Databases” is now available in paper format as a spiral bound book. The book covers how to connect to libraries on the Internet.

The book can be purchased from the UNT University Store. It is currently priced at $15.00. If you wish to order the book by mail, add $2.50 for postage & Handling and $1.27 for tax. Payments can be made by Mastercard, Visa, American Express or a check drawn on a U.S. bank.

To order, send a written request noting the book title and author to:

University Store
P.O. Box 13647
Denton, TX 76203-3647

All shipments will be made by UPS, so you need to make sure to put a shipping address and not a P.O. Box as a return address.

The guide will continue to be available free via anonymous FTP on ftp.unt.edu in the library directory.
Networking

The Government Connection

By Claudia Lynch, Benchmarks Editor (a04@unt.edu)

American government is finally making it into the 1980's! At the White House, typewriters are being set aside for personal computers and electronic mail systems are being utilized more than telephones. The following announcement appeared in Communications Daily (1/19/93):

The Clinton Administration will become the first presidency to have an official responsible for making official Presidential documents widely available using electronic distribution. Jonathan [Jock] Gill has been named Director of Electronic Publishing and Public Access E-mail. During the campaign, an E-mail system he created answered some 5,000 queries, most being sent out automatically. He will work with Jeff Eller, the new deputy assistant to the President and director of Media Affairs. Eller is said to have moved computer communications into the mainstream of political campaigning. Eller made Clinton's position papers available via such electronic venues as CompuServe, GEnie and Internet. Clinton's communications team is said to favor direct communication with the public via electronic media. Eller hopes to make the White House a model for other federal agencies in this regard.

Getting Your Message Across

Even though the White House E-mail system is still in the developmental stages, you can contact the Clinton administration via electronic mail. The addresses are as follows:

- CompuServe: 75300.3115
- Internet: 75300.3115@compuserve.com
- America Online: CLINTON PZ

Because the developmental nature of the E-mail system, however, it is probably prudent to still use the "traditional" method of making your opinion known — if you want someone to respond to your message in a timely manner.

White House Address and Phone Numbers:

- The White House
  1600 Pennsylvania Avenue, N.W.
  Washington DC 20500
  FAX: (202)456-2883
  General Comment Line — PHONE: (202) 456-1111
  Comments when bill signed or vetoed — PHONE: (202) 456-2226
- Federal Information Center — PHONE: (800) 726-4995
- President Bill Clinton — PHONE: (202) 456-1414
- Vice President Al Gore — PHONE: (202) 456-2326, (202) 456-7125
- Hillary Rodham Clinton — PHONE: (202) 456-6266
- Mike Espy, Agriculture — PHONE: (202) 720-2791 FAX: (202) 720-2166
- Ron Brown, Commerce — PHONE: (202) 482-4901 FAX: (202) 482-4901
- Les Aspin, Defense — PHONE: (703) 697-5737
- Richard Riley, Education — PHONE: (202) 401-1576 FAX: (202) 401-3130
- Hazel O'Leary, Energy — PHONE: (202) 586-5575 FAX: (202) 586-0834
- Carol Browner, EPA — PHONE: (202) 260-2080 FAX: (202) 260-6257
- Donna Shalala, Health — PHONE: (202) 690-6867 FAX: (202) 690-6608
- Henry Cisneros, HUD — PHONE: (202) 708-1420
- Bruce Babbitt, Interior — PHONE: (202) 208-6416 FAX: (202) 208-6956
- Robert Reich, Labor — PHONE: (202) 219-7316 FAX: (202) 219-8699
- Warren Christopher, State — PHONE: (202) 647-6575 FAX: (202) 647-7120
- Janet Reno, Attorney General — PHONE: (202) 514-2007 FAX: (202) 514-5331
- Fredric Pena, Transportation — PHONE: (202) 366-3580
- Lloyd Bentson, Treasury — PHONE: (202) 622-2960 FAX: (202) 622-1999
- Jesse Brown, Veterans — PHONE: (202) 535-8165 FAX: (202) 535-8498

Keeping Up With the Clinton Administration Electronically

Although the White House isn't quite ready for extensive communication via electronic mail, you can still keep tabs on what is going on there by accessing The White House Press Service through Gopher.

To access this service, choose the following menu topics (in the order listed) from any Gopher host system on cam-
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pus. (See page 16 for more detailed information on Gopher):

1. Other Gopher and Information Services
2. North America
3. USA
4. California
5. UC Santa Cruz, InfoSlug System
6. The World
7. White House Press Release Service

You can also choose other governmental topics from “The World” directory, including:

- U.S. Presidential Campaign ’92 Documents
- U.S. State Department Travel Advisories

You can sign up to receive various documents (press releases, etc.) by sending mail to Clinton-Info@campaign92.org. Include the phrase “request information” in the body of the mail message.

Another source of information on the Clinton White House is the CLINTON@MARIST list. To subscribe, send a mail message to LISTSERV@MARIST with the following text:

SUBSCRIBE CLINTON Your_full_name
Where Your_full_name is your first and last name.

A List of Federal Job Openings

By Claudia Lynch, Benchmarks Editor (as04@unt.edu)

In this day and time of scarce job opportunities, the FEDJOBS list on LISTSERV@DARTCMS1 could be a real “lifesaver.” You can get information from the list without subscribing to it. To obtain a list of available files, send a mail message to the LISTSERV@DARTCMS1 with the command INDEX FEDJOBS in the body of a mail message. To get a file you see listed in the index, use the command SEND filename filetype, for example SEND DALLAS TXT, in the body of the mail message.

To automatically receive copies of all job files, whenever they are updated, send mail to LISTSERV@DARTCMS1 containing the command: AFD ADD FEDJOBS PACKAGE F=MAIL These files can also be obtained via Anonymous FTP from DARTCMS1.DARTMOUTH.EDU in the FEDJOBS directory. (See the article on page 14 for more information about ftp.)

If you would like to subscribe to the FEDJOBS list send the following in a mail or interactive message to LISTSERV@DARTCMS1 or LISTSERV@DARTCMS1.DARTMOUTH.EDU:

SUBSCRIBE FEDJOBS Your_full_name
Where Your_full_name is your first and last name.

Clinton/Gore Technology Initiative

Reprinted from ALAWON, ALA Washington Office Newsletter: An electronic publication of the American Library Association, Washington Office (Vol. 2, No. 7, February 26, 1993). Footnotes have been added and some additional information has been supplied between braces {}.

President Clinton and Vice President Gore announced a new initiative, “Technology for America’s Economic Growth, A New Direction to Build Economic Strength,” on February 22.¹ This paper gives further details about the Administration’s stimulus and investment proposals related to technology. According to an accompanying release, the President has asked Gore to “play a leadership role in implementing these new initiatives.” Information infrastructure investments will include:

- A. Implementation of the High-Performance Computing and Communications Program established by the High-Performance Computing Act of 1991 introduced by Vice President Gore when he served in the Senate. Research and development funded by this program is creating (1) more powerful super computers, (2) faster computer networks and the first national high speed network (NREN), and (3) more sophisticated software. This network will be constructed by the private sector but encouraged by

¹ The 40-page text of this initiative is available from the Coalition for Networked Initiatives. To get it, send the following message get cnl-bigideas whose paper to LISTSERV@CNL.ORG You can subscribe to an ongoing discussion of White House technology policies by sending the message to LISTSERV@CNL.ORG with the text SUBSCRIBE cnl-bigideas Your_full_name
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federal policy and technology developments. In addition, it is providing scientists and engineers with the tools and training they need to solve "Grand Challenges," research problems — like modeling global warming — that cannot be solved without the most powerful computers.

B. Create a Task Force on Information Infrastructure. Government telecommunication and information policy has not kept pace with new developments in telecommunications and computer technology. As a result, government regulations have tended to inhibit competition and delay deployment of new technology. For instance, without a consistent, stable regulatory environment, the private sector will hesitate to make the investments necessary to build the high-speed national telecommunications network that this country needs to compete successfully in the 21st Century. To address this problem and others, we will create a high-level inter-agency task force within the National Economic Council which will work with Congress and the private sector to find consensus on and implement policy changes needed to accelerate deployment of a national information infrastructure. [547 million proposed for FY93 for networking and computing applications at NIST/NIH/NASA/NSF.]

C. Create an Information Infrastructure Technology Program to assist industry in the development of the hardware and software needed to fully apply advanced computing and networking technology in manufacturing, in health care, in life-long learning, and in libraries.

D. Provide Funding for Networking Pilot Projects through the National Telecommunications and Information Administration (NTIA) of the Department of Commerce. NTIA will provide matching grants for states, school districts, libraries, and other non-profit entities so that they can purchase the computers and networking connections needed for distance learning and for hooking into computer networks like the Internet. These pilot projects will demonstrate the benefits of networking to the educational and library communities. [564 million proposed for FY93.]

E. Promote Dissemination of Federal Information. Every year, the Federal government spends billions of dollars collecting and processing information (e.g., economic data, environmental data, and technical information). Unfortunately, while much of this information is very valuable, many potential users either do not know that it exists or do not know how to access it. We are committed to using new computer and networking technology to make this information more available to the taxpayers who paid for it. In addition, it will require consistent Federal information policies designed to ensure that Federal information is made available at a fair price to as many users as possible while encouraging growth of the information industry.

Methods of using technology to make government more efficient and more responsive will include the following:

New Ways to Communicate. In the past, citizens typically had to go to a federal office during business hours to receive benefits or services. A government that uses technology to expand its hours of service and communicate with the public electronically will deliver services and benefits where people need them, not where the government provides them. We will make it possible for people to communicate with a Federal agency using electronic as well as conventional mail. Automated terminals may be placed in public locations such as shopping centers or post offices that could provide in-hours access to a variety of government services.

Access to Government Information. Government information is a public asset. Markets depend on sound and timely economic decisions. Federal geographic and climatological information allows farmers to apply fertilizer more efficiently, local governments to formulate environmental policy, and public safety officials to prepare for natural disasters. The government will promote the timely and equitable access to government information via a diverse array of sources, both public and private, including state and local governments and libraries. The development of public networks such as the Internet and the National Research and Educational Network (NREN) will contribute significantly to this diversity, enabling government information to be disseminated inexpensively to a broad range of users.

Policy and Technology Infrastructure. Many of the government's policies in such areas as privacy, information security, records management, information dissemination, and procurement will be updated to take into account the rapid pace of technological change. In addition, the government must apply the economic principle of maximizing return on investment when acquiring information technology, and be able to acquire commercial, off the shelf technology quickly and easily.

2 "The NREN Program - Report to Congress" as issued by the Director of the Office of Science and Technology on December 9, 1992 is available in ASCII, WordPerfect 5.1, and PostScript files via Anonymous FTP from express.cise.nsf.gov in the directory pub/test. The file names are readme.txt, nrencongr.ascii, nrencongr.ps, nrencongr.wpt. See the article on page 14 for more information about Anonymous FTP.
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Networking and Computer Security

By Billy Barron, VAX/UNIX System Manager (billy@unt.edu)

While the rest of this issue has focused on the positives of networking, this article will focus on the darker side of networking. With increased access to network resources comes the fact that more people have access to at least the doors of your computers. Unfortunately, some of these people are irresponsible and will try to break into your computers and accounts.

Desktop Microcomputers

The microcomputer sitting on your desk, due to its simplicity, does not have problems with people trying to break into it. However, it is also the most susceptible to computer viruses which can be spread through networks (mainly via file downloading). There are several good virus protection programs available.

PC Virus Protection

For the PC users, we recommend F-ProT. UNT has a site license for F-ProT for on-campus users and it is free to home users. You can get it from ISB 119 (faculty & staff), ISB 110 (students), or via Gopher or Anonymous FTP to ftp.unt.edu in the /pub/antivirus/ibm directory. (See page 16 of this issue for more information about Gopher and the page 32 for more information about F-ProT).

The Network Connection

By Dr. Philip Baczewski, Assistant Director, Academic Computing Services and BITNET INFORREP (ael2@unt.edu)

This column is a continuing feature of Benchmarks intended to present news and information on various aspects of wide area networks.

Sending that Binary File

If you actively use BITNET or the Internet to communicate with other professionals in your field, chances are you've either tried or needed to send a WordPerfect or executable file over one of these networks. Maybe you've tried and gotten a message back like, "just what was that you sent me anyway?" If this situation sounds familiar, then you also may have discovered the distinction between a binary file and a text file.

A computer file is made up of a collection of bytes (eight-digit binary numbers) which can represent characters, numbers, or instructions for a computer's CPU. A WordPerfect document or an executable program file is commonly referred to as a binary file, a throwback term meaning a file containing bytes which don't represent printable characters. In a binary file which is an executable program, the bytes represent instructions to the computer's CPU. A binary file can also be a specially formatted data file. A WordPerfect file falls into the latter category, since it not only contains your printable text, but also contains formatting information in the form of unprintable byte codes. The bottom line? Since the standard methods of sending mail and files on BITNET and the Internet are designed to send printable text messages, sending a binary file is not always easy. But it's not impossible.

uuencode and uudecode

The most common method for sending a binary file over BITNET or the Internet is to use a program named uuencode to translate the "unprintable characters" into combinations of printable characters which can then be transmitted via normal means (i.e., MAIL or SENDFILE). The only catch is that the recipient of your message must have access to a program called uudecode in order to translate the file back to its useful binary format. Fortunately, these programs are commonly available for many different computer systems.

uuencode and uudecode originated in relation to a network called UUNet (a UUCP network — hence the "UU" names) for the same reasons that are outlined above. UUCP stands for "Unix to Unix Copy" and you will find uuencode and uudecode installed on most UNIX systems. The usefulness of these programs and the connection of various types of computers to UUCP networks led to the development of versions of the programs for VAX/VMS, PC, Macintosh, Amiga, and other computers. At the end of this article is a list of Anonymous FTP sources for PC and Macintosh versions of these programs.

1For more information about Anonymous FTP see the article on page 14.
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Using the Programs

"uuencode" and "udecode" programs are usually very easy to use. If you are using a PC on the UNT campus you might want to acquire the version of these that’s available for Anonymous FTP at ftp.unt.edu in the /pub/micro/ibm/utility directory. The filename uuencdec.arc is an archive file containing PC versions of "uuencode" and "udecode" and the C source code for them. (You will need the arc program to extract them from the archive, using the command arc -x uuencdec). You can use these programs as follows:

- To encode a file — `uuencode filename.ext > newname.ext`
- To decode a file — `udecode filename.ext`

(On other systems, consult the available on-line documentation for the exact command syntax.)

Since encoding a file will usually increase its size, it is a good idea to process large files with an archiving program that supports file compression. Some examples are `arc`, `zip`, `pkzip`, `lharc`, and `zoo`. Once again, if you use such a program you must be sure that the recipient has access to the same program. Fortunately, these programs too are either freeware or shareware and are usually easy to acquire.

So, if you are a coauthor of an article with a colleague across the country and you wish to exchange the WordPerfect version via Internet or BITNET mail, you might use the following sequence of commands:

- `pkzip article article.wp` — creates a file called `article.zip` which contains a compressed version of your WordPerfect file.
- `uuencode article.zip > article.zuu` — creates an encoded file that can be mailed over BITNET or the Internet (BITNET users can also use SENDFILE).

If you received such a file, you would use the following commands to convert it back to a format that is understandable to WordPerfect:

- `udecode article.zuu` — decodes the file and creates a binary file (in this example, an archive file).
- `pkunzip article` — extracts the WP file from the archive. ²

Binhex and Stuffit

No, that subheading is not an expletive. The Macintosh, being an intrinsically different microcomputer, supports some different programs which perform the same function as "uuencode" and "pkzip." A version of "uuencode" does exist for the Macintosh, however, you will more commonly find Macintosh files which have been encoded using Binhex. Binhex (versions 4 and below) functions similarly to "uuencode" in converting a binary file to printable characters. Binhex files usually have an extension of "~hex." A program called Stuffit is a file archive and compression utility. (Some versions of Stuffit can also decode Binhex files.) Stuffit files usually have the extension ".sit." Another file compression program is Compact Pro. All of these programs are shareware and can be acquired via Anonymous FTP.

²For more information on acquiring PKZIP, see the article on page 31 of this issue of Benchmarks.

Summing it All Up

Sending binary files over wide area networks may involve a little extra work on your part, but the end result in saved work and time may be well worth it. Eventually, mail programs will probably include standard compression and encoding features so that the above steps won’t be necessary. Currently by default, Pegasus mail encodes any mail message attachments which are binary files, however, the recipient still either needs to be also using Pegasus mail, or needs access to a uudecode program. The emerging MIME (Multipurpose Internet Mail Extensions) standard may be the solution which eventually enables different mail programs to automatically encode and decode binary attachments without any intervention on your part.³

Some Sources

- PC MS-DOS: `uuencode/udecode` and PKZIP (local source)
  - Host: ftp.unt.edu
  - Location: /pub/micro/ibm/utility
  - File names: uuencdec.arc
    pkz204g.exe (self extracting archive)

- PC MS-DOS: `uuencode/udecode` (remote source)
  - Host: wuarchive.wustl.edu
  - Location: /mirrors3/archive.
    unich.edu/msdos/un_indexed
  - File name: uuencdec.arc

- PC MS-DOS: PKZIP (remote source)
  - Host: procyon.cis.ksu.edu
  - Location: /pub/PK/Arc-lib/pkzip
  - File name: pkz204g.exe

³For more information see “MIME: Multimedia Across the Internet,” in the October 1992 issue of Benchmarks (Vol. 13, No. 8, p. 9) and the article on page 34 of this issue.
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- Macintosh: Stuffit and Compact Pro (local source)
  - Host: ftp.unl.edu
  - Location: /pub/micro/mac
  - File names: compact-pro-132.hqx
    stuffit16.sit

- Macintosh: Binhex, Stuffit, and uuecode/uudecode
  - Host: wuarchive.wustl.edu
  - Location: /mirrors2/info-mac/util
  - File names: binhex-40.hqx
    binhex-50.hqx
    binhex4.bin
    stuffit-converter-302.hqx
    stuffit-deluxe-304-updater.hqx
    stuffit-deluxe-305-updater.hqx
    stuffit-expander-301.bin
    stuffit-expander-301.hqx
    stuffit-frontier-303.hqx
    stuffit-lite-305.hqx
    stuffit-spacesaver-102-updater.hqx
    stuffit-spacesaver-103-updater.hqx
    stuffit-spacesaver-104-updater.hqx
    uu-lite-13.hqx
    uu-lite-14.hqx
    uutool-232.hqx

A Weighty Subject

The following item was submitted to rec.humor.funny under the title “Job Security for Tech Writers.” It reportedly was spotted in a New Scientist magazine article on “the paperless office.”

A modern US Navy cruiser now requires 26 tons of manuals. This is enough to affect the vessel’s performance.

List of the Month

Each month we will highlight one BITNET, Internet, or USENET Special Interest Group (SIG) mailing list. This month’s list...

NETTRAIN on LISTSERV@UBVM.BITNET Teaching Network Use or LISTSERV@UBVM.CC.BUFFALO.EDU (Formerly NET-TRAIN)

NETTRAIN is a discussion list for librarians, computer support personnel, computer jocks—all those who are involved in teaching others how to use Bitnet and the Internet. Topics for discussion include such areas as: how to divide responsibility for teaching internetwork use; methods of teaching and resources used; and policies on access (faculty, student, staff) to the networks. NETTRAIN will also serve as a clearinghouse for Bitnet and Internet training materials developed in a variety of contexts and for a variety of needs. NETTRAIN is, therefore, intended for experienced users of BITNET and the Internet, *not* for beginners looking for help with basic questions.

Archives of NETTRAIN and related files will be stored in the NETTRAIN FILELIST. To receive a list of files, send the command INDEX NETTRAIN in the BODY of a mail message to LISTSERV@UBVM.BITNET or LISTSERV@ubvm.cc.buffalo.edu.

To subscribe to NETTRAIN, send the following command to LISTSERV@UBVM on BITNET or LISTSERV@UBVM.CC.BUFFALO.EDU on the Internet via the BODY of an E-mail or BITNET interactive message:

SUBSCRIBE NETTRAIN your full name

For example: SUBSCRIBE NETTRAIN Bruce Wayne

If you are a staff or faculty member on campus who is involved in training others on Wide Area Network use, then this list may be very helpful to you. Note that as the above description states, this list is not for beginners, but for those who are experienced network users and who are training others. If you are a beginner, you may be interested in the mailing list HELP-NET@TEMPLEVM which was featured as the “List of the Month” in the June 1992 issue of Benchmarks.
Mac Virus Protection

For the Mac users, we recommend the combination of disinfectant and gatekeeper. Both of these programs are freely available. They can be acquired via Gopher or Anonymous FTP to ftp.unet.edu in the /pub/antivirus/mac directory.

It is very important to keep these programs updated to the latest version as new viruses appear regularly.

File Servers and Multiuser Systems

These kinds of computers are much less susceptible to viruses because of their security systems and the fact that fewer viruses exist for these platforms. However, the big problems on these systems are ones of account security.

Most Common Problems

The most common problem seems to be one of account sharing. When you are given an account through normal channels, it is for you and you alone unless otherwise noted. While the UNT Computer Security Policy is a little vague on whether or not you are allowed to share your account, it clearly states that you are responsible for anything someone else does in your account once you give out the password. To make matters worse in these cases, it is sometimes the case that this person will then give out your password to other people on the network. Then at this point, several people could potentially get you into a lot of trouble and potentially cause damage to the UNT computer systems.

The other major problem is that most networks have computer hackers out there who may try to break into your computer accounts. If you have an account on one of the host systems or have a UNIX workstation on the campus Ethernet, you are potentially at risk from hackers anywhere on the Internet (basically the whole world). However, there are steps you can take to minimize your risks.

If you have a UNIX workstation, feel free to call over and talk to us about steps you can take to tighten up your system's security. The default configuration of the UNIX operating system as shipped by some vendors is insecure, but can be easily corrected.

Password Protection

The most important line of security on any system is the password. Good password security is up to the user as well as the system administrator. Using a password that is in a dictionary or is someone's name is slightly inconvenient for the person trying to break into your account, but that is all. If they are determined, they will be able to get into your account. If possible, use a combination of letters, numbers, and special characters.

A better method to come up with a password is to think of a sentence, such as, "I don't think so, Tim!" Then make a password out of it by some method such as the first letters of each word and include punctuation. (Note: unfortunately, some systems limit the use of punctuation in a password.) In this example, the password would be "Idts,T!" Alternatively, you might use the last letters and get "tiko,m!"

Also, the longer your password the better. A password of four characters or less should not be used. Unfortunately, some operating systems do not allow passwords greater than eight characters.
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Recommendation: This book is more on the social/technical aspects of WANs. The second half is a list of the state of worldwide networking as of 1989-1990.

- The Internet Companion by Tracy LaQuey with Jeanne C. Ryer. —$10.95. It can be ordered from Addison-Wesley.

Recommendation: A book for the novice who might not even know what the Internet is.

- %@::: A Directory of Electronic Mail Addressing & Networks by Donnalyn Frey and Rick Adams — $27.95. It can be ordered by calling (800) 998-9938.

Recommendation: Basically the same information as the second half of The Matrix in a less verbose form. Also, less comprehensive.

- Crossing the Internet Threshold: an instructional handbook by Roy Tennant, John Ober, and Anne Lipow — $40+ It can be ordered by calling (501) 841-2636.

Recommendation: A training supplement, but is a very concise, clear, and brief guide to the Internet. It is highly recommended, but a bit pricey.

Question: I want to access the Internet from off-campus. How do I do this?

Answer: If you are not related to the University, contact a commercial Internet service provider, such as PSINET (800-82PS182). They will tell you how to get connected from your home. If you are related to the University, follow these steps:

1. Get a modem for your home computer. The faster the better. Try to stay with a Hayes compatible modem.
2. Install the modem. Make sure and follow the installation instructions in the manual that comes with your modem.
3. Acquire a communications package. You can get Procomm Plus and MS-Kermit from Computing Center Support Services in ISB 119.
4. Install the communications package. Read any documentation available about the package you have chosen.
5. Apply for a host account. We recommend using the VAX or Solbourne. Account forms are available from Computing Center Support Services in ISB 119.
6. Learn the UNT dial-up phone numbers. They can be found on the inside front cover of Benchmarks and/or in the Procomm Plus dialing directory.
7. Dial up the host computer and start learning about it. Documentation on the host systems is available from Computing Center Support Services in ISB 119, short courses are offered, and information there is also in Gopher. (See page 14 for more information on Gopher.)
8. Learn about the Internet. Documentation available from Computing Center Support Services in ISB 119, short courses are offered, and there is information in Gopher. In addition, there are tutorials available (see pages 17 and 18 of this issue of Benchmarks) and the commercial books mentioned earlier in this column.

Security Group Formed

By Billy Barron, VAX/UNIX System Manager (billy@unt.edu)

The Computing Center has formed a security group for internal purposes and to assist the rest of the campus with its security needs. The group has many objectives, including:

1. Making sure the University is in compliance with State computer security requirements.
2. Reviewing and making suggestions to be included in the UNT Computer Security Policy document.
3. Identifying the computer resources guardians, data custodians, etc. for the UNT Computer Security Policy document.
4. Establishing incident reporting and reaction procedures.
5. Auditing the security of computer systems upon request.
6. Developing recommendations for system managers on how to secure their computer systems.
7. Coordinating the distribution of security patches (software).
8. Monitoring security mailing lists and passing on relevant information.
9. Educating system managers and users alike in security issues.

The group is led by Susan Pierce (565-4065). Currently, the other members are Kevin Mullet (565-4168) and Billy Barron (565-2446). In the future, one or two more members will be added. If you have any security questions, concerns, or incidents to report, please feel free to give any of us a call. Security incidents are being taken very seriously and will be given immediate attention by the members of the group.
February 16, 1993

Richard Harris distributed the final version of the Strategic Plan, reminding members that the Plan was written in a very general manner in order to meet State deadlines as well as the State-mandated requirements, and should serve as the starting point for a planning process that is hoped will dovetail with the University plan.

**Instructional Technology Committee**

Ray Vondran reported on the recent activities of the Instructional Technology Committee, which was established late last fall on recommendation of the Provost. After an initial meeting where everyone shared their interests and frustrations, the committee asked Roger Simon to attend a meeting in order to inform the committee about the planned renovation of several classrooms. Barry Wagner, Director of CIS was also asked to attend to explain the changes taking place in CIS and to tell what CIS’s new role is for providing instructional services.

The IT Committee walked into the “end” of a planning process on the classroom renovation project; a consultant had been hired; a committee had been formed; and regardless of what the IT Committee’s feelings were, only a few changes could be made this late in the planning process. However, a subcommittee was immediately formed to look into the details of this project. The subcommittee consisted of Ken Brumbaugh (Chair), Bill McInerney, George Stonequest, Mark Withers, Hank Warrell, and Paul Gandel. The following recommendations came from that subcommittee:

1. That the Large Classroom Committee, headed by Roger Simon, needed to gather input from the instructors and departments who actually intend to use the specific new classrooms.

2. That CIS should organize immediate meetings between themselves, the architect, and the classroom users, to discuss individual plans for each room (including staff training and equipment maintenance).

3. That the general construction and audio plans for the rooms as a whole be accepted, but that a reassessment of the video plans be done.

At a later meeting of the entire IT Committee and Roger Simon, it was determined that it was also too late to make any changes in the type of video equipment that would be in the new classrooms, since much of it had already been purchased. A very positive outcome of all of this has been the bringing together of key groups for interaction which has laid the foundation for better planning in the future. Vondran stated that he believes the Instructional Technology Committee can be a vital link to keep all of the groups communicating.

A resultant charge to the IT Committee is to develop a standard for classrooms, which can be used as a guideline for future renovations. In addition, there will be further discussion of minimum standards for training of faculty on the use of new technology. Another issue to be addressed will be the planning of the renovation of the Lab School Gym. Future meetings of the IT Committee will be held on the first Wednesday of each month, 12:30-2:00, in 218 ISB and any interested IRC members are invited to attend.

In the discussion that followed Vondran’s report, Paul Dvorak suggested the purchase of user-friendly equipment and the development of curriculum suited for use in a high-tech environment. Without appropriate curriculum, the high-tech equipment would be worthless. It was noted that CIS is funded to design and develop a specialized curriculum for use in one of these high-tech classrooms, if any faculty are interested in presenting their idea to CIS.
SACS Self-Study
Paul Gandel, Chairman of the SACS Compliance ad hoc Committee (a subcommittee of the Strategic Planning Committee), distributed a draft of responses to questions that the IRC needs to answer. The questions were formulated by Virginia Wheless and Richard Harris as part of the SACS self-study. Gandel reviewed the document with the Council and asked for further input from members.

In the discussion that followed, it was pointed out that the needed policies regarding the allocation of computing resources and the assignment of priorities for computer use, as well as the establishment of a systematic way to review these and other computing policies, must be written. The Chair stated that until the completion of the project of all of the Program Committees of the IRC, the Strategic Planning Committee will proceed with the completion of the SACS Self-Study.

E-Mail Task Force
Bill Buntain reported that a technical working group supporting the E-Mail Task Force has begun evaluating E-Mail products again after having devoted a major effort in the past few months to solving major post Office Mail problems on the CC1 server. The working group plans to forward their findings to the Task Force in about a month. Buntain stated that their objective is to have a recommendation back to the IRC at its April meeting.

Building Wiring Project
Bill Buntain reported that there has been some delay in the progress of the building wiring because it was decided to use a higher grade of wiring which will allow for a better future growth path. It is anticipated that the wiring will begin around the first of April. Buntain further reported that bids for the next phase of the fiber optics backbone project will go out next month to expand the fiber backbone out from the Chilton Hall lab site.

Buntain also reported that there has been a request to wire Edwards Hall, Chestnut Hall and Highland Hall, three buildings that were not included in the original plan. The cost estimate for these projects is approximately $50,000. Richard Harris stated that should this money be available under the current budget, he will bring the issue to the IRC Steering Committee later this week in hopes of securing another source of funding to go ahead with these 3 buildings, as time permits.

The Council agreed that Richard should request that the same or greater amount be appropriated in each year's budget, as long as necessary, in order to continue the wiring of the campus.

Site Licenses
Buntain reported that the Computing Center is looking into site license arrangements with Borland, as well as WordPerfect's Customer Advantage Program. In conjunction with this, the Computing Center has been interested in minimizing the cost of administering the distribution of these products.

General Access Labs
Cengiz Capan reported on the Feb. 2 GALC meeting, at which a subcommittee was set up to look at supporting the Adaptive Lab, reported that a budget 3 times greater than last year's would be needed to adequately meet the needs of all disabled students on campus. The number of disabled students continues to increase every year, so there is a real need to support them. Capan plans to talk to other departments to see if they could share the funding burden.

The School of Visual Arts presented a request to the GALC for funding for a General Access Lab of their own, to be partially funded by a $3.00 fee being imposed on their students. The consensus of the group was that the students of the School of Visual Arts could be adequately served by the existing labs with the purchase of some specialized software to be used in them. GALC asked the School's representative to come back to the GALC if after this next year they felt that their needs had not been adequately met.

Capan reported that the committee has been looking at the utilization of the General Access Labs throughout the past semester by the use of the "Checkin" system, and will be able to use the data in the budgeting process which will begin in GALC's March meeting.

Other Business
The Council discussed the proposal for formation of an Administrative Committee as presented by Coy Hoggard at the January 12 meeting. Ray Vondran explained that this would be an advisory committee to the IRC with one member of the council serving either as chair or liaison to the IRC. A motion was passed to accept the proposal for the Administrative Committee, with the understanding that as University situations change, the makeup of the committee would need to be reviewed and appropriate shifts made.

Paul Dworak stated that he will have a report at the next IRC meeting as to how the Faculty Senate Subcommittee can interface with the new Instruction Committee when it is formed. The makeup of the Instruction and Research committees was briefly discussed and the Chair informed the Strategic Planning Committee to write a proposal for the formation of those two committees and present it at the March 23 meeting.

Richard Harris reported having attended a Statewide Telecommunications Executive Committee meeting where a joint proposal was presented by Texas A & M and the University of Texas to take on the statewide networking as contractors, with the General Services Commission handling the purchasing of equipment. Harris encouraged the committee to look at the state providing the raw circuits and the universities contracting for THENSET services.
Converting Batch Files From MUSIC To CMS

By George Morrow, Academic Mainframe Consultant (as01@unt.edu)

If you have been using MUSIC to run jobs on the Academic Mainframe, it is likely that those jobs were actually submitted to the MVS/SP Batch system. If you wish to continue running the same types of jobs once MUSIC service is discontinued, you will need to make some minor changes to your files once they have been transferred to your CMS User-ID. The following suggestions will help you to convert a MUSIC file that was used to submit a job to MVS batch processing into a file suitable for submitting from CMS.

First, remove the first two lines from the MUSIC file. These lines should be:

/INC OSJE
RETURN

Your JOB statement will then be the first line in the new file. Immediately following the JOB statement enter the following two lines:

/*ROUTE PRINT UNTVM1.userid
/*ROUTE PUNCH UNTVM1.userid

where "userid" is your CMS User-ID

These two lines should be used if you want the output from the batch run to return to your virtual machine's reader. If you want the output to go directly to the printer replace the UNTVM1.userid designation with LASER (for the ISB 133 printer) or with BA (for the COBA printer).

Submitting Jobs from CMS to MVS/SP

To submit the job to MVS, type SUBMIT fn ft fm from a clear screen, or place the cursor by the selected file in a FILELIST and type SUBMIT in the command field. The system will respond with the message:

CMS/MVSSP JOB SUBMISSION INTERFACE
1 --- nn RECORDS SUBMITTED TO MVSSP

If the file you submit is very large, you may need to submit your job by typing TO MVSSP fn ft fm or by placing the cursor by the selected file in a Filelist and typing TO MVSSP in the command field.

Note: SUBMIT will support /INC statements to include the contents of a different file within the job that is submitted:

/INCLUDE fn ft fm
or
/INC fn ft fm

TO MVSSP does not support /INCLUDE statements.

SUBMITTED files and included files must have a record format of F (Fixed), Variable formatted files may be converted to fixed with the COPY command. Use COPY / (RECFM F in the command field in FILELIST for a file you wish to convert. TO MVSSP does not have the record format restriction.

Retrieving Jobs from MVS/SP

After the job is executed and the output returned to your CMS machine, the system responds with the message:

FILE (nnnn) SPOOLED TO userid

To view the output file, type RDRLIST and place the cursor beside the file that you want to view. You can then type PEEK in the command field or press <PF1> to look at the file.

If the output is lengthy you can use the command PEEK / (for *) or you can receive the file to your A minidisk in order to view the entire file.

If you want to receive the file to your disk, type RECEIVE in the command field of your RDRLIST or press <PF9>. If you want to discard the file, type DISCARD in the command field. This will cause the file to be purged from your reader queue.

To print a file that has been received type PRINT in the command field beside the file in Filelist. The following two lines should be in your PROFILE EXEC to facilitate printing:

TAG DEV P A CAPMVS REMOTE4
SPOOL PRINTER TO RSCD DIST name

REMOTE1 may replace REMOTE4 to print in the College of Business. Name is an eight character or less name under which your output will be filed.
Office Filing Using WordPerfect

By Norman Howden, Assistant Professor of Library and Information Sciences (howden@lis.unt.edu) and Julie A. Rutter, SLIS Graduate Student (rutter@slab.unt.edu)

Can't find letters or documents you filed last week? Need that handout from last semester? Maybe you need an office filing system.

An office filing system has some basic ingredients that include a list of the files arranged by subject, a list arranged in filing order, and lists of files in each drawer. You also need some scheme for organizing the files in the drawers. The question of a scheme for organizing files is probably solved by our habits, unless they are business office-type files and that is a whole story in itself. In a typical faculty office, there will be files for many of the following:

- Professional organizations
- Tenure & promotion documents
- Research proposals submitted
- University committees
- Classes taught
- Faculty meetings
- Journal articles written
- Funded projects
- Professional committees

A basic degree of organization can be obtained by using distinctive labels for each category of file. When there are only one or two drawers of files, that alone might be enough organization.

We often need quick access to files for hot projects, conferences, and a few busy committees. One solution that might fit your needs is to have a tub file for the most current files. We use a discount store plastic milk crate for that, but you may have a small file drawer in your desk that will work just as well.

To handle more files, it is important to have a contents list so that a file can be found on a moments notice. The instructions that follow show you how to set up such a system. The objective is to have "subject access." We've not only added the possibility of making a list sorted by the first word in the title, but a list based on rotated descriptors. Rotated descriptor lists, called KWICs (key word in context) and KWOCs (key word out of context) have been around since Hans Peter Luhn at IBM introduced them in the late 1950s. A KWIC or KWOC program provides access to each word in the title. In the case of the program presented here, access is provided by rotating the title so each word has a chance to appear at the beginning of a line. The resulting list can be sorted for easy access by key word.

One final word of caution. This approach is based on having file drawers with easily noted labels. In our office there are three large multi-drawer file cabinets. They lend themselves to being called the left, right, and center cabinets and the top drawers are thus labeled L1, C1, or R1 as appropriate. This short notation works well with the filing lists. This also discourages casual passersby from wandering through the files, since there are no labels to give clues as to what is in each drawer. Each of us have a rough notion, and the file list fills in any gaps in knowledge caused by moving files around, which must be done to make room for new materials.

We have created an Office Filing List macro for WordPerfect that is available via Anonymous FTP from ftp.unt.edu (for more information about Anonymous FTP, see the article on page 14). To get the documentation and program files:

1. FTP to ftp.unt.edu
2. At the user name: prompt type anonymous
3. At the password: prompt type guest
4. type cd\pub\misc
5. type get\quickic.doc
6. type binary
7. type get quickkwic quickkwic

If you have any questions, feel free to contact us at 565-2760.
Paul Gandel noted that calls for information or trouble reports should henceforth be made to ext. 23224 (followed by 03 for after-hours emergencies).

Discussion followed, led by Paul Gandel and Bill Buntain regarding existing network support structure in the Computing Center.

When Not to Use ANSI.SYS on Your PC

By Erik Neale, ACS General Access Lab Manager (neale@unt.edu)

Last month, when writing about the new PKZIP (which is now in version 2.04g, by the way), I mentioned the program PKSFANSI which disables ANSI keyboard reassignments. This month, I’ll examine this problem in more detail and offer several solutions. But first, a little background.

Being a BBS system administrator for over three years, I had to deal with the issue of file downloads in significant detail. Sure, there were the usual problems of virus-infected files and trojan programs that really erased your hard disk instead of playing a nifty game. About halfway through my tenure as SYSOP, however, a new type of problem emerged, one that people are still not very familiar with. Some people call it the “ANSI Bomb.”

The ANSI Bomb

Most files available on BBSes are compressed in some manner, either using PKZIP or another compression utility. These compression programs allow the person who created the compressed file to store a message within that file that will be displayed when the file is uncompressed. Many BBS operators took advantage of this feature to advertise their BBSes to people who downloaded these files. Unfortunately, other people saw this as a way to wreak...
havoc, which they did by storing codes within this message that would reprogram a computer's function keys when the message was displayed. This sometimes led to hard disks being reformatted when someone pressed [F3] to recall their last DOS command.

How is this possible? All versions of MS-DOS since 3.0 have come with a file called ANSL.SYS. This file is a device driver that adds additional control over the appearance of the screen and the functionality of keys on the keyboard. By sending "ANSI Escape Sequences" to the computer, the screen color can be changed, the position of the cursor on the screen can be changed, and different commands can be assigned to keys. Using the ANSL.SYS device driver also increases the display speed of the monitor slightly.

Without going into detail, people of "malicious intent" started embedding these ANSI escape sequences into messages displayed when downloaded files were decompressed, and a myriad of results were possible. Though I never saw a file that had malicious codes embedded, I did see files with rather intense ANSI codes embedded that produced colorful displays on my monitor while the file was decompressing. A different set of codes could have wiped me out without my knowing it until it was too late.

Avoiding the Problem

So how is it possible to avoid this problem? On one extreme, simply don't call BBSes, don't download files, and never decompress anything. For that matter, don't even turn the computer on, as it is at its lowest risk of damage when inactive. However, most of us have computers to use them, so this option isn't a very good one.

Another solution is not loading ANSL.SYS as a device driver, thereby disabling the possibility of anything remapping the keyboard. But then, the added screen functionality of ANSL.SYS is lost. PKWare's solution is PKSFANSI, which disables the key-

board remapping functionality of ANSL.SYS without affecting the screen handling capabilities of the driver. As it turns out, though, ANSL.SYS occupies a pretty hefty region of memory when loaded, and its screen output enhancements aren't all that great, so the natural reaction is just to stop using it. Which is exactly what I recommend.

NANSI, FANSI, VANSI, and ZANSI

Over the last few years, I've seen a number of people writing replacements for ANSL.SYS. Their goal for doing so was to greatly improve their screen handling capabilities. There are several reliable ANSI replacements floating around the world today as a result of the effort of these individuals. All of them offer a significant increase in screen display speeds, support for more than 25 lines per page on some monitor systems, and a smaller memory requirement than ANSL.SYS. Plus they have cute names like NANSI, FANSI, VANSI, and ZANSI, just to name a few. Some of them have been built by modifying the code of others to improve speed or add other functionality.

One of the first, and probably the best-known, ANSI replacements was NANSI.SYS by Dan Kegel. His code was used as the basis of the other replacements named above. Both FANSI and ZANSI purport to be faster and smaller than NANSI. VANSI is claimed as a VGA-specific version of NANSI.ZANSI, which is the version I use, is also smaller than NANSI because the author removed the keyboard remapping capabilities of the driver. This is the main reason I use it over any of the others. It's difficult to really tell much difference in the display speeds of the replacements, but the disabled key remapping is absolutely essential to me.

These files can be found on a multitude of BBSes around the country, and those of you with FTP access can get them from the MSDOS mirror at uarchive.wustl.edu. In general, there is no charge for using these programs except in a commercial environment.

Virus Update

Compiled by Claudia Lynch, Benchmarks Editor (as04@unt.edu)

The following information comes from the VIRUS-L Digest.

General

- A FAQ (Frequently Asked Questions) document and all of the back issues of VIRUS-L Digest are available via Anonymous FTP on cert.org (192.88.209.5).

IBM and Compatible PCs

- Independent reviews of PC antiviral products are available via Anonymous FTP on cert.org (192.88.209.5) in the directory pub/virus-l/docs/reviews.
- New F-ProT adds new features (By Eric Neale, ACS General Access Lab Manager and UNT Virus Guru) —The latest release of F-ProT, version 2.07, adds a couple of interesting features that will help prevent the spread of virus to an even greater degree. These features appear as new command line switches to VIRSTOP.EXE. (For full information about VIRSTOP.EXE and the rest of the F-ProT package, please read the .DOC files that come with the distribution file.)
Two General Access Labs Upgrade Hardware

By Timothy Christian, GAB General Access Lab Manager (tim@unt.edu)

The College of Arts and Sciences' General Access Labs are pleased to announce the following hardware upgrades:

<table>
<thead>
<tr>
<th>Location</th>
<th>Old Machine Description</th>
<th>New Machine Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wooten Hall 120</td>
<td>Quantity = 18</td>
<td>Quantity = 18</td>
</tr>
<tr>
<td></td>
<td>XT/Intel 8088/8MHz</td>
<td>AT/Intel 80486/50MHz</td>
</tr>
<tr>
<td></td>
<td>640KB RAM</td>
<td>8 MB RAM</td>
</tr>
<tr>
<td></td>
<td>360KB floppy</td>
<td>1.2 MB floppy</td>
</tr>
<tr>
<td></td>
<td>720KB floppy</td>
<td>1.44 MB floppy</td>
</tr>
<tr>
<td></td>
<td>CGA</td>
<td>Super VGA (1280x1024x256)</td>
</tr>
<tr>
<td></td>
<td>14&quot; monitor</td>
<td>14&quot; monitor</td>
</tr>
<tr>
<td></td>
<td>DOS v3.3</td>
<td>DOS v5.0</td>
</tr>
<tr>
<td></td>
<td></td>
<td>MS 2-button Mouse</td>
</tr>
<tr>
<td>Terrill Hall 247</td>
<td>Quantity = 12</td>
<td>Quantity = 21</td>
</tr>
<tr>
<td></td>
<td>XT/Intel 8088/8MHz</td>
<td>AT/Intel 80486/50MHz</td>
</tr>
<tr>
<td></td>
<td>640KB RAM</td>
<td>8 MB RAM</td>
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<td>360KB floppy</td>
<td>1.44 MB floppy</td>
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<td></td>
<td>14&quot; monitor</td>
<td>14&quot; monitor</td>
</tr>
<tr>
<td></td>
<td>DOS v3.3</td>
<td>DOS v5.0</td>
</tr>
</tbody>
</table>

In the future, we also plan on buying mice for the new machines in Terrill Hall to enable the easy use of Microsoft Windows, XWindows and more. The quantity increase from 12 to 21 machines in Terrill Hall (noted above) is not a typo. These labs are open to all students carrying a valid UNT ID (or current-semester fee receipt with photo identification).

How's That Again?

Here's a definition guaranteed to drive you crazy:

LOOP: See Loop

WordPerfect User's Group

The WordPerfect User's Group continues to meet in the SCS Lab, Chilton Hall 255 from 2-3 p.m. this semester. Meeting dates are:

March 26, April 16, and May 21
PINE E-Mail Package Available on Sol

By Billy Barron, VAX/UNIX Systems Manager (billy@unt.edu)

We have installed the PINE E-mail package on Sol. PINE is somewhat easier to use than Elm, though Elm is better for the power user. We will be supporting both. During Spring Break, we will change the mail command to run PINE instead of Elm. The elm command will run Elm as it always has.

Using MIME/Multimedia E-Mail on Sol and VAX

By Chris Williams, Lead VAX/UNIX Operator/Programmer (egw@unt.edu) and Billy Barron, VAX/UNIX Systems Manager (billy@unt.edu)

Back in the October 1992 issue of Benchmarks, Mark Thacker gave an overview of MIME and the state of Multimedia E-mail. If you do not recall that article, go back and take a look at it. In this article, we will talk about the status of implementation of MIME on campus and on the Internet and how to send MIME E-mail using the Solbourne and VAX.

We now have three e-mail packages (two on Sol and one on VAX) that are somewhat MIME aware. For the packages on Sol, you will need an X Window terminal to view images on your screen. VAX MAIL has no ability to view images. Rumor has it that Pegasus mail will also have MIME support in the next few months.

On the Internet, MIME is supported here and there, but by no means is even close to being universal. For now, it is best to assume that a remote user does not have MIME unless you know otherwise. Note: in all our tests, we used GIF images as the MIME content. Sometimes we added a plaintext message, and we also played with mailto's richtext features.

Sending MIME Mail

- Using PINE on Sol — Type pine at the unix shell prompt. To send a MIME message, type C for “Compose”, and fill in all the proper headers. At the “Attachment” prompt, type in the name of the file you want to send. Of course, since MIME messages can just be PARTS of messages, you can send “normal” text as well. PINE is obviously the easiest to use, being almost exactly like Pegasus Mail, with its “Attachment” header.

- Currently, PINE only recognizes GIF files and everything else will get the format application/octet-stream. All you can do with application/octet-stream is save it to a file. This format is less desirable for the recipient to have to read. PINE appears to have no way to send richtext.

- Using mailto on Sol — mailto is the most configurable MIME message sender, because every user can have their own .mailcap file — the mailcap file describes the various message formats, how to receive them, how to send them, and so on. For example, the following entry means that, for image/gif files, use showpicture to view it, use getfilename GIF (“GIF” is part of the prompt) to include a GIF image, and show “a GIF image” as the description when you type ~* (should be all on one line).

When you’re composing a MIME message using mailto, you type ~* to include a file as a MIME part. This brings up a list of the various file types that mailto knows how to deal with (via /usr/local/etc/mailcap, and the user’s .mailcap (both are read)). Then you type the number of the kind of file you’d like to include, and there you go. Simple.

mailto also supports richtext — bold, italics, indentation, and other fun things you can do to your text. It’s rather neat :-) Type ~? for a list of all the tilde commands you can use. (Most, if not all, of mail’s tilde commands are supported, as well as MIME-related commands.)

A problem with mailto is that there doesn’t seem to be a way to set a default on how long a message can be before it gets split into smaller messages. You can do it with a ~command, but we haven’t found a way to make it a default.

- Using elm on Sol — elm’s MIME support, which comes with version 2.4.p121, is the hardest to use of the MIME utilities available on sol for sending MIME messages. To include a MIME part, put a line in the body of your message in this format (should be all on one line):

    [include file contenttype/subtype encoding]

for example,

    [include foo.gif image/gif base64]
includes the GIF image ‘foo.gif’ and base64’s it. Or, if you want to include a normal text file:

[include foo.txt text/plain]

Now for the bad news. If you specify a file that doesn’t exist, it prints “Include file can’t be accessed” and doesn’t send the mail. In fact, so far we can’t see that it saves a copy of it anywhere for you to try to resend.

* Using VMS Mail on VAX — It’s relatively simple to send MIME mail, but rather ugly everywhere else. To send it, just get into MAIL, and type SEND/FOREIGN file. name. Unfortunately, it sends it with a format of “application/vms-rms” which is not very useful when it comes to reading it.

Receiving MIME Mail

* Using PINE — With PINE, go into I (“Mail Index”), and put the reverse video bar on the message you want to read. PINE doesn’t appear to be able to tell you which messages have MIME contents from this menu, like elm does. However, if the message contains a MIME part, it tells you so, and how to go about viewing it. To view the MIME part, type A. Then PINE will prompt you for the part number to show. (PINE separates a message into “parts”; for example, if there were plaintext, a GIF image, and a JPEG image, plus a signature, that would be four parts. Then it asks you to either view it or save it. RichText is printed directly to the screen.)

* Using Elm — With elm, you know right off if a message has a MIME part in it, because it has an “M” to the left of the message in the message index. When you read it, and get to a non-text part, elm asks you if you’d like to view the picture, and also tells you how to get rid of it, when you’re done. With richtext, it just goes ahead and prints it with the right attribute.

We have also found that PINE decodes richtext much faster and better than elm does. In fact, elm has problems decoding it sometimes. But then, PINE isn’t perfect at it either.

By the way, when elm says it doesn’t know how to deal with a particular MIME format, choosing “1 — See it as text” is *NOT* a good choice if you don’t know what the file is, and it stands a chance of being binary — it DOESN’T mean “see the raw message,” it means “un-base64 it, and show it to me,” which, in the case of sending a GIF from the VAX to sol, ends up as the equivalent of cat pgw.gif, which is quite nasty to wade through, even at Ethernet speeds. The best thing to do then is “2 — Write it to a file,” or “3 — Just skip it.”

* Using VMS Mail — The VAX is the worst-off for reading MIME mail. The VAX doesn’t seem to always understand that a MIME message is really a MIME message, and will quite often go ahead and show you all the grossness that goes on with MIME. This is broken and should not happen. We think it might be the fact that it assumes some of the MIME headers would always be in a specific order, and since they aren’t always, it doesn’t detect that it’s a MIME message. It also doesn’t do richtext at all. Messages with richtext come through looking like:

-<underline>blah
blah
</underline>blah
<n1><n1>
<n1> blah blah blah
/indent

MIME messages come usually as two or more messages on the VAX. The normal text is one message and all the attachments are others. When you do get a MIME attachment, VAX mail says:

You cannot read this foreign format message. Use the EXTRACT command to copy the message to an external file.

Just type EXTRACT and it will save off the MIME attachment as a file.

Summary

We recommend using mailito for sending MIME mail and elm to read it. We recommend against the use of using the VAX to either send or read MIME mail, because it doesn’t do either well. For people who have trouble with powerful utilities, and for first-time users who need to send MIME mail, we suggest using PINE, for both sending and receiving MIME mail. At this time, we also recommend against using elm to send MIME mail, because it is easy to mess up and lose an entire message, if you are not careful.

Over time, we expect all of these utilities to get better with their implementations of MIME. For now, the implementations are good enough to get your feet wet into what MIME is, but should not be considered robust.
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____________________________

Academic Computing Services
The Computing Center
NT Box 13495
University of North Texas
Denton, TX 76203
FAX 817-565-4060

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